CI/SfB
Ri4 + j1 + j7
Uniclass L6617 + L6618

Specifying wood-based panels for structural use

This Wood Information Sheet (WIS) covers the following wood-based panels intended for structural use:

- cement bonded particleboard
- fibreboard
- oriented strand board (OSB)
- resin bonded particleboard (also known as chipboard)
- plywood
- solid wood panels.

Boards of these types, intended for use in construction, fall under the scope of the harmonised standard BS EN 13986 *Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking* [1] and must therefore carry a CE mark or UKCA mark. From January 2022, products placed on the market in Great Britain (England, Wales and Scotland) must carry the UKCA mark. In Northern Ireland, CE marking is required while slightly different marking arrangements are prescribed for GB suppliers only supplying Northern Ireland.

This WIS is an overview of the subject with signposts to more detailed sources that are listed at the end.

Contents

- UKCA and CE marking
- Design
- Specification
- Maintaining fitness for purpose
- Example specifications

Key points

- With the UK leaving the EU, UKCA marking will replace the CE mark for products placed on the GB market. During 2021 either mark can be used, but from January 2022 only the UKCA mark will be accepted.
- The Northern Ireland Protocol means that EU laws are required to be met in Northern Ireland, therefore CE marking is required. There are, however, UKNI marking provisions for GB manufacturers who only supply Northern Ireland and not the rest of Europe.

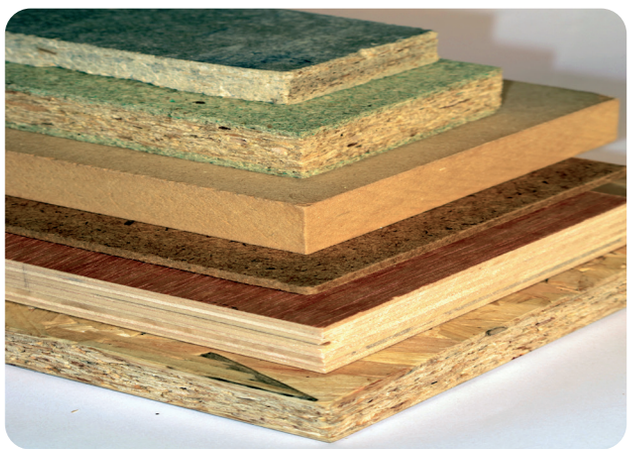

Figure 1: Wood-based panels, from top: cement bonded particleboard, chipboard, MDF, hardboard, plywood and OSB

- Statutory Instrument 2019 No. 465 adapts the EU CPR to UK law. SI 2020 No. 1359 accommodates the Northern Ireland Protocol.
- Products outside the scope of BS EN 13986 may be CE marked through a European Technical Assessment (ETA). In time, ETAs are likely to be replaced by UK Technical Approvals (UKTA) allowing the UKCA mark to be applied for such products.
- BS EN 13986 refers to a series of EN product standards for specifications and requirements for each panel type, otherwise known as technical classes. Harmonised standards, such as BS EN 13986, will continue to be recognised and have been brought into UK law as designated standards.
- If a manufacturer wishes to claim better performance values than those given in BS EN 13986, they can test and declare their own values as part of their Declaration of Performance (DoP).
- Properties that must be assessed are bending strength and stiffness, bond quality/internal bond, durability, formaldehyde release and pentachlorophenol content. Additional properties may be required depending on the use.
- In either GB or EU/NI markets, manufacturers of panels for use in construction must apply the appropriate mark to their products and supply a DoP presenting the properties of the product. For structural (loadbearing) panels this would normally include at least one characteristic strength or stiffness value needed for design using Eurocode 5. Currently, the DoP can include 'No Performance Determined' (NPD) against some properties.
- Separate DoPs are required for the UKCA and EU CE marking purposes, and where both marks are present, they should be distinctly separate on the panels, packaging or accompanying documentation.

