

EHITUSES KASUTATAVAD PUITPLAADID. OMADUSED,  
VASTAVUSHINDAMINE JA MÄRGISTAMINE

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

|   |  |
|---|--|
| See Eesti standard EVS-EN 13986:2004+A1:2015 sisaldab Euroopa standardi EN 13986:2004+A1:2015 ingliskeelset teksti. | This Estonian standard EVS-EN 13986:2004+A1:2015 consists of the English text of the European standard EN 13986:2004+A1:2015.      |
| Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.  | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
| Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 01.04.2015. | Date of Availability of the European standard is 01.04.2015.   |
| Standard on kättesaadav Eesti Standardikeskusest.   | The standard is available from the Estonian Centre for Standardisation.  |

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 83.140.99

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Aru 10, 10317 Tallinn, Eesti; koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

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.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

|   |           |
|---|-----------|
| Foreword.....   | 4         |
| <b>1</b> <b>Scope</b> .....   | <b>5</b>  |
| <b>2</b> <b>Normative references</b> .....  | <b>5</b>  |
| <b>3</b> <b>Terms and definitions</b> .....   | <b>8</b>  |
| <b>4</b> <b>Performance characteristics required for wood-based panels for use in construction</b> .....                            | <b>17</b> |
| 4.1 <b>Wood-based panels for internal use as structural components in dry conditions</b> .....                                      | <b>17</b> |
| 4.2 <b>Wood-based panels for internal use as structural components in humid conditions</b> .....                                    | <b>18</b> |
| 4.3 <b>Wood-based panels for external use as structural components</b> .....  | <b>19</b> |
| 4.4 <b>Wood-based panels for internal use as non-structural components in dry conditions</b> .....                                  | <b>20</b> |
| 4.5 <b>Wood-based panels for internal use as non-structural components in humid conditions</b> .....                                | <b>20</b> |
| 4.6 <b>Wood-based panels for external use as non-structural components</b> .....  | <b>21</b> |
| 4.7 <b>Wood-based panels for use as structural floor and roof decking on joists and as structural wall sheathing on studs</b> ..... | <b>22</b> |
| 4.8 <b>Other dangerous substances</b> .....   | <b>24</b> |
| <b>5</b> <b>Determination of the performance characteristics</b> .....  | <b>24</b> |
| 5.1 <b>Bending strength</b> .....   | <b>24</b> |
| 5.2 <b>Bending stiffness (Modulus of elasticity)</b> .....  | <b>24</b> |
| 5.3 <b>Bonding quality</b> .....  | <b>24</b> |
| 5.4 <b>Internal bond (Tensile strength)</b> .....   | <b>24</b> |
| 5.5 <b>Durability (Swelling in thickness)</b> .....   | <b>24</b> |
| 5.6 <b>Durability (Moisture resistance)</b> .....   | <b>25</b> |
| 5.6.1 <b>OSB</b> .....  | <b>25</b> |
| 5.6.2 <b>Particleboard</b> .....  | <b>25</b> |
| 5.6.3 <b>Cement-bonded particleboard</b> .....  | <b>25</b> |
| 5.6.4 <b>Fibreboard</b> .....   | <b>25</b> |
| 5.6.5 <b>Plywood, LVL and solid wood panels</b> .....   | <b>26</b> |
| 5.7 <b>Release of formaldehyde</b> .....  | <b>26</b> |
| 5.8 <b>Reaction to fire</b> .....   | <b>26</b> |
| 5.9 <b>Water vapour permeability</b> .....  | <b>29</b> |
| 5.10 <b>Airborne sound insulation</b> .....   | <b>29</b> |
| 5.11 <b>Sound absorption</b> .....  | <b>29</b> |
| 5.12 <b>Thermal conductivity</b> .....  | <b>30</b> |
| 5.13 <b>Strength and stiffness for structural use</b> .....   | <b>30</b> |
| 5.14 <b>Impact resistance for structural use</b> .....  | <b>30</b> |
| 5.14.1 <b>Floor decking on joists</b> .....   | <b>30</b> |
| 5.14.2 <b>Roof decking on joists</b> .....  | <b>30</b> |
| 5.14.3 <b>Wall sheathing on studs</b> .....   | <b>30</b> |
| 5.15 <b>Strength and stiffness under point load for structural use</b> .....  | <b>31</b> |
| 5.15.1 <b>Floor decking on joists</b> .....   | <b>31</b> |
| 5.15.2 <b>Roof decking on joists</b> .....  | <b>31</b> |
| 5.15.3 <b>Racking resistance (wall sheathing on studs)</b> .....  | <b>31</b> |
| 5.16 <b>Mechanical durability</b> .....   | <b>31</b> |
| 5.17 <b>Biological durability</b> .....   | <b>31</b> |
| 5.18 <b>Content of pentachlorophenol</b> .....  | <b>31</b> |
| 5.19 <b>Embedment strength</b> .....  | <b>32</b> |
| 5.20 <b>Air permeability</b> .....  | <b>32</b> |
| <b>6</b> <b>Assessment and verification of constancy of performance - AVCP</b> .....  | <b>32</b> |

