

BS 8103-3:2009



BSI British Standards

Structural design of low-rise buildings –

Part 3: Code of practice for timber floors and roofs for housing

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to viii, pages 1 to 200, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 8103 is published by BSI and came into effect on 30 November 2009. It was prepared by Technical Committee B/204, *Structural design of low-rise buildings*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 8103 supersedes BS 8103-3:1996, which is withdrawn.

Relationship with other publications

BS 8103 is published in four parts as follows:

- *Part 1: Code of practice for stability, site investigation, foundations and ground floor slabs for housing;*
- *Part 2: Code of practice for masonry walls for housing;*
- *Part 3 (this part): Code of practice for timber floors and roofs for housing;*
- *Part 4: Code of practice for suspended concrete floors for housing.*

Information about this document

A large proportion of the national building programme is concerned with new housing and alterations in both the public and private sectors, where the majority of houses are constructed with masonry walls and timber floors and roofs. This Part of BS 8103 covers timber used in that form of construction. It does not cover joinery or wood trim.

This code is written for those with expertise in building construction, but not necessarily in structural engineering design. Therefore, the recommendations are intended to provide safe design without the need for strength calculations, except for trussed rafter design which is normally entrusted to a specialist. Much of the guidance previously provided for trussed rafter roof construction has been removed from this revision in favour of reference to BS 5268-3¹⁾. Houses constructed within the limitations stated in the relevant clauses will not require additional specialist advice. For any conditions outside the scope of this part of BS 8103 (e.g. trimmers assembled from three or more members or supporting heavy partitions, or the use of connections other than nails, screws, bolts or toothed-plate connectors), appropriate specialist advice should be obtained.

Although BS 5268-2 permits load-sharing to be considered for spacings, etc. up to 610 mm centres, the span tables in this code are limited to 600 mm centres for convenience.

NOTE This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

In respect of timber members (floor joists, rafter, purlins, binders, etc.) the span tables in this code are based upon the use of strength graded solid timber and BS 5268-2 design philosophy. Proprietary items such as composite timber and wood-based panel or timber and metal section web joist members are not covered by the scope of the span tables in BS 8103-1. These items need purpose design by a specialist.

¹⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

The design guidance for wood-based panels for use in floor and flat roof structural decking have been updated and new sections including Oriented Strand Boards (OSB) have been added.

When using this code, it is important to ensure that the overall stability of the building is achieved and that the work of any specialist engaged is properly co-ordinated. BS 8103-1 covers the stability aspects of low-rise housing.

The recommendations in this code are intended to provide safe designs without the need for calculations of loading and strength/stiffness criteria. The provisions and limitations of this standard do not preclude other designs, provided that a specialist provides evidence of their adequacy.

Illustrations do not show all constructional details and are not intended to illustrate compliance with any other requirements or recommendations. They are not to scale and are not suitable for use as working drawings.

This revision takes into account the introduction of the new harmonized product specifications relating to timber and wood-based panels and other relevant construction products. This code also includes a new simplified snow loading zonal map for the United Kingdom which is based upon BS EN 1991-1-3 together with its UK National Annex.

The code is intended to support the various UK building regulations [1], [2], [3] and standards.

Use of this document

As a code of practice, this part of BS 8103 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 8103 is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

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

The word "should" is used to express recommendations of this standard. The word "may" is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word "can" is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Contractual and legal considerations

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

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

Introduction

The object of this Part of BS 8103 is to provide sufficient information to enable supervisory/technical staff of building companies to determine the size, grade and any limitations such as notching of certain timber components for floors and roofs of dwellings of limited size. It has to be emphasized, however, that a structural designer should be employed where the building falls outside the scope of this Part of BS 8103.

Much of the information provided is linked to the provisions given in supporting technical documents to the appropriate statutory building regulations of the UK [1], [2], [3]. Significant content details are as follows:

- a) tables for determining timber sizes for roof members to buildings situated at sites at which the imposed roof loading is not greater than 1.25 kN/m^2 ;
- b) a wide range of solid timber sizes;
- c) loading on joists, beams or trimmers, trimming joists, purlins and ceiling binders (see Table 6);

NOTE The bearing lengths quoted, are minimum design values and might need to be increased to accommodate fixings, tolerances in building, or to give stability to masonry walls.

- d) the inclusion of alternative decking materials for floors and flat roofs;
- e) timber bracing for single-storey non-residential buildings and annexes (see Annex N);
- f) tables for trimmers and beams (see Table 6);
- g) guidance on the determination of the imposed snow loading for a particular site location (see Annex M).

The tables for plywood floor decking or roof decking have been agreed with the major associations representing imported structural plywood, based on historical data and information.

The committee was advised by checking authorities that joist span tables were erroneously being used as though they applied also for trimmers and beams supporting joists. The tables for trimmers and beams have been added in an attempt to prevent this unacceptable practice and to make this Part of BS 8103 as useful as possible. It was difficult to evolve an easy method of deriving sizes, but it is hoped that, with a little familiarity, the new tables will prove useful even though they are for a limited range of spans, are only for single or twin members, and cover dead loading not heavier than 0.5 kN/m^2 .

The span tables do not include sizes that are based on the *North American NLGA/NGRDL rules* [4] [5] for green Imperial sawn sizes and tolerances. Therefore, none of the span tables are relevant for such sizes and tolerances. The tables may be used, however, if North American timber, stress-graded to the NLGA/NGRDL rules or to BS 4978, is sawn, re-sawn or processed to the BS EN 336 basic dry metric sizes and tolerances.

One aim of this Part of BS 8103 is to minimize the extent to which other British Standards and Codes need to be examined. For those cases where grading needs to be completed before the timber, or wood-based panels arrive on site e.g. for floor boards of solid timber, or tiling battens, grading rules are included in an annex. For those

cases where grading needs to be completed before the timber, plywood or orientated strand board arrives on site, grading rules are not repeated, but marks are given in Annex C, Annex F, Annex G and Annex H, which will assist site staff to identify that the correct grade has been delivered.

Throughout this Part of BS 8103, the figures are only illustrative, and do not show all the details of construction.

1 Scope

This Part of BS 8103 gives recommendations for the sizes of timber elements, fixings, and their connections with masonry walls, etc. It applies to detached, semi-detached, terraced houses and flats (with not more than four self-contained dwelling units per floor, accessible from one staircase) of not more than three storeys above ground, intended for domestic occupation. The recommendations also apply to single-storey non-residential buildings, e.g. domestic garages and annexes, not exceeding 36 m² in floor area.

The design of proprietary housing systems, i.e. cross wall constructions, timber framed houses, steel or concrete framed constructions, concrete panel constructions, is not covered by this standard.

The recommendations of this Part of BS 8103 are applicable only to housing where:

- a) the construction comprises masonry walls, timber roofs, suspended timber or precast concrete intermediate floors, suspended timber or concrete ground floors (either suspended or ground bearing);
- b) the roof profile is symmetrical duopitch, monopitch or flat;
NOTE 1 Pitched roofs of trussed rafter or traditional constructions are covered, but not constructions using principal trusses. Hip ends and "L" shaped plans are not specifically covered although values are given for jack rafters.
- c) the maximum clear span of a pitched roof does not exceed 12.0 m and imposes a total load on the supporting perimeter walls not greater than 12 kN/m run;
- d) gable and separating walls are of masonry construction extending up to the roof line in the case of pitched roofs;
- e) the roof area is not larger than 200 m² on plan; or, in the case of pitched roofs where no parapets exist, one of the roof dimensions does not exceed 10 m;
- f) there are no other buildings within 1.5 m of the perimeter of the building;
- g) the roof has no abrupt changes of height greater than 1 m on which snow drifting could occur;

NOTE 2 This limitation does not apply to the change of height between the main roof and the roof of a lower annexe, if the roof area of the annexe does not exceed 36 m². Chimneys and dormers whose vertical elevation areas, against which a drift could form, are less than 1 m², need not be considered as being an abrupt change of height.

- h) the maximum clear span of any floor joist or flat roof joist does not exceed 6.0 m;
- i) the design wind criteria is within the scope of BS 8103;

NOTE 3 Guidance is given in BS 8103-1 and BS 8103-2 on how to determine whether the design wind criteria for a building on a particular site is within the scope and application of BS 8103. Guidance is given in Annex M regarding the determination of snow load for a particular site.

- j) no part of any wall or roof is higher than 15m above the lowest adjacent ground level;
- k) floor joists, ceiling joists, flat roof joists, common or jack rafters or trussed rafters are spaced at centres which do not exceed 600 mm;
- l) the stability requirements and dimensional limitations accord with BS 8103-1:1995+A1:1995, Clause 5.

The sizes of timber shown in the span tables are limited to those normally readily available but do not preclude the use of larger or different sizes if justified by specialist calculation.

The design requirements and those for durability and timber preservation given in this Part of BS 8103 are related only to structural considerations.

For trussed rafter roofs, this standard contains only as much information as is necessary and mainly comprises references to BS 5268-3²⁾.

2 Normative references

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

BS 1202-1, *Specification for nails – Part 1: Steel nails*

BS 1210, *Specification for wood screws*

BS 1297, *Specification for tongued and grooved softwood flooring*

BS 4190, *ISO metric black hexagon bolts, screws and nuts – Specification*

BS 4320, *Specification for metal washers for general engineering purposes – Metric series*

BS 4978, *Visual strength grading of softwood – Specification*

BS 5268-3, *Structural use of timber – Part 3: Code of practice for trussed rafter roofs*

BS 5534, *Code of practice for slating and tiling (including shingles)*

BS 5628-3, *Code of practice for the use of masonry – Part 3: Materials and components, design and workmanship*

BS 6100-3, *Building and civil engineering – Vocabulary – Part 3: Civil engineering – General*

²⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

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

BS 8103-2, *Structural design of low rise buildings – Part 2: Code of practice for masonry walls for housing*

BS 8417:2003, *Preservation of timber – Recommendations*

BS EN 300, *Oriented strand boards (OSB) – Definitions, classification and specifications*

BS EN 312, *Particleboards – Specifications*

BS EN 335-1, *Durability of wood and wood-based products – Definitions of use classes – Part 1: General*

BS EN 336, *Structural timber – Sizes, permitted deviations*

BS EN 338, *Structural timber – Strength classes*

BS EN 350-2, *Durability of wood and wood-based products – Natural durability of solid wood – Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

BS EN 636, *Plywood – Specifications*

BS EN 845-1, *Specification for ancillary components for masonry – Part 1: Ties, tension straps, hangers and brackets*

BS EN 912, *Timber fasteners – Specifications for connections for timber*

BS EN 1912, *Structural timber – Strength classes – Assignment of visual grades and species*

BS EN 1991-1-1, *UK National Annex to Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings*

BS EN 1991-1-3, *Eurocode 1– Actions on structures – Part 1-3: General actions –Snow loads*

BS EN 13556, *Round and sawn timber – Nomenclature of timbers used in Europe*

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

BS EN 14081-1:2005, *Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements*

BS EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*

EN 15228³⁾, *Structural timber – Structural timber preservative treated against biological attack*

Canadian NLGA rules [1],

CLS/ALS sizes [6] [7],

USA NGRDL rules [5],

³⁾ In preparation.

3 Terms and definitions

For the purposes of this part of BS 8103, the terms and definitions given in BS 6100-3 and the following apply.

- 3.1 clear span**
clear distance between supports of joists, trimmed joists, etc. and rafters, measured along the member
- 3.2 common rafter**
timber rafter, not forming part of a truss, extending from eaves to ridge board, normally supported by purlins
- 3.3 flat roof**
roof having a slope of not more than 10° from the horizontal
- 3.4 jack rafter**
shortened rafter abutting a hip rafter or valley rafter
- 3.5 spacing of joists or rafters**
distance between the centres of joists or rafters
- 3.6 trimmed joist**
joist supported at one or both ends by a trimmer joist
- 3.7 trimmer joist**
joist supported at one or both ends by a trimming joist and supporting the ends of trimmed joists
- 3.8 trimming joist**
joist which, for part or all of its length, forms the edge of an opening (such as a stair well) and supports the end of a trimmer joist

NOTE See Figure 12 and Figure 13.

NOTE See Figure 12 and Figure 13.

4 Materials

4.1 Timber

4.1.1 Maximum moisture content

The maximum moisture content at the time of erection or fixing should conform to Annex A.

4.1.2 Flooring

Softwood flooring should conform to and be graded in accordance with BS 1297. The timber should be one of the species listed in **B.1**. The thickness should conform to **5.2.1.1**. As an alternative to softwood flooring, a hardwood of at least the same thickness as that given in **5.2.1.1** and having a density of at least 500 kg/m³ at 12% moisture content should be used. In such a case, the grading should conform to Annex B.

