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**Wood-based panels — Plywood —  
Blockboards and battenboards**

*Panneaux à base de bois — Contreplaqués — Panneaux lattés avec  
lattes étroites et avec lattes larges*

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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.

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](http://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](http://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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 89, *Wood-based panels*, Subcommittee SC 3, *Plywood*.

This second edition cancels and replaces the first edition (ISO 13609:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- inclusion of a reference to ISO 2426-4;
- deleted reference to ISO/IEC Guide 65:1996.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Wood-based panels — Plywood — Blockboards and battenboards

## 1 Scope

This document establishes requirements for the specifications of blockboards and battenboards for general use, in dry, tropic dry/humid, and high-humid/exterior conditions. It includes requirements of materials, lay-up, physical and mechanical properties, bonding quality, formaldehyde release, conformity verification, and marking.

The values listed in this document relate to product properties, but they are not characteristic values to be used in design calculations.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1954, *Plywood — Tolerances on dimensions*

ISO 2074, *Plywood — Vocabulary*

ISO 2426-2:2020, *Plywood — Classification by surface appearance — Part 2: Hardwood*

ISO 2426-3:2000, *Plywood — Classification by surface appearance — Part 3: Softwood*

ISO 2426-4:2018, *Plywood — Classification by surface appearance — Part 4: Palm-plywood*

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

ISO 12460-1, *Wood-based panels — Determination of formaldehyde release — Part 1: Formaldehyde emission by the 1-cubic-metre 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 12465:2007, *Plywood — Specifications*

ISO 12466-1, *Plywood — Bonding quality — Part 1: Test methods*

ISO 12466-2, *Plywood — Bonding quality — Part 2: Requirements*

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 16999, *Wood-based panels — Sampling and cutting of test pieces*

ISO 18775, *Veneers — Terms and definitions, determination of physical characteristics and tolerances*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO 2074, ISO 12465, and ISO 18775 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **core strip**

individual wood pieces with rectangular cross section which are assembled to form the solid core

## 4 Material requirement

### 4.1 Requirements for veneer

The following requirements apply to veneer at the time of pressing.

#### 4.1.1 Lignocellulosic materials

Any wood species or other lignocellulosic material is permitted.

Veneers shall be identified according to the species, species group, or mechanical properties.

When veneers of different species are used to form a layer, these veneers shall be of similar mechanical and physical properties.

#### 4.1.2 Thickness

The thickness,  $t$ , of veneer shall be  $0,55 \text{ mm} \leq t \leq 6,0 \text{ mm}$ . When veneers are used to cover a core, the thickness of veneers adjacent to the core shall not be less than 1,5 mm.

#### 4.1.3 Surface appearance

The surface appearance of veneer shall be controlled.

Surface appearance of the face layer shall satisfy the criteria defined for class II, as given in ISO 2426-2:2020, Table 1 or in ISO 2426-3:2000, Table 1 or in ISO 2426-4:2018, Table 1. Back layer shall not be more than 2 classes inferior to the face layer. If required, veneer classification of other layers shall be carried out in accordance with the limitations defined in ISO 12465:2007, Annex A.

#### 4.1.4 Joint

Veneers jointed in width are allowed. If there is a joint in length, it shall be bonded as finger jointing or scarf jointing. End joint is not permitted on face ply.

#### 4.1.5 Direction

The grain of the veneer directly applied on the core strip shall be perpendicular to the grain of the core.

### 4.2 Requirements for plywood

The following requirements apply to plywood at the time of pressing.

#### 4.2.1 Wood species or other lignocellulosic material

Any wood species or other lignocellulosic material is permitted.

Plywood used for face and back layer shall be of similar mechanical and physical properties.

#### 4.2.2 Thickness

The thickness of plywood shall be greater than or equal to 3,0 mm.

#### 4.2.3 Surface appearance

The surface appearance of plywood shall be controlled.

Surface appearance of the face layer shall satisfy the criteria defined for class II, as given in ISO 2426-2:2020, Table 1 or in ISO 2426-3:2000, Table 1 or in ISO 2426-4:2018, Table 1.

#### 4.2.4 Joint

Jointed plywood is not permitted when used for surface layers.

#### 4.2.5 Direction

The direction of the grain of the veneer glued to the core shall be determined by considering the veneer lay-up of the plywood.

### 4.3 Requirements for core strip

#### 4.3.1 Species

Within a panel, all strips should be made from the same species. If there are more than one species, similar physical property is required. Otherwise, there shall be an agreement between involved parties.

#### 4.3.2 Dimensions

For the blockboard, the width,  $w$ , of the strip shall be  $7 \text{ mm} \leq w \leq 30 \text{ mm}$ .

For the battenboard, the width,  $w$ , of the strip shall be  $30 \text{ mm} < w \leq 76 \text{ mm}$ .

There is no limitation for strip length.

The thickness of each strip should not be less than 8,0 mm within a tolerance of  $\pm 0,1 \text{ mm}$ .

