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# Wood-based panels — Floating floors —

## Part 1: Performance specifications and requirements

The European Standard EN 13810-1:2002 has the status of a  
British Standard

ICS 79.060.01





## National foreword

This British Standard is the official English language version of EN 13810-1:2002.

The UK participation in its preparation was entrusted to Technical Committee B/541, Wood-based panels, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

### Cross-references

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

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

This British Standard, having been prepared under the direction of the Building and Civil Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 8 January 2003

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## Wood-based panels - Floating floors - Part 1: Performance specifications and requirements

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Holzwerkstoffe - Schwimmend verlegte Fußböden - Teil 1:  
Leistungsspezifikationen und Anforderungen

This European Standard was approved by CEN on 23 October 2002.

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 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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 13810-1:2002) 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 June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

This standard is one of two performance standards for wood-based panels used in floating floors.

No existing European Standard is superseded.

Annex A is informative.

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

## 1 Scope

This European Standard provides the performance specifications and requirements for wood-based panels used in continuously fully supported non-structural floating floors.

## 2 Normative references

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

### General

EN 318, Wood-based panels — Determination of dimensional changes associated with changes in relative humidity.

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

EN 322, Wood-based panels — Determination of moisture content.

EN 324-1, Wood-based panels — Determination of dimensions of boards — Part 1: Determination of thickness, width and length.

EN 324-2, Wood-based panels — Determination of dimensions of boards — Part 2: Determination of squareness and edge straightness.

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 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 1195, Timber structures — Test methods — Performance of structural floor decking.

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

EN 12871:2001, Wood-based panels — Performance specifications and requirements for load bearing boards for use in floors, walls and roofs.

EN 1991-1-1, Eurocode 1: Actions on structures — Part 1-1: General actions; Densities, self-weight and imposed loads for buildings.

ENV 1995-1-1:1993, Eurocode 5 — Design of timber structures — Part 1-1: General rules and rules for buildings.

prCEN/TS 13810-2, Wood-based panels — Floating floors — Part 2: Test methods.

### Particleboards

EN 312-1, Particleboards — Specifications — Part 1: General requirements for all board types.



EN 312-4, Particleboards — Specifications — Part 4: Requirements for load-bearing boards for use in dry conditions.

EN 312-5, Particleboards — Specifications — Part 5: Requirements for load-bearing boards for use in humid conditions.

EN 312-6, Particleboards — Specifications — Part 6: Requirements for heavy duty load-bearing boards for use in dry conditions.

EN 312-7, Particleboards — Specifications — Part 7: Requirements for heavy duty load-bearing boards for use in humid conditions.

## OSB

EN 300, Oriented Strand Boards (OSB) — Definitions, classification and specifications.

## Plywood

EN 313-1, Plywood — Classification and terminology — Part 1: Classification.

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 315, Plywood — Tolerances for dimensions.

EN 635-1, Plywood — Classification by surface appearance — Part 1: General.

EN 635-2, Plywood — Classification by surface appearance — Part 2: Hardwood.

EN 635-3, Plywood — Classification by surface appearance — Part 3: Softwood.

EN 636-1, Plywood — Specifications — Part 1: Requirements for plywood for use in dry conditions.

EN 636-2, Plywood — Specifications — Part 2: Requirements for plywood for use in humid conditions.

EN 636-3, Plywood — Specifications — Part 3: Requirements for plywood for use in exterior conditions.

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

## Solid wood panels

EN 12775, Solid wood panels — Classification and terminology.

EN 13017-1, Solid wood panels — Classification by surface appearance — Part 1: Softwood.

EN 13017-2, Solid wood panels — Classification by surface appearance — Part 2: Hardwood.

prEN 13353, Solid wood panels (SWP) — Requirements.

prCEN/TS 13354, Solid wood panels — Bonding quality — Test method.

## Fibreboard

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 622-5, Fibreboards — Specifications — Part 5: Requirements for dry process boards (MDF).