4.1.3 Flat roof decking

Softwood flat roof decking should be tongued and grooved and should conform to BS 1297. The timber should be one of the species listed in **B.1**. The thickness should conform to Table 76.

4.1.4 Joists, beams or trimmers, trimming joists, common or jack rafters, purlins, ceiling joists and binders, trussed rafter material and secondary solid timber structural members

Joists, beams or trimmers, trimming joists, common or jack rafters, purlins, ceiling joists and binders, trussed rafter material and secondary timber structural members of solid softwood, but not strutting or solid bridging between joists, should be strength-graded and marked in accordance with BS 4978 or the Canadian NLGA rules [4] or the USA NGRDL rules [5] and BS EN 14081-1. The sizes should be sawn, or processed in accordance with BS EN 336, or CLS/ALS sizes [6] [7] as defined in the NLGA or NGRDL rules outlined in National Annex to BS EN 336, all with the tolerances given in BS EN 336, or, for trussed rafter material, sizes as processed in accordance with BS 5268-3⁴⁾.

NOTE 1 Sizes to BS EN 336 are referred to by a target size and a tolerance class. The target size is the size desired by the specifier.

NOTE 2 Tolerance class 1, designated (T1), is appropriate to sawn timber and tolerance class 2, designated (T2), and is appropriate to planed or processed timber. The term "regularized" is not used in BS EN 336, but the same end result can be achieved by specifying the thickness dimension to be tolerance class 1 and the width dimension to be tolerance class 2, for example 50(T1) × 194(T2) (see National Annex to BS EN 336). The span tables given in this part of BS 8103 (Table 7 to Table 74) are for sawn or processed sizes or surfaced CLS/ALS sizes.

NOTE 3 Table 7 to Table 74 cover strength-grade/species combinations which, conform to strength classes C16 and C24 as defined in BS EN 338.

NOTE 4 Softwood strength-grade/species combinations which conform to strength classes C16 and C24 are listed in Table 1.

Identification marks for strength-graded timber should be in accordance with Annex C.

4.1.5 Solid timber roof bracing, gable ladders, noggings, strutting, bridging or blocking between joints

Timber for roof bracing, gable ladders, noggings, strutting, bridging or blocking between joists should be one of the species given in Table 1 and should be free from any major strength-reducing defects, and from distortions which could affect the serviceability.

4.1.6 Wallplates

Wallplates should be of one of the species given in Table 1 and should be free from any major distortion. The top surface should be free of wane. Sizes should be as recommended in 6.2.4.

4.1.7 Battens for roof slating and tiling

Battens to support roof slates or tiles should be of one of the species listed in Annex D. Battens should span over at least three supports (i.e. at least two bays).

⁴⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

Table 1 Strength-grade/species combinations which meet classes C16 and C24

Species	Grade to meet strength class C16	Grade to meet strength class C24
All species listed in this table, machine graded to BS EN 14081-1 and marked accordingly	Machine graded to C16	C24
Imported redwood or whitewood graded to BS 4978	GS	SS
British-grown graded to BS 4978		
Douglas fir	SS	—
Larch	GS	SS
Pine	SS	—
Spruce	SS	—
Canadian graded to BS 4978		
Douglas fir-larch	GS	SS
Hem-fir	GS	SS
Spruce-pine-fir	GS	SS
Sitka spruce	SS	—
Canadian graded to NLGA [6] rules	Joist and plank/structural light framing	Joist and plank/structural light framing
Douglas fir-larch	No. 1 and No. 2	Select structural (SelStr)
Hem-fir	No. 1 and No. 2	Select structural (SelStr)
Spruce-pine-fir	No. 1 and No. 2	Select structural (SelStr)
Sitka spruce	Select structural (SelStr)	—
Canadian graded to MSR standard		
Douglas fir-larch	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
Hem-fir	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
Spruce-pine-fir	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
USA graded to BS 4978		
Douglas fir-larch	GS	SS
Hem-fir	GS	SS
Southern pine	GS	SS
Spruce-pine-fir	GS	SS
Western white woods	SS	—
USA graded to NGRDL	Joist and plank/structural light framing	Joist and plank/structural light framing
Douglas fir-larch	No. 1 and No. 2	Select structural (SelStr)
Hem-fir	No. 1 and No. 2	Select structural (SelStr)
Spruce-pine-fir	No. 1 and No. 2	Select structural (SelStr)
Western white woods	Select structural (SelStr)	—
Southern pine	No. 1, No. 2 and No.3	Select structural (SelStr)

Table 1 **Strength-grade/species combinations which meet classes C16 and C24** (*continued*)

Species	Grade to meet strength class C16	Grade to meet strength class C24
USA graded to MSR Standard	Light framing – construction (const)	
	Stud	
Douglas fir-larch	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
Hem-fir	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
Southern pine	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E
Spruce-pine-fir	Machine stress-rated, 1 450f-1.3E	Machine stress-rated, 1 800f-1.6E

NOTE 1 Where one strength-grade is tabulated, any stronger strength-grade of the same species also meets the strength class.

NOTE 2 Additional grades and species can be found in BS EN 1912.

NOTE 3 Strength class allocations of North American machine graded strength timber can vary according to production source, but for the purposes of this part of BS 8103 the relevant information in the grade mark is the strength class C16 or C24.

4.2 Plywood

4.2.1 General

Plywood for use in structural applications should comply with the requirements of BS EN 13986. Requirements for plywood for use in dry, humid and exterior conditions are outlined in BS EN 636.

4.2.2 Flooring

Plywood used for structural flooring where design and construction are in accordance with the relevant timber span tables given in this part of BS 8103, should be one of the types and grades given in Annex E and should also meet the requirements of BS EN 636. The thickness should conform to 5.2.2.1 and Table 3.

4.2.3 Flat roof decking

Plywood to be used for flat roof decking, where design and construction are in accordance with the relevant timber span tables given in this part of BS 8103, should be one of the types and grades given in Annex E and should also meet the requirements for BS EN 636. The thickness should conform to 8.2.2.2 and Table 77.

4.2.4 Identification marks

Identification marks for structural plywood should be in accordance with Annex F.

4.3 Particleboard

4.3.1 Flooring

Particleboard used for flooring should be of type P4, P5, P6 or P7 in accordance with BS EN 312.

NOTE 1 Types P4 and P6 are intended for use in non-humid environments. The National House-Building Council (NHBC) standards do not recommend type P4 or P6 for use in domestic floors.

NOTE 2 Manufacturers who have carried out performance testing will be able to provide information on the panel thickness required for various joist spacings.

The thickness should conform to **5.2.3.1** and Table 4.

4.3.2 Flat roof decking

Particleboard used for decking on flat roofs of uninsulated roof design or warm deck design, should be of type P5 or P7 in accordance with BS EN 312.

NOTE 1 Manufacturers who have carried out performance testing will be able to provide information on the panel thickness required for various joist spacings.

The thickness should conform to **8.2.3.1** and Table 79.

NOTE 2 BS 8217 does not recommend the use of particleboard under reinforced bitumen membranes.

4.3.3 Identification marks

Identification marks for particleboard covered by **4.3.1** and **4.3.2** should be as given in Annex G.

4.4 Oriented Strand Board (OSB)

4.4.1 Flooring

OSB used for flooring should be of type OSB/2, OSB/3 or OSB/4 to BS EN 300.

NOTE 1 Manufacturers who have carried out performance testing will be able to provide information on the panel thickness required for various joist spacings.

NOTE 2 NHBC Standards do not recommend type OSB/2 for use in domestic floors.

The thickness should conform to **5.2.4.1** and Table 5.

4.4.2 Flat roof decking

OSB used for decking on flat roofs of uninsulated roof design or warm deck design where insulation is placed above the deck should be of type OSB/3 or OSB/4 to BS EN 300.

NOTE Manufacturers who have carried out performance testing will be able to provide information on the panel thickness required for various joist spacings.

The thickness should conform to **8.2.4.1** and Table 81.

4.5 Mechanical fasteners

4.5.1 Nails

Nails should conform to BS 1202-1.

4.5.2 Steel screws

Steel screws should conform to BS 1210.

4.5.3 Bolts and washers

Bolts should conform to BS 4190. Bolts for timber fixings should be fitted with extra-large washers (form G, i.e. outside diameter approximately three times bolt diameter) which conform to BS 4320, or are made from equivalent steel plate of a size at least three times the bolt diameter.

4.5.4 Toothed-plate connector units

Toothed-plate connector units should conform to BS EN 912.

4.5.5 Joist hangers

For timber to masonry connections, joist hangers should conform to BS EN 845-1.

NOTE See also Figure 13.1 and Figure 13.2.

4.5.6 Metal restraint straps

Straps providing lateral restraint or restraint against uplift of roofs should normally be of low-carbon steel protected by galvanizing, austenitic stainless steel or of other suitably strong and durable materials as recommended in BS 5628-3⁵⁾ and specified in accordance with BS EN 845-1.

5 Flooring

5.1 General

5.1.1 Loading

NOTE 1 Flooring constructed in accordance with this standard is capable of supporting the loadings specified for residential occupancy subcategory A1 in BS EN 1991-1-1. This part of BS 8103 does not make provisions for other heavy concentrated loads.

The timber sizes given in the span tables can be used when a bath is to be placed on the floor area being supported, but the joists supporting the bath should be doubled-up.

NOTE 2 This applies whether the joists are parallel or perpendicular to the length of a rectangular bath. Other shapes of bath might need special consideration.

5.1.2 Non load-bearing lightweight partitions

Non load-bearing lightweight partitions should be supported directly by a joist; beam; solid blocking or noggings between joists (see Figure 9, Figure 10 or Figure 11). Partitions should not be supported directly by flooring.

⁵⁾ BS 5628-3 will be replaced by BS EN 1996-2 and PD 6697.

NOTE 1 For the purposes of this standard, a non load-bearing lightweight partition is one which weighs not more than 0.8 kN/m run. No member referred to in this part of BS 8103 is designed to support a load-bearing partition.

NOTE 2 Examples of non load-bearing partitions which weigh 0.8 kN/m run (82 kg/m) or less, are those with facings of 12.5 mm thick plasterboard on timber studding or a lightweight core.

5.1.3 Support members

Members supporting domestic flooring should be at least 35 mm thick, or 38 mm thick if supporting a plasterboard ceiling.

5.2 Materials and fixing recommendations

5.2.1 Timber flooring

5.2.1.1 Species and size

Tongued and grooved softwood flooring of the species and grading detailed in B.1 should be of at least the finished thickness shown in Table 2.

Table 2 Thickness of tongued and grooved softwood flooring for domestic loading

Maximum support centres of support members	Finished thickness
mm	mm
505	16
600	19

5.2.1.2 Fixing

Timber flooring should be fixed in accordance with I.1.

5.2.2 Plywood flooring

5.2.2.1 Species and size

Plywood flooring should be of one of the grades listed in Annex E. The nominal thicknesses for the range of plywoods described in 4.2.2 and Annex E, in relation to the joist centres, should conform to Table 3.

Table 3 Thickness of plywood flooring for domestic loading

Plywood type	Recommended nominal thickness	
	mm	
	Support members at 450 mm centres max.	Support members at 600 mm centres max.
American construction and industrial plywood: C-D grade exterior. Un-sanded	15.0	18.0
American construction and industrial plywood: C-C grade exterior. Un-sanded	15.0	18.0
Canadian Douglas fir plywood: select tight face, select and sheathing grades. Un-sanded	15.5	15.5
Canadian softwood plywood: select tight face, select and sheathing grades. Un-sanded	15.5	18.5
Finnish birch faced plywood: 1/1, 1/11, etc. Sanded	15.0	18.0
Finnish conifer plywood: 1/1, 1/11, etc. Sanded	15.0	18.0
Swedish softwood plywood: P30 grade. Un-sanded	15.0	16.0

NOTE The thicknesses shown apply to boards spanning three or more joists and where the face grain of the boards is perpendicular to the support members.

5.2.2.2 Fixing

Plywood flooring should be fixed in accordance with I.2.

5.2.3 Particleboard flooring

5.2.3.1 Specification and size

Particleboard flooring should be of one of the grades specified in 4.3.1 (i.e. type P5 or P7) and should have a minimum thickness conforming to Table 4 unless otherwise determined according to performance test or calculated design.

Table 4 Thickness of particleboard flooring for domestic loading

Maximum centres of support members	Minimum thickness
mm	mm
450	18
600	22

5.2.3.2 Fixing

Particleboard flooring should be fixed in accordance with I.3.

5.2.4 OSB flooring

5.2.4.1 Specification and size

OSB flooring should be one of the grades specified in 4.4.1 (i.e. type OSB/2, OSB/3 or OSB/4). The minimum thickness should conform to Table 5 unless otherwise determined according to performance test or calculated design.

