BRITISH STANDARD

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13986:2004
+A1:2015
Incorporating corrigendum May 2015

Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking

ICS 79.060.01

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 13986:2004+A1:2015, incorporating corrigendum May 2015. It supersedes BS EN 13986:2004 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by [A1⟩ ⟨A1].

EN 13986 is a "harmonized" European Standard and fully takes into account the requirements of the European Commission mandate M/113, Wood-based panels, given under the Construction Products Regulation (EU) No. 305/2011, and is intended to lead to CE marking.

The UK participation in its preparation was entrusted to Technical Committee B/541, Wood based panels.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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EUROPEAN STANDARD

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English Version

Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking

Panneaux à base de bois destinés à la construction - Caractéristiques, évaluation de conformité et marquage

Holzwerkstoffe zur Verwendung im Bauwesen - Eigenschaften, Bewertung der Konformität und Kennzeichnung

This European Standard was approved by CEN on 8 July 2004 and includes Amendment 1 approved by CEN on 19 January 2015.

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Foreword

This document (EN 13986:2004+A1:2015) 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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by January 2017.

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 includes Amendment 1, approved by CEN on 2015-01-19.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

This document has been prepared under Mandate M/113 given to CEN by the European Commission and the European Free Trade Association, as revised by the Standing Committee on Construction on 14 May 2003 and supports essential requirements of EU Regulations.

For relationship with [A1] Regulation (EU) No. 305/2011 [A1], see the informative Annex ZA, which is an integral part of this document.

This document supersedes [A1] EN 13986:2004 [A1].

[A1] *Deleted text* [A1]

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

1 Scope

This document defines wood-based panels for use in construction and specifies the relevant characteristics and the appropriate test methods to determine these characteristics for wood-based panels, unfaced, overlaid, veneered or coated:

- for internal use as structural components in dry conditions[1)];
- for internal (or protected external) use as structural components in humid conditions[2)];
- for external use as structural components[3)];
- for internal use as non-structural components in dry conditions[1)];
- for internal (or protected external) uses as non structural components in humid conditions[2)];
- for external use as non-structural components[3)];
- for use as structural floor decking on joists in dry[1)] or humid[2)] or external[3)] conditions;
- for use as structural roof decking on joists in dry[1)] or humid[2)] or external[3)] conditions;
- for use as structural wall sheathing on studs in dry[1)] or humid[2)] or external[3)] conditions.

It provides for the evaluation of conformity and the requirements for marking these products.

This document covers wood-based panels in the form of solid wood panels, LVL[4)], plywood, OSB, particleboards (chipboards) either resin- or cement-bonded, wet process fibreboards (hardboards, medium boards, softboards) and dry process fibreboards (MDF) for use in construction. They may contain chemical agents to improve their reaction to fire and their resistance to biological attack, e.g. by fungi and insects.

This document is not intended to be applicable to wood-based panels for use in non-constructional applications.

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 120, *Wood based panels - Determination of formaldehyde content - Extraction method called the perforator method*

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1) Dry conditions are defined in 3.8.2. Boards of this type are suitable for use in biological hazard class 1 of EN 335-3.

2) Humid conditions are defined in 3.8.3. Boards of this type are suitable for use in biological hazard classes 1 and 2 of EN 335-3.

3) Exterior conditions are defined in 3.8.4. Boards of this type are suitable for use in biological hazard classes 1, 2, 3 and 4 of EN 335-3.

4) [A1] *deleted text* [A1]. PrEN 14374 — Timber structures: Laminated Veneer Lumber (LVL), for use as a structural product — is being prepared by CEN/TC 124.

EN 300, *Oriented Strand Boards (OSB) - Definitions, classification and specifications*

EN 309, *Wood particleboards — Definitions and classification*

EN 310, *Wood-based panels - Determination of modulus of elasticity in bending and of bending strength*

EN 312, *Particleboards - Specifications*

EN 313-2, *Plywood - Classification and terminology - Part 2: Terminology*

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

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

EN 316, *Wood fibre boards - Definition, classification and symbols*

EN 317, *Particleboards and fibreboards - Determination of swelling in thickness after immersion in water*

EN 319, *Particleboards and fibreboards - Determination of tensile strength perpendicular to the plane of the board*

EN 321, *Wood-based panels - Determination of moisture resistance under cyclic test conditions*

EN 323, *Wood-based panels - Determination of density*

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*

EN 326-2, *Wood-based panels — Sampling, cutting and inspection — Part 2: Quality control in the factory*

EN 335-1, *Durability of wood and derived products — Definition of hazard classes of biological attack — Part 1: General*

EN 335-2, *Durability of wood and wood-based products — Definition of hazard classes of biological attack — Part 2: Application to solid wood*

EN 335-3, *Durability of wood and wood-based products — Definition of hazard classes of biological attack — Part 3: Application to wood-based panels*

[A1] EN 383, *Timber Structures - Test methods - Determination of embedment strength and foundation values for dowel type fasteners*

EN 594, *Timber structures - Test methods - Racking strength and stiffness of timber frame wall panels* [A1]

EN 596, *Timber structures - Test methods - Soft body impact test of timber framed walls*

EN 622-1, *Fibreboards - Specifications - Part 1: General requirements*

EN 622-2, *Fibreboards - Specifications - Part 2: Requirements for hardboards*

EN 622-3, *Fibreboards - Specifications - Part 3: Requirements for medium boards*

EN 622-4, *Fibreboards - Specifications - Part 4: Requirements for softboards*

[A1] EN 622-5 [A1], *Fibreboards - Specifications - Part 5: Requirements for dry process boards (MDF)*

EN 633, *Cement-bonded particleboards - Definition and classification*

EN 634-2, *Cement-bonded particleboards — Specifications — Part 2: Requirements for OPC bonded particleboards for use in dry, humid and exterior*

EN 636, *Plywood - Specifications*

〚A1〛 EN 717-1 〚A1〛, *Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method*

EN 717-2, *Wood-based panels - Determination of formaldehyde release - Part 2: Formaldehyde release by the gas analysis method*

〚A1〛 EN 789 〚A1〛, *Timber structures - Test methods - Determination of mechanical properties of wood based panels*

EN 1058, *Wood-based panels — Determination of characteristic values of mechanical properties and density*

EN 1087-1, *Particleboards - Determination of moisture resistance - Part 1: Boil test*

〚A1〛 EN 1156 〚A1〛, *Wood-based panels - Determination of duration of load and creep factors*

EN 1195, *Timber structure — Test methods — Performance of structural floor decking*

〚A1〛 EN 1995-1-1 〚A1〛, *Eurocode 5 — Design of timber structures — Part 1-1: General rules and rules for buildings*

〚A1〛 EN 12114, *Thermal performance of buildings - Air permeability of building components and building elements - Laboratory test method* 〚A1〛

EN 12369-1, *Wood-based panels - Characteristic values for structural design - Part 1: OSB, particleboards and fibreboards*

EN 12369-2, *Wood-based panels - Characteristic values for structural design - Part 2: Plywood*

EN 12524, *Building materials and products — Hygrothermal properties — Tabulated design values*

EN 12664, *Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance*

EN 12775, *Solid wood panels - Classification and terminology*

EN 12871, *Wood-based panels — Performance, specification and requirements for load-bearing boards for use in floors, walls, and roofs*

〚A1〛 CEN/TR 12872 〚A1〛, *Wood-based panels - Guidance on the use of load-bearing boards in floors, walls and roofs*

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

CEN/TS 13354, *Solid wood panels — Bonding quality — Test method*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

[A1] EN 14279 [A1], *Laminated Veneer Lumber (LVL) — Specifications, definitions, classification and requirements*

[A1] EN 14755 [A1], *Extruded particleboards - Specifications*

[A1] EN 15197, *Wood-based panels - Flaxboards - Specifications* [A1]

EN ISO 354, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 12572:2001, *Hygrothermal performance of building materials and products - Determination of water vapour transmission properties (ISO 12572:2001)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
wood-based panel
solid wood panel, laminated veneer lumber (LVL), plywood, oriented strand board (OSB), resin-bonded particleboard, cement-bonded particleboard or fibreboard

3.2
solid wood panel (SWP)
wood-based panel as defined in EN 12775 consisting of pieces of timber glued together on their edges and, if multi-layer, on their faces

3.2.1
solid wood panel for internal use as a structural component in dry conditions
solid wood panel incorporating the performance characteristics from 4.1 that are relevant to board type SWP/1 in EN 13353

NOTE The performance characteristics relevant to SWP/1 in structural use and their requirements are given in Table A.1.

3.2.2
solid wood panel for internal use as a structural component in humid conditions
solid wood panel incorporating the performance characteristics from 4.2 that are relevant to board type SWP/2 in EN 13353

NOTE The performance characteristics relevant to SWP/2 in structural use and their requirements are given in Table A.1.

3.2.3
solid wood panel for external use as a structural component
solid wood panel incorporating the performance characteristics from 4.3 that are relevant to board type SWP/3 in EN 13353

NOTE The performance characteristics relevant to SWP/3 in structural use and their requirements are given in Table A.1.

3.2.4
solid wood panel for internal use as a non-structural component in dry conditions
solid wood panel incorporating the performance characteristics from 4.4 that are relevant to board type SWP/1 in EN 13353

NOTE The performance characteristics relevant to SWP/1 in non-structural use and their requirements are given in Table A.1.

3.2.5
solid wood panel for internal use as a non-structural component in humid conditions
solid wood panel incorporating the performance characteristics from 4.5 that are relevant to board type SWP/2 in EN 13353

NOTE The performance characteristics relevant to SWP/2 in non-structural use and their requirements are given in Table A.1.

3.2.6
solid wood panel for external use as a non-structural component
solid wood panel incorporating the performance characteristics from 4.6 that are relevant to board type SWP/3 in EN 13353

NOTE The performance characteristics relevant to SWP/3 in non-structural use and their requirements are given in Table A.1.

