

BS EN 312:2010



BSI Standards Publication

# Particleboards — Specifications

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**National foreword**

This British Standard is the UK implementation of EN 312:2010. It supersedes BS EN 312:2003 which is withdrawn.

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.

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## Foreword

This document (EN 312:2010) 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of an identical text or by endorsement, at the latest by March 2011, and conflicting national standards shall be withdrawn at the latest by March 2011.

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 supersedes EN 312:2003.

Compared to EN 312:2003, the following main modifications have been made:

- a) New thickness ranges included;
- b) Certain values for bending strength, modulus of elasticity and thickness swelling modified.

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

## 1 Scope

This European Standard specifies the requirements for flat-pressed or calendar-pressed unfaced particleboards as defined in EN 309.

NOTE 1 This standard is called up in EN 13986 for construction applications. Products specified in this standard are referred to in EN 13986 as resin-bonded particleboards.

The values listed in this standard relate to product properties, but they are not characteristic values to be used in design calculations.

NOTE 2 Such characteristic values (e.g. for use in design calculation in EN 1995-1-1) are given either in EN 12369-1 or derived by testing according to EN 789, EN 1058 and ENV 1156.

Additional information on supplementary properties for certain applications is also given.

NOTE 3 Particleboards in accordance with this standard may be referred to as P1 to P7-boards. Boards of type P4 to P7 are intended for use in design and construction of load-bearing or stiffening building elements, e.g. walls, flooring, roofing and I-beams (see EN 1995-1-1 and/or performance standards).

This standard does not apply to extruded particleboards and flaxboards, which are standardised in EN 14755 and EN 15197 respectively.

## 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*

EN 309:2005, *Particleboards — Definition and classification*

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

EN 311, *Wood-based panels — Surface soundness — Test method*

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

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

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 322, *Wood-based panels — Determination of moisture content*

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

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 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 326-3, *Wood-based panels — Sampling, cutting and inspection — Part 3: Inspection of an isolated lot of panels*

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

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

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

EN 13986:2004, *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*

ISO 3340, *Fibre building boards — Determination of sand content*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13986:2004 and EN 309:2005 and the following apply.

#### 3.1

##### **dry conditions**

conditions corresponding to service class 1 of EN 1995-1-1:2004 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

#### 3.2

##### **humid conditions**

conditions corresponding to service class 2 of EN 1995-1-1:2004 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

#### 3.3

##### **general purpose**

all non-load bearing applications, e.g. furniture and fitments

#### 3.4

##### **load-bearing**

use in a load-bearing construction, i.e. an organized assembly of connected parts designed to provide mechanical resistance and stability to the works

NOTE Also referred to as "structural use".

### 4 Classifications

Seven types of boards are classified and are distinguished as follows:

- P1 General purpose boards for use in dry conditions;
- P2 Boards for interior fitments (including furniture) for use in dry conditions;
- P3 Non load-bearing boards for use in humid conditions;
- P4 Load-bearing boards for use in dry conditions;
- P5 Load-bearing boards for use in humid conditions;
- P6 Heavy duty load-bearing boards for use in dry conditions;
- P7 Heavy duty load-bearing boards for use in humid conditions.

## 5 General requirements for all board types

Particleboards shall comply with the general requirements as listed in Table 1 when dispatched from the production factory. For certain uses of particleboards (see performance standard EN 12871), special tolerances are required for the dimensional properties listed under No. 1. In the case of dispatch in cut sizes, or of further machined boards (tongued and grooved, and similar), special tolerances for properties No. 1, 2 and 3 may be agreed upon.