Table 5 Thickness of OSB flooring for domestic loading

Maximum centres of support members	Minimum thickness
mm	mm
450	15
600	18

5.2.4.2 Fixings

OSB flooring should be fixed in accordance with I.4.

6 Spans, sizes and spacings for solid timber members, notching, drilling and end-trimming

6.1 General**6.1.1 Span tables**

Table 7 to Table 74 inclusive, recommend timber sizes for spans and spacings for certain timber floor, flat roof, pitched roof and ceiling members. Explanatory notes and diagrams are also provided.

In these tables all spans are measured as the clear distance between supports. All spacings are the distance between longitudinal centres of members. Table 6 is a key to the contents of the span Table 7 to Table 74.

6.1.2 Loading

The recommendations given in this subclause assume 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 tables.

NOTE See also 5.1.1 and 5.1.2.

Examples of dead loading for typical floor, pitched roof and flat roof constructions are given in Annex L. These relate to the dead loading categories stated in individual span tables.

6.1.3 Strength classes

Combinations of species and strength grades of timber which achieve the strength classes to which the span tables relate are listed in Table 1.

6.1.4 Sizes of solid timber members

The dimensions of solid timber members given in Table 7 to Table 74 are based upon the size and tolerance requirements of BS EN 336. For certain joist members (e.g. those supporting a ceiling) the tables have been prepared on the basis that members are processed in accordance with tolerance class 2 of BS EN 336 across the timber width (joist depth) or are CLS/ALS processed sizes to provide level surfaces for ease of ceiling lining and the fixing of structural decking. For other timber

members (e.g. rafters, purlins and binders), the tables have been prepared on the basis of sawn dimensions or CLS/ALS processed sizes. The notes to individual tables state whether basic sawn or processed dimensioned timber is appropriate for the particular use. For timber of North American origin, the sizes shown are CLS/ALS sections, or sawn, resawn or processed to the BS EN 336 sizes and tolerances.

6.2 Floor joists and flat roof joists

6.2.1 Span tables

Span Table 7 to Table 10 inclusive give recommendations on the sizing of floor joists.

NOTE 1 These members have been calculated in accordance with BS 5268-7.1 to be capable of supporting the loadings given for each table. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

Table 7 and Table 8 should be applied where there are no partitions on the floor area being supported.

Table 9 and Table 10 should be applied where non load-bearing lightweight partitions as described in 5.1.2, at centres as close as is likely to occur, are supported on the floor.

Table 9 and Table 10 should be used in conjunction with Figure 9, Figure 10 and Figure 11. See also 5.1.1 regarding support for baths and other heavy concentrated loads.

Span Table 61 to Table 68 inclusive give recommendations on the sizing of flat roof joists.

NOTE 2 These members have been calculated in accordance with BS 5268-7.2 to be capable of supporting the loadings given for each table. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

Table 61, Table 62, Table 63, Table 65, Table 66 and Table 67 should be applied to situations where the only access is for the purposes of maintenance and repair.

Table 64 and Table 68 should be applied to situations where access is not limited to the purposes of maintenance and repair.

NOTE 3 See Annex M for guidance on the snow loading which is relevant for a particular site.

6.2.2 Notching, drilling and end-trimming

Notches, holes and end-trimming in floor joists and flat roof joists should be within the limits shown in Figure 1.

6.2.3 Strutting or bridging

Where the span of a floor joist or flat roof joist is more than 2.5 m, strutting is necessary.

This should be provided either by timber bridging or strutting in accordance with Figure 3, or by a proprietary system.

Timber strutting can be in the form of solid bridging of at least 38 mm basic thickness and with a depth equal to at least three-quarters of the depth of the joists; or it can consist of herringbone strutting with members of at least 38 mm by 38 mm basic size.

Herringbone strutting should not be used where the distance between the joists is more than approximately three times the depth of the joists.

6.2.4 Wallplates

Timber wallplates used to support floor joists and flat roof joists should be at least 70 mm wide.

NOTE In England and Wales it is normal for wallplates to have a basic thickness of 38 mm, whilst in Scotland thicknesses of 25 mm or 47 mm are common. These thicknesses are acceptable for this Part of BS 8103.

Joints along a wallplate should be made either with a halving joint at least 100 mm long with at least two nail fixings (see Figure 4), or by means of a proprietary fixing at a butt joint. A joint between wallplates at a corner should either be a halving joint with at least two nail fixings, or a proprietary fixing at a butt joint.

6.2.5 Bearing length

The ends of floor joists and flat roof joists are normally supported on masonry, a wallplate or a hanger. The bearing lengths given with each span table are minimum design values. Where it is necessary to provide a longer bearing to accommodate the end fixings or, in the case of floor joists supported on masonry, a 90 mm min. bearing should be provided to give restraint to the masonry wall.

6.2.6 Tying of floors and flat roofs to walls

Tying of floors and flat roofs to walls should be in accordance with BS 8103-1.

NOTE The strap details are shown in Figure 2 and Figure 7.

6.3 Trimmers, trimming joists and beams supporting floor joists

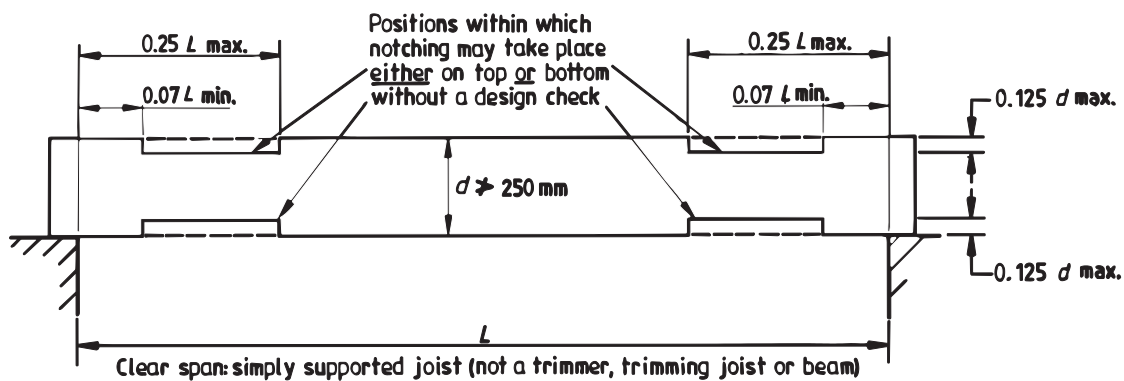
6.3.1 Span tables

Span Table 11 to Table 20 inclusive give recommendations on the sizing of trimmers, trimming joists and beams supporting a range of floor joist arrangements. These members are defined diagrammatically in the plans in Figure 12 to Figure 14, related to the relevant span tables.

NOTE These members have been calculated in accordance with BS 5268-2 to be capable of supporting the loadings applied by the various floor joist arrangements. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

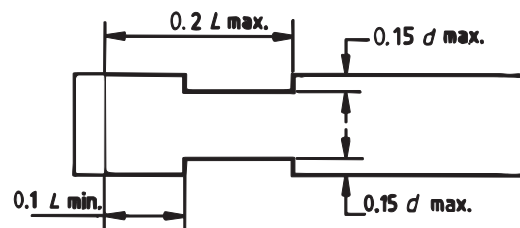
Table 11, Table 12, Table 13, Table 14, Table 17 and Table 18 should be applied to situations where partitions do not occur on the floor area being supported. Table 15, Table 16, Table 19 and Table 20 should be applied to situations where non load-bearing lightweight partitions (see 5.1.2) are supported on the floor.

Figure 1 Limits for notching and drilling of floor joists and end-trimming to fit steel hangers



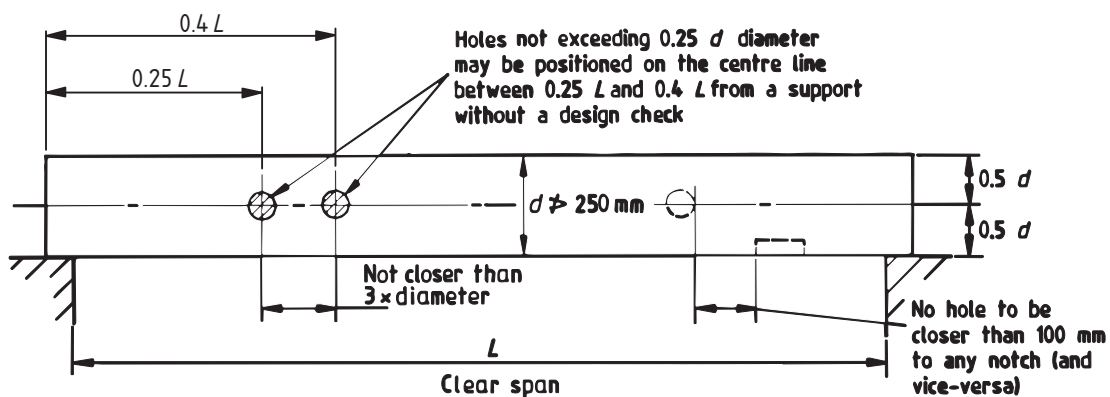
a) Limits for notching

NOTE 1 This alternative notching can occur at both ends, either on top or bottom, without a design check.



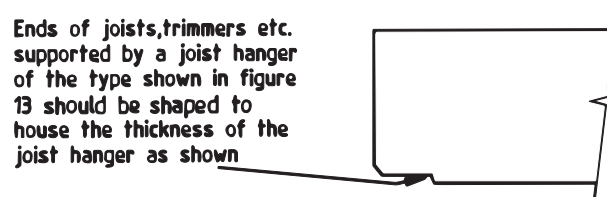
b) Alternative limits for notching

NOTE 2 This alternative notching can occur at both ends, either on top or bottom, without a design check.



c) Limits for drilling

NOTE 3 The holes permitted on the centre line can occur as well as a notch on the top or bottom.



d) End trimming

NOTE 4 The type shown in Figure 13.4 does not require the additional angled trim cut.

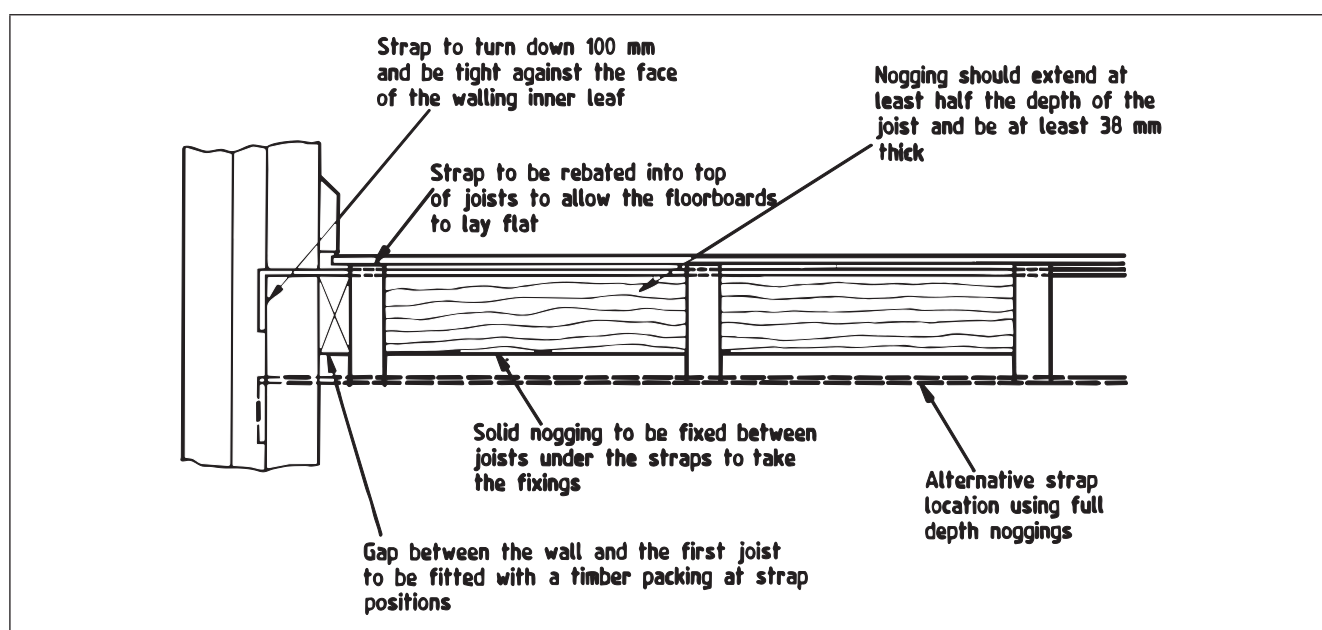
6.3.2 Notching, drilling and end-trimming

Trimmers, trimming joists and beams supporting floor joists should not be notched, drilled or end-trimmed unless justified by specialist calculation.

