





Wood Information Sheet

WIS 1-37

Subject: Structural **Revised:** September 2020

Introduction to Eurocode 5

The Eurocodes are a series of standards that establish common rules across the European Economic Area (EEA) for structural design using main construction materials such as concrete, steel, masonry, timber, aluminium and glass. Together with their National Annexes (NAs), where the national choice on a limited number of Nationally Determined Parameters (NDPs) may be declared, these standards allow a designer to prove compliance with the requirements of the European Construction Products Regulation, as well as the respective National Building Regulations.

BS EN 1995 family of standards, more commonly known as Eurocode 5 or EC5, is the standard for structural timber design.

Considerable research from across member states has gone into developing these standards, and they are continually supported by a systematic review process every five years. National Standardisation Bodies (NSBs) are required to help in the review process by collating the information and user feedback from their relevant jurisdictions.

This Wood Information Sheet (WIS) is an overview of the subject with signposts to more detailed sources of information that are listed at the end. This outlines the major differences between Eurocode 5 and BS 5268-2 Structural use of timber [1], the British Standard for timber design that was withdrawn by the British Standards Institute (BSI) in 2010 to make way for EC5, and includes guidance on transitioning between the two.

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Glulam arches at Norwich Academy, designed by Ramboll and KLH Figure 1: using Eurocode 5 Ramboll

Photo:

Key points

- Eurocode 5 contains only the timber design principles and essential application rules to realise them. Application rules are presented as design formulae eliminating the need for the material-specific tables that were presented in the BS 5268 family of standards.
- Principles are Eurocode statements for which no alternatives are deemed to be available, or appropriate, marked with a 'P' at the beginning.
- · Application rules are recognised rules or procedures that satisfy principles and are allowed to be replaced by alternatives if deemed necessary.
- The UK National Annex (UK NA) to Eurocode 5 contains NDPs and other country-specific information, where an option for national choice exists in Eurocode 5.
- PD 6693-1 Recommendations for the design of timber structures to Eurocode 5: Design of timber structures. General. Common rules and rules for buildings [2] contains non-contradictory practical advice extracted from the BS 5268 family of standards, as well as other information that is deemed by the BSI as supplementary to Eurocode 5 and the UK NA.
- BS EN 1990 Eurocode. Basis of structural design [3] and BS EN 1991-1-1 Eurocode 1. Actions on structures [4] must be used in conjunction with the relevant parts of Eurocode 5 as they contain general principles, actions (loads) and action combinations that apply to the most common types of design situations.
- BS 5268 family of standards followed 'permissible stress design' whereas Eurocode 5 designs are 'limit state designs' with ultimate and serviceability limit states.



Background

In 1975 the Commission of the European Community began a programme to 'eliminate technical obstacles to trade and the harmonisation of technical specifications' in construction. This led to the development of the Construction Products Directive in 1989. This was subsequently replaced by the Construction Products Regulation, which came into force in 2013. Ten structural Eurocodes listed below were also established as part of this effort to harmonise the technical rules for the design of construction works and were first published in 2004:

- EN1990 Eurocode: Basis of structural design
- EN1991 Eurocode 1: Actions on structures
- EN1992 Eurocode 2: Design of concrete structures
- EN1993 Eurocode 3: Design of steel structures
- EN1994 Eurocode 4: Design of composite steel and concrete structures
- EN1995 Eurocode 5: Design of timber structures
- EN1996 Eurocode 6: Design of masonry structures
- EN1997 Eurocode 7: Geotechnical design

- EN1998 Eurocode 8: Design of structures for earthquake resistance
- EN1999 Eurocode 9: Design of aluminium structures

Further Eurocodes are currently in development, including a Eurocode related to structural glass.

These Eurocodes harmonise design across the member states of EEA and align the principles of structural timber design with those used for most other building materials, notably concrete and steel. This improves the potential for wider structural use of timber, especially in composite constructions.