Table 1 — General requirements at dispatch

No	Property	Test method	Requirement
1 <sup>a</sup>	Tolerances on nominal dimensions	EN 324-1	
	— Thickness (sanded) within and between boards		± 0,3 mm
	— Thickness (unsanded) within and between boards		– 0,3 mm + 1,7 mm
	— Length and width		± 5 mm
2 <sup>a</sup>	Edge straightness tolerance	EN 324-2	1,5 mm per m
3 <sup>a</sup>	Squareness tolerance	EN 324-2	2 mm per m
4	Moisture content	EN 322	5 % to 13 %
5 <sup>a</sup>	Tolerance on the mean density within a board	EN 323	± 10 %
6 <sup>b</sup>	Formaldehyde release according to EN 13986		
	— Class E 1		
	Perforator value	EN 120	Content ≤ 8 mg/100 g oven dry board <sup>d</sup>
	Formaldehyde release <sup>c</sup>	EN 717-1	Release ≤ 0,124 mg/m <sup>3</sup> air
	— Class E 2		
	Perforator value	EN 120	Content > 8 mg/100 g oven dry board and ≤ 20 mg/100 g oven dry board
	Formaldehyde release <sup>c</sup>	EN 717-1	Release > 0,124 mg/m <sup>3</sup> air and ≤ 0,3 mg/m <sup>3</sup> air
<p><sup>a</sup> These values are characterized by a moisture content in the material corresponding to a relative humidity of 65 % and a temperature of 20 °C.</p> <p><sup>b</sup> The perforator values apply to boards with moisture contents H of 6,5 %. In the case of particleboards with different moisture content (in the range of 3 % ≤ H ≤ 10 %), the perforator value shall be multiplied by a factor F which can be calculated from the following equation:  <math display="block">F = - 0,133 H + 1,86</math></p> <p><sup>c</sup> Required for initial type testing other than for established products where initial type testing may also be done on the basis of existing data with EN 120 or EN 717-1 testing, either from factory production control or from external inspection.</p> <p><sup>d</sup> Experience has shown that to ensure compliance with these limits, the rolling average of the EN 120 values found from the internal factory production control over a period of ½ year should not exceed 6,5 mg HCHO/100 g panel mass.</p>			
NOTE In certain countries only products of formaldehyde class E1 are allowed.			

## 6 Requirement values

The requirements in Tables 2 to 11 shall be met by 5 percentile values (95 percentile values in the case of thickness swelling) based on the mean values for individual boards and calculated in accordance with EN 326-1. In the case of thickness swelling they shall be equal to or less than the values in Tables 2 to 11 and in the case of all other properties they shall be equal to or greater than the values in Tables 2 to 11.

The values in Tables 2 to 11 for both bending strength and modulus of elasticity shall apply to test results obtained in the weakest direction in the plane of the panel.

NOTE The manufacturer may test the panel in only the main direction if this direction is clearly indicated on the machined ready to use panel.

## 7 Requirements for general purpose boards for use in dry conditions (Type P1)

Boards of this type shall comply with the requirements given in Tables 1 and 2.

**Table 2 — General purpose boards for use in dry conditions (Type P1) — Requirements for specified mechanical properties**

Property	Test method	Unit	Requirement							
			Thickness range (mm, nominal)							
			< 3	3 to 6	> 6 to 13	> 13 to 20	> 20 to 25	>25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	11,5	11,5	10,5	10	10	8,5	7	5,5
Internal bond	EN 319	N/mm <sup>2</sup>	0,31	0,31	0,28	0,24	0,20	0,17	0,14	0,14

NOTE The values are characterised by a moisture content in the material corresponding to a relative humidity of 65 % and a temperature of 20 °C.

## 8 Requirements for boards for interior fitments (including furniture) for use in dry conditions (Type P2)

Boards of this type shall comply with the requirements given in Tables 1 and 3.

**Table 3 — Boards for interior fitments (including furniture) for use in dry conditions (Type P2) — Requirements for specified mechanical properties**

Property	Test method	Unit	Requirement								
			Thickness range (mm, nominal)								
			< 3	3 to 4	> 4 to 6	> 6 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	13	13	12	11	11	10,5	9,5	8,5	7
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	1 800	1 800	1 950	1 800	1 600	1 500	1 350	1 200	1 050
Internal bond	EN 319	N/mm <sup>2</sup>	0,45	0,45	0,45	0,40	0,35	0,30	0,25	0,20	0,20
Surface soundness	EN 311	N/mm <sup>2</sup>	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8

NOTE The values are characterised by a moisture content in the material corresponding to a relative humidity of 65 % and a temperature of 20 °C.

## 9 Requirements for non load-bearing boards for use in humid conditions (Type P3)

### 9.1 General

Boards of this type shall comply with the requirements given in Tables 1, 4 and 5.

