



BSI Standards Publication

Recommendations for the design of timber structures to Eurocode 5: Design of timber structures —

Part 1: General — Common rules and rules for building

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2019

Published by BSI Standards Limited 2019

ISBN 978 0 539 03984 9

ICS 91.010.30; 91.080.20

The following BSI references relate to the work on this document:

Committee reference B/525

Draft for comment 19/30396380 DC

Amendments/corrigenda issued since publication

Contents

	Page
Foreword	iii
0 Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Design responsibilities	2
5 Effective anchorages of timber floors to walls for buildings of Consequence Class 2a	2
6 Horizontal tie forces for Consequence Class 2b timber buildings of load-bearing wall construction	3
7 Assignment of timbers to BS EN 338 strength classes [BS EN 1995-1-1:2004+A1:2008, 3.21]	3
<i>Table 1 — Assignment of temperate hardwoods to BS EN 338 strength classes</i>	3
8 Factor $k_{c,90}$ for compression perpendicular to grain [BS EN 1995-1-1:2004+A1:2008, 6.1.5]	3
9 Effective lengths of compression members [BS EN 1995-1-1:2004+A1:2008, 6.3.2]	4
<i>Table 2 — Effective lengths of compression members</i>	4
<i>Table 3 — Effective lengths of compression members in trussed rafters</i>	4
10 Limits on notches and circular holes in joists and studs for which no calculations are required	5
11 Design of beams with holes	6
12 Characteristic properties of fasteners	8
13 Yield moment of annular ring-shanked nails [BS EN 1995-1-1:2001, 8.3.1.1(4)]	8
14 Diameters for evaluating lateral load-carrying capacities of screws [BS EN 1995-1-1:2004+A1:2008, 8.7.1]	8
15 Axially loaded screws [BS EN 1995-1-1:2004+A1:2008, 8.7.2]	8
16 Connections made with punched metal plate fasteners [BS EN 1995-1-1:2004+A1:2008, 8.1.1]	9
17 Misalignment tolerances in punched metal plate fastener joints [BS EN 1995-1-1:2004+A1:2008, 8.8.5.1]	9
18 Trusses with punched metal plate fasteners [BS EN 1995-1-1:2004+A1:2008, 9.2.2]	9
<i>Table 4 — Maximum lengths of chord and internal members</i>	10
<i>Figure 1 — Tension stress condition perpendicular to grain at joints</i>	11
<i>Table 5 — Modification factor, K_e, to account for loading eccentricities in girder trusses</i>	11
19 Masonry shielding to wall diaphragms	11
20 Simplified analysis of wall diaphragms [BS EN 1995-1-1:2004+A1:2008, 9.2.4.3]	11
<i>Figure 2 — Division of racking wall into wall diaphragms</i>	13
<i>Figure 3 — Forces transmitted into underlying construction by bottom rail of wall diaphragm</i>	16
<i>Table 6 — Values of sheathing combination factor, K_{comb}</i>	17
<i>Figure 4 — Calculation of design stabilizing and destabilizing moments</i>	18
<i>Figure 5 — Division of wall diaphragms into wall panels</i>	20
21 Contribution of plasterboard to racking resistance	21
22 Evaluation of design racking resistance of plasterboard-clad timber frame walls	21
<i>Table 7 — Total design shear capacities per unit length of the perimeter fasteners for various specifications of plasterboard</i>	22
23 Bracing to trussed rafter roofs [BS EN 1995-1-1:2004+A1:2008, 9.2.5.3]	22
24 Lateral load-carrying capacity of glued lap joints [BS EN 1995-1-1:2004+A1:2008, 10.3]	22
Annex A (normative) Exchange of information between building designer and component designer(s)	24
Annex B (informative) Effective anchorage of floors to timber frame wall buildings of Consequence Class 2a	26