The NSB of each member state (the BSI in the UK) must publish the structural Eurocodes without changing any part of the text. Member states can, however, add a national title page, a 'Foreword' section and a National Annex. These National Annexes contain country-specific design data that are allowed within the Eurocodes. These allow the Eurocodes to be adapted to local conditions such as differing snow depths, wind speeds and other design parameters, known as the NDPs. A series of second generation Eurocodes are

Table 1: Replacements for the BS 5268 family of British Standards

BS number	Title	Withdrawn	Replaced by
5268-2:2002, Amended 2007	Structural use of timber. Code of practice for permissible stress design, materials and workmanship	November 2009	BS EN 1995-1-1 Eurocode 5. Design of timber structures. General. Common rules and rules for buildings, together with the UK NA, and further guidance given in PD 6693*
5268-3:2006*	Structural use of timber. Code of practice for trussed rafter roofs	March 2010	
5268-4.1:1978	Structural use of timber. Fire resistance of timber structures. Recommendations for calculating fire resistance of timber members	March 2010	BS EN 1995-1-2 Eurocode 5. Design of timber structures. General. Structural fire design
5268-4.2:1990	Structural use of timber. Fire resistance of timber structures. Recommendations for calculating fire resistance of timber stud walls and joisted floor constructions	March 2010	
5268-5:1989	Structural use of timber. Code of practice for the preservative treatment of structural timber	January 2010	Not formally replaced, but see BS 8417 Preservation of wood. Code of practice [5]
5268-6.1:1996*	Structural use of timber. Code of practice for timber frame walls. Dwellings not exceeding seven storeys	November 2009	BS EN 1995-1-1 Eurocode 5. Design of timber structures. General. Common rules and rules for buildings, together with the UK NA, and further guidance given in PD 6693*
5268-6.2:2001*	Structural use of timber. Code of practice for timber frame walls. Buildings other than dwellings not exceeding four storeys	November 2009	
5268-7.1:1989	Structural use of timber. Recommendations for the	November 2009	<i>Eurocode 5 Span Tables</i> published by BM TRADA [6] provides tabulated values calculated to EC5 for a range of common joist, purlin and rafter sizes, and now includes further EC5-compliant guidance on designing trimmers and trimming joists.
(also 7.2 to 7.7)**	calculation basis for span tables. Domestic floor joists		

* PD 6693-1 Recommendations for the design of timber structures to Eurocode 5 provides guidance to supplement Eurocode 5 and the UK NA on the subjects covered in these standards, as well as providing non-contradictory guidance on topics that are not covered by Eurocode 5.

** Engineering calculation methods within these standards are retained by BM TRADA to publish Eurocode 5 Span Tables.



now being produced, with the publication date currently set to be in 2023. While capturing research output since 2004, these new standards will also attempt to reduce the number of NDPs, further simplifying the cross-border design across member states.

The British Standards Institution (BSI) ratified the UK National Annex to Eurocode 5 (UK NA) in 2006, and declared BS 5268 to be obsolescent in April 2010. Eurocodes are now referenced in Approved Document A [7] as practical guidance on meeting the Building Regulations Part A requirements in the UK.

With the UK leaving the EU in 2020, BSI has clarified its position to state that the 'UK will continue to remain a full member of the European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELEC)' [8]. This indicates that the Eurocodes will continue to be recognised as fulfilling the requirements of the Building Regulations Part A, and is expected to be so beyond the transition period.

BS EN 1995 Family of Standards

The Eurocode 5 family of standards is currently comprised of the following parts:

- BS EN 1995-1-1 General Common rules and rules for buildings [9]. This part of the standard contains the majority of the design principles, application rules and corresponding formulae, thus giving the basis for Eurocode 5 designs. This is currently being updated, with major revisions expected in the areas of connections, vibrations and racking design of walls, among other improvements.
- BS EN 1995-1-2 General Structural fire design [10]. This
 part of the standard gives specific guidance relating to the fire
 design of structural timber. Where necessary this refers back to
 BS EN 1995-1-1 for general design guidance. This is currently
 being updated, with major revisions expected in the calculation
 methods to incorporate design tables, as well as simplified and
 more advanced rules.
- BS EN 1995-2 Bridges [11]. This part of the standard provides bridge specific guidance only, referring back to BS EN 1995-1-1 where necessary for general design guidance. This too is currently being updated, with major revisions expected for example in the design method for fatigue.