3.3
laminated veneer lumber (LVL)
wood-based panel as defined in [A1] EN 14279 [A1] consisting of wood veneers with fibres primarily in the same direction

NOTE The performance characteristics relevant to LVL and their requirements are given in Table A.10.

3.4
plywood
wood-based panel as defined in EN 313-2 consisting of an assembly of layers glued together with the direction of the grain in adjacent layers usually at right angles

3.4.1
plywood for internal use as a structural component in dry conditions
plywood incorporating the performance characteristics from 4.1 that are relevant to plywood in EN 636, type EN 636-1

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.4.2
plywood for internal use as a structural component in humid conditions
plywood incorporating the performance characteristics from 4.2 that are relevant to plywood in EN 636, type EN 636-2

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.4.3
plywood for external use as a structural component
plywood incorporating the performance characteristics from 4.3 that are relevant to plywood in EN 636, type EN 636-3

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.4.4
plywood for internal use as a non-structural component in dry conditions
plywood incorporating the performance characteristics from 4.4 that are relevant to plywood in EN 636, type EN 636-1

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.4.5
plywood for internal use as a non-structural component in humid conditions
plywood incorporating the performance characteristics from 4.5 that are relevant to plywood in EN 636, type EN 636-2

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.4.6
plywood for external use as a non-structural component
plywood incorporating the performance characteristics from 4.6 that are relevant to plywood in EN 636, type EN 636-3

NOTE The performance characteristics relevant to this type of plywood and their requirements are given in Table A.2.

3.5
oriented strand board (OSB)
wood-based panel as defined in EN 300 as a multi-layered board made from strands of wood of a predetermined shape and thickness together with a binder. The strands in the external layers are aligned and parallel to the board length or width; the strands in the centre layer or layers can be randomly oriented, or aligned, generally at right angles to the strands of the external layers

3.5.1
OSB for internal use as a structural component in dry conditions
incorporating the performance characteristics from 4.1 that are relevant to board type OSB/2 in EN 300

NOTE The performance characteristics relevant to type OSB/2 and their requirements are given in Table A.3.

3.5.2
OSB for internal use as a structural component in humid conditions
incorporating the performance characteristics from 4.2 that are relevant to board type OSB/3 (general structural use) or OSB/4 (heavy duty) in EN 300

NOTE 1 The performance characteristics relevant to type OSB/3 and OSB/4 and their requirements are given in Table A.3.

NOTE 2 A revision of EN 300 is under development to cover also boards with a thickness of more than 25 mm. The requirements for these boards will become applicable as soon as the revised EN 300 is published.

3.5.3
OSB for internal use as a non-structural component in dry conditions
incorporating the performance characteristics from 4.4 that are relevant to board type OSB/1 in EN 300

NOTE The performance characteristics relevant to type OSB/1 and their requirements are given in Table A.3.

3.5.4
OSB for internal use as a non-structural component in humid conditions
incorporating the performance characteristics from 4.5 that are relevant to board type OSB/3 in EN 300

NOTE 1 The performance characteristics relevant to type OSB/3 and their requirements are given in Table A.3.

NOTE 2 A revision of EN 300 is under development to cover also boards with a thickness of more than 25 mm. The requirements for these boards will become applicable as soon as the revised EN 300 is published.

3.6
particleboard
(see: resin-bonded particleboard, cement-bonded particleboard)

3.6.1
resin-bonded particleboard
wood-based panel as defined in EN 309 manufactured under pressure and heat from particles of wood (wood flakes, chips, shavings, sawdust and similar) and/or other lignocellulosic material in particle form (flax shives, hemp shives, bagasse fragments and similar) with the addition of an adhesive

3.6.1.1
resin-bonded particleboard for internal use as a structural component in dry conditions
resin-bonded particleboard incorporating the performance characteristics from 4.1 that are relevant to board type P4 or types having higher levels of performance in EN 312

NOTE The performance characteristics relevant to type P4 and higher and their requirements are given in Table A.4.

3.6.1.2
resin-bonded particleboard for internal use as a structural component in humid conditions
resin-bonded particleboard incorporating the performance characteristics from 4.2 that are relevant to board type P5 or P7

NOTE The performance characteristics relevant to types P5 and P7 and their requirements are given in Table A.4.

3.6.1.3
resin-bonded particleboard for internal use as a non-structural component in dry conditions
resin-bonded particleboard incorporating the performance characteristics from 4.4 that are relevant to board type P1 or types having higher levels of performance in EN 312

NOTE The performance characteristics relevant to type P1 and higher and their requirements are given in Table A.4.

3.6.1.4
resin-bonded particleboard for internal use as a non-structural component in humid conditions
resin-bonded particleboard incorporating the performance characteristics from 4.5 that are relevant to board type P3, P5 or P7

NOTE The performance characteristics relevant to types P3, P5 and P7 and their requirements are given in Table A.4.

3.6.1.5
extruded particleboard for internal use as a non-structural component in dry conditions
resin-bonded particleboard incorporating the performance characteristics from 4.4 that are relevant to board types ES, ET, ESL or ETL in [A1] EN 14755 [A1]

NOTE The performance characteristics relevant to types ES, ET, ESL and ETL and their requirements are given in Table A.4.

3.6.2
cement-bonded particleboard
wood-based panel as defined in EN 633, manufactured under pressure, based on wood or other vegetable particles bonded with hydraulic cement and possibly containing additives

3.6.2.1
cement-bonded particleboard for use in dry, humid and external conditions
cement-bonded particleboard incorporating the performance characteristics from Clause 4 that are relevant to cement-bonded particleboard in EN 634-2

NOTE The performance characteristics relevant to cement-bonded particleboard and their requirements are given in Table A.5.

3.7
fibreboard
wood-based panel as defined in EN 316 with a nominal thickness of 1,5 mm or greater, manufactured from lignocellulosic fibres with application of heat and/or pressure. The bond is derived from either

- the felting of the fibres and their inherent adhesive properties, or
- from a synthetic binder added to the fibres

Other additives can be included

3.7.1
hardboard
fibreboard as defined in EN 316 having a density of ≥ 900 kg/m^3, manufactured from lignocellulosic fibre by the "wet process", i.e. having a fibre moisture content of more than 20 % at the forming stage and being produced under heat and pressure

3.7.1.1
hardboard for internal use as a structural component in dry conditions
hardboard incorporating the performance characteristics from 4.1 that are relevant to board type HB.LA in EN 622-2

NOTE The performance characteristics relevant to type HB.LA and their requirements are given in Table A.6.

3.7.1.2
hardboard for internal use as a structural component in humid conditions
hardboard incorporating the performance characteristics from 4.2 that are relevant to board type HB.HLA1 or HB.HLA2 in EN 622-2

NOTE The performance characteristics relevant to type HB.HLA1 and HB.HLA2 and their requirements are given in Table A.6.

3.7.1.3
hardboard for internal use as a non-structural component in dry conditions
hardboard incorporating the performance characteristics from 4.4 that are relevant to board type HB in EN 622-2

NOTE The performance characteristics relevant to type HB and their requirements are given in Table A.6.

3.7.1.4
hardboard for internal use as a non-structural component in humid conditions
hardboard incorporating the performance characteristics from 4.5 that are relevant to board type HB.H in EN 622-2

NOTE The performance characteristics relevant to type HB.H and their requirements are given in Table A.6.

3.7.1.5
hardboard for external use as a non-structural component
hardboard incorporating the performance characteristics from 4.6 that are relevant to board type HB.E in EN 622-2

NOTE The performance characteristics relevant to type HB.E and their requirements are given in Table A.6.

3.7.2
medium board
fibreboard as defined in EN 316 having a density of ≥ 400 kg/m^3 to < 900 kg/m^3, manufactured from lignocellulosic fibres by the "wet process", i.e. having a moisture content of more than 20 % at the forming

stage and being produced under heat and pressure. Low density medium boards have a density range of 400 kg/m^3 to < 560 kg/m^3 and high density medium boards have a density range of 560 kg/m^3 to < 900 kg/m^3.

3.7.2.1
medium board for internal use as a structural component in dry conditions
medium board incorporating the performance characteristics from 4.1 that are relevant to board type MBH.LA1 (general structural use) or MBH.LA2 (heavy duty) in EN 622-3

NOTE The performance characteristics relevant to type MBH.LA1 and MBH.LA2 and their requirements are given in Table A.7.

3.7.2.2
medium board for internal use as a structural component in humid condtions
medium board incorporating the performance characteristics from 4.2 that are relevant to board type MBH.HLS1 (general structural use) or MBH.HLS2 (heavy duty) in EN 622-3

NOTE The performance characteristics relevant to type MBH.HLS1 and MBH.HLS2 and their requirements are given in Table A.7.

3.7.2.3
medium board for internal use as a non-structural component in dry conditions
medium board incorporating the performance characteristics from 4.4 that are relevant to board type MBL or type MBH in EN 622-3

NOTE The performance characteristics relevant to types MBL and MBH and their requirements are given in Table A.7.

3.7.2.4
medium board for internal use as a non-structural component in humid conditions
medium board incorporating the performance characteristics from 4.5 that are relevant to board type MBL.H or type MBH.H in EN 622-3

NOTE The performance characteristics relevant to types MBL.H and MBH.H and their requirements are given in Table A.7.

3.7.2.5
medium board for external use as a non-structural component
medium board incorporating the performance characteristics from 4.6 that are relevant to board type MBL.E or type MBH.E in EN 622-3

NOTE The performance characteristics relevant to types MBL.E and MBH.E and their requirements are given in Table A.7.

3.7.3
softboard
fibreboard as defined in EN 316 having a density of < 400 kg/m^3, manufactured from lignocellulosic fibres by the “wet process”, i.e. having a fibre moisture content of more than 20 % at the forming stage and being produced under heat and pressure

3.7.3.1
softboard for internal use as a structural component in dry conditions
softboard incorporating the performance characteristics from 4.1 that are relevant to board type SB.LS in EN 622-4

NOTE The performance characteristics relevant to type SB.LS and their requirements are given in Table A.8.