6.3.3 Bearing

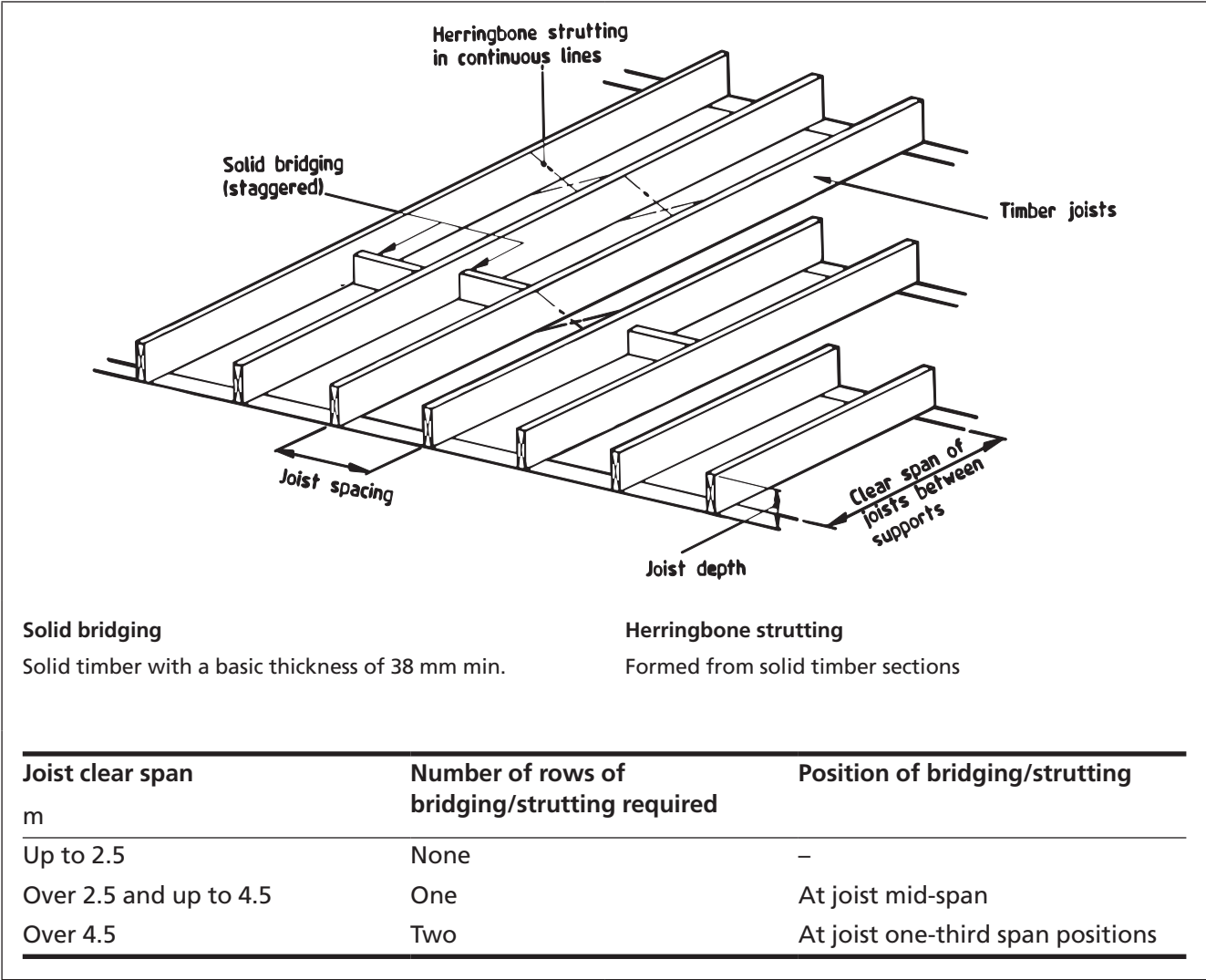
The ends of trimmers, trimming joists and beams supporting floor joists are normally supported on masonry, a wallplate or a hanger. The recommended minimum bearing length needed to support the design load should be selected from the span table for the worst design case within each table. It might be necessary to provide longer bearing to accommodate fixings or to give restraint to masonry.

Figure 2 Timber floor spanning parallel with a wall



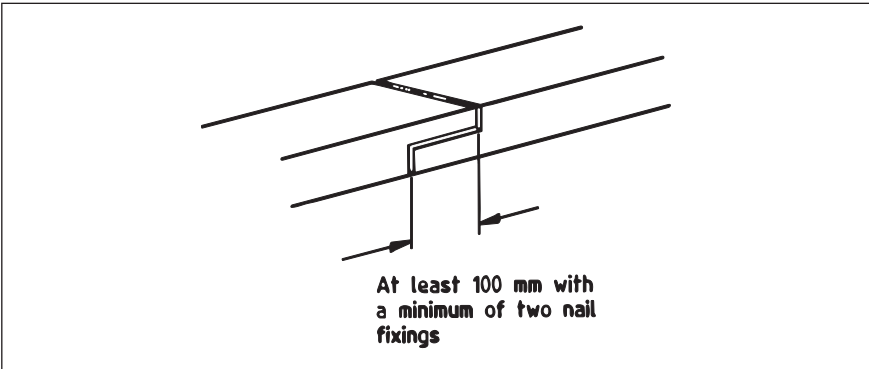
The strap illustrated in Figure 2 should be carried over at least three joists and be secured with four fixings, of which at least one should be in the third joist or in a noggings beyond the third joist.

Figure 3 Timber joist bridging/strutting requirements



Herringbone strutting (see Figure 3) should not be used where the spacing of the joists is greater than approximately three times the depth of the joist. In these instances only solid bridging should be used.

Figure 4 Wallplate halving joint



6.4 Traditional cut, framed pitched roof construction

6.4.1 General

A typical arrangement of a traditional cut, framed pitched roof construction is shown in Figure 5.

Span Table 21 to Table 60 inclusive recommend member sizes for traditional cut, framed pitched roofs which include ceiling joists, binders to support ceiling joists, rafters, and purlins to support rafters.

NOTE 1 A number of rafter pitches and rafter loading conditions are covered which is in accordance with BS EN 1991-1-3.

The span Table 21 to Table 60 can be used for member selection without further calculation, provided that the conditions referred to in the scope apply, together with the following:

- a) the dead and imposed loadings to be sustained by the ceiling, or the roof of which the members form a part do not exceed the values given in the notes to the appropriate diagrams or tables; and
- b) the timber is not holed or notched, other than birdsmouthing of rafters to a depth not exceeding one third of the depth of a rafter.

NOTE 2 See Annex M for guidance on the snow loading which is relevant for a particular site.

6.4.2 Bracing

A traditional cut, framed and pitched roof generally has sufficient built-in resistance to instability and wind forces by virtue of the nature of the roof and supporting construction (e.g. use of purlins and binders, tiling battens propping to members, hip ends, rigid sarking, or the like). However, the need for diagonal rafter bracing 5268-3 for trussed rafter roofs should be considered especially for single-hipped end and for non-hipped ended roofs of greater than 40° roof pitch to detached houses.

6.4.3 Battens for roof slating and tiling

Battens for roof slating and tiling of the species listed in Annex D should be in accordance with the sizes and tolerances given in 7.5.

NOTE This information has been presented in 7.5, which deals with trussed rafters, rather than in 6.4.3, as trussed rafters are the most common current form of construction for pitched roofs on small buildings.

6.4.4 Wallplates

Cut, framed, pitched roofs are normally supported on timber wallplates or similar flat bearing surfaces which should be carefully levelled and positioned to ensure that the roof is correctly aligned, with the bearings located at the positions assumed in the design and shown on the drawings. In all cases, the bearing areas should be sufficient to ensure that the permissible stresses for compression perpendicular to the grain are not exceeded in either the bearing or the roof timber. As a guide, the length of the bearing should be not less than 0.008 times the span of the roof, with a minimum value of 70 mm.

Joints along a wallplate should be made either with a halving joint at least 100 mm long with at least two nail fixings (see Figure 4), or by use of a proprietary fixing at a butt joint. A joint, between wallplates at a corner should either be a halving joint with at least two nail fixings, or consist of a proprietary fixing at a butt joint.

NOTE In England and Wales it is normal for wallplates to have a basic thickness of 38 mm, whilst in Scotland thicknesses of 25 mm or 47 mm are typical. These thicknesses are acceptable for this Part of BS 8103.

6.4.5 Connections including metal restraint straps

NOTE 1 For recommendations regarding tying the roof to the walls, see BS 8103-1. The tying details are shown in Figure 6 and Figure 7

Wallplates can be held down by one of the proprietary types of fixings [see Figure 7 b)] or, in the case of certain pitched roofs (see BS 8103-1), but not flat roofs, by nails into blockwork (but not into brickwork) by 75 mm long masonry nails at centres not exceeding 1 m, taking care to avoid vertical mortar joints.

At the eaves, each rafter or ceiling joist should be fixed to a wallplate by one of the proprietary types of fixings [see Figure 7 b)] or by nails. If nails are used, the minimum fixing at each bearing position should consist of two 4.5 mm diameter by 100 mm long round wire nails skew-nailed from each side of the ceiling joist or rafter into the wallplate.

If it is necessary to join lengths of rafters, the joint should be at a support position if bending is to be avoided in the connection.

NOTE 2 A typical detail which is not designed to take bending is shown in Figure 5 b).

If it is necessary to join lengths of ceiling joists, the joint should occur at a support position if bending is to be avoided in the connection.

NOTE 3 A typical detail which is not designed to take bending is shown in Figure 5 d).

Rafters should be joined to ceiling joists at the eaves.

NOTE 4 Typical details are shown in Figure 5 e).

Figure 5 Traditional cut framed pitched roof

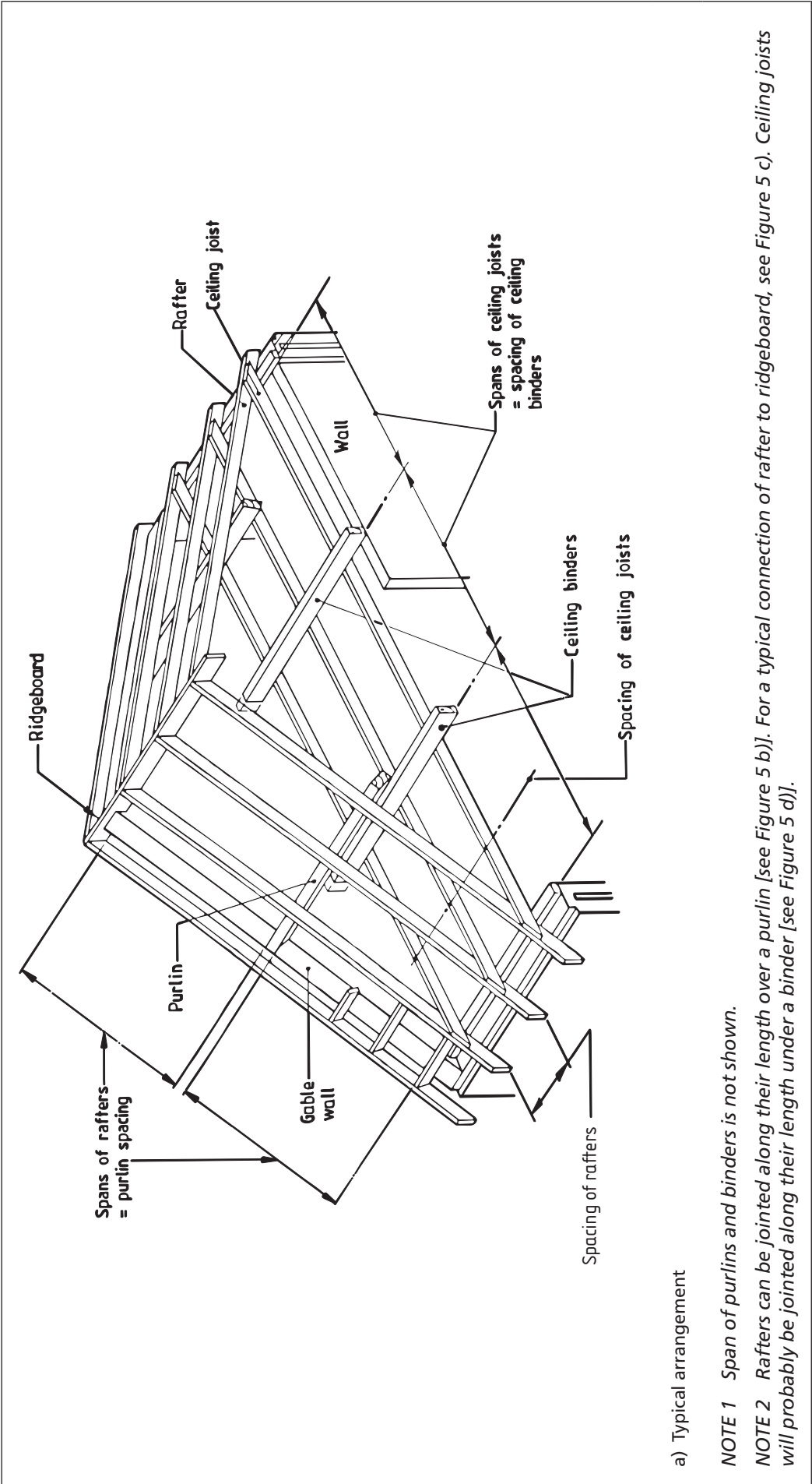
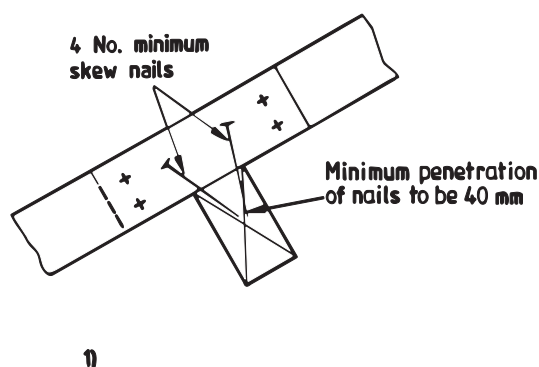
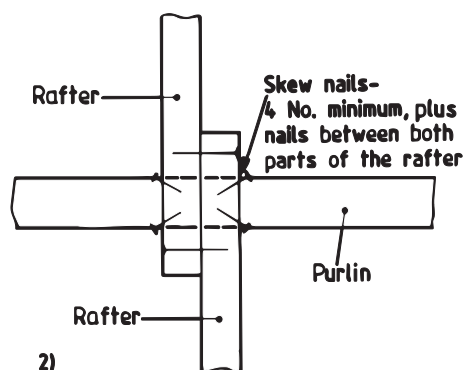


