BS EN 622-5:2009

Fibreboards — Specifications

Part 5: Requirements for dry process boards (MDF)

ICS 79.060.20

BSI British Standards

National foreword

This British Standard is the UK implementation of EN 622-5:2009. It supersedes BS EN 622-5:2006 which is withdrawn.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.

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

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

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Foreword

This document (EN 622-5:2009) 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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.

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 622-5:2006.

This standard is one of a series specifying requirements for fibreboards. The other parts of this series are listed in Clause 2 and in the bibliography.

Compared to EN 622-5:2006 the following modifications have been made:

a) Panel type MDF.RWH also intended for instantaneous or short-term load duration as a rigid underlay in roofing and walls;

b) Requirement for swelling in thickness after cyclic testing changed for panel type MDF.RWH in Table 11.

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, 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 dry process boards (MDF) as defined in EN 316.

The values listed in this European Standard relate to product properties but they are not characteristic values to be used in design calculations[1)].

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 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 320, *Fibreboards — Determination of resistance to axial withdrawal of screws*

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

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 382-1, *Fibreboards — Determination of surface absorption — Part 1: Test method for dry process fibreboards*

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

EN 1087-1:1995, *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 13271, *Timber fasteners — Characteristic load-carrying capacities and slip-moduli for connector joints*

EN 13446, *Wood-based panels — Determination of withdrawal capacity of fasteners*

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

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 the following apply.

3.1
dry conditions
conditions corresponding to service class 1 of EN 1995-1-1 which is characterized 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

NOTE Boards of this type are suitable for use only in hazard class 1 of EN 335-3.

3.2
humid conditions
conditions corresponding to service class 2 of EN 1995-1-1 which is characterized 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

NOTE Boards of this type are suitable for use in hazard classes 1 and 2 of EN 335-3.

3.3
general purpose use
use in non load-bearing applications not otherwise specified

3.4
non load-bearing use
use in non load-bearing conditions, e.g. as part of a building or construction

3.5
load-bearing use
structural use
use in a load-bearing construction, i.e. an organized assembly of connected parts designed to provide mechanical resistance and stability to the works

3.6
load duration class
class characterized by the effect of a constant load acting for a certain period of time in the life of the structure

NOTE 1 The load duration classes are defined in EN 1995-1-1, see Table 1.

Table 1 — Load duration category

Load duration class	Order of accumulated duration of characteristic load
Permanent	More than ten years
Long-term	six months to ten years
Medium-term	one week to six months
Short-term	Less than one week
Instantaneous	

NOTE 2 Examples of load-duration assignment are given in Table 2. Since climatic loads (snow, wind) vary between countries, the assignment of load-duration classes may be specified in the national annex.

Table 2 — Examples of load-duration assignment

Load duration class	Examples of loading
Permanent	Self weight
Long-term	Storage
Medium-term	Imposed floor load, snow
Short-term	Snow, wind
Instantaneous	Wind, accidental load

4 Requirements

4.1 General

Dry process boards shall comply with the general requirements of EN 622-1 together with the relevant requirements set out in 4.2, 4.3, 4.4, 4.5 and 4.6 of this European Standard. Some supplementary properties and their appropriate test methods are given in Clause 6.

The requirements in Tables 3 to 11 shall be met by 5 percentile values (95 percentile values in the case of swelling in thickness), based on the mean test values for individual panels and calculated in accordance with EN 326-1. In the case of swelling in thickness, they shall be equal to or less than the values in the tables, and in the case of all other properties, they shall be equal to or greater than the values in Tables 3 to 11.

The values in Tables 3 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.

Properties not required for specific thickness ranges are marked "—".

With the exception of swelling in thickness and internal bond after boil test (see Tables 4, 6, 8 and 11), the values given in the tables are characterised by a moisture content in the material corresponding to a temperature of 20 °C and a relative humidity of 65 %. The values given for swelling in thickness and internal bond after boil test are characterised by a moisture content in the material corresponding to a temperature of 20 °C and a relative humidity of 65 % before the treatment (immersion in water or boil treatment).

The moisture resistance of dry process boards for use in humid conditions (see Tables 4, 6, 8 and 11) is assessed by showing compliance with either one of two options:

— Option 1: Swelling in thickness and internal bond after cyclic test (according to EN 321);

— Option 2: Internal bond after immersion in boiling water (according to EN 1087-1:1995), with the modified procedure given in Annex A.

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 with only one set of specifications is required.

4.2 Requirements for non load-bearing boards, including boards for general purpose use

4.2.1 Requirements for boards for use in dry conditions

Table 3 specifies the requirements for general purpose boards for use in dry conditions, particularly interior fitments including furniture.

