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Wood-based panels — Oriented strand board (OSB) — Definitions, classification and specifications

Panneaux à base de bois — Panneaux de lamelles minces, longues et orientées (OSB) — Définitions, classification et spécifications

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16894 was prepared by Technical Committee ISO/TC 89, *Wood-based panels*, Subcommittee SC 2, *Particle boards*.

Wood-based panels — Oriented strand board (OSB) — Definitions, classification and specifications

1 Scope

This International Standard gives definitions, classifications and specifications for the manufacturing requirements of oriented strand board (OSB). The values given are used to classify OSB into one of four types, namely OSB type GP-REG, LB-REG, LB-MR or HLB-MR. The values are related to panel properties, but are not characteristic values to be used for design purposes.

NOTE 1 When OSB characteristic strength and stiffness values are required for design purposes, the properties can be established based on testing in accordance with ISO 16572, ASTM D7033-07 or EN 789.

NOTE 2 For specific load-bearing applications, such as walls, roofs, floors, I joist webs, the load-bearing OSB can meet the specific performance requirements for that intended application, in addition to the requirements of this International Standard.

NOTE 3 Information on supplementary properties is given in Annex C.

NOTE 4 This International Standard is the reference for OSB classifications and specifications. Other regional or national standards covering the performance of wood structural panels are given in the bibliography.

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.

ISO 9426, *Wood-based panels — Determination of dimensions of panels*

ISO 9427, *Wood-based panels — Determination of density*

ISO 12460-1, *Wood-based panels — Determination of formaldehyde release — Part 1: Formaldehyde emission by the 1-cubic-metre chamber method*

ISO 16572, *Timber structures — Wood-based panels — Test methods for structural properties*

ISO 16978, *Wood-based panels — Determination of modulus of elasticity in bending and of bending strength*

ISO 16979, *Wood-based panels — Determination of moisture content*

ISO 16983, *Wood-based panels — Determination of swelling in thickness after immersion in water*

ISO 16984, *Wood-based panels — Determination of tensile strength perpendicular to the plane of the panel*

ISO 16987, *Wood-based panels — Determination of moisture resistance under cyclic test conditions*

ISO 16998, *Wood-based panels — Determination of moisture resistance — Boil test*

ISO 17064:2004, *Wood-based panels — Fibreboard, particleboard and oriented strand board (OSB) — Vocabulary*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO 17064 and the following apply.

3.1 Terms and definitions

3.1.1
oriented strand board
OSB
multi-layered board made from strands of wood of predetermined shape and thickness, together with a binder, by the application of heat and pressure, with the strands in the external layers aligned and parallel to the board length or width

NOTE Adapted from ISO 17064:2004, definition 2.3.

3.1.2
major axis
direction in the plane of the board, in which the bending properties have the higher values

3.1.3
minor axis
direction in the plane of the board at right angles to the major axis

3.1.4
general purpose
GP
non-load-bearing applications, interior fitments and furniture

3.1.5
load-bearing
LB
denotes a structural or designed application, such as building elements or use as a component in a structural element such as the webs of I-joists

NOTE Examples of building elements are walls, roof and floor.

3.1.6
heavy duty load-bearing
HLB
special load-bearing grade of OSB with increased properties for more demanding applications

3.1.7
strand
manufactured wood element of a predetermined shape with an average length of more than 50 mm and average thickness less than 2 mm

3.1.8
regular
REG
product suitable for applications in dry conditions

3.1.9
moisture resistant
MR
product suitable for applications involving humid conditions

3.2 Abbreviated terms

The following abbreviated terms apply.

regular	REG	for dry conditions only
moisture resistant	MR	for humid conditions
load bearing	LB	structural or load bearing
general purpose	GP	for applications not requiring the specific properties of furniture or load-bearing grades
heavy duty load-bearing	HLB	for humid conditions

4 Classification of the OSB

Four types of board are classified and are distinguished as follows:

a) OSB GP-REG general purpose non-load-bearing OSB for interior fitments for use in dry conditions;

b) OSB LB-REG load-bearing OSB for use in dry conditions;

c) OSB LB-MR load-bearing OSB for use in humid conditions;

d) OSB HLB-MR heavy duty load-bearing OSB for use in humid conditions.

5 General requirements of all OSB types

All OSB types shall comply with the general requirements listed in Table 1 when dispatched from the producing factory.

Table 1 — General requirements for all OSB types

No.	Property	Test method	Requirements
1	Tolerances on nominal dimensions	ISO 9426	
	— thickness (sanded) within and between panels		± 0,3 mm
	— thickness (unsanded) within and between panels		± 0,8 mm
	— length and width		± 3,0 mm
2	Edge straightness tolerance	ISO 9426	1,5 mm/m
3	Squareness tolerance	ISO 9426	2,0 mm/m
4	Moisture content	ISO 16979	2 % to 12 %
5	Tolerance on the mean density within a board	ISO 9427	± 15 %
6	Formaldehyde release[ab]		
	— emission value	ISO 12460-1	0,124 or less mg/m^3

[a] There are other tests which may be used to measure formaldehyde content or release (e.g. ISO 12460-3, ISO 12460-4 and EN 120, see Bibliography). These may be used, provided a correlation is established with the reference method, ISO 12460-1.