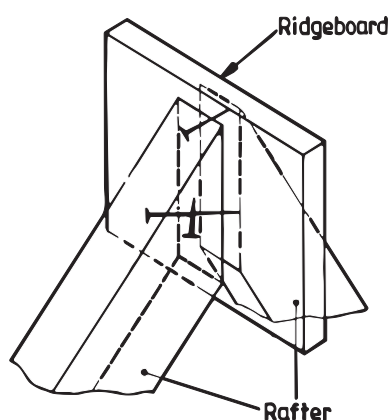
Figure 5 Traditional cut framed pitched roof (*continued*)

1)

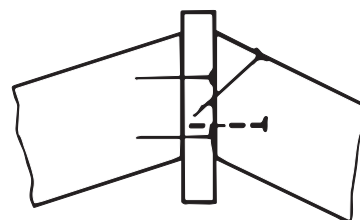


2)

b) Typical detail of joint in a rafter over a purlin

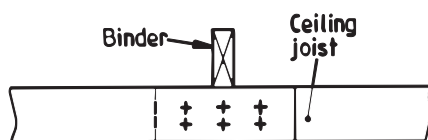
NOTE 1 This joint is not designed to take axial compression.

1)

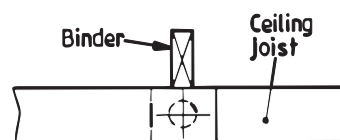


2)

c) Typical detail of joint of rafter to ridgeboard

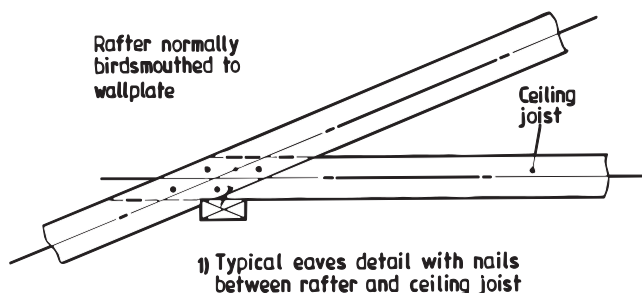


1) Typical detail with nails between binder and ceiling joist

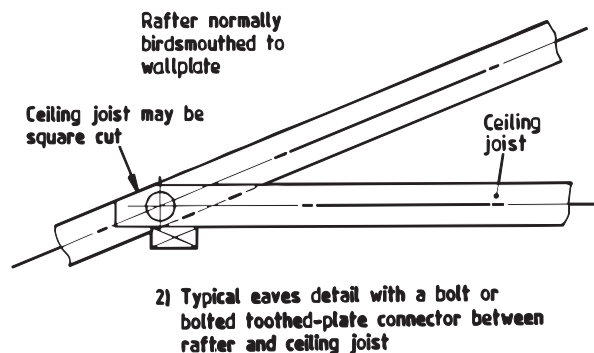


2) Typical detail with bolt or bolted toothed-plate connector between binder and ceiling joist

d) Typical details of joint (required to take axial tension) along length of ceiling joists at a binder position

NOTE 2 Binders and ceiling joists are fixed together by nails, a hanger or proprietary clip.

1) Typical eaves detail with nails between rafter and ceiling joist



2) Typical eaves detail with a bolt or bolted toothed-plate connector between rafter and ceiling joist

e) Typical details of joint (required to take axial load) between rafter and ceiling joist

Figure 6 Tying of pitched roofs to gable walls

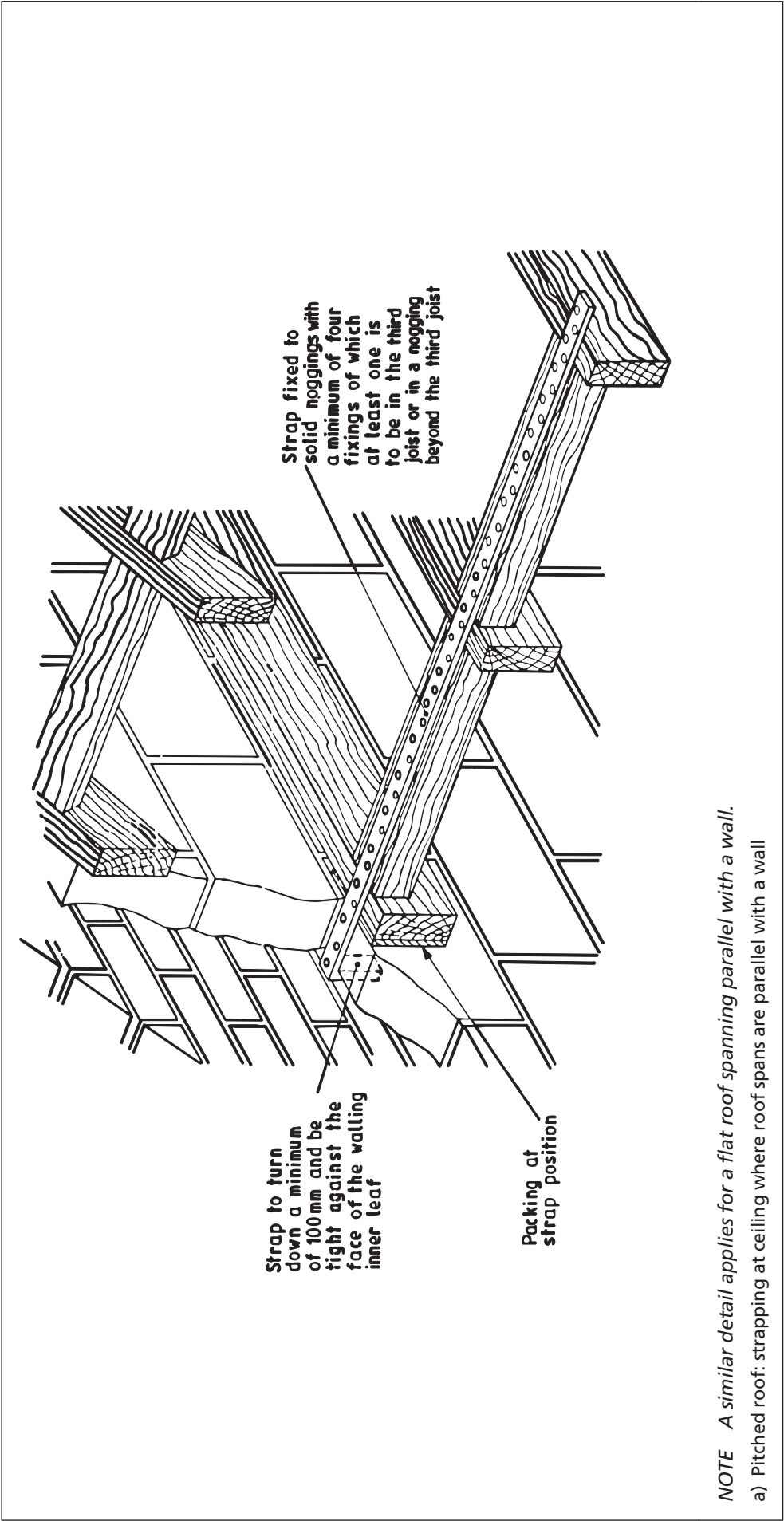
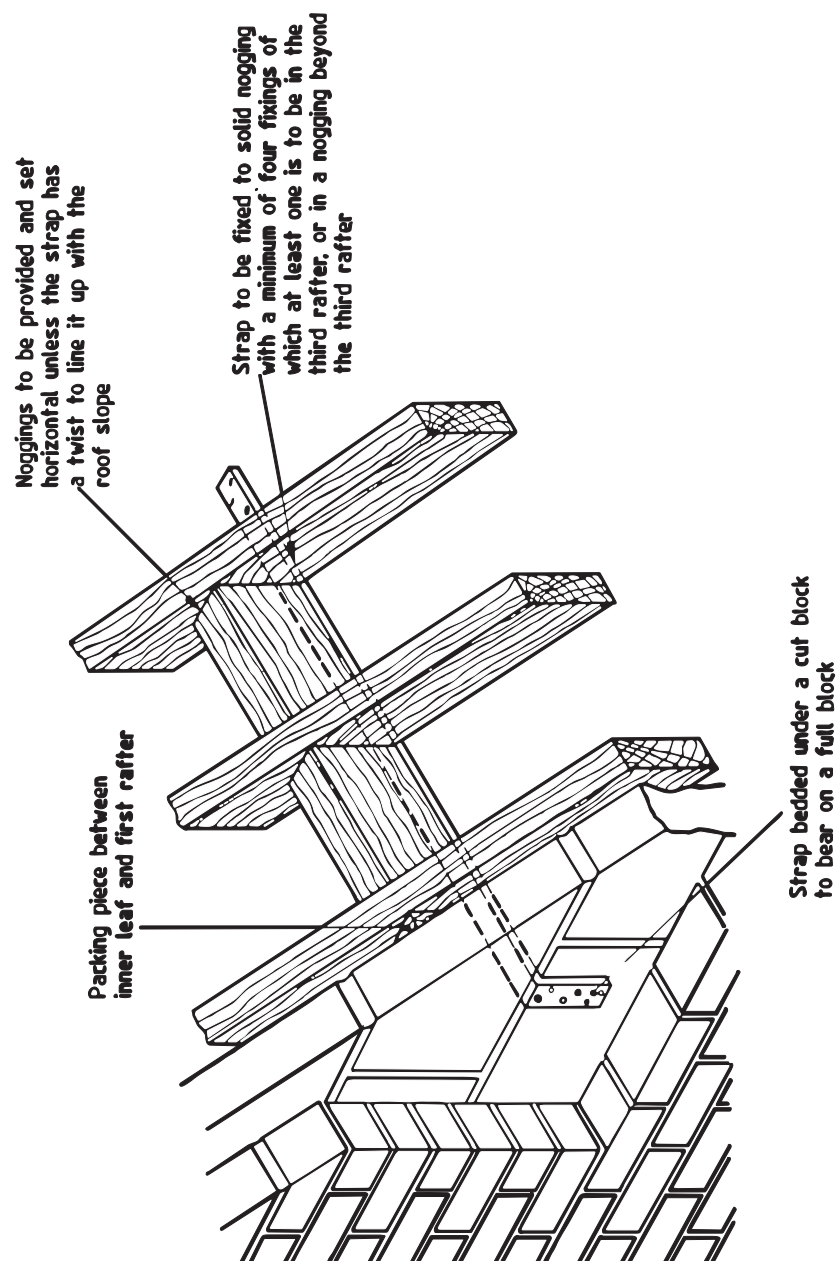


