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**Wood-based panels — Dry-process  
fibreboard —**

**Part 2:  
Requirements**

*Panneaux à base de bois — Panneaux de fibres obtenus par procédé  
à sec —*

*Partie 2: Exigences*

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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 16895-2 was prepared by Technical Committee ISO/TC 89, *Wood-based panels*, Subcommittee SC 1, *Fibre boards*.

ISO 16895 consists of the following parts, under the general title *Wood-based panels — Dry-process fibreboard*:

- *Part 1: Classifications*
- *Part 2: Requirements*

# Wood-based panels — Dry-process fibreboard —

## Part 2: Requirements

### 1 Scope

This part of ISO 16895 provides the manufacturing property requirements for uncoated dry-process fibreboard.

The values listed in this part of ISO 16895 relate to product properties used to classify fibreboards into one of four types, UDF, LDF, MDF and HDF (see Clause 3), for use in one of four service conditions, REG, MR, HMR and EXT. The values are not characteristic values to be used for design purposes.

### 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 12460-2, *Wood-based panels — Determination of formaldehyde release — Part 2: Small-scale chamber method*

ISO 12460-3, *Wood-based panels — Determination of formaldehyde release — Part 3: Gas analysis method*

ISO 12460-4, *Wood-based panels — Determination of formaldehyde release — Part 4: Desiccator method*

ISO 12460-5, *Wood-based panels — Determination of formaldehyde release — Part 5: Perforator method*

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

ISO 16895-1, *Wood-based panels — Dry-process fibreboard — Part 1: Classifications*

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 16981, *Wood-based panels — Determination of surface soundness*

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*

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

ISO 20585, *Wood-based panels — Determination of wet bending strength after immersion in water at 70 °C or 100 °C (boiling temperature)*

### 3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in ISO 17064 and ISO 16895-1 and the following abbreviations apply.

EXT	exterior
FN	furniture
GP	general purpose
HDF	high-density fibreboard
HMR	highly moisture resistant
LB	load bearing
LDF	low-density fibreboard
MDF	medium-density fibreboard
MR	moisture resistant
REG	regular
UDF	ultra-low-density fibreboard

### 4 Expression of specification limits and general requirements

#### 4.1 Expression of specification limits

This International Standard may be used to evaluate groups of panels or production batches. To evaluate a group of panels, this requires that:

- The mandatory tests of ISO 16895-1, Tables 5 to 8, be applied to samples of the group. Conditioning of test specimens is required and is specified in each test method.
- The results of the tests be evaluated against the appropriate specification limits in Tables 1 to 19 of this part of ISO 16895, according to the product type and thickness range of the panels. Tables 1 and 2 apply to all product types and thickness ranges of panels.

For density variation and dimensions (Table 1), specification limits are based on the mean values for individual panels (calculated in accordance with Annex A) and are maximum tolerances. For formaldehyde emission, Table 2 gives upper specification limits for individual panel results.

Specification limits in Tables 3 to 19 are based on 5 (lower) or 95 (upper) percentile expressions, according to 4.2 and 4.3.

Dry-process fibreboards shall comply with the relevant requirements of this International Standard when despatched from the producing factory.

#### 4.2 Lower specification limits

The requirements in Tables 3 to 21 are the lower specification limits for the following properties:

- a) bending strength [modulus of rupture (MOR)];
- b) modulus of elasticity (MOE);
- c) internal bond strength;
- d) surface soundness;
- e) internal bond strength after cyclic test;
- f) internal bond strength after boil test;
- g) wet bending strength.

The 5-percentile values based on the mean values for individual panels and calculated in accordance with Annex A shall be equal to or greater than the lower specification limits in Tables 3 to 21.

#### 4.3 Upper specification limits

The requirements in Tables 3 to 21 are the upper specification limits for the following properties:

- a) thickness swell after 24 h.
- b) thickness swell after cyclic test.

The 95-percentile values based on the mean values for individual panels and calculated in accordance with Annex A shall be equal to or less than the upper specification limits in Tables 3 to 21.

