

The Building Regulations 1991

**Structure**

**APPROVED DOCUMENT**

**A**

**A1**

**Loading**

**A2**

**Ground movement**

**A3**

**Disproportionate collapse**

## MAIN CHANGES IN THE 1992 EDITION (INCLUDING 1994 AMENDMENTS)

This edition of Approved Document A: Structure replaces the 1985 edition. The main changes are:

a. **Land-slip and subsidence:** an amendment to Requirement A2 draws attention to land-slip and subsidence as causes of ground movement. For guidance purposes Section 4 references a series of reports which review geological conditions in Great Britain with particular emphasis on landsliding, mining instability and natural underground cavities.

b. **Disproportionate collapse - multi storey buildings:** requirement A3 has been amended to safeguard the 'building' from disproportionate collapse rather than only the 'structure', but a building having a fifth storey within a certain roof space is now exempted. Detailed guidance is given in addition to that available in the referenced documents.

c. **Safeguarding of public buildings against disproportionate collapse:** new requirement A4, concerns the safeguarding of certain public buildings, shops and shopping malls against disproportionate collapse following the failure of any part of their roofs or roof supports. Guidance is given on the strategies that may be adopted in meeting the Requirement.

d. **Material change of use:** the amended Regulations requires a building to comply with Requirement A1 to A4\* repealed 1994 where there is a material change of use of the building into an hotel, institution or a public building. For guidance purposes Section 4 references publications concerning the appraisal of existing structures relating to a material change of use.

e. **Snow loading:** the guidance relating to the sizes of certain timber roof members has been extended to allow for the higher snow loading applicable to certain sites in England and Wales.

f. **Strutting to floors:** recommendations are now included for solid and herringbone timber strutting to floors.

g. **Design wind speed:** a simplified procedure has been included in the guidance for sizes of walls derived from Section 4 to ensure that the design wind speed for the building will not exceed 44 metres / second.

h. **Walls:** the guidance relating to buttressing walls, the lateral restraint to walls at roof level, and walls of small single storey non-residential buildings and annexes has been revised.

j. **Cladding:** guidance has been provided on the support and fixing of external wall cladding.

k. **Re-covering of roofs:** guidance has been provided on the inspection and strengthening measures that should be considered where roofs are to be re-covered as a material alteration as defined in the regulations.

\*Repealed 1994



# Contents

|  | PAGE |   | PAGE     |
|--|------|---|----------|
| <b>USE OF GUIDANCE</b>   | 3    | <b>Section 2: External Wall Cladding</b>  | 33       |
| <b>LOADING AND GROUND MOVEMENT<br/>THE REQUIREMENT A1 AND A2<br/>GUIDANCE</b>  | 5    | <b>Section 3: Re-covering of roofs</b>  | 35       |
| Introduction   | 6    | <b>Section 4: Codes, Standards and other<br/>references for all building types</b>  |          |
| <b>Section 1: Sizes of structural<br/>elements for certain residential<br/>buildings and other small buildings<br/>of traditional construction</b> |      | Loading   | 36       |
| General  | 7    | Structural work of timber   | 36       |
| Definitions  | 7    | Structural work of masonry  | 36       |
| <b>Section 1A: Basic requirements for<br/>stability</b>  | 8    | Structural work of reinforced,<br>pre-stressed or plain concrete  | 36       |
| <b>Section 1B: Sizes of timber floor,<br/>ceiling and roof members in single<br/>family houses</b>   |      | Structural work of steel  | 36       |
| Application  | 9    | Structural work of aluminium  | 36       |
| The use of this section  | 9    | Foundations   | 36       |
| Spans, sizes and spacings for<br>timber members  | 9    | Ground Movement (Requirement A2(b)<br>Existing buildings)   | 36<br>37 |
| <b>Section 1C: Thickness of walls in certain<br/>small buildings</b>   |      | <b>DISPROPORTIONATE COLLAPSE<br/>THE REQUIREMENT A3<br/>GUIDANCE</b>  | 38       |
| Application  | 13   | Performance   | 39       |
| Wall types   | 13   | Introduction  | 39       |
| The use of this section  | 13   | <b>Section 5: Reducing the sensitivity of<br/>the building to disproportionate<br/>collapse in the event of an accident</b> | 40       |
| Thickness of walls   | 13   | Alternative Approach  | 41       |
| Conditions relating to the building<br>of which the walls form part  | 17   | <b>Appendix A</b>   |          |
| Conditions relating to the wall  | 20   | <b>Tables of sizes of timber floor,<br/>ceiling and roof members in<br/>single family houses</b>                            | 43       |
| Construction materials and<br>workmanship  | 20   | <b>Standards referred to</b>  | 68       |
| Loading on walls   | 23   |   |          |
| End restraint  | 24   |   |          |
| Openings, recesses, overhangs<br>and chases  | 26   |   |          |
| Lateral support by roofs and floors  | 27   |   |          |
| Interruption of lateral support  | 29   |   |          |
| External walls of small single<br>storey non-residential buildings<br>and annexes  | 29   |   |          |
| <b>Section 1D: Proportions for masonry<br/>chimneys above the roof surface</b>   |      |   |          |
| Height to width relationship   | 30   |   |          |
| <b>Section 1E: Strip foundations of plain<br/>concrete</b>   |      |   |          |
| Conditions relating to the sub-soil  | 31   |   |          |
| Design provisions  | 31   |   |          |
| Minimum width of strip foundations   | 31   |   |          |

| <b>DIAGRAMS</b>  | PAGE | <b>TABLES</b>  | PAGE  |
|--|------|--|-------|
| 1. Key to tables A1-A24 in Appendix A relating to timber members           | 10   | 1. Common timber species/grade combinations  | 9     |
| 2. Imposed snow roof loading   | 12   | 2. Summary of tables A1-A24 in Appendix A relating to timber members                                 | 11    |
| 3. Determination of wall thickness   | 14   | 3. Strutting to joists   | 11    |
| 4. Exclusion of wall containing a bay                                      | 15   | 4. Wall types considered in this section   | 13    |
| 5. Parapet walls: height   | 16   | 5. Minimum thickness of certain external walls, compartment walls, and separating walls              | 14    |
| 6. Size and proportion of residential buildings of not more than 3 storeys | 17   | 6. Maximum spacing of cavity wall ties   | 15    |
| 7. Size of single storey non-residential buildings                         | 17   | 7. Imposed loads   | 18    |
| 8. Size of annexes   | 17   | 8. Maximum height of buildings on normal or slightly sloping sites                                   | 18    |
| 9. Maximum floor area enclosed by structural walls                         | 18   | 9. Maximum height of buildings on steeply sloping sites, including hill, cliff, and escarpment sites | 18    |
| 10. Map showing basic wind speeds in m/s                                   | 19   | 10. Value of factor 'x'  | 26    |
| 11. Measuring storey and wall heights                                      | 21   | 11. Lateral support for walls  | 27    |
| 12. Compressive strength of brick and block units                          | 22   | 12. Minimum width of strip foundations   | 32    |
| 13. Maximum span of floors   | 23   | Tables A1-A24 relating to timber members are in Appendix A   | 43-67 |
| 14. Differences in ground level  | 23   |  |       |
| 15. Openings in a buttressing wall   | 24   |  |       |
| 16. Buttressing  | 25   |  |       |
| 17. Sizes of openings and recesses   | 26   |  |       |
| 18. Lateral support by floors  | 27   |  |       |
| 19. Lateral support at roof level  | 28   |  |       |
| 20. Pier size and spacing  | 29   |  |       |
| 21. Proportions for masonry chimneys                                       | 30   |  |       |
| 22. Elevation of stepped foundation  | 31   |  |       |
| 23. Piers and chimneys   | 31   |  |       |
| 24. Foundation dimensions  | 32   |  |       |
| 25. Area at risk of collapse in the event of an accident                   | 40   |  |       |



## Use of Guidance

### THE APPROVED DOCUMENTS

The Building Regulations 1991, which come into operation on 1 June 1992, replace the Building Regulations 1985 (SI 1985 No. 1065) and consolidate all subsequent revisions to those regulations. This document is one of a series that has been approved by the Secretary of State as practical guidance on meeting the requirements of Schedule 1 and regulation 7 of the Building Regulations.

**At the back of this document is a list of those documents currently published by the Department of the Environment and the Welsh Office which have been approved for the purpose of the Building Regulations 1991.**

The detailed provisions contained in the Approved Documents are intended to provide guidance for some of the more common building situations. In other circumstances, alternative ways of demonstrating compliance with the requirements may be appropriate.

#### Evidence supporting compliance

**There is no obligation to adopt any particular solution contained in an Approved Document if you prefer to meet the relevant requirement in some other way.** However, should a contravention of a requirement be alleged then, if you have followed the guidance in the relevant Approved Documents, that will be evidence tending to show that you have complied with the Regulations. If you have not followed the guidance then that will be evidence tending to show that you have not complied. It will then be for you to demonstrate by other means that you have satisfied the requirement.

#### Other requirements

The guidance contained in an Approved Document relates only to the particular requirements of the Regulations which that document addresses. The building work will also have to comply with the requirements of any other relevant paragraphs in Schedule 1 to the Regulations. There are Approved Documents which give guidance on each of the other requirements in Schedule 1 and on regulation 7.

### LIMITATION ON REQUIREMENTS

In accordance with regulation 8, the requirements in Parts A to K and N of Schedule 1 to the Building Regulations do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about the building.

### MATERIALS AND WORKMANSHIP

Any building work which is subject to requirements imposed by Schedule 1 of the Building Regulations should, in accordance with regulation 7, be carried out with proper materials and in a workmanlike manner.

You may show that you have complied with regulation 7 in a number of ways, for example, by the appropriate use of a product bearing an EC mark in accordance with the Construction Products Directive (89/106/EEC), or by following an appropriate technical specification (as defined in that Directive), a British Standard, a British Board of Agrément Certificate, or an alternative national technical specification of any member state of the European Community which, in use, is equivalent. You will find further guidance in the Approved Document supporting regulation 7 on materials and workmanship.

#### Technical specifications

Building Regulations are made for specific purposes; health and safety, energy conservation and the welfare and convenience of disabled people. Standards and technical approvals are relevant guidance to the extent that they relate to these considerations. However, they may also address other aspects of performance such as serviceability or aspects which although they relate to health and safety are not covered by the Regulations.

When an approved document makes reference to a named standard, the relevant version of the standard is the one listed at the end of the publication. However, if this version of the standard has been revised or updated by the issuing standards body, the new version may be used as a source of guidance provided it continues to address the relevant requirements of the Regulations.

The Secretary of State has agreed with the British Board of Agrément on the aspects of performance which it needs to assess in preparing its Certificates in order that the Board may demonstrate the compliance of a product or system which has an Agrément Certificate with the requirements of the Regulations. An Agrément Certificate issued by the Board under these arrangements will give assurance that the product or system to which the Certificate relates, if properly used in accordance with the terms of the Certificate, will meet the relevant requirements.

Similarly, the appropriate use of a product which complies with a European Technical Approval as defined in the Construction Products Directive will also meet the relevant requirements.



**European Pre-standards (ENV)**

The British Standards Institution will be issuing Pre-standard (ENV) Structural Eurocodes as they become available from the European Standards Organisation CEN. CEN have asked national standards organisations within the European Community to make these provisional standards available to designers for trial use. It is hoped that the practical experience gained in these trials will provide valuable feedback which can be exploited in the development of the final EN standards.

DD ENV 1992-1-1:1992 Eurocode 2 :Part 1 and DD ENV 1993-1-1:1992 Eurocode 3 :Part 1-1 *General Rules and Rules for Buildings in concrete and steel* have been thoroughly examined over a period of several years and are considered to provide appropriate guidance when used in conjunction with their National Application Documents for the design of concrete and steel buildings respectively. When other ENV Eurocodes have been subjected to a similar level of examination they may also offer an alternative approach to Building Regulation compliance.

When the ENV Eurocodes are eventually converted into fully approved EN standards they are likely to be referenced by the guidance contained in future editions of the Part A Approved Document.

## The Requirements

This Approved Document, which takes effect on 1 June 1992, deals with the following requirements from Part A of Schedule 1 to the Building Regulations 1991:

---

*Requirement*

---

*Limits on application*

---

**Loading**

A1. - (1) The building shall be constructed so that the combined dead, imposed and wind loads are sustained and transmitted by it to the ground-

- (a) safely; and
- (b) without causing such deflection or deformation of any part of the building, or such movement of the ground, as will impair the stability of any part of another building.

(2) In assessing whether a building complies with sub paragraph (1) regard shall be had to the imposed and wind loads to which it is likely to be subjected in the ordinary course of its use for the purpose for which it is intended.

**Ground Movement**

A2. The building shall be constructed so that ground movement caused by:-

- (a) swelling, shrinkage or freezing of the subsoil; or
- (b) land-slip or subsidence (other than subsidence arising from shrinkage), in so far as the risk can be reasonably foreseen,  
will not impair the stability of any part of the building.

### Introduction

**0.1** In the Secretary of State's view the requirements of A1 and A2 will be met by adopting the guidance in Sections 1-3 or by following the recommendations given in the documents listed in Section 4.

Sections 1-4 give guidance on the following:

- a. **Section 1** give sizes of structural elements for certain residential buildings and other small buildings of traditional construction.
- b. **Section 2** gives guidance on the support and fixing of external wall cladding
- c. **Section 3** gives guidance where roofs are to be re-covered as a material alteration as defined in the Regulations.
- d. **Section 4** is relevant to all building types and lists Codes, Standards and other references for structural design and construction but, where they do not give precise guidance, consideration should be given to paragraph 0.2.

**0.2** The safety of a structure depends on the successful combination of design and construction, particularly:

- a. loading, where dead and imposed loads should be in accordance with BS 6399; Parts 1 and 3, and wind loads in accordance with CP3 Chapter V Part 2.
- b. properties of materials
- c. design analysis
- d. details of construction
- e. safety factors
- f. workmanship

The numeric values of safety factors, whether expressed explicitly or implicitly in design equations, or design values, should be derived from considerations of the above aspects of design and construction as a whole. A change in any one of these aspects may disturb the safety of the structure.

Loads used in calculations should allow for possible dynamic, concentrated and peak load effects that may occur.



# Section 1

## SIZES OF STRUCTURAL ELEMENTS FOR CERTAIN RESIDENTIAL BUILDINGS AND OTHER SMALL BUILDINGS OF TRADITIONAL CONSTRUCTION.

### General

1.1 This Section is presented as follows:

#### Section 1A

Basic requirements for stability.

#### Section 1B

Sizes of certain timber floor, ceiling and roof members in single family houses of not more than 3 storeys.

#### Section 1C

Thickness of masonry walls in certain residential buildings of not more than 3 storeys, small single storey non residential buildings and annexes.

#### Section 1D

Proportions for masonry chimneys.

#### Section 1E

Width of strip foundations of plain concrete.

1.2 Section 1A gives general rules which must be observed in following Sections 1B and 1C. Sections 1B to 1E may be used independently of each other.

**Throughout this section the diagrams are only illustrative and do not show all the details of construction.**

### Definitions

1.3 The following meanings apply to terms throughout this Section:

**Buttressing wall** A wall designed and constructed to afford lateral support to another wall perpendicular to it, support being provided from the base to the top of the wall.

**Cavity width** The horizontal distance between the two leaves of a cavity wall.

**Compartment wall** A wall constructed as a compartment wall to meet the requirements of regulation B3(2).

**Dead load** The load due to the weight of all walls, permanent partitions, floors, roofs and finishes including services, and all other permanent construction.

**Imposed load** The load assumed to be produced by the intended occupancy or use, including the weight of movable partitions, distributed, concentrated, impact, inertia and snow loads, but excluding wind loads.

**Pier** A member which forms an integral part of a wall, in the form of a thickened section at intervals along the wall, so as to afford lateral support to the wall to which it is bonded or securely tied.

**Separating wall** A wall or part of a wall which is common to adjoining buildings, and constructed to meet the requirements of regulation B3(2).

**Spacing** The distance between the longitudinal centres of any two adjacent timber members of the same type, measured in the plane of floor, ceiling or roof structure.

**Span** The distance measured along the centre line of a member between the centres of any two adjacent bearings or supports.

**Note:** The spans given in Section 1B and Appendix A for the floor joists, rafters, purlins, ceiling joists, binders and roof joists are **clear spans** i.e. spans between the faces of the supports.

**Supported Wall** A wall to which lateral support is afforded by a combination of buttressing walls, piers or chimneys acting in conjunction with floor(s) or roof.

**Wind load** The load due to the effect of wind pressure or suction.

## Section 1A

---

### BASIC REQUIREMENTS FOR STABILITY

**1A1** This section must be used in conjunction with sections 1B and 1C.

**1A2** Trussed rafter roofs should be braced to the recommendations of BS 5268: Part 3: 1985.

Where a traditionally framed roof (i.e. using rafters, purlins and ceiling joists) does not have sufficient built in resistance to instability, for instance from hipped returns, rigid sarking or the like, then bracing equivalent to that recommended in BS 5268: Part 3: 1985 should be considered.

**1A3** If the roof structure is braced as described in paragraph 1A2 above and is adequately anchored to the structure beneath, and the walls are designed and restrained in accordance with the requirements of Section 1C, no special provision should be needed to take account of loads due to the effect of wind pressure or suction.



# Section 1B

## SIZES OF CERTAIN TIMBER FLOOR CEILING AND ROOF MEMBERS IN SINGLE FAMILY HOUSES

### Application

**1B1** This Section only applies to single family houses of not more than 3 storeys.

### The use of this Section

**1B2** This Section must be used in conjunction with Section 1A.

### Spans, sizes and spacings for timber members

**1B3** The guidance given in this Section assumes that:

- the dead and imposed loads to be sustained by the floor, ceiling or roof of which the member forms part do not exceed the values given in the notes to the appropriate diagrams and the tables, and
- the species and grade of timber for the strength class to which the Table relates is either -
  - as given in Table 1 for more common species, or
  - as given in the more comprehensive tables of BS 5268: Part 2: 1991, and

**Table 1 Common species/grade combinations which satisfy the requirements for the strength classes to which tables A1 - A24 in Appendix A relate.**

| Species   | Origin   | Grading Rules | Grades to satisfy strength class |                                       |     |                               |                                       |  |
|---|----------|---------------|----------------------------------|---------------------------------------|-----|-------------------------------|---------------------------------------|--|
|   |          |               | SC3                              |                                       |     | SC4                           |                                       |  |
| Redwood or whitewood                            | Imported | BS 4978       | GS                               | MGS                                   | M50 | SS                            | MSS                                   |  |
| Douglas Fir                                     | UK       | BS 4978       | M50                              | SS                                    | MSS | -                             | -                                     |  |
| Larch   | UK       | BS 4978       | GS                               | MGS                                   | M50 | SS                            | MSS                                   |  |
| Scotch Pine                                     | UK       | BS 4978       | GS                               | MGS                                   | M50 | SS                            | MSS                                   |  |
| Corsican Pine                                   | UK       | BS 4978       |                                  | M50                                   |     | SS                            | MSS                                   |  |
| European Spruce                                 | UK       | BS 4978       |                                  | M75                                   |     |                               |                                       |  |
| Sitka Spruce                                    | UK       | BS 4978       |                                  | M75                                   |     |                               |                                       |  |
| Douglas Fir-Larch<br>Hem-Fir<br>Spruce-Pine-Fir | CANADA   | BS 4978       | GS                               | MGS                                   | M50 | SS                            | MSS                                   |  |
| Douglas Fir-Larch<br>Hem-Fir<br>Spruce-Pine-Fir | CANADA   | NLGA          | Joist & Plank<br>Struct. L.F.    | No.1 & No.2<br>No.1 & No.2            |     | Joist & Plank<br>Struct. L.F. | Select<br>Select                      |  |
| Douglas Fir-Larch<br>Hem-Fir<br>Spruce-Pine-Fir | CANADA   | MSR           |                                  | Machine<br>Stress-Rated<br>1450f-1.3E |     |                               | Machine<br>Stress-Rated<br>1650f-1.5E |  |
| Douglas Fir-Larch                               | USA      | BS 4978       | GS                               | MGS                                   |     | SS                            | MSS                                   |  |
| Hem-Fir   | USA      | BS 4978       | GS                               | MGS                                   | M50 | SS                            | MSS                                   |  |
| Western Whitewoods                              | USA      | BS 4978       | SS                               | MSS                                   |     | -                             | -                                     |  |
| Southern Pine                                   | USA      | BS 4978       | GS                               | MGS                                   |     | SS                            | MSS                                   |  |
| Douglas Fir-Larch                               | USA      | NGRDL         | Joist & Plank<br>Struct. L.F.    | No.1 & No.2<br>No.1 & No.2            |     | Joist & Plank<br>Struct. L.F. | Select<br>Select                      |  |
| Hem-Fir   | USA      | NGRDL         | Joist & Plank<br>Struct. L.F.    | No.1 & No.2<br>No.1 & No.2            |     | Joist & Plank<br>Struct. L.F. | Select<br>Select                      |  |
| Western Whitewoods                              | USA      | NGRDL         | Joist & Plank<br>Struct. L.F.    | Select<br>Select                      |     | -                             | -                                     |  |
| Southern Pine                                   | USA      | NGRDL         | Joist & Plank                    | No.3<br>Stud grade                    |     | Joist & Plank                 | Select                                |  |
| Douglas Fir-Larch<br>Hem-Fir<br>Southern Pine   | USA      | MSR           |                                  | Machine<br>Stress-Rated<br>1450f-1.3E |     |                               | Machine<br>Stress-Rated<br>1650f-1.5E |  |

Notes: The common species/grade combinations given in this table are for particular use with the other tables in Appendix A and for cross section sizes given in those tables. Definitive and more comprehensive tables for assigning species/grade combinations to strength classes are given in BS 5268: Part 2: 1991. The grading rules for American and Canadian Lumber are those approved

by the American Lumber Standards (ALS) Board of Review and the Canadian Lumber Standards (CLS) Accreditation Board respectively (see BS 5268: Part 2: 1991). NLGA denotes the National Lumber Grading Association NGRDL denotes the National Grading Rules for Dimension Lumber MSR denotes the North American Export Standard for Machine Stress-Rated Lumber.



c. floorboarding complying with BS 1297: 1987 is used.

**1B4** The strength classes, species, grades and species combinations referred to in this Section are as defined in BS 5268: Part 2: 1991.

**1B5** The cross sectional dimensions given in the tables to this Section in Appendix A are applicable to either basic sawn or regularised sizes as defined in BS 4471: 1987. Reference should be made to the accompanying notes to the tables to determine whether sawn or regularised sizes apply. The tables do not apply where dimensions have been reduced by planing. For timber of North American origin the tables apply only as indicated to surface sizes unless the timber has been resawn to BS 4471 requirements.

**1B6** Notches and holes in simply supported floor and roof joists should be within the following limits.

a. **notches** should be no deeper than 0.125 times the depth of a joist and should not be cut closer to the support than 0.07 of the span, nor further away than 0.25 times the span, and

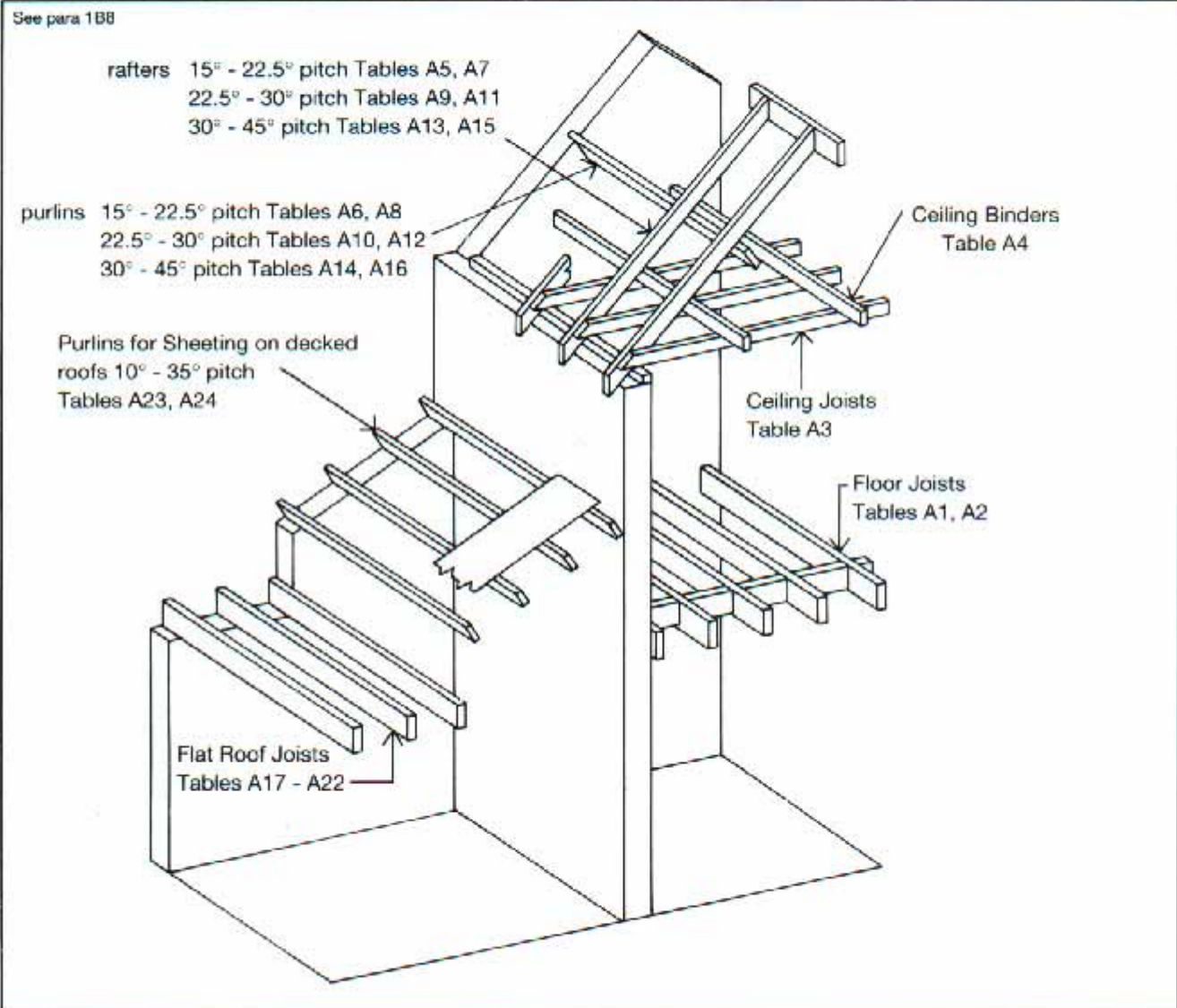
b. **holes** should be no greater diameter than 0.25 times the depth of the joist; should be drilled at the neutral axis; and should be not less than 3 diameters (centre to centre) apart; and should be located between 0.25 and 0.4 times the span from the support.

No notches or holes should be cut in roof rafters, other than at supports where the rafter may be birdsmouthed to a depth not exceeding 0.33 times the rafter depth.

**1B7** Bearing areas and workmanship should comply with the relevant requirements of BS 5268: Part 2 1991. Refer also to paragraphs 1C33 to 1C37.

**1B8** Diagram 1 and Table 2 refer to tables with accompanying diagrams and notes that give spans sizes and spacings for certain

**Diagram 1 Key to tables A1-A24 in Appendix A relating to timber members**





**Table 2 Summary of Tables A1 – A24 in Appendix A relating to timber members.**

| Construction   | Timber members | Imposed Loading<br>KN/m <sup>2</sup> | Table numbers<br>Strength class |     |
|--|----------------|--------------------------------------|---------------------------------|-----|
|  |                |                                      | SC3                             | SC4 |
| Floors   | joists         |                                      | A1                              | A2  |
| Ceilings   | joists         |                                      | A3                              | A3  |
|  | binders        |                                      | A4                              | A4  |
| Pitched roofs greater than 15° but less than or equal to 22½°          | rafters        | 0.75                                 | A5                              | A5  |
|  |                | 1.00                                 | A7                              | A7  |
|  | purlins        | 0.75                                 | A6                              | A6  |
|  |                | 1.00                                 | A8                              | A8  |
| Pitched roofs greater than 22½° but less than or equal to 30°          | rafters        | 0.75                                 | A9                              | A9  |
|  |                | 1.00                                 | A11                             | A11 |
|  | purlins        | 0.75                                 | A10                             | A10 |
|  |                | 1.00                                 | A12                             | A12 |
| Pitched roofs greater than 30° but less than or equal to 45°           | rafters        | 0.75                                 | A13                             | A13 |
|  |                | 1.00                                 | A15                             | A15 |
|  | purlins        | 0.75                                 | A14                             | A14 |
|  |                | 1.00                                 | A16                             | A16 |
| Flat roofs access for maintenance only                                 | joists         | 0.75                                 | A17                             | A18 |
|  |                | 1.00                                 | A19                             | A20 |
| Flat roofs full access allowed   | joists         |                                      | A21                             | A22 |
| Sheeted or decked roofs greater than 10° but less than or equal to 35° | purlins        | 0.75                                 | A23                             | A23 |
|  |                | 1.00                                 | A24                             | A24 |

**Notes**

**1** The strength class given in this table assumes that the species and grades of timber to be used are those described in Table 1.

**2** The diagrams are only illustrative and do not show all details of construction. Adequate connections between members should be provided as appropriate.

**3** These tables do not apply to trussed rafter roofs.

timber floor, ceiling and roof members in Appendix A. In tables A1 - A24 all spans except those for floorboards are measured as the clear dimension between supports and all spacings are the dimensions between longitudinal centres of members.

**1B9** In the use of tables A5 - A24 the imposed snow loading applicable to roofs at particular sites is given in Diagram 2

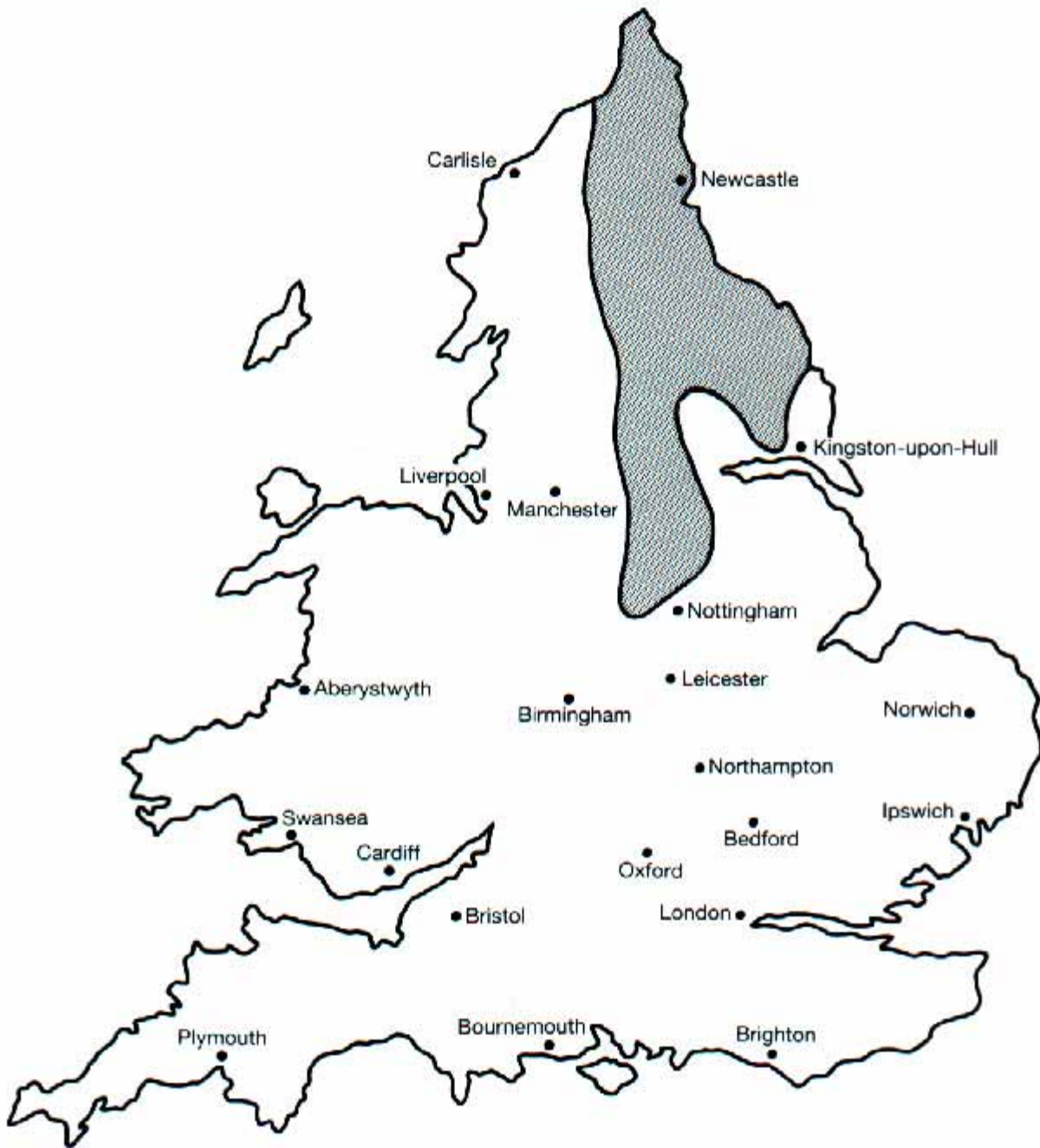
**1B10** Floor joists spanning in excess of 2.5m should be strutted by one or more rows of solid or herringbone strutting in accordance with Table 3. Solid strutting should be at least 38mm timber thickness extending at least 0.75 times the depth of the joists. Herringbone strutting should be of at least 38mm x 38mm timber size but should not be used where the distance between joists is greater than 3 times the depth of the joists.

**Table 3 Strutting to joists.**

| Joist span<br>m | No of rows<br>of strutting    |
|-----------------|-------------------------------|
| less than 2.5   | none                          |
| 2.5 - 4.5       | 1 at mid-span                 |
| more than 4.5   | 2 at one third span positions |

Diagram 2 Imposed snow roof loading

See para 1B9



| Site location  | Loading               |
|--|-----------------------|
| Within hatched area at an altitude of less than 100m above ordnance datum            | 1.00kN/m <sup>2</sup> |
| Outside hatched area at an altitude of less than 100m above ordnance datum           | 0.75kN/m <sup>2</sup> |
| Outside hatched area at an altitude lying between 100m and 200m above ordnance datum | 1.00kN/m <sup>2</sup> |

Note:  
For sites at greater altitude reference should be made to BS 6399: Part 3 to determine imposed and snow loading.



# Section 1C

## THICKNESS OF WALLS IN CERTAIN SMALL BUILDINGS

### Application

**1C1** This Section applies to the following building types:

- residential buildings of not more than three storeys, and
- small single storey non-residential buildings, and
- small buildings forming annexes to residential buildings. (including garages and outbuildings).

### Wall types

**1C2** Only the types of wall given in Table 4, which must extend to the full storey height, and parapet walls are considered in this section.

### The use of this Section

**1C3** When using this Section it should be noted that:

- this section must be used in conjunction with Section 1A;
- if wall thickness is to be determined according to paragraphs 1C4 to 1C13, all appropriate design conditions given in this section must be satisfied;
- walls should comply with the relevant requirements of BS 5628: Part 3:1985, except as regards the conditions given in paragraphs 1C14 to 1C39;
- in formulating the guidance of this section the worst combination of circumstances likely to arise was taken into account. If a requirement of this part is considered too onerous in a particular case it may be appropriate to consider a minor departure on the basis of judgement and experience, or to show adequacy by calculation in respect of the aspect of the wall which is subject to the departure rather than for the entire wall;

**Table 4 Wall types considered in this Section**

#### Residential buildings of up to three storeys

external walls  
internal loadbearing walls  
compartment walls  
separating walls

#### Small single storey non-residential buildings and annexes

external walls  
internal loadbearing walls

e. the guidance given is based upon the compressive strengths of bricks and blocks of:

- bricks 5, 7 and 15N/mm<sup>2</sup>,
- blocks 2.8 and 7N/mm<sup>2</sup>,

depending on circumstances (see Diagram 12).

BS 5628 Part 1: 1978 gives design strengths for walls where the suitability for use of masonry units of other compressive strengths is being considered.