Table 3 — Requirements for general purpose boards for use in dry conditions (type MDF)

Property	Test method	Unit	Ranges of nominal thickness mm								
			1,8 to 2,5	> 2,5 to 4	> 4 to 6	> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	45	35	30	17	15	12	10	8	6
Internal bond	EN 319	N/mm^2	0,65	0,65	0,65	0,65	0,60	0,55	0,55	0,50	0,50
Bending strength	EN 310	N/mm^2	23	23	23	23	22	20	18	17	15
Modulus of elasticity in bending	EN 310	N/mm^2	—	—	2 700	2 700	2 500	2 200	2 100	1 900	1 700

4.2.2 Requirements for boards for use in humid conditions

Table 4 specifies the requirements for general purpose boards for use in humid conditions.

Table 4 — Requirements for general purpose boards for use in humid conditions (type MDF.H)

Property	Test method	Unit	Ranges of nominal thickness mm								
			1,8 to 2,5	> 2,5 to 4	> 4 to 6	> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	35	30	18	12	10	8	7	7	6
Internal bond	EN 319	N/mm^2	0,70	0,70	0,70	0,80	0,80	0,75	0,75	0,70	0,60
Bending strength	EN 310	N/mm^2	27	27	27	27	26	24	22	17	15
Modulus of elasticity in bending	EN 310	N/mm2	2 700	2 700	2 700	2 700	2 500	2 400	2 300	2 200	2 000
Option 1 Swelling in thickness after cyclic testing	EN 317 EN 321	%	50	40	25	19	16	15	15	15	15
Internal bond after cyclic testing	EN 319 EN 321	N/mm^2	0,35	0,35	0,35	0,30	0,25	0,20	0,15	0,10	0,10
Option 2 Internal bond after boil test [a]	EN 319 EN 1087-1	N/mm^2	0,20	0,20	0,20	0,15	0,15	0,12	0,12	0,10	0,10
[a] EN 1087-1 applies with the modified procedure given in Annex A.											

4.3 Requirements for load-bearing boards

4.3.1 Requirements for load-bearing boards for use in dry conditions

Table 5 specifies the requirements for load-bearing boards for use in dry conditions for all load duration classes.

Table 5 — Requirements for load-bearing boards for use in dry conditions (type MDF.LA)

Property	Test method	Unit	Ranges of nominal thickness mm								
			1,8 to 2,5	> 2,5 to 4	> 4 to 6	> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	45	35	30	17	15	12	10	8	6
Internal bond	EN 319	N/mm^2	0,70	0,70	0,70	0,70	0,65	0,60	0,60	0,55	0,50
Bending strength	EN 310	N/mm^2	29	29	29	29	27	25	23	21	19
Modulus of elasticity in bending	EN 310	N/mm^2	3 000	3 000	3 000	3 000	2 800	2 500	2 300	2 100	1 900
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 may result in additional requirements having to be complied with.											

4.3.2 Requirements for load-bearing boards for use in humid conditions

Table 6 specifies the requirements for load-bearing boards for use in humid conditions for instantaneous or short-term load duration only.

Table 6 — Requirements for load-bearing boards for use in humid conditions (MDF.HLS)

Property	Test method	Unit	Ranges of nominal thickness (mm)								
			1,8 to 2,5	> 2,5 to 4	> 4 to 6	> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	35	30	18	12	10	8	7	7	6
Internal bond	EN 319	N/mm^2	0,70	0,70	0,70	0,80	0,80	0,75	0,75	0,70	0,60
Bending strength	EN 310	N/mm^2	34	34	34	34	32	30	28	21	19
Modulus of elasticity in bending	EN 310	N/mm^2	3 000	3 000	3 000	3 000	2 800	2 700	2 600	2 400	2 200
Option 1 Swelling in thickness after cyclic testing	EN 317 EN 321	%	50	40	25	19	16	15	15	15	15
Internal bond after cyclic testing	EN 319 EN 321	N/mm^2	0,35	0,35	0,35	0,30	0,25	0,20	0,15	0,10	0,10
Option 2 Internal bond after boil test [a]	EN 319 EN 1087-1	N/mm^2	0,20	0,20	0,20	0,15	0,15	0,12	0,12	0,10	0,10
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 may result in additional requirements having to be complied with.											
[a] EN 1087-1 applies with the modified procedure given in Annex A.											

4.4 Requirements for light MDF boards for non load-bearing applications, including general purpose boards

4.4.1 Requirements for boards for use in dry conditions

Table 7 specifies the requirements for light MDF boards for use in dry conditions.