#### 4.4 Moisture resistance requirement options

Requirements for moisture resistance are dependent upon the test method employed to assess this property. Three alternative sets of requirements (Option 1, Option 2 and Option 3) are set out in Tables 5 to 8, 12 to 18, 20 and 21 corresponding to the three principal recognized methods of evaluation. It is necessary to show compliance with only one of these three options, as follows:

- *Option 1:* Requirements apply to those fibreboards subjected to a cyclic accelerated ageing test, followed by the determination of thickness swell and internal bond, as described in ISO 16987.
- *Option 2:* Requirements apply to those fibreboards subjected to an accelerated ageing test, consisting of immersion in boiling water followed by determination of internal bond, as described in ISO 16998.
- *Option 3:* Requirements apply to those fibreboards subjected to an accelerated ageing test consisting of determination of the wet bending strength following immersion in water at 70 °C or immersion in boiling water for exterior grade products, as described in Method A or Method B of ISO 20585.

**4.5 Density variation, dimension and moisture content requirements**

At least 95 % of the mean values of the individual panels shall be within the maximum tolerances stated in Table 1.

Density ranges given for each product type in Clauses 5, 6, 7 and 8 are a guide only and not a mandatory specification. Products may be designated as a particular type if they meet the specified requirements for that type.

**Table 1 — Requirements for density variation, dimensions and moisture content**

Property	Test method	Requirement		
Density variation within panel	ISO 9427	±10 % max from mean		
Length and width	ISO 9426	±2 mm/m, max. ±5 mm		
Squareness	ISO 9426	< 2 mm/m		
Thickness	ISO 9426	<b>Thickness range</b> (mm, nominal)		
		< 8	≥ 8 to 12	> 12
— Unsanded board		-0,3 +1,5	-0,3 +1,5	-0,5 +1,7
— Sanded board		±0,2	±0,3	±0,3
Moisture content (advisory only)	ISO 16979	5 to 13 %		

**4.6 Formaldehyde emission requirements**

Compliance with formaldehyde requirements can be confirmed by applying one test method only of those listed in Table 2. The reference chamber method can take up to four weeks for each test to be completed. The other tests are designated production control methods because one test can be completed within 24 h. Each individual panel result shall comply with the specification limits stated in Table 2 for the selected method.

**Table 2 — Maximum emission limits of formaldehyde for fibreboard**

Test method and units				
Reference chamber method	Production control methods			
	Small chamber method	Gas analysis method	Desiccator method	Perforator method
ISO 12460-1	ISO 12460-2	ISO 12460-3	ISO 12460-4	ISO 12460-5
Emission	Emission	Emission	Emission	Content
mg/m <sup>3</sup>	ppm	mg/m <sup>2</sup> /h	mg/L	mg/100 g
0,124	<sup>a</sup>	3,5	0,7	8
NOTE National regulations may impose restrictions on the use of boards of particular formaldehyde emission levels.				
<sup>a</sup> If the small chamber method or any other method is used for production control, correlations should be established with the reference chamber method to determine the emission value that is equivalent to the chamber method limit value stated in this table. Correlations may be regional, national, company or plant specific as appropriate.				

**4.7 Load bearing particleboard**

When fibreboard is classified as “load bearing” (LB) and nominated for structural applications, characteristic strength and stiffness values shall be established based upon testing in accordance with ISO 16572 or equivalent ASTM or EN standards. Alternatively, for specific load bearing applications (e.g. walls, roofs, floors, I-joist webs), the load bearing fibreboard shall meet the specific performance requirements for that intended application.

## 5 Specific property requirements for ultra-low-density fibreboard

Ultra low-density fibreboards have a nominal density of less than 550 kg/m<sup>3</sup>.

Requirements for UDF-FN REG fibreboard are listed in Table 3.

