

# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 16893

ISO/TC 89/SC 2

Secretariat: SA

Voting begins on:  
2013-09-30

Voting terminates on:  
2013-12-30

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## Wood-based panels — Particleboard

*Panneaux à base de bois — Panneaux de particules*

[Revision of first edition (ISO 16893-1:2008) and ISO 16893-2:2010]

ICS: 79.060.20

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ISO/DIS 16893:2013(E)

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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 16893 was prepared by Technical Committee ISO/TC 89, *Wood-based Panels*, Subcommittee SC 2, *Particleboards*.

This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

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# Wood-based panels — Particleboard

## 1 Scope

ISO 16893 specifies a classification matrix and the related mandatory tests and thickness ranges to be applied to particleboard for general purposes, furniture, load-bearing applications, and heavy-duty load-bearing applications. It then provides the manufacturing property requirements for these types of uncoated particleboard.

The values listed in this part of ISO 16893 relate to product properties used to classify particleboards into one of four grades (P-GP, P-FN, P-LB or P-HLB, see Clause 3), for use in three service conditions (REG, **MR1** and **MR2**). 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 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, *Wood-based panels — Determination of wet bending strength after immersion in water at 70 °C or 100 °C (boiling temperature)*

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

### 3 Terms, definitions and abbreviated terms

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

|          |                                     |
|----------|-------------------------------------|
| EXT      | exterior                            |
| F        | fungi <b>resistant</b>              |
| FN       | furniture                           |
| FR       | fire retardant                      |
| GP       | general purpose                     |
| HLB      | heavy-duty load bearing             |
| HMR      | highly moisture resistant           |
| I        | insect <b>resistant</b>             |
| LB       | load bearing                        |
| MR1      | moisture resistant <b>temperate</b> |
| MR2      | moisture resistant <b>tropical</b>  |
| P        | particleboard                       |
| REG      | regular                             |
| $\delta$ | thickness                           |

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## 4 Classifications

### 4.1 Classification matrices

An overall classification matrix, which includes all major classes available at the time of publication, is shown in Table 1. Table 1 allows for future classes to be included as they become available on international markets.

Not all products in the matrix are currently available or under development. For example there are no existing exterior condition products. Realistic property tables can only be developed for existing products. The remainder are potential future products and property tables will be developed when necessary.

**Table 1 — Classification matrix for particleboard**

| Type                 | Service conditions  |   |   |                                       |
|----------------------|---|---|---|---------------------------------------|
|                      | Dry conditions (regular)  | Humid conditions<br>—temperate  | Humid conditions<br>—tropical   | High humid and<br>exterior conditions |
| <b>P-GP</b>          | REG general purpose   | MR1 general purpose   | MR2 general purpose   | No existing product                   |
| Application examples | General uses, veneer grade  | General uses  | General uses  |                                       |
| <b>P-FN</b>          | REG furniture grade   | MR1 furniture grade   | MR2 furniture grade   | No existing product                   |
| Application examples | Carcass, furniture, cabinets, substrate for any decorative finish | Carcass, furniture, cabinets for kitchen and bathroom, toilet partitions, substrate for any decorative finish | Cabinets for kitchen and bathroom; moulded chair and table                      |                                       |
| <b>P-LB</b>          | REG load bearing  | MR1 load bearing  | MR2 load bearing  | No existing product                   |
| Application examples | Domestic flooring, shelving, general construction                 | Domestic flooring, shelving, roof decking, wall sheathing, general construction                               | Domestic flooring, shelving, roof decking, wall sheathing, general construction |                                       |
| <b>P-HLB</b>         | REG heavy-duty load bearing                                       | MR1 heavy-duty load bearing   | MR2 heavy-duty load bearing   | No existing product                   |
| Application examples | Industrial flooring, shelving                                     | Industrial flooring, shelving, beams  | Industrial flooring, shelving   |                                       |

### 4.2 Uses

Products specified in this document 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 HMP high humid conditions**

exterior EXT exposed to weather conditions, above ground  
 load bearing LB structural or load bearing  
 heavy-duty load bearing HLB heavy structural or load bearing  
 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

**4.3 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.

NOTE Relevant tests and performance requirements can be specified by national standards and codes.

**4.4 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 (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 service conditions. The inclusion of P-LB and P-HLB grades in the high humid section of the classification matrix (Table 1) is on the basis that performance is validated by experimental test results or history of use.

**5 Tests related to each class of particleboard**

**5.1 Mandatory tests**

The mandatory tests shown in Table 2 shall be applied to the various particleboard grades identified in Table 1. All property requirements shall be met at dispatch from factory.

**Table 2 — Tests related to particleboard grades**

| Property   | Method                              | P-GP                      | P-FN                      | P-LB                      | P-HLB                     |
|--|-------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Density variation  | ISO 9427                            | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Dimensions   | ISO 9426                            | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Formaldehyde emission  | ISO 12460-1                         | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Moisture content   | ISO 16979                           | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Internal bond strength   | ISO 16984                           | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Bending strength—<br>Modulus of rupture (MOR)                      | ISO 16978                           | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| <del>Bending stiffness—</del><br>Modulus of elasticity (MOE)       | ISO 16978                           | —                         | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Thickness <del>swelling</del>                                      | ISO 16983                           | <b>MR1</b> <b>MR2</b>     | <b>MR1</b> <b>MR2</b>     | REG <b>MR1</b> <b>MR2</b> | REG <b>MR1</b> <b>MR2</b> |
| Surface soundness  | ISO 16981                           | —                         | REG <b>MR1</b> <b>MR2</b> | —                         | —                         |
| Moisture resistance  | ISO 20585<br>ISO 16998<br>ISO 16987 | <b>MR1</b> <b>MR2</b>     | <b>MR1</b> <b>MR2</b>     | <b>MR1</b> <b>MR2</b>     | <b>MR1</b> <b>MR2</b>     |
| <del>Moisture resistance—</del><br><del>Wet bending strength</del> | <del>ISO 16987</del>                | <del>MR</del>             | <del>MR</del>             | <del>MR</del>             | <del>MR</del>             |

**5.2 Optional tests**

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