

Code of practice for the

**Selection and application of
particleboard, oriented strand
board (OSB), cement bonded
particleboard and wood
fibreboards for specific
purposes**

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/541, Wood-based panels, upon which the following bodies were represented:

- Apa Engineered Wood Association
- Association of British Plywood & Veneer Manufacturers
- British Woodworking Federation
- Council of the Forest Industries of British Columbia
- Department of the Environment (Building Research Establishment)
- Flat Roofing Contractors' Advisory Board
- Forestry Commission
- Furniture Industry Research Association
- Institution of Structural Engineers
- Local Authority Organizations
- Mineral Bonded Board Products Federation
- National Federation of Roofing Contractors
- National House-Building Council
- National Panel Products Association
- Royal Institution of British Architects
- Structural Board Association
- Timber Research and Development Association
- Timber Trade Federation
- Wood Panel Industries Federation
- Zurich Municipal Building Guarantee

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Foreword

This British Standard has been prepared by Technical Committee B/541. It supersedes BS 5669-5:1993, which is withdrawn.

Since being superseded by a group of BS ENs, BS 1142 and BS 5669-1, -2, -3 and -4 have been declared obsolescent and will eventually be withdrawn, effectively making BS 5669-5 unusable. The new BS EN specifications for fibreboards, particleboards, oriented strand boards (OSB) and cement bonded particleboards, which have already replaced the obsolescent standards, do not at present have any companion documents giving guidance on the selection and application of the specified materials, or on the correct methods for storing and handling them before use.

In view of this, the Technical Committee and user bodies such as the Department of the Environment, Trade and the Regions (DETR), architects, regulatory bodies and building insurers considered that a companion code of practice for the BS ENs was essential to ensure that the newly specified materials were correctly selected and applied. This British Standard is intended to fulfil that role; however, it is recognized that a comprehensive revision of this standard will be required when a new “package” of European Standards, giving guidance on the performance of wood-based panels used in the construction of floors, walls and roofs, becomes available. Each of these European Standards comprises three parts: specification, requirements and test methods. These documents are at present European pre-Standards undergoing public enquiry.

The BS EN specifications referred to in this standard require fewer characteristics than BS 5669-2, -3 and -4 and BS 1142. In some cases, therefore, recommended performance levels are proposed for additional properties (for example hard body impact resistance). The values for such properties are determined by the appropriate BS EN method of test, referred to in the relevant clause and the list of references.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 24, an inside back cover and a back cover.

1 Scope

This British Standard gives recommendations for the storage, handling, selection and application of the fibreboards, particleboards¹⁾, oriented strand boards (OSB) and cement bonded particleboards defined and specified in the following standards: BS EN 316, BS EN 622-1, -2, -3, -4 and -5, BS EN 309, BS EN 312-1, -2, -3, -4, -5, -6 and -7, BS EN 300, BS EN 633 and BS EN 634-1 and -2.

NOTE The guidance given on the selection and use of fibreboards is restricted to construction uses.

2 Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1

particleboard²⁾

panel material manufactured under pressure and heat from particles of wood (wood flakes, chips, shavings, sawdust, wafers, strands and similar) and/or other lignocellulosic material in particle form (flax shives, hemp shives, bagasse fragments and similar) with the addition of an adhesive

3.2

oriented strand board (OSB)³⁾

multi-layered board made from strands of wood of a predetermined shape and thickness together with a binder. The strands in the external layers are aligned and parallel to the board length or width; the strands in the centre layer or layers may be randomly oriented, or aligned, generally at right angles to the strands of the external layers

3.3

cement bonded particleboard⁴⁾

sheet material manufactured under pressure, based on wood or other vegetable particles bound with hydraulic cement and possibly containing additives

3.4

wood fibreboard⁵⁾

panel material with a thickness of 1,5 mm and greater, manufactured from lignocellulosic fibres with application of heat and/or pressure. The bond is derived from either:

- the felting of the fibres and their inherent adhesive properties; or
- from a synthetic binder added to the fibres.