Figure 6 Tying of pitched roofs to gable walls (*continued*)

b) Pitched roof: connections at gable verge line

Figure 7 Pitched or flat roof bearing on to a wallplate

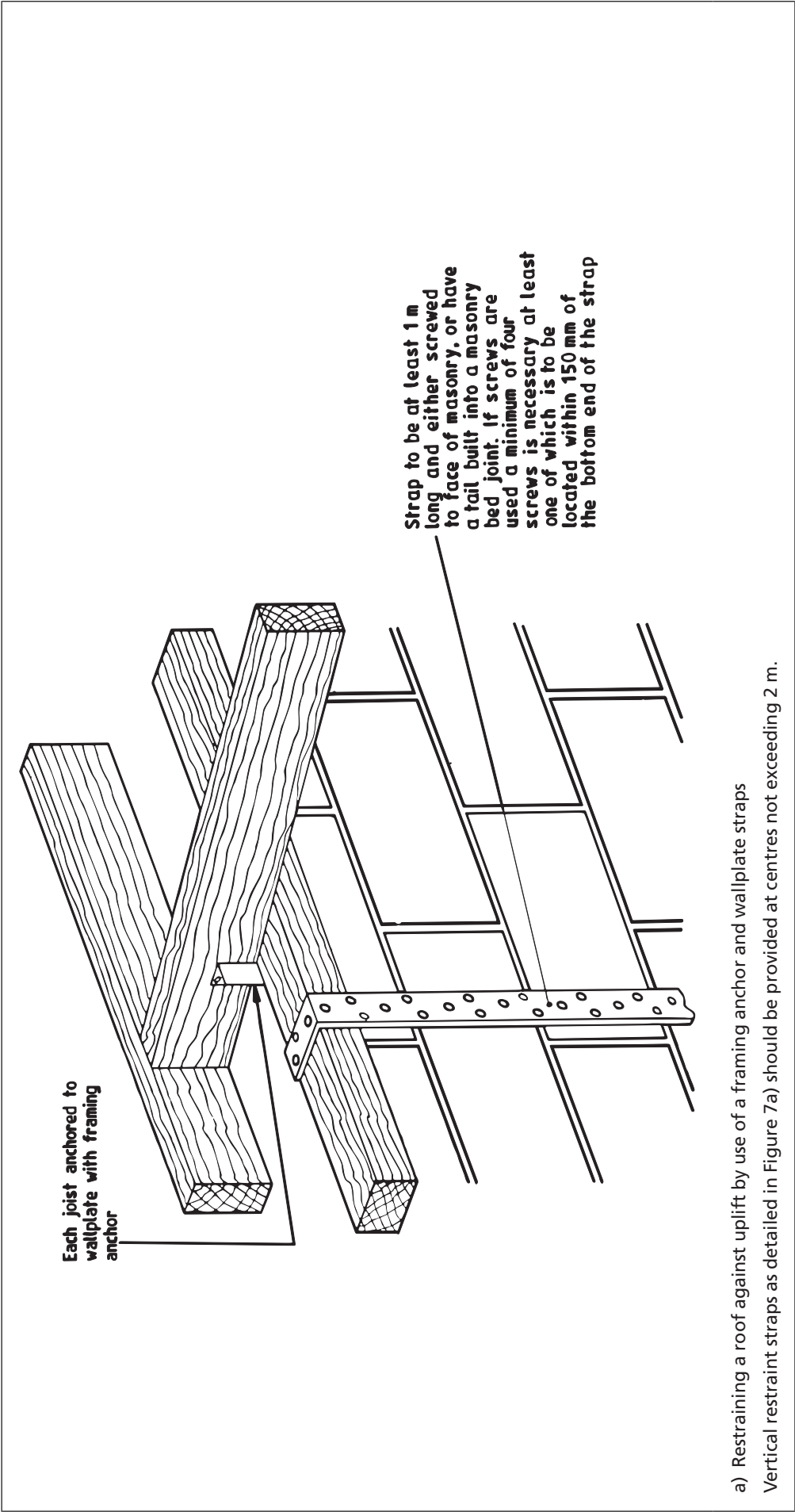


Figure 7 Pitched or flat roof bearing on to a wallplate (continued)

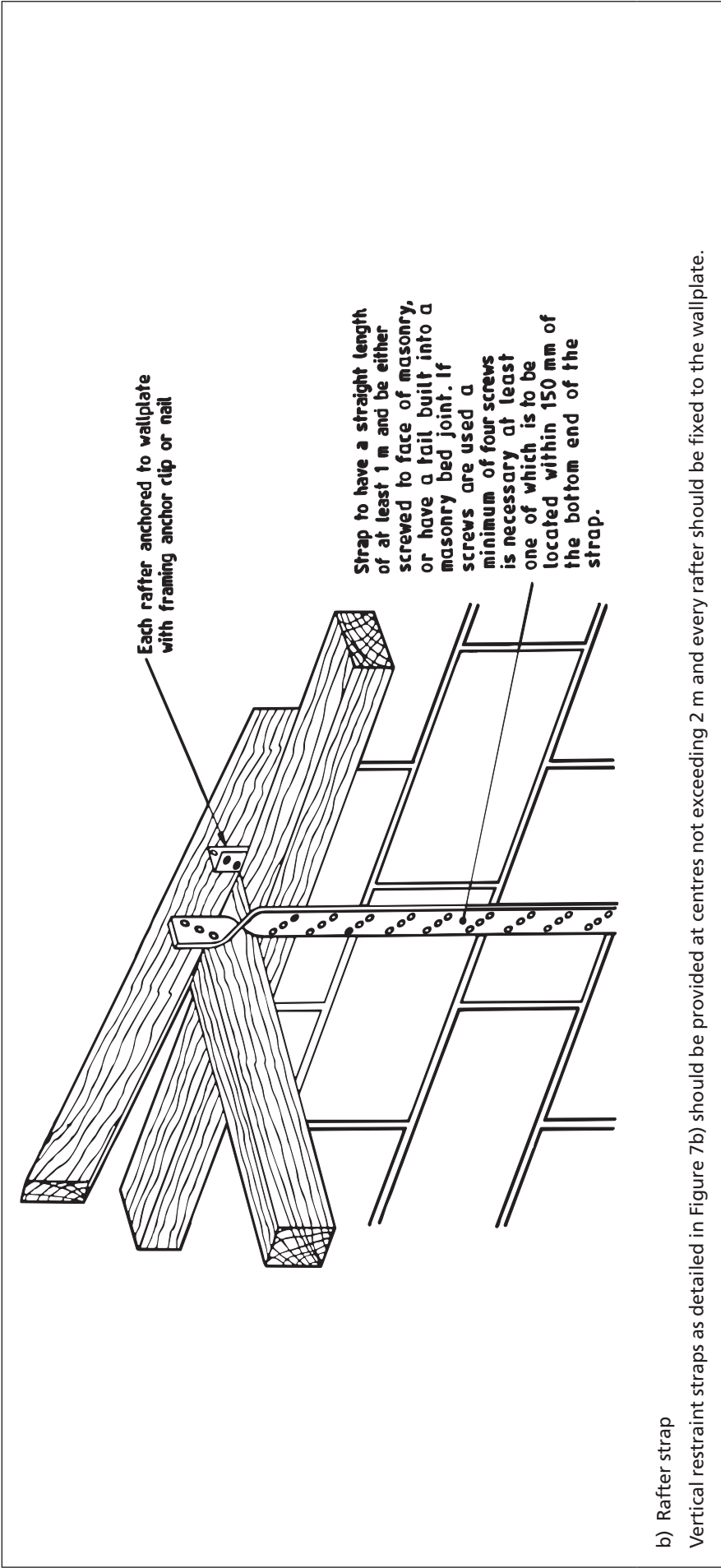


Table 6 Key to Table 7 to Table 74

Construction element	Timber member	Table reference	
		Timber strength class (see Table 1)	
		C16	C24
Floors:			
Not supporting partitions	Joists	7	8
	Beams or trimmers	11 and 12	13 and 14
	Trimming joists	17	18
Supporting non load-bearing lightweight partitions	Joists	9	10
	Beams or trimmers	15	16
	Trimming joists	19	20
Ceilings:			
	Joists	21	23
	Binders	22	24
Pitched roofs:			
Pitch greater than 15° but not more than 22½°			
— Imposed snow load 0.75 kN/m ²	Rafters	25	31
	Purlins	26	32
— Imposed snow load 1.00 kN/m ²	Rafters	37	43
	Purlins	38	44
— Imposed snow load 1.25 kN/m ²	Rafters	49	55
	Purlins	50	56
Pitch greater than 22½° but not greater than 30°			
— Imposed snow load 0.75 kN/m ²	Rafters	27	33
	Purlins	28	34
— Imposed snow load 1.00 kN/m ²	Rafters	39	45
	Purlins	40	46
— Imposed snow load 1.25 kN/m ²	Rafters	51	57
	Purlins	52	58
Pitch greater than 30° but not greater than 45°			
— Imposed snow load 0.75 kN/m ²	Rafters	29	35
	Purlins	30	36
— Imposed snow load 1.00 kN/m ²	Rafters	41	47
	Purlins	42	48
— Imposed snow load 1.25 kN/m ²	Rafters	53	59
	Purlins	54	60
Flat roofs:			
With access for the purposes of maintenance and repair only (Access limited)			
— Imposed snow load 0.75 kN/m ²	Joists	61	65
— Imposed snow load 1.00 kN/m ²	Joists	62	66
— Imposed snow load 1.25 kN/m ²	Joists	63	67
With access not limited to the purposes of maintenance and repair (Access not limited)			
— Imposed load 1.50 kN/m ²	Joists	64	68

Table 6 Key to Table 7 to Table 74 (continued)

Construction element	Timber member	Table reference	
		Timber strength class (see Table 1)	
		C16	C24
Sheeted or decked roofs:			
Pitch greater than 10° but not greater than 35°			
— Imposed snow load 0.75 kN/m ²	Purlins	69	72
— Imposed snow load 1.00 kN/m ²	Purlins	70	73
— Imposed snow load 1.25 kN/m ²	Purlins	71	74
NOTE 1 The strength classes given in Table 7 to Table 74 assume that the qualifying species/strength grade combinations to be used are those given in Table 1.			
NOTE 2 The illustrations which accompany the span tables are diagrammatic and do not show all details of construction.			
NOTE 3 The imposed snow loading categories assume that actual imposed loads on roof constructions will be calculated using BS EN 1991-1-3. See Annex M for guidance on snow loadings relevant for a particular site.			
NOTE 4 Span tables are not given for trussed rafter roof constructions.			

Adequate connections between members should be provided as appropriate.

Trussed rafters should be designed in accordance with BS 5268-3⁶⁾.

6.5 Floor joists: Notes and recommendations to Table 7, Table 8, Table 9 and Table 10

6.5.1 When a lightweight partition is parallel to the joist span, one additional joist should be provided directly under the partition, as shown in Figure 9 and Figure 10, or noggings should be provided as shown in Figure 11. Non load-bearing lightweight partitions perpendicular to floor joists spaced at centres not exceeding 600 mm do not require support from noggings.

NOTE 1 The sizes, spacings and spans given will support the dead loads stated in the tables together with an imposed load not exceeding 1.50 kN/m². Examples of some typical floor constructions and their respective dead loadings are given in Annex L. In addition, Table 9 and Table 10 make allowance for non load-bearing lightweight partitions weighing not more than 0.8 kN/m run at spacings as close as is likely to occur in practice. See also Figure 8.

NOTE 2 The timber sizes given in the span tables can be used when a bath is to be placed on the floor area being supported providing that the joists supporting the bath are doubled-up. This applies both if the joists are parallel or perpendicular to the length of a rectangular bath. Other shapes of bath need special consideration. Special consideration might also be required for other heavy concentrated loads.

⁶⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

NOTE 3 The section sizes given in the tables are either sawn across the timber thickness in accordance with tolerance class 1 of BS EN 336 and processed in accordance with tolerance class 2 across the timber width (joist depth), or are CLS/ALS processed sizes in accordance with tolerance class 2, to provide level surfaces for ease of ceiling lining and the fixing of structural decking. BS EN 336 tolerances are as follows:

- a) on a sawn thickness of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a processed thickness or depth of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- c) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.5.2 Unless justified by specialist calculation, the minimum bearing length at supports for floor joists should be as stated at the base of each table.

NOTE It might be necessary to provide longer bearing to accommodate fixings or simply for practical reasons such as construction tolerances.