Table 7 — Requirements for light MDF boards for use in dry conditions (type L-MDF)

Property	Test method	Unit	Ranges of nominal thickness mm					
			> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	20	16	14	12	11	11
Internal bond	EN 319	N/mm^2	0,45	0,45	0,45	0,45	0,40	0,40
Bending strength	EN 310	N/mm^2	20	20	18	15	14	14
Modulus of elasticity in bending	EN 310	N/mm^2	1 700	1 700	1 600	1 500	1 400	1 200

NOTE In deviation from EN 319 hardwood and hardwood plywood blocks should not be used.

4.4.2 Requirements for boards for use in humid conditions

Table 8 specifies the requirements for light MDF boards for use in humid conditions.

Table 8 — Requirements for light MDF boards for use in humid conditions (type L.MDF.H)

Property	Test method	Unit	Ranges of nominal thickness mm					
			> 6 to 9	> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	18	16	13	12	11	10
Internal bond	EN 319	N/mm^2	0,45	0,45	0,45	0,45	0,40	0,40
Bending strength	EN 310	N/mm^2	20	20	18	16	16	14
Modulus of elasticity in bending	EN 310	N/mm^2	1 700	1 700	1 600	1 500	1 400	1 200
Option 1 Swelling in thickness after cyclic testing	EN 317 EN 321	%	19	16	15	15	15	15
Internal bond after cyclic testing	EN 319 EN 321	N/mm^2	0,30	0,25	0,20	0,15	0,10	0,10
Option 2 Internal bond after boil test[a]	EN 319 EN 1087-1	N/mm^2	0,15	0,15	0,12	0,12	0,10	0,10

[a] EN 1087-1 applies with the modified procedure given in Annex A.

NOTE 1 In deviation from EN 319 hardwood and hardwood plywood blocks should not be used.

NOTE 2 The requirements quoted in Table 8 apply to a special type of light MDF manufactured for specific applications in humid conditions. Users should refer to the manufacturer's data sheets for detailed information.

4.5 Requirements for ultra-light MDF boards for non load-bearing applications, including general purpose boards

Tables 9 and 10 specify the requirements for ultra-light MDF boards for use in dry conditions.

Table 9 — Requirements for ultra-light MDF boards for use in dry conditions (type UL1-MDF)

Property	Test method	Unit	Ranges of nominal thickness mm				
			> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	18	14	13	12	12
Internal bond	EN 319	N/mm^2	0,15	0,15	0,15	0,13	0,13
Bending strength	EN 310	N/mm^2	7,7	6,9	6	5,1	5,1
Modulus of elasticity in bending	EN 310	N/mm^2	600	560	510	470	470

NOTE 1 In deviation from EN 319 hardwood and hardwood plywood blocks should not be used.

NOTE 2 Boards of type UL1-MDF are typically used as insulation panels providing limited mechanical stiffening.

Table 10 — Requirements for ultra-light MDF boards for use in dry conditions (type UL2-MDF)

Property	Test method	Unit	Ranges of nominal thickness mm				
			> 9 to 12	> 12 to 19	> 19 to 30	> 30 to 45	> 45
Swelling in thickness 24 h	EN 317	%	18	14	13	12	12
Internal bond	EN 319	N/mm^2	0,35	0,35	0,35	0,30	0,30
Bending strength	EN 310	N/mm^2	18	16	14	12	12
Modulus of elasticity in bending	EN 310	N/mm^2	1 400	1 300	1 200	1 100	1 100

NOTE 3 In deviation from EN 319 hardwood and hardwood plywood blocks should not be used.

NOTE 4 Boards of type UL2-MDF are typically used as panels with stiffening function. They can be used with fasteners. These panels also have insulating properties.

4.6 Requirements for boards for use in rigid underlays in roofing and walls

Table 11 specifies the requirements for boards for use in rigid underlays in roofing and walls.

This board type may also be used for instantaneous (e.g. wind) or short-term (e.g. snow) load duration only in application as a rigid underlay in roofing and walls.

NOTE 1 These boards are referred to in EN 14964 with additional requirements.

Table 11 — Requirements for use in rigid underlays in roofs and walls (type MDF.RWH)

Property	Test method	Unit	Range of nominal thickness mm
			12 to 20
Swelling in thickness 24 h	EN 317	%	10
Internal bond	EN 319	N/mm^2	0,30
Bending strength	EN 310	N/mm^2	14
Modulus of elasticity in bending	EN 310	N/mm^2	1 600
Option 1 Swelling in thickness after cyclic testing	EN 317 EN 321	%	15
Internal bond after cyclic testing	EN 319 EN 321	N/mm^2	0,15
Option 2 Internal bond after boil test[a]	EN 319 EN 1087-1	N/mm^2	0,06
[a] EN 1087-1 applies with the modified procedure given in Annex A.			

