

Structural use of timber —

Part 6: Code of practice for timber frame walls —

Section 6.1 Dwellings not exceeding seven storeys

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/525, Building and Civil Engineering Structures, to Subcommittee B/525/5, Structural use of timber, upon which the following bodies were represented:

- British Woodworking Federation
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Property and Buildings Directorate)
- Health and Safety Executive
- Institution of Civil Engineers
- Institution of Structural Engineers
- National House-Building Council
- Timber Research and Development Association
- Timber Trade Association
- Co-opted members

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 March 1996

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Amendments issued since publication

Amd. No.	Date	Comments
9256	June 1996	Indicated by a sideline in the margin
17381	30 November 2007	See foreword

The following BSI references relate to the work on this standard:
Committee reference B/525/5
Draft for comment 94/105417
DC

ISBN 978 0 580 60136 1

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Foreword

This Section of BS 5268 has been prepared by Subcommittee B/525/5.

The start and finish of text introduced or altered by Amendment No. 1 is indicated in the text by tags **A₂** and **A₂**.

BS 5268 consists of the following other Parts:

- *Part 2: Code of practice for permissible stress design, materials and workmanship;*
- *Part 3: Code of practice for trussed rafter roofs;*
- *Part 4: Fire resistance of timber structures;*
- *Section 4.1: Recommendations for calculating fire resistance of timber members;*
- *Section 4.2: Recommendations for calculating fire resistance of timber stud walls and joisted floor constructions;*
- *Part 5: Code of practice for the preservative treatment of structural timber;*
- *Part 7: Recommendations for the calculation basis for span tables.*

This Section of BS 5268 was first published in 1988 and revised in 1996 to cover buildings of up to four storeys. Since then it has been used extensively by an increasing number of designers, including those new to timber frame.

However, since 1996, designers have gained increasing experience with this form of construction and in the light of further research (notably the TF2000 project at BRE Cardington) this edition of BS 5268-6.1, has extended the scope to cover dwellings up to seven storeys high. The opportunity has also been taken to further clarify certain parts of the text and to refer to new, appropriate European Standards. Guidance has also been included to facilitate the design of movement joints.

This British Standard relates to dwellings up to seven storeys high and covers only the structural design of timber frame walls, although some of the information may also be relevant to other similar forms of construction.

Whilst this Section of BS 5268 covers the structural design of timber frame walls, the following constructional features may significantly affect the basis of the design, and they are drawn to the attention of the designer:

- a) weathering;
- b) condensation control;
- c) thermal insulation;
- d) fire resistance;
- e) sound insulation;
- f) durability;
- g) movement joint design.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 34, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This Section of BS 5268 gives recommendations for the design, testing, fabrication and erection of timber frame walls for dwellings not exceeding $\overline{A_2}$ seven $\overline{A_2}$ storeys and consisting of timber frame walls, with studs not exceeding 610 mm centre to centre and one or both faces of the studs being partly or wholly connected to sheathing, lining, gusset plates or other forms of bracing. Although the information on racking resistance given in this Section of BS 5268 is restricted to wall panels no greater in height than 2.7 m, it is not intended that it should be so restrictive where wall panels are not subject to racking forces or where racking resistance can be justified by other means. All structural materials are assumed to be subject only to service classes 1 and 2 as defined in BS 5268-2.

The design information contained in this Section of BS 5268 may also be relevant to other types of building where the storey heights, proportions and configuration are similar to those covered by this Section of BS 5268.

1.2 References

1.2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on page 33. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

1.2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on page 34, but reference should be made to the latest editions.

1.3 Definitions

For the purposes of this Section of BS 5268 the definitions given in BS 6100 and the symbols given in BS 5268-2 apply together with the following.

1.3.1

cripple stud

vertical member in a framed partition or wall that supports a lintel

1.3.2

racking resistance

ability of a partition or wall panel to resist horizontal wind forces in the plane of the panel

1.3.3

spandrel panel

wall panel for a gable

1.3.4

stud

vertical member in a framed partition or wall

1.3.5

timber frame wall

wall constructed of timber framing members, bracing and/or wall sheathing

1.3.6

wall lining

manufactured sheet or board used to line a wall or partition

1.3.7

wall panel

component that forms part of a timber frame wall

1.3.8

wall sheathing

manufactured sheet or board used as a bracing

Section 2. Materials

2.1 General

The materials used should conform to the appropriate British Standards.

Reference should be made to BS 5268-5 for information on wood preservation.

All sheathing and lining materials should be adequately thick and robust to avoid damage during manufacture, transport and erection.

2.2 Species of timber

A2 *Note deleted* **A2**

All structural timber should be stress graded in accordance with BS 5268-2.

2.3 Sheathing materials

2.3.1 Plywood

The species and grades of plywood for sheathing should be one of those described in BS 5268-2.

2.3.2 Fibre building boards

Fibre building boards for use as structural sheathing should be one of the following types:

- A2** a) type HB.HLA2 tempered hardboard conforming to BS EN 622-2:1997;
 b) type MBH.HLS1 or MBH.HLS2 medium board conforming to BS EN 622-3:2004;
 c) impregnated softboard type SB.HLS conforming to BS EN 622-4:1997.

2.3.3 Particleboard

Particleboard sheathing should be type P5 conforming to BS EN 312-5:1997 or type P7 conforming to BS EN 312-7:1997.

2.3.4 Oriented strand board

Oriented strand board for sheathing should be type OSB/3 or OSB/4 conforming to BS EN 300:2006

2.3.5 Cement bonded particleboard

Cement bonded particleboard should be type OPC bonded conforming to BS EN 634-2:1997

2.3.6 Other sheathings

Designers should assure themselves of the suitability and durability of any sheathing material with a view to its intended end use.