If the end of a joist is supported on a steel hanger, the end should if necessary be shaped to fit the hanger neatly as indicated in diagrammatic form in Figure 1d), and the gap between the end of the joist and the inside face of the hanger should not exceed 6 mm. If the end of a joist is supported on masonry, the end bearing should be at least 90 mm to provide restraint to the masonry wall.

6.5.3 Notching and drilling of floor joists should not exceed the limits given in 6.2.2 and Figure 1.

NOTE Permissible clear spans have been calculated in accordance with BS 5268-7.1. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

Figure 8 Floor joist arrangement

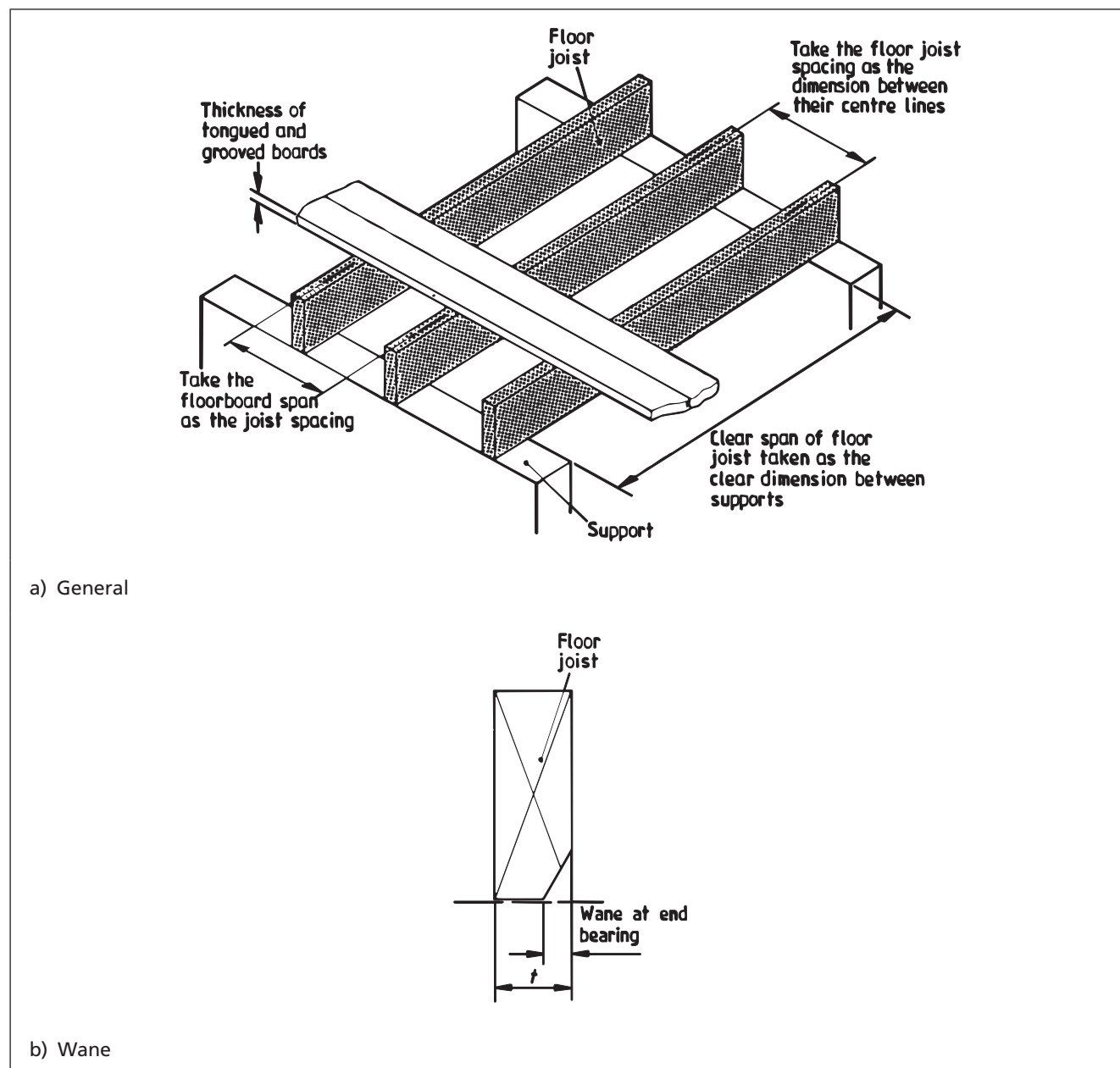


Figure 9 Double joist construction

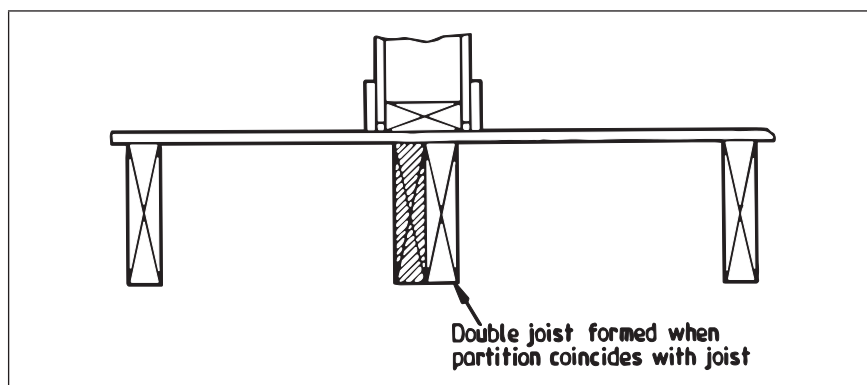


Figure 10 Provision of extra joist

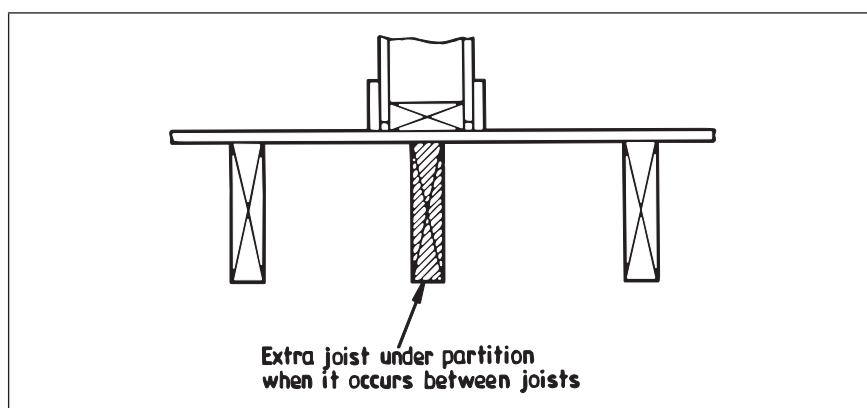


Figure 11 Noggings supporting partitions

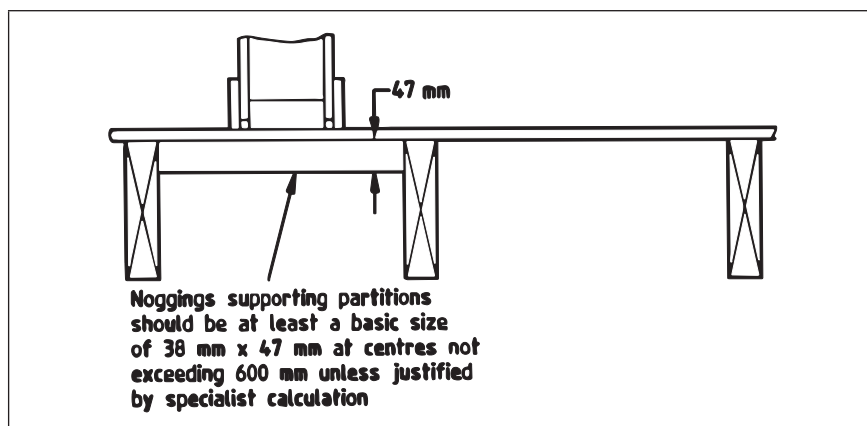


Table 7 Permissible clear spans of joists supporting floors with no partitions. Timber of strength class C16

C16		No partitions								
Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		Not more than 0.25			More than 0.25 but not more than 0.50			More than 0.50 but not more than 1.25		
		Spacing of joists mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.130	1.011	0.767	1.061	0.954	0.731	0.920	0.834	0.652
	38 × 97	1.828	1.692	1.303	1.717	1.556	1.214	1.423	1.301	1.037
	38 × 120	2.482	2.385	1.925	2.368	2.215	1.755	1.947	1.791	1.448
	38 × 145	2.983	2.868	2.510	2.853	2.707	2.331	2.453	2.290	1.872
	38 × 170	3.442	3.306	2.873	3.281	3.098	2.690	2.808	2.649	2.267
	38 × 195	3.939	3.752	3.263	3.724	3.518	3.056	3.189	3.010	2.609
	38 × 220	4.434	4.193	3.648	4.161	3.932	3.418	3.567	3.367	2.920
	47 × 72	1.324	1.233	0.942	1.272	1.154	0.891	1.091	0.993	0.783
	47 × 97	2.024	1.914	1.583	1.920	1.818	1.460	1.665	1.527	1.228
	47 × 120	2.663	2.561	2.302	2.548	2.450	2.087	2.255	2.081	1.696
	47 × 145	3.200	3.078	2.786	3.062	2.945	2.609	2.723	2.570	2.174
	47 × 170	3.691	3.551	3.188	3.533	3.398	2.987	3.116	2.942	2.552
	47 × 195	4.221	4.063	3.619	4.042	3.889	3.391	3.538	3.341	2.900
	47 × 220	4.723	4.572	4.044	4.549	4.354	3.791	3.954	3.735	3.244
	63 × 97	2.319	2.197	1.919	2.191	2.079	1.822	1.934	1.839	1.533
	63 × 120	2.931	2.821	2.566	2.807	2.700	2.454	2.527	2.429	2.088
	63 × 145	3.518	3.388	3.084	3.370	3.244	2.950	3.037	2.920	2.577
	63 × 170	4.055	3.905	3.558	3.886	3.741	3.404	3.504	3.370	2.950
	63 × 195	4.633	4.465	4.070	4.442	4.278	3.896	4.009	3.850	3.350
	63 × 220	5.061	4.923	4.580	4.905	4.770	4.365	4.512	4.301	3.745
	75 × 120	3.100	2.985	2.718	2.970	2.859	2.601	2.677	2.575	2.327
	75 × 145	3.719	3.582	3.265	3.564	3.432	3.125	3.216	3.094	2.807
	75 × 170	4.283	4.128	3.765	4.107	3.957	3.605	3.709	3.569	3.212
	75 × 195	4.830	4.700	4.306	4.683	4.523	4.125	4.242	4.084	3.646
	75 × 220	5.268	5.128	4.793	5.109	4.971	4.641	4.740	4.595	4.074
CLS/ALS sizes	38 × 89	1.617	1.463	1.121	1.499	1.356	1.052	1.259	1.149	0.910
	38 × 140	2.843	2.733	2.398	2.719	2.587	2.167	2.330	2.149	1.752
	38 × 184	3.721	3.557	3.092	3.530	3.334	2.895	3.022	2.852	2.471
	38 × 235	4.710	4.460	3.890	4.430	4.180	3.640	3.800	3.590	3.110

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 38 mm.

If wane is not permitted, the minimum design bearing length is 20 mm.

See also 6.5.2.

^{A)} Check the availability of section sizes.