Cement bonded particleboards

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

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

3 Terms and definitions

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

- 3.1  
floating floor  
decking of wood-based panels continuously supported by one or more resilient materials, without being fixed to the floor base
- 3.2  
service class  
see ENV 1995-1-1:1993

4 Specifications

4.1 Wood-based panel decking

4.1.1 General

Any load-bearing panel complying with EN 13986 may be used as floating floor systems.

Specifications shall take into account the factors given in Tables 1 and 2.

Table 1 — Characteristics of panel products to be considered in specifications				
Particleboard	OSB	Plywood and solid wood panel	Fibreboard	Cement bonded particleboard
Grade	Grade	Lay-up	Grade	Grade
Thickness	Thickness	Wood-species	Thickness	Thickness
Service class	Service class	Surface appearance class	Service class	Service class
		Thickness		
		Service class		



The following parameters shall be specified for wood-based panels when used in floating floors (see Table 2):

type of (decking) panel;

joints;

- 1) tongue and groove on all four panel edges;
- 2) glue;

conditioning before installation:

- 1) moisture content;
- 2) dimensional changes due to change in moisture content.

Table 2 — European Standards for specifications and test methods relevant to the design parameters of floating floor decking

Design parameter	Relevant EN	Explanation
<b>Joints</b> — tongue & groove or similar — nail, screw or similar — glue type Conditioning before installation — moisture content — dimensional changes	EN 324-1/2 EN 324-1 — —  EN 322  EN 318	Dimension Tolerances Specified by the performance test Specified by the performance test  Specified by the manufacturer Related to service class Specified by the manufacturer Related to service class and function
<b>Particleboard</b> — thickness — service class/grade	EN 324-1 EN 312-1 EN 312-4/5/6/7	As stated by the manufacturer Tolerances As stated by the manufacturer
<b>OSB</b> — thickness — service class/grade	EN 324-1 EN 300 EN 300	As stated by the manufacturer Tolerances As stated by the manufacturer (OSB/2, OSB/3 or OSB/4)
<b>Plywood</b> — lay-up — wood species and surface appearance class	 EN 313-1/2 EN 635-1/2/3	 As stated by the manufacturer As stated by the manufacturer
— thickness — service class <b>Solid wood panel</b> — lay-up — wood species and surface appearance class	EN 324-1 EN 315 EN 636-1/2/3  EN 12775 EN 13017-1/2	As stated by the manufacturer Tolerances As stated by the manufacturer  As stated by the manufacturer As stated by the manufacturer
— thickness — service class <b>Fibreboard</b>	EN 324-1 EN 315 prEN 13353	As stated by the manufacturer Tolerances As stated by the manufacturer
— thickness — service class, type and grade <b>Cement bonded particleboard</b>	EN 324-1 EN 622-1 EN 622-2/3/5	As stated by the manufacturer Tolerances As stated by the manufacturer
— thickness — service class	EN 324-1 EN 634-1 EN 634-2	As stated by the manufacturer Tolerances As stated by the manufacturer

#### 4.1.2 Durability

The following properties shall be specified for all wood-based panels used for floating floor decking in service class 1 or 2 (see Table 3):



biological durability

moisture resistance and glue bond quality depending on panel type

**Table 3 — European Standards relating to the durability of wood-based panels**

Wood-based panel	Relevant EN	Explanation
Particleboard	EN 335-3 EN 312-4/5/6/7 EN 312-5/7 EN 321 EN 1087-1	Biological hazard class Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 2 — Cyclic test Service class 2 — Boil test
Plywood	EN 335-3 ENV 1099 EN 636-1/2/3 EN 636-2/3 EN 314-1/2	Biological hazard class Guideline for biological durability <sup>b</sup> Service class 1 — Dry conditions Service class 2 — Humid conditions Tests and requirement according to service class
Solid wood panel	EN 335-3 prEN 13353	Biological hazard class Service class 1 — Dry conditions
OSB	prEN 13353 prCEN/TS 13354  EN 335-3 EN 300 OSB/2/3/4	Service class 2 — Humid conditions Tests and requirement according to service class  Biological hazard class Service class 1 — Dry conditions
Fibreboard	EN 300 OSB/3/4 EN 321 EN 1087-1  EN 335-3 EN 622-2/3/5	Service class 2 — Humid conditions Service class 2 — Cyclic test Service class 2 — Boil test <sup>a</sup>  Biological hazard class Service class 1 — Dry conditions
Cement bonded particleboard	EN 622-2/3/5 EN 321 EN 1087-1  EN 335-3	Service class 2 — Humid conditions Service class 2 — Cyclic test Service class 2 — Boil test <sup>a</sup>  Biological hazard class
	EN 634-2 EN 634-2 EN 321	Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 2 — Cyclic test
<sup>A</sup> EN 1087-1 test methods are modified for OSB and Fibreboard type MDF, see panel specification standard		