UKCA and CE marking

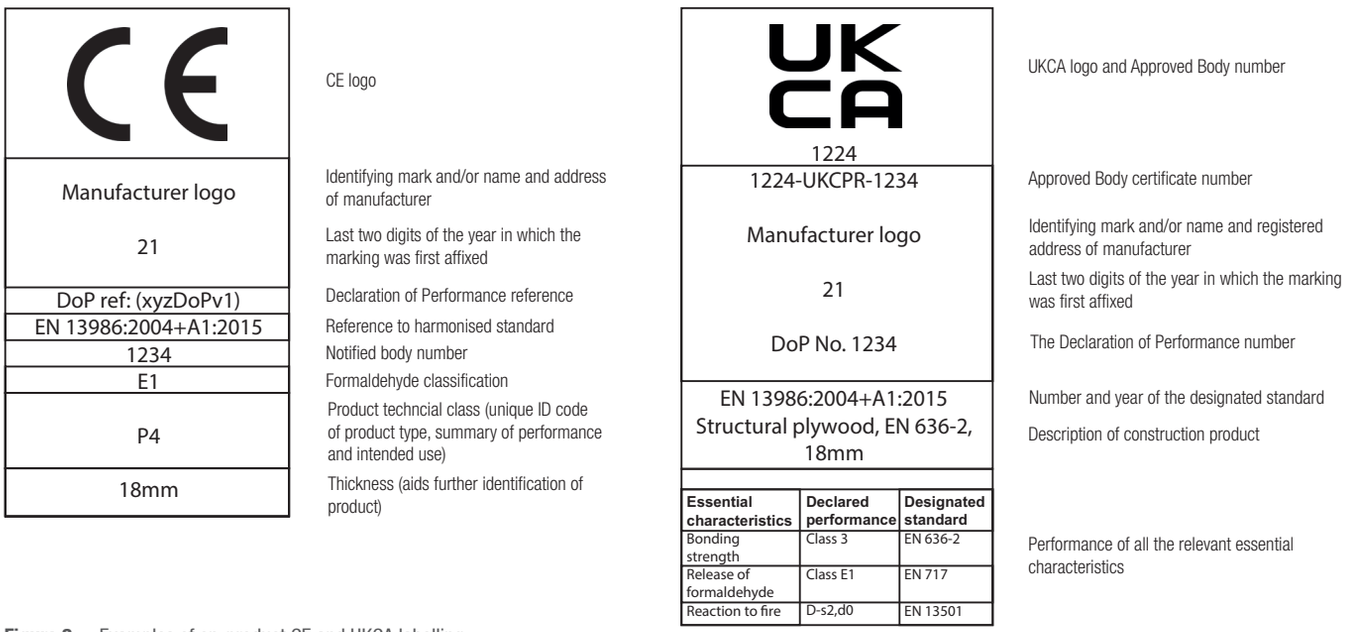

Figure 2: Examples of on-product CE and UKCA labelling

Prior to the introduction of the CPR in July 2013, CE marking of panels was voluntary in the UK. Since that time, it has been mandatory for manufacturers (or their representatives in the EU) to apply the CE mark for any construction product covered by a 'harmonised' European standard, such as BS EN 13986. The transition to UKCA marking will make the UKCA mark mandatory from January 2022 in GB.

Where manufacturers intend to place products on the EU market and/or Northern Ireland, CE marking will still be required. There are, however, additional marking provisions for GB manufacturers who only supply Northern Ireland and not the rest of Europe; these are the so-called UKNI marking (sometimes referred to as the UK(NI) mark or the UK(NI) indication).

CE marking is described in more detail in TRADA's WIS 2/3-56 *CE marking: implications for timber products* [2]. This WIS also includes the Technical Bulletin 'UKCA marking'[3] which explains UKCA marking in detail and how EU CPR will be retained in UK law. In 2019, as part of the UK's preparations for leaving the EU, a new Statutory Instrument SI2019 No.465 (the 2019 amendment) was passed. This aims to preserve the CPR in UK law with as few changes as possible. To accommodate the Northern Ireland Protocol a separate S.I. was created and should be read in tandem as it amends the 2019 S.I. i.e. S.I. 2020 No. 1359 *The Construction Products (Amendment etc.) (EU Exit) Regulations 2020*.

BS ENs are the official English language version of European standards ENs. Other versions may be designated, for example NF EN, France; SS EN, Sweden; DIN EN, Germany. These may appear in documentation and marks on panels manufactured outside the UK and, providing the EN number is the same, are equally acceptable.