Other additives may be included

3.5 wet process fibreboards⁵⁾

fibreboards having a fibre moisture content of more than 20 % at the stage of forming. The following types are differentiated, according to their density:

3.5.1

softboards⁵⁾

(density < 400 kg/m³)

these fibreboards have thermal and acoustic properties. They can be given additional properties, e.g. fire retardance, moisture resistance

3.5.2

medium boards⁵⁾

(density ≥ 400 kg/m³ < 900 kg/m³)

- low density medium boards (400 kg/m³ < 560 kg/m³)
- high density medium boards (560 kg/m³ < 900 kg/m³)

they can be given additional properties, e.g. fire retardance, moisture resistance

3.5.3

hardboards⁵⁾

(density ≥ 900 kg/m³)

they can be given additional properties, e.g. fire retardance, moisture resistance, resistance against biological attack, workability (e.g. mouldability)

3.6

dry process fibreboards (MDF)⁵⁾

fibreboards having a fibre moisture content of less than 20 % at the forming stage, and having a density of ≥ 600 kg/m³.

So-called “medium density fibreboards” (MDF) are produced with a synthetic adhesive under heat and pressure.

They can be given additional properties, e.g. fire retardance, moisture resistance, resistance against biological attack

¹⁾ Sometimes referred to as wood chipboards.

²⁾ Repeated from BS EN 309.

³⁾ Repeated from BS EN 300.

⁴⁾ Repeated from BS EN 633.

⁵⁾ Repeated from BS EN 316.

3.7**major axis³⁾**

direction in the plane of the board in which the bending properties have the higher values

3.8**minor axis³⁾**

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

3.9**dry conditions⁶⁾**

conditions (defined in terms of service class 1 of ENV 1995-1-1 for load-bearing boards) characterized by a moisture content of the material corresponding to a temperature of 20 °C and a relative humidity of the surrounding air exceeding 65 % only for a few weeks per year. Boards of this type are suitable for use only in biological hazard class 1 of EN 335-3

3.10**humid conditions⁶⁾**

conditions (defined in terms of service class 2 of ENV 1995-1-1 for load-bearing boards) characterized by a moisture content of the material corresponding to a temperature of 20 °C and a relative humidity of the surrounding air exceeding 85 % only for a few weeks per year. Boards of this type are suitable for use only in biological hazard classes 1 and 2 of EN 335-3

3.11**exterior conditions⁶⁾**

weathering conditions, liquid water or water vapour in a damp but ventilated location. Boards of this type are suitable for use in biological hazard classes 1, 2 and 3 of EN 335-3. (Defined in terms of service class 3 of ENV 1995-1-1 for load bearing boards.)

3.12**general purpose use⁶⁾**

all non-load bearing applications, e.g. furniture and fittings

3.13**load-bearing use⁶⁾**

use in a load-bearing construction, i.e. an organized assembly of connected parts designed to provide mechanical resistance and stability to the works (see BS 5268-2 or DD ENV 1995-1-1 and/or performance standards)

3.14**biological hazard class 1⁷⁾**

situation in which the wood or wood-based product is under cover, fully protected from the weather and not exposed to wetting

3.15**biological hazard class 2⁷⁾**

situation in which the wood or wood-based product is under cover and fully protected from the weather but where high environmental humidity can lead to occasional but not persistent wetting

3.16**biological hazard class 3⁷⁾**

situation in which the wood or wood-based product is not covered and not in contact with the ground. It is either continually exposed to the weather or is protected from the weather but subject to frequent wetting

3.17**biological hazard class 4⁷⁾**

situation in which the wood or wood-based product is in contact with the ground or fresh water and thus is permanently exposed to wetting

3.18**damp proof membrane**

layer or sheet of material within a floor or similar construction, or vertically within a wall, to prevent passage of moisture

3.19**vapour control layer**

layer of material restricting the transmission of vapour

4 Handling, stacking, storage and conditioning of boards and safety considerations

4.1 General

The recommendations given in 4.2 to 4.5 are fundamental to avoid damage, distortion, or degradation of boards during transit or storage and it is essential that they are followed.