<sup>B</sup> This standard describes the moisture content that can be attained by different panel products and their risk of attack from different wood-destroying organisms (fungi, insects and marine borers) when exposed to different service environments. The service environments are defined in terms of the hazard classed of biological attack (see EN 335-1). It does not define the expected service life of the different panel products when used in different service environments.



### 4.1.3 Mechanical properties

#### 4.1.3.1 General

Test methods and requirements are set out in Tables 4, 5, 6 and 7.

#### 4.1.3.2 Load categories

Load categories shall be A, B, C or D in relation to EN 1991-1-1 or in special cases of the field of application.

Areas in dwellings, offices, etc. are divided into categories according to their specific use:

- Category A: Areas for domestic and residential activities
  - e.g. — rooms in residential buildings and houses;
  - rooms and wards in hospitals;
  - bedrooms in hotels and hostels;
  - kitchens and toilets.
- Category B: Office areas
- Category C: Areas where people may congregate (with the exception of areas defined under categories A, B and D)
  - C1: Areas with tables, e.g. areas in schools, cafés, restaurants, dining halls, reading rooms, receptions
  - C2: Areas with fixed seats e.g. areas in churches, theatres or cinemas, conference rooms, lecture halls, assembly halls, waiting rooms
  - C3: Areas without obstacles for moving people, e.g. areas in museums, exhibition rooms, and access areas in public and administration buildings, hotels
  - C4: Areas with possible physical activities, e.g. dance halls, gymnastic rooms, stages
  - C5: Areas susceptible to over crowding, e.g. in building for public events like concert halls, sport halls including stands, terraces and access areas
- Category D: Shopping areas
  - D1: Areas in general retail shops
  - D2: Areas in department stores, e.g. areas in warehouses, stationary and office stores

#### 4.1.3.3 Uniformly distributed load

Bending stiffness.

#### 4.1.3.4 Concentrated point load

Deflection in relation to concentrated point load (serviceability).

#### 4.1.3.5 Dynamic load

Dynamic impact loads.

#### 4.1.3.6 Alternating load

Wheel load in relation to load category B, C or D.



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Table 4 — European Standards relating to mechanical properties, test methods and requirements

Type of load	Relevant EN	Explanation
Uniformly distributed load Bending modulus/stiffness <sup>a</sup>	EN 1058 EN 789 EN 12369-1	Sampling for and evaluation of characteristic values Technical data sheet from the manufacturer based on tests Characteristic values for established panel products
Concentrated point load Deflection under concentrated point load/according to load category	prCEN/TS 13810-2	Determination of concentrated point load and related deflection. Load category, field of application.
Dynamic load Impact load Alternating load	EN 1195	Specified by the performance test. Determination of soft body impact
Wheel load <sup>a</sup>	prCEN/TS 13810-2	Specified by the performance test
<sup>a</sup> The requirements of characteristic values given in Table 4 can be satisfied by using either the values set out in EN 12369-1 or from test data derived by using EN 789 and EN 1058.		

## 4.2 Supporting material

See annex A.

## 4.3 Vapour control layer

A vapour control layers providing a sufficient vapour resistance (generally  $\geq 200$  MNs/mg comparable to  $S_d = 40$  m) shall be installed above the insulation to make sure that a moisture increase by condensation inside the flooring system is avoided.