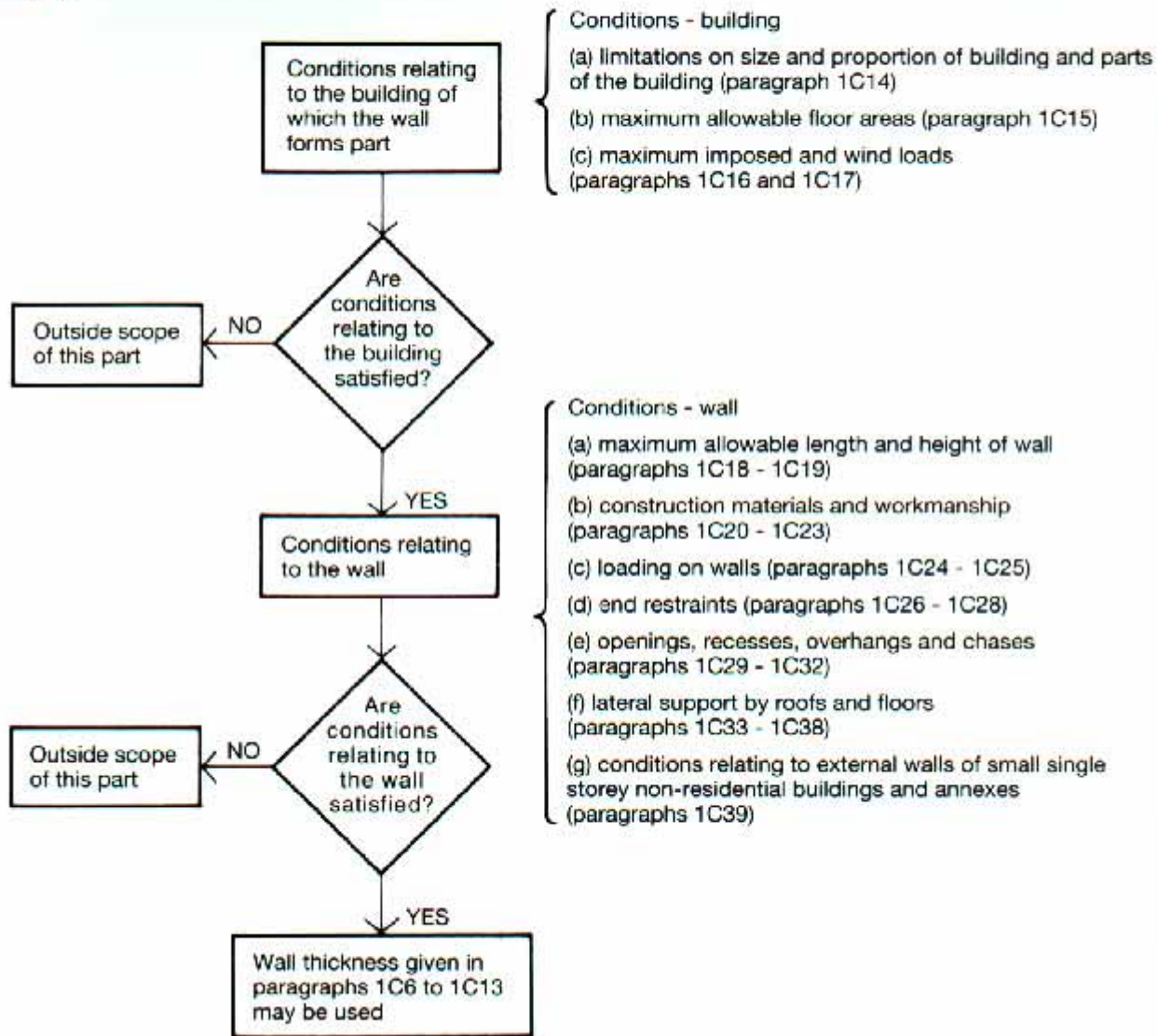
### Thickness of walls

**1C4** General wall thickness may be determined according to this Section provided:

- conditions relating to the building of which the wall forms a part (see paragraphs 1C14 to 1C17), and
- conditions relating to the wall (see paragraphs 1C18 to 1C39) are met. (see Diagram 3)

**Diagram 3 Determination of wall thickness**

See para 1C4



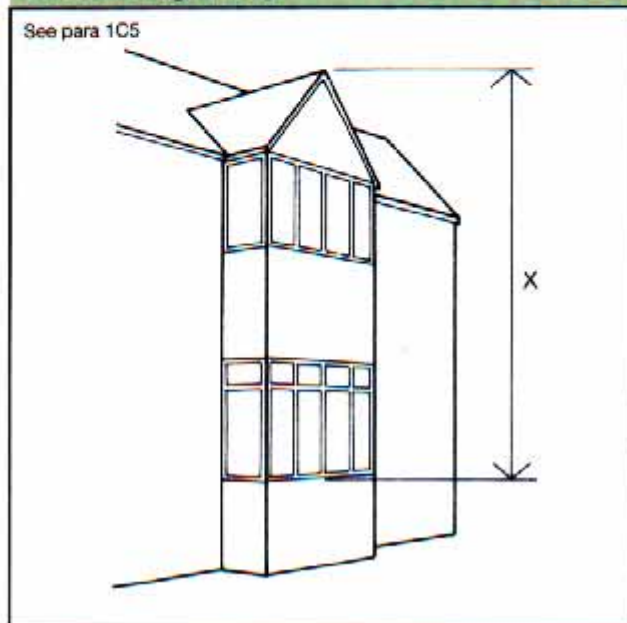
**Table 5 Minimum thickness of certain external walls, compartment walls and separating walls**

| Height of wall                      | Length of wall                     | Minimum thickness of wall  |
|-------------------------------------|------------------------------------|--|
| not exceeding 3.5m                  | not exceeding 12m                  | 190mm for whole of its height  |
| exceeding 3.5m but not exceeding 9m | not exceeding 9m                   | 190mm for whole of its height  |
|                                     | exceeding 9m but not exceeding 12m | 290mm from the base for the height of one storey and 190mm for the rest of its height  |
| exceeding 9m but not exceeding 12m  | not exceeding 9m                   | 290mm from the base for the height of one storey and 190mm for the rest of its height  |
|                                     | exceeding 9m but not exceeding 12m | 290mm from the base for the height of two storeys and 190mm for the rest of its height |



**1C5 Exceptions - Walls forming part of a bay window:** This Section does not apply to any portion of an external wall which is constructed as a bay for, or as a gable over, a bay window above ground floor cill level. (indicated as X in Diagram 4)

**Diagram 4 Exclusion of wall containing a bay**



**1C6 Solid external walls, compartment walls and separating walls in coursed brickwork or blockwork:** Solid walls constructed of coursed brickwork or blockwork should be at least as thick as 1/16 of the storey height. Further requirements are given in Table 5.

**1C7 Solid external walls, compartment walls and separating walls of uncoursed stone, flints etc.:** The thickness of walls constructed in uncoursed stone, flints, clunches, of bricks or other burnt or vitrified material should not be less than 1.33 times the thickness determined by paragraph 1C6.

**1C8 Cavity walls in coursed brickwork or blockwork:** All cavity walls should have leaves at least 90mm thick and cavities at least 50mm wide. For maximum width of cavity and spacing of cavity wall ties refer to Table 6. For specification of wall ties refer to paragraph 1C20.

For external walls, compartment walls and separating walls in cavity construction, the combined thickness of the two leaves plus 10mm should not be less than the thickness determined by paragraph 1C6 for a solid wall of the same height and length.

**1C9 Walls providing vertical support to other walls:** Irrespective of the materials used in the construction, a wall should not be less in thickness than any part of the wall to which it gives vertical support.

**1C10 Internal loadbearing walls in brickwork or blockwork:** (except compartment walls or separating walls) should have a thickness not less than:

$$\left( \frac{\text{specified thickness from Table 5}}{2} \right) - 5\text{mm}$$

except for a wall in the lowest storey of a three storey building, carrying load from both upper storeys, which should have a thickness as determined by the above equation or 140mm whichever is the greatest.

**Table 6 Maximum spacing of cavity wall ties**

| Width of cavity (mm) | Horizontal spacing (mm) | Vertical spacing (mm) | Other comment        |
|----------------------|-------------------------|-----------------------|----------------------|
| 50-75                | 900                     | 450                   | See notes 1 and 2    |
| 76-100               | 750                     | 450                   | See notes 1, 2 and 3 |

**Notes**

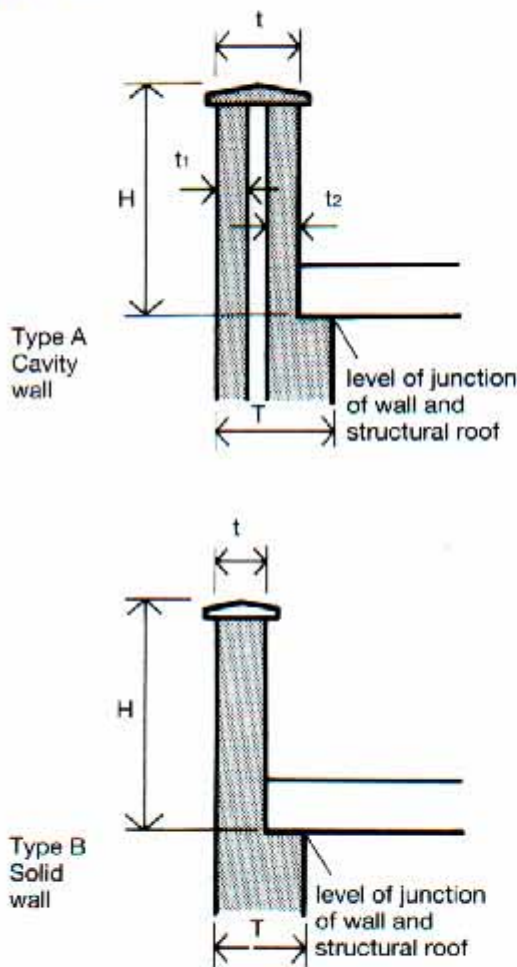
1 The horizontal and vertical spacing of wall ties may be varied if necessary to suit the construction provided the number of ties per unit is maintained.

2 Wall ties spaced not more than 300mm apart vertically should be provided within 225mm from the sides of all openings with unbonded jambs.

3 Vertical Twist Type ties, or ties of equivalent performance should be used in cavities wider than 75mm.

Diagram 5 Parapet walls: height

See para 1C11



| Wall type             | Thickness (mm)   | Parapet height H to be not more than (mm) |
|-----------------------|--|---|
| Type A<br>Cavity wall | $t_1 + t_2$<br>equal or less than 200                        | 600                                       |
|                       | $t_1 + t_2$<br>greater than 200<br>equal to or less than 250 | 860                                       |
| Type B<br>Solid wall  | $t = 150$  | 600                                       |
|                       | $t = 190$  | 760                                       |
|                       | $t = 215$  | 860                                       |

Note:  $t$  should be less than or equal to  $T$

**1C11 Parapet walls:** The minimum thickness and maximum height of parapet walls should be as given in Diagram 5.

**1C12 Single leaves of certain external walls:** The single leaf of external walls of small single storey non-residential buildings and of annexes need be only 90mm thick, notwithstanding paragraph 1C39.

**1C13 Modular bricks and blocks:** Where walls are constructed of bricks or blocks having modular dimensions derived from BS 6750: 1986, wall thicknesses prescribed in this section which derive from a dimension of brick or block may be reduced by an amount not exceeding the deviation from work size permitted by a British Standard relating to equivalent sized bricks or blocks made of the same material.



## Conditions relating to the building of which the wall forms part

**1C14** This Section applies only to buildings having proportions within the following parameters (see Diagrams 6,7 and 8)

### a. residential buildings of not more than 3 storeys:

- i. the maximum height of the building measured from the lowest finished ground level adjoining the building to the highest point of any wall or roof should not be greater than 15m, subject to the limits of paragraph 1C17,

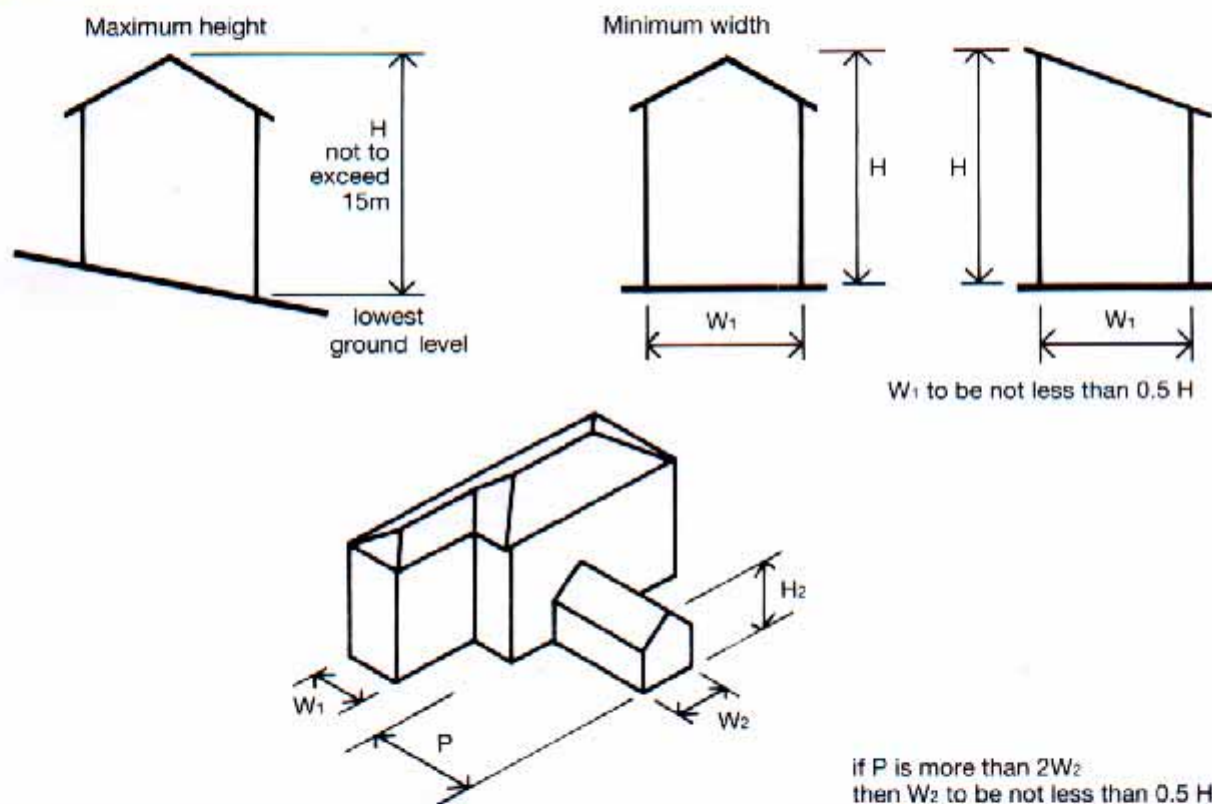
- ii. the height of the building  $H$  should not exceed twice the least width of the building  $W_1$ ,
- iii. the height of the wing  $H_2$  should not exceed twice the least width of the wing  $W_2$  where the projection  $P$  exceeds twice the width  $W_2$ .

b. **small single-storey non-residential buildings:** height  $H$  should not exceed 3m and  $W$  should not exceed 9m (see diagram 7), subject to the limits of paragraph 1C17.

c. **annexes:** height  $H$  should not exceed 3m, (see diagram 8), subject to the limits of paragraph 1C17.

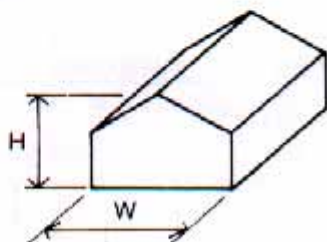
**Diagram 6 Size and proportion of residential buildings of not more than 3 storeys**

See para 1C14



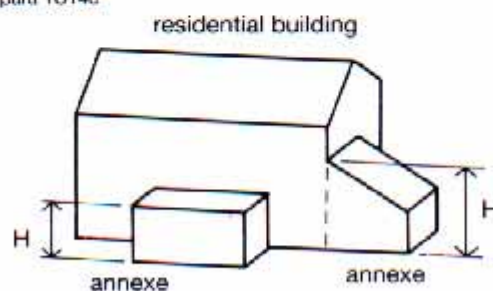
**Diagram 7 Size of single storey non residential buildings**

See para 1C14b



**Diagram 8 Size of annexes**

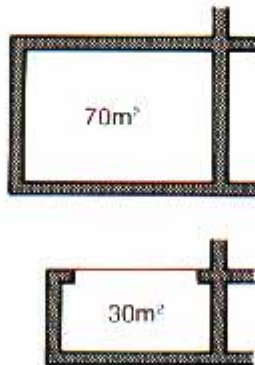
See para 1C14c



**1C15 Maximum floor area:** The guidance of this Section assumes that no floor enclosed by structural walls on all sides exceeds 70m<sup>2</sup>; and that no floor without a structural wall on one side exceeds 30m<sup>2</sup>. (See Diagram 9)

**Diagram 9 Maximum floor area enclosed by structural walls**

See para 1C15



**1C16 Imposed loads on roofs, floors and ceilings:** The design considerations given in this Section are intended to be adequate for the imposed loads given in Table 7.

**Table 7 Imposed loads**

| Element  | Loading  |
|----------|--|
|          | distributed load:  |
| roof     | 1.00 kN/m <sup>2</sup> for spans not exceeding 12m<br>1.5 kN/m <sup>2</sup> for spans not exceeding 6m |
| floors   | distributed load: 2.00kN/m <sup>2</sup>  |
| ceilings | distributed load: 0.25kN/m <sup>2</sup><br>together with<br>concentrated load: 0.9kN                   |

**1C17 Design Wind Speed:** The guidance given in this Section is adequate where the design wind speed  $V_s$  for the building is no greater than 44 metres/second, as determined in accordance with CP3 Chapter V: Part 2: 1972. The maximum building heights given in Tables 8 and 9 correlate to this value of  $V_s$  for various site exposure conditions and basic wind speeds. A map showing basic wind speeds is given in Diagram 10.

**Table 8 Maximum height of buildings on normal or slightly sloping sites**

| Basic wind speed m/s | Maximum building height in metres                        |  |  |                               |
|----------------------|--|--|--|-------------------------------|
|                      | Location   |  |  |                               |
|                      | Unprotected sites, open countryside with no obstructions | Open countryside with scattered windbreaks | Country with many windbreaks, small towns, outskirts of large cities | protected sites, city centres |
| 36                   | 15   | 15   | 15   | 15                            |
| 38                   | 15   | 15   | 15   | 15                            |
| 40                   | 15   | 15   | 15   | 15                            |
| 42                   | 15   | 15   | 15   | 15                            |
| 44                   | 15   | 15   | 15   | 15                            |
| 46                   | 11   | 15   | 15   | 15                            |
| 48                   | 9  | 13   | 15   | 15                            |

**Table 9 Maximum height of buildings on steeply sloping sites, including hill, cliff and escarpment sites**

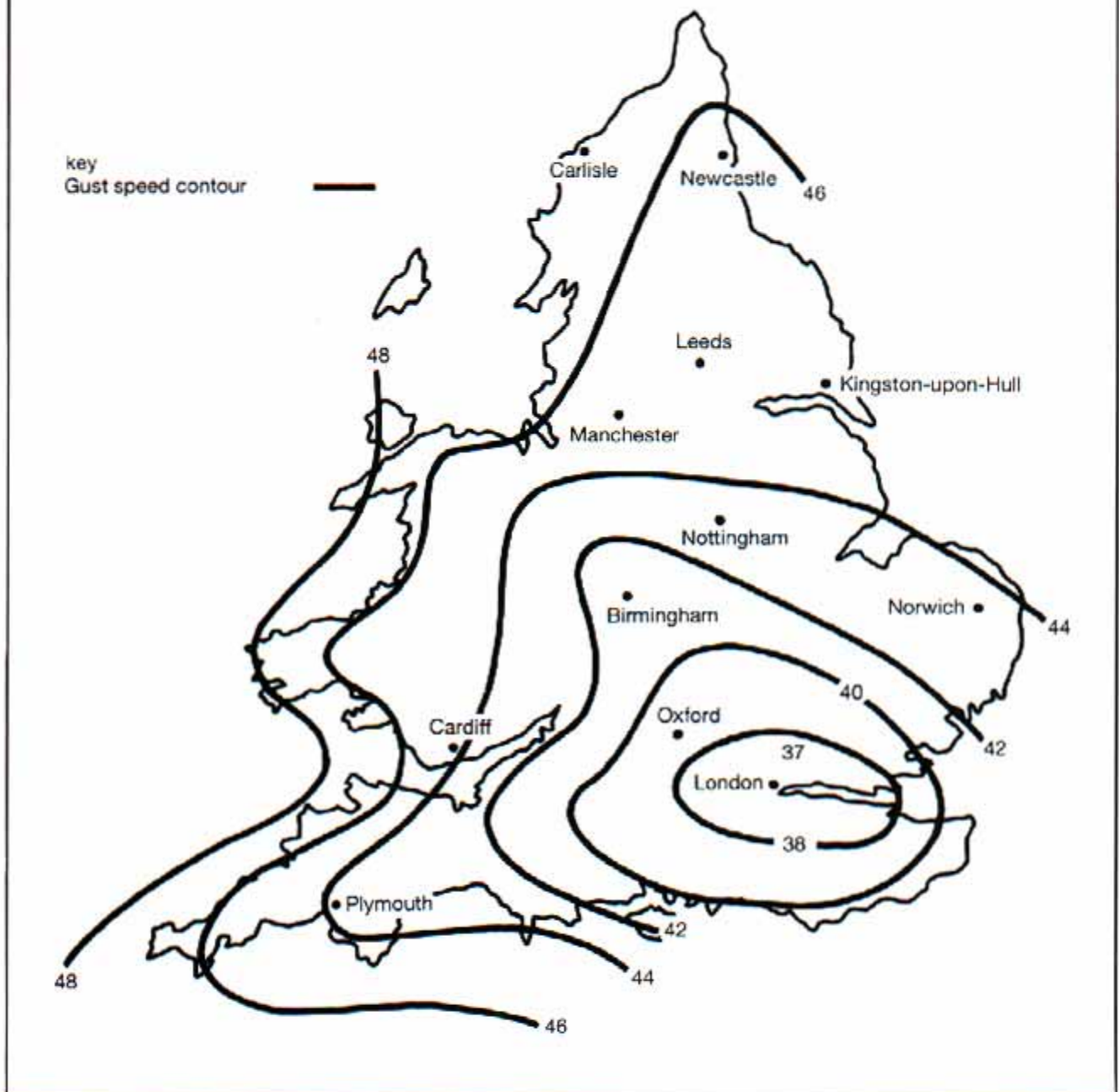
| Basic wind speed m/s | Maximum building height in metres                        |  |  |                               |
|----------------------|--|--|--|-------------------------------|
|                      | Location   |  |  |                               |
|                      | Unprotected sites, open countryside with no obstructions | Open countryside with scattered windbreaks | Country with many windbreaks, small towns, outskirts of large cities | Protected sites, city centres |
| 36                   | 8  | 11   | 15   | 15                            |
| 38                   | 6  | 9  | 15   | 15                            |
| 40                   | 4  | 7.5  | 14   | 15                            |
| 42                   | 3  | 6  | 12   | 15                            |
| 44                   | 0*   | 5  | 10   | 15                            |
| 46                   | 0*   | 4  | 8  | 15                            |
| 48                   | 0*   | 3  | 6.5  | 14                            |

\* Section 1C guidance is not applicable.



Diagram 10 Map showing basic wind speeds in m/s

See para 1C17



## Notes:

- 1 Maximum gust speed likely to be exceeded on the average only once in 50 years at 10m above ground in open level country.
- 2 Contour lines are drawn at 2m/s intervals.

## Conditions relating to the wall

**1C18 Maximum allowable length and height of the wall:** This Section does not deal with walls longer than 12m, measured from centre to centre of buttressing walls, piers or chimneys providing restraint, or with walls exceeding 12m in height. (see also Table 5).

**1C19 Rules of measurement for heights of walls and storeys:** The height of a wall or a storey should be measured in accordance with the rules in Diagram 11.

## Construction materials and workmanship

**1C20 Wall ties:** Wall ties should comply with BS 1243: 1978 or be of other not less suitable type. In conditions of severe exposure austenitic stainless steel or suitable non-ferrous ties should be used. (for definition of severe exposure, refer to BS 5628: Part 3: 1985).

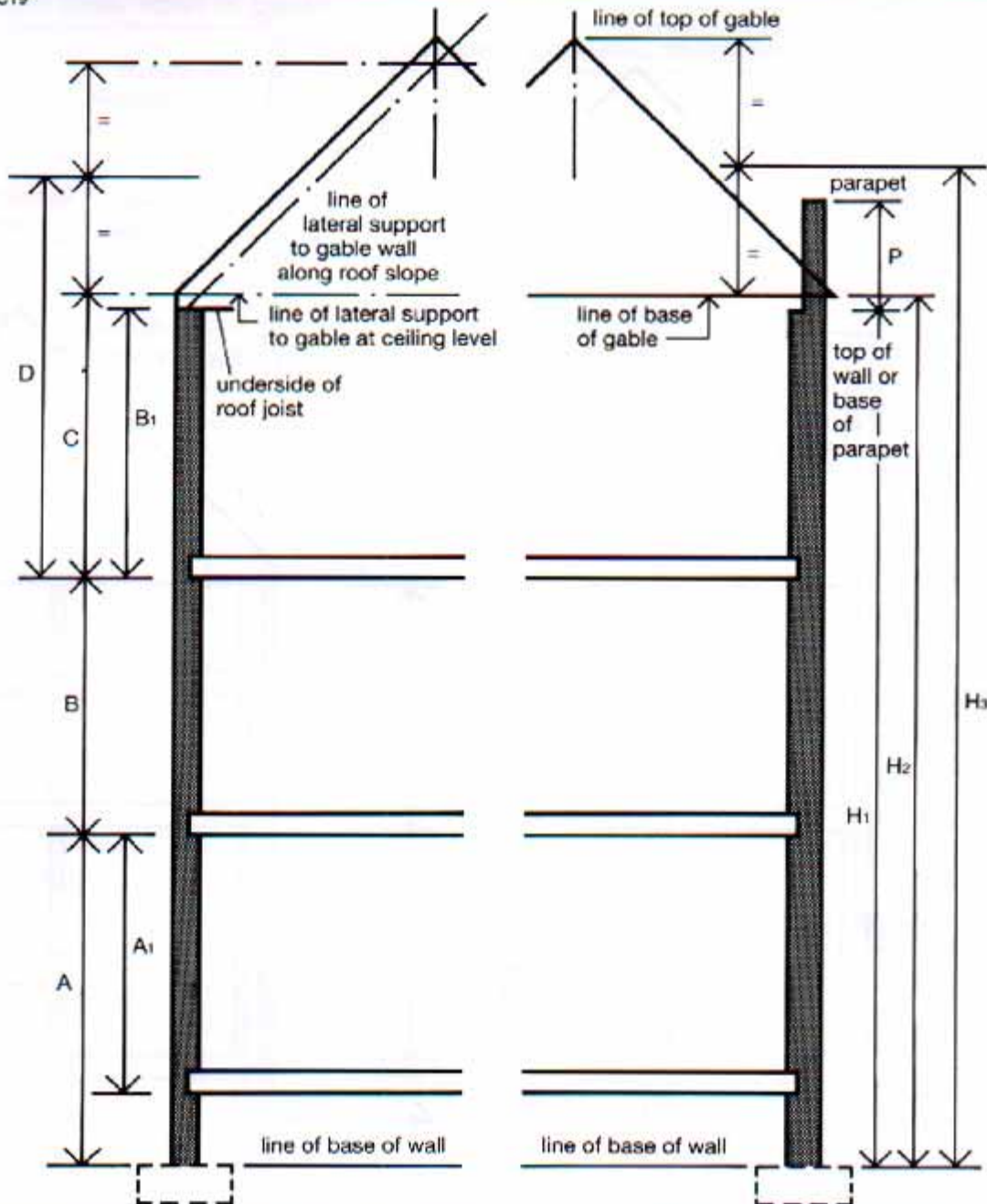
**1C21 Brick and block construction:** Walls should be properly bonded and solidly put together with mortar and constructed of:

- a. clay bricks or blocks conforming to BS 3921: 1974 or BS 6649: 1985, or
- b. calcium silicate bricks conforming to BS 187: 1978 or BS 6649: 1985, or
- c. concrete bricks or blocks conforming to BS 6073: Part 1: 1981, or
- d. square dressed natural stone conforming to the appropriate requirements described in BS 5390: 1976 (1984).



Diagram 11 Measuring storey and wall heights

See para 1C19



## Key

**(a) Measuring storey heights**

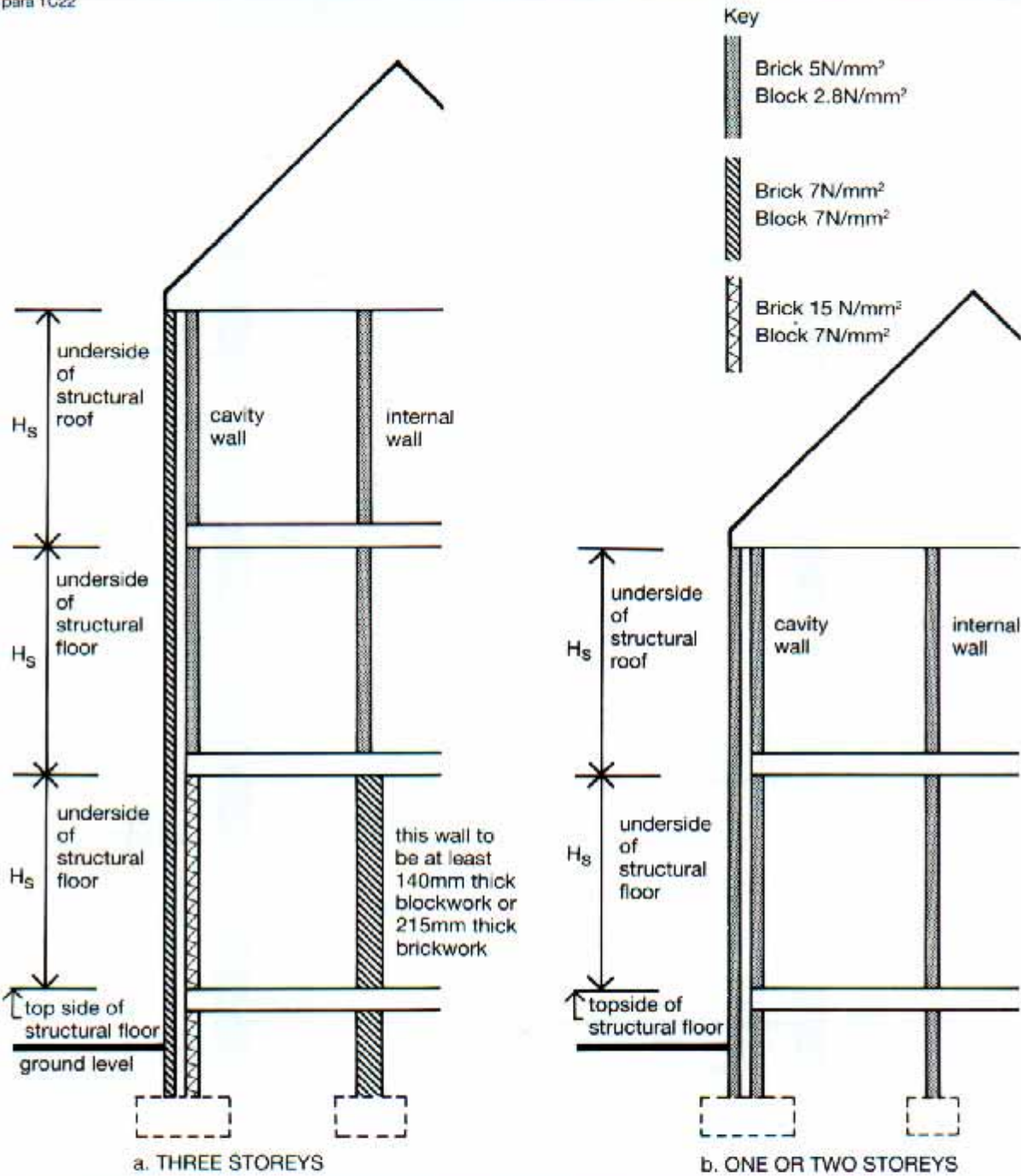
- A** is the ground storey height if the ground floor is a suspended timber floor or a structurally separate ground floor slab
- A<sub>1</sub>** is the ground storey height if the ground floor is a suspended concrete floor bearing on the external wall
- B** is the intermediate storey height
- B<sub>1</sub>** is the top storey height for walls which do not include a gable
- C** is the storey height where lateral support is given to the gable at both ceiling level and along the roof slope
- D** is the storey height for walls which include a gable where lateral support is given to the gable along the roof slope

**(b) Measuring wall heights**

- H<sub>1</sub>** is the height of a wall that does not include a gable
- H<sub>2</sub>** is the height of a compartment or separating wall which may extend up to the underside of the roof
- H<sub>3</sub>** is the height of a wall (except a compartment or separating wall) which includes a gable
- P** If the parapet height is more than 1.2m the height should be added to H<sub>1</sub>

Diagram 12 Compressive strength of brick and block units

See para 1C22



Notes

- 1 If  $H_s$  is not greater than 2.7m, the compressive strength of bricks or blocks should be used in walls as indicated by the key.
- 2 If  $H_s$  is greater than 2.7m, the compressive strength of bricks or blocks used in the wall shall either be at least 7N/sq mm or as indicated by the key, whichever is the greater.

- 3 If the external wall is solid construction, the bricks or blocks should have a compressive strength of at least that shown for the internal leaf of a cavity wall in the same position.
- 4 The guidance given in the diagram should only be used to determine the compressive strength of brick and block units for walls of two and three storey buildings where the roof construction is of timber.



**1C22 Compressive strength of bricks and blocks:** Bricks and blocks, when tested in accordance with the appropriate British Standard, should have a compressive strength not less than the values given in Diagram 12.

**1C23 Mortar:** Mortar should be:

- a. to the proportions -
  - i. given in BS 5628: Part 1: 1978 for mortar designation (iii), or
  - ii. 1:1:6 Portland Cement, lime and fine aggregate measured by volume of dry materials, or
- b. of equivalent or where appropriate of greater strength, which is compatible with the masonry units and position of use.

### Loading on walls

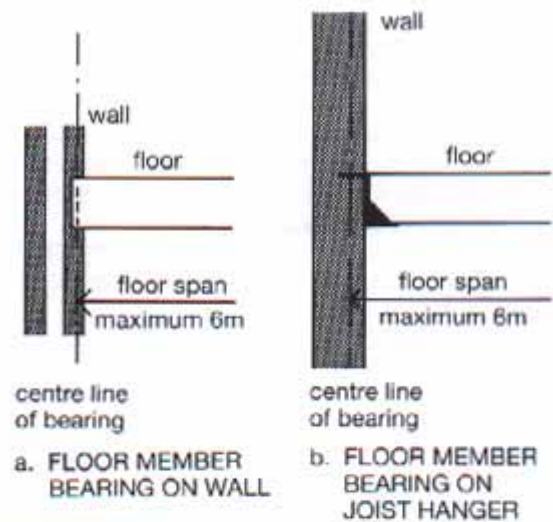
**1C24 Maximum span of floors:** The maximum span for any floor supported by a wall is 6m where the span is measured centre to centre of bearing. (see Diagram 13)

**1C25 Other loading conditions:**

- a. Vertical loading on walls should be distributed. This may be assumed for concrete floor slabs, precast concrete floors, and timber floors designed in accordance with Section 1B, and where the bearing length for lintels is 150mm or greater. Where a lintel has a clear span of 1200mm or less the bearing length may be reduced to 100mm.

**Diagram 13 Maximum span of floors**

See para 1C24



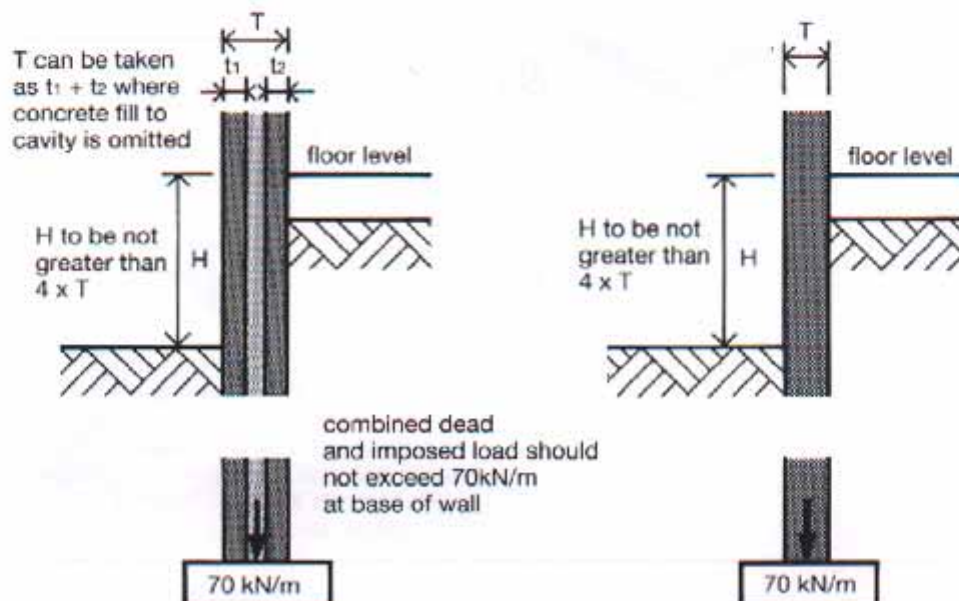
- b. differences in level of ground or other solid construction between one side of the wall and the other should be less than 4 times the thickness of the wall as shown in Diagram 14.

c. the combined dead and imposed load should not exceed 70kN/m at base of wall. (see Diagram 14)

- d. walls should not be subjected to lateral load other than from wind, and that covered by paragraph 1C25(b).

**Diagram 14 Differences in ground level**

See para 1C25b



## End restraint

### 1C26 Buttrressing walls piers and chimneys:

The ends of every wall, except single leaf walls less than 2.5m in storey height and length in small single storey non-residential buildings and annexes should be bonded or otherwise securely tied throughout their full height to a buttrressing wall, pier or chimney. Long walls may be provided with intermediate support, dividing the wall into distinct lengths; each distinct length is a supported wall for the purposes of this section. The buttrressing wall, pier or chimney should provide support from the base to the full height of the wall.