BS EN 13986 refers to a series of EN product standards for specifications and requirements for most panel types, otherwise known as technical classes, for example OSB/3 or P5. The exception to this is plywood. These standards set out minimum properties and quality control procedures for different grades of panel, according to:

- their purpose, such as loadbearing or heavy duty loadbearing
- the service class conditions in which they are suitable for use, such as dry, humid or exterior conditions.

Table 1 lists the technical classes of panels suitable for use in appropriate structural (loadbearing) applications according to BS EN 13986.

For products within the scope of BS EN 13986 but not within a technical class because, for example, they are outside the thickness ranges or perhaps the manufacturer simply wishes to claim higher values, the manufacturer can apply the UKCA/CE mark and declare his own specification values according to Table 14 of BS EN 13986 without reference to a technical class.

Under BS EN 13986, manufacturers are required to have available a Declaration of Performance (DoP), presenting technical information on their product. These will include information on relevant characteristics as outlined below. Specifiers and purchasers should always obtain this information to ensure that the material being offered meets their requirements. UKCA and CE marking will require separate DoPs to be made available.

If a product does not fall under the scope of a designated/harmonised standard it is intended that products may be UKCA/CE marked through a UKTA/ETA using a UK Assessment Document (UKAD) or a European Assessment Document (EAD). However, at the time of writing, the UK procedures to enable this to be carried out have not been put in place.

To comply with CPR Article 9, and hence UK CPR, the UKCA/CE mark (see *Figure 2*) should include:

- the last two digits of the year in which the mark was first affixed
- the name and address of the manufacturer or an unambiguous identification mark allowing the name and address to be identified
- the unique code identifying the product type
- a reference to the DoP
- the level or class of performance declared (this could refer to any number of properties)
- a reference to the designated/harmonised technical specification (BS EN 13986 in this case)
- the identification number of the UK Approved Body (UKAB)/EU Notified Body (NB) responsible for certifying the FPC
- the intended use of the product.

Table 1: Technical classes of panel listed in BS EN 13986 as suitable for structural applications

Panel type	Standard	Technical class
Cement-bonded particleboard	BS EN 634-2 *Cement-bonded particleboards. Specifications. Requirements for OPC bonded particleboards for use in dry, humid and external conditions* [4]	Modulus of elasticity class 1 or 2
Fibreboards	BS EN 622-2 *Fibreboards. Specifications. Requirements for hardboards* [5]	HB.LA loadbearing, dry HB.HLA1 loadbearing, humid HB.HLA2 heavy duty loadbearing, humid
	BS EN 622-3 *Fibreboards. Specifications. Requirements for medium boards* [6]	MBH.LA1 loadbearing, dry MBH.LA2 heavy duty loadbearing, dry MBH.HLS1 loadbearing, humid * MBH.HLS2 heavy duty loadbearing, humid *
	BS EN 622-4 *Fibreboards. Specifications. Requirements for softboards* [7]	SB.LS loadbearing, dry * SB.HLS loadbearing, humid *
	BS EN 622-5 *Fibreboards. Specifications. Requirements for dry process boards (MDF)* [8]	MDF.LA loadbearing, dry MDF.HLS loadbearing, humid *
OSB	BS EN 300 *Oriented strand boards (OSB). Definitions, classification and specifications* [9]	OSB/2 loadbearing, dry OSB/3 loadbearing, humid OSB/4 heavy duty loadbearing, humid
Particleboard (resin bonded)	BS EN 312 *Particleboards. Specifications* [10]	P4 loadbearing, dry P5 loadbearing, humid P6 heavy duty loadbearing, dry P7 heavy duty loadbearing, humid
Plywood	BS EN 636 *Plywood. Specifications* [11]	EN 636-1 S structural, dry EN 636-2 S structural, humid EN 636-3 S structural, exterior
Solid wood panels	BS EN 13353 *Solid wood panels (SWP). Requirements* [12]	BS EN 13353 *Solid wood panels (SWP). Requirements*

* Fibreboards suitable only for structural applications where there are instantaneous or short-term loads only. This is indicated by the 'S' in the type classification.

Performance characteristics

BS EN 13986 sets out the required performance characteristics (properties) for panels in various applications, although not all of the applications are structural. It lists structural components under the following categories:

- internal use as structural components in dry conditions
- internal use as structural components in humid conditions
- external use as structural components
- use as structural floor and roof decking on joists as well as structural wall sheathing on studs.