NOTE 1 A vapour control layer is not required in floating floors on a wood based substructure (see example in Figure A.3).

The diffusion resistance of the vapour control layer shall always be higher than the diffusion resistance of the floor covering materials.

NOTE 2  $S_d$  is the equivalent depth of air to give the same diffusion resistance as the wood based panel.  $S_d = 40$  m = diffusion resistance of 40 m of air.

# 5 Performance requirements

## 5.1 Stiffness

The floating floor shall be sufficiently stiff to ensure that the specified use does not cause deflections that may influence its performance.

## 5.2 Loads and deflection limits

In addition to those limits specified in 6.4 of EN 12871:2001 the requirements set out in Tables 5, 6 and 7 below shall be satisfied.

The concentrated loads, alternating loads and impact load for floating floors are given in Tables 5, 6 and 7.

NOTE 1 The test method prCEN/TS 13810-2 as EN 1195 relate to an contact area with a diametre of 25 mm. The factor ( $k_{dis} = 0,65$ ) taking into account the reduced contact area with regard to EN 1991-1-1, see EN 12871, has been used.

NOTE 2 Alternating load simulates walking, chair wheels, pallet lifter etc.

NOTE 3 The impact load simulates falling objects, humans falling, jumping, dancing.

Table 5 — Concentrated point load — Load and deflection requirements

Load category: EN 1991-1-1	A	B	C1 to C3 and C5	C4	D1	D2
Concentrated load: EN 1991-1-1 kN based on 50 mm × 50 mm contact area	2	2	4	7	4	7
Concentrated load: See NOTE 1 based on 25 mm contact area kN	1,3	1,3	2,6	4,5	2,6	4,5
Deflection limit in millimetres for concentrated load						
x under load rack 1-4	3,0					
x beside load rack 5-8	2,5					
Δx difference (between under c	2,5					

and beside load rack)					
Table 6 — Alternating load	Load, cycles and deflection requirements				
Load category: EN 1991-1-1	B	C1, C2, C3 and C5	C4	D1	D2
Alternating load in kilo Newtons per wheel	1,5	3,0	5,0	3,0	5,0
Minimum number of load cycles	75 000				
Corresponding number of rotations	25 000				
Deflection limit in millimetres Δy <sub>a</sub>	3,0				

Table 7 — Impact load — Drop height, number of impact and deflection requirements

Impact load: Drop height in millimetres	350
Number of impacts	10
Deflection limit in millimetres after impact load Δy <sub>im</sub>	1,0

6 Sampling

Panels used for prototype testing according to prCEN/TS 13810-2 shall be sampled from production over a period of at least 3 weeks.