In addition to these three parts some new topics are currently being considered to be developed as Technical Guides that are expected to follow the general principals of Eurocode 5, giving specific, yet complementary design rules. Technical Guides are a means to get the industry to trial a set of design rules before being implemented as a full Eurocode, or a part thereof. All Eurocodes undergo a systematic review every five years, with amendments released afterwards if necessary. This is the mechanism with which innovations and state of the art in design is captured into the Eurocodes. Most recent updates to the Eurocode 5 family of standards were released as the second amendments in 2014. A second generation of Eurocode 5, which is currently being developed, is expected to be available for public use after 2023. In the meantime the most up-to-date Eurocode 5 parts to be used for UK design are referenced in this document.

UK National Annexes (UK NAs)

Designs for structures to be built in the UK should use the values and references in the UK NAs. However, an NA is allowed to list NDPs and preferences only for the clauses that are listed in the Eurocode 5 as being available for national determination. In the case of Eurocode 5 this list of clauses is very short. :

The UK NA to BS EN 1995-1-1 covers, among other things:

- assignment of loads to duration classes
- guidance on assignment of timber constructions to service classes
- partial factors for material properties
- guidance on limiting values for deflections
- an expanded design method for domestic floor vibrations
- choice of method for design of wall diaphragms.

The UK NA to BS EN 1995-1-2 is currently quite a short document specifying the preferred national values for a number of fire-specific design parameters, as well as indicating the preferred informative annexes to be used for UK practice. Designs for structures elsewhere should use the values and references in the National Annex for the relevant country.

At the time of writing the UK did not have a National Annex for the bridges part of the Eurocode, BS EN 1995-2.

Designs for structures elsewhere should use the values and references in the National Annex for the relevant country.

Published Document, PD 6693

Early designers migrating to the Eurocodes noticed that much of the practical advice, particularly relating to the UK practice, found in the corresponding British Standards were missing in the Eurocodes. BS 5268-2, the British Standard for timber design that was withdrawn in 2010, contained useful practical guidance relating to the UK practice. Published document PD 6693-1 *Recommendations for the design of timber structures to Eurocode 5* incorporates some of that



material, updated to be non-contradictory to Eurocode 5. It includes guidance on the preferred wall racking design method for the UK, recommendations for masonry shielding effect, guidance on trussed rafters, allowances for holes and notches in beams, and several other subjects important to UK designers. PD 6693 also lists the assigned strength classes to be used with European oak and sweet chestnut.

Eurocode 5 versus BS 5268

Eurocode 5 contains only the design principles and essential application rules containing general formulae. It is formula-driven and lacks the quick look-up tables of BS 5268. All parts of the BS 5268 family are now replaced by Eurocode 5 or other documents, as shown in *Table 1*. However, TRADA has retained some of the non-contradictory engineering principles contained in BS 5268 in producing its guidance documents. For example, TRADA continues to produce *Eurocode 5 Span Tables* [6] based on the engineering equations and simplifications presented in BS 5268-7 family of standards that were specially written for the production of span tables.

Limit states

The fundamental difference between Eurocode 5 and BS 5268-2 is their approach to design. BS 5268-2 used 'permissible or allowable stress design' whereas Eurocode 5 uses 'limit state design', bringing timber design in line with other materials such as steel and concrete. Using Eurocode 5, the designer generally has to check two limit states:

- ultimate limit states, beyond which parts of the structure may fail
- serviceability limit states, beyond which, under normal use, excessive deflection or vibration compromises the functioning of the structure, its appearance or user comfort.

To check ultimate limit states, the designer starts with the characteristic values of the loads (termed 'actions' in Eurocode 5) and of the material properties. These values are modified by partial factors to arrive at design values that are usually higher for the loads and lower for the material properties than their respective characteristic values.

Load (Action) data

BS EN 1991 family of standards together with their UK National Annexes give the characteristic load data required for design. BS EN 1990 lists the partial factors required to modify these load data to design values.