3.7.3.2
softboard for internal use as a strucutural component in humid conditions
softboard incorporating the performance characteristics from 4.2 that are relevant to board type SB.HLS in EN 622-4

NOTE The performance characteristics relevant to type SB.HLS and their requirements are given in Table A.8.

3.7.3.3
softboard for internal use as a non-structural component in dry conditions
softboard incorporating the performance characteristics from 4.4 that are relevant to board type SB in EN 622-4

NOTE The performance characteristics relevant to type SB and their requirements are given in Table A.8.

3.7.3.4
softboard for internal use as a non-structural component in humid conditions
softboard incorporating the performance characteristics from 4.5 that are relevant to board type SB.H in EN 622-4

NOTE The performance characteristics relevant to type SB.H and their requirements are given in Table A.8.

3.7.3.5
softboard for external use as a non-structural component
softboard incorporating the performance characteristics from 4.6 that are relevant to board type SB.E in EN 622-4

NOTE The performance characteristics relevant to type SB.E and their requirements are given in Table A.8.

3.7.4
dry-process fibreboard (MDF)
wood-based panel as defined in EN 316 manufactured from lignocellulosic fibres by the “dry process”, i.e. having a fibre moisture content less than 20 % at the forming stage and being essentially produced under heat and pressure with the addition of an adhesive

3.7.4.1
MDF for internal use as a structural component in dry conditions
MDF incorporating the performance characteristics from 4.1 that are relevant to board type MDF.LA in [A1] EN 622-5 [A1]

NOTE The performance characteristics relevant to type MDF.LA and their requirements are given in Table A.9.

3.7.4.2
MDF for internal use as a structural component in humid conditions
MDF incorporating the performance characteristics from 4.2 that are relevant to board type MDF.HLS in [A1] EN 622-5 [A1]

NOTE The performance characteristics relevant to type MDF.HLS and their requirements are given in Table A.9.

3.7.4.3
MDF for internal use as a non-structural component in dry conditions
MDF incorporating the performance characteristics from 4.4 that are relevant to board type MDF in [A1] EN 622-5 [A1]

NOTE The performance characteristics relevant to type MDF and their requirements are given in Table A.9.

3.7.4.4
MDF for internal use as a non-structural component in humid conditions
MDF incorporating the performance characteristics from 4.5 that are relevant to board type MDF.H in [A1] EN 622-5 [A1]

NOTE The performance characteristics relevant to type MDF.H and their requirements are given in Table A.9.

3.7.4.5
MDF for internal use as non-structural component in rigid underlays in roofs and walls in humid conditions
MDF incorporating the performance characteristics from 4.5 that are relevant to type MDF.RWH in [A1] EN 622-5 [A1]

NOTE 1 Requirements for MDF.RWH will be specified in a revision of [A1] EN 622-5 [A1]. MDF.RWH will not be covered by this document until the revised [A1] EN 622-5 [A1]is published.

NOTE 2 The performance characteristics relevant to type MDF.RWH and their requirements are given in Table A.9.

3.7.4.6
UL-MDF for internal use as non-structural component in dry conditions
Ultra-light MDF incorporating the performance characteristics from 4.4 that are relevant to type UL-MDF in [A1] EN 622-5 [A1]

NOTE 1 Requirements for UL-MDF will be specified in a revision of [A1] EN 622-5 [A1]. UL-MDF will not be covered by this document until [A1] EN 622-5 [A1]is published.

NOTE 2 The performance characteristics relevant to type UL-MDF and their requirements are given in Table A.9.

3.7.4.7
L-MDF for internal use as non-structural component in dry conditions
Light MDF incorporating the performance characteristics from 4.4 that are relevant to type L-MDF in [A1] EN 622-5 [A1]

NOTE 1 Requirements for L-MDF will be specified in a revision of [A1] EN 622-5 [A1]. L-MDF will not be covered by this document until [A1] EN 622-5 [A1]is published.

NOTE 2 The performance characteristics relevant to type L-MDF and their requirements are given in Table A.9.

3.7.4.8
L-MDF for internal use as non-structural component in humid conditions
Light MDF incorporating the performance characteristics from 4.5 that are relevant to type L-MDF.H in [A1] EN 622-5 [A1]

NOTE 1 Requirements for L-MDF.H will be specified in a revision of [A1] EN 622-5 [A1]. L-MDF.H will not be covered by this document until [A1] EN 622-5 [A1]is published.

NOTE 2 The performance characteristics relevant to type L-MDF.H and their requirements are given in Table A.9.

3.8
general terms:

3.8.1
structural use
use of a panel under load-bearing conditions as part of a building or other construction

3.8.2
dry conditions
conditions corresponding to service class 1 of [A1] EN 1995-1-1 [A1] which is characterised by a moisture content in the material corresponding to a temperature of 20 °C and a relative humidity of the surrounding air only exceeding 65 % for a few weeks per year

3.8.3
humid conditions
conditions corresponding to service class 2 of [A1] EN 1995-1-1 [A1] which is characterised by a moisture content in the material corresponding to a temperature of 20 °C and a relative humidity of the surrounding air only exceeding 85 % for a few weeks per year

3.8.4
external conditions
conditions corresponding to service class 3 of [A1] EN 1995-1-1 [A1] which is characterised by climatic conditions leading to higher moisture contents than in service class 2

3.8.5
technical class
class of product performance included in a standard for the purpose of relating product performance to its intended use

3.8.6
reaction to fire
response of a product in contributing by its own decomposition to a fire to which it is exposed, under specified conditions [EN 13501-1:2002]

3.8.7
unfaced panel
wood-based panel without overlaid, coated or veneered surfaces

3.8.8
overlaid panel
wood-based panel surfaced with one or more overlay sheets or films, for example impregnated paper, plastics, resin film, metal

3.8.9
coated panel
wood-based panel surfaced with a coating, normally applied in liquid form, for functional or decorative purposes

3.8.10
veneered panel
wood-based panel overlaid with a veneer

3.8.11
structural floor decking
a flooring assembly of wood-based panels supported on joists over which the decking spans

NOTE Performance characteristics are given in EN 12871.

3.8.12
structural wall sheathing
wood-based panel capable of providing mechanical resistance to a wall structure

NOTE Performance characteristics are given in EN 12871.

3.8.13
structural roof decking
an assembly of wood-based panels supported on joists over which the roof decking spans

NOTE Performance characteristics are given in EN 12871.

4 Performance characteristics required for wood-based panels for use in construction

4.1 Wood-based panels for internal use as structural components in dry conditions

The performance characteristics 1 to 6 for the respective panel products shall be determined according to the clauses quoted in Table 1 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (〚A1〛 7 to 17 〚A1〛 of Table 1) shall be determined only if required.

Table 1 — Performance characteristics for wood-based panels for internal use as structural components in dry conditions

No.	Performance characteristic	Solid wood panel	Plywood and LVL	OSB	Particleboard	Cement-bonded particleboard	Fibreboard
1	Bending strength	5.1					
2	Bending stiffness (Modulus of Elasticity)	5.2					
3	Bonding quality	5.3		—			
4	Internal bond (Tensile strength)	—		5.4			
5	Durability (Swelling in thickness)	—		5.5			
6	Release of formaldehyde	5.7					
7	Reaction to fire	5.8					
8	Water vapour permeability	5.9					
9	Airborne sound insulation	5.10					
10	Sound absorption	5.11					
11	Thermal conductivity	5.12					
12	Strength and stiffness for structural use	5.13					
13	Mechanical durability	5.16					
14	Biological durability	5.17					
15	Content of pentachlorophenol	5.18					
〚A1〛 16	Racking resistance	5.15.3					
17	Embedment strength	5.19 〚A1〛					

NOTE Performance characteristics for wood-based panels for use as structural floor and roof decking on joists as well as structural wall sheathing on studs are given in Table 7.

4.2 Wood-based panels for internal use as structural components in humid conditions

The performance characteristics 1 to 7 for the respective panel products shall be determined according to the clauses quoted in Table 2 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (〈A1〉 8 to 18 〈A1〉 of Table 2) shall be determined only if required.

Table 2 — Performance characteristics for wood-based panels for internal use as structural components in humid conditions

No.	Performance characteristic	Solid wood panel	Plywood and LVL	OSB	Particleboard	Cement-bonded particleboard	Fibreboard[a]
1	Bending strength	5.1					
2	Bending stiffness (Modulus of Elasticity)	5.2					
3	Bonding quality	5.3		—			
4	Internal bond (Tensile strength)	—		5.4			
5	Durability (Swelling in thickness)	—		5.5			
6	Durability (Moisture resistance)	5.6.5		5.6.1	5.6.2	5.6.3	5.6.4
7	Release of formaldehyde	5.7					
8	Reaction to fire	5.8					
9	Water vapour permeability	5.9					
10	Airborne sound insulation	5.10					
11	Sound absorption	5.11					
12	Thermal conductivity	5.12					
13	Strength and stiffness for structural use	5.13					
14	Mechanical durability	5.16					
15	Biological durability	5.17					
16	Content of pentachlorophenol	5.18					
〈A1〉 17	Racking resistance	5.15.3					
18	Embedment strength	5.19 〈A1〉					

NOTE Performance characteristics for wood-based panels for use as structural floor and roof decking on joists as well as structural wall sheathing on studs are given in Table 7.

[a] In these climatic conditions, the use of high density medium boards (MBH) and of dry process fibreboards (MDF) for structural components is restricted to instantaneous or short-term load durations only.

4.3 Wood-based panels for external use as structural components

The performance characteristics 1 to 7 for the respective panel products shall be determined according to the clauses quoted in Table 3 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (〈A1〉 8 to 18 〈A1〉 of Table 3) shall be determined only if required.