**Table 3 — Requirements for UDF-FN REG**

Property	Test method	Units	Requirement			
			Thickness ranges (mm, nominal)			
			> 9 to 13	> 9 to 13	> 9 to 13	> 9 to 13
Bending strength (MOR)	ISO 16978	MPa	18	14	13	12
Internal bond strength	ISO 16984	MPa	0,35	0,35	0,30	0,30
24 h thickness swell	ISO 16983	%	18	14	13	12

## 6 Specific property requirements for low-density fibreboard

### 6.1 General

Low-density fibreboards have a nominal density of 550 to 650 kg/m<sup>3</sup>.

### 6.2 Requirements for furniture type low-density fibreboard for use in dry conditions

Requirements for LDF-FN REG fibreboard are listed in Table 4.

**Table 4 — Requirements for LDF-FN REG fibreboard**

Property	Test method	Units	Requirement				
			Thickness ranges (mm, nominal)				
			> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	20	20	18	15	14
Modulus of elasticity (MOE)	ISO 16987	MPa	1 700	1 700	1 600	1 400	1 100
Internal bond strength	ISO 16984	MPa	0,45	0,45	0,45	0,40	0,35
24 h thickness swell	ISO 16983	%	20	16	14	12	11

6.3 Requirements for general purpose low-density fibreboard for use in humid conditions

Requirements for LDF-GP MR fibreboard are listed in Table 5.

Table 5 — Requirements for LDF-GP MR fibreboard

Property	Test method	Units	Requirement				
			Thickness ranges (mm, nominal)				
			> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	20	20	18	16	14
Modulus of elasticity (MOE)	ISO 16987	MPa	1 700	1 700	1 600	1 500	1 300
Internal bond strength	ISO 16984	MPa	0,45	0,45	0,45	0,45	0,40
24 h thickness swell	ISO 16983	%	18	16	13	12	10
<b>Moisture resistance</b>							
Option 1:							
Internal bond strength after cyclic test	ISO 16987	MPa	0,25	0,18	0,16	0,13	0,10
Thickness swell after cyclic test		%	19	16	15	15	15
Option 2:							
Internal bond strength after boil test	ISO 16998	MPa	0,12	0,09	0,09	0,08	0,07
Option 3:							
Bending strength after immersion in water at 70 °C	ISO 20585	MPa	6,0	5,5	4,5	3,5	3,0

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#### 6.4 Requirements for furniture type low-density fibreboard for use in humid conditions

Requirements for LDF-FN MR fibreboard are listed in Table 6.

**Table 6 — Requirements for LDF-FN MR fibreboard**

Property	Test method	Units	Requirement				
			Thickness ranges (mm, nominal)				
			> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	22	22	20	18	15
Modulus of elasticity (MOE)	ISO 16987	MPa	1 800	1 800	1 700	1 600	1 400
Internal bond strength	ISO 16984	MPa	0,50	0,50	0,45	0,40	0,38
24 h thickness swell	ISO 16983	%	16	13	11	10	10
Surface soundness	ISO 16981	MPa	0,7	0,7	0,8	0,8	0,8
<b>Moisture resistance</b>							
Option 1:							
Internal bond strength after cyclic test	ISO 16987	MPa	0,25	0,18	0,16	0,13	0,10
Thickness swell after cyclic test		%	19	16	15	15	15
Option 2:							
Internal bond strength after boil test	ISO 16998	MPa	0,12	0,09	0,09	0,08	0,07
Option 3:							
Wet bending strength after immersion in water at 70 °C	ISO 20585	MPa	6,0	5,5	4,5	3,5	3,0

**6.5 Requirements for general purpose low-density fibreboard for use in high humid conditions**

Requirements for LDF-GP HMR fibreboard are listed in Table 7.