[b] OSB manufactured with phenolic and/or isocyanate resins have a history of low formaldehyde emission results, which meets the requirements of all International Standards.

6 Requirement values

The values given in Tables 2 to 7, and determined by the relevant test methods as listed in Clauses 7 to 10, shall be used for factory production control (FPC) purposes only and shall not be used in design calculations.

With the exception of the moisture resistance requirements in Tables 5 and 7 and swelling in thickness requirements in Tables 2, 3, 4 and 6, the values given in Tables 2 to 7 are characterized by moisture content in the material corresponding to a temperature of 20 °C and a relative humidity of the surrounding air of 65 %.

The values for the moisture resistance requirements in Tables 5 and 7 and swelling in thickness requirements in Tables 2, 3, 4 and 6 are characterized by moisture content in the material before the treatment corresponding to a temperature of 20 °C and a relative humidity of the surrounding air of 65 %.

The requirements in Tables 2 to 7 shall be met by the 5th percentile values (95th percentile values in the case of swelling in thickness), based on the mean values for individual panels and calculated in accordance with Annex A. 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 given in the tables.

7 Requirements for general purpose non-load-bearing OSB for interior fitments for use in dry conditions (Type OSB GP-REG)

In addition to the requirements specified in Clause 5, this clause specifies the requirements for general purpose OSB, and OSB for interior fitments (including furniture), for use in dry conditions. Therefore, OSB of this type shall comply with the requirements given in Tables 1 and 2.

For definitions of values given in Table 2, see Clause 6.

Table 2 — General purpose non-load-bearing OSB for interior fitments (including furniture) for use in dry conditions — Requirements for specified mechanical and swelling properties

Board type OSB GP-REG	Test method	Unit	Requirement		
			Board thickness range nominal mm		
Property			6 to 10	> 10 and < 18	18 to 25
Bending strength — major axis	ISO 16978	MPa	20	18	16
Bending strength — minor axis	ISO 16978	MPa	10	9	8
Modulus of elasticity in bending — major axis	ISO 16978	MPa	2 500	2 500	2 500
Modulus of elasticity in bending — minor axis	ISO 16978	MPa	1 200	1 200	1 200
Internal bond	ISO 16984	MPa	0,30	0,28	0,26
Swelling in thickness — 24 h	ISO 16983	%	25	25	25

8 Requirements for load-bearing OSB for use in dry conditions (Type OSB LB-REG)

In addition to the requirements specified in Clause 5, this clause specifies the requirements for load-bearing OSB for use in dry conditions. Therefore, OSB of this type shall comply with the requirements given in Tables 1 and 3.

For definitions of values given in Table 3, see Clause 6.

Table 3 — Load-bearing OSB for use in dry conditions — Requirements for specified mechanical and swelling properties

Board type OSB LB-REG	Test method	Unit	Requirement				
			Board thickness range nominal mm				
Property			6 to 10	> 10 and < 18	18 to 25	> 25 to 32	> 32 to 40
Bending strength — major axis	ISO 16978	MPa	22	20	18	16	14
Bending strength — minor axis	ISO 16978	MPa	11	10	9	8	7
Modulus of elasticity in bending — major axis	ISO 16978	MPa	3 500	3 500	3 500	3 500	3 500
Modulus of elasticity in bending — minor axis	ISO 16978	MPa	1 400	1 400	1 400	1 400	1 400
Internal bond	ISO 16984	MPa	0,34	0,32	0,30	0,29	0,26
Swelling in thickness — 24 h	ISO 16983	%	20	20	20	20	20
If it is known by the purchaser that the OSB is intended for specific use in flooring, walls or roofing, additional applicable performance requirements in the reference standards should be consulted (see Bibliography), as these additional requirements can apply.							

9 Requirements for load-bearing OSB for use in humid conditions (Type OSB LB-MR)

9.1 General

In addition to the requirements specified in Clause 5, this clause specifies the requirements for load-bearing OSB for use in humid conditions. Therefore, OSB of this type shall comply with the requirements of Tables 1, 4 and 5.

For definitions of values given in Tables 4 and 5, see Clause 6.

9.2 Mechanical and swelling properties

Table 4 — Load-bearing OSB for use in humid conditions — Requirements for specified mechanical and swelling properties

Board type OSB LB-MR	Test method	Unit	Requirement				
			Board thickness range nominal mm				
Property			6 to 10	> 10 and < 18	18 to 25	> 25 to 32	> 32 to 40
Bending strength — major axis	ISO 16978	MPa	22	20	18	16	14
Bending strength — minor axis	ISO 16978	MPa	11	10	9	8	7
Modulus of elasticity in bending — major axis	ISO 16978	MPa	3 500	3 500	3 500	3 500	3 500
Modulus of elasticity in bending — minor axis	ISO 16978	MPa	1 400	1 400	1 400	1 400	1 400
Internal bond	ISO 16984	MPa	0,34	0,32	0,30	0,29	0,26
Swelling in thickness — 24 h	ISO 16983	%	20	15	15	15	15
If it is known by the purchaser that the OSB is intended for specific use in flooring, walls or roofing, additional applicable performance requirements in the reference standards should be consulted (see Bibliography), as these additional requirements can apply.							