Materials and design data

Eurocode 5 uses 'characteristic' values of materials that are different from the 'grade stress' values that were given in BS 5268-2. Grade stress values were already reduced for longterm load duration and included a safety factor. Characteristic values, on the other hand, are derived from a statistical analysis of laboratory test results and are generally higher than the grade stress values. Eurocode 5 does not list any characteristic values, for which the designer should consult other standards such as BS EN 338 [12] (for solid structural timber) or manufacturers' data. Compulsory factors to take account of safety, load duration and environmental conditions are commonly applied to convert the characteristic values and are presented in Eurocode 5 for harmonised materials, but should be obtained from the manufacturers for other products and materials that follow a different route to the market than through harmonised product standards. (Please refer to WIS 2/3-56 CE marking: Implications for timber products [13]).

Unlike in the British Standards, as the material properties are separated from the design rules given in Eurocode 5, new and innovative materials can be accommodated within the existing rules of Eurocode 5 without the need for rewriting the standard, which is an advantage to the development of new building technologies.

Strength grading

Solid timber must be strength graded, either visually or by machine, to comply with the Construction Products Regulation. Once graded, the characteristic values for design purposes can be obtained from other European standards, depending on the strength classes the timbers are assigned to.

In the UK, visual grading of solid timber is carried out according to BS 4978 [14] for structural softwoods and BS 5756 [15] for temperate hardwoods. Timber graded to these standards is assigned a strength class by following the guidelines in BS EN 1912 [16]. Machine grading follows BS EN 14081 suite of standards. Material properties corresponding to each strength class is given in BS EN 338. More information can be found in the TRADA *WIS 4-7 Timber strength grading and strength classes* [17].

Eurocode 5 cites the relevant standards with which all timbers and panel products must comply and specifies some design factors such as reference dimensions for calculations. Information relating to glued laminated timber can be found in BS EN 14080 *Timber structures. Glued laminated timber. Requirements* [18]. Crosslaminated timber (CLT) is expected to be covered by the product standard BS EN 16351 *Timber structures. Cross laminated timber.*



Requirements [19], although a consensus on a wider usage of this standard has not been reached at the time of writing. General design rules for CLT will be included into the second generation Eurocode 5.

About decimal point indicators

It is important to note that, in line with continental European notation, the Eurocodes use a comma (,) as the decimal point indicator. However, TRADA guidance for Eurocode 5 follows the practice common in most English-speaking countries of using a full stop/period (.) to indicate a decimal point.

Wood-based panels

Wood-based panels for permanent incorporation within a building must comply with the Construction Products Regulation, achieved by compliance with the harmonised standard BS EN 13986. This standard in turn refers to a series of product standards for specifications and requirements for each panel product type. TRADA's *WIS 2/3-23* gives more information on wood-based panel products [20].

Adhesive types suitable for use in particular service classes are specified by reference to BS EN 301 Adhesives, phenolic and aminoplastic, for loading bearing timber structures [21], and BS EN 15425 Adhesives [22].

Table 2 lists the standards with which timber and timber-based materials should comply, and where the characteristic values used in design can be found.

Timber composites

TRADA's WIS 1-42 *Timber I-joists: applications and design* [23] provides guidance on timber I-joists, applications and design.

Adhesives

BS EN 16254 Adhesives. Emulsion polymerized isocyanate (EPI) for load-bearing timber structures. Classification and performance requirements [24] gives the classification and performance requirements for these types of adhesives where they are intended to be used in timber structures. WIS 2-3/31 Adhesives for structural use [25] provides further information on adhesively bonded timber connections.

Material	Material – requirements	Material – characteristic properties	
Structural solid timber*	BS EN 14081-1 [26]	BS EN 338 [12]	
	BS EN 14081-2 [27]		
	BS EN 14081-3 [28]		
Glulam	BS EN 14080 [18]	BS EN 14080 [18]	
LVL	BS EN 14374 [29]	Third-party accredited manufacturer data, such as those offered under a CE Mark or a BM TRADA Q-Mark	
	BS EN 14279 [30]		
All wood-based panels	BS EN 13986 [31]	BS EN 12369-1 [32]	
	Also, relevant product standard(s) below.	BS EN 12369-2 [33]	
Fibreboards	BS EN 622-1 [34]	Third party accredited manufacturer data, such as those offered under a CE Mark or a BM TRADA Q-Mark	
	BS EN 622-2 [35]		
	BS EN 622-3 [36]		
	BS EN 622-4 [37]		
	BS EN 622-5 [38]		
OSB	BS EN 300 [39]		
Particleboards	BS EN 312 [40]		
	BS EN 14755 [41]		
	BS EN 634-1 [42]		
	BS EN 634-2 [43]		
Plywood	BS EN 636 [44]	BS EN 12369-2 [33]	
	ecies and grades of timber commonly availabl <i>ngth classes</i> [17]. PD 6693-1 lists the values f	le in the UK relate to these strength classes is given in WIS 4-7 <i>Timber</i> for oak and sweet chestnut.	