4.2 Transport and delivery

Boards should be adequately protected by a waterproof covering during all transportation. It is particularly important that the edges are well covered.

The edges of boards should be fully protected so as to prevent damage by lashings or other banding. Boards should be loaded so as to avoid distortion in transit (see 4.4). Details of board type and quantity should accompany each delivery.

4.3 Handling

The most vulnerable parts of the boards are their edges and corners. Even if the boards are to be further trimmed before use, they should be carefully handled and, if necessary, edges and corners should be additionally protected on site. This particularly applies to profiled boards such as tongued and grooved flooring. When handling boards it is essential to avoid any contamination of the surface likely to cause permanent damage or have an adverse effect on subsequent finishing or finishes.

³⁾ Repeated from BS EN 300.

⁶⁾ Repeated from BS EN 622.

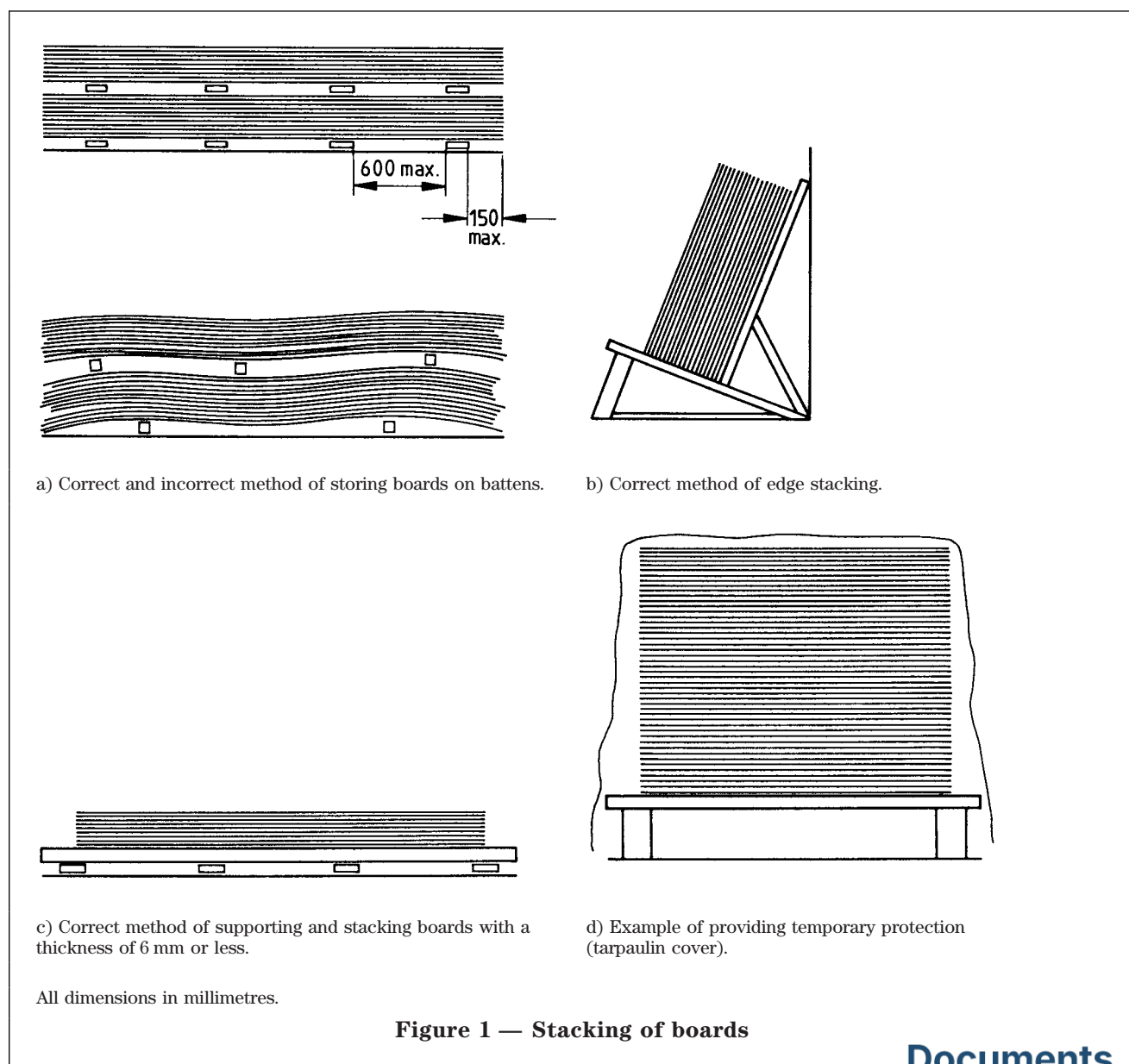
⁷⁾ Repeated from BS EN 335-1.