Other sheet materials may be used provided that they are either covered by a British or European Standard of manufacture, including reference to their suitability as a sheathing material, or have been proven for use as a sheathing by an independent testing authority. **A2**

2.4 Gypsum plasterboard

Where gypsum plasterboard is assumed to make a structural contribution in the design of a timber frame wall, the plasterboard should be manufactured in accordance with **A2** BS EN 520 **A2**.

2.5 Adhesives

Adhesives used in the construction of timber frame wall panels should be of a type **A2**, durability **A2** and quality suitable for the conditions of use.

NOTE Further advice on suitable adhesives and the quality of workmanship is given in BS 5268-2 and BS 6446.

2.6 Fasteners

All structural fasteners within the scope of this Section of BS 5268 should be corrosion resistant and should be checked for compatibility with any ^{A2} *Text deleted* ^{A2} treatments used and any other metal work with which they are in contact.

^{A2} Fasteners used in the construction of panels and for fixing sheathing should be manufactured from mild steel, suitably protected against corrosion, or stainless steel, and be of round head or “D” head configuration and a size specified by the timber frame wall designer. ^{A2}

2.7 Masonry

Where masonry cladding is assumed to have a shielding effect on the timber frame or to contribute to the racking resistance of a timber frame wall it should be designed in accordance with BS 5628-1, BS 5628-2 ^{A2}, BS 5628-3 ^{A2} and should be at least 100 mm thick and have a minimum mass of 75 kg/m² of surface.

Section 3. Loading

3.1 General

Timber frame walls should be designed to carry the appropriate dead, imposed and wind loads given in BS 6399-1, BS 6399-2 and BS 6399-3 and to transfer such loads to the foundation without undue distortion and movement.

A2 Timber framed buildings should be designed to be robust. When timber framed buildings of certain classes are specifically required to be additionally designed to resist disproportionate collapse this should be carried out in accordance with the provisions in BS 5268-2. **A2**

3.2 Wind loading

3.2.1 Distribution of wind load

Wind acting on a building induces external and internal pressures on the roof and walls, as described in BS 6399-2. Both horizontal and vertical loads thus developed should be considered in the design of timber frame walls.

A2 Where the building consists of a number of independent structural units the wind transfer between units, for example by party wall straps or similar devices, should be proven. **A2**

NOTE The wind load is resisted primarily by transfer directly to the ground at the base of the wall and by the racking resistance of timber frame supporting walls, the load having been transferred via the floor and ceiling diaphragms. Other unquantifiable factors assisting in the resistance to wind loads are taken into account in the interaction factor given in 4.9.5.

3.2.2 Wind loading on masonry clad timber frame walls

A2 Where timber frame walls are clad by masonry walls and the following specifications are complied with, the external wind loading transferred to the timber structure should be determined in accordance with 3.2.3.

a) The masonry walls should be constructed of:

- 1) clay masonry units conforming to BS EN 771-1;
- 2) calcium silicate masonry units conforming to BS EN 771-2;
- 3) aggregate concrete masonry units conforming to BS EN 771-3;
- 4) autoclaved aerated concrete masonry units conforming to BS EN 771-4;
- 5) manufactured stone masonry units conforming to BS EN 771-5;
- 6) natural stone masonry units conforming to BS EN 771-6;
- 7) bricks of special shapes and sizes conforming to BS 4729.

b) The mortar should conform to the requirements of BS 5628-3 and be at least strength class M4 to BS EN 998-2, or of designation iii) to BS 5628. Alternatively, a 1:1:5 to 6 CEM1: lime: sand mortar batched by volume or weight of dry materials may be used [site batched designation iii)].

NOTE Depending upon exposure situations higher strength class (or designation) mortars may be appropriate. BS 5628-3 provides guidance on mortar selection and use.

c) Masonry claddings should be connected to the timber frame with wall ties or wall tie systems that have sufficient strength and stiffness to transfer wind loads to the timber frame wall.

Wall ties and wall tie systems should conform to BS EN 845-1. Wall tie user classes and their load capacity definition are given in Annex B.

d) Wall tie design should take into consideration all the anticipated differential vertical movement across the cavity as defined in 4.13. **A2**

3.2.3 Wind load transferred to timber frame wall

A2 3.2.3.1 Timber frame walls not exceeding four storeys **A2**

The wind load used in calculating the racking load and overturning and sliding forces to be resisted by the timber frame walls should be derived by multiplying the external wind load on the masonry cladding by the modification factor K_{100} appropriate to the number of storeys being considered (see Table 1).

A2 For buildings not exceeding three storeys, the K_{100} values in the third and fourth columns of Table 1 should only be used if the masonry wall has buttresses or returns not less than 550 mm. For four storey buildings, the K_{100} values in the third and fourth columns of Table 1 should only be used if the masonry wall has buttresses or returns not less than 950 mm. **A2**

In calculating the racking load and overturning and sliding forces, it should be assumed that the modified wind load acts uniformly over the entire area of the shielded timber frame wall. **A2** The modification factor K_{100} should not be applied to the design of individual elements, for example, studs. **A2**

A2 3.2.3.2 *Timber frame walls exceeding four storeys*

The wind load used in calculating the racking load and overturning and sliding forces to be resisted by the timber frame walls should be derived by multiplying the external wind load on the masonry cladding by the following K_{100} modification factors:

- For all storeys above the fourth storey, a K_{100} value of 1.00 should be used.
- For the lower four storeys, the K_{100} value should be determined from Table 1 with the percentage of loaded wall occupied by openings being calculated using the lower four storeys only. The K_{100} values in the third and fourth columns of Table 1 should only be used if the masonry wall has buttresses or returns not less than 1 200 mm. **A2**