The performance characteristics may have been tested by the manufacturer and maintained through a production quality control process, or in some cases, standard values listed in BS EN 13986 may be used. These standard values are sometimes referred to as Classified Without Further Testing (CWFT).

Properties that must be assessed:

- bending strength and stiffness (quality control tests)
- bond quality/internal bond (quality control tests)
- durability – moisture resistance, thickness swelling (quality control tests)
- formaldehyde – a constituent of some adhesives, particularly aminoplastic resins (certain types of panel may not require testing if no formaldehyde-containing materials are added during, or post-production). For more details see BS EN 13986 Annex B
- pentachlorophenol (only if materials used contain more than 5ppm PCP). For more details see BS EN 13986 Clause 5.18.

Properties where standard values may be used

For some properties, BS EN 13986 lists generic values (CWFT) that a manufacturer may declare without testing their product. These are:

- reaction to fire (BS EN 13986 gives values for certain products for a given class, provided that mounting and other products adjacent to the wood-based panel are the same as tested when developing the European Commission Decision they are based upon)
- water vapour permeability (BS EN 13986 gives values for certain products)
- airborne sound insulation and sound absorption (BS EN 13986 gives values for certain products)
- thermal conductivity (BS EN 13986 gives values for certain products)
- characteristic values of strength and stiffness (these are provided separately in BS EN 12369, see *Design* considerations below or manufacturer's data)
- mechanical durability – creep and duration of load (BS EN 1995-1-1 *Eurocode 5. Design of timber structures. General. Common rules and rules for buildings* [13] gives modification factors)
- biological durability (BS EN 335 *Durability of wood and wood-based products. Use classes: definitions, application to solid wood and wood-based products* [14] contains guidance).

Testing for a particular end use

Depending upon the end use, additional criteria need to be defined:

- Floor and roof decking on joists – soft body impact and concentrated load tests should be carried out 'if required'. The procedures are described in BS EN 12871 *Wood-based panels. Performance specifications and requirements for loadbearing boards for use in floors, walls and roofs* [15]. These tests are only relevant to panels spanning between supports, so would not be relevant where the panels are fully supported or where there is no concentrated load or impact requirement.
- Wall sheathing – soft body impact tests should be carried out 'if required'. The procedures are given in BS EN 596 *Timber structures. Test methods. Soft body impact test of timber framed walls* [16], and are to be carried out as described in BS EN 12871. Racking resistance tests to BS EN 594 *Timber structures. Test methods. Racking strength and stiffness of timber frame wall panels* [17] may also be required if the wall is to provide racking capacity to the structure.

These performance-based tests for floors, walls and roofs are carried out on small sections of components and the results are only relevant to the construction tested (such as panel type and thickness, and joist/stud spacings). Such data may be provided by the manufacturer, but NPD is currently still an option. Part of the BS EN 12871 testing is for impact which is a pass or fail test, the other part is a point load test. An engineer uses characteristic values derived from the point load test to verify that, for a given span, a product is suitable for the design imposed point load.

Design

In the case of floor and roof decking, and wall sheathing, structural design calculations using *Eurocode 5* require design stresses and performance-based values.

An important consequence of the CPR/UK CPR is that manufacturers of products intended for structural use should specify characteristic values of parameters needed for design using Eurocodes. Although most wood-based panels have generic characteristic values given in BS EN 12369, plywood is produced in a wide variety of species and lay-ups, and manufacturers must specify characteristic values for each type of plywood. Currently, however, NPD is still an option so the range of properties claimed by different manufacturers is very variable.

BS EN 12369 *Wood-based panels. Characteristic values for structural design* is in three parts:

- *Part 1: OSB, particleboards and fibreboards* [18], which includes the oriented strand boards OSB/2, OSB/3 and OSB/4, particleboards P4, P5, P6 and P7, and fibreboards HB.HLA2, MBH.LA2, MDF.LA and MDF.HLS
- *Part 2: Plywood* [19], which gives characteristic values of mechanical properties for plywood in bending, based on a series of strength classes and modulus classes. It includes advice on determining characteristic values in tension and compression by a combination of testing and calculation. Conservative values for shear are included
- *Part 3: Solid-wood panels* [20], which includes SWP/1 S, SWP/2 S and SWP/3 S.