**Table 7 — Requirements for LDF-GP HMR fibreboard**

Property	Test method	Units	Requirement	
			Thickness ranges (mm, nominal)	
			> 9 to 13	> 13 to 22
Bending strength (MOR)	ISO 16978	MPa	20	18
Modulus of elasticity (MOE)	ISO 16987	MPa	1 700	1 600
Internal bond strength	ISO 16984	MPa	0,45	0,45
24 h thickness swell	ISO 16983	%	12	10
<b>Moisture resistance</b>				
Option 1:				
Internal bond strength after cyclic test	ISO 16987	MPa	0,20	0,20
Thickness swell after cyclic test		%	15	15
Option 2:				
Internal bond strength after boil test	ISO 16998	MPa	0,10	0,10
Option 3:				
Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	9	9

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## 6.6 Requirements for furniture type low-density fibreboard for use in high humid conditions

Requirements for LDF-FN HMR fibreboard are listed in Table 8.

**Table 8 — Requirements for LDF-FN HMR fibreboard**

Property	Test method	Units	Requirement		
			Thickness ranges (mm, nominal)		
			> 9 to 13	> 13 to 22	> 22 to 34
Bending strength (MOR)	ISO 16978	MPa	22	20	18
Modulus of elasticity (MOE)	ISO 16978	MPa	1 800	1 700	1 600
Internal bond strength	ISO 16984	MPa	0,50	0,45	0,40
24 h thickness swell	ISO 16983	%	12	10	9
Surface soundness	ISO 16981	MPa	0,7	0,8	0,8
<b>Moisture resistance</b>					
Option 1:					
Internal bond strength after cyclic test	ISO 16987	MPa	0,25	0,20	0,17
Thickness swell after cyclic test		%	15	12	10
Option 2:					
Internal bond strength after boil test	ISO 16998	MPa	0,15	0,15	0,15
Option 3:					
Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	11	10	9

## 7 Specific property requirements for medium-density fibreboard

### 7.1 General

Medium-density fibreboards have a nominal density of 650 to 800 kg/m<sup>3</sup>.

### 7.2 Requirements for general purpose medium-density fibreboard for use in dry conditions

Requirements for MDF-GP REG fibreboard are listed in Table 9.

**Table 9 — Requirements for MDF-GP REG fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	23	23	23	22	22	20	17
Modulus of elasticity (MOE)	ISO 16978	MPa	2 700	2 600	2 500	2 400	2 200	1 800	1 800
Internal bond strength	ISO 16984	MPa	0,60	0,60	0,60	0,50	0,45	0,40	0,38
24 h thickness swell	ISO 16983	%	45	35	20	17	15	12	10

### 7.3 Requirements for furniture type medium-density fibreboard for use in dry conditions

Requirements for MDF-FN REG fibreboard are listed in Table 10.

**Table 10 — Requirements for MDF-FN REG fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	26	26	26	25	23	21	18
Modulus of elasticity (MOE)	ISO 16978	MPa	2 800	2 600	2 600	2 500	2 300	1 800	1 800
Internal bond strength	ISO 16984	MPa	0,65	0,65	0,65	0,60	0,50	0,45	0,40
24 h thickness swell	ISO 16983	%	45	35	20	17	15	12	10
Surface soundness	ISO 16981	MPa	0,6	0,6	0,6	0,6	0,9	0,9	0,9

#### 7.4 Requirements for load bearing medium-density fibreboard for use in dry conditions

Requirements for MDF-LB REG fibreboard are listed in Table 11.

**Table 11 — Requirements for MDF-LB REG fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	29	29	29	27	25	23	20
Modulus of elasticity (MOE)	ISO 16978	MPa	3 000	3 000	3 000	2 800	2 500	2 300	2 000
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,65	0,60	0,60	0,50
24 h thickness swell	ISO 16983	%	45	35	17	15	12	10	8

#### 7.5 Requirements for general purpose medium-density fibreboard for use in humid conditions

Requirements for MDF-GP MR fibreboard are listed in Table 12.