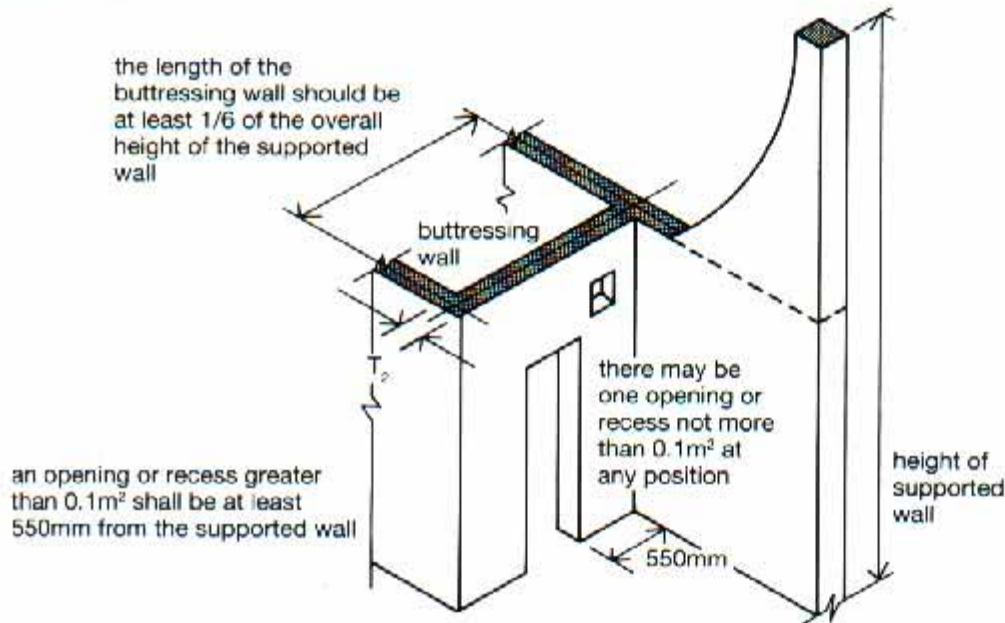
### 1C27 Design criteria for buttrressing walls:

Diagram 15 gives guidance for buttrressing walls. Additionally if the buttrressing wall is not itself a supported wall its thickness  $T_2$  should not be less than:

- half the thickness required by this section for an external or separating wall of similar height and length less 5mm, or
- 75mm if the wall forms part of a dwellinghouse and does not exceed 6m in total height and 10m in length, and
- 90mm in any other cases.

**Diagram 15 Openings in a buttrressing wall**

See para 1C27



#### Notes

- The buttrressing wall should be bonded or securely tied to the supported wall and at the other end to a buttrressing wall, pier or chimney.
- Openings or recesses in the buttrressing wall should

be as shown - the position and shape of the openings should not impair the lateral support to be given by the buttrressing wall.

- Refer to Diagram 11 for the rules for measuring the height of the supported wall.

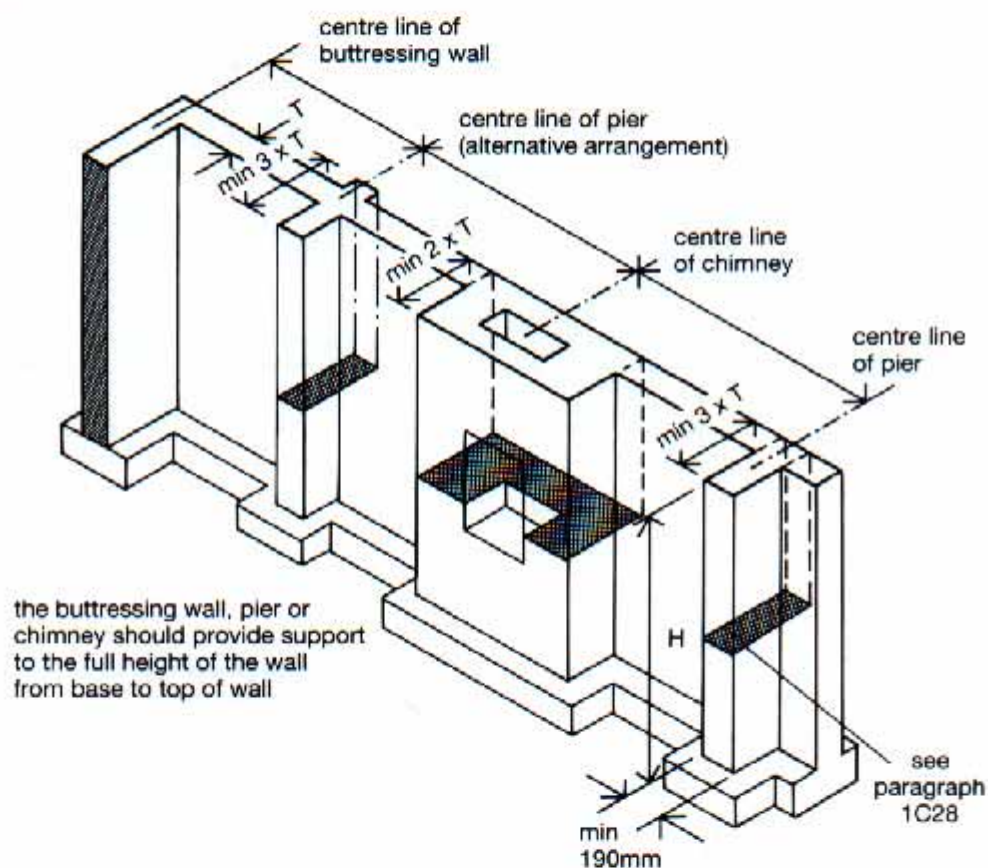


**1C28** Design criteria for piers and chimneys providing restraint:

- a. piers should measure at least 3 times the thickness of the supported wall and chimneys twice the thickness, measured at right angles to the wall. Piers should have a minimum width of 190mm (see Diagram 16)
- b. the sectional area on plan of chimneys (excluding openings for fireplaces and flues) should be not less than the area required for a pier in the same wall, and the overall thickness should not be less than twice the required thickness of the supported wall. (see Diagram 16)

**Diagram 16** Buttrressing

See para 1C28



## Openings, recesses, overhangs and chases

**1C29 General:** The number, size and position of openings and recesses should not impair the stability of a wall or the lateral support afforded by a buttressing wall to a supported wall. Construction over openings and recesses should be adequately supported.

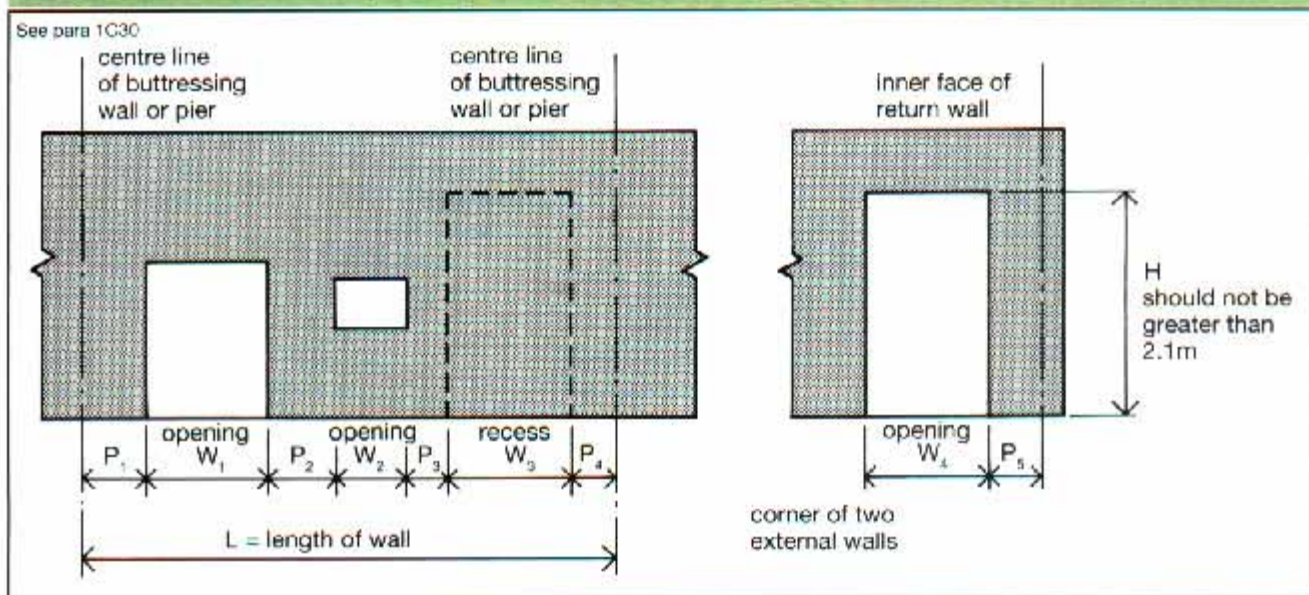
**1C30 Dimensional criteria for openings and recesses:** The dimensional criteria are given in Diagram 17 and Table 10.

### 1C31 Chases:

- vertical chases should not be deeper than 1/3 of the wall thickness or, in cavity walls, 1/3 of the thickness of the leaf
- horizontal chases should not be deeper than 1/6 of the thickness of the leaf or wall
- chases should not be so positioned as to impair the stability of the wall, particularly where hollow blocks are used.

**1C32 Overhangs:** The amount of any projection should not impair the stability of the wall.

**Diagram 17 Sizes of openings and recesses**



### Notes

Requirements (refer to Table 10 for values of factor X).

- $W_1 + W_2 + W_3$  should not exceed  $\frac{2L}{3}$
- $W_1$ ,  $W_2$  or  $W_3$  should not exceed 3m
- $P_1$  should be greater than or equal to  $\frac{W_1}{X}$
- $P_2$  should be greater than or equal to  $\frac{W_1 + W_2}{X}$
- $P_3$  should be greater than or equal to  $\frac{W_2 + W_3}{X}$

6  $P_4$  should be greater than or equal to  $\frac{W_3}{X}$

7  $P_5$  should be greater than or equal to  $\frac{W_4}{X}$  but should not be less than 385mm.

8 Take the value of the factor X from Table 10, or it can be given the value 6, provided the compressive strength of the bricks or blocks (in the case of a cavity wall - in the loaded leaf) is not less than 7N/mm<sup>2</sup>.

**Table 10 Value of factor 'x' (see Diagram 17)**

| Nature of roof span         | Maximum roof span (m) | Minimum thickness of wall inner leaf (m) | Span of floor is parallel to wall | Span of timber floor into wall |          | Span of concrete floor into wall |          |
|-----------------------------|-----------------------|--|-----------------------------------|--------------------------------|----------|----------------------------------|----------|
|                             |                       |  |                                   | max 4.5m                       | max 6.0m | max 4.5m                         | max 6.0m |
| Value of factor 'X'         |                       |  |                                   |                                |          |                                  |          |
| roof spans parallel to wall | not applicable        | 100                                      | 6                                 | 6                              | 6        | 6                                | 6        |
|                             |                       | 90                                       | 6                                 | 6                              | 6        | 6                                | 5        |
| timber roof spans into wall | 9                     | 100                                      | 6                                 | 6                              | 5        | 4                                | 3        |
|                             |                       | 90                                       | 6                                 | 4                              | 4        | 3                                | 3        |



**Lateral support by roofs and floors**

**1C33** A wall in each storey of a building should extend to the full height of that storey, and have horizontal lateral supports to restrict movement of the wall at right angles to its plane.

**1C34** Floors and roofs should:

- a. act to transfer lateral forces from walls to buttressing walls, piers or chimneys, and
- b. be secured to the supported wall by connections specified in paragraphs 1C35 and 1C36.

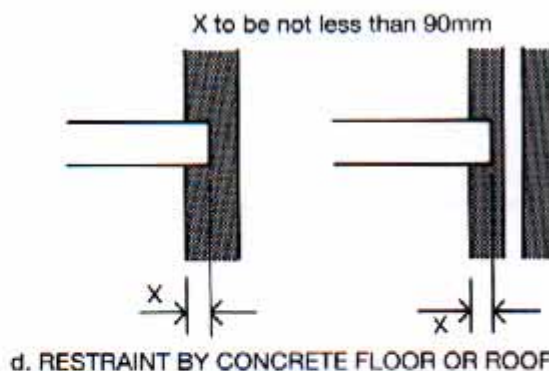
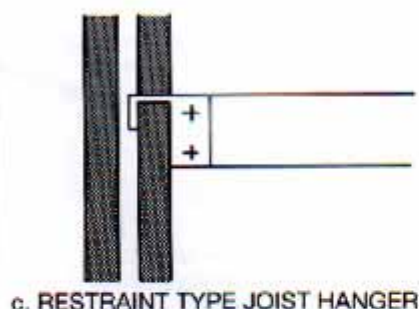
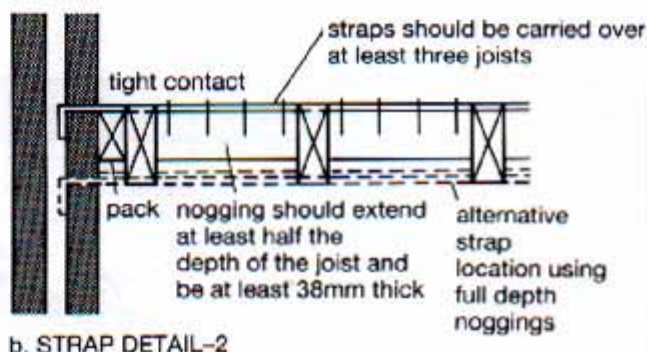
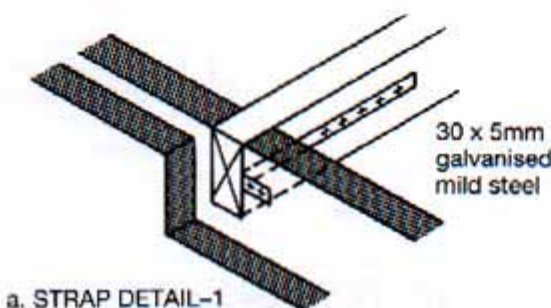
**1C35** The requirements for lateral restraint of walls at roof and floor levels are given in Table 11 and guidance on satisfying the requirements is given in paragraphs 1C36 and 1C37.

**Table 11 Lateral support for walls**

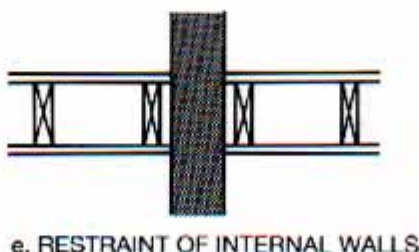
| Wall type   | Wall length     | Lateral support required  |
|---|-----------------|---|
| solid or cavity; external compartment separating                        | any length      | roof lateral support by every roof forming a junction with the supported wall   |
|   | greater than 3m | floor lateral support by every floor forming a junction with the supported wall |
| internal load-bearing wall (not being a compartment or separating wall) | any length      | roof or floor lateral support at the top of each storey                         |

**Diagram 18 Lateral support by floors**

See para 1C36



where contact between floors and walls on both sides of the wall is at intervals no greater than 2m



floors should be at or about the same level on each side of the wall. Where lateral support is intermittent, the point of contact should be in line or nearly in line



**1C36** Walls should be strapped to floors above ground level, at intervals not exceeding 2m and as shown in Diagram 18 by galvanised mild steel or other durable metal straps which have a minimum cross-section of 30mm x 5mm.

Straps need not be provided:

a. in the longitudinal direction of joists in houses of not more than 2 storeys, if the joists are at not more than 1.2m centres and have at least 90mm bearing on the supported walls or 75mm bearing on a timber wall-plate at each end, and

b. in the longitudinal direction of joists in houses of not more than 2 storeys, if the joists are carried on the supported wall by joist hangers of the restraint type described in BS 5628: Part 1 and shown in Diagram 18(c), and are incorporated at not more than 2m centres, and

c. when a concrete floor has at least 90mm bearing on the supported wall (see Diagram 18(d)), and

d. where floors are at or about the same level on each side of a supported wall, and contact

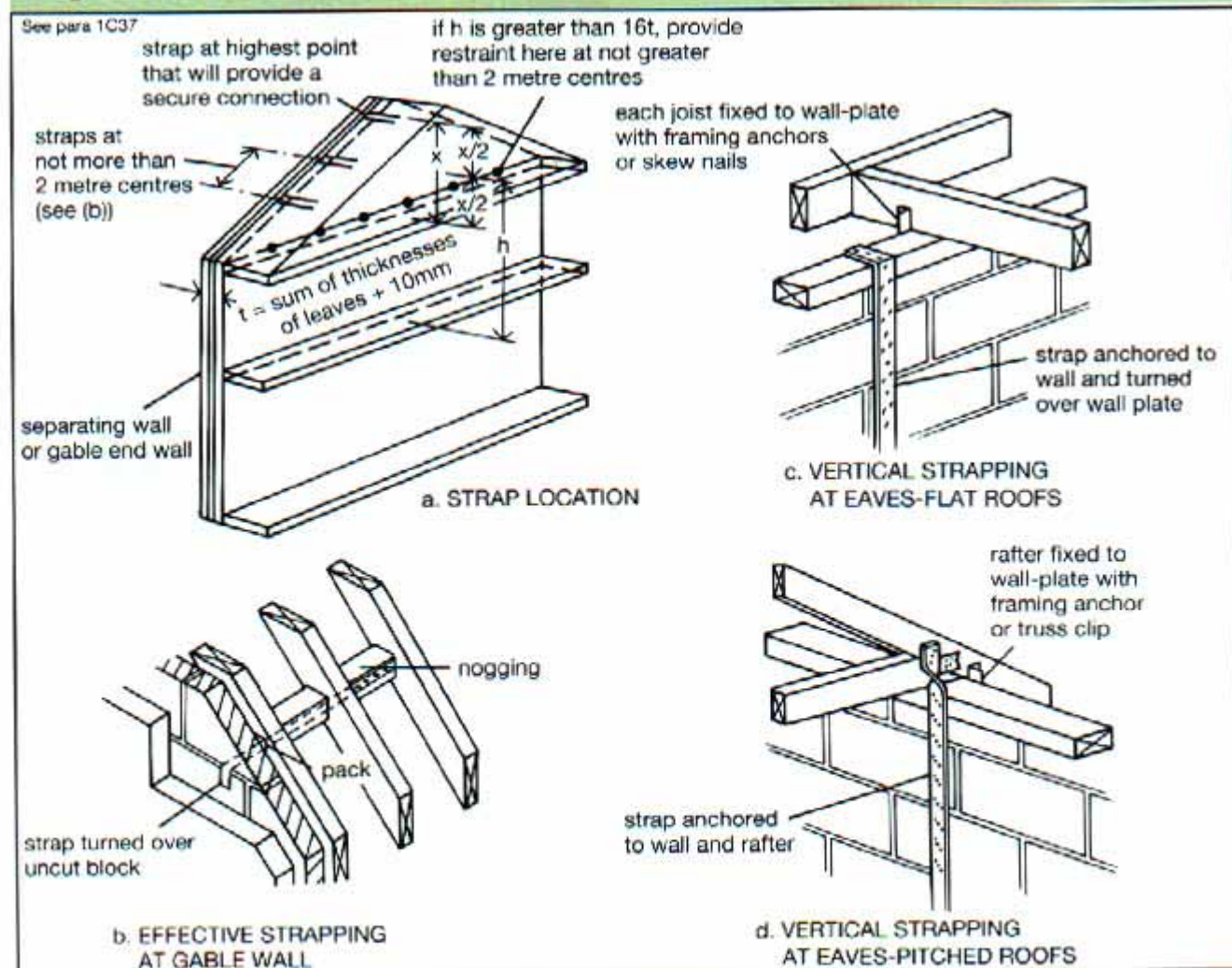
between the floors and wall is either continuous or at intervals not exceeding 2m. Where contact is intermittent, the points of contact should be in line or nearly in line on plan. (see Diagram 18(e))

**1C37** Gable walls should be strapped to roofs as shown in Diagram 19(a) and (b) by galvanised mild steel or other durable metal straps which have a minimum cross-section of 30mm x 5mm.

Vertical strapping at least 1m in length should be provided at eaves level at intervals not exceeding 2m as shown in Diagram 19 (c) and (d). Vertical strapping may be omitted if the roof:

- has a pitch of 15° or more, and
- is tiled or slated, and
- is of a type known by local experience to be resistant to wind gusts, and
- has main timber members spanning onto the supported wall at not more than 1.2m centres.

**Diagram 19 Lateral support at roof level**





### Interruption of lateral support

**1C38** Where an opening in a floor or roof for a stairway or the like adjoins a supported wall and interrupts the continuity of lateral support, the following conditions should be satisfied for the purposes of Section 1C:

- the maximum permitted length of the opening is to be 3m, measured parallel to the supported wall, and
- where a connection is provided by means other than by anchor, this should be provided throughout the length of each portion of the wall situated on each side of the opening, and
- where connection is provided by mild steel anchors, these should be spaced closer than 2m on each side of the opening to provide the same number of anchors as if there were no opening, and
- there should be no other interruption of lateral support.

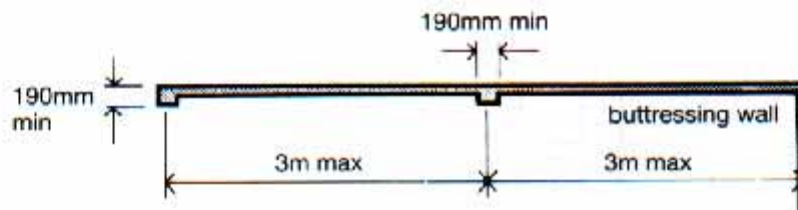
### External walls of small single storey non-residential buildings and annexes

**1C39** Single leaf external walls which:

- enclose a floor area not exceeding 36m<sup>2</sup>
- are of solid construction in bricks and blocks of 90mm minimum thickness, and
- are not subject to any load other than wind load and the distributed load of the roof of the small building or annexe, and
- are greater than 2.5m in length or height, should be bonded at each end and intermediately to buttressing walls or piers of size and spacing as shown in Diagram 20.

**Diagram 20 Pier size and spacing**

See para 1C39



## Section 1D

### PROPORTIONS FOR MASONRY CHIMNEYS ABOVE THE ROOF SURFACE

#### Height to width relationship

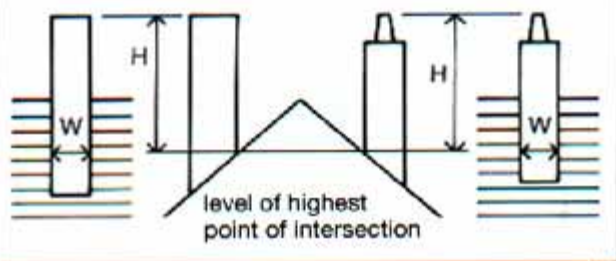
**1D1** Where a chimney is not adequately supported by ties or securely restrained in any way, its height if measured from the highest point of intersection with the roof surface, gutter, etc. should not exceed  $4.5W$ , provided the density of the masonry is greater than  $1500\text{kg/m}^3$ , where:

**W** is the least horizontal dimension of the chimney measured at the same point of intersection, and

**H** is measured to the top of any chimney pot or other flue terminal. (see Diagram 21)

**Diagram 21 Proportions for masonry chimneys**

See para 1D1





## Section 1E

### STRIP FOUNDATIONS OF PLAIN CONCRETE

#### Conditions relating to the sub-soil

**1E1** There should not be:

- made ground or wide variation in type of subsoil within the loaded area, nor
- weaker type of soil at such a depth below the soil on which the foundation rests as could impair the stability of the structure.

#### Design provisions

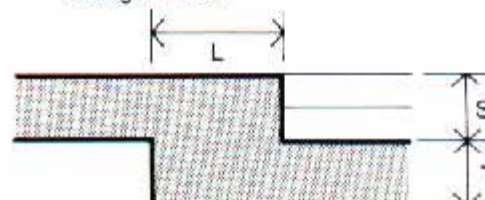
**1E2** The following design provisions relate to foundations:

- the foundations should be situated centrally under the wall
- strip foundations should have the minimum widths given in Table 12
- for foundations in chemically aggressive soil conditions guidance in BS 5328: Part 1 should be followed. In non-aggressive soils, concrete should be composed of cement to BS 12: 1989 and fine and coarse aggregate conforming to BS 882: 1983 and the mix should comply with one of the following recommendations:
  - in proportion of 50kg of cement to not more than 0.1 m<sup>3</sup> of fine aggregate and 0.2 m<sup>3</sup> of coarse aggregate, or
  - Grade ST1 concrete to BS 5328: Part 2
- minimum thickness T of concrete foundation should be 150mm or P, whichever is the greater where P is derived using Table 12. (see Diagram 24 a. and b.)
- foundations stepped on elevation should overlap by twice the height of the step, by the thickness of the foundation, or 300mm, whichever is greater. (see Diagram 22)
- steps in foundations should not be of greater height than the thickness of the foundation. (see Diagram 22)
- foundation of piers, buttresses and chimneys should project as indicated in Diagram 23 and the projection X should never be less than P.

**Diagram 22 Elevation of stepped foundation**

See para 1E2e. and f.

foundations should unite at each change in level

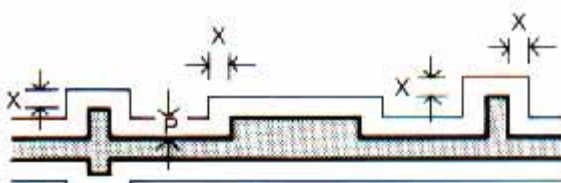


minimum overlap  $L =$  twice height of step, or thickness of foundation or 300mm, whichever is greater

S should not be greater than T

**Diagram 23 Piers and chimneys**

See para 1E2g



projection X should not be less than P

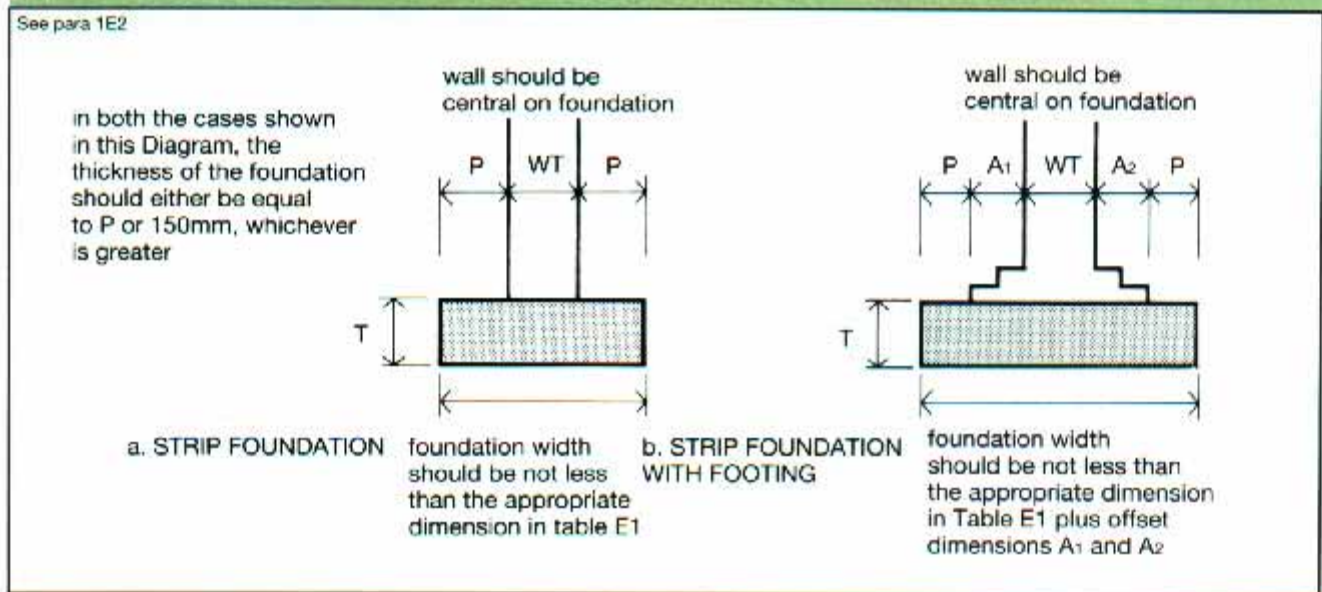
#### Minimum width of strip foundations

**1E3** Providing the previous conditions relating to the subsoil (paragraph 1E1) and design provisions relating to the foundations (paragraph 1E2) are observed, and the type and condition of subsoil is known, and loading at the base of the wall is within acceptable limits, the recommended widths of foundations given in Table 12 may be used.

**Table 12 Minimum width of strip foundations**

| Type of subsoil                        | Condition of subsoil                               | Field test applicable  | Total load of load-bearing walling not more than [kN/linear metre] |     |   |     |     |     |
|--|--|--|--|-----|---|-----|-----|-----|
|  |  |  | 20   | 30  | 40  | 50  | 60  | 70  |
| I<br>rock                              | not inferior to sandstone, limestone or firm chalk | requires at least a pneumatic or other mechanically operated pick for excavation   | in each case equal to the width of wall                            |     |   |     |     |     |
| II<br>gravel sand                      | compact compact                                    | requires pick for excavation. Wooden peg 50mm square in cross section hard to drive beyond 150mm                         | 250  | 300 | 400   | 500 | 600 | 650 |
| III<br>clay sandy clay                 | stiff stiff  | cannot be moulded with the fingers and requires a pick or pneumatic or other mechanically operated spade for its removal | 250  | 300 | 400   | 500 | 600 | 650 |
| IV<br>clay sandy clay                  | firm firm  | can be moulded by substantial pressure with the fingers and can be excavated with graft or spade                         | 300  | 350 | 450   | 600 | 750 | 850 |
| V<br>sand silty sand clayey sand       | loose loose loose                                  | can be excavated with a spade. Wooden peg 50mm square in cross section can be easily driven                              | 400  | 600 | Note<br>In relation to types V, VI and VII foundation do not fall within the provisions of this section if the total load exceeds 30kN/m. |     |     |     |
| VI<br>silt clay sandy clay silty clay  | soft soft soft                                     | fairly easily moulded in the fingers and readily excavated   | 450  | 650 |   |     |     |     |
| VII<br>silt clay sandy clay silty clay | very soft very soft very soft                      | natural sample in winter conditions exudes between fingers when squeezed in fist   | 600  | 850 |   |     |     |     |

**Diagram 24 Foundation dimensions**





## Section 2

### EXTERNAL WALL CLADDING

#### General

**2.1** This Section provides guidance regarding the support and fixing of external wall cladding which, by reason of weight or height, would present a hazard if it became detached from the building. An acceptable level of safety can be achieved by different standards of provisions, depending on the type and location of the cladding. The guidance given relates to the heavier form of cladding, e.g. concrete. Some of the guidance is also applicable to curtain walling.

**2.2** These provisions are not intended to provide guidance concerning the weather resistance of wall cladding which is included in Approved Document C: Site preparation and resistance to moisture.

**2.3** Wall cladding will meet the requirement if:

- a. the wall cladding is capable of safely sustaining and transmitting to the supporting structure of the building, all dead, imposed and wind loads, and
- b. the cladding is securely fixed to and supported by the supporting structure of the building. This fixing should comprise both vertical support and lateral restraint, and
- c. provision is made, where necessary, to accommodate differential movement of the cladding and the supporting structure of the building, and
- d. the cladding and its fixings (including any support components) are of durable materials, the anticipated life of the fixings being not less than that of the cladding.

Where the fixings are not readily accessible for inspection and maintenance, particular care will be required in the choice of materials and standards of workmanship to be achieved. (see the Approved Document for Regulation 7)

#### Technical approach

##### Loading

**2.4** Wind loading on the wall cladding should be derived from CP3: Chapter V: Part 2: 1972, using Class A building size for determining ground roughness factor  $S_z$ . In no case should the factor  $S_z$  be taken as less than 1.

**2.5** Forces imposed on wall cladding by ladders or access cradles for the purposes of maintenance should be derived from a consideration of the equipment likely to be used.

**2.6** Where the wall cladding is required to support other fixtures e.g. antennae, signboards etc., full account should be taken of the loads and forces arising from such fixtures.

**2.7** Where the wall cladding is required to function as pedestrian guarding to stairs, ramp, a vertical drop of 600mm or greater, or as a vehicle barrier, then account should be taken of the additional imposed loading, as stipulated in Approved Document K: Stairs, ramps and guards.

**2.8** For sports stadia requiring a safety certificate where the wall cladding is required to safely withstand lateral pressures from crowds, the design loading should be based on the recommendations given in the Home Office / Scottish Office 'Guide to Safety at Sports Grounds', 1990.

#### Fixings

**2.9** The strength of a fixing should be derived from tests using materials representative of the material into which the fixing is to be anchored, taking account of any inherent weaknesses that may affect the strength of the fixing e.g. cracks in concrete due to shrinkage and flexure, or voids in masonry construction. For the purposes of such tests the following standards and references may be used:

- a. BS 5080: Part 1: 1974
- b. BS 5080: Part 2: 1986
- c. British Board of Agrément MOAT No 19: 1981 *The assessment of Torque Expanded Anchor Bolts when used in Dense Aggregate Concrete.*

**2.10** Where expanding bolt type fixings are provided, their assumed safe working shear and tensile strength should not exceed the lower of the following values:

- a. [the mean shear or tensile failure test load less 3 times the standard deviation derived from the tests] x 1/3.
- b. the mean of the loads which cause a displacement of 0.1mm under direct tension and 1.0mm under direct shear.

**2.11** where resin bonded fixings are provided, their assumed safe working shear and tensile strength should not exceed the following:

- a. [the mean shear or tensile failure test load less 3 times the standard deviation derived from the tests] x 1/3.

**2.12** The design of certain resin bonded fixings should take account of their rapid loss of strength at temperatures above 50°C.



**2.13** The component parts of mechanical fixings and support components should be lockable or be otherwise mechanically fixed together to prevent unintended slippage between the parts.

**2.14** The design of fixings should allow for any possible eccentricity in the application of the imposed load on the fixings. In such circumstances the possibility of local spalling of the material in which the fixing is anchored should be allowed for by assuming an increase in eccentricity equal to 0.5 x the diameter of the fixing.

### **Movement**

**2.15** Guidance is given in BS 8200: 1985 and BS 5628: Part 3: 1985 on the means of providing for the differential movement of the wall cladding and the supporting structure of the building.

### **Information from codes and standards**

**2.16** The following Codes and Standards provide information which may also be used to meet the Requirements A1/2 with regard to the support and fixing of external wall cladding.

(a) Loading: CP3: Chapter V: Part 2: 1972 *Wind loads*. (although in no case should the factor  $S_3$  be taken as less than 1.0)

(b) Fixings: Clause 38 of BS 8200: 1985 and clauses 6 and 20 of BS 8298: 1989. (provided the guidance for fixings given in paragraphs 2.9 to 2.14 inclusive of this section is followed).



## Section 3

---

### RE-COVERING OF ROOFS

New roof coverings may impose substantially higher loads on the roof structure compared to the original ones. Occasionally, the new material may be substantially lighter than the original material. In both cases the following procedure is recommended.

- a. Compare the loading imposed by the proposed roof covering with the original roof loading. (In calculating the loading allowance should be made for the increase in load due to water absorption e.g. 0.3% for oven dry slates and up to 10.5% for clay plain tiles and concrete tiles based on dry mass per unit area of roof coverings.
- b. Arrange for inspection of the existing roof structure and check whether:
  - i. the roof structure is capable of sustaining the increased load, or
  - ii. the vertical restraints are adequate for the wind uplift which may result due to the use of lighter roof material and/or provision of new underlay.
- c. Provide appropriate strengthening measures such as:
  - i. replacement of defective members, fixings (including nails) and vertical restraints;
  - ii. provision of additional structural members, e.g. trusses, rafters, bracing, purlins etc., as may be required to sustain the increased loading;
  - iii. provision of restraining straps, additional ties and fixings to the walls, as may be required to resist the wind uplift.



## Section 4

### CODES, STANDARDS AND REFERENCES FOR REQUIREMENTS A1 AND 2

#### Introduction

**4.1** This Section is relevant to all building types and lists codes, standards and other references for structural design and construction.

#### References

##### 4.2 Loading:

a. Dead and imposed loads

BS 6399: *Loading for buildings:*

Part 1: 1984 *Code of practice for dead and imposed loads.*

b. Imposed roof loads

BS 6399: *Loading for buildings:*

Part 3: 1988 *Code of practice for imposed roof loads*

c. Wind loads

CP3: *Code of basic data for the design of buildings:*

Chapter V: *Loading:* Part 2: 1972 *Wind loads* (although in no case should the factor  $S_3$  be taken as less than 1)

Exceptionally where the actual load is greater than BS 6399: Part 1: 1984 design loads, the actual load should be used having regard to Section 3 of this Approved Document.