	<i>Figure B.1 — Details of effective anchorage of floors to timber frame walls in buildings of Consequence Class 2a</i>	27
Annex C	(informative) Actions and combinations of actions that may be considered in the design of trussed rafters	27
	<i>Table C.1 — Summary of actions for duo-pitch and mono-pitch trussed rafters</i>	28
	<i>Table C.2 — Summary of action combinations for duo-pitch and mono-pitch trussed rafters</i>	29
Annex D	(informative) Masonry shielding to timber frame wall diaphragms	31
	<i>Figure D.1 — Area of brickwork providing wind shield to timber frame structure</i>	32
Annex E	(normative) Bracing of trussed rafter roofs	32
	<i>Table E.1 — Thickness and fixing of sarking materials</i>	33
	<i>Figure E.1 — Procedure for the design of roof bracing at rafter level</i>	34
	<i>Figure E.2 — Procedure for the design of roof bracing at ceiling level</i>	35
	<i>Figure E.3 — Standard bracing for rafter and web members of duopitch trussed rafters</i>	36
	<i>Figure E.4 — Standard bracing for rafter and web members of mono-pitch trussed rafters</i>	38
	<i>Figure E.5 — Limiting spans for standard bracing of trussed rafter roofs ^{A)}</i>	41
	<i>Table E.2 — Maximum truss spans for Figure E.5</i>	42
	<i>Figure E.6 — Basic wind zones for buildings at site altitudes ≤150 m</i>	44
	<i>Figure E.7 — Basic wind zones for buildings at site altitudes between 150 m and 300 m</i>	45
	<i>Table E.3 — Maximum design cumulative surface wind pressures (kN/m²) on windward and leeward gable walls for roofs constructed using the details of Figure E.10</i>	46
	<i>Table E.4 — Maximum design cumulative surface wind pressures (kN/m²) on windward and leeward gable walls for roofs constructed using the details of Figure E.11 and E.12</i>	46
	<i>Table E.5 — Maximum design horizontal wind force (kN/m) at bottom chord level on 12.5 mm thick plasterboard ceiling diaphragms</i>	47
	<i>Table E.6 — Maximum design horizontal wind force (kN/m) at bottom chord level on 15 mm thick plasterboard ceiling diaphragms</i>	47
	<i>Figure E.8 — Standard bracing for rafter members: detail C1 and D1</i>	48
	<i>Figure E.9 — Standard bracing for rafter members: detail C2 and D2</i>	49
	<i>Figure E.10 — Standard bracing for rafter members: detail C3</i>	51
	<i>Figure E.11 — Standard bracing for rafter members: detail D3 splice connection and D4 crossing connection</i>	52
Annex F	(informative) Optional recommendations for the support of water tanks in trussed rafter roofs	53
	<i>Figure F.1 — Support for water tanks</i>	54
	<i>Table F.1 — Sizes for support members for water tanks ^{A)}</i>	55
	Bibliography	56

Summary of pages

This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 56, an inside back cover and a back cover.

Foreword

Publishing information

This Published Document is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 September 2019. It was prepared by Subcommittee B/525/5, *Structural use of timber*, under the authority of Technical Committee B/525, *Building and civil engineering structure*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

PD 6693-1:2019 supersedes PD 6693-1:2012, which is withdrawn.

Relationship with other publications

This Published Document is a background paper that gives non-contradictory complimentary information for use in the UK with the Eurocode for actions on structures, BS EN 1995-1-1 and its UK National Annex.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **G.1.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

0 Introduction

When there is a need for guidance on a subject that is not covered by the Eurocode, a country can choose to publish documents that contain non-contradictory complementary information that supports the Eurocode. This Published Document, which has been prepared by BSI Subcommittee B/525/5, *Structural use of timber*, provides just such information and has been cited as a reference in the UK National Annex to BS EN 1995-1-1.

1 Scope

This Published Document gives non-contradictory complementary information for use with BS EN 1995-1-1 and NA to BS EN 1995-1-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 8103-1, *Structural design of low-rise buildings — Part 1: Code of practice for stability, site investigation, foundations, precast concrete floors and ground floor slabs for housing*

BS 8212, *Code of practice for dry lining and partitioning using gypsum plasterboard*

BS EN 301, *Adhesives, phenolic and aminoplastic, for loading bearing timber structures — Classification and performance requirements*

BS EN 338:2009, *Structural timber — Strength classes*

BS EN 520, *Gypsum plasterboards — Definitions, requirements and test methods*

BS EN 1995-1-1:2004+A1:2008, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

BS EN 13986, *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*

BS EN 14592, *Timber structures — Dowel-type fasteners — Requirements*

BS EN 15425, *Adhesives — One component polyurethane for load bearing timber structures — Classification and performance requirements*

3 Terms and definitions

3.1 Terms and definitions [BS EN 1995-1-1:2004+A1:2008, 1.5]

For the purposes of this Published Document, the terms and definitions given in BS EN 1995-1-1:2004+A1:2008 and the following apply.

3.1.1 attic truss

trussed rafter that is designed to allow a habitable room within the roof space

3.1.2 chord member

member of the external profile of the truss

NOTE For example, a rafter or a ceiling tie.