Table 3 — Performance characteristics for wood-based panels for external use as structural components

No.	Performance characteristic	Solid wood panel	Plywood and LVL	Cement-bonded particleboard
1	Bending strength	5.1		
2	Bending stiffness (Modulus of elasticity)	5.2		
3	Bonding quality	5.3		—
4	Internal bond (Tensile strength)	—		5.4
5	Durability (Swelling in thickness)	—		5.5
6	Durability (Moisture resistance)	5.6.5		5.6.3
7	Release of formaldehyde	5.7		
8	Reaction to fire	5.8		
9	Water vapour permeability	5.9		
10	Airborne sound insulation	5.10		
11	Thermal conductivity	5.12		
12	Strength and stiffness for structural use	5.13		
13	Mechanical durability	5.16		
14	Biological durability	5.17		
15	Content of pentachlorophenol	5.18		
〈A1〉 16	Air permeability	5.20		
17	Racking resistance	5.15.3		
18	Embedment strength	5.19 〈A1〉		
These wood-based panels should be used out of direct contact with the ground, soil or water.				
〈A1〉 NOTE 1 〈A1〉 Performance characteristics for wood-based panels for use as structural floor and roof decking on joists as well as structural wall sheathing on studs are given in Table 7.				
〈A1〉 NOTE 2 Air permeability is relevant only for use as wind barriers. 〈A1〉				

4.4 Wood-based panels for internal use as non-structural components in dry conditions

The performance characteristics 1 to 4 for the respective panel products shall be determined according to the clauses quoted in Table 4 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (5 to 11 of Table 4) shall be determined only if required.

Table 4 — Performance characteristics for wood-based panels for internal use as non-structural components in dry conditions

No.	Performance characteristic	Solid wood panel	Plywood and LVL	OSB	Particleboard	Cement-bonded particleboard	Fibreboard
1	Durability against ageing (Bending strength)	—	5.1				
2	Bonding quality	5.3		—			
3	Internal bond (Tensile strength)	—		5.4			
4	Release of formaldehyde	5.7					
5	Reaction to fire	5.8					
6	Water vapour permeability	5.9					
7	Airborne sound insulation	5.10					
8	Sound absorption	5.11					
9	Thermal conductivity	5.12					
10	Biological durability	5.17					
11	Content of pentachlorophenol	5.18					

4.5 Wood-based panels for internal use as non-structural components in humid conditions

The performance characteristics 1 to 6 for the respective panel products shall be determined according to the clauses quoted in Table 5 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (7 to 13 of Table 5) shall be determined only if required.

Table 5 — Performance characteristics for wood-based panels for internal use as non-structural components in humid conditions

No.	Performance characteristic	Solid wood panel	Plywood and LVL	OSB	Particleboard	Cement-bonded particleboard	Fibreboard
1	Durability against ageing (Bending strength)	—	5.1				
2	Bonding quality	5.3		—			
3	Internal bond (Tensile strength)	—		5.4			
4	Durability (Swelling in thickness)	—		5.5			
5	Durability (Moisture resistance)	5.6.5		5.6.1	5.6.2	5.6.3	5.6.4
6	Release of formaldehyde	5.7					
7	Reaction to fire	5.8					
8	Water vapour permeability	5.9					
9	Airborne sound insulation	5.10					
10	Sound absorption	5.11					
11	Thermal conductivity	5.12					
12	Biological durability	5.17					
13	Content of pentachlorophenol	5.18					

4.6 Wood-based panels for external use as non-structural components

The performance characteristics 1 to 5 for the respective panel products shall be determined according to the clauses quoted in Table 6 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics (〈A1〉 6 to 12 〈A1〉 of Table 6) shall be determined only if required.

Table 6 — Performance characteristics for wood-based panels for external use as non-structural components

No.	Performance characteristic	Solid wood panel[a]	Plywood[a] and LVL[a]	Cement-bonded particleboard	Fibreboard[a, b]
1	Durability against ageing (Bending strength)	—	5.1		
2	Bonding quality	5.3		—	
3	Internal bond (Tensile strength)	—		5.4	
4	Durability (Moisture resistance)	5.6.5		5.6.3	5.6.4
5	Release of formaldehyde	5.7			
6	Reaction to fire	5.8			
7	Water vapour permeability	5.9			
8	Airborne sound insulation	5.10			
9	Thermal conductivity	5.12			
10	Biological durability	5.17			
11	Content of pentachlorophenol	5.18			
[A1] 12	Air permeability	5.20 [A1]			

[A1] NOTE Air permeability is relevant only for use as wind barriers. [A1]

[a] These wood-based panels should be used out of direct contact with the ground, soil or water.

[b] These wood-based panels may only be used in exterior conditions if a treatment of proven exterior durability (coating or otherwise) has been applied to the relevant surfaces and edges.

4.7 Wood-based panels for use as structural floor and roof decking on joists and as structural wall sheathing on studs

The performance characteristics 1 to 7 for the respective panel products shall be determined according to the clauses quoted in Table 7 in order to ensure that the specification requirements of the wood-based panels, as defined under Clause 3, are fulfilled (see Annex A) and that the formaldehyde classification is established (see Annex B). The other performance characteristics ([A1] 8 to 20 [A1] of Table 7) shall be determined only if required.

Table 7 — Performance characteristics for wood-based panels for use as structural floor and roof decking on joists as well as structural wall sheathing on studs

No.	Performance characteristic	Solid wood panel	Plywood and LVL	OSB	Particleboard	Cement-bonded particleboard	Fibreboard
1	Bending strength	5.1					
2	Bending stiffness (Modulus of Elasticity)	5.2					
3	Bonding quality	5.3		—			
4	Internal bond (Tensile strength)	—		5.4			
5	Durability (Swelling in thickness)	—		5.5			
6	Durability (Moisture resistance)[a]	5.6.5		5.6.1	5.6.2	5.6.3	5.6.4
7	Release of formaldehyde	5.7					
8	Reaction to fire	5.8					
9	Water vapour permeability	5.9					
10	Airborne sound insulation	5.10					
11	Sound absorption	5.11					
12	Thermal conductivity	5.12					
13	Strength and stiffness for structural use	5.13					
14	Impact resistance for structural use	5.14					
15	Strength and stiffness under point load for structural use[b]	5.15					
16	Mechanical durability	5.16					
17	Biological durability	5.17					
18	Content of pentachlorophenol	5.18					
〈A1〉 19	Racking resistance	5.15.3					
20	Embedment strength	5.19 〈A1〉					

[a] For end uses under humid conditions only.

[b] For structural floor or roof decking on joists only.

[A1]

4.8 Other dangerous substances

National regulations on dangerous substances may require, when construction products covered by this standard are placed on those markets, verification and declaration on release, and sometimes on content, of other substances than those already covered in other clauses of this standard.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction web site on EUROPA accessed through:

http://ec.europa.eu/enterprise/construction/cpd-ds/

[/A1]

5 Determination of the performance characteristics

This clause gives the methods for determining the performance characteristics listed in Tables 1 to 7.

5.1 Bending strength

The bending strength shall be determined according to EN 310, except for solid wood panels which shall be tested according to [A1] EN 789 [/A1]and for extruded particleboards which shall be tested according to [A1] EN 14755 [/A1]. The results shall be expressed as a 5 percentile value according to EN 326-1.

5.2 Bending stiffness (Modulus of elasticity)

The modulus of elasticity in bending shall be determined according to EN 310 except for solid wood panels which shall be tested according to [A1] EN 789 [/A1]. The results shall be expressed as a 5 percentile value according to EN 326-1.

5.3 Bonding quality

The bonding quality of solid wood panels shall be determined and the results expressed according to CEN/TS 13354. The bonding quality of plywood shall be determined according to EN 314-1 and the results expressed according to EN 314-2.

The bonding quality of LVL shall be determined according to [A1] EN 14279 [/A1].

5.4 Internal bond (Tensile strength)

For OSB, particleboard, cement-bonded particleboard, and fibreboard, the tensile strength perpendicular to the plane of the board shall be determined according to EN 319, except for extruded particleboards which shall be tested according to [A1] EN 14755 [/A1]. The result shall be expressed as a 5 percentile value according to EN 326-1.

5.5 Durability (Swelling in thickness)

The swelling in thickness shall be determined according to EN 317 and expressed as a 95 percentile value, according to EN 326-1.

5.6 Durability (Moisture resistance)

5.6.1 OSB

5.6.1.1 The durability against moisture shall be determined by measuring the residual bending strength after the cyclic test EN 321 (see 5.6.1.2) and by measuring the residual internal bond after either the humid cyclic test EN 321 or the boil test EN 1087-1 as modified by EN 300 (see 5.6.1.3).

5.6.1.2 The residual bending strength after the cyclic test specified in EN 321 shall be determined according to EN 310 and expressed as a 5 percentile value according to EN 326-1.

5.6.1.3 The residual internal bond shall be determined according to EN 319 after either the cyclic test specified in EN 321, or the boil test specified in EN 1087-1 as modified by EN 300. The result shall be expressed as a 5 percentile value according to EN 326-1.

5.6.2 Particleboard

5.6.2.1 The durability against moisture shall be determined either according to EN 321 (see 5.6.2.2) or according to EN 1087-1 (see 5.6.2.3).

5.6.2.2 If the durability against moisture is determined according to EN 321, the results shall be expressed as:

— a 5 percentile value according to EN 326-1 for the residual internal bond, determined according to EN 319, and

— a 95 percentile value according to EN 326-1 for the residual swelling in thickness determined according to EN 317.

5.6.2.3 If the durability against moisture is determined according to EN 1087-1, the results shall be expressed as a 5 percentile value according to EN 326-1 for the residual internal bond, determined according to EN 319.

5.6.3 Cement-bonded particleboard

The durability against moisture shall be determined by testing both the internal bond and the swelling in thickness after the cyclic test EN 321. The results shall be expressed as:

— a 5 percentile value according to EN 326-1 for the residual internal bond determined according to EN 319, and

— a 95 percentile value according to EN 326-1 for the residual swelling in thickness determined according to EN 317.

