INTERNATIONAL STANDARD

ISO 16895

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Wood-based panels — Dry-process fibreboard

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

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 89, *Wood-based panels*, Subcommittee SC 1, *Fibre boards*.

This first edition cancels and replaces ISO 16895-1:2008 and ISO 16895-2:2010, of which the product classification and specification have been technically revised.

Wood-based panels — Dry-process fibreboard

1 Scope

This International Standard specifies a classification matrix, related mandatory tests and thickness ranges for ultra-low-, low-, medium- and high-density dry process wood-based fibreboard. It then provides the manufacturing property requirements for these types of uncoated fibreboard.

The values listed in this International Standard relate to product properties used to classify fibreboards into one of four types (UDF, LDF, MDF and HDF, see Clause 3), one of four grades (GP, FN, BL and LB), for use in one of four service conditions (REG, MR1, MR2, and HMR). The values are not characteristic values to be used for design purposes.

NOTE Fibreboards are broadly divided into two groups based on the manufacturing process, namely the dry process group and the wet process group (see Clause 3). Wet process fibreboards lie outside the scope of this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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 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*

ISO 16985, *Wood-based panels — Determination of dimensional changes associated with changes in relative humidity*

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 20585:2005, *Wood-based panels — Determination of wet bending strength after immersion in water at 70 degrees C or 100 degrees C (boiling temperature)*

ISO 27528, *Wood-based panels — Determination of resistance to axial withdrawal of screws*

3 Terms and definitions

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

3.1
dry process fibreboard
wood fibreboard with a forming line moisture content, as a mass fraction, of less than or equal to 20 % and whose primary bonding results from applied adhesives or resins

3.2
wet process fibreboard
wood fibreboard with a forming line moisture content, as a mass fraction, of greater than 20 % and whose primary bonding results from felting of wood fibres and their inherent adhesive properties

4 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply.

BL	building
DIY	do-it-yourself
EXT	exterior
F	fungi resistant
FN	furniture
FR	fire retardant
GP	general purpose
HDF	high-density fibreboard
HMR	highly moisture resistant
I	insect resistant
LB	load bearing
LDF	low-density fibreboard
MDF	medium-density fibreboard
MR1	moisture resistant — temperate
MR2	moisture resistant — tropical
REG	regular
UDF	ultra-low-density fibreboard

δ thickness

5 Classification, designation and coding

5.1 General

5.1.1 Classification matrices

Overall classification matrices, which include all major classes available at the time of publication, are shown in Tables 1 to 4. Tables 1 to 4 allow for future classes to be included as they become available on international markets.

Not all products in the matrices shown in Tables 1 to 4 are currently available or under development. Realistic property tables can only be developed for existing products. The remainder are potential future products and property tables will be developed when necessary.

Density ranges given in product descriptions in 5.2 to 5.5 are a guide. Manufacturers may classify a product as a particular type or grade if it meets all the property requirements of the nominated type or grade. For example, a thin fibreboard of density 830 kg/m^3 could be called MDF if it meets all property requirements of the particular MDF grade nominated.

5.1.2 Uses

Products specified in this International Standard have the following applications.

regular	REG	dry conditions only
moisture resistant — temperate	MR1	temperate humid conditions
moisture resistant — tropical	MR2	tropical humid conditions
highly moisture resistant	HMR	high humid conditions
exterior	EXT	exposed to weather conditions, above ground
general purpose	GP	applications not requiring the specific properties of furniture or load-bearing grades
furniture	FN	in furniture manufacture, cabinet making, fitments, joinery, bases for surface decorative treatment
building	BL	building applications requiring high dimensional stability
load bearing	LB	structural or load bearing
do-it-yourself	DIY	home projects done by residents rather than professional tradespersons

5.1.3 Additional classifications

If additional attribute classifications are used, such as fire retardant (FR), insect resistant (I) and fungi resistant (F), claimed performance shall be confirmed by appropriate testing. Relevant tests and performance requirements may be specified by national standards and regulations.

5.1.4 Structural grades

When a product is used in a load-bearing or structural application, additional information shall be available in the form of characteristic values derived from structural testing (see ISO 16572), experimental test results or history of use to validate its performance under the proposed conditions.

It should be noted that engineering design methods do not provide for design for high humid or exterior service conditions. The inclusion of the MDF-LB grade in the "high humid" section of the classification matrix (see Table 3) is on the basis that performance is validated by experimental test results or history of use.

5.2 Ultra-low-density fibreboard (UDF)

UDF has a nominal density less than 550 kg/m^3 and is classified according to Table 1.

Table 1 — UDF classification matrix

UDF type	Service conditions				
	Dry	Humid temperate	Humid tropical	High humid	Exterior
UDF-FN	REG furniture grade	No existing product	No existing product	No existing product	No existing product
Application examples	Light-duty partitions				

5.3 Low-density fibreboard (LDF)

LDF has a nominal density in the range 550 kg/m^3 to 650 kg/m^3 and is classified according to Table 2.