##### 4.3 Structural work of timber:

BS 5268: *Structural use of timber:*

Part 2: 1991 *Code of practice for permissible stress design, materials and workmanship.*

Part 3: 1985 *Code of practice for trussed rafter roofs.*

##### 4.4 Structural work of masonry:

BS 5628: *Code of practice for use of masonry:*

Part 1: 1978 *Structural use of unreinforced masonry.*

Part 3: 1985 *Materials and components, design and workmanship.*

##### 4.5 Structural work of reinforced, pre-stressed or plain concrete:

BS 8110: *Structural use of concrete:*

Part 1: 1985 *Code of practice for design and construction.*

Part 2: 1985 *Code of practice for special circumstances*

Part 3: 1985 *Design charts for singly reinforced beams, doubly reinforced beams and rectangular columns.*

##### 4.6 Structural work of steel

BS 5950: *Structural use of steelwork in buildings:*

Part 1: 1990 *Code of practice for design in simple and continuous construction: hot rolled sections.*

Part 2: 1992 *Specification for materials, fabrication and erection: hot rolled sections.*

Part 3: *Design in composite construction:*

Section 3.1: 1990 *Code of practice for design of simple and continuous composite beams.*

Part 4: 1982 *Code of practice for design of floors with profiled steel sheeting.*

Part 5: 1987 *Code of practice for design of cold formed sections.*

BS 449: *Specification for the use of structural steel in building:*

Part 2: 1969 *Metric units*

##### 4.7 Structural work of aluminium

CP 118: 1969: *The structural use of aluminium* (using one of the principal or supplementary aluminium alloys designated in Section 1.1 of that code, and for the purpose of section 5.3 of that code, the structure should be classified as safe-life structure).

##### 4.8 Foundations

BS 8004: 1986 *Code of practice for foundations.*

#### Ground Movement (Requirement A2b.)

**4.9** There may be known and or recorded conditions of ground instability, such as geological faults, landslides or disused mines, or unstable strata of similar nature which affects or may potentially affect a building site or its environs. These should be taken into account before proceeding with the design of a building or its foundations. Attention is drawn to the series of reviews of various geotechnical conditions carried out under the sponsorship of the Minerals and Land Reclamation Division of the Directorate of Planning Services (DPS/2) of the DOE which are listed below. These reviews aim to identify the work done on particular forms of land instability, to assess its general applicability and to identify any gaps in knowledge in order to obtain a general picture of the scale and nature of problems and how they might be overcome. The results comprise regional reports with atlases of county maps at 1:250,000 scale and databases for use by all those who are concerned with planning, development and engineering. Additionally reports cover the nature and causes of instability and implications for planning and development, methods of investigation and remedial preventative measures. The reviews undertaken are:



- 
- a. *Review of research into landsliding in Great Britain*
  - b. *Review of mining instability in Great Britain*
  - c. *Review of natural underground cavities in Great Britain*
  - d. *Review of foundation conditions in Great Britain*

Information regarding their availability can be obtained from DPS/2, DOE, Room C15/19, 2 Marsham Street, London SW1P 3EB

### **Existing buildings**

**4.10** Compliance with Part A (structure) is required in certain classes of change of use of a building, subject to the control of Regulations 5 and 6. Guidance relevant to structural appraisals related to 'change of use' is given in the following documents:

- a. BRE Digest 366: *Structural Appraisal of Existing Buildings for Change of Use.*
- b. The Institution of Structural Engineers Report *Appraisal of Existing Structures, 1980.*

Note: With reference to the item 'design checks' in the above mentioned Institution of Structural Engineers report the choice of various partial factors should be made to suit the individual circumstances of each case. For BS Codes and Standards quoted in the report the latest versions referred to in this Approved Document should be used.

## The Requirement

This Approved Document, which takes effect on 1 June 1992, deals with the following requirements from Part A of Schedule 1 to the Building Regulations 1991:

---

*Requirement**Limits on application*

---

**Disproportionate Collapse**

**A3.** The building shall be constructed so that in the event of an accident the building will not suffer collapse to an extent disproportionate to the cause.

Requirement A3 applies only to a building having five or more storeys (each basement level being counted as one storey) excluding a storey within the roof space where the slope of the roof does not exceed 70° to the horizontal.



---

## Guidance

---

### Performance

In the Secretary of State's view, the requirement of A3 will be met by an appropriate choice of measures:

- a. to avoid or reduce the hazards to which the building may be exposed;
- b. to reduce the sensitivity of the building to disproportionate collapse should an accident occur.

### Introduction

**0.3** The guidance in Section 5 deals with the means of reducing the sensitivity of the building to disproportionate collapse in the event of an accident.

## Section 5

### REDUCING THE SENSITIVITY OF THE BUILDING TO DISPROPORTIONATE COLLAPSE IN THE EVENT OF AN ACCIDENT.

5.1 The requirement will be met by adopting the following approach:

a. Provide effective horizontal and vertical ties in accordance with the recommendations given in the Codes and Standards listed under paragraph 5.2 below. If these measures are followed no further action is likely to be necessary.

b. If effective horizontal tying is provided and it is not feasible to provide effective vertical tying of any of the vertical loadbearing members, then each such untied member should be considered to be notionally removed, one at a time in each storey in turn, to check that its removal would allow the rest of the structure to bridge over the missing member albeit in a substantially deformed condition.

In considering this option, it should be recognised that certain areas of the structure

(e.g. cantilevers or simply supported floor panels etc.) will remain vulnerable to collapse. In these instances, the area at risk of collapse of the structure should be limited to that given under paragraph 5.1c below.

If it is not possible to bridge over the missing member, that member should be designed as a protected member (see paragraph 5.1d below)

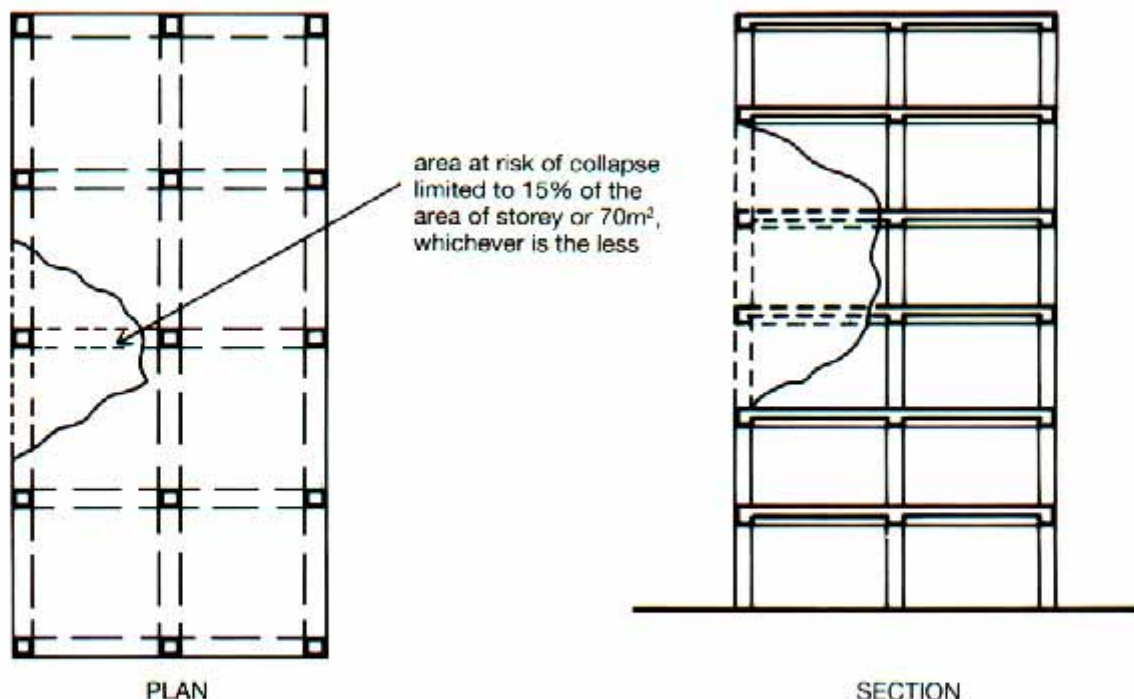
c. If it is not feasible to provide effective horizontal and vertical tying of any of the loadbearing members, then each support member should be considered to be notionally removed, one at a time in each storey in turn, to check that, on its removal the area at risk of collapse of the structure within the storey and the immediately adjacent storeys is limited to

- i. 15% of the area of the storey or
- ii. 70m<sup>2</sup>

whichever is the less (see Diagram 25). It should be noted that the area at risk is the area of the floor at risk of collapse on the removal of the member and not necessarily the entire area supported by the member in conjunction with other members.

Diagram 25 Area at risk of collapse in the event of an accident

See para 5.1c





If, on removal of a member, it is not possible to limit the area put at risk of collapse as above, that member should be designed as a protected member. (see paragraph 5.1d)

d. **Design of protected members:** The protected members (sometimes called 'key' elements) should be designed in accordance with the recommendations given in the appropriate Codes and Standards listed in paragraph 5.2.

### Alternative approach

**5.2** The performance can also be met by following the relevant recommendations given in the clauses of the Codes and Standards listed below:

**Structural work of masonry:** Clause 37 of BS 5628: *Code of practice for use of masonry Part 1: 1978 Structural use of unreinforced masonry*.

**Structural work of steel:** Clause 2.4.5.3 of BS 5950: *Structural use of steelwork in building Part 1: 1990 Code of practice for design in simple and continuous construction: hot rolled Sections*. (The accidental loading referred to in clause 2.4.5.5 should be chosen having particular regard to the importance of the key element and the consequences of failure, and the key element should always be capable of withstanding a load of at least 34kN/m<sup>2</sup> applied from any direction.)

**Structural work of reinforced, prestressed or plain concrete:** Clause 2.2.2.2 of BS 8110 *Structural use of concrete. Part 1: 1985 Code of practice for design and construction*, and Clause 2.6 of Part 2: *1985 Code of practice for special circumstances*.

---

# Appendix A

---

## TABLES OF SIZES OF TIMBER FLOOR, CEILING, AND ROOF MEMBERS IN SINGLE FAMILY HOUSES.

**A1** This Appendix must be used in conjunction with Sections 1A and 1B.

**A2** The section sizes given in these tables for floor ceiling and flat roof joists are either regularised from BS 4471 basic sawn sizes in accordance with the requirements and tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.

The section sizes for ceiling binders and roof members - including purlins for sheeting - are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.

**A3** All spans except those for floorboards are measured as the clear dimension between supports and all spacings are the dimensions between longitudinal centres of members.



**Table A1 Floor joists**

**Maximum clear span of joist(m) Timber of strength class SC3 (see Table 1)**

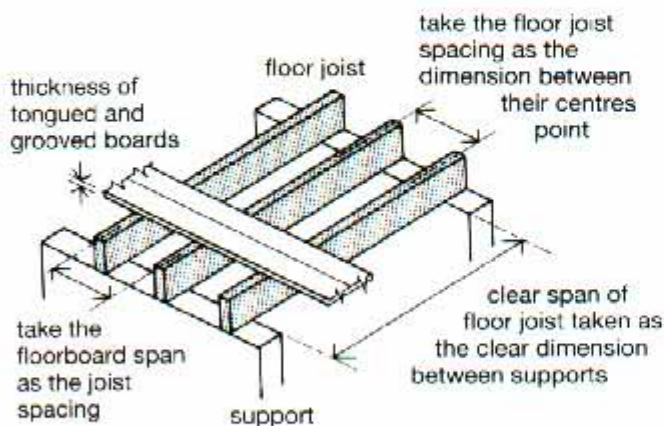
**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist**

| Size of joist<br>(mm x mm) | Not more than 0.25     |      |      | More than 0.25 but<br>not more than 0.50 |      |      | More than 0.50 but<br>not more than 1.25 |      |      |
|----------------------------|------------------------|------|------|--|------|------|--|------|------|
|                            | Spacing of joists (mm) |      |      |  |      |      |  |      |      |
|                            | 400                    | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.83                   | 1.69 | 1.30 | 1.72                                     | 1.56 | 1.21 | 1.42                                     | 1.30 | 1.04 |
| 38 x 122                   | 2.48                   | 2.39 | 1.93 | 2.37                                     | 2.22 | 1.76 | 1.95                                     | 1.79 | 1.45 |
| 38 x 147                   | 2.98                   | 2.87 | 2.51 | 2.85                                     | 2.71 | 2.33 | 2.45                                     | 2.29 | 1.87 |
| 38 x 170                   | 3.44                   | 3.31 | 2.87 | 3.28                                     | 3.10 | 2.69 | 2.81                                     | 2.65 | 2.27 |
| 38 x 195                   | 3.94                   | 3.75 | 3.26 | 3.72                                     | 3.52 | 3.06 | 3.19                                     | 3.01 | 2.61 |
| 38 x 220                   | 4.43                   | 4.19 | 3.85 | 4.16                                     | 3.93 | 3.42 | 3.57                                     | 3.37 | 2.92 |
| 47 x 97                    | 2.02                   | 1.91 | 1.58 | 1.92                                     | 1.82 | 1.46 | 1.67                                     | 1.53 | 1.23 |
| 47 x 122                   | 2.66                   | 2.56 | 2.30 | 2.55                                     | 2.45 | 2.09 | 2.26                                     | 2.08 | 1.70 |
| 47 x 147                   | 3.20                   | 3.08 | 2.79 | 3.06                                     | 2.95 | 2.61 | 2.72                                     | 2.57 | 2.17 |
| 47 x 170                   | 3.69                   | 3.55 | 3.19 | 3.53                                     | 3.40 | 2.99 | 3.12                                     | 2.94 | 2.55 |
| 47 x 195                   | 4.22                   | 4.06 | 3.82 | 4.04                                     | 3.89 | 3.39 | 3.54                                     | 3.34 | 2.90 |
| 47 x 220                   | 4.72                   | 4.57 | 4.04 | 4.55                                     | 4.35 | 3.79 | 3.95                                     | 3.74 | 3.24 |
| 50 x 97                    | 2.08                   | 1.97 | 1.67 | 1.98                                     | 1.87 | 1.54 | 1.74                                     | 1.60 | 1.29 |
| 50 x 122                   | 2.72                   | 2.62 | 2.37 | 2.60                                     | 2.50 | 2.19 | 2.33                                     | 2.17 | 1.77 |
| 50 x 147                   | 3.27                   | 3.14 | 2.86 | 3.13                                     | 3.01 | 2.69 | 2.81                                     | 2.65 | 2.27 |
| 50 x 170                   | 3.77                   | 3.62 | 3.29 | 3.61                                     | 3.47 | 3.08 | 3.21                                     | 3.03 | 2.63 |
| 50 x 195                   | 4.31                   | 4.15 | 3.73 | 4.13                                     | 3.97 | 3.50 | 3.65                                     | 3.44 | 2.99 |
| 50 x 220                   | 4.79                   | 4.66 | 4.17 | 4.64                                     | 4.47 | 3.91 | 4.07                                     | 3.85 | 3.35 |
| 63 x 97                    | 2.32                   | 2.20 | 1.92 | 2.19                                     | 2.08 | 1.82 | 1.93                                     | 1.84 | 1.53 |
| 63 x 122                   | 2.93                   | 2.82 | 2.57 | 2.81                                     | 2.70 | 2.45 | 2.53                                     | 2.43 | 2.09 |
| 63 x 147                   | 3.52                   | 3.39 | 3.08 | 3.37                                     | 3.24 | 2.95 | 3.04                                     | 2.92 | 2.58 |
| 63 x 170                   | 4.06                   | 3.91 | 3.56 | 3.89                                     | 3.74 | 3.40 | 3.50                                     | 3.37 | 2.95 |
| 63 x 195                   | 4.63                   | 4.47 | 4.07 | 4.44                                     | 4.28 | 3.90 | 4.01                                     | 3.85 | 3.35 |
| 63 x 220                   | 5.06                   | 4.92 | 4.58 | 4.91                                     | 4.77 | 4.37 | 4.51                                     | 4.30 | 3.75 |
| 75 x 122                   | 3.10                   | 2.99 | 2.72 | 2.97                                     | 2.86 | 2.60 | 2.68                                     | 2.58 | 2.33 |
| 75 x 147                   | 3.72                   | 3.58 | 3.27 | 3.56                                     | 3.43 | 3.13 | 3.22                                     | 3.09 | 2.81 |
| 75 x 170                   | 4.28                   | 4.13 | 3.77 | 4.11                                     | 3.96 | 3.61 | 3.71                                     | 3.57 | 3.21 |
| 75 x 195                   | 4.83                   | 4.70 | 4.31 | 4.68                                     | 4.52 | 4.13 | 4.24                                     | 4.08 | 3.65 |
| 75 x 220                   | 5.27                   | 5.13 | 4.79 | 5.11                                     | 4.97 | 4.64 | 4.74                                     | 4.60 | 4.07 |
| 38 x 140                   | 2.84                   | 2.73 | 2.40 | 2.72                                     | 2.59 | 2.17 | 2.33                                     | 2.15 | 1.75 |
| 38 x 184                   | 3.72                   | 3.56 | 3.09 | 3.53                                     | 3.33 | 2.90 | 3.02                                     | 2.85 | 2.47 |
| 38 x 235                   | 4.71                   | 4.46 | 3.89 | 4.43                                     | 4.18 | 3.64 | 3.80                                     | 3.59 | 3.11 |

**Notes to Table A1 and A2**

**1** Softwood tongued and grooved floorboards if supported at a joist spacing of up to 500mm should be at least 16mm finished thickness; and if supported at wider spacings up to 600mm should be 19mm finished thickness.

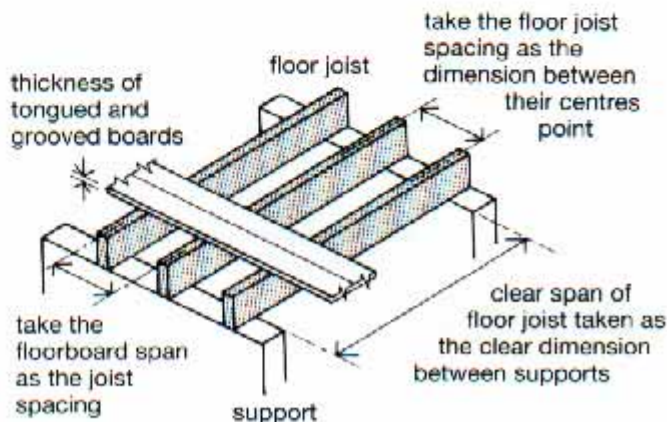
**2** The sizes, spacings and spans given will support the dead loads stated in the tables, and an imposed load not exceeding 1.5kN/m<sup>2</sup>. (These tables can be used when a bath is to be installed provided joists supporting the bath are duplicated.)





**Table A2 Floor joists****Maximum clear span of joist(m) Timber of strength class SC4 (see Table 1)**

| Size of joist<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the joist |      |      |  |      |      |  |      |      |
|----------------------------|--|------|------|--|------|------|--|------|------|
|                            | Not more than 0.25   |      |      | More than 0.25 but<br>not more than 0.50 |      |      | More than 0.50 but<br>not more than 1.25 |      |      |
|                            | Spacing of joists (mm)   |      |      |  |      |      |  |      |      |
|                            | 400  | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.94   | 1.83 | 1.59 | 1.84                                     | 1.74 | 1.51 | 1.64                                     | 1.55 | 1.36 |
| 38 x 122                   | 2.58   | 2.48 | 2.20 | 2.47                                     | 2.37 | 2.08 | 2.18                                     | 2.07 | 1.83 |
| 38 x 147                   | 3.10   | 2.98 | 2.71 | 2.97                                     | 2.85 | 2.59 | 2.67                                     | 2.56 | 2.31 |
| 38 x 170                   | 3.58   | 3.44 | 3.13 | 3.43                                     | 3.29 | 2.99 | 3.08                                     | 2.96 | 2.68 |
| 38 x 195                   | 4.10   | 3.94 | 3.58 | 3.92                                     | 3.77 | 3.42 | 3.53                                     | 3.39 | 3.07 |
| 38 x 220                   | 4.61   | 4.44 | 4.03 | 4.41                                     | 4.25 | 3.86 | 3.97                                     | 3.82 | 3.46 |
| 47 x 97                    | 2.14   | 2.03 | 1.76 | 2.03                                     | 1.92 | 1.68 | 1.80                                     | 1.71 | 1.50 |
| 47 x 122                   | 2.77   | 2.66 | 2.42 | 2.65                                     | 2.55 | 2.29 | 2.38                                     | 2.27 | 2.01 |
| 47 x 147                   | 3.33   | 3.20 | 2.91 | 3.19                                     | 3.06 | 2.78 | 2.87                                     | 2.75 | 2.50 |
| 47 x 170                   | 3.84   | 3.69 | 3.36 | 3.67                                     | 3.54 | 3.21 | 3.31                                     | 3.18 | 2.88 |
| 47 x 195                   | 4.39   | 4.22 | 3.85 | 4.20                                     | 4.05 | 3.68 | 3.79                                     | 3.64 | 3.30 |
| 47 x 220                   | 4.86   | 4.73 | 4.33 | 4.71                                     | 4.55 | 4.14 | 4.26                                     | 4.10 | 3.72 |
| 50 x 97                    | 2.20   | 2.09 | 1.82 | 2.08                                     | 1.98 | 1.73 | 1.84                                     | 1.75 | 1.54 |
| 50 x 122                   | 2.83   | 2.72 | 2.47 | 2.71                                     | 2.60 | 2.36 | 2.43                                     | 2.33 | 2.06 |
| 50 x 147                   | 3.39   | 3.27 | 2.97 | 3.25                                     | 3.13 | 2.84 | 2.93                                     | 2.81 | 2.55 |
| 50 x 170                   | 3.91   | 3.77 | 3.43 | 3.75                                     | 3.61 | 3.28 | 3.38                                     | 3.25 | 2.94 |
| 50 x 195                   | 4.47   | 4.31 | 3.92 | 4.29                                     | 4.13 | 3.75 | 3.86                                     | 3.72 | 3.37 |
| 50 x 220                   | 4.93   | 4.80 | 4.42 | 4.78                                     | 4.64 | 4.23 | 4.35                                     | 4.18 | 3.80 |
| 63 x 97                    | 2.43   | 2.32 | 2.03 | 2.31                                     | 2.19 | 1.93 | 2.03                                     | 1.93 | 1.71 |
| 63 x 122                   | 3.05   | 2.93 | 2.67 | 2.92                                     | 2.81 | 2.55 | 2.63                                     | 2.53 | 2.27 |
| 63 x 147                   | 3.67   | 3.52 | 3.21 | 3.50                                     | 3.37 | 3.07 | 3.16                                     | 3.04 | 2.76 |
| 63 x 170                   | 4.21   | 4.06 | 3.70 | 4.04                                     | 3.89 | 3.54 | 3.64                                     | 3.51 | 3.19 |
| 63 x 195                   | 4.77   | 4.64 | 4.23 | 4.61                                     | 4.45 | 4.05 | 4.17                                     | 4.01 | 3.65 |
| 63 x 220                   | 5.20   | 5.06 | 4.73 | 5.05                                     | 4.91 | 4.56 | 4.68                                     | 4.51 | 4.11 |
| 75 x 122                   | 3.22   | 3.10 | 2.83 | 3.09                                     | 2.97 | 2.71 | 2.78                                     | 2.68 | 2.43 |
| 75 x 147                   | 3.86   | 3.72 | 3.39 | 3.70                                     | 3.57 | 3.25 | 3.34                                     | 3.22 | 2.93 |
| 75 x 170                   | 4.45   | 4.29 | 3.91 | 4.27                                     | 4.11 | 3.75 | 3.86                                     | 3.71 | 3.38 |
| 75 x 195                   | 4.97   | 4.83 | 4.47 | 4.82                                     | 4.69 | 4.29 | 4.41                                     | 4.25 | 3.86 |
| 75 x 220                   | 5.42   | 5.27 | 4.93 | 5.25                                     | 5.11 | 4.78 | 4.88                                     | 4.74 | 4.35 |
| 38 x 140                   | 2.96   | 2.84 | 2.58 | 2.83                                     | 2.72 | 2.47 | 2.54                                     | 2.44 | 2.17 |
| 38 x 184                   | 3.87   | 3.72 | 3.38 | 3.70                                     | 3.56 | 3.23 | 3.33                                     | 3.20 | 2.90 |
| 38 x 235                   | 4.85   | 4.71 | 4.31 | 4.70                                     | 4.54 | 4.12 | 4.24                                     | 4.08 | 3.70 |



**3** The section sizes are either regularised from BS 4471 basic sawn sizes in accordance with the requirements and tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.

**4** The minimum bearing length at supports for floor joists should be 35mm.

**5** Notches and drilling of floor joists should not exceed the limits given in paragraph 1B6.

**6** Partition loads have not been allowed for in tables A1 and A2.



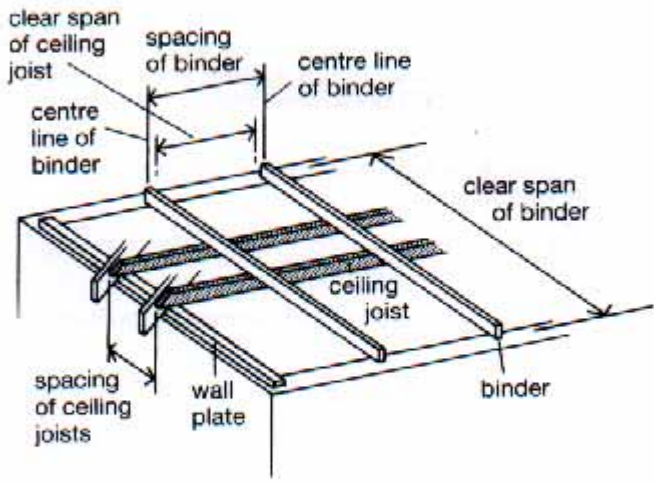
**Table A3 Ceiling joists**  
**Maximum clear span of joist(m) Timber of strength class SC3 and SC4 (see Table 1)**

Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist

| Size of joist<br>(mm x mm) | Not more than 0.25     |      |      | More than 0.25 but not more than 0.50 |      |      | Not more than 0.25 |      |      | More than 0.25 but not more than 0.50 |      |      |
|----------------------------|------------------------|------|------|---------------------------------------|------|------|--------------------|------|------|---------------------------------------|------|------|
|                            | Spacing of joists (mm) |      |      |                                       |      |      |                    |      |      |                                       |      |      |
|                            | 400                    | 450  | 600  | 400                                   | 450  | 600  | 400                | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 72                    | 1.15                   | 1.14 | 1.11 | 1.11                                  | 1.10 | 1.06 | 1.21               | 1.20 | 1.17 | 1.17                                  | 1.16 | 1.12 |
| 38 x 97                    | 1.74                   | 1.72 | 1.67 | 1.67                                  | 1.64 | 1.58 | 1.84               | 1.82 | 1.76 | 1.76                                  | 1.73 | 1.66 |
| 38 x 122                   | 2.37                   | 2.34 | 2.25 | 2.25                                  | 2.21 | 2.11 | 2.50               | 2.46 | 2.37 | 2.37                                  | 2.33 | 2.22 |
| 38 x 147                   | 3.02                   | 2.97 | 2.85 | 2.85                                  | 2.80 | 2.66 | 3.18               | 3.13 | 3.00 | 3.00                                  | 2.94 | 2.79 |
| 38 x 170                   | 3.63                   | 3.57 | 3.41 | 3.41                                  | 3.34 | 3.16 | 3.81               | 3.75 | 3.58 | 3.58                                  | 3.51 | 3.32 |
| 38 x 195                   | 4.30                   | 4.23 | 4.02 | 4.02                                  | 3.94 | 3.72 | 4.51               | 4.43 | 4.22 | 4.22                                  | 4.13 | 3.89 |
| 38 x 220                   | 4.98                   | 4.88 | 4.64 | 4.64                                  | 4.54 | 4.27 | 5.21               | 5.11 | 4.86 | 4.86                                  | 4.75 | 4.47 |
| 47 x 72                    | 1.27                   | 1.26 | 1.23 | 1.23                                  | 1.21 | 1.17 | 1.35               | 1.33 | 1.30 | 1.30                                  | 1.28 | 1.24 |
| 47 x 97                    | 1.92                   | 1.90 | 1.84 | 1.84                                  | 1.81 | 1.73 | 2.03               | 2.00 | 1.93 | 1.93                                  | 1.90 | 1.83 |
| 47 x 122                   | 2.60                   | 2.57 | 2.47 | 2.47                                  | 2.42 | 2.31 | 2.74               | 2.70 | 2.60 | 2.60                                  | 2.55 | 2.43 |
| 47 x 147                   | 3.30                   | 3.25 | 3.11 | 3.11                                  | 3.05 | 2.90 | 3.47               | 3.42 | 3.27 | 3.27                                  | 3.21 | 3.04 |
| 47 x 170                   | 3.96                   | 3.89 | 3.72 | 3.72                                  | 3.64 | 3.44 | 4.15               | 4.08 | 3.89 | 3.89                                  | 3.81 | 3.61 |
| 47 x 195                   | 4.68                   | 4.59 | 4.37 | 4.37                                  | 4.28 | 4.04 | 4.90               | 4.81 | 4.57 | 4.57                                  | 4.47 | 4.22 |
| 47 x 220                   | 5.39                   | 5.29 | 5.03 | 5.03                                  | 4.91 | 4.63 | 5.64               | 5.53 | 5.25 | 5.25                                  | 5.14 | 4.84 |
| 50 x 72                    | 1.31                   | 1.30 | 1.27 | 1.27                                  | 1.25 | 1.21 | 1.39               | 1.37 | 1.34 | 1.34                                  | 1.32 | 1.28 |
| 50 x 97                    | 1.97                   | 1.95 | 1.89 | 1.89                                  | 1.86 | 1.78 | 2.08               | 2.06 | 1.99 | 1.99                                  | 1.96 | 1.88 |
| 50 x 122                   | 2.67                   | 2.63 | 2.53 | 2.53                                  | 2.49 | 2.37 | 2.81               | 2.77 | 2.66 | 2.66                                  | 2.62 | 2.49 |
| 50 x 147                   | 3.39                   | 3.34 | 3.19 | 3.19                                  | 3.13 | 2.97 | 3.56               | 3.50 | 3.35 | 3.35                                  | 3.29 | 3.12 |
| 50 x 170                   | 4.06                   | 3.99 | 3.81 | 3.81                                  | 3.73 | 3.53 | 4.25               | 4.18 | 3.99 | 3.99                                  | 3.91 | 3.69 |
| 50 x 195                   | 4.79                   | 4.70 | 4.48 | 4.48                                  | 4.38 | 4.13 | 5.01               | 4.92 | 4.68 | 4.68                                  | 4.58 | 4.32 |
| 50 x 220                   | 5.52                   | 5.41 | 5.14 | 5.14                                  | 5.03 | 4.73 | 5.77               | 5.66 | 5.37 | 5.37                                  | 5.25 | 4.95 |
| 38 x 89                    | 1.54                   | 1.53 | 1.48 | 1.48                                  | 1.46 | 1.41 | 1.63               | 1.62 | 1.57 | 1.57                                  | 1.55 | 1.49 |
| 38 x 140                   | 2.84                   | 2.79 | 2.68 | 2.68                                  | 2.63 | 2.50 | 2.99               | 2.94 | 2.82 | 2.82                                  | 2.77 | 2.63 |
| 38 x 184                   | 4.01                   | 3.94 | 3.75 | 3.75                                  | 3.68 | 3.47 | 4.20               | 4.13 | 3.94 | 3.94                                  | 3.85 | 3.64 |

**Notes to Tables A3 and A4**

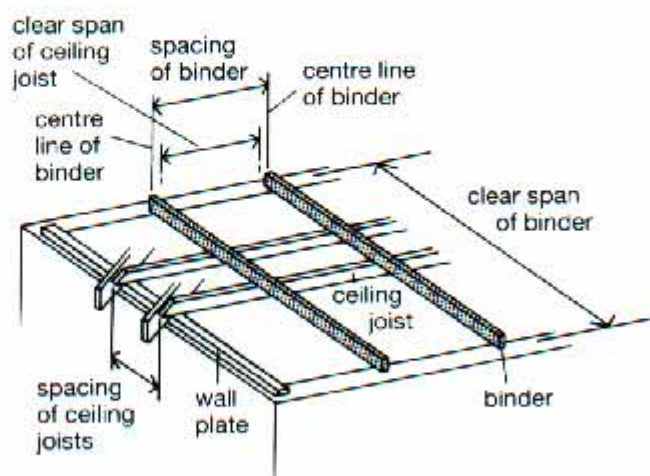
- Where spans for ceiling joists or binders are unequal the section sizes should be determined by the longer span.
- See paragraph 1A2 which gives guidance on the need for bracing roof structures.
- The sizes, spacings and spans given will support the dead loads given in the table and a maximum imposed load of 0.25 kN/m<sup>2</sup> and a concentrated load of 0.9 kN acting together.  
 In calculating the ceiling joist sizes no account has been taken of trimming (e.g. around the flues) or other loads (e.g. water tanks).
- The section sizes for ceiling joists are either regularised from BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- The section sizes for binders are either BS4471 basic sawn sizes with the tolerances of BS4471 or CLS/ALS sizes with BS 4971 tolerances.
- The minimum bearing length at supports for ceiling joists and binders should be 35mm
- No notches or holes should be cut in binders unless checked by a competent person.