NOTE 2 In deviation from EN 319 hardwood and hardwood plywood blocks should not be used.

5 Verification of compliance

5.1 General

Verification of compliance with this European Standard shall be carried out using the test methods listed in EN 622-1 and in Tables 3 to 11 as appropriate.

For boards for use in construction applications EN 13986 applies.

5.2 External control

External control of the factory, if any, shall be carried out according to EN 326-2. The inspection of an isolated lot of panels shall be carried out according to EN 326-3.

5.3 Factory production control

Factory production control shall be carried out according to EN 326-2. The properties listed in Tables 3, 4, 5, 6, 7, 8, 9, 10 and 11 and in EN 622-1 shall be controlled, using intervals between tests not exceeding the intervals given in Table 12. 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. The intervals between tests given in Table 12 are related to a production under statistical control.

Table 12 — Maximum interval between test

Property	Maximum interval between tests
General properties	See EN 622-1
Moisture resistance	
Option 1	1 week
Option 2	8 h [a]
All other properties listed in Tables 3 to 11	8 h [a]

[a] If several thickness ranges are produced in 8 h, the internal control shall be organised so that at least one panel of each thickness range is tested in one week's production.

6 Supplementary properties

For certain applications, information on some of the properties listed in Table 13 may be required. On request, this information shall be supplied by the board manufacturer, in which case it shall have been derived using the test methods in Table 13.

Table 13 — Supplementary properties

Property	Test method
Axial withdrawal of screws	EN 320
Surface soundness	EN 311
Dimensional changes	EN 318
Surface absorption	EN 382-1
Grit Content	ISO 3340
Withdrawal capacity of fasteners	EN 13446
Timber fasteners. Characteristic load-carrying capacity and slip moduli.	EN 13271

7 Marking

7.1 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 applications as defined in the Construction Products Directive (89/106/EEC) shall be marked according to the requirements of EN 13986.

NOTE In certain countries only products of formaldehyde class E1 are allowed.

7.2 Other boards

In the case of other boards produced in conformity with this 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) manufacturer's name, trade mark, or identification mark;

b) number of this European Standard, i.e. EN 622-5;

c) panel type e.g. MDF, or MDF.HLS;

d) nominal thickness;

e) formaldehyde class according to EN 622-1;

f) batch number, or the production week and year.

NOTE In case of cut-to-size panels, where the first purchaser is the user of the product and where he agrees that marking (other than on the package) is unnecessary, the marking of such individual panels in the package need not be undertaken.

Annex A
(normative)

Boil test according to EN 1087-1 - Modified procedure

EN 1087-1:1995 shall be used with the following modifications in the clauses:

Add the following subclause:

4.5 Air circulating oven – capable of maintaining an internal temperature of (70 ± 2) °C.

Add the following sentence in 5.5:

5.5 The bonding of the test pieces to the testing blocks shall only be carried out after the boil and subsequent treatments have been completed.

All other aspects of this subclause apply.

6 Procedure – replace with the following subclause:

6.2 After (120 ± 5) min remove the test pieces and immerse them in water at (20 ± 5) °C for (60 ± 5) min. The test pieces shall have their faces vertical and be separated from each other and from the sides and the bottom of the water bath by at least 15 mm.

Remove the test pieces from the water, dry them with a paper towel and place them, with their faces horizontal, in the drying oven at (70 ± 2) °C for (960 ± 15) min. Remove the test pieces from the oven, allow them to cool to approximately room temperature and bond the loading blocks to the faces.

NOTE If the surfaces of the test pieces are rough or uneven, they may be smoothed before bonding to the blocks by rubbing on a piece of abrasive paper which is held on a flat surface.

Bibliography

[1] EN 316, *Wood fibre boards — Definition, classification and symbols*

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

[3] EN 622-2, *Fibreboards — Specifications — Part 2: Requirements for hardboards*

[4] EN 622-3, *Fibreboards — Specifications — Part 3: Requirements for medium boards*

[5] EN 622-4, *Fibreboards — Specifications — Part 4: Requirements for softboards*

[6] EN 789, *Timber structures — Test methods — Determination of mechanical properties of wood-based panels*

[7] EN 1058, *Wood-based panels — Determination of characteristics values of mechanical properties and density*

[8] ENV 1156, *Wood-based panels — Determination of duration of load and creep factors*

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

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

[11] ENV 12872, *Wood-based panels — Guidance on the use of load-bearing boards in floors, walls and roofs*

[12] EN 14964, *Rigid underlays for discontinuous roofing — Definitions and characteristics*

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