4.4 Stacking

Boards should be stacked flat, off the ground, and on a level surface with all four edges flush. Stacking on edge should be avoided wherever possible. The ideal base is a close-boarded or slatted pallet. If this is not possible the board should be carefully stacked level on battens of equal thickness separated from each other by not more than 600 mm (see Figure 1a). The top of the pile should be covered with some kind of protective board to prevent warping of the topmost board. Intermediate bearers are recommended every 10 to 15 boards and it is essential that the bearers are placed directly above those below. The ends of the battens should be equidistant from the long edges of the stack and parallel to the ends. Overhang of the boards at the edges and ends of the stack should not exceed 150 mm at any point.

Where boards are banded, the bands should be cut as soon as practicable after delivery to prevent them from permanently deforming the boards, which may expand due to moisture absorption.

Where space only permits edge stacking, the edges should not be permitted to come into direct contact with the floor (see Figure 1b). The haphazard leaning of boards against walls should always be discouraged. Where boards with a thickness of 6 mm or less are being stacked it is recommended that support be provided for the entire area of the board by placing a thicker board (at least 18 mm) at the base of the pile (see Figure 1c).



4.5 Storage and conditioning

Boards expand on taking up moisture from the surrounding air and shrink on losing it. The boards listed in Tables 2 and 10 are manufactured to dimensional tolerances allowing close fits to be achieved on jointing and placing the boards into position. Careful storage is therefore very important if the boards are to be maintained in the correct condition for their subsequent use.

All boards should be protected from rain and accidental soaking.

Only when boards are required for conditioning should any protective wrapping be removed. Where the boards are to be used in warm, dry areas the moisture content should be kept as low as possible to avoid unacceptable shrinkage after installation. The moisture content of the boards when they leave the factory ranges from 2 % to 13 %. Table 1 gives the approximate equilibrium moisture content for different board types stored under different relative humidities of the surrounding air.

These levels can only be taken as a general guide and will vary with type and density of board. Long-term storage in damp conditions can cause damage to the surface and edges of the boards. Boards should therefore be stored in an enclosed dry building. Where temporary storage outside cannot be avoided, the stacks should be covered with polyethylene or a tarpaulin, keeping all boards well clear of the ground (see Figure 1d).

NOTE Boards gradually attain the moisture content dictated by the atmosphere within the building. Although it is not possible to give precise levels, the following figures give a general indication of the range of moisture content of boards under various conditions:

- a) continuously heated building: 7 % to 9 %;
- b) intermittently heated building: 9 % to 12 %;
- c) unheated new building: up to 15 %.

Any increase in moisture content causes slight expansion in the boards and, although this also cannot be precisely defined, as a rough guide, an increase in moisture content of 1 % increases length and width by 0.3 mm per metre run for particleboard and OSB and 0.4 mm per metre run for wet and dry process fibreboards, and by 0.05 mm per metre run for cement bonded particleboard.

Design precautions necessary to accommodate movement of board are given in 5.5, 6.3, 7.3, 8.3 and 9.2, but wherever possible boards should be allowed to reach equilibrium conditions by storing them under the atmospheric conditions in which they are to be used. It is recommended that the boards are air conditioned by stacking each board with separators in between to allow free circulation of air.