5.6.4 Fibreboard

5.6.4.1 Hardboard for general purpose and load-bearing applications and high density medium boards for load-bearing applications

The durability against moisture of HB.H, HB.HLA1 and MBH.HLS1 (for use in humid conditions) and of HB.E (for use in exterior conditions) shall be determined according to EN 1087-1, as modified by EN 622-2 or EN 622-3 respectively. The results shall be expressed as a 5 percentile value according to EN 326-1 for the residual internal bond values determined according to EN 319.

a) either without the need for further testing (CWFT), as given in Table 8[5)], if the panel meets the material characteristics and the end use conditions given therein,

b) or based on testing of the panel according to the relevant test methods, given in standards referred to in EN 13501-1, when the panel does not meet the requirements of Table 8 or where a higher classification than the one in a) is sought.

When the option b) is applied and where required by the test method, the panels shall be mounted and fixed in a manner representative of its intended end use.

Table 8 — Classes of reaction to fire performance for wood-based panels

Product	EN product standard	End use condition [f]	Minimum density kg/m^3	Minimum thickness mm	Class [g] (excluding floorings)	Class [h] (floorings)
Cement-bonded particleboard[a]	EN 634-2	without an air gap behind the panel	1000	10	B-S1, d0	B_{fl}-s1
Fibreboard, hard [a]	EN 622-2		900	6	D-s2,d0	D_{fl}-s1
Fibreboard, hard [c]	EN 622-2	with a closed air gap not more than 22 mm behind the wood-based panel	900	6	D-s2,d2	-
Particleboard [abe]	EN 312	without an air gap behind the wood-based panel	600	9	D-s2,d0	D_{fl}-s1
Fibreboard, hard and medium [abe]	EN 622-2 EN 622-3					
MDF [abe]	EN 622-5					
OSB [abe]	EN 300					
Plywood [abe]	EN 636		400	9	D-s2,d0	D_{fl}-s1
Solid wood panel [abe]	EN 13353			12		
Flaxboard[abe]	EN 15197		450	15	D-s2,d0	D_{fl}-s1
Particleboard[ce]	EN 312	with a closed or an open air gap not more than 22 mm behind the wood-based panel	600	9	D-s2,d2	-
Fibreboard, hard and medium [ce]	EN 622-2 EN 622-3					
MDF [ce]	EN 622-5					
OSB [ce]	EN 300					
Plywood [ce]	EN 636		400	9	D-s2,d2	-
Solid wood panel [ce]	EN 13353			12		
Particleboard [de]	EN 312	with a closed air gap behind the wood-based panel	600	15	D-s2,d0	D_{fl}-s1
Fibreboard, medium [de]	EN 622-3					
MDF [de]	EN 622-5					
OSB [de]	EN 300					
Plywood [de]	EN 636		400	15	D-s2,d1	D_{fl}-s1
Solid wood panel [de]	EN 13353				D-s2,d0	

5) This table is the same as Table 1 of Commission Decision 2003/43/EC of 17 January 2003 (OJEU L13 of 18.1.2003) corrected by Corrigendum (OJEU L33 of 8-2-2003) and amended by Commission Decision 2007/348/EC of 15 May 2007 (OJEU L131 of 23-05-2007)

Product	EN product standard	End use condition [f]	Minimum density kg/m^3	Minimum thickness mm	Class [g] (excluding floorings)	Class [h] (floorings)
Flaxboard [d e]	EN 15197		450	15	D-s2,d0	D_{fl}-s1
Particleboard [d e]	EN 312	with an open air gap behind the wood-based panel	600	18	D-s2,d0	D_{fl}-s1
Fibreboard, medium [d e]	EN 622-3					
MDF [d e]	EN 622-5					
OSB [d e]	EN 300					
Plywood [d e]	EN 636		400	18	D-s2,d0	D_{fl}-s1
Solid wood panel [d e]	EN 13353					
Flaxboard [d e]	EN 15197		450	18	D-s2,d0	D_{fl}-s1
Particleboard [e]	EN 312	any	600	3	E	Efl
OSB [e]	EN 300					
MDF [e]	EN 622-5		400	3	E	Efl
			250	9	E	Efl
Plywood [e]	EN 636		400	3	E	Efl
Fibreboard, hard [e]	EN 622-2		900	3	E	Efl
Fibreboard, medium [e]	EN 622-3		400	9	E	Efl
Fibreboard, soft	EN 622-4		250	9	E	Efl

[a] Mounted without an air gap directly against class A1 or A2-s1, d0 products with minimum density 10kg/m^3 or at least class D-s2, d2 products with minimum density 400 kg/m^3.

[b] A substrate of cellulose insulation material of at least class E may be included if mounted directly against the wood-based panel, but not for floorings.

[c] Mounted with an air gap behind. The reverse face of the cavity shall be at least class A2-s1, d0 products with minimum density 10 kg/m^3.

[d] Mounted with an air gap behind. The reverse face of the cavity shall be at least class D-s2, d2 products with minimum density 400 kg/m^3.

[e] Veneered, phenol- and melamine-faced panels are included for class excl. floorings.

[f] A vapour barrier with a thickness up to 0,4 mm and a mass up to 200 g/m^2 can be mounted in between the wood-based panel and a substrate if there are no air gaps in between.

[g] Class as provided for in Table 1 of the Annex to Decision 2000/147/EC.

[h] Class as provided for in Table 2 of the Annex to Decision 2000/147/EC.

The classes given in Table 8 are for unjointed panels, tongue and groove jointed panels, installed according to CEN/TR 12872 and fully supported joints, installed according to CEN/TR 12872. A1

5.9 Water vapour permeability

The water vapour permeability shall either be determined as the water vapour resistance factor according EN ISO 12572:2001 or taken from Table 9.

Table 9 — Water vapour resistance factors of wood-based panels as given in EN 12524

Wood-based panel	Mean density	Vapour resistance factor	
	kg/m^3	Wet cup μ	Dry cup μ
Solid wood panel, plywood and LVL	300 500 700 1 000	50 70 90 110	150 200 220 250
OSB	650	30	50
Particleboard	300 600 900	10 15 20	50 50 50
Cement-bonded particleboard	1 200	30	50
Fibreboard	250 400 600 800	2 5 12 20	5 10 20 30
NOTE For densities not given in Table 9, values can be found by interpolation.			

5.10 Airborne sound insulation

The airborne sound insulation shall be determined only for uses subject to acoustic sound requirements. The sound transmission loss R of a single wood-based panel, measured in dB, is related the mean surface mass m_A in kg/m^2 according to the following equation (which is only valid for the frequency range of 1 kHz to 3 kHz and at a surface mass > 5 kg/m^2):

$$R = 13 \times lg\ (m_A) + 14$$

NOTE The sound insulation in buildings and of building elements can be determined according to EN ISO 140-3 and classified according to EN ISO 717-1.

5.11 Sound absorption

The sound absorption coefficient shall only be determined when the panel is intended to be used as an acoustical absorbant. It shall either be determined according to EN ISO 354 or taken from Table 10.

Table 10 — Sound absorption coefficients

Wood-based panel	Sound absorption coefficient	
	Frequency range 250 Hz to 500 Hz	Frequency range 1 000 Hz to 2000 Hz
Solid wood panel, plywood and LVL	0,10	0,30
OSB, Particleboard	0,10	0,25
Cement-bonded particleboard	0,10	0,30

Fibreboard mean density < 400 kg/m^3 mean density ≥ 400 kg/m^3	0,10 0,10	0,30 0,20

5.12 Thermal conductivity

The thermal conductivity shall be determined only for uses subject to thermal insulation requirements. It shall either be determined according to EN 12664 or taken from Table 11.

Table 11 — Thermal conductivity of wood-based panels in relation to density

Wood-based panel	Mean density ρ kg/m^3	Thermal conductivity λ W/(m · K)
Solid wood panel plywood and LVL	300 500 700 1 000	0,09 0,13 0,17 0,24
OSB	650	0,13
Particleboard	300 600 900	0,07 0,12 0,18
Cement-bonded particleboard	1 200	0,23
Fibreboard	250 400 600 800	0,05 0,07 0,10 0,14
NOTE For densities not given in Table 11, λ can be found by interpolation		

5.13 Strength and stiffness for structural use

The bending strength and stiffness shall be determined according to [A1] EN 789 [A1] and expressed as a characteristic value according to EN 1058 (for plywood see EN 636:2003, 5.2.2). The characteristic values for use in structural design may also be taken from the relevant part of EN 12369, if included.

If required, the compression, tension and shear strength and stiffness shall be determined according to [A1] EN 789 [A1] and expressed as a characteristic value according to EN 1058. The characteristic values for use in structural design may also be taken from the relevant part of EN 12369, if included.

5.14 Impact resistance for structural use

5.14.1 Floor decking on joists

The impact resistance shall be determined according to EN 1195 in conjunction with EN 12871.

5.14.2 Roof decking on joists

The impact resistance shall be determined and evaluated according to EN 12871.

5.14.3 Wall sheathing on studs

The impact resistance shall be determined according to EN 596 in conjunction with EN 12871.

5.15 Strength and stiffness under point load for structural use

5.15.1 Floor decking on joists

The strength and stiffness shall be determined according to EN 1195 in conjunction with EN 12871.

NOTE The concept of punching shear is taken into account in EN 12871 by determining the performance of the wood-based panel by concentrated load testing according to EN 1195 using a range of contact areas.

5.15.2 Roof decking on joists

The strength and stiffness shall be determined and evaluated according to EN 12871.

〖A1〗

5.15.3 Racking resistance (wall sheathing on studs)

Where required the characteristic racking strength $F_{Rd,max,k}$ (N) and mean stiffness R_{mean} (N/mm) for wood-based panels used as wall sheathing on studs shall be determined according to EN 594. The value can only be used for the tested system.

Alternatively, those parameters which enable the racking strength to be calculated from EN 1995-1-1 can be declared. For this calculation the panel thickness t and the characteristic lateral load carrying capacity $F_{v,k}$ of the actual combination of panel and fastener shall be declared.