### 9.2 Mechanical and swelling properties

**Table 4 — Non load-bearing boards for use in humid conditions (P3) — Requirements for specified mechanical and swelling properties**

Property	Test method	Unit	Requirement								
			Thickness range (mm, nominal)								
			< 3	3 to 4	> 4 to 6	> 6 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	13	13	14	15	14	12	11	9	7,5
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	1 800	1 800	1 950	2 050	1 950	1 850	1 700	1 550	1 350
Internal bond	EN 319	N/mm <sup>2</sup>	0,50	0,50	0,50	0,45	0,45	0,40	0,35	0,30	0,25
Swelling in thickness, 24 h	EN 317	%	25	23	20	17	14	13	13	12	12

NOTE The values for bending properties, internal bond and swelling in thickness are characterised by a moisture content in the material (before treatment in the case of swelling in thickness) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

### 9.3 Moisture resistance

**Table 5 — Non load-bearing boards for use in humid conditions (Type P3) — Requirements for moisture resistance**

Property	Test method	Unit	Requirement								
			Thickness range (mm, nominal)								
			< 3	3 to 4	> 4 to 6	> 6 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
OPTION 1											
Internal bond after cyclic test	EN 321	N/mm <sup>2</sup>	0,18	0,18	0,18	0,15	0,13	0,12	0,10	0,09	0,08
Swelling in thickness after cyclic test	EN 321	%	15	15	14	14	13	12	12	11	11
OPTION 2											
Internal bond after boil test	EN 1087-1	N/mm <sup>2</sup>	0,09	0,09	0,09	0,09	0,08	0,07	0,07	0,06	0,06

NOTE The values for internal bond and swelling in thickness after option 1 treatment are characterised by a moisture content in the material (before and after cyclic test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

The values for internal bond after option 2 treatment are characterised by a moisture content in the material (before the boil test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

Requirements for moisture resistance, and if applicable swelling, are dependent upon the test method employed to assess these properties. Thus, two alternative sets of requirements (Option 1 and Option 2) are set out in Table 5 corresponding to the two principal recognised methods of evaluation. It is necessary for the manufacturer to show compliance with only one of these two options.

Option 1 requirements apply to boards subjected to an accelerated ageing test, the so-called "cyclic test in humid conditions" described in EN 321. Option 2 requirements apply to boards subjected to the so-called "boil test" described in EN 1087-1. The glues or adhesive systems suitable for the application of Option 1 and Option 2 are unrestricted.

The alkali content of boards shall not exceed 2,0 %, based on oven-dry mass and total thickness (tested analytically) and shall not exceed 1,7 % in the outer layers (by calculation).

When verifying compliance by external control only the test option performed and notified by the manufacturer shall be carried out. If the option is unknown it will be necessary to carry out both sets of procedures, even though compliance is required with only one set of requirements.

## 10 Requirements for load-bearing boards for use in dry conditions (Type P4)

Boards of this type shall comply with the requirements given in Tables 1 and 6.

**Table 6 — Load-bearing boards for use in dry conditions (Type P4) — Requirements for specified mechanical and swelling properties**

Property	Test method	Unit	Requirement									
			Thickness range (mm, nominal)									
			< 3	3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	14	15	16	16	16	15	13	11	9	7
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	1 800	1 950	2 200	2 300	2 300	2 300	2 050	1 850	1 500	1 200
Internal bond	EN 319	N/mm <sup>2</sup>	0,50	0,45	0,45	0,40	0,40	0,35	0,30	0,25	0,20	0,20
Swelling in thickness, 24 h	EN 317	%	25	25	21	19	16	15	15	15	14	14

If it is made known by the purchaser that the boards are intended for specific use in flooring, walls or roofing the performance standard EN 12871 also has to be consulted. This might result in additional requirements having to be complied with.

NOTE The values for bending properties, internal bond and swelling in thickness are characterised by a moisture content in the material (before treatment in the case of swelling in thickness) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

## 11 Requirements for load-bearing boards for use in humid conditions (Type P5)

### 11.1 General

Boards of this type shall comply with the requirements given in Tables 1, 7 and 8.

