

Particleboards — Specification

Part 1:

General requirements for all board types

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Part 1:

General requirements for all board types

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DKS 2242-1: 2018

Foreword

This Kenya Standard was prepared by the Plywood and Boards Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

The standard sets out three principal grades of particleboard including a grade suitable for high architectural finished surfaces. The sizes specified in the standard are in line with the metrication policy, though special sizes for use in the manufacture of doors are also specified.

During the preparation of this standard, references were made to the following document.

EN 312, Particleboards specifications Part 1. General requirements for all board types.

Acknowledgement is hereby made for the assistance derived from this source.

Particleboards — Specification

Part 1:

General requirements for all board types

1 Scope

This Kenya Standard specifies the requirements for some properties, which are common for all types of uncoated particleboards or flat pressed, calendar-pressed unfaced particleboards as defined in EN 309 according to EN 312: Parts 2 to 7.

2 Normative references

This Kenya 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 Kenyan Standard, only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 120, *Wood-based panels — Determination of formaldehyde content — Extraction method called the perforator method*
- EN 312-2, *Particleboards — Specifications — Part 2: Requirements for general purpose boards for use in dry conditions*
- EN 312-3, *Particleboards— Specifications — Part 3: Requirements for boards for interior fitments (including furniture) for use in dry conditions*
- EN 312-4, *Particleboards— Specifications — Part 4: Requirements for load-bearing boards for use in dry conditions*
- prEN 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*
- prEN 312-7, *Particleboards — Specifications — Part 7: Requirements for heavy duty load-bearing boards for use in humid 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*

3 Terms and definitions

For the purposes of this document, the terms and definitions

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 Classification

- 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

Particleboards shall comply with the general requirements as listed in Table 1 when dispatched from the producing factory. For certain types or uses of particleboards (see specific standards for board types and performance standards), or in the case of dispatch in cut sizes, or further machined, (tongued and grooved, and similar), special tolerances for properties No. 1, 2 and 3 may be agreed upon.

Table 1 — General requirements at dispatch

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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 to	> 20 to 25	>25 to	> 32 to	> 40
Bending strength	EN 310	N/m ²	11,5	11,5	10,5	10	10	8,5	7	5,5
	EN 319	N/m ²	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 ²	13	13	12	11	11	10,5	9,5	8,5	7
Modulus of elasticity in bending	EN 310	N/mm ²	1 800	1 800	1 950	1 800	1 600	1 500	1 350	1 200	1 050
Internal bond	EN 319	N/mm ²	0,45	0,45	0,45	0,40	0,35	0,30	0,25	0,20	0,20
Surface soundness	EN 311	N/mm ²	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 ²	13	13	14	15	14	12	11	9	7,5
Modulus of elasticity in bending	EN 310	N/mm ²	1 800	1 800	1 950	2 050	1 950	1 850	1 700	1 550	1 350
Internal bond	EN 319	N/mm ²	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.

10 Moisture resistance

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

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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 ²	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 ²	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.

11 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

Bending strength	EN 310	N/mm ²	14	15	16	16	16	15	13	11	9	7
Modulus of elasticity in bending	EN 310	N/mm ²	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 ²	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.

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

12.1 General

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

12.2 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 ²	16	18	19	18	18	16	14	12	10	9
Modulus of elasticity in bending	EN 310	N/mm ²	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 ²	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.

12.3 Moisture resistance

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

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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 ²	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 ²	0,15	0,15	0,15	0,15	0,15	0,14	0,12	0,11	0,10	0,09
<p>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.</p> <p>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.</p>												

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.

13 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

Test	Requirement										
	Thickness range (mm, nominal)										

Property	method	Unit	Requirement								
			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 ²	18	20	20	20	18	16	15	14	12
Modulus of elasticity in bending	EN 310	N/mm ²	2 800	2 900	3 150	3 150	3 000	2 550	2 400	2 200	2 050
Internal bond	EN 319	N/mm ²	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.

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

14.1 General

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

14.2 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 ²	20	21	22	22	20	18,5	17	16	15
Modulus of elasticity in bending	EN 310	N/mm ²	3 000	3 100	3 350	3 350	3 100	2 900	2 800	2 600	2 400
Internal bond	EN 319	N/mm ²	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.

14.3 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 ²	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 ²	0,25	0,25	0,25	0,25	0,23	0,20	0,18	0,17	0,15	
<p>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.</p> <p>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.</p>												

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

15 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
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Density Dimensional	EN 323
changes Surface	EN 318
soundness Swelling	EN 311
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.

16 Verification of compliance

16.1 General

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

16.2 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 %.

16.3 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 potentiala 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 hr
All other properties listed in Tables 2 to 11	8 hr

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- a 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.
- b 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.

17 Marking

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

- a) the manufacturer's name, trade mark, or identification mark;
- b) the number of this Kenyan Standard ;
- 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 colours 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 white, blue	P1
Interior fitments, dry	white, green	P2
Non load-bearing, humid	yellow, yellow, blue yellow, yellow,	P3
Load-bearing, dry	green yellow, blue	P4
Load-bearing, humid	yellow, green	P5
Heavy duty load-bearing, dry		P6
Heavy duty load-bearing, humid		P7