|  |   |           |
|--|---|-----------|
| <b>6.1</b>   | <b>General .....</b>  | <b>32</b> |
| <b>6.2</b>   | <b>Type testing .....</b>   | <b>32</b> |
| <b>6.2.1</b>   | <b>General .....</b>  | <b>32</b> |
| <b>6.2.2</b>   | <b>Test samples, testing and compliance criteria .....</b>  | <b>33</b> |
| <b>6.2.3</b>   | <b>Test reports .....</b>   | <b>35</b> |
| <b>6.2.4</b>   | <b>Shared other party results .....</b>   | <b>35</b> |
| <b>6.2.5</b>   | <b>Cascading determination of the product type results .....</b>  | <b>35</b> |
| <b>6.3</b>   | <b>Factory production control (FPC) .....</b>   | <b>37</b> |
| <b>6.3.1</b>   | <b>General .....</b>  | <b>37</b> |
| <b>6.3.2</b>   | <b>Requirements .....</b>   | <b>37</b> |
| <b>6.3.3</b>   | <b>Product specific requirements .....</b>  | <b>41</b> |
| <b>6.3.4</b>   | <b>Initial inspection of factory and of FPC .....</b>   | <b>41</b> |
| <b>6.3.5</b>   | <b>Continuous surveillance of FPC .....</b>   | <b>42</b> |
| <b>6.3.6</b>   | <b>Procedure for modifications .....</b>  | <b>42</b> |
| <b>6.3.7</b>   | <b>One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity .....</b> | <b>42</b> |
| <b>7</b>   | <b>Marking .....</b>  | <b>43</b> |
| <b>Annex A (normative) Technical classes for wood-based panels .....</b>   |   | <b>46</b> |
| <b>Annex B (normative) Formaldehyde classes .....</b>  |   | <b>50</b> |
| <b>Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation .....</b> |   | <b>52</b> |
| <b>ZA.1</b>  | <b>Scope and relevant characteristics .....</b>   | <b>52</b> |
| <b>ZA.2</b>  | <b>Procedures for Assessment and Verification of the Constancy of Performance (AVCP) of wood-based panels .....</b> | <b>56</b> |
| <b>ZA.2.1</b>  | <b>Systems of AVCP .....</b>  | <b>56</b> |
| <b>ZA.2.2</b>  | <b>Declaration of performance (DoP) .....</b>   | <b>59</b> |
| <b>ZA.2.2.1</b>  | <b>General .....</b>  | <b>59</b> |
| <b>ZA.2.2.2</b>  | <b>Content .....</b>  | <b>60</b> |
| <b>ZA.3</b>  | <b>CE marking and labelling .....</b>   | <b>61</b> |
| <b>ZA.3.1</b>  | <b>CE marking .....</b>   | <b>61</b> |
| <b>ZA.3.2</b>  | <b>Labelling .....</b>  | <b>63</b> |
| <b>Bibliography .....</b>  |   | <b>68</b> |

## 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  $\boxed{A_1}$   $\triangleleft A_1$ .

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  $\boxed{A_1}$  Regulation (EU) No. 305/2011  $\triangleleft A_1$ , see the informative Annex ZA, which is an integral part of this document.

This document supersedes  $\boxed{A_1}$  EN 13986:2004  $\triangleleft A_1$ .

$\boxed{A_1}$  Deleted text  $\triangleleft A_1$

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<sup>1)</sup>;
- for internal (or protected external) use as structural components in humid conditions<sup>2)</sup>;
- for external use as structural components<sup>3)</sup>;
- for internal use as non-structural components in dry conditions<sup>1)</sup>;
- for internal (or protected external) uses as non structural components in humid conditions<sup>2)</sup>;
- for external use as non-structural components<sup>3)</sup>;
- for use as structural floor decking on joists in dry<sup>1)</sup> or humid<sup>2)</sup> or external<sup>3)</sup> conditions;
- for use as structural roof decking on joists in dry<sup>1)</sup> or humid<sup>2)</sup> or external<sup>3)</sup> conditions;
- for use as structural wall sheathing on studs in dry<sup>1)</sup> or humid<sup>2)</sup> or external<sup>3)</sup> 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<sup>4)</sup>, 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*

- 
- 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) ~~EN 14374~~ 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*
- 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*
- 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*
- EN 622-5, *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*

EN 717-1, *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*

EN 789, *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*

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

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

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

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

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*

EN 12872, *Wood-based panels - Guidance on the use of load-bearing boards in floors, walls and roofs*

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

EN 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*

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

EN 14755, *Extruded particleboards - Specifications*

EN 15197, *Wood-based panels - Flaxboards - Specifications*

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

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.