## 11.2 Mechanical and swelling properties

**Table 7 — Load-bearing boards for use in humid conditions (Type P5) — Requirements for specified mechanical and swelling properties**

Property	Test method	Unit	Requirement									
			Thickness range (mm, nominal)									
			< 3	3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	16	18	19	18	18	16	14	12	10	9
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	2 000	2 400	2 450	2 550	2 550	2 400	2 150	1 900	1 700	1 550
Internal bond	EN 319	N/mm <sup>2</sup>	0,50	0,50	0,45	0,45	0,45	0,45	0,40	0,35	0,30	0,25
Swelling in thickness, 24 h	EN 317	%	16	16	14	13	11	10	10	10	9	9

If it is made known by the purchaser that the boards are intended for specific use in flooring, walls or roofing, the performance standard EN 12871 also has to be consulted. This might result in additional requirements having to be complied with.

NOTE The values for bending properties, internal bond and swelling in thickness are characterised by a moisture content in the material (before treatment in the case of swelling in thickness) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

## 11.3 Moisture resistance

**Table 8 — Load-bearing boards for use in humid conditions (Type P5) — Requirements for moisture resistance**

Property	Test method	Unit	Requirement									
			Thickness range (mm, nominal)									
			< 3	3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
OPTION 1												
Internal bond after cyclic test	EN 321	N/mm <sup>2</sup>	0,30	0,30	0,30	0,25	0,25	0,22	0,20	0,17	0,15	0,12
Swelling in thickness after cyclic test	EN 321	%	12	12	12	12	12	12	11	10	9	9
OPTION 2												
Internal bond after boil test	EN 1087-1	N/mm <sup>2</sup>	0,15	0,15	0,15	0,15	0,15	0,14	0,12	0,11	0,10	0,09

NOTE The values for internal bond and swelling in thickness after option 1 treatment are characterised by a moisture content in the material (before and after cyclic test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

The values for internal bond after option 2 treatment are characterised by a moisture content in the material (before the boil test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

Requirements for moisture resistance, and if applicable swelling, are dependent upon the test method employed to assess these properties. Thus, two alternative sets of requirements (Option 1 and Option 2) are set out in Table 8 corresponding to the two principal recognised methods of evaluation. It is necessary for the manufacturer to show compliance with only one of these two options.

Option 1 requirements apply to boards subjected to an accelerated ageing test, the so-called "cyclic test in humid conditions" described in EN 321. Option 2 requirements apply to boards subjected to the so-called "boil test" described in EN 1087-1. The glues or adhesive systems suitable for the application of Option 1 and Option 2 are unrestricted.

The alkali content of boards shall not exceed 2,0 %, based on oven-dry mass and total thickness (tested analytically) and shall not exceed 1,7 % in the outer layers (by calculation).

When verifying compliance by external control only the test option performed and notified by the manufacturer shall be carried out. If the option is unknown it will be necessary to carry out both sets of procedures, even though compliance is required with only one set of requirements.

## 12 Requirements for heavy duty load-bearing boards for use in dry conditions (Type P6)

Boards of this type shall comply with the requirements given in Tables 1 and 9.

**Table 9 — Heavy duty load-bearing boards for use in dry conditions (Type P6) — Requirements for specified mechanical and swelling properties**

Property	Test method	Unit	Requirement								
			Thickness range (mm, nominal)								
			3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	18	20	20	20	18	16	15	14	12
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	2 800	2 900	3 150	3 150	3 000	2 550	2 400	2 200	2 050
Internal bond	EN 319	N/mm <sup>2</sup>	0,65	0,65	0,60	0,60	0,50	0,40	0,35	0,30	0,25
Swelling in thickness, 24 h	EN 317	%	18	16	16	16	15	15	15	14	14

If it is made known by the purchaser that the boards are intended for specific use in flooring, walls or roofing, the performance standard EN 12871 also has to be consulted. This might result in additional requirements having to be complied with.

NOTE The values for bending properties, internal bond and swelling in thickness are characterised by a moisture content in the material (before treatment in the case of swelling in thickness) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

## 13 Requirements for heavy duty load-bearing boards for use in humid conditions (Type P7)

### 13.1 General

Boards of this type shall comply with the requirements given in Tables 1, 10 and 11.