 Table 2:
 Sources of information on material properties and design data



Fasteners and connectors

TRADA's WIS 2/3-52 *Fasteners for structural timber: nails, staples, screws, dowels and bolts* [45] provides further information on timber engineering hardware and connectors.

Eurocode terms and requirements

Principles versus application rules

In accordance with BS EN 1990 *Eurocode. Basis of structural design*, Eurocode 5 makes a distinction between 'principles' and 'application rules'. Principles are statements and requirements for which no alternatives are deemed available. They are designated by the letter 'P' in front of the paragraph number. Application rules are generally recognised rules or procedures that satisfy the principles. They can be replaced by alternatives as long as the alternatives can be demonstrated to satisfy the same principles.

Actions

In accordance with BS EN 1990, Eurocode 5 sets out the fundamental requirements for the design of structures and requires that the timber structures be fit for their intended use under all applied actions.

Actions in this context are both direct (forces applied to the structure) and indirect (imposed deformations such as temperature-induced effects or settlement). Actions are classified as:

- permanent, such as self-weight of the structure
- · variable, such as imposed loads and accidental loads.

The characteristic values for actions are modified by partial factors to take account of design situations and can be further modified by reduction (combination) factors as given in BS EN 1990 to account for load combinations.

Service and load duration classes

Eurocode 5 defines three service classes similar to those of the BS 5268 family of standards. The UK National Annex to Eurocode 5 includes examples of relevant environmental conditions for each of the three service classes. In the second generation of Eurocode 5 it is expected a further service class to account for fully submerged timber structures will be presented.

There are, however, five load duration classes in Eurocode 5 as opposed to the four in BS 5268, with differing load durations to suit the conditions set out in BS EN 1990. Modification factors for service class and load duration class are combined in Eurocode 5 to form one modification factor, which is tabulated for solid timber, glued laminated timber and wood-based board materials.

Durability

BS EN 335 *Durability of wood and wood-based products* [46] defines the durability of wood and wood-based products with reference to five 'use classes', of which only the first three are likely to occur in most common structures. Eurocode 5 specifies that the wood or wood-based product must have adequate natural durability for the use class or be preservative treated.

Timber is inherently acidic. As such, when exposed to moisture timber can lead to corrosion of metal components of fasteners and other structural connections. These must therefore be inherently corrosion resistant or protected against corrosion, to a level appropriate to the service class they are expected to be exposed to. Eurocode 5 gives guidance on the minimum coating thicknesses for each service class for various types of fastener. It is expected that further guidance on this will be made available in the second generation Eurocode 5.

Both naturally durable timbers and preservative-treated wood can fulfil the durability requirements of Eurocode 5. The specification of preservative treatment levels in the European standards is included in BS 8417.

Ultimate limit states

The section of Eurocode 5 on ultimate limit states sets out the design procedure for members of solid timber, glulam, laminated veneer lumber or panel products. Design rules for bending, shear, compression both parallel and perpendicular to grain, tension and torsion, as well as rules for combined actions, are presented. Stability and biaxial bending of columns are now discussed in detail. Design rules for tapered, curved, pitched or cambered elements for glulam designs are also presented.

Discussions on notching are also included, but guidance on drilling holes in beams is not presented; for this the designer must refer to PD 6693-1. It is expected that the second generation of Eurocode 5 will contain detailed guidance on the limits for notches and holes to prevent splitting of timber members.

Serviceability limit states

The section on serviceability deals with the requirements for limiting deflection and vibration, and gives the principles and equations for their calculation, which are currently being further enhanced for the second generation of Eurocode 5. Detailed discussions on joint slip and vibration are now included. UK NA gives guidance on vibration for UK constructions and can be seen as an extension of the information contained in Eurocode 5. Serviceability limit states design is often regarded as one of the



more complex areas of Eurocode 5, so TRADA has produced a number of guides to these topics (see *Further advice*).