For products not listed in BS EN 12369 or where a manufacturer wants to declare their own values rather than the generic values it lists (eg due to the product being better performing), characteristic values may be determined by testing in accordance with BS EN 789 *Timber structures. Test methods. Determination of mechanical properties of wood based panels* [21] and calculation in accordance with BS EN 1058:2009 *Wood-based panels. Determination of characteristic 5-percentile values and characteristic mean values* [22].

The properties listed in BS EN 12369 include characteristic values for bending, tension, compression and shear. In the case of floors and roofs, this enables the behaviour under uniform loads to be assessed, but there is no agreed method of calculating behaviour under concentrated or impact loads. Where required, these criteria should be tested in accordance with BS EN 12871 and the data provided by the manufacturer.

Like all wood-based products, panels are affected by the duration of the load applied, both in relation to deflection (creep) and to failure. *Eurocode 5* gives factors to account for these effects.

In the case of floor and roof decking, the soft body impact test has to demonstrate that the requirements of BS EN 12871 can be met. The concentrated load test results are used to check the capacity of the panel against the design concentrated load, specified in BS EN 1991-1-1 *Eurocode 1. Actions on structures. General actions. Densities, self-weight, imposed loads for buildings* [23]. Design checks may also need to be carried out for any uniform load specified.

In wall sheathing, design for racking resistance can be carried out by test in accordance with BS EN 594. But there is no codified method for using this data with *Eurocode 5*. Guidance on design for racking by calculation using *Eurocode 5* is given in PD 6693-1 *Recommendations for the design of timber structures to Eurocode 5: Design of timber structures. General. Common rules and rules for buildings* [24]. This requires a declaration of the panel thickness and the characteristic lateral load-carrying capacity of the specific panel and fastener being used.

The above refers principally to design for structural criteria but the design may also need to take account of other factors such as fire, acoustics and durability.

Specification

The simplest and most effective way of specifying a panel product for structural use is to require compliance with BS EN 13986 and a technical class, for example OSB/3. The specification should consider at least the following factors:

- panel type – this may be generic, such as plywood, or a more specific technical class such as BS EN 300 OSB/3
- thickness
- fire performance rating
- durability requirement – mechanical and biological – in BS EN 13986 mechanical durability relates to factors for thickness swelling and moisture resistance. If high moisture contents are anticipated panels may also require additional measures to ensure adequate biological durability, e.g. modification or a maintained coating and edge sealing (see BS EN 355 and, for plywood, CEN/TS 1099 [25] for guidance) to reduce the risk of fungal decay
- formaldehyde class.

The panel specification selected should:

- be a loadbearing type complying with BS EN 13986. Refer to the appropriate product standard, such as BS EN 312
- be suitable for the prevailing service class. For example, Service Class 2 requires a panel suitable for use in humid conditions
- have adequate minimum strength and stiffness properties – specify minimum characteristic values.

Take care when specifying plywood in an exterior environment. Both the glue bond and biological durability of the wood plies contribute to the overall durability of the panel. Most plywoods will require preservative treatment or other form of protection if a prolonged life in an exterior environment is desired.

The specification may need to cover other criteria, such as acoustics, water vapour transmission or thermal conductivity.

If a specific brand of product has been found to be suitable and to comply with the regulations, then it may be specified directly. However, specifiers and suppliers should remember that substitution with a similar material will not automatically ensure compliance with the regulations and all performance requirements.

Maintaining fitness for purpose

Compliance with the UKCA/CE marking requires that anyone who handles or distributes a panel must be in a position to demonstrate its 'fitness for purpose'. Distributors and merchants therefore have a legal obligation to supply a product that is suitable for the communicated intended end-use, as well as the technical data needed to verify its performance.

Fitness for purpose can also be affected by the way that panels are handled, transported and stored at all stages through the supply chain, including construction sites. As a natural material, wood is hygroscopic; it can take up and release moisture from the atmosphere and its physical and mechanical properties can change as a result. Wood-based panels behave in a similar way to solid wood, swelling if they absorb moisture and shrinking if moisture is lost. Panels should be installed into a building at a moisture content as close as possible to that which they will achieve in service. Correct storage, transportation, handling and conditioning are therefore vital to the correct performance of the panel in the finished building.