### 13.2 Mechanical and swelling properties

**Table 10 — Heavy duty load-bearing boards for use in humid conditions (Type P7) — Requirements for specified mechanical and swelling properties**

Property	Test method	Unit	Requirement								
			Thickness range (mm, nominal)								
			3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	> 13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40
Bending strength	EN 310	N/mm <sup>2</sup>	20	21	22	22	20	18,5	17	16	15
Modulus of elasticity in bending	EN 310	N/mm <sup>2</sup>	3 000	3 100	3 350	3 350	3 100	2 900	2 800	2 600	2 400
Internal bond	EN 319	N/mm <sup>2</sup>	0,75	0,75	0,75	0,75	0,70	0,65	0,60	0,55	0,50
Swelling in thickness, 24 h	EN 317	%	10	10	10	10	10	10	10	9	9

If it is made known by the purchaser that the boards are intended for specific use in flooring, walls or roofing, the performance standard EN 12871 also has to be consulted. This might result in additional requirements having to be complied with.

**NOTE** The values for bending properties, internal bond and swelling in thickness are characterised by a moisture content in the material (before treatment in the case of swelling in thickness) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

### 13.3 Moisture resistance

**Table 11 — Heavy duty load-bearing boards for use in humid conditions (Type P7) — Requirements for moisture resistance**

Property	Test method	Unit	Requirement									
			Thickness range (mm, nominal)									
			3 to 4	> 4 to 6	> 6 to 10	> 10 to 13	>13 to 20	> 20 to 25	> 25 to 32	> 32 to 40	> 40	
OPTION 1												
Internal bond after cyclic test	EN 321	N/mm <sup>2</sup>	0,45	0,44	0,41	0,41	0,36	0,33	0,28	0,25	0,20	
Swelling in thickness after cyclic test	EN 321	%	11	11	11	11	11	10	9	8	8	
OPTION 2												
Internal bond after boil test	EN 1087-1	N/mm <sup>2</sup>	0,25	0,25	0,25	0,25	0,23	0,20	0,18	0,17	0,15	

NOTE The values for internal bond and swelling in thickness after option 1 treatment are characterised by a moisture content in the material (before and after cyclic test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

The values for internal bond after option 2 treatment are characterised by a moisture content in the material (before the boil test) corresponding to a relative humidity of 65 % and a temperature of 20 °C.

Requirements for moisture resistance, and if applicable swelling, are dependent upon the test method employed to assess these properties. Thus, two alternative sets of requirements (Option 1 and Option 2) are set out in Table 11 corresponding to the two principal recognised methods of evaluation. It is necessary for the manufacturer to show compliance with only one of these two options.

Option 1 requirements apply to boards subjected to an accelerated ageing test, the so-called "cyclic test in humid conditions" described in EN 321. Option 2 requirements apply to boards subjected to the so-called "boil test" described in EN 1087-1. The glues or adhesive systems suitable for the application of Option 1 and Option 2 are unrestricted.

The alkali content of boards shall not exceed 2,0 %, based on oven-dry mass and total thickness (tested analytically) and shall not exceed 1,7 % in the outer layers (by calculation).

When verifying compliance by external control only the test option performed and notified by the manufacturer shall be carried out. If the option is unknown it will be necessary to carry out both sets of procedures, even though compliance is required with only one set of requirements.

### 14 Supplementary properties

For certain applications, information on some of the properties listed in Table 12 may be required. On request, this information shall be supplied by the board manufacturer and in this case shall have been derived using the test methods listed in Table 12.

**Table 12 — Supplementary properties and test methods**

Property	Test method
Density	EN 323
Dimensional changes	EN 318
Surface soundness	EN 311
Swelling in thickness	EN 317
Sand content	ISO 3340

NOTE For certain applications, information on additional properties not specified in Table 12 may be required. For instance, information on thermal conductivity, water vapour permeability and fire behaviour of particleboards is given in EN 13986.

## 15 Verification of compliance

### 15.1 General

Verification of compliance with this EN shall be carried out using the test methods listed in Tables 1 to 12.

### 15.2 External control

External control of the factory, if any, shall be carried out according to EN 326-2.