**Table 12 — Requirements for MDF-GP MR fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	27	27	27	26	24	22	16
Modulus of elasticity (MOE)	ISO 16978	MPa	2 700	2 700	2 700	2 500	2 400	2 300	2 000
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,65	0,65	0,60	0,55
24 h thickness swell	ISO 16983	%	35	30	14	12	10	9	7
<b>Moisture resistance</b>									
Option 1:									
Internal bond strength after cyclic test	ISO 16987	MPa	0,35	0,35	0,30	0,25	0,20	0,15	0,10
Thickness swell after cyclic test		%	50	40	20	16	15	15	15
Option 2:									
Internal bond strength after boil test	ISO 16998	MPa	0,20	0,18	0,15	0,12	0,10	0,07	0,05
Option 3:									
Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	8	7	7	6	5	4	4

7.6 Requirements for furniture type medium-density fibreboard for use in humid conditions

Requirements for MDF-FN MR fibreboard are listed in Table 13.

Table 13 — Requirements for MDF-FN MR fibreboard

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	27	27	27	26	24	22	17
Modulus of elasticity (MOE)	ISO 16978	MPa	2 800	2 600	2 600	2 500	2 300	1 800	1 800
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,60	0,50	0,45	0,40
24 h thickness swell	ISO 16983	%	30	18	12	10	8	7	7
Surface soundness	ISO 16981	MPa	0,6	0,7	0,7	0,8	0,9	0,9	0,9
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,35	0,35	0,30	0,25	0,20	0,15	0,10
Thickness swell after cyclic test		%	50	40	20	16	15	15	15
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,20	0,18	0,15	0,12	0,10	0,07	0,05
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	8	7	7	6	5	4	4

## 7.7 Requirements for load bearing medium-density fibreboard for use in humid conditions

Requirements for MDF-LB MR fibreboard are listed in Table 14.

Table 14 — Requirements for MDF-LB MR fibreboard

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	34	34	34	32	30	28	20
Modulus of elasticity (MOE)	ISO 16978	MPa	3 000	3 000	3 000	2 800	2 700	2 500	2 200
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,70	0,65	0,60	0,60
24 h thickness swell	ISO 16983	%	35	18	12	10	8	7	7
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,35	0,30	0,30	0,25	0,20	0,15	0,10
Thickness swell after cyclic test		%	50	25	20	16	15	15	10
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,20	0,18	0,15	0,12	0,10	0,07	0,05
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	9	8	8	8	6	4	4

**7.8 Requirements for general purpose medium-density fibreboard for use in high humid conditions**

Requirements for MDF-GP HMR fibreboard are listed in Table 15.

**Table 15 — Requirements for MDF-GP HMR fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	28	27	27	26	24	22	18
Modulus of elasticity (MOE)	ISO 16978	MPa	2 800	2 700	2 700	2 500	2 400	2 300	2 000
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,65	0,65	0,60	0,55
24 h thickness swell	ISO 16983	%	20	14	12	10	7	6	5
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,45	0,40	0,35	0,30	0,25	0,20	0,18
Thickness swell after cyclic test		%	25	20	17	15	11	9	7
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,25	0,20	0,20	0,18	0,15	0,12	0,10
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	12	10	9	8	8	7	7

## 7.9 Requirements for furniture type medium-density fibreboard for use in high humid conditions

Requirements for MDF-FN HMR fibreboard are listed in Table 16.

**Table 16 — Requirements for MDF-FN HMR fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	30	28	27	26	24	23	21
Modulus of elasticity (MOE)	ISO 16978	MPa	2 800	2 700	2 700	2 500	2 400	1 800	1 800
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,60	0,50	0,45	0,40
24 h thickness swell	ISO 16983	%	20	14	11	9	7	6	5
Surface soundness	ISO 16981	MPa	0,6	0,7	0,7	0,8	0,9	0,9	0,9
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,45	0,40	0,35	0,30	0,25	0,20	0,18
Thickness swell after cyclic test		%	25	20	17	15	11	9	7
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,25	0,20	0,20	0,18	0,15	0,12	0,10
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	14	12	12	12	10	9	8

**7.10 Requirements for load bearing medium-density fibreboard for use in high humid conditions**

Requirements for MDF-LB HMR fibreboard are listed in Table 17.