9.3 Moisture resistance

For the requirements for moisture resistance, three options are given in Table 5, corresponding to the three principal recognized methods of evaluation. The manufacturer shall show compliance with only one of these options.

a) The Option 1 requirements apply to OSB subjected to an accelerated aging test, called the cyclic test, in accordance with ISO 16987.

b) The Option 2 requirements apply to OSB subjected to the boil test in accordance with ISO 16998.

c) The Option 3 requirements apply to OSB subjected to an accelerated moisture cycle that has been used in national standards for OSB in North America[26].

For Option 1, there are two alternative sets of requirements, either through measuring the internal bond after the cyclic test (alternative A) or through measuring the bending strength after the cyclic test (alternative B). The manufacturer shall show compliance with only one of these two alternatives.

Table 5 — Load-bearing OSB for use in humid conditions — Requirements for moisture resistance

Board type OSB LB-MR	Test method	Unit	Requirement				
			Board thickness range nominal mm				
Property			6 to 10	> 10 and < 18	18 to 25	> 25 to 32	> 32 to 40
Option 1 — alternative A, internal bond after cyclic test	ISO 16987	MPa	0,18	0,15	0,13	0,10	0,08
— alternative B, bending strength after cyclic test in major axis	ISO 16987 ISO 16978	MPa	9	8	7	6	6
Option 2 — Internal bond after boil test	ISO 16998	MPa	0,15	0,13	0,12	0,06	0,05
Option 3 — Bending strength after vacuum soak/re-dry cycle	Annex B	MPa	16,5	15	13,5	12	10,5

10 Requirements for heavy duty load-bearing OSB for use in humid conditions (Type OSB HLB-MR)

10.1 General

In addition to the requirements specified in Clause 5, this clause specifies the requirements for heavy duty load-bearing OSB for use in humid conditions. Therefore, OSB of this type shall comply with the requirements of Tables 1, 6 and 7.

For definitions of values given in Tables 6 and 7, see Clause 6.

10.2 Mechanical and swelling properties

Table 6 — Heavy duty load-bearing OSB for use in humid conditions — Requirements for specified mechanical and swelling properties

Board type OSB HLB-MR	Test method	Unit	Requirement				
			Board thickness range nominal mm				
Property			6 to 10	> 10 and < 18	18 to 25	> 25 to 32	> 32 to 40
Bending strength — major axis	ISO 16978	MPa	30	28	26	24	22
Bending strength — minor axis	ISO 16978	MPa	16	15	14	13	12
Modulus of elasticity in bending — major axis	ISO 16978	MPa	4 800	4 800	4 800	4 800	4 800
Modulus of elasticity in bending — minor axis	ISO 16978	MPa	1 900	1 900	1 900	1 900	1 900
Internal bond	ISO 16984	MPa	0,50	0,45	0,40	0,35	0,30
Swelling in thickness — 24 h	ISO 16983	%	12	12	12	12	12
If it is known by the purchaser that the OSB is intended for specific use in flooring, walls or roofing, additional applicable performance reference standards in Annex C should be consulted as these requirements can apply.							

10.3 Moisture resistance

For the requirements for moisture resistance, two options are given in Table 7 corresponding to the two principal recognized methods of evaluation. It is necessary for the manufacturer to show compliance with only one of these two options.

a) The Option 1 requirements apply to OSB subjected to an accelerated aging test, the cyclic test, in accordance with ISO 16987.

b) The Option 2 requirements apply to OSB subjected to the boil test in accordance with ISO 16998.

The glues or adhesive systems suitable for the application of either Option 1 or 2 are unrestricted.

For Option 1, there are two alternative sets of requirements, either through measuring the internal bond after the cyclic test (alternative A) or through measuring the bending strength after the cyclic test (alternative B). The manufacturer shall show compliance with only one of these two alternatives.

Table 7 — Heavy duty load-bearing OSB for use in humid conditions — Requirements for moisture resistance

Board type OSB HLB-MR	Test method	Unit	Requirement				
			Board thickness range nominal mm				
Property			6 to 10	> 10 and < 18	18 to 25	> 25 to 32	> 32 to 40
Option 1 — Alternative A, internal bond after cyclic test	ISO 16987	MPa	0,21	0,17	0,15	0,10	0,08
Option 1 — Alternative B, bending strength after cyclic test in major axis	ISO 16987 and ISO 16978	MPa	15	14	13	6	6
Option 2, internal bond after boil test	ISO 16998	MPa	0,17	0,15	0,13	0,06	0,05