NOTE Knowing the characteristic embedment strength f_h a lower bound for $F_{v,k}$ can be calculated from EN 1995-1-1. 〖A1〗

5.16 Mechanical durability

The mechanical durability shall either be determined according to 〖A1〗 EN 1156 〖A1〗or the appropriate modification factors k_{mod} and k_{def} may be taken from 〖A1〗 EN 1995-1-1 〖A1〗.

5.17 Biological durability

The hazard class(es) in which a product may be used shall be taken from the relevant parts of EN 335.

NOTE In the case of plywood, ENV 1099 should be used as guidance.

5.18 Content of pentachlorophenol

Wood-based panels normally contain less than 5 ppm of pentachlorophenol (PCP). If the product contains raw materials that include PCP, then the product shall be tested according to methods valid in the country of use. 〖A1〗 *deleted text* 〖A1〗

NOTE 1 A European test method has been developed in CEN/TC 38 "Durability of wood and derived materials" as CEN/TR 14823.

NOTE 2 In certain countries products with a PCP content of more than 5 ppm are not allowed.

A1

5.19 Embedment strength

Where required, the embedment strength f_h shall be determined according to EN 383 and declared as its characteristic value in Newtons per square millimeter (N/mm^2). In addition, the type and diameter of the fasteners used for the test shall be declared.

The declared characteristic value for the embedment strength is valid only for the type and diameter of the fastener used for the tests.

Alternatively,those parameters which enable the characteristic embedment strength to be calculated from e.g. EN 1995-1-1 should be declared.

NOTE The use of other design codes is sometimes required by national provisions.

For plywood the characteristic density ρ_k should be declared, for hardboard, particleboard and OSB the panel thickness t should be declared.

5.20 Air permeability

The air permeability of wood-based panels is relevant only for external use and shall be determined and expressed, where required, as the air permeability coefficient according to EN 12114. A1

A1

6 Assessment and verification of constancy of performance - AVCP

6.1 General

The compliance of wood-based panels with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

— determination of the product type on the basis of type testing;

— factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

6.2 Type testing

6.2.1 General

All performances related to characteristics included in this standard shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests (e.g. use of previously existing data, CWFT and conventionally accepted performance).

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristics for all products within that same family.

NOTE 1 Products may be grouped in different families for different characteristics.

NOTE 2 Reference to the assessment method standards will be made to allow the selection of a suitable representative sample.

In addition, the determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance:

— at the beginning of the production of a new or modified wood-based panel (unless a member of the same product range), or

— at the beginning of a new or modified method of production (where this may affect the stated properties); or

they shall be repeated for the appropriate characteristic(s), whenever a change occurs in the wood-based panel design, in the raw material or in the supplier of the components, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the characteristics.

Where components are used whose characteristics have already been determined, by the component manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed. The specifications of these components shall be documented.

Products bearing regulatory marking in accordance with appropriate harmonized European specifications may be presumed to have the performances declared in the DoP, although this does not replace the responsibility on the wood-based panel manufacturer to ensure that the wood-based panel as a whole is correctly manufactured and its component products have the declared performance values.

6.2.2 Test samples, testing and compliance criteria

Where sampling of wood-based panels for type testing is required the general principles and definitions of EN 326-1 and EN 326-2 apply. The number of samples shall be in accordance with Table 11.

Table 11 — Number of samples to be tested and compliance criteria

Characteristic	Requirement	Assessment method	No. of samples (panels)	Compliance criteria
Bending strength	Clause 4 and Annex A	5.1	12 or 6[a]	Clause 4 and Annex A
Bending stiffness (Modulus of elasticity)	Clause 4 and Annex A	5.2	12 or 6[a]	Clause 4 and Annex A
Durability – Bonding strength	Clause 4 and Annex A	5.3	12 or 6[a]	Clause 4 and Annex A
Durability – Internal bond (Tensile strength)	Clause 4 and Annex A	5.4	12 or 6[a]	Clause 4 and Annex A
Durability – Swelling in	Clause 4 and Annex A	5.5	12 or 6[a]	Clause 4 and Annex A

Characteristic	Requirement	Assessment method	No. of samples (panels)	Compliance criteria
thickness				
Durability (Moisture resistance)		5.6		
Internal bond after cyclic test (EN 321)	Clause 4 and Annex A		12 or 6[a]	Clause 4 and Annex A
Internal bond after boil test (EN 1087-1)	Clause 4 and Annex A		12 or 6[a]	Clause 4 and Annex A
Bending strength after cyclic test (EN 321)	Clause 4 and Annex A		12 or 6[a]	Clause 4 and Annex A
Release or content of formaldehyde	Clause 4 and Annex B	5.7	1	Clause 4 and Annex B
Reaction to fire	Clause 4	5.8	3	Clause 4
Water vapour permeability	Clause 4	5.9	5	Clause 4
Airborne sound insulation	Clause 4	5.10	1	Clause 4
Sound absorption	Clause 4	5.11	1	Clause 4
Thermal conductivity	Clause 4	5.12	10	Clause 4
Strength and stiffness for structural use	Clause 4	5.13	32	Clause 4
Impact resistance for structural use	Clause 4	5.14	5 test points for roofs and floors 3 test points for walls	Clause 4
Strength and stiffness under point load for structural use and racking resistance	Clause 4	5.15	12 test points	Clause 4
Mechanical durability	Clause 4	5.16	6	Clause 4
Biological durability	Clause 4	5.17	6	Clause 4
Content of pentachlorophenol (PCP)	Clause 4	5.18	5	Clause 4
Embedment	Clause 4	5.19	12	Clause 4

Characteristic	Requirement	Assessment method	No. of samples (panels)	Compliance criteria
strength				
Air permeability	Clause 4	5.20	5	Clause 4
[a] The minimum number of panels may be reduced to 6, if the product properties can be documented from internal records of at least 12 tested panels in the start-up period.				

6.2.3 Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the wood-based panel to which they relate.

6.2.4 Shared other party results

A manufacturer may use the results of the product type determination obtained by someone else (e.g. by another manufacturer, as a common service to manufacturers, or by a product developer), to justify his own declaration of performance regarding a product that is manufactured according to the same design (e.g. dimensions) and with raw materials, constituents and manufacturing methods of the same kind, provided that:

- the results are known to be valid for products with the same essential characteristics relevant for the product performance;
- in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted [6)] to transmit to the manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;
- the manufacturer using other party results accepts to remain responsible for the product having the declared performances and he also:
  - ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product type; and
  - keeps available a copy of the determination of the product type report that also contains the information needed for verifying that the product is manufactured according to the same design and with raw materials, constituents and manufacturing methods of the same kind.

6.2.5 Cascading determination of the product type results

For some construction products, there are companies (often called "system houses") which supply or ensure the supply of, on the basis of an agreement[7)] some or all of the components (e.g. in case of windows: profiles,

6) The formulation of such an agreement can be done by license, contract, or any other type of written consent.

7) This can be, for instance, a contract, license or whatever kind of written agreement, which should also contain clear provisions with regard to responsibility and liability of the component producer (system house, on the one hand, and the assembler of the finished product, on the other hand.

gaskets, weather strips)[8] to an assembler who then manufactures the finished product (referred to below as the "assembler") in his factory.

Provided that the activities for which such a system house is legally established include manufacturing/assembling of products as the assembled one, the system house may take the responsibility for the determination of the product type regarding one or several essential characteristics of an end product which is subsequently manufactured and/or assembled by other firms in their own factory.

When doing so, the system house shall submit an "assembled product" using components manufactured by it or by others, to the determination of the product type and then make the determination of the product type report available to the assemblers, i.e. the actual manufacturer of the product placed on the market.

To take into account such a situation, the concept of cascading determination of the product type might be taken into consideration in the technical specification, provided that this concerns characteristics for which either a notified product certification body or a notified test laboratory intervene, as presented below.

The determination of the product type report that the system house has obtained with regard to tests carried out by a notified body, and which is supplied to the assemblers, may be used for the regulatory marking purposes without the assembler having to involve again a notified body to undertake the determination of the product type of the essential characteristic(s) that were already tested, provided that:

– the assembler manufactures a product which uses the same combination of components (components with the same characteristics), and in the same way, as that for which the system house has obtained the determination of the product type report. If this report is based on a combination of components not representing the final product as to be placed on the market, and/or is not assembled in accordance with the system house's instruction for assembling the components, the assembler needs to submit his finished product to the determination of the product type;

– the system house has notified to the manufacturer the instructions for manufacturing/assembling the product and installation guidance;

– the assembler (manufacturer) assumes the responsibility for the correct assembly of the product in accordance with the instructions for manufacturing/assembling the product and installation guidance notified to him by the system house;

– the instructions for manufacturing/assembling the product and installation guidance notified to the assembler (manufacturer) by the system house are an integral part of the assembler's Factory Production Control system and are referred to in the determination of the product type report;

– the assembler is able to provide documented evidence that the combination of components he is using, and his way of manufacturing, correspond to the one for which the system house has obtained the determination of the product type report (he needs to keep a copy of the system house's determination of the product type report);

– regardless the possibility of referring, on the basis of the agreement signed with the system house, to the latter's responsibility and liability under private law, the assembler remains responsible for the product being in compliance with the declared performances, including both the design and the manufacture of the product, which is given when he affixes the regulatory marking on his product.

8) These companies may produce components but they are not required to do so.

6.3 Factory production control (FPC)

6.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market comply with the declared performance of the essential characteristics.

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.

This factory production control system documentation shall ensure a common understanding of the evaluation of the constancy of performance and enable the achievement of the required product performances and the effective operation of the production control system to be checked. Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the compliance of the product with the declared performances of the essential characteristics.

In case the manufacturer has used shared or cascading product type results, the FPC shall also include the appropriate documentation as foreseen in 6.2.4 and 6.2.5.

6.3.2 Requirements

6.3.2.1 General

The manufacturer is responsible for organizing the effective implementation of the FPC system in line with the content of this product standard. Tasks and responsibilities in the production control organization shall be documented and this documentation shall be kept up-to-date.