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## 7 Documentation

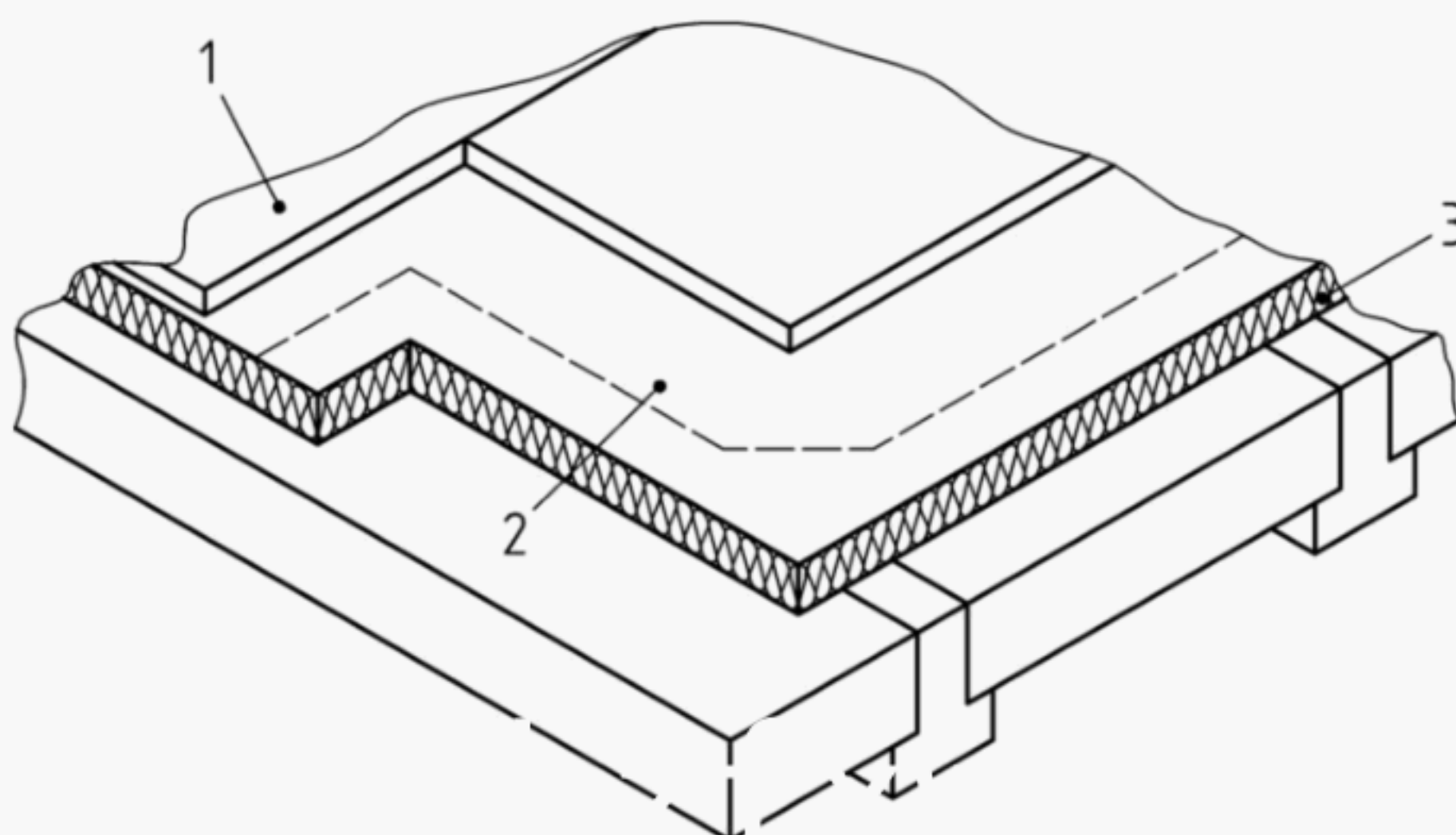
Where specific combinations of panel product and supporting materials meet the requirements set out for use in load category A, B, C or D, supporting documentation shall be provided by either the manufacturers of the component products or by the supplier of the floor system.

## Annex A (informative)

### Installation of floating floors

#### A.1 Examples for floating floors

Typical constructions are shown in Figures A.1, A.2, and A.3.