Inspection of isolated lots shall be carried out according to EN 326-3.

In the case of formaldehyde potential determined by EN 120 perforator method, however, for both external control and inspection of isolated lots of panels, the respective requirements set out in Table 1 shall be the arithmetic mean value of at least three boards. Additionally, no individual board shall exceed an upper tolerance limit of + 10 %.

### 15.3 Factory production control

Factory production control shall be carried out according to EN 326-2.

The properties listed in the Tables 1 to 11, shall be controlled using intervals between tests not exceeding the intervals given in Table 13. Sampling shall be carried out at random. Alternative test methods and/or unconditioned test pieces may be used if a valid correlation to the specified test methods can be proven (see EN 326-2).

Each requirement relating to formaldehyde potential (perforator value) shall be met by the 95 percentile value based on test values of individual boards. The 95 percentile value shall be equal to or less than the respective tabulated values given in Table 1.

**Table 13 — Maximum intervals between tests for each production line**

Property	Maximum interval between tests
Moisture content	8 h per type of board
Formaldehyde potential <sup>a</sup> Class E 1 Class E 2	24 h per type of board 1 week per type of board
All other properties listed in Table 1	8 h per type and thickness range
Moisture resistance Option 1 Option 2	1 week 8 h <sup>b</sup>
All other properties listed in Tables 2 to 11	8 h <sup>b</sup>
<p><sup>a</sup> Certain types of particleboards are known to release little or no formaldehyde. In these cases, the test intervals may be increased. However, it remains the responsibility of the manufacturer or inspection agency, if any, to ensure compliance with this European Standard.</p> <p><sup>b</sup> If several thickness ranges are produced in one 8 h shift, the internal control shall be organised so that at least one board of each thickness range is tested in one week's production.</p>	

## 16 Marking

### 16.1 Boards marketed within the European Economic Area for construction applications

Boards produced in conformity with this European Standard and marketed in any of the territories of the European Economic Area for use in construction as defined in the Construction Products Directive (89/106/EEC) shall be marked according to the requirements of EN 13986.

### 16.2 Other Boards

In the case of other boards produced in conformity with this European Standard, each panel or package shall be clearly marked by the manufacturer by indelible direct printing with at least the following information in this sequence:

- a) the manufacturer's name, trade mark, or identification mark;
- b) the number of this European Standard EN 312;
- c) the panel type e.g. P5;
- d) the nominal thickness;
- e) the formaldehyde class;
- f) the batch number, or the production week and year.

Additionally, panels may be colour coded by the vertical application near one corner of a series of colour stripes each 25 mm in width. Colour coding is voluntary. If applied, it shall comply with the system shown in Annex A. This standard does not exclude the dyeing of the whole board or of certain layers of the board according to traditional national practices.

## Annex A (normative)

### Voluntary colour coding system for particleboards

Two colours are used in each case. The first colour defines the panel as either intended for general purpose use or for load bearing applications (either one or two stripes of this colour are used). The second colour identifies the panel as being suitable for use in either dry or humid conditions.

The colour used are as follows:

- First colour -white: General purpose;
- First colour -yellow: Load-bearing;
- Second colour -blue: Dry conditions;
- Second colour -green: Humid conditions.

**Table A.1 — Colour coding for particleboards complying with European Standards**

Specification	Colour code	Board type
General purpose use, dry	white, white, blue	P1
Interior fitments, dry	white, blue	P2
Non load-bearing, humid	white, green	P3
Load-bearing, dry	yellow, yellow, blue	P4
Load-bearing, humid	yellow, yellow, green	P5
Heavy duty load-bearing, dry	yellow, blue	P6
Heavy duty load-bearing, humid	yellow, green	P7

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- [3] EN 1058, *Wood-based panels — Determination of characteristic 5-percentile values and characteristic mean values*
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- [5] EN 1995-1-1:2004, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*
- [6] EN 12369-1, *Wood-based panels — Characteristic values for structural design — Part 1: OSB, particleboards and fibreboards*
- [7] EN 14755, *Extruded particleboards — Specifications*
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- [9] Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, Official Journal L 40, 11.2.1989, pp. 12-26



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