Connections and assemblies

Connections

Connections is the longest and the most complex topic covered in Eurocode 5. This section covers the design of connections made with dowel-type fasteners based on Johansen formulations and gives detailed guidance for other forms of connections. Detailed design methods for laterally loaded nails, staples, screws, bolts and steel dowels are presented. Connection situations for twoand three-member timber to timber and steel or wood-based panel to timber joints are covered. No tables of capacities are presented; the designer is required to apply equations specific to the design situation.

Also covered in this section are design procedures for connections with connectors, including punched plate metal fasteners, toothed plates, shear plates and split rings. However, glued-in rods are not covered, although guidance is available in *Manual for the design of timber building structures to Eurocode 5* (see *Further advice*).

Components and assemblies

Engineered wood products are supported by Eurocode 5 including design rules for glued thin-webbed beams, glued thin-flanged beams, and mechanically jointed and glued columns. Eurocode 5 also includes assemblies and guidance on trusses, roof and floor diaphragms, wall diaphragms and bracing systems.

UK-specific guidance on these aspects are further detailed in the UK NA to BS EN 1995-1-1 and the PD 6693. Design of diaphragm walls are currently expected to be carried out to the rules given in PD 6693 until further improvements to the method are published in the forthcoming second generation Eurocode 5.

Structural detailing and control

Eurocode 5 acknowledges the importance of quality control and materials handling. It sets requirements for materials, joints assembly, common fixings, transportation and erection, all to ensure the materials satisfy the quality assumptions made in the design process. However, compared to BS 5268 and due to variations in national construction practices, Eurocode 5 stops short of giving detailed rules.

The National Structural Timber Specification [47] provides detailed guidance as well as an editable version of a specification to aid the designer to specify timber and related products to suit the Eurocode 5 requirements. A forthcoming second generation Eurocode 5 is expected to contain an 'execution' standard similar to those for other structural materials.

Informative annexes

Eurocode 5 includes three Informative Annexes (not to be confused with the National Annexes). Annex A advises on possible shear failure types and limits at multiple dowel-type, steel-to-timber connections. There is expectation that this annex will be improved on and absorbed in to the main body of the Eurocode 5 within the connections chapter in the upcoming second edition.

Annex B offers a method of simplified analysis for mechanically jointed beams. This annex is widely used by CLT designers to calculate stiffness.

Annex C is a design method for built-up columns, including lattice columns.

Second generation Eurocode 5

Eurocode 5 was first published as DD ENV 1995-1-1 in 1994. 'An ENV is made available for provisional application only, and does not have the status of a European Standard. The aim is to use the experience gained during the ENV period to modify the ENV so that it can be adopted as a European Standard.'

The first Eurocode 5 with the status of a European Standard was published in 2004, with amendments published in 2009 and 2014.

In 2010, the European Commission mandated the European Committee for Standardization (CEN) to 'initiate a process of further evolution of the Eurocode system, incorporating both new and revised Eurocodes, leading to the publication of the second generation of EN Eurocodes'.

While the overarching aim of the second generation of Eurocodes is to incorporate new topics of interest to the member countries, a secondary but another key objective was to improve the ease of use of the Eurocodes by taking into account the user feedback received through the systematic review process.

Work is now underway to complete the technical writing of the second generation of Eurocode 5 in 2023. The UK continues to provide expertise to these drafting committees through nominations by the BSI. TRADA members are encouraged to email advisory@trada.co.uk to give feedback on their experiences of using Eurocode 5.



Further advice

TRADA publishes downloadable PDF Guidance Documents (GD) for engineers and specialist designers, including:

- GD2: How to calculate the design values of loads using Eurocodes [48]
- GD5: How to calculate deformations in timber structures using Eurocodes [49]
- GD6: Vibration in timber floors (Eurocode 5) [50]
- GD7: Multiple fastener joints: design recommendations for BS 5268-2 and Eurocode 5 [51]
- GD10: Cross-laminated timber design guide for project feasibility (Eurocode 5) [52].