Table 2 — LDF classification matrix

LDF type	Service conditions				
	Dry	Humid temperate	Humid tropical	High humid	Exterior
LDF-GP	No existing product	MR1 general purpose	MR2 general purpose	No existing product	No existing product
Application examples		Roof underlay/sheathing, wall sheathing	Roof underlay/sheathing, wall sheathing		
LDF-FN	REG furniture grade	MR1 furniture grade	MR2 furniture grade	No existing product	No existing product
Application examples	Furniture, DIY uses, general uses, light-duty partitions	Furniture, DIY uses, general uses	Furniture, DIY uses, general uses		
LDF-BL	REG building grade	MR1 building grade	No existing product	No existing product	No existing product
Application examples	Window frames, door backs	Window frames, door backs			

5.4 Medium density fibreboard (MDF)

MDF has a nominal density in the range 650 kg/m^3 to 800 kg/m^3 and is classified according to Table 3.

Table 3 — MDF classification matrix

MDF type	Service conditions				
	Dry	Humid temperate	Humid tropical	High humid	Exterior
MDF-GP	REG general purpose	MR1 general purpose	MR2 general purpose	No existing product	No existing product
Application examples	DIY uses, general uses, veneer grade	DIY uses, general uses, overlay floors	DIY uses, general uses, overlay floors		
MDF-FN	REG furniture grade	MR1 furniture/fitments grade	MR2 furniture/fitments grade	HMR furniture/fitments grade	No existing product
Application examples	Carcase, furniture, cabinets, substrate for any decorative finish	Carcase, furniture, cabinets for kitchen and bathroom, substrate for any decorative finish	Carcase, furniture, cabinets for kitchen and bathroom, substrate for any decorative finish	Fascias, window joinery, protected exterior construction	
MDF-LB	REG load bearing	MR1 load bearing	MR2 load bearing	No existing product	No existing product
Application examples	Domestic flooring, shelving, general construction	Domestic or industrial flooring, shelving, general construction	Domestic or industrial flooring, wall and roof sheathing, beams, toilet partitions		
MDF-BL	REG building grade	MR1 building grade	MR2 building grade	HMR building grade	No existing product
Application examples	Window frames, door linings, bearing walls	Window frames, door linings, bearing walls	Window frames, door linings, bearing walls, floor and roof sheathing, underlay	Window frames, door linings, bearing walls, floor and roof sheathing, underlay	

5.5 High-density fibreboard (HDF)

HDF has a nominal density greater than 800 kg/m^3 and is classified according to Table 4.

Table 4 — HDF classification matrix

HDF type	Service conditions				
	Dry	Humid temperate	Humid tropical	High humid	Exterior
HDF-GP	REG general purpose	MR1 general purpose	MR2 general purpose	No existing product	No existing product
Application examples	Composite flooring, machined articles, patterns, packaging	Composite flooring, wall panelling in public amenities, packaging	Composite flooring, wall panelling in public amenities		
HDF-BL	REG building grade	MR1 building grade	MR2 building grade	No existing product	No existing product
Application examples	Composite flooring	Composite flooring	Bearing walls		

6 Tests related to each grade

6.1 Mandatory tests

The mandatory tests shown in Tables 5 to 8 shall be applied to the various fibreboard grades identified in Tables 1 to 4, respectively. All property requirements shall be met at dispatch from the factory.

6.2 Optional tests

If information on additional properties is agreed between user and manufacturer, it shall be determined using the test method(s) nominated from ISO 3340, ISO 16985 and/or ISO 27528.

Table 5 — Tests relating to each UDF grade

Property	Method	UDF-FN
Dimensions	ISO 9426	REG
Density variation	ISO 9427	REG
Formaldehyde emission	ISO 12460-1	REG
Moisture content	ISO 16979	REG
Internal bond strength	ISO 16984	REG
Bending strength — Modulus of rupture (MOR)	ISO 16978	REG

Table 6 — Tests relating to each LDF grade

Property	Method	LDF-GP	LDF-FN	LDF-BL
Dimensions	ISO 9426	MR1 MR2	REG MR1 MR2	REG MR1
Density variation	ISO 9427	MR1 MR2	REG MR1 MR2	REG MR1
Formaldehyde emission	ISO 12460-1	MR1 MR2	REG MR1 MR2	REG MR1
Moisture content	ISO 16979	MR1 MR2	REG MR1 MR2	REG MR1
Internal bond strength	ISO 16984	MR1 MR2	REG MR1 MR2	REG MR1
Bending strength — Modulus of rupture (MOR)	ISO 16978	MR1 MR2	REG MR1 MR2	REG MR1
Bending stiffness — Modulus of elasticity (MOE)	ISO 16978	MR1 MR2	REG MR1 MR2	REG MR1
Thickness swelling	ISO 16983	MR1 MR2	REG MR1 MR2	REG MR1
Surface soundness	ISO 16981	—	MR1 MR2	—
Moisture resistance	ISO 16987 ISO 16998 ISO 20585	MR1 MR2	MR1 MR2	—
Moisture resistance — Wet bending strength	ISO 20585	—	—	MR1

Table 7 — Tests relating to each MDF grade

Property	Method	MDF-GP	MDF-FN	MDF-BL	MDF-LB
Dimensions	ISO 9426	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2
Density variation	ISO 9427	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2
Formaldehyde emission	ISO 12460–1	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2
Moisture content	ISO 16979	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2
Internal bond strength	ISO 16984	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2
Bending strength — Modulus of rupture (MOR)	ISO 16978	REG MR1 MR2	REG MR1 MR2 HMR	REG MR1 MR2 HMR	REG MR1 MR2