**Table A4 Binders supporting ceiling joists****Maximum clear span of binder(m) Timber of strength class SC3 and SC4 (see Table 1)****Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the binder**

| Size of binder<br>(mm x mm) | Not more than 0.25      |      |      |      |      |      | More than 0.25<br>but not more than 0.50 |      |      |      |      |      |
|-----------------------------|-------------------------|------|------|------|------|------|--|------|------|------|------|------|
|                             | Spacing of binders (mm) |      |      |      |      |      |  |      |      |      |      |      |
|                             | 1200                    | 1500 | 1800 | 2100 | 2400 | 2700 | 1200                                     | 1500 | 1800 | 2100 | 2400 | 2700 |
| 47 x 150                    | 2.17                    | 2.05 | 1.96 | 1.88 | 1.81 |      | 1.99                                     | 1.87 |      |      |      |      |
| 47 x 175                    | 2.59                    | 2.45 | 2.33 | 2.24 | 2.15 | 2.08 | 2.37                                     | 2.23 | 2.11 | 2.02 | 1.94 | 1.87 |
| 50 x 150                    | 2.22                    | 2.11 | 2.01 | 1.93 | 1.86 |      | 2.04                                     | 1.92 | 1.83 |      |      |      |
| 50 x 175                    | 2.65                    | 2.51 | 2.39 | 2.29 | 2.21 | 2.13 | 2.42                                     | 2.28 | 2.16 | 2.07 | 1.99 | 1.91 |
| 50 x 200                    | 3.08                    | 2.91 | 2.77 | 2.65 | 2.55 | 2.47 | 2.81                                     | 2.64 | 2.50 | 2.39 | 2.29 | 2.21 |
| 63 x 125                    | 1.97                    | 1.87 |      |      |      |      | 1.82                                     |      |      |      |      |      |
| 63 x 150                    | 2.44                    | 2.31 | 2.20 | 2.12 | 2.04 | 1.97 | 2.23                                     | 2.11 | 2.00 | 1.91 | 1.84 |      |
| 63 x 175                    | 2.90                    | 2.74 | 2.61 | 2.51 | 2.41 | 2.33 | 2.65                                     | 2.49 | 2.37 | 2.26 | 2.17 | 2.10 |
| 63 x 200                    | 3.37                    | 3.18 | 3.03 | 2.90 | 2.79 | 2.69 | 3.07                                     | 2.88 | 2.74 | 2.61 | 2.51 | 2.42 |
| 63 x 225                    | 3.83                    | 3.61 | 3.44 | 3.29 | 3.16 | 3.05 | 3.49                                     | 3.27 | 3.10 | 2.96 | 2.84 | 2.74 |
| 75 x 125                    | 2.12                    | 2.01 | 1.92 | 1.85 |      |      | 1.95                                     | 1.84 |      |      |      |      |
| 75 x 150                    | 2.61                    | 2.47 | 2.36 | 2.26 | 2.18 | 2.11 | 2.39                                     | 2.25 | 2.14 | 2.05 | 1.97 | 1.90 |
| 75 x 175                    | 3.10                    | 2.93 | 2.79 | 2.68 | 2.58 | 2.49 | 2.83                                     | 2.66 | 2.53 | 2.42 | 2.32 | 2.24 |
| 75 x 200                    | 3.59                    | 3.39 | 3.23 | 3.09 | 2.98 | 2.88 | 3.27                                     | 3.08 | 2.92 | 2.79 | 2.68 | 2.58 |
| 75 x 225                    | 4.08                    | 3.85 | 3.66 | 3.51 | 3.37 | 3.26 | 3.71                                     | 3.50 | 3.31 | 3.16 | 3.03 | 2.92 |
| 47 x 150                    | 2.28                    | 2.16 | 2.06 | 1.98 | 1.90 | 1.84 | 2.09                                     | 1.97 | 1.87 |      |      |      |
| 47 x 175                    | 2.72                    | 2.57 | 2.45 | 2.34 | 2.26 | 2.18 | 2.48                                     | 2.34 | 2.22 | 2.12 | 2.03 | 1.96 |
| 50 x 150                    | 2.33                    | 2.21 | 2.11 | 2.02 | 1.95 | 1.89 | 2.14                                     | 2.02 | 1.92 | 1.83 |      |      |
| 50 x 175                    | 2.78                    | 2.63 | 2.51 | 2.40 | 2.31 | 2.23 | 2.54                                     | 2.39 | 2.27 | 2.17 | 2.08 | 2.01 |
| 50 x 200                    | 3.23                    | 3.05 | 2.90 | 2.78 | 2.67 | 2.58 | 2.95                                     | 2.77 | 2.62 | 2.51 | 2.40 | 2.32 |
| 63 x 125                    | 2.07                    | 1.97 | 1.88 | 1.81 |      |      | 1.91                                     | 1.80 |      |      |      |      |
| 63 x 150                    | 2.56                    | 2.42 | 2.31 | 2.22 | 2.14 | 2.07 | 2.34                                     | 2.21 | 2.10 | 2.01 | 1.93 | 1.86 |
| 63 x 175                    | 3.04                    | 2.87 | 2.74 | 2.62 | 2.53 | 2.44 | 2.78                                     | 2.61 | 2.48 | 2.37 | 2.28 | 2.20 |
| 63 x 200                    | 3.52                    | 3.32 | 3.16 | 3.03 | 2.92 | 2.82 | 3.21                                     | 3.02 | 2.86 | 2.73 | 2.63 | 2.53 |
| 63 x 225                    | 4.00                    | 3.77 | 3.59 | 3.44 | 3.31 | 3.19 | 3.65                                     | 3.42 | 3.24 | 3.10 | 2.97 | 2.86 |
| 75 x 125                    | 2.22                    | 2.11 | 2.01 | 1.94 | 1.87 | 1.81 | 2.04                                     | 1.93 | 1.84 |      |      |      |
| 75 x 150                    | 2.73                    | 2.59 | 2.47 | 2.37 | 2.28 | 2.21 | 2.50                                     | 2.36 | 2.24 | 2.15 | 2.06 | 1.99 |
| 75 x 175                    | 3.24                    | 3.07 | 2.92 | 2.80 | 2.70 | 2.61 | 2.96                                     | 2.79 | 2.65 | 2.53 | 2.43 | 2.35 |
| 75 x 200                    | 3.75                    | 3.54 | 3.37 | 3.23 | 3.11 | 3.00 | 3.42                                     | 3.22 | 3.05 | 2.92 | 2.80 | 2.70 |
| 75 x 225                    | 4.26                    | 4.02 | 3.82 | 3.66 | 3.52 | 3.40 | 3.88                                     | 3.65 | 3.46 | 3.30 | 3.17 | 3.06 |





**Table A5 Common or jack rafters for roofs having a pitch more than 15° but not more than 22.5° with access only for purposes of maintenance or repair. Imposed loading 0.75kN/m<sup>2</sup> (see Diagram 2)**

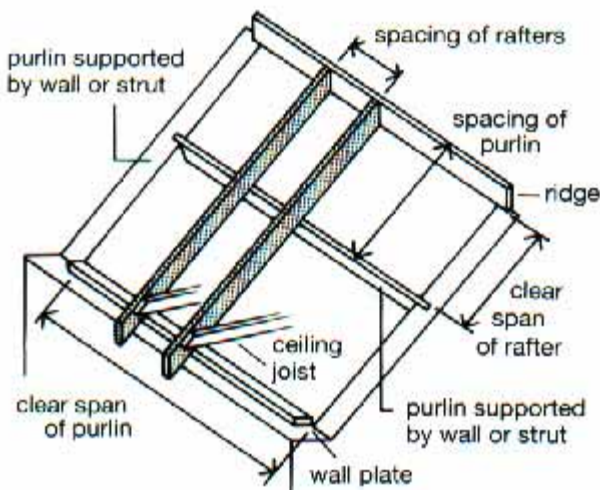
**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter**

| Size of rafter<br>(mm x mm) | Spacing of rafters (mm) |      |      |                                       |      |      |                                       |      |      |
|-----------------------------|-------------------------|------|------|---------------------------------------|------|------|---------------------------------------|------|------|
|                             | Not more than 0.50      |      |      | More than 0.50 but not more than 0.75 |      |      | More than 0.75 but not more than 1.00 |      |      |
|                             | 400                     | 450  | 600  | 400                                   | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 100                    | 2.10                    | 2.05 | 1.93 | 1.93                                  | 1.88 | 1.75 | 1.80                                  | 1.75 | 1.61 |
| 38 x 125                    | 2.69                    | 2.79 | 2.53 | 2.63                                  | 2.55 | 2.34 | 2.44                                  | 2.35 | 2.15 |
| 38 x 150                    | 3.47                    | 3.34 | 3.03 | 3.26                                  | 3.14 | 2.78 | 3.08                                  | 2.96 | 2.57 |
| 47 x 100                    | 2.46                    | 2.40 | 2.16 | 2.25                                  | 2.19 | 2.03 | 2.10                                  | 2.03 | 1.87 |
| 47 x 125                    | 3.10                    | 2.99 | 2.72 | 2.92                                  | 2.81 | 2.56 | 2.78                                  | 2.67 | 2.41 |
| 47 x 150                    | 3.71                    | 3.57 | 3.25 | 3.50                                  | 3.36 | 3.06 | 3.32                                  | 3.20 | 2.86 |
| 50 x 100                    | 2.54                    | 2.45 | 2.23 | 2.35                                  | 2.29 | 2.09 | 2.19                                  | 2.12 | 1.95 |
| 50 x 125                    | 3.17                    | 3.05 | 2.78 | 2.98                                  | 2.87 | 2.61 | 2.83                                  | 2.73 | 2.48 |
| 50 x 150                    | 3.78                    | 3.64 | 3.32 | 3.57                                  | 3.43 | 3.12 | 3.39                                  | 3.26 | 2.94 |
| 38 x 89                     | 1.76                    | 1.72 | 1.63 | 1.63                                  | 1.59 | 1.49 | 1.53                                  | 1.49 | 1.38 |
| 38 x 140                    | 3.24                    | 3.12 | 2.83 | 3.05                                  | 2.93 | 2.61 | 2.82                                  | 2.72 | 2.41 |
| 38 x 100                    | 2.42                    | 2.33 | 2.11 | 2.28                                  | 2.19 | 1.99 | 2.16                                  | 2.08 | 1.88 |
| 38 x 125                    | 3.01                    | 2.90 | 2.64 | 2.83                                  | 2.73 | 2.48 | 2.69                                  | 2.59 | 2.35 |
| 38 x 150                    | 3.60                    | 3.47 | 3.16 | 3.39                                  | 3.26 | 2.97 | 3.22                                  | 3.10 | 2.82 |
| 47 x 100                    | 2.59                    | 2.49 | 2.27 | 2.44                                  | 2.35 | 2.13 | 2.32                                  | 2.23 | 2.02 |
| 47 x 125                    | 3.22                    | 3.11 | 2.83 | 3.04                                  | 2.92 | 2.66 | 2.89                                  | 2.78 | 2.53 |
| 47 x 150                    | 3.85                    | 3.71 | 3.38 | 3.63                                  | 3.50 | 3.18 | 3.45                                  | 3.32 | 3.02 |
| 50 x 100                    | 2.64                    | 2.54 | 2.32 | 2.49                                  | 2.40 | 2.18 | 2.37                                  | 2.28 | 2.07 |
| 50 x 125                    | 3.29                    | 3.17 | 2.89 | 3.10                                  | 2.98 | 2.72 | 2.95                                  | 2.83 | 2.58 |
| 50 x 150                    | 3.93                    | 3.78 | 3.45 | 3.70                                  | 3.57 | 3.25 | 3.52                                  | 3.39 | 3.09 |
| 38 x 89                     | 2.16                    | 2.07 | 1.88 | 2.03                                  | 1.95 | 1.77 | 1.92                                  | 1.85 | 1.68 |
| 38 x 140                    | 3.37                    | 3.24 | 2.95 | 3.17                                  | 3.05 | 2.77 | 3.01                                  | 2.90 | 2.63 |

**Notes to Tables A5 and A6**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



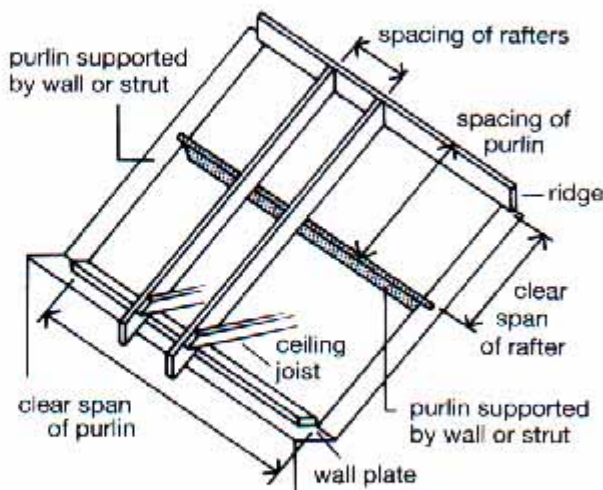
take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A6 Purlins supporting rafters to which Table A5 refers  
(Imposed loading 0.75kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |      |   |      |      |      |      |      |   |      |      |      |      |      |
|-----------------------------|--|------|------|------|------|------|---|------|------|------|------|------|---|------|------|------|------|------|
|                             | Not more than 0.5  |      |      |      |      |      | More than 0.5<br>but not more than 0.75 |      |      |      |      |      | More than 0.75<br>but not more than 1.0 |      |      |      |      |      |
|                             | Spacing of purlins (mm)  |      |      |      |      |      |   |      |      |      |      |      |   |      |      |      |      |      |
|                             | 1500   | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                    | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                    | 1800 | 2100 | 2400 | 2700 | 3000 |
| 50 x 150                    | 1.90   |      |      |      |      |      |   |      |      |      |      |      |   |      |      |      |      |      |
| 50 x 175                    | 2.22   | 2.08 | 1.96 | 1.87 |      |      | 2.08                                    | 1.95 | 1.84 |      |      |      | 1.97                                    | 1.84 |      |      |      |      |
| 50 x 200                    | 2.53   | 2.37 | 2.24 | 2.13 | 2.02 | 1.92 | 2.38                                    | 2.22 | 2.10 | 1.97 | 1.85 |      | 2.25                                    | 2.10 | 1.95 | 1.82 |      |      |
| 50 x 225                    | 2.84   | 2.66 | 2.52 | 2.40 | 2.26 | 2.14 | 2.67                                    | 2.50 | 2.35 | 2.20 | 2.07 | 1.96 | 2.53                                    | 2.36 | 2.18 | 2.03 | 1.91 | 1.81 |
| 63 X 150                    | 2.06   | 1.94 | 1.83 |      |      |      | 1.94                                    | 1.82 |      |      |      |      | 1.84                                    |      |      |      |      |      |
| 63 x 175                    | 2.41   | 2.26 | 2.13 | 2.03 | 1.95 | 1.87 | 2.26                                    | 2.12 | 2.00 | 1.91 | 1.82 |      | 2.14                                    | 2.01 | 1.90 | 1.80 |      |      |
| 63 x 200                    | 2.75   | 2.58 | 2.44 | 2.32 | 2.22 | 2.14 | 2.58                                    | 2.42 | 2.29 | 2.18 | 2.08 | 1.97 | 2.45                                    | 2.29 | 2.16 | 2.05 | 1.93 | 1.83 |
| 63 x 225                    | 3.09   | 2.89 | 2.74 | 2.61 | 2.50 | 2.40 | 2.90                                    | 2.72 | 2.57 | 2.45 | 2.33 | 2.20 | 2.75                                    | 2.58 | 2.43 | 2.29 | 2.16 | 2.04 |
| 75 x 125                    | 1.83   |      |      |      |      |      |   |      |      |      |      |      |   |      |      |      |      |      |
| 75 x 150                    | 2.19   | 2.08 | 1.95 | 1.86 |      |      | 2.06                                    | 1.94 | 1.83 |      |      |      | 1.96                                    | 1.83 |      |      |      |      |
| 75 x 175                    | 2.56   | 2.40 | 2.27 | 2.17 | 2.08 | 2.00 | 2.41                                    | 2.26 | 2.13 | 2.03 | 1.95 | 1.87 | 2.28                                    | 2.14 | 2.02 | 1.92 | 1.84 |      |
| 75 x 200                    | 2.92   | 2.74 | 2.59 | 2.47 | 2.37 | 2.28 | 2.75                                    | 2.58 | 2.44 | 2.32 | 2.22 | 2.14 | 2.61                                    | 2.44 | 2.31 | 2.20 | 2.10 | 2.00 |
| 75 x 225                    | 3.28   | 3.08 | 2.91 | 2.78 | 2.66 | 2.56 | 3.09                                    | 2.89 | 2.74 | 2.61 | 2.50 | 2.40 | 2.93                                    | 2.74 | 2.60 | 2.47 | 2.36 | 2.23 |
| 50 x 150                    | 1.99   | 1.86 |      |      |      |      | 1.87                                    |      |      |      |      |      |   |      |      |      |      |      |
| 50 x 175                    | 2.32   | 2.17 | 2.05 | 1.95 | 1.87 |      | 2.18                                    | 2.04 | 1.92 | 1.83 |      |      | 2.06                                    | 1.93 | 1.82 |      |      |      |
| 50 x 200                    | 2.64   | 2.48 | 2.34 | 2.23 | 2.14 | 2.05 | 2.49                                    | 2.33 | 2.20 | 2.09 | 2.00 | 1.92 | 2.36                                    | 2.20 | 2.08 | 1.98 | 1.89 |      |
| 50 x 225                    | 2.97   | 2.78 | 2.63 | 2.51 | 2.40 | 2.31 | 2.79                                    | 2.62 | 2.47 | 2.35 | 2.25 | 2.16 | 2.65                                    | 2.48 | 2.34 | 2.22 | 2.12 | 1.94 |
| 63 x 150                    | 2.16   | 2.02 | 1.91 | 1.82 |      |      | 2.03                                    | 1.90 |      |      |      |      | 1.92                                    | 1.80 |      |      |      |      |
| 63 x 175                    | 2.51   | 2.36 | 2.23 | 2.13 | 2.04 | 1.96 | 2.36                                    | 2.22 | 2.10 | 2.00 | 1.91 | 1.84 | 2.24                                    | 2.10 | 1.99 | 1.89 | 1.81 |      |
| 63 x 200                    | 2.87   | 2.69 | 2.55 | 2.43 | 2.33 | 2.24 | 2.70                                    | 2.53 | 2.39 | 2.28 | 2.18 | 2.10 | 2.56                                    | 2.40 | 2.27 | 2.16 | 2.06 | 1.98 |
| 63 x 225                    | 3.22   | 3.02 | 2.86 | 2.73 | 2.61 | 2.52 | 3.03                                    | 2.84 | 2.69 | 2.56 | 2.45 | 2.36 | 2.88                                    | 2.70 | 2.55 | 2.43 | 2.32 | 2.23 |
| 75 x 125                    | 1.81   |      |      |      |      |      |   |      |      |      |      |      |   |      |      |      |      |      |
| 75 x 150                    | 2.29   | 2.15 | 1.04 | 1.94 | 1.86 |      | 2.16                                    | 2.02 | 1.91 | 1.82 |      |      | 2.05                                    | 1.92 | 1.82 |      |      |      |
| 75 x 175                    | 2.67   | 2.51 | 2.37 | 2.26 | 2.17 | 2.09 | 2.51                                    | 2.36 | 2.23 | 2.13 | 2.04 | 1.96 | 2.39                                    | 2.24 | 2.12 | 2.02 | 1.93 | 1.85 |
| 75 x 200                    | 3.05   | 2.86 | 2.71 | 2.58 | 2.48 | 2.39 | 2.87                                    | 2.69 | 2.55 | 2.43 | 2.33 | 2.24 | 2.72                                    | 2.55 | 2.42 | 2.30 | 2.20 | 2.12 |
| 75 x 225                    | 3.42   | 3.21 | 3.04 | 2.90 | 2.78 | 2.68 | 3.22                                    | 3.02 | 2.86 | 2.73 | 2.62 | 2.52 | 3.06                                    | 2.87 | 2.72 | 2.59 | 2.48 | 2.38 |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A7 Common or jack rafters for roofs having a pitch more than 15° but not more than 22.5° with access only for purposes of maintenance or repair. Imposed loading 1.00kN/m<sup>2</sup> (see Diagram 2)**

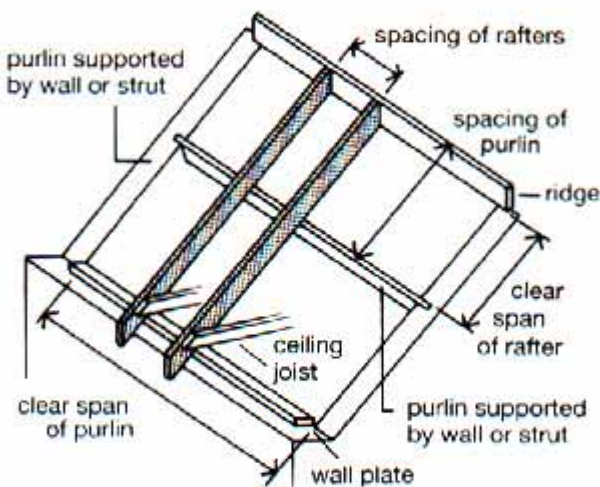
**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter**

| Size of rafter<br>(mm x mm) | Spacing of rafters (mm) |      |      |                                       |      |      |                                       |      |      |
|-----------------------------|-------------------------|------|------|---------------------------------------|------|------|---------------------------------------|------|------|
|                             | Not more than 0.50      |      |      | More than 0.50 but not more than 0.75 |      |      | More than 0.75 but not more than 1.00 |      |      |
|                             | 400                     | 450  | 600  | 400                                   | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 100                    | 2.10                    | 2.05 | 1.90 | 1.93                                  | 1.88 | 1.75 | 1.80                                  | 1.75 | 1.61 |
| 38 x 125                    | 2.73                    | 2.63 | 2.35 | 2.59                                  | 2.49 | 2.17 | 2.44                                  | 2.34 | 2.03 |
| 38 x 150                    | 3.27                    | 3.14 | 2.79 | 3.10                                  | 2.97 | 2.58 | 2.94                                  | 2.78 | 2.41 |
| 47 x 100                    | 2.35                    | 2.26 | 2.05 | 2.23                                  | 2.15 | 1.95 | 2.10                                  | 2.03 | 1.83 |
| 47 x 125                    | 2.93                    | 2.82 | 2.56 | 2.78                                  | 2.68 | 2.41 | 2.66                                  | 2.56 | 2.26 |
| 47 x 150                    | 3.50                    | 3.37 | 3.07 | 3.33                                  | 3.20 | 2.86 | 3.18                                  | 3.06 | 2.68 |
| 50 x 100                    | 2.40                    | 2.31 | 2.10 | 2.28                                  | 2.19 | 1.99 | 2.18                                  | 2.09 | 1.88 |
| 50 x 125                    | 2.99                    | 2.88 | 2.62 | 2.84                                  | 2.73 | 2.48 | 2.71                                  | 2.61 | 2.33 |
| 50 x 150                    | 3.57                    | 3.44 | 3.13 | 3.40                                  | 3.27 | 2.95 | 3.25                                  | 3.12 | 2.76 |
| 38 x 89                     | 1.76                    | 1.72 | 1.63 | 1.63                                  | 1.59 | 1.49 | 1.53                                  | 1.49 | 1.38 |
| 38 x 140                    | 3.05                    | 2.94 | 2.61 | 2.90                                  | 2.78 | 2.42 | 2.76                                  | 2.61 | 2.26 |
| 38 x 100                    | 2.28                    | 2.19 | 1.99 | 2.16                                  | 2.08 | 1.88 | 2.07                                  | 1.99 | 1.80 |
| 38 x 125                    | 2.84                    | 2.73 | 2.48 | 2.70                                  | 2.59 | 2.35 | 2.58                                  | 2.48 | 2.25 |
| 38 x 150                    | 3.40                    | 3.27 | 2.97 | 3.23                                  | 3.10 | 2.82 | 3.09                                  | 2.97 | 2.69 |
| 47 x 100                    | 2.44                    | 2.35 | 2.14 | 2.32                                  | 2.23 | 2.03 | 2.22                                  | 2.13 | 1.94 |
| 47 x 125                    | 3.04                    | 2.93 | 2.67 | 2.89                                  | 2.78 | 2.53 | 2.77                                  | 2.66 | 2.42 |
| 47 x 150                    | 3.64                    | 3.50 | 3.19 | 3.46                                  | 3.33 | 3.03 | 3.31                                  | 3.18 | 2.89 |
| 50 x 100                    | 2.49                    | 2.40 | 2.18 | 2.37                                  | 2.28 | 2.07 | 2.27                                  | 2.18 | 1.98 |
| 50 x 125                    | 3.10                    | 2.99 | 2.72 | 2.95                                  | 2.84 | 2.58 | 2.82                                  | 2.72 | 2.47 |
| 50 x 150                    | 3.71                    | 3.57 | 3.26 | 3.46                                  | 3.40 | 3.09 | 3.38                                  | 3.25 | 2.95 |
| 38 x 89                     | 2.03                    | 1.95 | 1.77 | 1.93                                  | 1.85 | 1.68 | 1.84                                  | 1.77 | 1.60 |
| 38 x 140                    | 3.18                    | 3.06 | 2.78 | 3.02                                  | 2.90 | 2.63 | 2.88                                  | 2.77 | 2.52 |

**Notes to Tables A7 and A8**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.00kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or GLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



take the clear span for the purlin as the clear dimension between supporting struts and/or walls

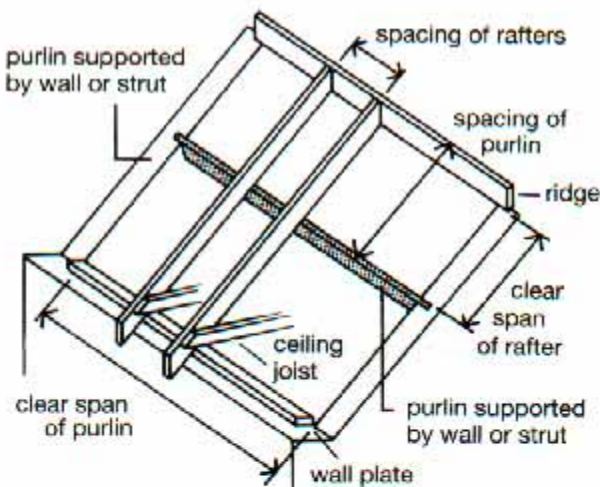


**Table A8 Purlins supporting rafters to which Table A7 refers  
(Imposed loading 1.0kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the purlin**

| Size of purlin<br>(mm x mm) | Not more than 0.50 |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      | More than 0.75<br>but not more than 1.00 |      |      |      |      |                               |
|-----------------------------|--------------------|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|-------------------------------|
|                             |                    |      |      |      |      |      | Spacing of purlins (mm)                  |      |      |      |      |      |  |      |      |      |      |                               |
|                             | 1500               | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000                          |
| 50 x 175                    | 2.09               | 1.95 | 1.84 |      |      |      | 1.97                                     | 1.85 |      |      |      |      |  |      |      |      |      | 1.88                          |
| 50 x 200                    | 2.38               | 2.23 | 2.10 | 1.97 | 1.85 |      | 2.26                                     | 2.11 | 1.96 | 1.82 |      |      |  |      |      |      |      | 2.15 1.98 1.83                |
| 50 x 225                    | 2.68               | 2.50 | 2.36 | 2.20 | 2.07 | 1.96 | 2.54                                     | 2.36 | 2.18 | 2.04 | 1.92 | 1.81 |  |      |      |      |      | 2.42 2.21 2.04 1.90           |
| 63 x 150                    | 1.94               | 1.82 |      |      |      |      | 1.84                                     |      |      |      |      |      |  |      |      |      |      |                               |
| 63 x 175                    | 2.27               | 2.12 | 2.01 | 1.91 | 1.83 |      | 2.15                                     | 2.01 | 1.90 | 1.81 |      |      |  |      |      |      |      | 2.05 1.92 1.81                |
| 63 x 200                    | 2.59               | 2.42 | 2.29 | 2.16 | 2.09 | 1.96 | 2.45                                     | 2.30 | 2.17 | 2.06 | 1.94 | 1.83 |  |      |      |      |      | 2.30 2.19 2.06 1.92 1.81      |
| 63 x 225                    | 2.91               | 2.72 | 2.58 | 2.45 | 2.33 | 2.21 | 2.76                                     | 2.58 | 2.44 | 2.30 | 2.16 | 2.05 |  |      |      |      |      | 2.63 2.46 2.30 2.15 2.02 1.91 |
| 75 x 150                    | 2.07               | 1.94 | 1.83 |      |      |      | 1.96                                     | 1.84 |      |      |      |      |  |      |      |      |      | 1.87                          |
| 75 x 175                    | 2.41               | 2.26 | 2.14 | 2.04 | 1.95 | 1.88 | 2.29                                     | 2.14 | 2.03 | 1.93 | 1.85 |      |  |      |      |      |      | 2.18 2.04 1.93 1.84           |
| 75 x 200                    | 2.75               | 2.58 | 2.44 | 2.33 | 2.23 | 2.14 | 2.61                                     | 2.45 | 2.31 | 2.20 | 2.11 | 2.01 |  |      |      |      |      | 2.49 2.33 2.20 2.10 1.98 1.88 |
| 75 x 225                    | 3.09               | 2.90 | 2.74 | 2.61 | 2.50 | 2.41 | 2.93                                     | 2.75 | 2.60 | 2.48 | 2.36 | 2.24 |  |      |      |      |      | 2.80 2.62 2.48 2.35 2.21 2.09 |
| 50 x 150                    | 1.87               |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |                               |
| 50 x 175                    | 2.18               | 2.04 | 1.93 | 1.83 |      |      | 2.07                                     | 1.93 | 1.82 |      |      |      |  |      |      |      |      | 1.97 1.84                     |
| 50 x 200                    | 2.49               | 2.33 | 2.20 | 2.10 | 2.00 | 1.92 | 2.36                                     | 2.21 | 2.08 | 1.98 | 1.89 |      |  |      |      |      |      | 2.25 2.10 1.98 1.88           |
| 50 x 225                    | 2.80               | 2.62 | 2.48 | 2.36 | 2.25 | 2.16 | 2.65                                     | 2.48 | 2.34 | 2.23 | 2.13 | 1.95 |  |      |      |      |      | 2.53 2.36 2.23 2.12 1.91      |
| 63 x 150                    | 2.03               | 1.90 | 1.80 |      |      |      | 1.93                                     | 1.81 |      |      |      |      |  |      |      |      |      | 1.84                          |
| 63 x 175                    | 2.37               | 2.22 | 2.10 | 2.00 | 1.91 | 1.84 | 2.25                                     | 2.10 | 1.99 | 1.89 | 1.81 |      |  |      |      |      |      | 2.14 2.01 1.90 1.80           |
| 63 x 200                    | 2.70               | 2.53 | 2.40 | 2.28 | 2.19 | 2.10 | 2.57                                     | 2.40 | 2.27 | 2.16 | 2.07 | 1.99 |  |      |      |      |      | 2.45 2.29 2.16 2.06 1.97 1.89 |
| 63 x 225                    | 3.04               | 2.85 | 2.70 | 2.57 | 2.46 | 2.36 | 2.88                                     | 2.70 | 2.55 | 2.43 | 2.32 | 2.23 |  |      |      |      |      | 2.75 2.58 2.43 2.31 2.21 2.12 |
| 75 x 125                    | 1.80               |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |                               |
| 75 x 150                    | 2.16               | 2.03 | 1.92 | 1.83 |      |      | 2.05                                     | 1.92 | 1.82 |      |      |      |  |      |      |      |      | 1.96 1.83                     |
| 75 x 175                    | 2.52               | 2.36 | 2.24 | 2.13 | 2.04 | 1.96 | 2.39                                     | 2.24 | 2.12 | 2.02 | 1.93 | 1.86 |  |      |      |      |      | 2.28 2.14 2.02 1.92 1.84      |
| 75 x 200                    | 2.87               | 2.70 | 2.56 | 2.43 | 2.33 | 2.24 | 2.73                                     | 2.56 | 2.42 | 2.31 | 2.21 | 2.12 |  |      |      |      |      | 2.61 2.44 2.31 2.20 2.10 2.02 |
| 75 x 225                    | 3.23               | 3.03 | 2.87 | 2.74 | 2.62 | 2.52 | 3.07                                     | 2.88 | 2.72 | 2.59 | 2.46 | 2.39 |  |      |      |      |      | 2.93 2.75 2.60 2.47 2.36 2.27 |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A9 Common or jack rafters for roofs having a pitch more than 22.5° but not more than 30° with access only for purposes of maintenance or repair. Imposed loading 0.75kN/m<sup>2</sup> (see Diagram 2)**

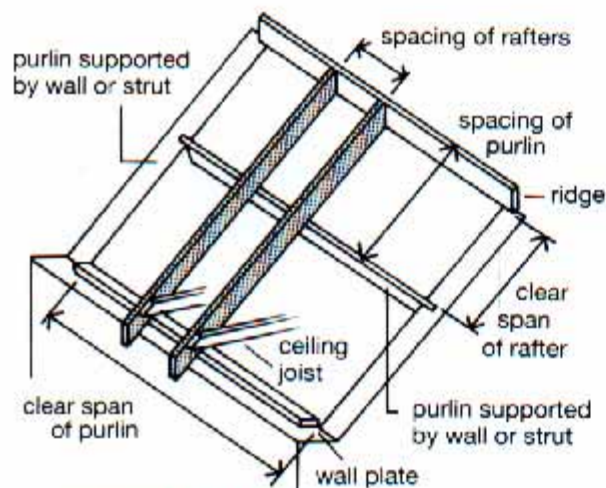
**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter**

| Size of rafter<br>(mm x mm) | Spacing of rafters (mm) |      |      |                                       |      |      |                                       |      |      |
|-----------------------------|-------------------------|------|------|---------------------------------------|------|------|---------------------------------------|------|------|
|                             | Not more than 0.50      |      |      | More than 0.50 but not more than 0.75 |      |      | More than 0.75 but not more than 1.00 |      |      |
|                             | 400                     | 450  | 600  | 400                                   | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 100                    | 2.18                    | 2.13 | 2.01 | 2.01                                  | 1.96 | 1.82 | 1.88                                  | 1.82 | 1.68 |
| 38 x 125                    | 2.97                    | 2.86 | 2.60 | 2.74                                  | 2.66 | 2.44 | 2.54                                  | 2.46 | 2.25 |
| 38 x 150                    | 3.55                    | 3.42 | 3.11 | 3.34                                  | 3.21 | 2.92 | 3.17                                  | 3.04 | 2.72 |
| 47 x 100                    | 2.55                    | 2.46 | 2.23 | 2.35                                  | 2.28 | 2.10 | 2.18                                  | 2.12 | 1.95 |
| 47 x 125                    | 3.18                    | 3.06 | 2.79 | 2.99                                  | 2.88 | 2.62 | 2.84                                  | 2.73 | 2.48 |
| 47 x 150                    | 3.80                    | 3.66 | 3.33 | 3.57                                  | 3.44 | 3.13 | 3.39                                  | 3.27 | 2.97 |
| 50 x 100                    | 2.60                    | 2.51 | 2.28 | 2.45                                  | 2.36 | 2.14 | 2.28                                  | 2.21 | 2.03 |
| 50 x 125                    | 3.24                    | 3.12 | 2.84 | 3.05                                  | 2.93 | 2.67 | 2.89                                  | 2.79 | 2.53 |
| 50 x 150                    | 3.87                    | 3.73 | 3.40 | 3.65                                  | 3.51 | 3.20 | 3.46                                  | 3.33 | 3.03 |
| 38 x 89                     | 1.82                    | 1.79 | 1.69 | 1.69                                  | 1.65 | 1.55 | 1.58                                  | 1.55 | 1.44 |
| 38 x 140                    | 3.32                    | 3.19 | 2.90 | 3.12                                  | 3.00 | 2.72 | 2.94                                  | 2.84 | 2.55 |
| 38 x 100                    | 2.48                    | 2.38 | 2.17 | 2.33                                  | 2.24 | 2.03 | 2.21                                  | 2.12 | 1.93 |
| 38 x 125                    | 3.08                    | 2.97 | 2.70 | 2.90                                  | 2.79 | 2.53 | 2.75                                  | 2.65 | 2.40 |
| 38 x 150                    | 3.69                    | 3.55 | 3.23 | 3.47                                  | 3.34 | 3.04 | 3.29                                  | 3.17 | 2.88 |
| 47 x 100                    | 2.65                    | 2.55 | 2.32 | 2.49                                  | 2.40 | 2.18 | 2.37                                  | 2.28 | 2.07 |
| 47 x 125                    | 3.30                    | 3.18 | 2.90 | 3.11                                  | 2.99 | 2.72 | 2.95                                  | 2.84 | 2.58 |
| 47 x 150                    | 3.94                    | 3.80 | 3.46 | 3.71                                  | 3.58 | 3.26 | 3.53                                  | 3.40 | 3.09 |
| 50 x 100                    | 2.71                    | 2.61 | 2.37 | 2.55                                  | 2.45 | 2.23 | 2.42                                  | 2.32 | 2.11 |
| 50 x 125                    | 3.37                    | 3.24 | 2.96 | 3.17                                  | 3.05 | 2.78 | 3.01                                  | 2.90 | 2.63 |
| 50 x 150                    | 4.02                    | 3.87 | 3.53 | 3.79                                  | 3.65 | 3.32 | 3.60                                  | 3.46 | 3.15 |
| 38 x 89                     | 2.21                    | 2.12 | 1.93 | 2.07                                  | 1.99 | 1.81 | 1.97                                  | 1.89 | 1.72 |
| 38 x 140                    | 3.45                    | 3.32 | 3.02 | 3.24                                  | 3.12 | 2.84 | 3.08                                  | 2.96 | 2.69 |