Books:

- Eurocode 5 Span tables [6]
- Eurocode 5: timber design essentials for engineers [53]
- Manual for the design of timber building structures to Eurocode 5 2nd edition [54].

Software for structural design using EC5:

- Timbersizer [55]
- Timberconnections [56].

All of the above are available from www.trada.co.uk.

References

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- PD 6693-1:2019 Recommendations for the design of timber structures to Eurocode 5: Design of timber structures, Part 1: General – Common rules and rules for buildings, BSI
- 3. BS EN 1990:2002+A1:2005 Eurocode. Basis of structural design, BSI
- 4. BS EN 1991-1-1:2002 Eurocode 1. Actions on structures, BSI
- 5. BS 8417:2011+A1:2014 Preservation of wood. Code of practice, BSI
- 6. *Eurocode 5 Span tables*, 4th edition, ISBN 978-1909594142, BM TRADA, 2014
- England and Wales Building Regulations: Approved Document A (Structure), NBS, 2010, available at www.planningportal.gov.uk
- 8. www.bsigroup.com/en-GB/our-services/standards-subscription-services/ Eurocodes-Plus/eurocodes-in-the-post-brexit-world
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- 12. BS EN 338:2016 Structural timber. Strength classes, BSI
- 13. WIS 2/3-56 CE marking: Implications for timber products, BM TRADA, 2016
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- 18. BS EN 14080:2013 Timber structures. Glued laminated timber. Requirements, BSI
- 19. BS EN 16351:2015 Timber structures. Cross laminated timber. Requirements, BSI
- 20. WIS 2/3-23 Introduction to wood based panel products, BM TRADA, 2019
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- 22. BS EN 15425:2017 Adhesives. One component polyurethane for loadbearing timber structures. Classification and performance requirements, BSI
- 23. WIS 1-42 Timber I-joists: applications and designs, BM TRADA, 2018
- 24. BS EN 16254:2013+A1:2016 Adhesives. Emulsion polymerized isocyanate (EPI) for load-bearing timber structures. Classification and performance requirements, BSI
- 25. WIS 2/3-31 Adhesives for structural use, BM TRADA, 2019
- 26. BS EN 14081-1+A1:2019 Timber structures. Strength graded structural timber with rectangular cross section. General requirements, BSI
- 27. BS EN 14081-2:2018 Timber structures. Strength graded structural timber with rectangular cross section. Machine grading. Additional requirements for initial type testing, BSI
- BS EN 14081-3+A1:2018 Timber structures. Strength graded structural timber with rectangular cross section. Machine grading; additional requirements for factory production control, BSI
- 29. BS EN 14374:2004 Timber structures. Structural laminated veneer lumber. Requirements, BSI
- 30. BS EN 14279+A1:2009 Laminated veneer lumber (LVL). Definitions, classification and specifications, BSI



- 31. BS EN 13986+A1:2015 Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking, BSI
- BS EN 12369-1:2001 Wood-based panels. Characteristic values for structural design. OSB, particleboards and fireboards, BSI
- BS EN 12369-2:2011 Wood-based panels. Characteristic values for structural design. Plywood, BSI
- 34. BS EN 622-1:2003 Fibreboards. Specifications. General requirements, BSI
- 35. BS EN 622-2:2004 Fibreboards. Specifications. Requirements for hardboards, BSI
- BS EN 622-3:2004 Fibreboards. Specifications. Requirements for medium boards, BSI
- BS EN 622-4:2019 Fibreboards. Specifications. Requirements for softboards, BSI
- BS EN 622-5:2009 Fibreboards. Specifications. Requirements for dry process boards (MDF), BSI
- BS EN 300:2006 Oriented strand boards (OSB). Definitions, classification and specifications, BSI
- 40. BS EN 312:2010 Particleboards. Specifications, BSI
- 41. BS EN 14755:2005 Extruded particleboards. Specifications, BSI
- 42. BS EN 634-1:1995 Cement-bonded particle boards. Specification. General requirements, BSI
- 43. BS EN 634-2:2007 Cement-bonded particleboards. Specifications. Requirements for OPC bonded particleboards for use in dry, humid and external conditions, BSI
- 44. BS EN 636+A1:2015 Plywood. Specifications, BSI
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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-forprofit 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.

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