#### Key

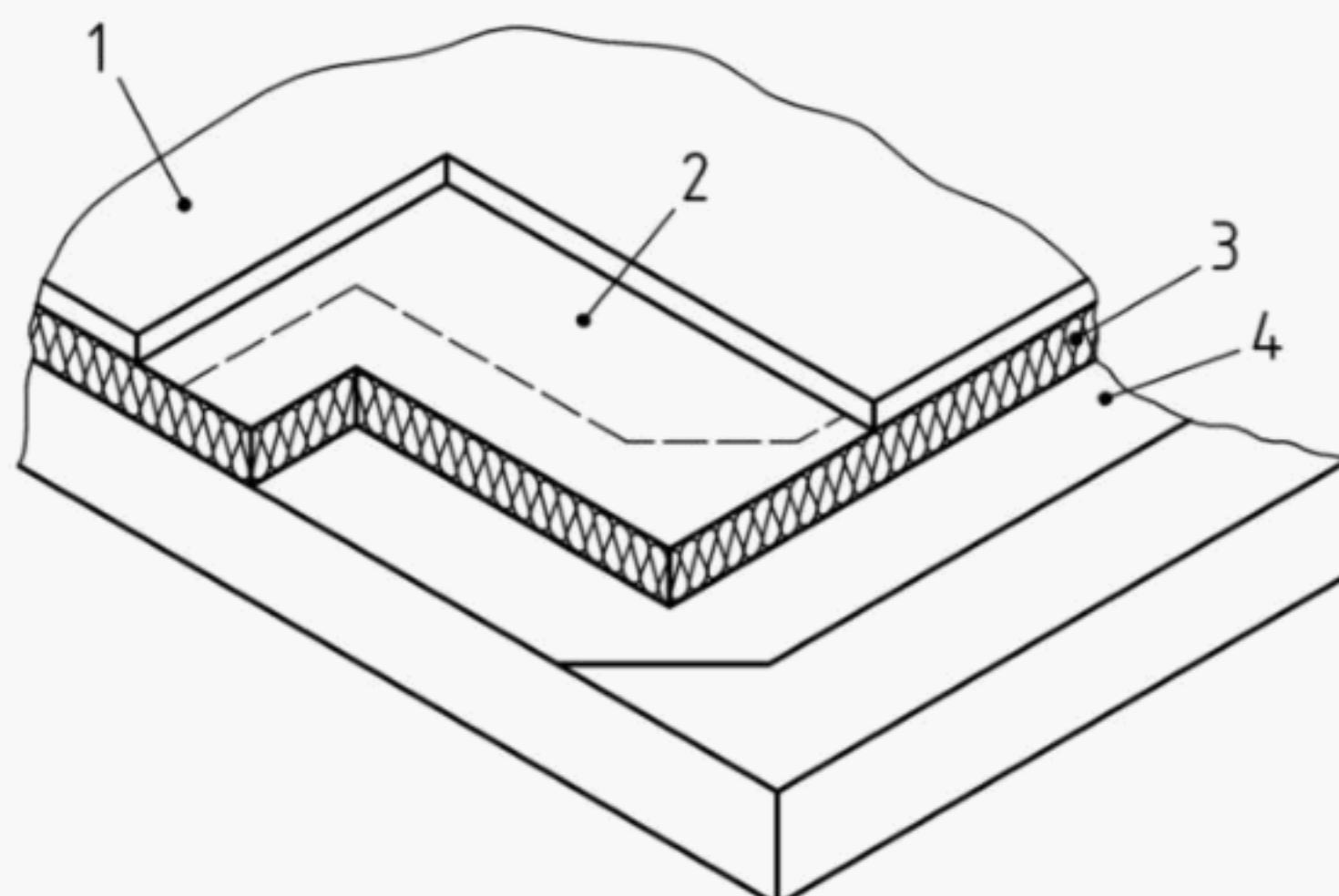
- 1 Panel
- 2 Moisture and vapour control layer
- 3 Insulation

NOTE 1 Tongued and grooved flooring panel with all joints glued. Joints in the insulation should be staggered and not coincident.

NOTE 2 A levelling screed can be required if the top surface of the subfloor is not adequately flat. Screed should be fully dry before the floating floor is laid.