**Notes to Tables A9 and A10**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



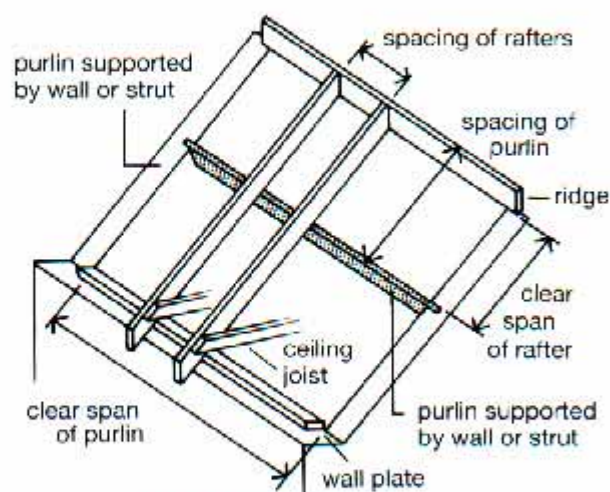
take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A10 Purlins supporting rafters to which Table A9 refers  
(Imposed load 0.75kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |  |      |      |      |      |  |      |      |      |      |      |      |      |
|-----------------------------|---|------|------|------|------|--|------|------|------|------|--|------|------|------|------|------|------|------|
|                             | Not more than 0.50  |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      | More than 0.75<br>but not more than 1.00 |      |      |      |      |      |      |      |
|                             | Spacing of purlins (mm)   |      |      |      |      |  |      |      |      |      |  |      |      |      |      |      |      |      |
|                             | 1500  | 1800 | 2100 | 2400 | 2700 | 3000                                     | 1500 | 1800 | 2100 | 2400 | 2700                                     | 3000 | 1500 | 1800 | 2100 | 2400 | 2700 | 3000 |
| 50 x 150                    | 1.95  | 1.83 |      |      |      |  | 1.83 |      |      |      |  |      |      |      |      |      |      |      |
| 50 x 175                    | 2.27  | 2.12 | 2.01 | 1.92 | 1.83 |  | 2.13 | 1.99 | 1.88 |      |  |      | 2.02 | 1.89 |      |      |      |      |
| 50 x 200                    | 2.59  | 2.43 | 2.30 | 2.19 | 2.09 | 1.99                                     | 2.43 | 2.28 | 2.15 | 2.03 | 1.91                                     | 1.81 | 2.30 | 2.15 | 2.01 | 1.88 |      |      |
| 50 x 225                    | 2.92  | 2.73 | 2.58 | 2.46 | 2.34 | 2.22                                     | 2.74 | 2.56 | 2.42 | 2.27 | 2.14                                     | 2.02 | 2.59 | 2.42 | 2.25 | 2.10 | 1.98 | 1.87 |
| 63 x 150                    | 2.12  | 1.98 | 1.88 |      |      |  | 1.99 | 1.86 |      |      |  |      | 1.88 |      |      |      |      |      |
| 63 x 175                    | 2.47  | 2.31 | 2.19 | 2.09 | 2.00 | 1.92                                     | 2.32 | 2.17 | 2.05 | 1.95 | 1.87                                     |      | 2.19 | 2.05 | 1.94 | 1.85 |      |      |
| 63 x 200                    | 2.81  | 2.64 | 2.50 | 2.36 | 2.28 | 2.19                                     | 2.64 | 2.48 | 2.34 | 2.23 | 2.13                                     | 2.04 | 2.50 | 2.35 | 2.22 | 2.11 | 1.99 | 1.89 |
| 63 x 225                    | 3.16  | 2.97 | 2.81 | 2.68 | 2.56 | 2.47                                     | 2.97 | 2.78 | 2.63 | 2.51 | 2.40                                     | 2.28 | 2.82 | 2.64 | 2.49 | 2.37 | 2.23 | 2.11 |
| 75 x 125                    | 1.88  |      |      |      |      |  |      |      |      |      |  |      |      |      |      |      |      |      |
| 75 x 150                    | 2.25  | 2.11 | 2.00 | 1.91 | 1.83 |  | 2.11 | 1.98 | 1.87 |      |  |      | 2.00 | 1.88 |      |      |      |      |
| 75 x 175                    | 2.62  | 2.46 | 2.33 | 2.22 | 2.13 | 2.05                                     | 2.46 | 2.31 | 2.19 | 2.08 | 1.99                                     | 1.92 | 2.33 | 2.19 | 2.07 | 1.97 | 1.89 | 1.81 |
| 75 x 200                    | 2.99  | 2.81 | 2.66 | 2.54 | 2.43 | 2.34                                     | 2.81 | 2.64 | 2.50 | 2.38 | 2.28                                     | 2.19 | 2.67 | 2.50 | 2.36 | 2.25 | 2.15 | 2.07 |
| 75 x 225                    | 3.36  | 3.15 | 2.99 | 2.85 | 2.73 | 2.63                                     | 3.16 | 2.96 | 2.80 | 2.67 | 2.56                                     | 2.46 | 3.00 | 2.81 | 2.66 | 2.53 | 2.42 | 2.31 |
| 50 x 150                    | 2.04  | 1.91 | 1.81 |      |      |  | 1.91 |      |      |      |  |      | 1.81 |      |      |      |      |      |
| 50 x 175                    | 2.37  | 2.22 | 2.10 | 2.00 | 1.92 | 1.84                                     | 2.23 | 2.09 | 1.97 | 1.88 |  |      | 2.11 | 1.97 | 1.86 |      |      |      |
| 50 x 200                    | 2.71  | 2.54 | 2.40 | 2.29 | 2.19 | 2.11                                     | 2.54 | 2.38 | 2.25 | 2.14 | 2.05                                     | 1.97 | 2.41 | 2.26 | 2.13 | 2.02 | 1.94 | 1.84 |
| 50 x 225                    | 3.05  | 2.86 | 2.70 | 2.57 | 2.46 | 2.37                                     | 2.86 | 2.68 | 2.53 | 2.41 | 2.30                                     | 2.21 | 2.71 | 2.54 | 2.39 | 2.28 | 2.18 | 2.07 |
| 63 x 125                    | 1.84  |      |      |      |      |  |      |      |      |      |  |      |      |      |      |      |      |      |
| 63 x 150                    | 2.21  | 2.07 | 1.96 | 1.87 |      |  | 2.08 | 1.95 | 1.84 |      |  |      | 1.97 | 1.84 |      |      |      |      |
| 63 x 175                    | 2.57  | 2.42 | 2.29 | 2.18 | 2.09 | 2.01                                     | 2.42 | 2.27 | 2.15 | 2.04 | 1.96                                     | 1.88 | 2.29 | 2.15 | 2.03 | 1.93 | 1.85 |      |
| 63 x 200                    | 2.94  | 2.76 | 2.61 | 2.49 | 2.39 | 2.30                                     | 2.76 | 2.59 | 2.45 | 2.33 | 2.24                                     | 2.15 | 2.62 | 2.45 | 2.32 | 2.21 | 2.11 | 2.03 |
| 63 x 225                    | 3.30  | 3.10 | 2.93 | 2.80 | 2.68 | 2.58                                     | 3.10 | 2.91 | 2.75 | 2.62 | 2.51                                     | 2.42 | 2.94 | 2.76 | 2.61 | 2.48 | 2.38 | 2.28 |
| 75 x 125                    | 1.96  | 1.84 |      |      |      |  | 1.84 |      |      |      |  |      |      |      |      |      |      |      |
| 75 x 150                    | 2.35  | 2.20 | 2.09 | 1.99 | 1.91 | 1.84                                     | 2.21 | 2.07 | 1.96 | 1.87 |  |      | 2.09 | 1.96 | 1.86 |      |      |      |
| 75 x 175                    | 2.73  | 2.57 | 2.43 | 2.32 | 2.22 | 2.14                                     | 2.57 | 2.41 | 2.28 | 2.18 | 2.09                                     | 2.01 | 2.44 | 2.29 | 2.16 | 2.06 | 1.97 | 1.90 |
| 75 x 200                    | 3.12  | 2.93 | 2.78 | 2.65 | 2.54 | 2.45                                     | 2.93 | 2.75 | 2.61 | 2.49 | 2.38                                     | 2.29 | 2.79 | 2.61 | 2.47 | 2.35 | 2.26 | 2.17 |
| 75 x 225                    | 3.50  | 3.29 | 3.12 | 2.98 | 2.86 | 2.75                                     | 3.30 | 3.10 | 2.93 | 2.80 | 2.68                                     | 2.58 | 3.13 | 2.94 | 2.78 | 2.65 | 2.54 | 2.44 |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A11 Common or jack rafters for roofs having a pitch more than 22.5° but not more than 30° with access only for purposes of maintenance or repair. Imposed loading 1.00kN/m<sup>2</sup> (see Diagram 2)**

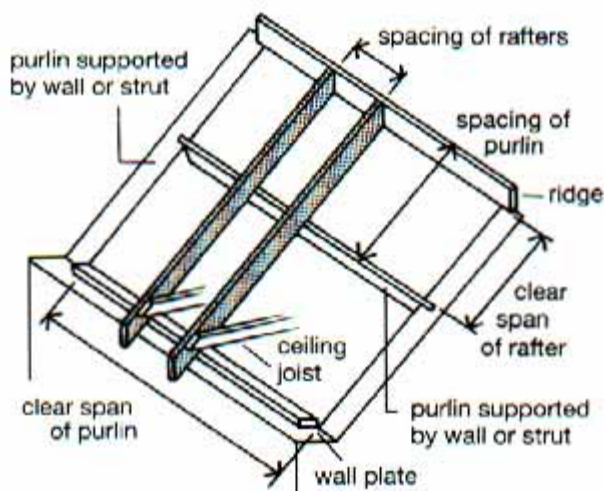
**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter

| Size of rafter<br>(mm x mm) | Not more than 0.50      |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|-----------------------------|-------------------------|------|------|--|------|------|--|------|------|
|                             | Spacing of rafters (mm) |      |      |  |      |      |  |      |      |
|                             | 400                     | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 100                    | 2.18                    | 2.13 | 1.96 | 2.01                                     | 1.96 | 1.82 | 1.88                                     | 1.82 | 1.68 |
| 38 x 125                    | 2.80                    | 2.69 | 2.45 | 2.65                                     | 2.55 | 2.30 | 2.53                                     | 2.44 | 2.15 |
| 38 x 150                    | 3.35                    | 3.22 | 2.93 | 3.18                                     | 3.06 | 2.73 | 3.03                                     | 2.92 | 2.55 |
| 47 x 100                    | 2.41                    | 2.32 | 2.11 | 2.28                                     | 2.20 | 2.00 | 2.18                                     | 2.10 | 1.90 |
| 47 x 125                    | 3.00                    | 2.89 | 2.63 | 2.85                                     | 2.74 | 2.49 | 2.72                                     | 2.62 | 2.37 |
| 47 x 150                    | 3.59                    | 3.46 | 3.14 | 3.41                                     | 3.28 | 2.98 | 3.25                                     | 3.13 | 2.83 |
| 50 x 100                    | 2.46                    | 2.37 | 2.15 | 2.33                                     | 2.24 | 2.04 | 2.23                                     | 2.14 | 1.94 |
| 50 x 125                    | 3.06                    | 2.95 | 2.68 | 2.91                                     | 2.80 | 2.54 | 2.78                                     | 2.67 | 2.43 |
| 50 x 150                    | 3.66                    | 3.52 | 3.21 | 3.48                                     | 3.34 | 3.04 | 3.32                                     | 3.20 | 2.90 |
| 38 x 89                     | 1.82                    | 1.79 | 1.69 | 1.69                                     | 1.65 | 1.55 | 1.59                                     | 1.55 | 1.44 |
| 38 x 140                    | 3.13                    | 3.01 | 2.74 | 2.97                                     | 2.85 | 2.56 | 2.83                                     | 2.72 | 2.29 |
| 38 x 100                    | 2.34                    | 2.25 | 2.04 | 2.21                                     | 2.13 | 1.93 | 2.11                                     | 2.03 | 1.84 |
| 38 x 125                    | 2.91                    | 2.80 | 2.55 | 2.76                                     | 2.66 | 2.41 | 2.64                                     | 2.53 | 2.30 |
| 38 x 150                    | 3.48                    | 3.35 | 3.05 | 3.30                                     | 3.18 | 2.89 | 3.16                                     | 3.04 | 2.75 |
| 47 x 100                    | 2.51                    | 2.41 | 2.19 | 2.38                                     | 2.29 | 2.08 | 2.27                                     | 2.18 | 1.98 |
| 47 x 125                    | 3.12                    | 3.00 | 2.73 | 2.96                                     | 2.85 | 2.59 | 2.83                                     | 2.72 | 2.47 |
| 47 x 150                    | 3.73                    | 3.59 | 3.27 | 3.54                                     | 3.41 | 3.10 | 3.38                                     | 3.26 | 2.96 |
| 50 x 100                    | 2.56                    | 2.46 | 2.24 | 2.42                                     | 2.33 | 2.12 | 2.32                                     | 2.23 | 2.02 |
| 50 x 125                    | 3.18                    | 3.06 | 2.79 | 3.02                                     | 2.91 | 2.64 | 2.89                                     | 2.78 | 2.52 |
| 50 x 150                    | 3.80                    | 3.66 | 3.34 | 3.61                                     | 3.48 | 3.16 | 3.45                                     | 3.32 | 3.02 |
| 38 x 89                     | 2.08                    | 2.00 | 1.82 | 1.97                                     | 1.90 | 1.72 | 1.88                                     | 1.81 | 1.64 |
| 38 x 140                    | 3.25                    | 3.13 | 2.85 | 3.09                                     | 2.97 | 2.70 | 2.95                                     | 2.84 | 2.57 |

**Notes to Tables A11 and A12**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.00kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



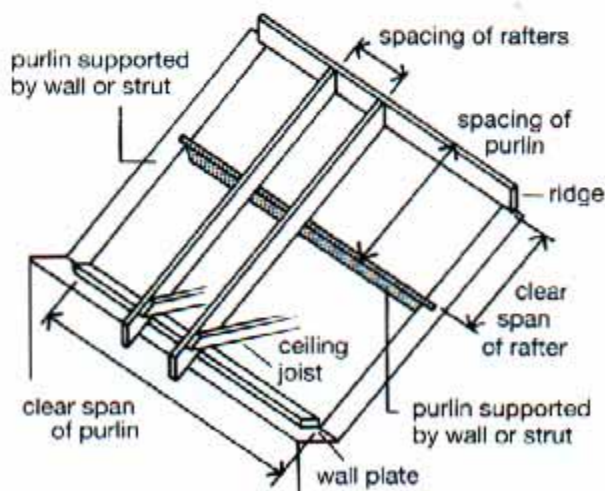
take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A12 Purlins supporting rafters to which Table A11 refers  
(Imposed load 1.00kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |      |      |      |      |
|-----------------------------|---|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|------|------|------|------|------|
|                             | Not more than 0.50  |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      | More than 0.75<br>but not more than 1.00 |      |      |      |      |      |      |      |      |      |
|                             | Spacing of purlins (mm)   |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |      |      |      |      |
|                             | 1500  | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 |      |      |      |      |
| 50 x 150                    | 1.84  |      |      |      |      |      | 2.03                                     | 1.89 |      |      |      |      |  |      |      |      | 1.93 | 1.80 |      |      |      |      |
| 50 x 175                    | 2.14  | 2.00 | 1.89 |      |      |      | 2.31                                     | 2.16 | 2.03 | 1.89 |      |      |  |      |      |      | 2.20 | 2.05 | 1.89 |      |      |      |
| 50 x 200                    | 2.45  | 2.29 | 2.16 | 2.05 | 1.93 | 1.82 | 2.60                                     | 2.43 | 2.26 | 2.11 | 1.99 | 1.88 |  |      |      |      | 2.48 | 2.29 | 2.11 | 1.97 | 1.85 |      |
| 50 x 225                    | 2.75  | 2.57 | 2.43 | 2.29 | 2.15 | 2.04 |  |      |      |      |      |      |  |      |      |      |      |      |      |      |      |      |
| 63 x 150                    | 2.00  | 1.87 |      |      |      |      | 1.89                                     |      |      |      |      |      |  |      |      |      | 1.88 |      |      |      |      |      |
| 63 x 175                    | 2.33  | 2.18 | 2.06 | 1.96 | 1.88 | 1.80 | 2.20                                     | 2.06 | 1.95 | 1.85 |      |      |  |      |      |      | 2.10 | 1.96 | 1.85 |      |      |      |
| 63 x 200                    | 2.66  | 2.49 | 2.35 | 2.24 | 2.14 | 2.05 | 2.51                                     | 2.35 | 2.22 | 2.12 | 2.00 | 1.90 |  |      |      |      | 2.40 | 2.24 | 2.12 | 1.99 | 1.87 |      |
| 63 x 225                    | 2.98  | 2.80 | 2.65 | 2.52 | 2.41 | 2.29 | 2.83                                     | 2.65 | 2.50 | 2.38 | 2.24 | 2.12 |  |      |      |      | 2.69 | 2.52 | 2.38 | 2.22 | 2.09 | 1.98 |
| 75 x 150                    | 2.12  | 1.99 | 1.88 |      |      |      | 2.01                                     | 1.88 |      |      |      |      |  |      |      |      | 1.92 |      |      |      |      |      |
| 75 x 175                    | 2.47  | 2.32 | 2.20 | 2.09 | 2.00 | 1.93 | 2.34                                     | 2.20 | 2.08 | 1.98 | 1.89 | 1.82 |  |      |      |      | 2.24 | 2.09 | 1.98 | 1.88 | 1.80 |      |
| 75 x 200                    | 2.82  | 2.65 | 2.51 | 2.39 | 2.29 | 2.20 | 2.68                                     | 2.51 | 2.37 | 2.26 | 2.16 | 2.08 |  |      |      |      | 2.55 | 2.39 | 2.26 | 2.15 | 2.05 | 1.94 |
| 75 x 225                    | 3.17  | 2.98 | 2.82 | 2.68 | 2.57 | 2.47 | 3.01                                     | 2.82 | 2.67 | 2.54 | 2.43 | 2.32 |  |      |      |      | 2.87 | 2.69 | 2.54 | 2.42 | 2.29 | 2.17 |
| 50 x 150                    | 1.92  |      |      |      |      |      | 1.82                                     |      |      |      |      |      |  |      |      |      | 2.02 | 1.89 |      |      |      |      |
| 50 x 175                    | 2.24  | 2.10 | 1.98 | 1.89 | 1.80 |      | 2.12                                     | 1.98 | 1.87 |      |      |      |  |      |      |      | 2.31 | 2.16 | 2.03 | 1.93 | 1.81 |      |
| 50 x 200                    | 2.56  | 2.39 | 2.26 | 2.15 | 2.06 | 1.98 | 2.42                                     | 2.26 | 2.14 | 2.03 | 1.94 | 1.86 |  |      |      |      | 2.59 | 2.42 | 2.29 | 2.17 | 2.04 | 1.83 |
| 50 x 225                    | 2.87  | 2.69 | 2.54 | 2.42 | 2.32 | 2.22 | 2.72                                     | 2.55 | 2.40 | 2.29 | 2.18 | 2.09 |  |      |      |      |      |      |      |      |      |      |
| 63 x 150                    | 2.09  | 1.95 | 1.85 |      |      |      | 1.98                                     | 1.85 |      |      |      |      |  |      |      |      | 1.88 |      |      |      |      |      |
| 63 x 175                    | 2.43  | 2.28 | 2.16 | 2.05 | 1.97 | 1.89 | 2.30                                     | 2.16 | 2.04 | 1.94 | 1.86 |      |  |      |      |      | 2.20 | 2.06 | 1.94 | 1.85 |      |      |
| 63 x 200                    | 2.77  | 2.60 | 2.46 | 2.35 | 2.25 | 2.16 | 2.63                                     | 2.46 | 2.33 | 2.22 | 2.12 | 2.04 |  |      |      |      | 2.51 | 2.35 | 2.22 | 2.11 | 2.02 | 1.94 |
| 63 x 225                    | 3.12  | 2.92 | 2.77 | 2.64 | 2.52 | 2.43 | 2.95                                     | 2.77 | 2.62 | 2.49 | 2.39 | 2.29 |  |      |      |      | 2.82 | 2.64 | 2.49 | 2.37 | 2.27 | 2.18 |
| 75 x 125                    | 1.85  |      |      |      |      |      | 2.10                                     | 1.97 | 1.86 |      |      |      |  |      |      |      | 2.01 | 1.88 |      |      |      |      |
| 75 x 150                    | 2.22  | 2.08 | 1.97 | 1.88 |      |      | 2.45                                     | 2.30 | 2.17 | 2.07 | 1.98 | 1.91 |  |      |      |      | 2.34 | 2.19 | 2.07 | 1.97 | 1.89 | 1.81 |
| 75 x 175                    | 2.58  | 2.42 | 2.29 | 2.19 | 2.10 | 2.02 | 2.80                                     | 2.62 | 2.48 | 2.36 | 2.26 | 2.18 |  |      |      |      | 2.67 | 2.50 | 2.37 | 2.25 | 2.16 | 2.07 |
| 75 x 200                    | 2.95  | 2.77 | 2.62 | 2.50 | 2.39 | 2.30 | 3.14                                     | 2.95 | 2.79 | 2.66 | 2.55 | 2.45 |  |      |      |      | 3.00 | 2.81 | 2.66 | 2.53 | 2.42 | 2.33 |
| 75 x 225                    | 3.31  | 3.11 | 2.94 | 2.81 | 2.70 | 2.59 |  |      |      |      |      |      |  |      |      |      |      |      |      |      |      |      |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls

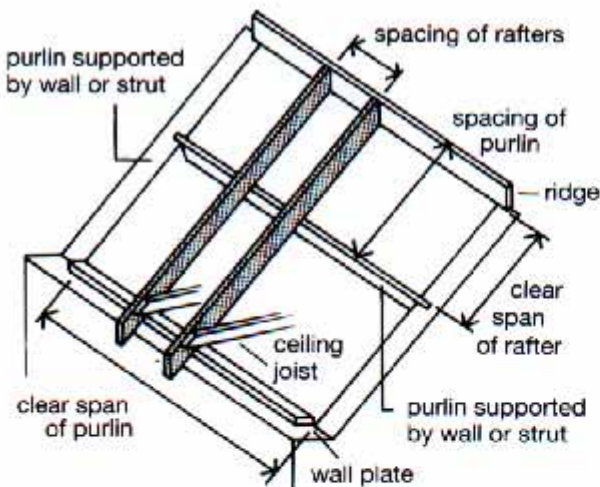


**Table A13 Common or jack rafters for roofs having a pitch more than 30° but not more than 45° with access only for purposes of maintenance or repair. Imposed loading 0.75kN/m<sup>2</sup> (see Diagram 2)**

**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter**

| Size of rafter<br>(mm x mm) | Spacing of rafters (mm) |      |      |                                       |      |      |                                       |      |      |
|-----------------------------|-------------------------|------|------|---------------------------------------|------|------|---------------------------------------|------|------|
|                             | Not more than 0.50      |      |      | More than 0.50 but not more than 0.75 |      |      | More than 0.75 but not more than 1.25 |      |      |
|                             | 400                     | 450  | 600  | 400                                   | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 100                    | 2.28                    | 2.23 | 2.10 | 2.10                                  | 2.05 | 1.91 | 1.96                                  | 1.91 | 1.76 |
| 38 x 125                    | 3.07                    | 2.95 | 2.69 | 2.87                                  | 2.77 | 2.52 | 2.65                                  | 2.56 | 2.35 |
| 38 x 150                    | 3.67                    | 3.53 | 3.22 | 3.44                                  | 3.31 | 3.01 | 3.26                                  | 3.14 | 2.85 |
| 47 x 100                    | 2.64                    | 2.54 | 2.31 | 2.45                                  | 2.38 | 2.17 | 2.28                                  | 2.21 | 2.04 |
| 47 x 125                    | 3.29                    | 3.17 | 2.88 | 3.09                                  | 2.97 | 2.70 | 2.92                                  | 2.81 | 2.56 |
| 47 x 150                    | 3.93                    | 3.78 | 3.45 | 3.69                                  | 3.55 | 3.23 | 3.50                                  | 3.37 | 3.06 |
| 50 x 100                    | 2.69                    | 2.59 | 2.36 | 2.53                                  | 2.43 | 2.21 | 2.38                                  | 2.30 | 2.09 |
| 50 x 125                    | 3.35                    | 3.23 | 2.94 | 3.15                                  | 3.03 | 2.76 | 2.98                                  | 2.87 | 2.61 |
| 50 x 150                    | 4.00                    | 3.86 | 3.52 | 3.76                                  | 3.62 | 3.30 | 3.57                                  | 3.44 | 3.13 |
| 38 x 89                     | 1.91                    | 1.87 | 1.77 | 1.77                                  | 1.73 | 1.62 | 1.67                                  | 1.62 | 1.50 |
| 38 x 140                    | 3.43                    | 3.30 | 3.01 | 3.22                                  | 3.10 | 2.82 | 3.05                                  | 2.93 | 2.66 |
| 38 x 100                    | 2.56                    | 2.47 | 2.24 | 2.40                                  | 2.31 | 2.10 | 2.28                                  | 2.19 | 1.99 |
| 38 x 125                    | 3.19                    | 3.07 | 2.80 | 2.99                                  | 2.88 | 2.62 | 2.84                                  | 2.73 | 2.48 |
| 38 x 150                    | 3.81                    | 3.67 | 3.35 | 3.58                                  | 3.45 | 3.14 | 3.39                                  | 3.27 | 2.97 |
| 47 x 100                    | 2.74                    | 2.64 | 2.41 | 2.58                                  | 2.48 | 2.25 | 2.44                                  | 2.35 | 2.13 |
| 47 x 125                    | 3.41                    | 3.29 | 3.00 | 3.21                                  | 3.09 | 2.81 | 3.04                                  | 2.93 | 2.66 |
| 47 x 150                    | 4.08                    | 3.93 | 3.59 | 3.83                                  | 3.69 | 3.36 | 3.64                                  | 3.50 | 3.19 |
| 50 x 100                    | 2.80                    | 2.70 | 2.45 | 2.63                                  | 2.53 | 2.30 | 2.49                                  | 2.40 | 2.18 |
| 50 x 125                    | 3.48                    | 3.35 | 3.06 | 3.27                                  | 3.15 | 2.87 | 3.10                                  | 2.99 | 2.72 |
| 50 x 150                    | 4.16                    | 4.01 | 3.66 | 3.91                                  | 3.77 | 3.43 | 3.71                                  | 3.57 | 3.25 |
| 38 x 89                     | 2.28                    | 2.20 | 2.00 | 2.14                                  | 2.06 | 1.87 | 2.03                                  | 1.95 | 1.77 |
| 38 x 140                    | 3.56                    | 3.43 | 3.13 | 3.35                                  | 3.22 | 2.93 | 3.17                                  | 3.05 | 2.77 |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls

**Notes to Tables A13 and A14**

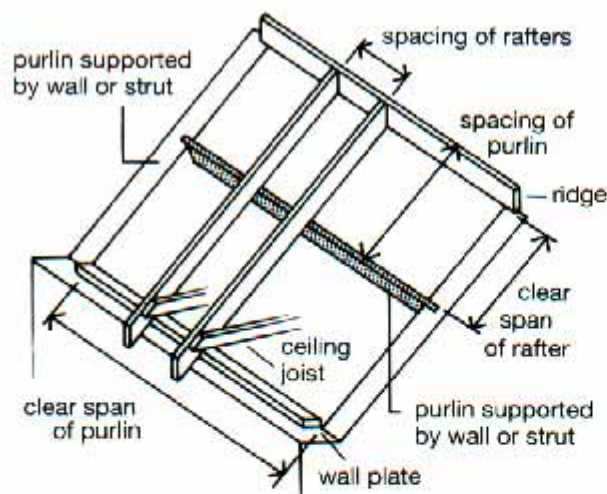
- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



**Table A14 Purlins supporting rafters to which Table A13 refers  
(Imposed load 0.75kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |
|-----------------------------|---|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|------|
|                             | Not more than 0.50  |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      | More than 0.75<br>but not more than 1.00 |      |      |      |      |      |
|                             | Spacing of purlins (mm)   |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |
|                             | 1500  | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 |
| 50 x 150                    | 2.02  | 1.89 |      |      |      |      | 1.89                                     |      |      |      |      |      |  |      |      |      |      |      |
| 50 x 175                    | 2.36  | 2.21 | 2.09 | 1.99 | 1.90 | 1.83 | 2.21                                     | 2.06 | 1.95 | 1.86 |      |      | 2.08                                     | 1.95 | 1.84 |      |      |      |
| 50 x 200                    | 2.69  | 2.52 | 2.38 | 2.27 | 2.17 | 2.09 | 2.52                                     | 2.38 | 2.23 | 2.12 | 2.01 | 1.90 | 2.38                                     | 2.23 | 2.10 | 1.97 | 1.85 |      |
| 50 x 225                    | 3.02  | 2.83 | 2.68 | 2.55 | 2.44 | 2.34 | 2.83                                     | 2.65 | 2.50 | 2.38 | 2.24 | 2.12 | 2.68                                     | 2.50 | 2.36 | 2.20 | 2.07 | 1.96 |
| 63 x 125                    | 1.83  |      |      |      |      |      | 1.83                                     |      |      |      |      |      | 1.83                                     |      |      |      |      |      |
| 63 x 150                    | 2.19  | 2.06 | 1.95 | 1.85 |      |      | 2.05                                     | 1.93 | 1.82 |      |      |      | 1.94                                     | 1.82 |      |      |      |      |
| 63 x 175                    | 2.55  | 2.40 | 2.27 | 2.16 | 2.07 | 1.99 | 2.39                                     | 2.24 | 2.12 | 2.02 | 1.94 | 1.86 | 2.27                                     | 2.12 | 2.01 | 1.91 | 1.83 |      |
| 63 x 200                    | 2.91  | 2.74 | 2.59 | 2.47 | 2.37 | 2.28 | 2.73                                     | 2.56 | 2.42 | 2.31 | 2.21 | 2.13 | 2.59                                     | 2.42 | 2.29 | 2.18 | 2.09 | 1.98 |
| 63 x 225                    | 3.28  | 3.07 | 2.91 | 2.78 | 2.66 | 2.56 | 3.07                                     | 2.88 | 2.73 | 2.60 | 2.49 | 2.39 | 2.91                                     | 2.72 | 2.58 | 2.45 | 2.33 | 2.21 |
| 75 x 125                    | 1.94  | 1.82 |      |      |      |      | 1.82                                     |      |      |      |      |      |  |      |      |      |      |      |
| 75 x 150                    | 2.33  | 2.19 | 2.07 | 1.97 | 1.89 | 1.82 | 2.18                                     | 2.05 | 1.94 | 1.85 |      |      | 2.07                                     | 1.94 | 1.83 |      |      |      |
| 75 x 175                    | 2.71  | 2.55 | 2.41 | 2.30 | 2.21 | 2.12 | 2.55                                     | 2.39 | 2.26 | 2.15 | 2.06 | 1.99 | 2.41                                     | 2.26 | 2.14 | 2.04 | 1.95 | 1.87 |
| 75 x 200                    | 3.10  | 2.91 | 2.75 | 2.63 | 2.52 | 2.43 | 2.91                                     | 2.73 | 2.58 | 2.46 | 2.36 | 2.27 | 2.75                                     | 2.58 | 2.44 | 2.33 | 2.23 | 2.14 |
| 75 x 225                    | 3.48  | 3.27 | 3.10 | 2.95 | 2.83 | 2.73 | 3.26                                     | 3.06 | 2.90 | 2.77 | 2.65 | 2.55 | 3.09                                     | 2.90 | 2.74 | 2.61 | 2.50 | 2.41 |
| 50 x 150                    | 2.11  | 1.98 | 1.87 |      |      |      | 1.98                                     | 1.85 |      |      |      |      | 1.87                                     |      |      |      |      |      |
| 50 x 175                    | 2.46  | 2.31 | 2.18 | 2.08 | 1.99 | 1.91 | 2.31                                     | 2.16 | 2.04 | 1.94 | 1.86 |      | 2.18                                     | 2.04 | 1.93 | 1.83 |      |      |
| 50 x 200                    | 2.81  | 2.63 | 2.49 | 2.37 | 2.27 | 2.19 | 2.63                                     | 2.47 | 2.33 | 2.22 | 2.12 | 2.04 | 2.49                                     | 2.33 | 2.20 | 2.09 | 2.00 | 1.92 |
| 50 x 225                    | 3.16  | 2.96 | 2.80 | 2.67 | 2.56 | 2.46 | 2.96                                     | 2.77 | 2.62 | 2.50 | 2.39 | 2.30 | 2.80                                     | 2.62 | 2.48 | 2.36 | 2.25 | 2.16 |
| 63 x 125                    | 1.91  |      |      |      |      |      | 1.91                                     |      |      |      |      |      | 1.91                                     |      |      |      |      |      |
| 63 x 150                    | 2.29  | 2.15 | 2.03 | 1.94 | 1.86 |      | 2.15                                     | 2.01 | 1.90 | 1.81 |      |      | 2.03                                     | 1.90 | 1.80 |      |      |      |
| 63 x 175                    | 2.67  | 2.50 | 2.37 | 2.26 | 2.17 | 2.08 | 2.50                                     | 2.35 | 2.22 | 2.12 | 2.03 | 1.95 | 2.37                                     | 2.22 | 2.10 | 2.00 | 1.91 | 1.84 |
| 63 x 200                    | 3.04  | 2.86 | 2.71 | 2.58 | 2.47 | 2.38 | 2.86                                     | 2.68 | 2.54 | 2.42 | 2.31 | 2.23 | 2.70                                     | 2.53 | 2.40 | 2.28 | 2.19 | 2.10 |
| 63 x 225                    | 3.42  | 3.21 | 3.04 | 2.90 | 2.78 | 2.68 | 3.21                                     | 3.01 | 2.85 | 2.72 | 2.60 | 2.50 | 3.04                                     | 2.85 | 2.70 | 2.57 | 2.55 | 2.36 |
| 75 x 125                    | 2.03  | 1.90 | 1.80 |      |      |      | 1.90                                     |      |      |      |      |      | 1.80                                     |      |      |      |      |      |
| 75 x 150                    | 2.43  | 2.28 | 2.16 | 2.06 | 1.98 | 1.91 | 2.28                                     | 2.14 | 2.03 | 1.93 | 1.85 |      | 2.16                                     | 2.03 | 1.92 | 1.83 |      |      |
| 75 x 175                    | 2.83  | 2.66 | 2.52 | 2.40 | 2.31 | 2.22 | 2.66                                     | 2.49 | 2.36 | 2.25 | 2.16 | 2.08 | 2.52                                     | 2.36 | 2.24 | 2.13 | 2.04 | 1.96 |
| 75 x 200                    | 3.23  | 3.03 | 2.88 | 2.74 | 2.63 | 2.54 | 3.03                                     | 2.85 | 2.70 | 2.57 | 2.47 | 2.37 | 2.88                                     | 2.70 | 2.55 | 2.43 | 2.33 | 2.24 |
| 75 x 225                    | 3.63  | 3.41 | 3.23 | 3.08 | 2.96 | 2.85 | 3.41                                     | 3.20 | 3.03 | 2.89 | 2.77 | 2.67 | 3.23                                     | 3.03 | 2.87 | 2.74 | 2.62 | 2.52 |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A15 Common or jack rafters for roofs having a pitch more than 30° but not more than 45° with access only for purposes of maintenance or repair. Imposed loading 1.00kN/m<sup>2</sup> (see Diagram 2)**

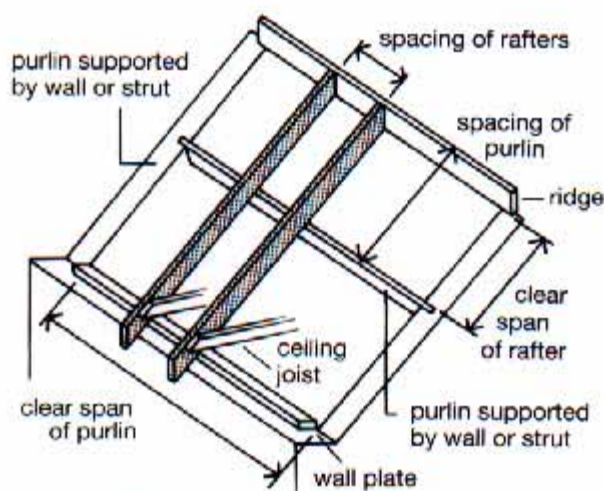
**Maximum clear span of rafter(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the rafter**

| Size of rafter<br>(mm x mm) | Not more than 0.50      |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|-----------------------------|-------------------------|------|------|--|------|------|--|------|------|
|                             | Spacing of rafters (mm) |      |      |  |      |      |  |      |      |
|                             | 400                     | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 100                    | 2.28                    | 2.23 | 2.03 | 2.10                                     | 2.05 | 1.91 | 1.96                                     | 1.91 | 1.76 |
| 38 x 125                    | 2.90                    | 2.79 | 2.54 | 2.75                                     | 2.64 | 2.40 | 2.62                                     | 2.52 | 2.26 |
| 38 x 150                    | 3.47                    | 3.34 | 3.04 | 3.29                                     | 3.16 | 2.87 | 3.13                                     | 3.01 | 2.69 |
| 47 x 100                    | 2.50                    | 2.40 | 2.18 | 2.36                                     | 2.27 | 2.06 | 2.25                                     | 2.17 | 1.97 |
| 47 x 125                    | 3.11                    | 2.99 | 2.72 | 2.94                                     | 2.83 | 2.58 | 2.81                                     | 2.70 | 2.45 |
| 47 x 150                    | 3.72                    | 3.58 | 3.26 | 3.52                                     | 3.39 | 3.08 | 3.36                                     | 3.23 | 2.94 |
| 50 x 100                    | 2.55                    | 2.45 | 2.23 | 2.41                                     | 2.32 | 2.11 | 2.30                                     | 2.21 | 2.01 |
| 50 x 125                    | 3.17                    | 3.05 | 2.78 | 3.00                                     | 2.89 | 2.63 | 2.87                                     | 2.76 | 2.51 |
| 50 x 150                    | 3.79                    | 3.65 | 3.33 | 3.59                                     | 3.46 | 3.15 | 3.43                                     | 3.30 | 3.00 |
| 38 x 89                     | 1.91                    | 1.87 | 1.77 | 1.77                                     | 1.73 | 1.62 | 1.67                                     | 1.62 | 1.50 |
| 38 x 140                    | 3.24                    | 3.12 | 2.84 | 3.07                                     | 2.95 | 2.68 | 2.93                                     | 2.82 | 2.52 |
| 38 x 100                    | 2.42                    | 2.33 | 2.12 | 2.29                                     | 2.20 | 2.00 | 2.18                                     | 2.10 | 1.90 |
| 38 x 125                    | 3.02                    | 2.90 | 2.64 | 2.86                                     | 2.75 | 2.50 | 2.72                                     | 2.62 | 2.38 |
| 38 x 150                    | 3.61                    | 3.47 | 3.16 | 3.42                                     | 3.29 | 2.99 | 3.26                                     | 3.14 | 2.85 |
| 47 x 100                    | 2.60                    | 2.50 | 2.27 | 2.46                                     | 2.36 | 2.15 | 2.34                                     | 2.25 | 2.05 |
| 47 x 125                    | 3.23                    | 3.11 | 2.83 | 3.06                                     | 2.95 | 2.68 | 2.92                                     | 2.81 | 2.55 |
| 47 x 150                    | 3.86                    | 3.72 | 3.39 | 3.66                                     | 3.52 | 3.21 | 3.49                                     | 3.36 | 3.06 |
| 50 x 100                    | 2.65                    | 2.55 | 2.32 | 2.51                                     | 2.41 | 2.19 | 2.39                                     | 2.30 | 2.09 |
| 50 x 125                    | 3.30                    | 3.17 | 2.89 | 3.12                                     | 3.01 | 2.73 | 2.98                                     | 2.87 | 2.61 |
| 50 x 150                    | 3.94                    | 3.79 | 3.46 | 3.73                                     | 3.60 | 3.27 | 3.57                                     | 3.43 | 3.12 |
| 38 x 89                     | 2.16                    | 2.08 | 1.89 | 2.04                                     | 1.96 | 1.78 | 1.95                                     | 1.87 | 1.70 |
| 38 x 140                    | 3.37                    | 3.25 | 2.95 | 3.19                                     | 3.07 | 2.79 | 3.05                                     | 2.93 | 2.66 |

**Notes to Tables A15 and A16**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.00kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The tables are applicable to purlins installed perpendicular to the roof slope, whereby any horizontal thrust sustained by the rafters is restrained by the ceiling joists, or by other means.
- 3 When the spans of rafters or purlins are unequal the section sizes should be determined for each span or by the longest span.
- 4 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 5 No notches or holes should be cut in purlins unless checked by a competent person.
- 6 The minimum bearing length at supports should be 35mm for rafters and 50mm for purlins.