**Table 17 — Requirements for MDF-LB HMR fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	36	34	34	34	30	28	23
Modulus of elasticity (MOE)	ISO 16978	MPa	3 100	3 000	3 000	2 800	2 700	2 500	2 200
Internal bond strength	ISO 16984	MPa	0,75	0,70	0,70	0,70	0,65	0,60	0,60
24 h thickness swell	ISO 16983	%	20	14	11	9	7	6	5
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,45	0,40	0,35	0,35	0,30	0,27	0,25
Thickness swell after cyclic test		%	25	20	17	15	11	9	7
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,25	0,20	0,20	0,18	0,15	0,12	0,10
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	15,0	15,0	15,0	15,0	13,0	11,5	10,5

### 7.11 Requirements for fitments type medium-density fibreboard for use in exterior conditions

Requirements for MDF-FN EXT fibreboard are listed in Table 18.

**Table 18 — Requirements for MDF-FN EXT fibreboard**

Property	Test method	Units	Requirement						
			Thickness ranges (mm, nominal)						
			≥ 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22	> 22 to 34	> 34
Bending strength (MOR)	ISO 16978	MPa	34	30	30	28	26	23	21
Modulus of elasticity (MOE)	ISO 16978	MPa	2 800	2 600	2 500	2 400	2 400	1 800	1 800
Internal bond strength	ISO 16984	MPa	0,70	0,70	0,70	0,65	0,60	0,55	0,50
24 h thickness swell	ISO 16983	%	15	12	10	7	5	4	4
<b>Moisture resistance</b>									
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,50	0,40	0,40	0,35	0,30	0,25	0,22
Thickness swell after cyclic test		%	20	16	15	12	10	8	6
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,30	0,25	0,24	0,22	0,20	0,20	0,18
Option 3: Bending strength after immersion in water at 100 °C	ISO 20585 Method B	MPa	12	12	12	12	10	9	8

## 8 Specific property requirements for high-density fibreboard

### 8.1 General

High-density fibreboards have a nominal density of greater than 800 kg/m<sup>3</sup>.

### 8.2 Requirements for general purpose high-density fibreboard for use in dry conditions

Requirements for HDF-GP REG fibreboard are listed in Table 19.

**Table 19 — Requirements for HDF-GP REG fibreboard**

Property	Test method	Units	Requirement				
			Thickness ranges (mm, nominal)				
			> 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22
Bending strength (MOR)	ISO 16978	MPa	38	37	36	35	35
Modulus of elasticity (MOE)	ISO 16978	MPa	3 900	3 800	3 600	3 500	3 200
Internal bond strength	ISO 16984	MPa	0,95	0,90	0,85	0,80	0,80
Surface soundness	ISO 16981	MPa	0,8	0,9	1,0	1,2	1,2

### 8.3 Requirements for general purpose high-density fibreboard for use in humid conditions

Requirements for HDF-GP MR fibreboard are listed in Table 20.

**Table 20 — Requirements for HDF-GP MR fibreboard**

Property	Test method	Units	Requirement				
			Thickness ranges (mm, nominal)				
			> 1,5 to 3,5	> 3,5 to 6	> 6 to 9	> 9 to 13	> 13 to 22
Bending strength (MOR)	ISO 16978	MPa	42	42	42	40	38
Modulus of elasticity (MOE)	ISO 16978	MPa	3 900	3 800	3 600	3 500	3 200
Internal bond strength	ISO 16984	MPa	1,20	1,20	1,20	1,00	1,00
24 h thickness swell	ISO 16983	%	16	14	12	10	6
Surface soundness	ISO 16981	MPa	0,8	0,9	1,0	1,2	1,2
<b>Moisture resistance</b>							
Option 1: Internal bond strength after cyclic test	ISO 16987	MPa	0,40	0,40	0,40	0,35	0,35
Thickness swell after cyclic test		%	18	16	14	11	11
Option 2: Internal bond strength after boil test	ISO 16998	MPa	0,40	0,40	0,40	0,30	0,30
Option 3: Bending strength after immersion in water at 70 °C	ISO 20585 Method A	MPa	15	15	15	15	13