Figure A.1 — Example of floating floor on an in-situ concrete substructure

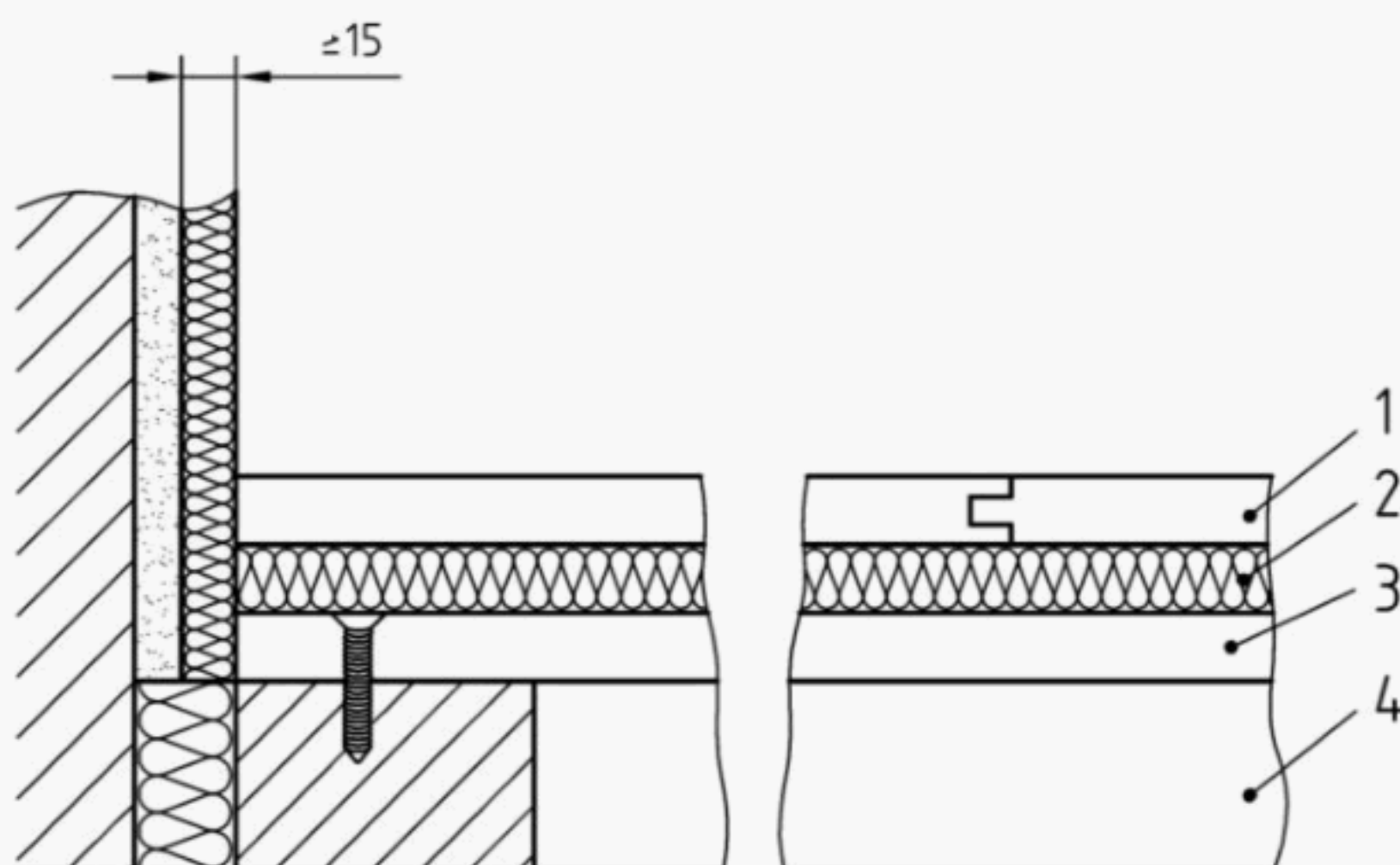


**Key**

- 1 Panel
- 2 Moisture and vapour control layer
- 3 Insulation
- 4 Damp proof membrane

NOTE Tongued and grooved flooring panel with all joints glued. Joints in the panel and the insulation should be staggered and not coincident.

Figure A.2 — Example of floating floor on a concrete substructure



Dimensions in millimetres

**Key**

- 1 Panel
- 2 Insulation
- 3 Structural floor
- 4 Beam (or timber battens)

NOTE Tongued and grooved flooring panel with all joints glued. Joints in the insulation should be staggered and not coincident.

Figure A.3 — Example of a floating floor on a suspended floor system



## A.2 Moisture during installation

Wood based panels should not be laid until all wet works are completed and the building is dried out. In wet construction (i.e. brick and block work) the overlay floor should not be installed until latest opportunity. The moisture content should be documented. In dry construction, e.g. timber frame, the overlay floor should only be installed as a working platform once the building is watertight. After laying, the floor should be protected from dirt and moisture. Any factory applied protective layer should be retained in place for as long as possible.