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

Personnel performing work affecting the constancy of performance of the product shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

In each factory the manufacturer may delegate the action to a person having the necessary authority to:

- identify procedures to demonstrate constancy of performance of the product at appropriate stages;
- identify and record any instance of non-constancy;
- identify procedures to correct instances of non-constancy.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control. The manufacturer's documentation and procedures should be appropriate to the product and manufacturing process. The FPC system should achieve an appropriate level of confidence in the constancy of performance of the product. This involves:

a) the preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;

b) the effective implementation of these procedures and instructions;

c) the recording of these operations and their results;

d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European Standard.

If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question.

The manufacturer who subcontracts all of his activities may in no circumstances pass the above responsibilities on to a subcontractor.

NOTE Manufacturers having an FPC system, which complies with EN ISO 9001 standard and which addresses the provisions of the present European Standard are considered as satisfying the FPC requirements of the Regulation (EU) No 305/2011.

6.3.2.2 Equipment

6.3.2.2.1 Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

6.3.2.2.2 Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.3.2.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their compliance. In case supplied kit components are used, the constancy of performance system of the component shall be that given in the appropriate harmonized technical specification for that component.

6.3.2.4 Controls during manufacturing process

The manufacturer shall plan and carry out production under controlled conditions.

6.3.2.5 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of the characteristics he declares, are maintained. The characteristics, and the means of control, are given in Table 11. The manufacturer shall sample the wood-based panels for the FPC testing according to EN 326-1 and shall control the required performance characteristics of the panel according to EN 326-2. The performance characteristics given in Tables 1 to 7, that are relevant to the intended end-use conditions, shall be controlled using frequencies of testing equal to or greater than the frequencies given in Table 12. Sampling shall be carried out at random.

Annex A
(normative)

Technical classes for wood-based panels

NOTE Compliance with the requirements in Tables A.1 to A.10 for panels for structural uses ensures that the product meets the characteristic values given in the manufacturer's documentation or in the relevant part of EN 12369, if included.

Table A.1 — Technical classes SWP/1, SWP/2 and SWP/3 for solid wood panels for structural or non-structural use

Technical class	Requirements			
	Bonding quality	Durability	Modulus of elasticity in bending	Bending strength
SWP/1 structural	According to EN 13353			
SWP/2 structural	According to EN 13353			
SWP/3 structural	According to EN 13353			
SWP/1 non structural	According to EN 13353		—	
SWP/2 non structural	According to EN 13353		—	
SWP/3 non structural	According to EN 13353		—	

Table A.2 — Technical classes for plywood to be used in dry, humid or exterior conditions

Technical class	Requirements			
	Bonding quality	Durability	Modulus of elasticity in bending	Bending strength
Dry (EN 636-1)	According to EN 636			
Humid (EN 636-2)	According to EN 636			
Exterior (EN 636-3)	According to EN 636			

Table A.3 — Technical classes OSB/1, OSB/2, OSB/3 and OSB/4 for oriented strand boards

Technical class	Requirements						
					Requirements for moisture resistance		
	Bending strength	Internal bond	Modulus of elasticity in bending	Swelling in thickness 24 h	Internal bond after cyclic test	Bending strength after cyclic test	Internal bond after boil test
OSB/1	According to EN 300				—		
OSB/2	According to EN 300				—		
OSB/3	According to EN 300				According to EN 300		
OSB/4	According to EN 300				According to EN 300		

Table A.4 — Technical classes P1, P2, P3, P4, P5, P6 and P7 for resin-bonded particleboard and ES, ET, ESL and ETL for extruded particleboard

Technical class	Requirements						
					Requirements for moisture resistance		
	Bending strength	Internal bond	Modulus of elasticity in bending	Swelling in thickness 24 h	Internal bond after cyclic test	Swelling in thickness after cyclic test	Internal bond after boil test
P1	According to EN 312		—		—		
P2	According to EN 312			—	—		
P3	According to EN 312				According to EN 312		
P4	According to EN 312				—		
P5	According to EN 312				According to EN 312		
P6	According to EN 312				—		
P7	According to EN 312				According to EN 312		
ES	According to A1 EN 14755 A1		—		—		
ET	According to A1 EN 14755 A1		—		—		
ESL	According to A1 EN 14755 A1		—		—		
ETL	According to A1 EN 14755 A1		—		—		

Table A.5 — Technical classes 1 and 2 for cement-bonded particleboard

Technical class	Requirements				
					Requirements for moisture resistance
	Bending strength	Internal bond	Modulus of elasticity in bending	Swelling in thickness 24 h	Internal bond after cyclic test
1	According to EN 634-2				According to EN 634-2
2	According to EN 634-2				According to EN 634-2

Table A.6— Technical classes HB, HB.H, HB.E, HB.LA, HB.HLA1, HB.HLA2 for hardboard

Technical class	Requirements					
					Requirements for moisture resistance	
	Bending strength	Internal bond	Modulus of elasticity in bending	Swelling in thickness 24 h	Internal bond after boil test	Bending strength after boil test
HB	According to EN 622-2		—	According to EN 622-2	—	
HB.H	According to EN 622-2		—	According to EN 622-2	According to EN 622-2	—
HB.E	According to EN 622-2				According to EN 622-2	—
HB.LA	According to EN 622-2				—	
HB.HLA1	According to EN 622-2				According to EN 622-2	—
HB.HLA2	According to EN 622-2				According to EN 622-2	

Table ZA.3.1 — Assignment of AVCP tasks for wood-based panels under system 1

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Tables ZA.1.1 and ZA.1.2, relevant for the intended use which are declared	6.3
	Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Tables ZA.1.1 and ZA.1.2, relevant for the intended use which are declared, except reaction to fire for the classes below	6.2
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Tables ZA.1.1 and ZA.1.2 relevant for the intended use which are declared	6.3
Tasks for the notified product certification body	Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire, for classes (A1, A2, B or C)[a]	6.2
	Initial inspection of manufacturing plant and of FPC	Parameters related to essential characteristics of Tables ZA.1.1 and ZA.1.2, which are declared relevant for the intended use. Documentation of the FPC.	6.3
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Tables ZA.1.1 and ZA.1.2, relevant for the intended use which are declared, namely: reaction to fire, for classes above, and, in case of panels for structural use, also strength (i.e. in tension, compression, bending and shear, including punching shear), stiffness (MOE), impact resistance, bonding strength, racking resistance, embedment strength and swelling in thickness. Documentation of FPC.	6.3

[a] See footnote (*) to Table ZA.2

Table ZA.3.2 — Assignment of AVCP tasks for wood-based panels under system 2+

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1.1, relevant for the intended use which are declared	6.3
	Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1.1, relevant for the intended use which are declared	6.2
	Testing of samples taken at factory in accordance with the prescribed test plan	Essential characteristics of Table ZA.1.1 relevant for the intended use which are declared	6.3
Task for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1.1, relevant for the intended use which are declared. Documentation of the FPC.	6.3
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1.1, relevant for the intended use which are declared, in particular: reaction to fire, for classes (A1, A2, B, C, D or E)[a] or (A1 to F)[b], strength (i.e. in tension, compression, bending and shear, including punching shear), stiffness (MOE), impact resistance, bonding strength, racking resistance, embedment strength and swelling in thickness. Documentation of FPC.	6.3

[a] See footnote (**) to Table ZA.2, where applicable.

[b] See footnote (***) to Table ZA.2, where applicable.

Table ZA.3.3 — Assignment of AVCP tasks for wood-based panels under system 3

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1.2, relevant for the intended use which are declared	6.3
	Determination of the product type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	Parameters related to essential characteristics of Table ZA.1.2, relevant for the intended use which are declared, except the reaction to fire classes below	6.2
Task for a notified testing laboratory	Determination of the product type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire, for classes (A1, A2, B, C, D or E)[a]	6.2

[a] See footnote (**) to Table ZA.2, where applicable.

Table ZA.3.4 — Assignment of AVCP tasks for wood-based panels under system 4

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1.2, relevant for the intended use which are declared	6.3
	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	Characteristics of Table ZA.1.2, relevant for the intended use which are declared	6.2

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No 305/2011:

In case of products under system 1

- the factory production control and further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

- the certificate of constancy of performance issued by the notified product certification body on the basis of determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control and continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 2+

- the determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; the factory production control and the testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

- the certificate of conformity of the factory production control, issued by the notified production control certification body on the basis of:

  - initial inspection of the manufacturing plant and of factory production control and

  - continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 3

- the factory production control carried out by the manufacturer; and

- the determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product, carried out by the notified testing laboratory.

In case of products under system 4

- the factory production control carried out by the manufacturer
- the determination by the manufacturer of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011.

According to this Regulation, the DoP shall contain, in particular, the following information:

- the reference of the product-type for which the declaration of performance has been drawn up;
- the AVCP system or systems of the construction product, as set out in Annex V of the CPR;
- the reference number and date of issue of the harmonised standard which has been used for the assessment of each essential characteristic;
- where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

(a) the intended use or uses for the construction product, in accordance with the applicable harmonised technical specification;

(b) the list of essential characteristics, as determined in the harmonised technical specification for the declared intended use or uses;

(c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;

(d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared;

(e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;

(f) for the listed essential characteristics for which no performance is declared, the letters "NPD" (No Performance Determined).

Regarding the supply of the DoP, article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006, (REACH) shall be provided together with the DoP.

ZA.3 CE marking and labelling

ZA.3.1 CE marking

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

- to the wood-based panel

or

- to a label attached to it.

Where this is not possible or not warranted on account of the nature of the product, it shall be affixed:

- to the packaging

or

- to the accompanying documents.

The CE marking shall be followed by:

- the last two digits of the year in which it was first affixed,
- the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity;
- the unique identification code of the product-type;
- the reference number of the declaration of performance;
- the level or class of all relevant essential characteristics (see Tables ZA.1.1 and ZA.1.2) declared;
- the dated reference to the harmonised technical specification applied;
- the identification number of the notified body, *[only for products under systems 1+, 1, 2+ and 3]*;
- the intended use as laid down in the harmonised technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

Figures ZA.1 to ZA.10 give examples of the information related to products subject to AVCP under each of the different systems to be given on the wood-based panel.