Each piece of core strip shall be sized in thickness, individually or after assembly into the core plate.

The ratio of width to thickness of each strip should not exceed 3,5.

#### 4.3.3 Quality of core strip

Each piece of core strip shall meet the quality requirements as follows:

- for sound knot, the maximum of diameter shall not exceed 25 mm or 80 % of the width of the strip, whichever is lesser;
- for intergrown knot or encased knot, the maximum diameter shall not exceed 15 mm or half of the width of the strip, whichever is lesser;
- for gum pocket, resin pocket, and bark pocket, the width shall not exceed 3 mm;
- for want or wane, the width shall not exceed 5 mm on the core face and the length shall not exceed 20 mm.

#### 4.3.4 Moisture content

Moisture content of the core strip shall be between 8 % and 12 % at the time of assembling.

## 4.4 Requirements for core strip assembly

### 4.4.1 Direction of core strip

The length direction of the strip shall be parallel or nearly parallel to the long edge of the board.

### 4.4.2 Jointing assembly in the length direction of core strip

For jointed strip, following criteria shall be satisfied:

- any joint seam shall not be wider than 1 mm;
- the distance between any two adjacent seams shall not be less than 50 mm;
- for finger jointing or scarf jointing, the slope of the scarves shall not be steeper than 1 in 8.

### 4.4.3 Jointing assembly in the width direction of core strip

In width direction, the core strips could be glued or unglued and the following criteria shall be satisfied:

- gap between solid wood strips shall not exceed 1,5 mm;
- in any 1 000 mm in the width direction of core strip, the sum of gaps shall not exceed 6 mm.

### 4.4.4 Thickness and tolerance

Determination of thickness and tolerance of the core plate shall be carried out in accordance with ISO 9426 and ISO 1954.

## 4.5 Adhesives

Except the adhesive used for bonding core strips in width direction, the adhesive used for combination with the veneers, plywood, and core shall provide the board performance necessary to satisfy the requirements for bond type as specified in [Clause 7](#).

Bonding strength and durability of the adhesives applied to finger jointing and scarf jointing veneers and strips shall not be inferior to the criteria defined above. Any glue failure is not permitted in transverse modulus of rupture test.

## 5 Panel lay-up and manufacturing requirements

The lay-up shall be controlled, including the thickness, orientation, wood species, and quality of veneers.

NOTE Any other characteristics can be required and added as in contract, if necessary.

## 6 General requirements

### 6.1 Dimensions and tolerances

Unless stated otherwise by the manufacturer, dimensions of blockboard or battenboard are determined in the conditions given in ISO 9426, and tolerances applied in the conditions given in ISO 1954.

### 6.2 Classification by surface appearance

If required, classification by surface appearance shall be carried out in accordance with ISO 2426-2, ISO 2426-3 or ISO 2426-4.

### 6.3 Requirements of physical and mechanical properties

#### 6.4 Moisture content

Sampling and cutting of test pieces shall be carried out in accordance with ISO 16999.

Determination of moisture content of board shall be carried out in accordance with ISO 16979.

Unless specified otherwise, moisture content of blockboard and battenboard shall be between 8,0 % and 14,0 % when dispatched from the factory.

##### 6.4.1 Mechanical properties

If required, the modulus of elasticity in bending and bending strength in both panel directions shall be provided in accordance with ISO 16978.

### 7 Bonding quality

The bonding quality shall be established by testing in accordance with the requirements of ISO 12466-1 and classified in accordance with ISO 12466-2.

- for blockboards and battenboards used in dry conditions, the bonding quality shall comply with the requirements of bonding class 1 of ISO 12466-2;
- for blockboards and battenboards used in dry/humid conditions, the bonding quality shall comply with the requirements of bonding class 2 of ISO 12466-2;
- for blockboards and battenboards used in high-humid/exterior conditions, the bonding quality shall comply with the requirements of bonding class 3 of ISO 12466-2.

### 8 Formaldehyde release requirements

Determination the formaldehyde release shall be carried out in accordance with ISO 12460-1 as the reference method, and ISO 12460-3 or ISO 12460-4 for factory production control, see [Table 1](#).

If factory production control methods are employed to determine formaldehyde release, a correlation between the utilized method and the 1-cubic-meter chamber method as in ISO 12460-1 shall be established.

**Table 1 — Limit of formaldehyde release**

Characteristic	Test method	Requirement
Formaldehyde release	ISO 12460-1	≤0,124 mg/m <sup>3</sup>

### 9 Other characteristics

Other characteristics, such as reaction to fire, insect resistance, and fungi resistance, can be determined and expressed to the corresponding national standards or regulations, if necessary.

### 10 Conformances

- a) Blockboards and battenboards conforming to this document shall be manufactured under a quality system which includes factory production and quality control with internal auditing.
- b) External auditing of the factory quality control.

The bodies certifying the quality-control system should follow the requirements of ISO/IEC 17065.