The PanelGuide [26] and PD CEN/TR 12872:2014 *Wood-based panels. Guidance on the use of loadbearing boards in floors, walls and roofs* [27] offer further guidance.

Example specifications

The examples in *Tables 2 and 3* illustrate the specification of typical applications of wood-based panels. 'Real life' specifications will vary depending on the governing factors of a particular design, and must be considered on a case-by-case basis.

In these examples, 'x' denotes a value or grade which must be determined by the designer/specifier and included in the specification. The design follows *Eurocode 5*.

The specification for the complete wall element will also address:

- substrate
- fixing type
- setting out
- fixing centres
- fixing distance from edges.

The specification for the complete floor element will also address:

- substrate
- setting out of panels
- expansion provision
- support of joints between panels
- fixing to joists.

Table 2: Wall panel with OSB wall sheathing – service class 2

Component	Specification	Purchasing	Notes
Sheathing	Oriented strand board compliant with BS EN 13986 for loadbearing applications in humid conditions, ie OSB/3 compliant with BS EN 300, with additional impact testing carried out to BS EN 596 for wall sheathing.	Look for a UKCA or CE mark which includes BS EN 13986 and states that the panel is OSB/3 (a structural panel will also show the Approved/Notified Body number. The mark may also include 'Wall Sheathing' if the BS EN 594 and/or BS EN 596 tests have been carried out. This should also be stated on the DoP.	For a material to be marked for loadbearing humid conditions it has to comply with BS EN 300 requirements. OSB/3 is a loadbearing board for use in humid conditions (service class 2). The BS EN 596 test is a pass/fail test.
	Thickness: **x** mm and lateral load-carrying capacity: **x** kN.	Manufacturer's technical information should state this.	Required to achieve the required racking resistance according to *Eurocode 5*.
	Formaldehyde class: E**x.**	The UKCA or CE mark will state whether the board is E1 or E2.	A formaldehyde class has to be stated.

Table 3: Plywood floor – service class 1
(Consider service class 2, depending upon the risk of wetting)

Component	Specification	Purchasing	Notes
Flooring	Plywood compliant with BS EN 13986, suitable for internal use as structural floor decking on joists, ie compliant with BS EN 636 grade BS EN 636-1 S, (or grade BS EN 636-2 S) with additional performance testing to conform to load category **x** on **x** mm span as per *Eurocode 1*. Characteristic strength and stiffness values as follows.	Look for a UKCA or CE mark which includes BS EN 13986 and states that the panel is BS EN 636-1 S (or BS EN 636-2 S). A structural panel will show the notified body number, the regulation and the manufacturer's number. The mark may also include 'Flooring' to indicate that BS EN 12871 point load and impact tests have been carried out. The load category for a specific span can be found from the manufacturer or it may be stated on the mark. Characteristic strength and stiffness values can be obtained from the manufacturer or agent – they may be based on BS EN 12369-2 or derived from test data to BS EN 789. This information should also be stated on the DoP.	For a plywood to be UKCA or CE marked for service class 1 conditions it must comply with BS EN 636 grade BS EN 636-1 S. For service class 2 conditions it must comply with grade BS EN 636-2 S. (In both cases, 'S' indicates 'structural'.) To be used as flooring the board must be categorised as loadbearing with additional BS EN 12871 performance testing carried out.
	Thickness: **x** mm.	Manufacturer's technical information should state this.	Required to meet design requirements.
	Formaldehyde class: E**x.**	The UKCA or CE mark will state whether the board is E1 or E2.	A formaldehyde class has to be stated.

Acknowledgement

BM TRADA is grateful for the assistance of the Wood Panel Industries Federation in the drafting and review of this information sheet.