Panel under AVCP system 2+

Figure ZA.1 shows an example of CE marking with reference to a technical class given in the commercial documents, accompanying each package of the wood-based panels. The example relates to untreated particleboard for internal use as structural floor decking on joists in humid conditions.

CE 4321			*CE-marking consisting of the "CE"-logo* *Identification number of the notified production control certification body*
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium **15** 00001-DOP-2013/05/12			*Name and registered address of the manufacturer, or identifying mark* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 13986:2004+A1:2015 P5 – Floor Decking – Span 600 mm, 22 mm			*Number and year of the European Standard* *Unique identification code of the panel and its intended use*
Strength and **Stiffness**	in compression, tension, bending shear, as:	P5	*Performances of **all** relevant essential characteristics*
Punching shear, as:			
- point load strength:	ultimate serviceability	6 500 N 6 500 N	
- point load stiffness:		600 N/mm	
Impact resistance: (acc. to EN 12871)		Class I	
Reaction to fire:		D_{FL}-s1	
Water vapour permeability μ:	wet dry	15 50	
Release of formaldehyde:		E1	
Content of pentachlorophenol (PCP):		PCP ≤ 5 ppm	
Airborne sound insulation (density)		R = 29 dB	*Based on density of 700 kg/m^3 and a surface mass of 15,4 kg/m^2*
Sound absorption α		0,10 / 0,25	
Thermal conductivity λ		0,12 W/m×K	
Durability, as:			
- internal bond		P5	
- **swelling in thickness**		P5	
- moisture resistance		P5	
- biological (EN 335-3)		Class 2	

Figure ZA.1 — Example of CE marking with reference to a technical class given in the commercial documents, accompanying the packaging of the panels (AVCP system 2+)

The CE marking logo shall be accompanied with the following information:

a) identification number of the notified certification body *(for panels with AVCP system 1 or 2+ only)*;

b) name or identifying mark of the manufacturer;

NOTE The registered address of the manufacturer may also be added.

c) reference number of the declaration of performance (DoP)*;*

d) dated reference to this standard (i.e. EN 13986:year);

e) description of the panel, as its:

1) nominal thickness

2) indication 'PT', in case of treatment with biocides against biological attack;

f) information on performance of essential characteristics:

1) technical class;

2) reaction to fire class, including the additional classification, if any, and only if not taken from Table 8;

3) release of formaldehyde: class E1 or E2.

Information on the panel under AVCP system 4

In Figures ZA.3 and ZA.4 an example of the information on a wood-based panel (e.g. MDF) for internal non-structural use in dry conditions and subject to Assessment and Verification of the Constancy of Performance (AVCP) system 4 is given. Figure ZA.3 shows such marking given either on a label affixed to the panel or on the packaging of these panels and Figure ZA.4 the same example printed directly on the panel.

CE	*CE-marking consisting of the "CE"-logo*
AnyCo Ltd 00023-DOP-2013/06/12	*Name or identifying mark of the manufacturer* *NOTE Registered address of the manufacturer may also be added.* *Reference number of the DoP*
EN 13986:2004+A1:2015 **MDF**	*Number and year of the European Standard* *Unique identification code of the product type and its intended use*
15 mm **E1**	*Performances on some of the essential characteristics*

Figure ZA.3 — Example of information on a label affixed to the panel or on the packaging of these panels (for panel under AVCP system 4)

CE_**AnyCo Ltd_00023-DOP-2013/06/12**_EN 13986:2004+A1:2015_**MDF_15 mm_E1**

Figure ZA.4 — Example of information on the panel (for panel under AVCP system 4)

NOTE This information on the panel is to be affixed by the company "AnyCo Ltd" in the year 2013. With regard to some characteristics, given in Table ZA.1.2, which are to be declared, this panel complies with the requirements for the type of panel "MDF", given in Table A.9 (according to EN 622-5). In addition, with regard to release of formaldehyde, it is declared as class E1, according to Annex B.

Furthermore, as the panel meets the requirements of Table 8 as regard the reaction to fire class (and therefore has AVCP system 4) this class is not declared. Furthermore, as the panel has not been treated against biological attack, no indication is given concerning treatment.

Information on the panel under AVCP system 3

In Figures ZA.5 and ZA.6 an example of the information on a wood-based panel (e.g. resin-bonded particle-board) for internal non-structural use in dry conditions and subject to Assessment and Verification of the Constancy of Performance (AVCP) system 3 is given. Figure ZA.5 shows such marking given on a label affixed to the panel and Figure ZA.6 shows the same example printed on the panel.

CE	*CE-marking consisting of the "CE"-logo*
AnyCo Ltd 00007-DOP-2013/05/17	*Name or identifying mark of the manufacturer* *NOTE Registered address of the manufacturer may also be added.* *Reference number of the DoP*
EN 13986:2004+A1:2015 **P2**	*Number and year of the European Standard* *Unique identification code of the product type and its intended use*
8 mm **D-s2, d0** **E1**	*Performances on some of the essential characteristics*

Figure ZA.5 — Example of information on a label affixed to the panel (for panel under AVCP system 3)

CE_**AnyCo Ltd_00007-DOP-2013/05/17**_EN 13986:2004+A1:2015_**P2_8 mm_D-s2, d0_E1**

Figure ZA.6 — Example of information on the panel (for panel under AVCP system 3)

NOTE This information on the panel is to be affixed by the company "AnyCo Ltd" in the year 2013. With regard to some characteristics, given in Table ZA.1.2, which are to be declared, this panel complies with the requirements for the

type of panel “P2”, given in Table A.4 (according to EN 312). In addition, with regard to release of formaldehyde, it is declared as class E1, according to Annex B.

Furthermore, it is also declared the reaction to fire class based on the results of all required tests done, as the panel does not meet both requirements of Table 8 for CWFT. Thus, the actual panel’s thickness is also declared.

As the panel has not been treated against biological attack, no indication is given concerning treatment.

Information on the panel under AVCP system 2+

In Figures ZA.7 and ZA.8 an example of the information on a wood-based panel (e.g. plywood) for external use as a structural component and subject to Assessment and Verification of the Constancy of Performance (AVCP) system 2+ is given. Figure ZA.7 shows such marking given on a label affixed to the panel and Figure ZA.8 the same example printed on the panel.

CE **4321**	*CE-marking consisting of the "CE"-logo* *Identification number of the notified production control certification body*
AnyCo Ltd 00010-DOP-2013/05/30	*Name or identifying mark of the manufacturer NOTE Registered address of the manufacturer may also be added.* *Reference number of the DoP*
EN 13986:2004+A1:2015 EN 636-3 **S**	*Number and year of the European Standard* *Unique identification code of the panel and its intended use*
9,5 mm **E1**	*Performances on some of the essential characteristics*

Figure ZA.7 — Example of information on a label affixed to the panel (for panel under AVCP system 2+)

CE**_4321_AnyCo Ltd_00010-DOP-2013/05/30_**EN 13986:2004+A1:2015_EN 636-3 **S_9,5 mm_E1**

Figure ZA.8 — Example of information on the panel (for panel under AVCP system 2+)

NOTE This information on the panel is to be affixed by the company “AnyCo Ltd” in the year 2013. With regard to some characteristics, given in Table ZA.1.1, which are to be declared, this panel complies with the requirements for the type of panel “EN 636-3”, given in Table A.2 (according to EN 636) with indication “S” as it is intended for use in structural applications. In addition, with regard to release of formaldehyde, it is declared as class E1, according to Annex B.

Furthermore, as the panel meets the requirements of Table 8 as regard the reaction to fire class this class is not declared. In addition, as the panel has not been treated against biological attack, no indication is given concerning treatment.

Information on the panel under AVCP system 1

In Figures ZA.9 and ZA.10 an example of the information on a wood-based panel (e.g. resin-bonded particleboard, treated with fire retardant) for internal structural use in humid conditions and subject to Assessment and Verification of the Constancy of Performance (AVCP) system 1 is given. Figure ZA.9 shows such marking given on a label affixed to the panel and Figure ZA.10 shows the same example printed on the panel.

CE **4321**	*CE-marking consisting of the "CE"-logo* *Identification number of the product certification body*
AnyCo Ltd 00002-DOP-2013/05/14	*Name or identifying mark of the manufacturer* *NOTE Registered address of the manufacturer may also be added.* *Reference number of the DoP*
EN 13986:2004+A1:2015 **P5**	*Number and year of the European Standard* *Unique identification code of the panel and its intended use*
22 mm **B-s2, d0** **E1**	*Performances on some of the essential characteristics*

Figure ZA.9 — Example of information on a label affixed to the panel (for panel under AVCP system 1)

CE**_4321_AnyCo Ltd_00002-DOP-2013/05/14_**EN 13986:2004+A1:2015**_P5_22 mm_B-s2, d0_E1**

Figure ZA.10 — Example of information on the panel (for panel under AVCP system 1)

NOTE This information on the panel is to be affixed by the company “AnyCo Ltd” in the year 2013. With regard to some characteristics, given in Table ZA.1.1, which are to be declared, this panel complies with the requirements for the type of panel “P5”, given in Table A.4 (according to EN 312). In addition, with regard to release of formaldehyde, it is declared as class E1, according to Annex B.

Furthermore, because it is treated with fire retardant it is also declared the reaction to fire class based on the results of all required tests done, under AVCP system 1.

In addition, as the panel has not been treated against biological attack, no indication is given concerning treatment. A1

Bibliography

EN 634-1, *Cement-bonded particleboards — Specifications — Part 1: General requirements.*

ENV 1099, *Plywood — Biological durability — Guidance for the assessment of plywood for use in different hazard classes.*

EN ISO 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements.*

EN ISO 717-1, *Acoustics — Rating of insulation in building elements — Part 1: Airborne sound insulation.*

EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000).*

CEN/TR 14823, *Quantitative determination of pentachlorophenol in wood.*

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