After finishing the floating floor the desired covering material should be installed immediately.

If this is not possible, the surface of the wood-based panels should be protected during the works against moisture increase or drying (e.g. by polythene sheets, liquid primer for wood panels).

## A.3 Moisture content in use

### A.3.1 General

The moisture content of the wood based panels should not increase from adjacent constructions or materials. The wood based panels should be protected against water splash.

Cold and hot pipes in the floating floor system should be thermally insulated.

### A.3.2 Damp-proof membrane

A damp proof membrane should always be incorporated into all types of ground floor construction. In wet construc-

tion it is necessary to include a damp proof membrane between the wet substructure and the floating floor system. The membrane should be turned up the wall.

In beam and block construction (dry) of the ground floor the void beneath should be well ventilated.

Materials for damp-proof membranes should be used taking account of the manufacturers recommendations.

NOTE Care should be taken so as not to trap moisture.	
<b>Table A.1 — Examples for damp proof membranes</b>	
Material	$\mu$ -value (permeability)
polyethene sheets, thickness $t \geq 200 \mu\text{m}$ ( $S_d = 100 \text{ m}$ )	50 000
bitumen sheets impregnated or coated	10 000 to 80 000
hot applied asphalts (thickness $t \geq 15 \text{ mm}$ )	almost damp proof

### A.3.3 Vapour control layer

See 4.3.



### A.3.4 Panel type

Panels under service class 1 conditions should be selected from Table A.2.

**Table A.2 — Service class 1 panels**

Wood-based panel	EN	Example of use
Particleboard	EN 312-4/5/6/7	living room, office, exhibition stand
OSB	EN 300-OSB/2/3/4	
Fibreboard	EN 622-2/3/5; EN 316	
Plywood	EN 636-1/2/3	
Solid wood panel	prEN 13353	
Cement bonded particleboard	EN 634-2	

Panels under service class 2 conditions should be selected from Table A.3.

**Table A.3 — Service class 2 panels**

Wood-based panel	EN	Example of use
Particleboard	EN 312-5/7	bathroom, kitchen, entrance halls, shops
OSB	EN 300-OSB 3/4	
Fibreboard	EN 622-2/3/5; EN 316	
Plywood	EN 636-2/3	
Solid wood panel	prEN 13353	
Cement bonded particleboard	EN 634-2	

## A.4 Installation

### A.4.1 Sub-floors

Sub-floors should be flat and level. The surface finish of a concrete or screed base should be similar to that produced by a float finish. Surface regulatory should be maximum 3 mm deviation from under a 3 metre straight edge.



## A.4.2 Supporting material

Supporting materials are installed for improving thermal and sound resistance. Examples of suitable materials are given in Table A.4.

**Table A.4 — Examples of insulation materials**

Material <sup>a</sup>	Sound insulation	Thermal insulation
Mineral wool	+	+
Softboards acc. EN 622-4	+	+
Expanded polystyrene	limited	+
Extruded polystyrene	limited	+
<sup>a</sup> The degree of insulation is a function of material thickness and density. + suitable		

The insulation layer should be continuous without gaps.

**NOTE** The recommendations of the insulation manufacturer regarding the design of the floating floor system (incl. load category) should be followed.

## A.4.3 Installation of panels

Tongue and groove panels should be used. The panel joints shall be staggered and shall not coincide with the joints of the insulation material.

Panel joints should be glued (e.g. by PVAC).

To enable expansion to occur a perimeter gap should be provided equal to 2 mm/m length/width of floor but not less than 10 mm.

Perimeter gaps should be filled with material which enables expansion if occur (e.g. with stripes of insulation material). Gap providing wedges or packers should be removed after installation and hardening of the glue.

**NOTE 1** In large rooms with length or width > 10,0 m expansion gaps of 2 mm/m should be provided every 10 metres.

**NOTE 2** Partitions and stairs should not be installed on floating floors.



## Bibliography

EN 316, Wood fibreboards — Definition, classification and symbols.

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

EN 13986, Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking.

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