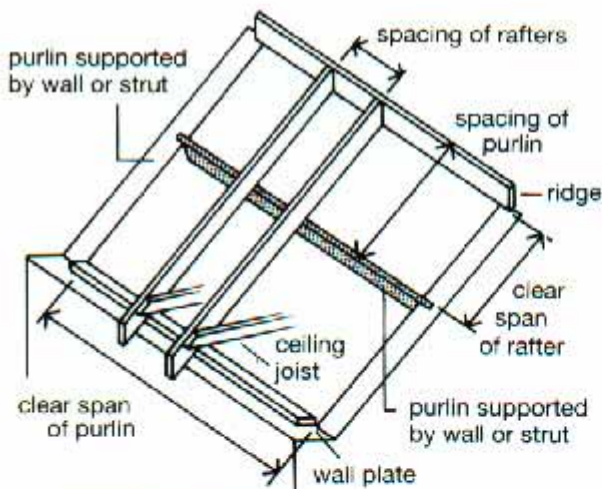
take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A16 Purlins supporting rafters to which Table A15 refers  
(Imposed load 1.00kN/m<sup>2</sup>).**

**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |
|-----------------------------|---|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|------|
|                             | Not more than 0.50  |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      | More than 0.75<br>but not more than 1.00 |      |      |      |      |      |
|                             | Spacing of purlins (mm)   |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |
|                             | 1500  | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 | 1500                                     | 1800 | 2100 | 2400 | 2700 | 3000 |
| 50 x 150                    | 1.91  |      |      |      |      |      | 1.80                                     |      |      |      |      |      |  |      |      |      |      |      |
| 50 x 175                    | 2.22  | 2.08 | 1.97 | 1.87 |      |      | 2.10                                     | 1.96 | 1.85 |      |      |      | 2.00                                     | 1.87 |      |      |      |      |
| 50 x 200                    | 2.54  | 2.38 | 2.25 | 2.14 | 2.03 | 1.92 | 2.40                                     | 2.24 | 2.12 | 1.99 | 1.87 |      | 2.28                                     | 2.13 | 1.99 | 1.85 |      |      |
| 50 x 225                    | 2.85  | 2.67 | 2.53 | 2.40 | 2.27 | 2.15 | 2.70                                     | 2.52 | 2.38 | 2.22 | 2.09 | 1.98 | 2.56                                     | 2.40 | 2.22 | 2.07 | 1.95 | 1.84 |
| 63 x 150                    | 2.07  | 1.94 | 1.84 |      |      |      | 1.96                                     | 1.83 |      |      |      |      | 1.86                                     |      |      |      |      |      |
| 63 x 175                    | 2.41  | 2.26 | 2.14 | 2.04 | 1.95 | 1.88 | 2.28                                     | 2.14 | 2.02 | 1.92 | 1.84 |      | 2.17                                     | 2.03 | 1.92 | 1.83 |      |      |
| 63 x 200                    | 2.76  | 2.58 | 2.44 | 2.33 | 2.23 | 2.14 | 2.61                                     | 2.44 | 2.31 | 2.20 | 2.10 | 2.00 | 2.48                                     | 2.32 | 2.19 | 2.09 | 1.97 | 1.86 |
| 63 x 225                    | 3.10  | 2.90 | 2.75 | 2.62 | 2.51 | 2.41 | 2.93                                     | 2.74 | 2.59 | 2.47 | 2.36 | 2.23 | 2.79                                     | 2.61 | 2.47 | 2.33 | 2.20 | 2.08 |
| 75 x 125                    | 1.84  |      |      |      |      |      | 2.08                                     | 1.95 | 1.85 |      |      |      | 1.98                                     | 1.86 |      |      |      |      |
| 75 x 150                    | 2.20  | 2.07 | 1.96 | 1.86 |      |      | 2.43                                     | 2.28 | 2.15 | 2.05 | 1.96 | 1.89 | 2.31                                     | 2.17 | 2.05 | 1.95 | 1.87 |      |
| 75 x 175                    | 2.57  | 2.41 | 2.28 | 2.17 | 2.08 | 2.00 | 2.77                                     | 2.60 | 2.46 | 2.34 | 2.24 | 2.16 | 2.64                                     | 2.47 | 2.34 | 2.23 | 2.13 | 2.04 |
| 75 x 200                    | 2.93  | 2.75 | 2.60 | 2.48 | 2.38 | 2.29 | 3.12                                     | 2.92 | 2.76 | 2.63 | 2.52 | 2.43 | 2.97                                     | 2.78 | 2.63 | 2.50 | 2.40 | 2.28 |
| 75 x 225                    | 3.29  | 3.09 | 2.92 | 2.79 | 2.67 | 2.57 |  |      |      |      |      |      |  |      |      |      |      |      |
| 50 x 150                    | 1.99  | 1.87 |      |      |      |      | 1.88                                     |      |      |      |      |      | 2.09                                     | 1.96 | 1.85 |      |      |      |
| 50 x 175                    | 2.32  | 2.18 | 2.06 | 1.96 | 1.88 | 1.80 | 2.20                                     | 2.06 | 1.94 | 1.85 |      |      | 2.39                                     | 2.23 | 2.11 | 2.00 | 1.91 |      |
| 50 x 200                    | 2.65  | 2.49 | 2.35 | 2.24 | 2.14 | 2.06 | 2.51                                     | 2.35 | 2.22 | 2.11 | 2.02 | 1.94 | 2.68                                     | 2.51 | 2.37 | 2.25 | 2.15 | 2.01 |
| 50 x 225                    | 2.98  | 2.79 | 2.64 | 2.52 | 2.41 | 2.31 | 2.82                                     | 2.64 | 2.49 | 2.37 | 2.27 | 2.18 |  |      |      |      |      |      |
| 63 x 125                    | 1.81  |      |      |      |      |      | 2.05                                     | 1.92 | 1.81 |      |      |      | 1.95                                     | 1.83 |      |      |      |      |
| 63 x 150                    | 2.16  | 2.03 | 1.92 | 1.83 |      |      | 2.38                                     | 2.24 | 2.11 | 2.01 | 1.93 | 1.85 | 2.27                                     | 2.13 | 2.01 | 1.91 | 1.83 |      |
| 63 x 175                    | 2.52  | 2.36 | 2.24 | 2.13 | 2.04 | 1.97 | 2.72                                     | 2.55 | 2.41 | 2.30 | 2.20 | 2.12 | 2.59                                     | 2.43 | 2.30 | 2.19 | 2.09 | 2.01 |
| 63 x 200                    | 2.88  | 2.70 | 2.56 | 2.44 | 2.33 | 2.24 | 3.06                                     | 2.87 | 2.71 | 2.59 | 2.48 | 2.38 | 2.92                                     | 2.73 | 2.58 | 2.46 | 2.35 | 2.26 |
| 63 x 225                    | 3.23  | 3.03 | 2.87 | 2.74 | 2.62 | 2.52 |  |      |      |      |      |      |  |      |      |      |      |      |
| 75 x 125                    | 1.92  |      |      |      |      |      | 1.82                                     |      |      |      |      |      | 2.07                                     | 1.94 | 1.84 |      |      |      |
| 75 x 150                    | 2.30  | 2.16 | 2.04 | 1.95 | 1.87 |      | 2.18                                     | 2.04 | 1.93 | 1.84 |      |      | 2.42                                     | 2.27 | 2.14 | 2.04 | 1.96 | 1.88 |
| 75 x 175                    | 2.68  | 2.51 | 2.38 | 2.27 | 2.18 | 2.10 | 2.54                                     | 2.38 | 2.25 | 2.15 | 2.06 | 1.98 | 2.76                                     | 2.59 | 2.45 | 2.33 | 2.23 | 2.15 |
| 75 x 200                    | 3.06  | 2.87 | 2.72 | 2.59 | 2.49 | 2.39 | 2.89                                     | 2.72 | 2.57 | 2.45 | 2.35 | 2.26 |  |      |      |      |      |      |



take the clear span for the purlin as the clear dimension between supporting struts and/or walls



**Table A17 Joists for flat roofs with access only for purposes of maintenance or repair. Imposed loading 0.75kN/m<sup>2</sup> (see Diagram 2)**

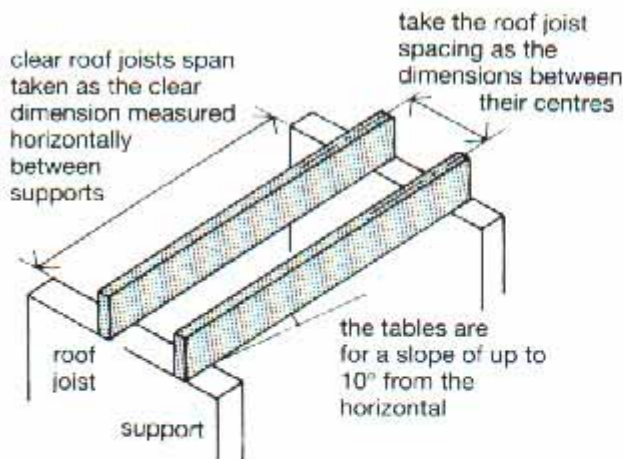
**Maximum clear span of joist(m) Timber of strength class SC3 (see Table 1)**

Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist

| Size of joist<br>(mm x mm) | Not more than 0.50     |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|----------------------------|------------------------|------|------|--|------|------|--|------|------|
|                            | Spacing of joists (mm) |      |      |  |      |      |  |      |      |
|                            | 400                    | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.74                   | 1.72 | 1.67 | 1.67                                     | 1.64 | 1.58 | 1.61                                     | 1.58 | 1.51 |
| 38 x 122                   | 2.37                   | 2.34 | 2.25 | 2.25                                     | 2.21 | 2.11 | 2.16                                     | 2.11 | 2.01 |
| 38 x 147                   | 3.02                   | 2.97 | 2.85 | 2.85                                     | 2.80 | 2.68 | 2.72                                     | 2.68 | 2.51 |
| 38 x 170                   | 3.63                   | 3.57 | 3.37 | 3.41                                     | 3.34 | 3.17 | 3.24                                     | 3.17 | 2.98 |
| 38 x 195                   | 4.30                   | 4.23 | 3.86 | 4.03                                     | 3.94 | 3.63 | 3.81                                     | 3.72 | 3.45 |
| 38 x 220                   | 4.94                   | 4.76 | 4.34 | 4.64                                     | 4.48 | 4.09 | 4.38                                     | 4.27 | 3.88 |
| 47 x 97                    | 1.92                   | 1.90 | 1.84 | 1.84                                     | 1.81 | 1.74 | 1.77                                     | 1.74 | 1.65 |
| 47 x 122                   | 2.60                   | 2.57 | 2.47 | 2.47                                     | 2.43 | 2.31 | 2.36                                     | 2.31 | 2.19 |
| 47 x 147                   | 3.30                   | 3.25 | 3.12 | 3.12                                     | 3.06 | 2.90 | 2.96                                     | 2.90 | 2.74 |
| 47 x 170                   | 3.96                   | 3.89 | 3.61 | 3.72                                     | 3.64 | 3.40 | 3.53                                     | 3.44 | 3.23 |
| 47 x 195                   | 4.68                   | 4.53 | 4.13 | 4.37                                     | 4.28 | 3.89 | 4.14                                     | 4.04 | 3.70 |
| 47 x 220                   | 5.28                   | 5.09 | 4.65 | 4.99                                     | 4.81 | 4.38 | 4.75                                     | 4.58 | 4.17 |
| 50 x 97                    | 1.97                   | 1.95 | 1.89 | 1.89                                     | 1.86 | 1.78 | 1.81                                     | 1.78 | 1.70 |
| 50 x 122                   | 2.67                   | 2.64 | 2.53 | 2.53                                     | 2.49 | 2.37 | 2.42                                     | 2.37 | 2.25 |
| 50 x 147                   | 3.39                   | 3.34 | 3.19 | 3.19                                     | 3.13 | 2.97 | 3.04                                     | 2.97 | 2.80 |
| 50 x 170                   | 4.06                   | 3.99 | 3.69 | 3.81                                     | 3.73 | 3.47 | 3.61                                     | 3.53 | 3.30 |
| 50 x 195                   | 4.79                   | 4.62 | 4.22 | 4.48                                     | 4.38 | 3.97 | 4.23                                     | 4.13 | 3.78 |
| 50 x 220                   | 5.38                   | 5.19 | 4.74 | 5.09                                     | 4.90 | 4.47 | 4.85                                     | 4.67 | 4.25 |
| 63 x 97                    | 2.19                   | 2.16 | 2.09 | 2.09                                     | 2.06 | 1.97 | 2.01                                     | 1.97 | 1.87 |
| 63 x 122                   | 2.95                   | 2.91 | 2.79 | 2.79                                     | 2.74 | 2.61 | 2.66                                     | 2.61 | 2.47 |
| 63 x 147                   | 3.72                   | 3.66 | 3.44 | 3.50                                     | 3.43 | 3.25 | 3.33                                     | 3.26 | 3.07 |
| 63 x 170                   | 4.44                   | 4.35 | 3.97 | 4.16                                     | 4.07 | 3.74 | 3.95                                     | 3.85 | 3.56 |
| 63 x 195                   | 5.14                   | 4.96 | 4.54 | 4.86                                     | 4.69 | 4.28 | 4.61                                     | 4.47 | 4.07 |
| 63 x 220                   | 5.77                   | 5.57 | 5.10 | 5.46                                     | 5.27 | 4.82 | 5.21                                     | 5.02 | 4.59 |
| 75 x 122                   | 3.17                   | 3.12 | 3.00 | 3.00                                     | 2.94 | 2.80 | 2.86                                     | 2.80 | 2.65 |
| 75 x 147                   | 3.98                   | 3.92 | 3.64 | 3.75                                     | 3.67 | 3.44 | 3.56                                     | 3.48 | 3.27 |
| 75 x 170                   | 4.74                   | 4.58 | 4.19 | 4.44                                     | 4.33 | 3.96 | 4.21                                     | 4.11 | 3.77 |
| 75 x 195                   | 5.42                   | 5.23 | 4.79 | 5.13                                     | 4.95 | 4.53 | 4.89                                     | 4.72 | 4.31 |
| 75 x 220                   | 6.07                   | 5.87 | 5.38 | 5.76                                     | 5.56 | 5.09 | 5.50                                     | 5.30 | 4.85 |
| 38 x 140                   | 2.84                   | 2.79 | 2.68 | 2.68                                     | 2.63 | 2.51 | 2.56                                     | 2.51 | 2.37 |
| 38 x 184                   | 4.01                   | 3.94 | 3.64 | 3.76                                     | 3.68 | 3.43 | 3.58                                     | 3.48 | 3.25 |

**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm.
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.



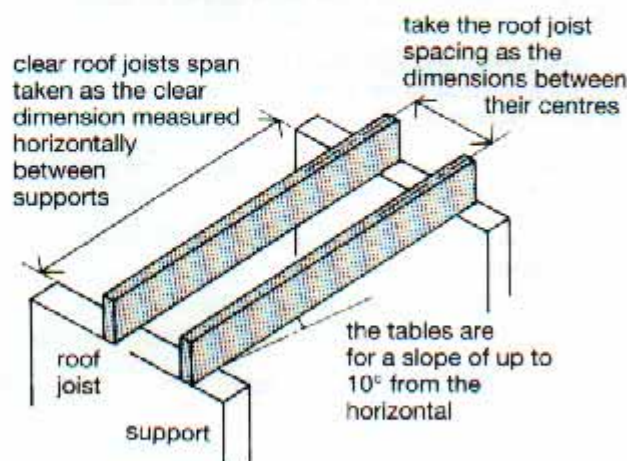


**Table A18 Joists for flat roofs with access only for purposes of maintenance or repair. Imposed loading 0.75kN/m<sup>2</sup> (see Diagram 2)**

**Maximum clear span of joist(m) Timber of strength class SC4 (see Table 1)**

Dead Load [ kN/m<sup>2</sup>] excluding the self weight of the joist

| Size of joist<br>(mm x mm) | Not more than 0.50     |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|----------------------------|------------------------|------|------|--|------|------|--|------|------|
|                            | Spacing of joists (mm) |      |      |  |      |      |  |      |      |
|                            | 400                    | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.84                   | 1.82 | 1.76 | 1.76                                     | 1.73 | 1.66 | 1.69                                     | 1.66 | 1.59 |
| 38 x 122                   | 2.50                   | 2.46 | 2.37 | 2.37                                     | 2.33 | 2.22 | 2.27                                     | 2.22 | 2.11 |
| 38 x 147                   | 3.18                   | 3.13 | 3.00 | 3.00                                     | 2.94 | 2.79 | 2.85                                     | 2.79 | 2.64 |
| 38 x 170                   | 3.81                   | 3.75 | 3.50 | 3.58                                     | 3.51 | 3.30 | 3.40                                     | 3.32 | 3.12 |
| 38 x 195                   | 4.51                   | 4.40 | 4.01 | 4.22                                     | 4.13 | 3.78 | 3.99                                     | 3.90 | 3.59 |
| 38 x 220                   | 5.13                   | 4.95 | 4.51 | 4.85                                     | 4.67 | 4.25 | 4.59                                     | 4.44 | 4.04 |
| 47 x 97                    | 2.03                   | 2.00 | 1.94 | 1.94                                     | 1.91 | 1.83 | 1.86                                     | 1.83 | 1.74 |
| 47 x 122                   | 2.74                   | 2.70 | 2.60 | 2.60                                     | 2.55 | 2.43 | 2.48                                     | 2.43 | 2.30 |
| 47 x 147                   | 3.47                   | 3.42 | 3.26 | 3.27                                     | 3.21 | 3.04 | 3.11                                     | 3.04 | 2.87 |
| 47 x 170                   | 4.15                   | 4.08 | 3.76 | 3.89                                     | 3.81 | 3.54 | 3.69                                     | 3.61 | 3.36 |
| 47 x 195                   | 4.88                   | 4.70 | 4.29 | 4.58                                     | 4.44 | 4.05 | 4.33                                     | 4.22 | 3.85 |
| 47 x 220                   | 5.48                   | 5.29 | 4.83 | 5.18                                     | 5.00 | 4.56 | 4.94                                     | 4.78 | 4.33 |
| 50 x 97                    | 2.08                   | 2.06 | 1.99 | 1.99                                     | 1.96 | 1.88 | 1.91                                     | 1.88 | 1.79 |
| 50 x 122                   | 2.81                   | 2.77 | 2.66 | 2.66                                     | 2.62 | 2.49 | 2.54                                     | 2.49 | 2.36 |
| 50 x 147                   | 3.56                   | 3.50 | 3.32 | 3.35                                     | 3.29 | 3.12 | 3.19                                     | 3.12 | 2.94 |
| 50 x 170                   | 4.26                   | 4.18 | 3.83 | 3.99                                     | 3.91 | 3.61 | 3.78                                     | 3.69 | 3.43 |
| 50 x 195                   | 4.97                   | 4.80 | 4.38 | 4.68                                     | 4.53 | 4.13 | 4.43                                     | 4.31 | 3.93 |
| 50 x 220                   | 5.59                   | 5.39 | 4.93 | 5.28                                     | 5.09 | 4.65 | 5.04                                     | 4.85 | 4.42 |
| 63 x 97                    | 2.31                   | 2.28 | 2.20 | 2.20                                     | 2.16 | 2.07 | 2.11                                     | 2.07 | 1.97 |
| 63 x 122                   | 3.10                   | 3.05 | 2.93 | 2.93                                     | 2.88 | 2.74 | 2.80                                     | 2.74 | 2.59 |
| 63 x 147                   | 3.90                   | 3.84 | 3.58 | 3.67                                     | 3.60 | 3.38 | 3.49                                     | 3.41 | 3.21 |
| 63 x 170                   | 4.65                   | 4.51 | 4.12 | 4.35                                     | 4.26 | 3.89 | 4.13                                     | 4.03 | 3.70 |
| 63 x 195                   | 5.33                   | 5.15 | 4.71 | 5.05                                     | 4.87 | 4.45 | 4.82                                     | 4.64 | 4.24 |
| 63 x 220                   | 5.98                   | 5.78 | 5.30 | 5.67                                     | 5.47 | 5.00 | 5.41                                     | 5.22 | 4.76 |
| 75 x 122                   | 3.33                   | 3.27 | 3.14 | 3.14                                     | 3.08 | 2.93 | 2.99                                     | 2.93 | 2.77 |
| 75 x 147                   | 4.17                   | 4.10 | 3.78 | 3.92                                     | 3.84 | 3.57 | 3.73                                     | 3.64 | 3.40 |
| 75 x 170                   | 4.92                   | 4.75 | 4.35 | 4.64                                     | 4.50 | 4.11 | 4.40                                     | 4.29 | 3.92 |
| 75 x 195                   | 5.61                   | 5.42 | 4.97 | 5.32                                     | 5.14 | 4.70 | 5.08                                     | 4.90 | 4.48 |
| 75 x 220                   | 6.29                   | 6.08 | 5.59 | 5.97                                     | 5.77 | 5.28 | 5.70                                     | 5.50 | 5.04 |
| 38 x 140                   | 2.99                   | 2.94 | 2.82 | 2.82                                     | 2.75 | 2.63 | 2.69                                     | 2.63 | 2.49 |
| 38 x 184                   | 4.21                   | 4.13 | 3.79 | 3.94                                     | 3.85 | 3.57 | 3.73                                     | 3.64 | 3.39 |



**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm.
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.



**Table A19 Joists for flat roofs with access only for purposes of maintenance or repair. Imposed loading 1.0kN/m<sup>2</sup> (see Diagram 2)**

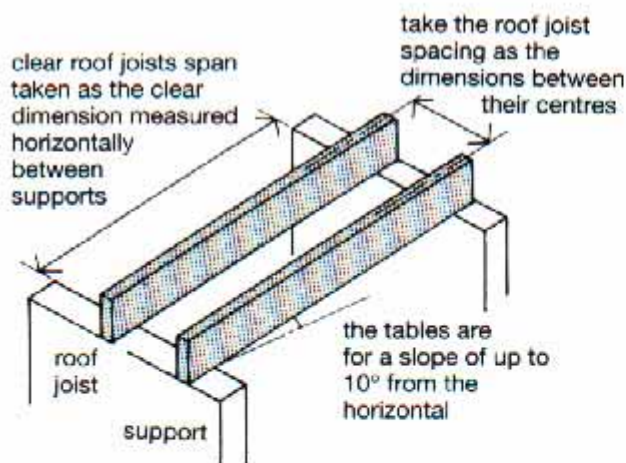
**Maximum clear span of joist(m) Timber of strength class SC3 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist**

| Size of joist<br>(mm x mm) | Not more than 0.50     |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|----------------------------|------------------------|------|------|--|------|------|--|------|------|
|                            | Spacing of joists (mm) |      |      |  |      |      |  |      |      |
|                            | 400                    | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.74                   | 1.72 | 1.67 | 1.67                                     | 1.64 | 1.58 | 1.61                                     | 1.58 | 1.51 |
| 38 x 122                   | 2.37                   | 2.34 | 2.25 | 2.25                                     | 2.21 | 2.11 | 2.16                                     | 2.11 | 2.01 |
| 38 x 147                   | 3.02                   | 2.97 | 2.75 | 2.85                                     | 2.80 | 2.61 | 2.72                                     | 2.66 | 2.49 |
| 38 x 170                   | 3.62                   | 3.49 | 3.17 | 3.41                                     | 3.31 | 3.01 | 3.24                                     | 3.17 | 2.88 |
| 38 x 195                   | 4.15                   | 3.99 | 3.63 | 3.94                                     | 3.79 | 3.45 | 3.77                                     | 3.63 | 3.29 |
| 38 x 220                   | 4.67                   | 4.49 | 4.09 | 4.44                                     | 4.27 | 3.88 | 4.25                                     | 4.09 | 3.71 |
| 47 x 97                    | 1.92                   | 1.90 | 1.84 | 1.84                                     | 1.81 | 1.74 | 1.77                                     | 1.74 | 1.65 |
| 47 x 122                   | 2.60                   | 2.57 | 2.45 | 2.47                                     | 2.43 | 2.31 | 2.36                                     | 2.31 | 2.19 |
| 47 x 147                   | 3.30                   | 3.24 | 2.95 | 3.12                                     | 3.06 | 2.80 | 2.96                                     | 2.90 | 2.68 |
| 47 x 170                   | 3.88                   | 3.74 | 3.40 | 3.69                                     | 3.56 | 3.23 | 3.53                                     | 3.40 | 3.09 |
| 47 x 195                   | 4.44                   | 4.27 | 3.89 | 4.23                                     | 4.07 | 3.70 | 4.05                                     | 3.89 | 3.54 |
| 47 x 220                   | 4.99                   | 4.81 | 4.38 | 4.75                                     | 4.58 | 4.17 | 4.55                                     | 4.38 | 3.99 |
| 50 x 97                    | 1.97                   | 1.95 | 1.89 | 1.89                                     | 1.86 | 1.78 | 1.81                                     | 1.78 | 1.70 |
| 50 x 122                   | 2.67                   | 2.64 | 2.50 | 2.53                                     | 2.49 | 2.37 | 2.42                                     | 2.37 | 2.25 |
| 50 x 147                   | 3.39                   | 3.31 | 3.01 | 3.19                                     | 3.13 | 2.86 | 3.04                                     | 2.97 | 2.73 |
| 50 x 170                   | 3.96                   | 3.81 | 3.47 | 3.77                                     | 3.63 | 3.30 | 3.61                                     | 3.47 | 3.16 |
| 50 x 195                   | 4.53                   | 4.36 | 3.97 | 4.31                                     | 4.15 | 3.78 | 4.13                                     | 3.97 | 3.61 |
| 50 x 220                   | 5.09                   | 4.90 | 4.47 | 4.85                                     | 4.67 | 4.25 | 4.65                                     | 4.47 | 4.07 |
| 63 x 97                    | 2.19                   | 2.16 | 2.09 | 2.09                                     | 2.06 | 1.97 | 2.01                                     | 1.97 | 1.87 |
| 63 x 122                   | 2.95                   | 2.91 | 2.70 | 2.79                                     | 2.74 | 2.57 | 2.66                                     | 2.61 | 2.46 |
| 63 x 147                   | 3.70                   | 3.56 | 3.25 | 3.50                                     | 3.39 | 3.09 | 3.33                                     | 3.25 | 2.95 |
| 63 x 170                   | 4.26                   | 4.10 | 3.74 | 4.06                                     | 3.91 | 3.56 | 3.89                                     | 3.74 | 3.41 |
| 63 x 195                   | 4.86                   | 4.69 | 4.28 | 4.64                                     | 4.47 | 4.07 | 4.45                                     | 4.28 | 3.90 |
| 63 x 220                   | 5.46                   | 5.27 | 4.82 | 5.21                                     | 5.02 | 4.59 | 5.00                                     | 4.82 | 4.39 |
| 75 x 122                   | 3.17                   | 3.12 | 2.86 | 3.00                                     | 2.94 | 2.72 | 2.86                                     | 2.80 | 2.60 |
| 75 x 147                   | 3.90                   | 3.76 | 3.44 | 3.72                                     | 3.59 | 3.27 | 3.56                                     | 3.44 | 3.13 |
| 75 x 170                   | 4.49                   | 4.33 | 3.98 | 4.29                                     | 4.13 | 3.77 | 4.11                                     | 3.98 | 3.61 |
| 75 x 195                   | 5.13                   | 4.95 | 4.53 | 4.89                                     | 4.72 | 4.31 | 4.70                                     | 4.53 | 4.13 |
| 75 x 220                   | 5.76                   | 5.56 | 5.09 | 5.50                                     | 5.30 | 4.85 | 5.28                                     | 5.09 | 4.65 |
| 38 x 140                   | 2.84                   | 2.79 | 2.62 | 2.68                                     | 2.63 | 2.48 | 2.56                                     | 2.51 | 2.37 |
| 38 x 184                   | 3.92                   | 3.77 | 3.43 | 3.73                                     | 3.58 | 3.25 | 3.56                                     | 3.43 | 3.11 |

**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.0kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm.
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.





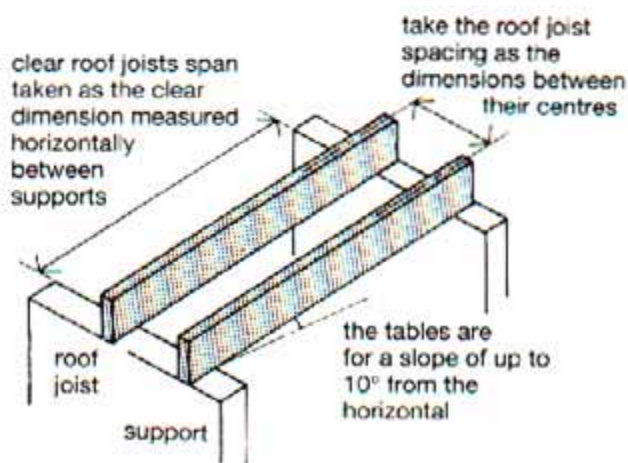
**Table A20 Joists for flat roofs with access only for purposes of maintenance or repair. Imposed loading 1.0kN/m<sup>2</sup> (see Diagram 2)**

**Maximum clear span of joist(m) Timber of strength class SC4 (see Table 1)**

| Size of joist<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the joist |      |      |  |      |      |  |      |      |
|----------------------------|--|------|------|--|------|------|--|------|------|
|                            | Not more than 0.50   |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|                            | Spacing of joists (mm)   |      |      |  |      |      |  |      |      |
|                            | 400  | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 97                    | 1.84   | 1.82 | 1.76 | 1.76                                     | 1.73 | 1.66 | 1.69                                     | 1.66 | 1.59 |
| 38 x 122                   | 2.50   | 2.46 | 2.37 | 2.37                                     | 2.33 | 2.22 | 2.27                                     | 2.22 | 2.11 |
| 38 x 147                   | 3.18   | 3.13 | 2.86 | 3.00                                     | 2.94 | 2.71 | 2.85                                     | 2.79 | 2.59 |
| 38 x 170                   | 3.77   | 3.63 | 3.30 | 3.58                                     | 3.45 | 3.13 | 3.40                                     | 3.30 | 2.99 |
| 38 x 195                   | 4.31   | 4.15 | 3.78 | 4.10                                     | 3.95 | 3.59 | 3.93                                     | 3.78 | 3.43 |
| 38 x 220                   | 4.85   | 4.67 | 4.25 | 4.61                                     | 4.44 | 4.04 | 4.42                                     | 4.25 | 3.86 |
| 47 x 97                    | 2.03   | 2.00 | 1.94 | 1.94                                     | 1.91 | 1.83 | 1.86                                     | 1.83 | 1.74 |
| 47 x 122                   | 2.74   | 2.70 | 2.55 | 2.60                                     | 2.55 | 2.42 | 2.48                                     | 2.43 | 2.30 |
| 47 x 147                   | 3.47   | 3.37 | 3.07 | 3.27                                     | 3.21 | 2.91 | 3.11                                     | 3.04 | 2.79 |
| 47 x 170                   | 4.03   | 3.89 | 3.54 | 3.84                                     | 3.70 | 3.36 | 3.88                                     | 3.54 | 3.22 |
| 47 x 195                   | 4.61   | 4.44 | 4.05 | 4.39                                     | 4.23 | 3.85 | 4.21                                     | 4.05 | 3.68 |
| 47 x 220                   | 5.18   | 5.00 | 4.56 | 4.94                                     | 4.76 | 4.33 | 4.73                                     | 4.56 | 4.15 |
| 50 x 97                    | 2.08   | 2.06 | 1.99 | 1.99                                     | 1.96 | 1.88 | 1.91                                     | 1.88 | 1.79 |
| 50 x 122                   | 2.81   | 2.77 | 2.60 | 2.66                                     | 2.62 | 2.47 | 2.54                                     | 2.49 | 2.36 |
| 50 x 147                   | 3.56   | 3.44 | 3.13 | 3.35                                     | 3.27 | 2.97 | 3.19                                     | 3.12 | 2.85 |
| 50 x 170                   | 4.11   | 3.96 | 3.61 | 3.92                                     | 3.77 | 3.43 | 3.75                                     | 3.61 | 3.28 |
| 50 x 195                   | 4.70   | 4.53 | 4.13 | 4.48                                     | 4.31 | 3.93 | 4.29                                     | 4.13 | 3.76 |
| 50 x 220                   | 5.28   | 5.09 | 4.65 | 5.04                                     | 4.85 | 4.42 | 4.83                                     | 4.65 | 4.23 |
| 63 x 97                    | 2.31   | 2.28 | 2.20 | 2.20                                     | 2.16 | 2.07 | 2.11                                     | 2.07 | 1.97 |
| 63 x 122                   | 3.10   | 3.05 | 2.81 | 2.93                                     | 2.88 | 2.67 | 2.80                                     | 2.74 | 2.56 |
| 63 x 147                   | 3.84   | 3.70 | 3.38 | 3.66                                     | 3.52 | 3.21 | 3.49                                     | 3.38 | 3.07 |
| 63 x 170                   | 4.42   | 4.26 | 3.89 | 4.21                                     | 4.06 | 3.70 | 4.04                                     | 3.89 | 3.54 |
| 63 x 195                   | 5.05   | 4.87 | 4.45 | 4.81                                     | 4.64 | 4.24 | 4.62                                     | 4.45 | 4.06 |
| 63 x 220                   | 5.67   | 5.47 | 5.00 | 5.41                                     | 5.22 | 4.76 | 5.19                                     | 5.00 | 4.56 |
| 75 x 122                   | 3.33   | 3.26 | 2.97 | 3.14                                     | 3.08 | 2.83 | 2.99                                     | 2.93 | 2.71 |
| 75 x 147                   | 4.05   | 3.91 | 3.57 | 3.86                                     | 3.72 | 3.40 | 3.71                                     | 3.57 | 3.25 |
| 75 x 170                   | 4.66   | 4.50 | 4.11 | 4.45                                     | 4.29 | 3.92 | 4.27                                     | 4.11 | 3.75 |
| 75 x 195                   | 5.32   | 5.14 | 4.70 | 5.08                                     | 4.90 | 4.48 | 4.88                                     | 4.70 | 4.29 |
| 75 x 220                   | 5.97   | 5.77 | 5.28 | 5.70                                     | 5.50 | 5.04 | 5.48                                     | 5.28 | 4.83 |
| 38 x 140                   | 2.99   | 2.94 | 2.72 | 2.82                                     | 2.77 | 2.59 | 2.69                                     | 2.63 | 2.47 |
| 38 x 184                   | 4.07   | 3.92 | 3.57 | 3.87                                     | 3.73 | 3.39 | 3.71                                     | 3.57 | 3.24 |

#### Notes

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.0kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm.
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.