References

1. BS EN 13986:2004+A1:2015 *Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking*, BSI
2. WIS 2/3-56 *CE marking: implications for timber products*, Exova BM TRADA, 2016
3. Technical Bulletin 'UKCA marking', BM TRADA 2021
4. BS EN 634-2:2007 *Cement-bonded particleboards. Specifications. Requirements for OPC bonded particleboards for use in dry, humid and external conditions*, BSI
5. BS EN 622-2:2004 *Fibreboards. Specifications. Requirements for hardboards*, BSI
6. BS EN 622-3:2004 *Fibreboards. Specifications. Requirements for medium boards*, BSI
7. BS EN 622-4:2019 *Fibreboards. Specifications. Requirements for softboards*, BSI
8. BS EN 622-5:2009 *Fibreboards. Specifications. Requirements for dry process boards (MDF)*, BSI
9. BS EN 300:2006 *Oriented strand boards (OSB). Definitions, classification and specifications*, BSI
10. BS EN 312:2010 *Particleboards. Specifications*, BSI
11. BS EN 636:2012+A1:2015 *Plywood. Specifications*, BSI
12. BS EN 13353:2008+A1:2011 *Solid wood panels (SWP). Requirements*, BSI
13. BS EN 1995-1-1:2004+A2:2014 *Eurocode 5. Design of timber structures. General. Common rules and rules for buildings*, BSI
14. BS EN 335:2013 *Durability of wood and wood-based products. Use classes: definitions, application to solid wood and wood-based products*, BSI
15. BS EN 12871:2013 *Wood-based panels. Performance specifications and requirements for loadbearing boards for use in floors, walls and roofs*, BSI
16. BS EN 596:1995 *Timber structures. Test methods. Soft body impact test of timber framed walls*, BSI
17. BS EN 594:2011 *Timber structures. Test methods. Racking strength and stiffness of timber frame wall panels*, BSI
18. BS EN 12369-1:2001 *Wood-based panels. Characteristic values for structural design. OSB, particleboards and fireboards*, BSI
19. BS EN 12369-2:2011 *Wood-based panels. Characteristic values for structural design. Plywood*, BSI
20. BS EN 12369-3:2008 *Wood-based panels. Characteristic values for structural design. Solid-wood panels*, BSI
21. BS EN 789:2004 *Timber structures. Test methods. Determination of mechanical properties of wood based panels*, BSI
22. BS EN 1058:2009 *Wood-based panels. Determination of characteristic 5-percentile values and characteristic mean values*, BSI
23. BS EN 1991-1-1:2002 *Eurocode 1. Actions on structures. General actions. Densities, self-weight, imposed loads for buildings*, BSI
24. PD 6693-1:2019 *Recommendations for the design of timber structures to Eurocode 5: Design of timber structures. General. Common rules and rules for buildings*, BSI
25. DD CEN/TS 1099:2007 *Plywood. Biological durability. Guidance for the assessment of plywood for use in different use classes*, BSI
26. *PanelGuide*, V4.1, Wood Panel Industries Federation and others, 2018, available at www.trada.co.uk
27. PD CEN/TR 12872:2014 *Wood-based panels. Guidance on the use of loadbearing boards in floors, walls and roofs*, BSI

About TRADA

The Timber Research and Development Association (TRADA) is an internationally recognised centre of excellence on the specification and use of timber and wood products.

TRADA is a company limited by guarantee and not-for-profit membership-based organisation. TRADA's origins go back over 80 years and its name is synonymous with independence and authority. Its position in the industry is unique with a diverse membership encompassing companies and individuals from around the world and across the entire wood supply chain, from producers, merchants and manufacturers, to architects, engineers and end users.

Our aim

To provide members with the highest quality information on timber and wood products to enable them to maximise the benefits that timber can provide.

What we do

We seek to achieve this aim through active and on-going programmes of information and research. Information is provided through our website, an extensive collection of printed materials and our training courses.

Research is largely driven by the desire to update and improve our information so that it continues to meet our members' needs in the future.

e: membership@trada.co.uk
w: www.trada.co.uk

bmtrada
Proud to be part of element

BM TRADA, part of the Element Group, provides a comprehensive range of independent testing, inspection, certification, technical and training services. BM TRADA is TRADA's appointed provider for its research and information programmes, and for the administration of its membership services.

BM TRADA

Chiltern House, Stocking Lane, Hughenden Valley
High Wycombe, Buckinghamshire HP14 4ND
t: +44 (0)1494 569600 **w:** www.bmtrada.com
e: advisory@trada.co.uk or publications@bmtrada.co.uk