Conditioning in air is suitable for most board types and applications. Where higher humidities may occur after fixing, it is recommended that hardboards and some wet process mediumboards are conditioned with water prior to laying. In this method, water is brushed into the mesh face of each board and the boards then stacked mesh face to mesh face for a prescribed time. Water conditioning is unsuitable for particleboards, OSB, dry process fibreboards and certain pre-treated boards, such as flame retardant and predecorated boards.

4.6 Safety

Persons using these materials should be familiar with normal industrial practice.

This code of practice does not purport to address all the safety issues associated with the normal use of wood-based panels.

It is the responsibility of the user to establish health and safety practices when storing or handling these materials which will ensure compliance with UK regulations. These are principally the Control of Substances Hazardous to Health regulations 1994 (COSHH)⁸⁾ [1], and especially regulations 6, 7-(6) and 10; although all the regulations are relevant.

The principal hazardous substances associated with the storage and use of wood-based panels are wood dust, produced by cutting, drilling and sanding, and formaldehyde. The latter is only a significant consideration in respect of certain particleboards and MDF. Both substances are subject to maximum exposure limits (MEL).

The MEL's are only likely to be realized if materials are worked in poorly ventilated areas, or, in the case of formaldehyde, if very large amounts of panels are stored in hot, confined or poorly ventilated spaces.

Table 1 — Approximate equilibrium moisture content for different types of board

Relative humidity at 20 °C	Approximate equilibrium moisture content			
	Particleboard	OSB	Cement bonded particleboard	Wood fibreboards
%	%	%	%	%
30	7	5	5	5
65	11	10	10	8
85	15	15	14	12

⁸⁾ SI 1994 No. 3246

5 Selection and application of particleboard, oriented strand board (OSB) and cement bonded particleboard

5.1 General

Clause 5 gives guidance on selection and application of the types and grades of particleboard, OSB and cement bonded particleboard which can be considered for use in certain applications. Only common uses in the construction industry in the case of particleboard, OSB and cement bonded particleboard, and use in furniture and built-in fitments are covered. It is not intended that the use of the materials is restricted solely to these applications.

Additional guidance on the use of boards in specific applications can be found in the codes and standards referred to in this clause.

NOTE Until such time as the introduction of appropriate European Standards, grade references given in other British Standards referred to in this standard will need to be substituted with the relevant grades as listed in 5.3.1, 6.1, 7.1, 8.1, 9.1 and 10.2. Comparative guidance is given in annex A.

5.2 Grades

Table 2 shows the types and grades of particleboards, OSB and cement bonded particleboards specified in the BS ENs referred to in this standard.

5.3 Application of boards in domestic flooring

5.3.1 Selection of material

It is essential that the materials used in suspended or floating floors or overlayments in domestic premises be selected from the following, according to the category of use described in Table 3:

- a) particleboards P5 conforming to BS EN 312-5 and P7 conforming to BS EN 312-7;
- b) oriented strand board, type OSB/2, OSB/3 or OSB/4 conforming to BS EN 300;
- c) cement bonded particleboard conforming to BS EN 634-2.

NOTE Oriented strand board should not be used as the floating overlay board on a continuously supported floating floor (5.3.3.1).

Table 2 — Types and grades of particleboard, OSB and cement bonded particleboard

Board type	Grade	References
Particleboard		
General purpose (for use in dry conditions)	P2	BS EN 312-2
Boards for interior fitments (including furniture) (for use in dry conditions)	P3	BS EN 312-3
Load bearing (for use in dry conditions)	P4	BS EN 312-4
Load bearing (for use in humid conditions)	P5	BS EN 312-5
Heavy duty load bearing (for use in dry conditions)	P6	BS EN 312-6
Heavy duty load bearing (for use in humid conditions)	P7	BS EN 312-7
Oriented strand board		
General purpose and boards for interior fitments (including furniture) (for use in dry conditions)	OSB/1	BS EN 300
Load bearing (for use in dry conditions)	OSB/2	BS EN 300
Load bearing (for use in humid conditions)	OSB/3	BS EN 300
Heavy duty load bearing (for use in humid conditions)	OSB/4	BS EN 300
Cement bonded particleboard		
OPC (ordinary Portland cement) (for use in dry, humid and exterior conditions)	—	BS EN 634-2