**Table A21 Joists for flat roofs with access not limited to the purposes of maintenance or repair. Imposed loading 1.50kN/m<sup>2</sup>**

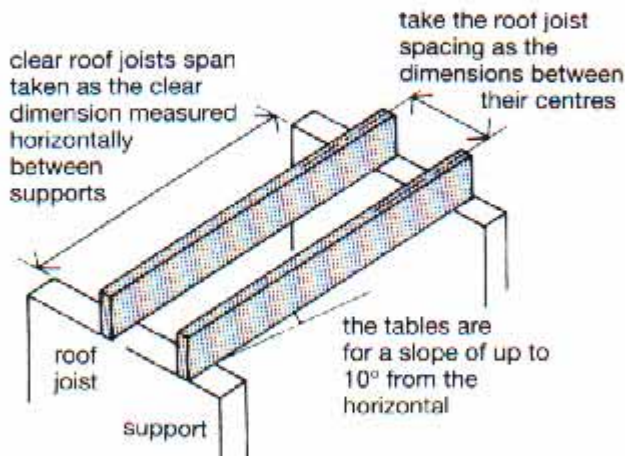
**Maximum clear span of joist(m) Timber of strength class SC3 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist**

| Size of joist<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the joist |      |      |                                       |      |      |                                       |      |      |
|----------------------------|--|------|------|---------------------------------------|------|------|---------------------------------------|------|------|
|                            | Not more than 0.50   |      |      | More than 0.50 but not more than 0.75 |      |      | More than 0.75 but not more than 1.00 |      |      |
|                            | Spacing of joists (mm)   |      |      |                                       |      |      |                                       |      |      |
|                            | 400  | 450  | 600  | 400                                   | 450  | 600  | 400                                   | 450  | 600  |
| 38 x 122                   | 1.80   | 1.79 | 1.74 | 1.74                                  | 1.71 | 1.65 | 1.68                                  | 1.65 | 1.57 |
| 38 x 147                   | 2.35   | 2.33 | 2.27 | 2.27                                  | 2.25 | 2.18 | 2.21                                  | 2.18 | 2.09 |
| 38 x 170                   | 2.88   | 2.85 | 2.77 | 2.77                                  | 2.74 | 2.64 | 2.68                                  | 2.64 | 2.53 |
| 38 x 195                   | 3.47   | 3.43 | 3.29 | 3.33                                  | 3.28 | 3.16 | 3.21                                  | 3.16 | 3.02 |
| 38 x 220                   | 4.08   | 4.03 | 3.71 | 3.90                                  | 3.84 | 3.56 | 3.75                                  | 3.68 | 3.43 |
| 47 x 122                   | 2.00   | 1.99 | 1.94 | 1.94                                  | 1.93 | 1.87 | 1.89                                  | 1.87 | 1.81 |
| 47 x 147                   | 2.60   | 2.58 | 2.51 | 2.51                                  | 2.48 | 2.40 | 2.44                                  | 2.40 | 2.31 |
| 47 x 170                   | 3.18   | 3.14 | 3.06 | 3.06                                  | 3.02 | 2.91 | 2.95                                  | 2.91 | 2.78 |
| 47 x 195                   | 3.82   | 3.78 | 3.54 | 3.56                                  | 3.61 | 3.40 | 3.52                                  | 3.46 | 3.28 |
| 47 x 220                   | 4.48   | 4.38 | 3.99 | 4.27                                  | 4.20 | 3.83 | 4.10                                  | 4.03 | 3.70 |
| 50 x 122                   | 2.06   | 2.05 | 2.00 | 2.00                                  | 1.98 | 1.93 | 1.95                                  | 1.93 | 1.86 |
| 50 x 147                   | 2.68   | 2.65 | 2.59 | 2.59                                  | 2.56 | 2.47 | 2.51                                  | 2.47 | 2.38 |
| 50 x 170                   | 3.27   | 3.23 | 3.14 | 3.14                                  | 3.10 | 2.99 | 3.04                                  | 2.99 | 2.86 |
| 50 x 195                   | 3.93   | 3.88 | 3.61 | 3.76                                  | 3.70 | 3.47 | 3.62                                  | 3.56 | 3.35 |
| 50 x 220                   | 4.60   | 4.47 | 4.07 | 4.38                                  | 4.30 | 3.91 | 4.21                                  | 4.13 | 3.78 |
| 63 x 97                    | 1.67   | 1.66 | 1.63 | 1.63                                  | 1.61 | 1.57 | 1.59                                  | 1.57 | 1.53 |
| 63 x 122                   | 2.31   | 2.29 | 2.24 | 2.24                                  | 2.21 | 2.15 | 2.17                                  | 2.15 | 2.07 |
| 63 x 147                   | 2.98   | 2.95 | 2.87 | 2.87                                  | 2.84 | 2.74 | 2.78                                  | 2.74 | 2.63 |
| 63 x 170                   | 3.62   | 3.59 | 3.41 | 3.48                                  | 3.43 | 3.28 | 3.36                                  | 3.30 | 3.16 |
| 63 x 195                   | 4.34   | 4.29 | 3.90 | 4.15                                  | 4.08 | 3.75 | 3.99                                  | 3.92 | 3.62 |
| 63 x 220                   | 5.00   | 4.82 | 4.39 | 4.82                                  | 4.64 | 4.22 | 4.62                                  | 4.48 | 4.08 |
| 75 x 122                   | 2.50   | 2.48 | 2.42 | 2.42                                  | 2.40 | 2.32 | 2.35                                  | 2.32 | 2.24 |
| 75 x 147                   | 3.23   | 3.19 | 3.11 | 3.11                                  | 3.07 | 2.96 | 3.00                                  | 2.96 | 2.84 |
| 75 x 170                   | 3.91   | 3.87 | 3.61 | 3.75                                  | 3.69 | 3.47 | 3.61                                  | 3.55 | 3.35 |
| 75 x 195                   | 4.66   | 4.53 | 4.13 | 4.45                                  | 4.36 | 3.97 | 4.28                                  | 4.20 | 3.84 |
| 75 x 220                   | 5.28   | 5.09 | 4.65 | 5.09                                  | 4.90 | 4.47 | 4.92                                  | 4.74 | 4.32 |
| 38 x 140                   | 2.19   | 2.17 | 2.12 | 2.12                                  | 2.10 | 2.04 | 2.07                                  | 2.04 | 1.94 |
| 38 x 184                   | 3.21   | 3.17 | 3.08 | 3.08                                  | 3.04 | 2.93 | 2.98                                  | 2.93 | 2.80 |

**Notes**

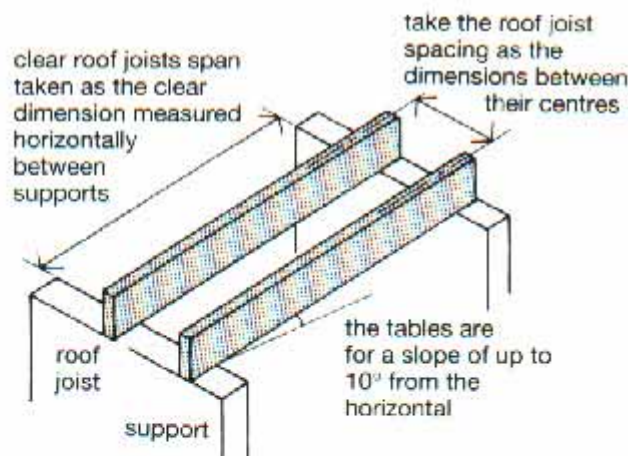
- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.50kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either regularised from BS 4471 basic sawn sizes in accordance with the requirements and tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm.
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.





**Table A22 Joists for flat roofs with access not limited to purposes of maintenance or repair. Imposed loading 1.50kN/m<sup>2</sup>****Maximum clear span of joist(m) Timber of strength class SC4 (see Table 1)****Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the joist**

| Size of joist<br>(mm x mm) | Not more than 0.50            |      |      | More than 0.50 but<br>not more than 0.75 |      |      | More than 0.75 but<br>not more than 1.00 |      |      |
|----------------------------|-------------------------------|------|------|--|------|------|--|------|------|
|                            | <b>Spacing of joists (mm)</b> |      |      |  |      |      |  |      |      |
|                            | 400                           | 450  | 600  | 400                                      | 450  | 600  | 400                                      | 450  | 600  |
| 38 x 122                   | 1.91                          | 1.90 | 1.86 | 1.86                                     | 1.84 | 1.79 | 1.81                                     | 1.79 | 1.73 |
| 38 x 147                   | 2.49                          | 2.46 | 2.40 | 2.40                                     | 2.38 | 2.30 | 2.33                                     | 2.30 | 2.21 |
| 38 x 170                   | 3.04                          | 3.01 | 2.93 | 2.93                                     | 2.89 | 2.79 | 2.83                                     | 2.79 | 2.67 |
| 38 x 195                   | 3.66                          | 3.62 | 3.43 | 3.51                                     | 3.46 | 3.29 | 3.38                                     | 3.33 | 3.18 |
| 38 x 220                   | 4.30                          | 4.25 | 3.86 | 4.10                                     | 4.04 | 3.71 | 3.94                                     | 3.87 | 3.58 |
| 47 x 122                   | 2.12                          | 2.10 | 2.06 | 2.06                                     | 2.04 | 1.98 | 2.00                                     | 1.98 | 1.91 |
| 47 x 147                   | 2.75                          | 2.73 | 2.66 | 2.66                                     | 2.62 | 2.54 | 2.57                                     | 2.54 | 2.44 |
| 47 x 170                   | 3.35                          | 3.32 | 3.22 | 3.22                                     | 3.18 | 3.06 | 3.11                                     | 3.06 | 2.93 |
| 47 x 195                   | 4.03                          | 3.98 | 3.68 | 3.85                                     | 3.80 | 3.54 | 3.71                                     | 3.64 | 3.42 |
| 47 x 220                   | 4.71                          | 4.56 | 4.15 | 4.49                                     | 4.39 | 3.99 | 4.31                                     | 4.23 | 3.85 |
| 50 x 122                   | 2.19                          | 2.17 | 2.12 | 2.12                                     | 2.10 | 2.04 | 2.06                                     | 2.04 | 1.97 |
| 50 x 147                   | 2.83                          | 2.81 | 2.73 | 2.73                                     | 2.70 | 2.61 | 2.65                                     | 2.61 | 2.51 |
| 50 x 170                   | 3.45                          | 3.41 | 3.28 | 3.31                                     | 3.27 | 3.15 | 3.20                                     | 3.15 | 3.01 |
| 50 x 195                   | 4.14                          | 4.09 | 3.76 | 3.96                                     | 3.90 | 3.61 | 3.81                                     | 3.74 | 3.49 |
| 50 x 220                   | 4.83                          | 4.65 | 4.23 | 4.61                                     | 4.47 | 4.07 | 4.42                                     | 4.32 | 3.93 |
| 63 x 97                    | 1.77                          | 1.75 | 1.72 | 1.72                                     | 1.71 | 1.66 | 1.68                                     | 1.66 | 1.61 |
| 63 x 122                   | 2.44                          | 2.42 | 2.36 | 2.36                                     | 2.34 | 2.27 | 2.30                                     | 2.27 | 2.18 |
| 63 x 147                   | 3.15                          | 3.12 | 3.03 | 3.03                                     | 2.99 | 2.89 | 2.93                                     | 2.89 | 2.77 |
| 63 x 170                   | 3.82                          | 3.78 | 3.54 | 3.66                                     | 3.61 | 3.41 | 3.53                                     | 3.47 | 3.29 |
| 63 x 195                   | 4.56                          | 4.45 | 4.06 | 4.36                                     | 4.29 | 3.90 | 4.19                                     | 4.11 | 3.77 |
| 63 x 220                   | 5.19                          | 5.00 | 4.56 | 5.00                                     | 4.82 | 4.39 | 4.84                                     | 4.66 | 4.24 |
| 75 x 122                   | 2.64                          | 2.62 | 2.56 | 2.56                                     | 2.53 | 2.45 | 2.48                                     | 2.45 | 2.36 |
| 75 x 147                   | 3.40                          | 3.36 | 3.25 | 3.27                                     | 3.23 | 3.11 | 3.16                                     | 3.11 | 2.98 |
| 75 x 170                   | 4.11                          | 4.07 | 3.75 | 3.94                                     | 3.88 | 3.61 | 3.79                                     | 3.73 | 3.49 |
| 75 x 195                   | 4.79                          | 4.70 | 4.29 | 4.67                                     | 4.53 | 4.13 | 4.49                                     | 4.38 | 3.99 |
| 75 x 220                   | 5.48                          | 5.28 | 4.83 | 5.28                                     | 5.08 | 4.65 | 5.11                                     | 4.93 | 4.49 |
| 38 x 140                   | 2.32                          | 2.30 | 2.25 | 2.25                                     | 2.22 | 2.16 | 2.19                                     | 2.16 | 2.08 |
| 38 x 184                   | 3.39                          | 3.35 | 3.24 | 3.25                                     | 3.21 | 3.09 | 3.14                                     | 3.09 | 2.95 |

**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.50kN/m<sup>2</sup>, or a concentrated load of 0.9kN.
- 2 The section sizes are either regularised from BS 4471 basic sawn sizes in accordance with the tolerances and requirements of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 35mm
- 4 Notches and drilling of roof joists should not exceed the limit given in paragraph 1B6.



**Table A23 Purlins supporting sheeting or decking for roofs having a pitch more than 10° but not more than 35°. Imposed loading 0.75kN/m<sup>2</sup>**

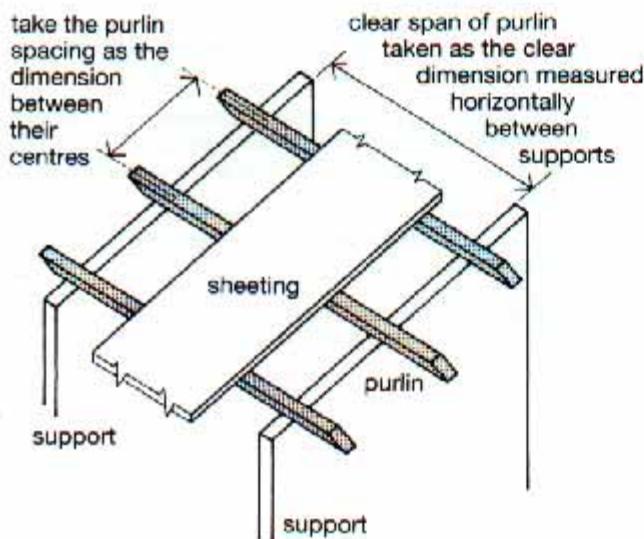
**Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

**Dead Load [ kN/m<sup>2</sup> ] excluding the self weight of the purlin**

| Size of purlin<br>(mm x mm) | Not more than 0.25      |      |      |      |      |      | More than 0.25<br>but not more than 0.50 |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      |
|-----------------------------|-------------------------|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|------|
|                             | Spacing of purlins (mm) |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |
|                             | 900                     | 1200 | 1500 | 1800 | 2100 | 2400 | 900                                      | 1200 | 1500 | 1800 | 2100 | 2400 | 900                                      | 1200 | 1500 | 1800 | 2100 | 2400 |
| 50 x 100                    | 1.68                    | 1.63 | 1.51 | 1.42 | 1.34 | 1.28 | 1.55                                     | 1.48 | 1.40 | 1.31 | 1.24 | 1.18 | 1.45                                     | 1.37 | 1.31 | 1.22 | 1.16 | 1.10 |
| 50 x 125                    | 2.24                    | 2.03 | 1.88 | 1.77 | 1.67 | 1.60 | 2.06                                     | 1.88 | 1.74 | 1.63 | 1.54 | 1.47 | 1.91                                     | 1.77 | 1.63 | 1.53 | 1.44 | 1.37 |
| 50 X 150                    | 2.68                    | 2.44 | 2.26 | 2.12 | 2.01 | 1.91 | 2.49                                     | 2.26 | 2.09 | 1.96 | 1.85 | 1.76 | 2.34                                     | 2.12 | 1.96 | 1.83 | 1.73 | 1.65 |
| 50 x 175                    | 3.12                    | 2.84 | 2.63 | 2.47 | 2.34 | 2.23 | 2.90                                     | 2.63 | 2.43 | 2.28 | 2.16 | 2.06 | 2.72                                     | 2.47 | 2.28 | 2.13 | 2.02 | 1.92 |
| 50 x 200                    | 3.56                    | 3.24 | 3.00 | 2.82 | 2.67 | 2.55 | 3.31                                     | 3.00 | 2.78 | 2.60 | 2.46 | 2.35 | 3.11                                     | 2.81 | 2.60 | 2.44 | 2.30 | 2.19 |
| 50 x 225                    | 4.00                    | 3.63 | 3.37 | 3.17 | 3.00 | 2.86 | 3.71                                     | 3.37 | 3.12 | 2.93 | 2.77 | 2.64 | 3.49                                     | 3.16 | 2.92 | 2.74 | 2.59 | 2.47 |
| 63 x 100                    | 1.87                    | 1.77 | 1.64 | 1.54 | 1.46 | 1.39 | 1.72                                     | 1.64 | 1.51 | 1.42 | 1.34 | 1.28 | 1.60                                     | 1.52 | 1.42 | 1.33 | 1.26 | 1.20 |
| 63 x 125                    | 2.42                    | 2.20 | 2.04 | 1.92 | 1.82 | 1.73 | 2.25                                     | 2.04 | 1.89 | 1.77 | 1.68 | 1.60 | 2.10                                     | 1.91 | 1.77 | 1.66 | 1.57 | 1.50 |
| 63 x 150                    | 2.90                    | 2.63 | 2.44 | 2.30 | 2.18 | 2.08 | 2.69                                     | 2.44 | 2.26 | 2.12 | 2.01 | 1.92 | 2.53                                     | 2.29 | 2.12 | 2.00 | 1.88 | 1.79 |
| 63 X 175                    | 3.37                    | 3.07 | 2.85 | 2.67 | 2.54 | 2.42 | 3.13                                     | 2.84 | 2.63 | 2.47 | 2.34 | 2.23 | 2.94                                     | 2.67 | 2.47 | 2.32 | 2.19 | 2.09 |
| 63 X 200                    | 3.84                    | 3.50 | 3.25 | 3.05 | 2.89 | 2.76 | 3.57                                     | 3.24 | 3.01 | 2.82 | 2.67 | 2.55 | 3.36                                     | 3.05 | 2.82 | 2.65 | 2.51 | 2.39 |
| 63 x 225                    | 4.31                    | 3.92 | 3.64 | 3.43 | 3.25 | 3.10 | 4.01                                     | 3.64 | 3.38 | 3.17 | 3.01 | 2.87 | 3.77                                     | 3.42 | 3.17 | 2.97 | 2.82 | 2.68 |
| 50 x 100                    | 1.79                    | 1.71 | 1.58 | 1.48 | 1.40 | 1.34 | 1.64                                     | 1.57 | 1.46 | 1.37 | 1.30 | 1.23 | 1.53                                     | 1.45 | 1.37 | 1.28 | 1.21 | 1.15 |
| 50 x 125                    | 2.34                    | 2.13 | 1.97 | 1.85 | 1.75 | 1.67 | 2.17                                     | 1.97 | 1.82 | 1.71 | 1.62 | 1.54 | 2.02                                     | 1.85 | 1.71 | 1.60 | 1.51 | 1.44 |
| 50 X 150                    | 2.80                    | 2.55 | 2.36 | 2.22 | 2.10 | 2.00 | 2.60                                     | 2.36 | 2.18 | 2.05 | 1.94 | 1.85 | 2.44                                     | 2.21 | 2.05 | 1.92 | 1.81 | 1.73 |
| 50 x 175                    | 3.26                    | 2.97 | 2.75 | 2.58 | 2.45 | 2.34 | 3.03                                     | 2.75 | 2.54 | 2.39 | 2.26 | 2.15 | 2.85                                     | 2.58 | 2.39 | 2.24 | 2.12 | 2.01 |
| 50 X 200                    | 3.72                    | 3.38 | 3.14 | 2.95 | 2.79 | 2.67 | 3.45                                     | 3.13 | 2.90 | 2.73 | 2.58 | 2.46 | 3.25                                     | 2.94 | 2.72 | 2.55 | 2.42 | 2.30 |
| 50 X 225                    | 4.17                    | 3.80 | 3.52 | 3.31 | 3.14 | 3.00 | 3.88                                     | 3.52 | 3.26 | 3.06 | 2.90 | 2.77 | 3.65                                     | 3.31 | 3.06 | 2.87 | 2.72 | 2.59 |
| 63 X 100                    | 1.99                    | 1.84 | 1.71 | 1.61 | 1.52 | 1.45 | 1.81                                     | 1.71 | 1.58 | 1.49 | 1.41 | 1.34 | 1.69                                     | 1.60 | 1.48 | 1.39 | 1.32 | 1.26 |
| 63 x 125                    | 2.53                    | 2.30 | 2.13 | 2.00 | 1.90 | 1.81 | 2.35                                     | 2.13 | 1.97 | 1.85 | 1.76 | 1.68 | 2.21                                     | 2.00 | 1.85 | 1.74 | 1.65 | 1.57 |
| 63 X 150                    | 3.02                    | 2.75 | 2.55 | 2.40 | 2.28 | 2.17 | 2.81                                     | 2.55 | 2.37 | 2.22 | 2.10 | 2.01 | 2.64                                     | 2.40 | 2.22 | 2.08 | 1.97 | 1.88 |
| 63 X 175                    | 3.52                    | 3.20 | 2.97 | 2.80 | 2.65 | 2.53 | 3.27                                     | 2.97 | 2.76 | 2.59 | 2.45 | 2.34 | 3.08                                     | 2.79 | 2.59 | 2.43 | 2.30 | 2.19 |
| 63 x 200                    | 4.01                    | 3.65 | 3.39 | 3.19 | 3.03 | 2.89 | 3.73                                     | 3.39 | 3.14 | 2.95 | 2.80 | 2.67 | 3.51                                     | 3.19 | 2.95 | 2.77 | 2.62 | 2.50 |
| 63 x 225                    | 4.49                    | 4.10 | 3.81 | 3.58 | 3.40 | 3.25 | 4.18                                     | 3.80 | 3.53 | 3.32 | 3.15 | 3.00 | 3.94                                     | 3.58 | 3.32 | 3.11 | 2.95 | 2.81 |

**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 0.75kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for purlins should be 50mm.
- 4 No notches or holes should be cut in purlins unless checked by a competent person.



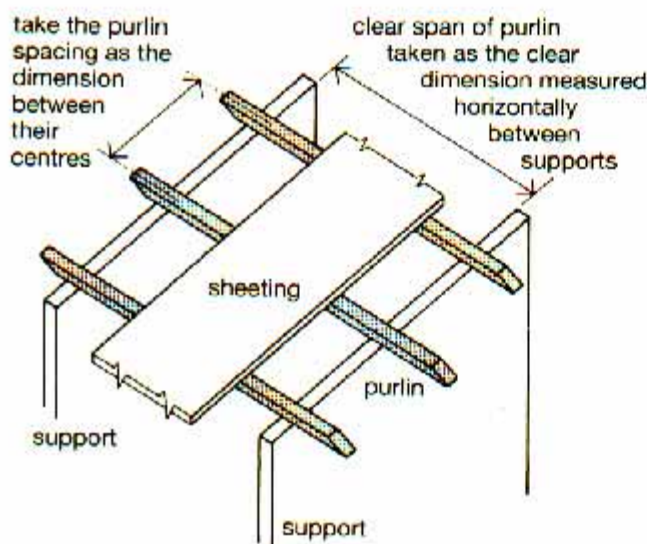


**Table A24 Purlins supporting sheeting or decking for roofs having a pitch more than 10° but not more than 35°. Imposed loading 1.0kN/m<sup>2</sup>****Maximum clear span of purlin(m) Timber of strength class SC3 and SC4 (see Table 1)**

| Size of purlin<br>(mm x mm) | Dead Load [ kN/m <sup>2</sup> ] excluding the self weight of the purlin |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |     |      |      |      |      |      |
|-----------------------------|---|------|------|------|------|------|--|------|------|------|------|------|--|------|------|------|------|------|-----|------|------|------|------|------|
|                             | Not more than 0.25  |      |      |      |      |      | More than 0.25<br>but not more than 0.50 |      |      |      |      |      | More than 0.50<br>but not more than 0.75 |      |      |      |      |      |     |      |      |      |      |      |
|                             | Spacing of purlins (mm)   |      |      |      |      |      |  |      |      |      |      |      |  |      |      |      |      |      |     |      |      |      |      |      |
|                             | 900   | 1200 | 1500 | 1800 | 2100 | 2400 | 900                                      | 1200 | 1500 | 1800 | 2100 | 2400 | 900                                      | 1200 | 1500 | 1800 | 2100 | 2400 | 900 | 1200 | 1500 | 1800 | 2100 | 2400 |
| 50 x 100                    | 1.67  | 1.51 | 1.40 | 1.31 | 1.24 | 1.18 | 1.55                                     | 1.42 | 1.31 | 1.22 | 1.16 | 1.10 | 1.45                                     | 1.34 | 1.24 | 1.16 | 1.09 | 1.04 |     |      |      |      |      |      |
| 50 x 125                    | 2.08  | 1.88 | 1.74 | 1.64 | 1.55 | 1.47 | 1.95                                     | 1.77 | 1.63 | 1.53 | 1.45 | 1.38 | 1.85                                     | 1.67 | 1.54 | 1.44 | 1.36 | 1.30 |     |      |      |      |      |      |
| 50 x 150                    | 2.49  | 2.26 | 2.09 | 1.96 | 1.85 | 1.77 | 2.34                                     | 2.12 | 1.96 | 1.83 | 1.73 | 1.65 | 2.22                                     | 2.00 | 1.85 | 1.73 | 1.64 | 1.56 |     |      |      |      |      |      |
| 50 x 175                    | 2.90  | 2.63 | 2.43 | 2.28 | 2.16 | 2.06 | 2.73                                     | 2.47 | 2.28 | 2.14 | 2.02 | 1.92 | 2.58                                     | 2.34 | 2.16 | 2.02 | 1.91 | 1.81 |     |      |      |      |      |      |
| 50 x 200                    | 3.31  | 3.00 | 2.78 | 2.61 | 2.47 | 2.35 | 3.11                                     | 2.82 | 2.60 | 2.44 | 2.31 | 2.20 | 2.95                                     | 2.67 | 2.46 | 2.31 | 2.18 | 2.07 |     |      |      |      |      |      |
| 50 x 225                    | 3.72  | 3.37 | 3.12 | 2.93 | 2.77 | 2.64 | 3.49                                     | 3.16 | 2.93 | 2.74 | 2.59 | 2.47 | 3.31                                     | 3.00 | 2.77 | 2.59 | 2.45 | 2.31 |     |      |      |      |      |      |
| 63 x 100                    | 1.80  | 1.64 | 1.51 | 1.42 | 1.35 | 1.28 | 1.69                                     | 1.54 | 1.42 | 1.33 | 1.26 | 1.20 | 1.60                                     | 1.45 | 1.34 | 1.26 | 1.19 | 1.13 |     |      |      |      |      |      |
| 63 x 125                    | 2.25  | 2.04 | 1.89 | 1.77 | 1.68 | 1.60 | 2.11                                     | 1.92 | 1.77 | 1.66 | 1.57 | 1.50 | 2.00                                     | 1.81 | 1.68 | 1.57 | 1.49 | 1.41 |     |      |      |      |      |      |
| 63 x 150                    | 2.69  | 2.44 | 2.26 | 2.13 | 2.01 | 1.92 | 2.53                                     | 2.29 | 2.12 | 1.99 | 1.88 | 1.80 | 2.40                                     | 2.17 | 2.01 | 1.88 | 1.78 | 1.70 |     |      |      |      |      |      |
| 63 x 175                    | 3.13  | 2.85 | 2.64 | 2.48 | 2.35 | 2.24 | 2.95                                     | 2.67 | 2.47 | 2.32 | 2.20 | 2.09 | 2.80                                     | 2.53 | 2.34 | 2.20 | 2.08 | 1.98 |     |      |      |      |      |      |
| 63 x 200                    | 3.57  | 3.25 | 3.01 | 2.83 | 2.68 | 2.55 | 3.38                                     | 3.05 | 2.82 | 2.65 | 2.51 | 2.39 | 3.19                                     | 2.89 | 2.67 | 2.51 | 2.37 | 2.26 |     |      |      |      |      |      |
| 63 x 225                    | 4.01  | 3.65 | 3.38 | 3.18 | 3.01 | 2.87 | 3.77                                     | 3.43 | 3.17 | 2.98 | 2.82 | 2.69 | 3.58                                     | 3.25 | 3.01 | 2.82 | 2.67 | 2.54 |     |      |      |      |      |      |
| 50 x 100                    | 1.74  | 1.58 | 1.46 | 1.37 | 1.30 | 1.24 | 1.64                                     | 1.48 | 1.37 | 1.28 | 1.21 | 1.16 | 1.53                                     | 1.40 | 1.30 | 1.21 | 1.15 | 1.09 |     |      |      |      |      |      |
| 50 x 125                    | 2.17  | 1.97 | 1.82 | 1.71 | 1.62 | 1.54 | 2.04                                     | 1.85 | 1.71 | 1.60 | 1.52 | 1.44 | 1.94                                     | 1.75 | 1.62 | 1.51 | 1.43 | 1.36 |     |      |      |      |      |      |
| 50 x 150                    | 2.60  | 2.36 | 2.19 | 2.05 | 1.94 | 1.85 | 2.45                                     | 2.22 | 2.05 | 1.92 | 1.82 | 1.73 | 2.32                                     | 2.10 | 1.94 | 1.82 | 1.72 | 1.63 |     |      |      |      |      |      |
| 50 x 175                    | 3.03  | 2.75 | 2.55 | 2.39 | 2.26 | 2.16 | 2.85                                     | 2.58 | 2.39 | 2.24 | 2.12 | 2.02 | 2.70                                     | 2.45 | 2.26 | 2.12 | 2.00 | 1.90 |     |      |      |      |      |      |
| 50 x 200                    | 3.46  | 3.14 | 2.91 | 2.73 | 2.58 | 2.46 | 3.25                                     | 2.95 | 2.73 | 2.56 | 2.42 | 2.30 | 3.08                                     | 2.79 | 2.58 | 2.42 | 2.28 | 2.17 |     |      |      |      |      |      |
| 50 x 225                    | 3.88  | 3.52 | 3.27 | 3.07 | 2.90 | 2.77 | 3.65                                     | 3.31 | 3.06 | 2.87 | 2.72 | 2.59 | 3.46                                     | 3.14 | 2.90 | 2.72 | 2.57 | 2.44 |     |      |      |      |      |      |
| 63 x 100                    | 1.89  | 1.71 | 1.58 | 1.49 | 1.41 | 1.34 | 1.77                                     | 1.61 | 1.49 | 1.39 | 1.32 | 1.26 | 1.68                                     | 1.52 | 1.41 | 1.32 | 1.25 | 1.19 |     |      |      |      |      |      |
| 63 x 125                    | 2.35  | 2.13 | 1.98 | 1.86 | 1.76 | 1.68 | 2.21                                     | 2.00 | 1.85 | 1.74 | 1.65 | 1.57 | 2.10                                     | 1.90 | 1.76 | 1.65 | 1.56 | 1.48 |     |      |      |      |      |      |
| 63 x 150                    | 2.81  | 2.55 | 2.37 | 2.22 | 2.11 | 2.01 | 2.65                                     | 2.40 | 2.22 | 2.08 | 1.97 | 1.88 | 2.51                                     | 2.27 | 2.10 | 1.97 | 1.87 | 1.78 |     |      |      |      |      |      |
| 63 x 175                    | 3.27  | 2.97 | 2.76 | 2.59 | 2.46 | 2.34 | 3.08                                     | 2.79 | 2.59 | 2.43 | 2.30 | 2.19 | 2.92                                     | 2.65 | 2.45 | 2.30 | 2.18 | 2.07 |     |      |      |      |      |      |
| 63 x 200                    | 3.73  | 3.39 | 3.15 | 2.96 | 2.80 | 2.67 | 3.51                                     | 3.19 | 2.95 | 2.77 | 2.63 | 2.50 | 3.33                                     | 3.02 | 2.80 | 2.63 | 2.48 | 2.37 |     |      |      |      |      |      |
| 63 x 225                    | 4.18  | 3.81 | 3.53 | 3.32 | 3.15 | 3.01 | 3.94                                     | 3.58 | 3.32 | 3.12 | 2.95 | 2.81 | 3.74                                     | 3.30 | 3.15 | 2.95 | 2.79 | 2.66 |     |      |      |      |      |      |

**Notes**

- 1 The sizes spacings and spans given will support the dead loads stated in the table and imposed loads of 1.0kN/m<sup>2</sup>, measured on plan or a concentrated load of 0.9kN.
- 2 The section sizes are either BS 4471 basic sawn sizes with the tolerances of BS 4471 or CLS/ALS sizes with BS 4471 tolerances.
- 3 The minimum bearing length at supports for roof joists should be 50mm
- 4 No notches or holes should be cut in purlins unless checked by a competent person.





## Standards referred to

### A 1/2

BS 12: 1989 *Specification for Portland cements.*

BS 187: 1978 *Specification for calcium silicate (sandlime and flintlime) bricks*

Amendment slip

1: AMD 5427

BS 449: *Specification for the use of structural steel in building:*

Part 2: 1969 *Metric units*

Amendment slips

1: AMD 416,

2: AMD 523,

3: AMD 661,

4: AMD 1135,

5: AMD 1787,

6: AMD 4576,

7: AMD 5698,

8: AMD 6255.

BS 882: 1983 *Specification for aggregates from natural sources for concrete*

Amendment slip

1: AMD 5150.

BS 1243: 1978 *Specification for metal ties for cavity wall construction*

Amendment slips

1: AMD 3651,

2: AMD 4024.

BS 1297: 1987 *Specification for tongued and grooved softwood flooring.*

BS 3921: 1985 *Specification for clay bricks.*

BS 4471: 1987 *Specification for sizes of sawn and processed softwood.*

BS 4978: 1988 *Specification for softwood grades for structural use.*

BS 5268: *Structural use of timber:*

Part 2: 1991 *Code of practice for permissible stress design, materials and workmanship.*

Part 3: 1985 *Code of practice for trussed rafter roofs*

Amendment slip

1: AMD 5931

Part 6: *Code of practice for timber framed walls.* Section 6.1: 1988 *Dwellings not exceeding three storeys.*

BS 5328: *Concrete:*

Part 1: 1991 *Guide to specifying Concrete*

Part 2: 1991 *Methods for specifying concrete mixes.*

BS 5390: 1976 *Code of practice for stone masonry,*

Amendment slip

1: AMD 4272.

BS 5628: *Code of practice for use of masonry:*  
Part 1: 1978 *Structural use of unreinforced masonry*

Amendment slips

1: AMD 2747,

2: AMD 3445,

3: AMD 4800,

4: AMD 5736.

Part 3: 1985 *Materials and components, design and workmanship*

Amendment slip

1: AMD 4974.

BS 5950: *Structural use of steelwork in buildings:*

Part 1: 1990 *Code of practice for design in simple and continuous construction: hot rolled sections.*

Part 2: 1992 *Specification for materials, fabrication and erection: hot rolled sections.*

Part 3: *Design in composite construction:*  
Section 3.1: 1990 *Code of practice for design of simple and continuous composite beams.*

Part 4: 1982 *Code of practice for design of floors with profiled steel sheeting.*

Part 5: 1987 *Code of practice for design of cold rolled sections.*

Amendment slip

1: AMD 5957.

BS 6073: *Precast concrete masonry units*

Part 1: 1981 *Specification for precast concrete masonry units*

Amendment slips

1: AMD 3944,

2: AMD 4462.

BS 6399: *Loading for buildings:*

Part 1: 1984 *Code of practice for dead and imposed loads*

Amendment slips

1: AMD 4949,

2: AMD 5881,

3: AMD 6031.

Part 3: 1988 *Code of practice for imposed roof loads*

Amendment slip

1: AMD 6033.

BS 6649: 1985 *Specification for clay and calcium silicate modular bricks.*

BS 6750: 1986 *Specification for modular co-ordination in building.*



BS 8004: 1986 *Code of practice for foundations.*

BS 8110 Structural use of concrete, Part 1: 1985 *Code of practice for design and construction*

Amendment slips

1: AMD 5917,

2: AMD 6276.

Part 2: 1985 *Code of practice for special circumstances*

Amendment slip

1: AMD 5914.

Part 3: 1985 *Design charts for single reinforced beams, doubly reinforced beams and rectangular columns*

Amendment slips

1: AMD 5918.

BS 8200: 1985 *Code of practice for design of non-loadbearing external vertical enclosure of buildings.*

BS 8298: 1989 *Code of practice for design and installation of natural stone cladding and lining.*

CP3: Chapter V: *Loading:*

Part 2: 1972 *Wind loads*

Amendment slips

1: AMD 4952,

2: AMD 5152,

3: AMD 5343,

4: AMD 6028.

CP 118: 1969 *The structural use of aluminium.*

Amendment slip

1: AMD 1129.

## A3

BS 5628: *Code of practice for use of masonry:* Part 1: 1978 Structural use of unreinforced masonry

Amendment slips

1: AMD 2747,

2: AMD 3445,

3: AMD 4800,

4: AMD 5736.

BS 5950: *Structural use of steelwork in building:*

Part 1: 1990 Code of practice for design in simple and continuous construction; hot rolled sections,

BS 8110 *Structural use of concrete:*

Part 1: 1985 *Code of practice for design and construction,*

Amendment slips

1: AMD 5917,

2: AMD 6276.

Part 2: 1985 *Code of practice for special circumstances*

Amendment slip

1: AMD 5914.

### Approved documents published by the Department of the Environment and the Welsh Office as at October 1991

The following Approved Documents have been approved for the purposes of the Building Regulations 1991 as amended by the Building Regulations (Amendment) Regulations 1994 and will take effect on 1 July 1995.

F Ventilation, 1995 edition

L Conservation of fuel and power, 1995 edition

The following Approved Documents continue to be approved for the purposes of the Building Regulations 1991 (with requirement A4 deleted 1994)

A Structure, 1992 edition

B Fire safety, 1992 edition

C Site preparation and resistance to moisture, 1992 edition

D Toxic substances, 1985 edition

E Resistance to the passage of sound, 1992 edition

G Hygiene, 1992 edition

H Drainage and waste disposal, 1990 edition

J Heat producing appliances, 1990 edition

K Stairs, ramps and guards, 1992 edition

M Access and facilities for disabled people, 1992 edition

N Glazing - materials and protection, 1992 edition

Regulation 7 Materials and workmanship, 1992 edition

Note that the Manual to the Building Regulations 1985 has been withdrawn.



Published by The Stationery Office and available from:

**The Stationery Office**

(mail, telephone and fax orders only)  
PO Box 29, Norwich NR3 1GN  
Telephone orders/General enquiries 0870 600 5522  
Fax orders 0870 600 5533

[www.thestationeryoffice.com](http://www.thestationeryoffice.com)

**The Stationery Office Bookshops**

123 Kingsway, London WC2B 6PQ  
020 7242 6393 Fax 020 7242 6412  
68-69 Bull Street, Birmingham B4 6AD  
0121 236 9696 Fax 0121 236 9699  
33 Wine Street, Bristol BS1 2BQ  
0117 926 4306 Fax 0117 929 4515  
9-21 Princess Street, Manchester M60 8AS  
0161 834 7201 Fax 0161 833 0634  
16 Arthur Street, Belfast BT1 4GD  
028 9023 8451 Fax 028 9023 5401  
The Stationery Office Oriol Bookshop  
18-19 High Street, Cardiff CF1 2BZ  
029 2039 5548 Fax 029 2038 4347  
71 Lothian Road, Edinburgh EH3 9AZ  
0870 606 5586 Fax 0870 606 5588

**The Stationery Office's Accredited Agents**

(see Yellow Pages)

*and through good booksellers*

© Crown copyright 1992. Published for the Department of the Environment, Transport and the Regions under licence from the Controller of Her Majesty's Stationery Office.

Applications for reproduction should be made in writing to The Copyright Unit, Her Majesty's Stationery Office, St Clements House, 2-16 Colegate, Norwich NR3 1BQ

First published 1992  
(Replaces Approved Documents A 1985 edition)  
Seventh impression 2000

£10

ISBN 0-11-752312-7



9 780117 523128