Table 8 Permissible clear spans of joists supporting floors with no partitions. Timber of strength class C24

C24		No partitions								
Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		Not more than 0.25			More than 0.25 but not more than 0.50			More than 0.50 but not more than 1.25		
		Spacing of joists mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.262	1.189	1.023	1.215	1.146	0.989	1.108	1.048	0.874
	38 × 97	1.936	1.829	1.586	1.838	1.739	1.514	1.635	1.551	1.358
	38 × 120	2.582	2.482	2.200	2.469	2.369	2.076	2.180	2.073	1.826
	38 × 145	3.103	2.984	2.709	2.969	2.854	2.588	2.667	2.561	2.305
	38 × 170	3.580	3.444	3.128	3.426	3.294	2.989	3.079	2.958	2.678
	38 × 195	4.096	3.941	3.581	3.921	3.771	3.423	3.526	3.388	3.068
	38 × 220	4.609	4.436	4.034	4.413	4.246	3.856	3.971	3.816	3.458
	47 × 72	1.404	1.324	1.144	1.347	1.273	1.103	1.223	1.159	1.010
	47 × 97	2.141	2.025	1.763	2.026	1.920	1.678	1.795	1.705	1.499
	47 × 120	2.770	2.664	2.421	2.651	2.549	2.290	2.382	2.268	2.006
	47 × 145	3.327	3.201	2.910	3.185	3.064	2.783	2.865	2.754	2.496
	47 × 170	3.836	3.693	3.359	3.674	3.535	3.212	3.307	3.179	2.883
	47 × 195	4.387	4.224	3.845	4.202	4.045	3.678	3.786	3.640	3.302
	47 × 220	4.860	4.725	4.328	4.707	4.552	4.141	4.262	4.099	3.720
	63 × 97	2.432	2.321	2.030	2.308	2.192	1.925	2.032	1.934	1.709
	63 × 120	3.046	2.933	2.669	2.918	2.808	2.553	2.628	2.527	2.273
	63 × 145	3.665	3.521	3.207	3.503	3.372	3.069	3.158	3.038	2.759
	63 × 170	4.211	4.058	3.699	4.037	3.888	3.541	3.643	3.505	3.185
	63 × 195	4.770	4.637	4.231	4.614	4.445	4.052	4.168	4.011	3.646
	63 × 220	5.204	5.064	4.731	5.046	4.908	4.560	4.678	4.514	4.106
	75 × 120	3.220	3.102	2.827	3.086	2.972	2.705	2.784	2.678	2.678
	75 × 145	3.862	3.721	3.394	3.703	3.567	3.250	3.344	3.218	3.218
	75 × 170	4.446	4.286	3.913	4.265	4.110	3.748	3.855	3.711	3.711
	75 × 195	4.966	4.833	4.474	4.816	4.686	4.287	4.408	4.245	4.245
	75 × 220	5.415	5.272	4.932	5.253	5.113	4.778	4.878	4.743	4.743
CLS/ALS sizes	38 × 89	1.713	1.617	1.399	1.633	1.544	1.341	1.464	1.388	1.201
	38 × 140	2.957	2.844	2.581	2.829	2.719	2.466	2.541	2.440	2.170
	38 × 184	3.869	3.723	3.382	3.703	3.561	3.232	3.329	3.199	2.897
	38 × 235	4.850	4.710	4.310	4.700	4.540	4.120	4.240	4.080	3.700

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 45 mm.

If wane is not permitted, the minimum design bearing length is 24 mm.

See also 6.5.2.

^{A)} Check the availability of section sizes.

Table 9 Permissible clear spans of joists for floors supporting non load-bearing lightweight partitions ^{A)}.
Timber of strength class C16

C16		Lightweight partitions								
Size of joist ^{B)} mm × mm		Dead load kN/m ²								
		Not more than 0.25			More than 0.25 but not more than 0.50			More than 0.50 but not more than 1.25		
		Spacing of joists mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.017	0.910	0.690	0.955	0.859	0.658	0.828	0.751	0.586
	38 × 97	1.646	1.523	1.173	1.545	1.401	1.093	1.281	1.171	0.933
	38 × 120	2.234	2.147	1.732	2.131	1.993	1.579	1.753	1.612	1.303
	38 × 145	2.685	2.581	2.259	2.568	2.437	2.098	2.207	2.061	1.684
	38 × 170	3.098	2.976	2.586	2.953	2.788	2.421	2.527	2.384	2.040
	38 × 195	3.545	3.377	2.937	3.352	3.166	2.750	2.871	2.709	2.348
	38 × 220	3.990	3.773	3.284	3.745	3.539	3.076	3.210	3.030	2.628
	47 × 72	1.191	1.110	0.848	1.145	1.038	0.802	0.982	0.894	0.705
	47 × 97	1.822	1.723	1.424	1.728	1.636	1.314	1.498	1.375	1.105
	47 × 120	2.397	2.305	2.071	2.293	2.205	1.878	2.030	1.872	1.526
	47 × 145	2.880	2.770	2.507	2.756	2.650	2.348	2.451	2.313	1.957
	47 × 170	3.322	3.196	2.869	3.180	3.059	2.688	2.805	2.648	2.297
	47 × 195	3.799	3.657	3.257	3.638	3.500	3.052	3.184	3.007	2.610
	47 × 220	4.250	4.115	3.640	4.094	3.918	3.412	3.559	3.362	2.920
	63 × 97	2.087	1.978	1.727	1.972	1.871	1.640	1.740	1.655	1.380
	63 × 120	2.638	2.539	2.309	2.526	2.430	2.209	2.274	2.186	1.879
	63 × 145	3.166	3.049	2.775	3.033	2.919	2.655	2.733	2.628	2.319
	63 × 170	3.649	3.515	3.202	3.497	3.367	3.064	3.153	3.033	2.655
	63 × 195	4.170	4.018	3.663	3.998	3.850	3.506	3.608	3.465	3.015
	63 × 220	4.555	4.431	4.122	4.415	4.293	3.928	4.061	3.871	3.370
	75 × 120	2.790	2.687	2.446	2.673	2.573	2.341	2.409	2.317	2.094
	75 × 145	3.347	3.224	2.939	3.208	3.089	2.813	2.894	2.785	2.526
	75 × 170	3.855	3.715	3.389	3.697	3.561	3.245	3.338	3.212	2.891
	75 × 195	4.347	4.230	3.875	4.214	4.070	3.712	3.818	3.675	3.281
	75 × 220	4.741	4.615	4.314	4.598	4.474	4.177	4.266	4.136	3.667
CLS/ALS sizes	38 × 89	1.455	1.317	1.009	1.349	1.220	0.947	1.133	1.034	0.819
	38 × 140	2.559	2.460	2.158	2.447	2.329	1.951	2.097	1.934	1.577
	38 × 184	3.349	3.201	2.783	3.177	3.000	2.606	2.720	2.567	2.224
	38 × 235	4.236	4.009	3.490	3.979	3.760	3.270	3.412	3.221	2.794

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 34 mm.

If wane is not permitted, the minimum design bearing length is 18 mm.

See also 6.5.2.

^{A)} See 6.5.1 when a partition is parallel to the joists.

^{B)} Check the availability of section sizes.

Table 10 Permissible clear spans of joists for floors supporting non load-bearing lightweight partitions^{A)}.
Timber of strength class C24

C24		Lightweight partitions								
Size of joist ^{B)} mm × mm		Dead load kN/m ²								
		Not more than 0.25			More than 0.25 but not more than 0.50			More than 0.50 but not more than 1.25		
		Spacing of joists mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.136	1.070	0.921	1.093	1.031	0.890	0.997	0.943	0.786
	38 × 97	1.742	1.646	1.427	1.654	1.565	1.362	1.472	1.396	1.222
	38 × 120	2.324	2.234	1.980	2.222	2.132	1.868	1.962	1.865	1.644
	38 × 145	2.793	2.686	2.438	2.672	2.568	2.330	2.400	2.305	2.074
	38 × 170	3.222	3.099	2.815	3.083	2.965	2.690	2.771	2.662	2.410
	38 × 195	3.686	3.547	3.223	3.529	3.394	3.081	3.173	3.049	2.761
	38 × 220	4.148	3.993	3.630	3.972	3.821	3.471	3.574	3.435	3.112
	47 × 72	1.263	1.191	1.029	1.213	1.145	0.993	1.101	1.043	0.909
	47 × 97	1.926	1.823	1.587	1.824	1.728	1.510	1.615	1.535	1.349
	47 × 120	2.493	2.398	2.179	2.386	2.294	2.061	2.144	2.042	1.806
	47 × 145	2.994	2.881	2.619	2.866	2.757	2.504	2.579	2.478	2.246
	47 × 170	3.453	3.323	3.023	3.306	3.181	2.891	2.977	2.861	2.594
	47 × 195	3.948	3.801	3.460	3.782	3.640	3.310	3.407	3.276	2.972
	47 × 220	4.374	4.253	3.895	4.237	4.097	3.727	3.836	3.689	3.348
	63 × 97	2.189	2.089	1.827	2.077	1.972	1.732	1.829	1.741	1.538
	63 × 120	2.742	2.639	2.402	2.626	2.527	2.298	2.366	2.275	2.046
	63 × 145	3.290	3.168	2.886	3.152	3.035	2.762	2.842	2.734	2.483
	63 × 170	3.790	3.652	3.329	3.634	3.499	3.187	3.279	3.155	2.866
	63 × 195	4.293	4.174	3.808	4.153	4.001	3.646	3.751	3.610	3.282
	63 × 220	4.684	4.558	4.258	4.541	4.417	4.104	4.211	4.063	3.696
	75 × 120	2.898	2.792	2.544	2.778	2.675	2.435	2.505	2.410	2.190
	75 × 145	3.475	3.349	3.055	3.333	3.210	2.925	3.009	2.896	2.633
	75 × 170	4.001	3.858	3.522	3.839	3.699	3.374	3.470	3.340	3.039
	75 × 195	4.469	4.350	4.027	4.334	4.217	3.858	3.968	3.820	3.478
	75 × 220	4.874	4.745	4.438	4.728	4.601	4.300	4.390	4.268	3.915
CLS/ALS sizes	38 × 89	1.542	1.456	1.259	1.470	1.390	1.207	1.318	1.249	1.081
	38 × 140	2.662	2.560	2.323	2.546	2.448	2.220	2.287	2.196	1.953
	38 × 184	3.482	3.350	3.044	3.333	3.205	2.909	2.996	2.879	2.607
	38 × 235	4.361	4.238	3.874	4.222	4.077	3.704	3.814	3.666	3.322

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 41 mm.

If wane is not permitted, the minimum design bearing length is 21 mm.

See 6.5.2.

A) See 6.5.1 when a partition is parallel to the joists.

B) Check the availability of section sizes.

6.6 Beams and trimmers: Notes to Table 11 to Table 16

NOTE 1 The overall sizes of the double (or single) beams or trimmers shown in Figure 12 will support load from the area shown hatched in plans A and B, including the following loads:

- a) load from the trimmed floor joists;
- b) a dead load not exceeding 0.5 kN/m^2 ;
- c) an imposed load not exceeding 1.5 kN/m^2 ;
- d) and, in the case of Table 15 and Table 16, loads from non load-bearing lightweight partitions weighing not more than 0.8 kN/m run at spacings as close as those likely to occur in practice.

Examples of some typical floor constructions and their respective dead loadings are given in Annex L.

NOTE 2 The section sizes given in the tables are either sawn across the timber thickness in accordance with tolerance class 1 of BS EN 336 and processed in accordance with tolerance class 2 across the timber width (joist depth), or are CLS/ALS processed sizes in accordance with tolerance class 2, to provide level surfaces for ease of ceiling lining and the fixing of structural decking. BS EN 336 tolerances are as follows:

- a) on a sawn thickness of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a processed thickness or depth of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- c) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.6.1 Where the beams or trimmers in Table 15 and Table 16 consist of double-members; they should be fixed together with their tops flush. Unless justified by specialist calculation, the fixings should be by nailing as follows.

Overall width of double-member	Nail length and diameter	Nominal centres of nails
mm	mm	mm
76	75 × 3.8	150
94	90 × 4.2	150
126	125 × 5.5	200
150	150 × 6.0	200

NOTE 1 These values are relevant only where the span of floor joists, which are supported by a beam or trimmer, does not exceed 6 m.

NOTE 2 The centres quoted apply where two rows of nails in line are used. If staggered nailing is used, the values refer to the centres in one row.

6.6.2 Unless justified by specialist calculation, the minimum design bearing length at supports should be as stated at the base of each table.

NOTE It might be necessary to provide longer bearing to accommodate fixings or simply for practical reasons such as construction tolerances.

If a beam or trimmer is supported by a hanger, it is strongly recommended that a structural designer be consulted or that a proprietary design of hanger be used. If the end of a beam or trimmer is supported on masonry, the end bearing should be at least 90 mm to provide restraint to the masonry wall. Also, where the bearing is on masonry, the bearing area provided should conform to BS 8103-2.

6.6.3 Notching or drilling of a beam or trimmer should not be carried out unless justified by specialist calculation.

NOTE The design of the beams and trimmers has been based on BS 5268-2. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1. Spans of less than 1.8 m are not tabulated.

6.6.4 Particularly where floor joists occur only on one side of a beam or trimmer and are supported on steel hangers, it is recommended that consideration be given to preventing rotation of the beam or trimmer, e.g. by a fixing into the beam or trimmer near the bottom of the hangers.

NOTE 1 For guidance on fixing joists to beams or trimmers by a hanger see Figure 13.

Connections of joists to trimmers, or trimming joists or beams (see Figure 12) should be by:

- a) a proprietary joist hanger of adequate capacity; or
- b) a connection justified by specialist calculation; or
- c) a beam positioned beneath the floor joist.

NOTE 2 Typical joist hangers are shown in Figure 13.

If the floor joists are perpendicular to the trimming joist, the latter should be designed as a beam. (See Table 11 to Table 14.)

Figure 12 Plans relating to Table 11 to Table 16

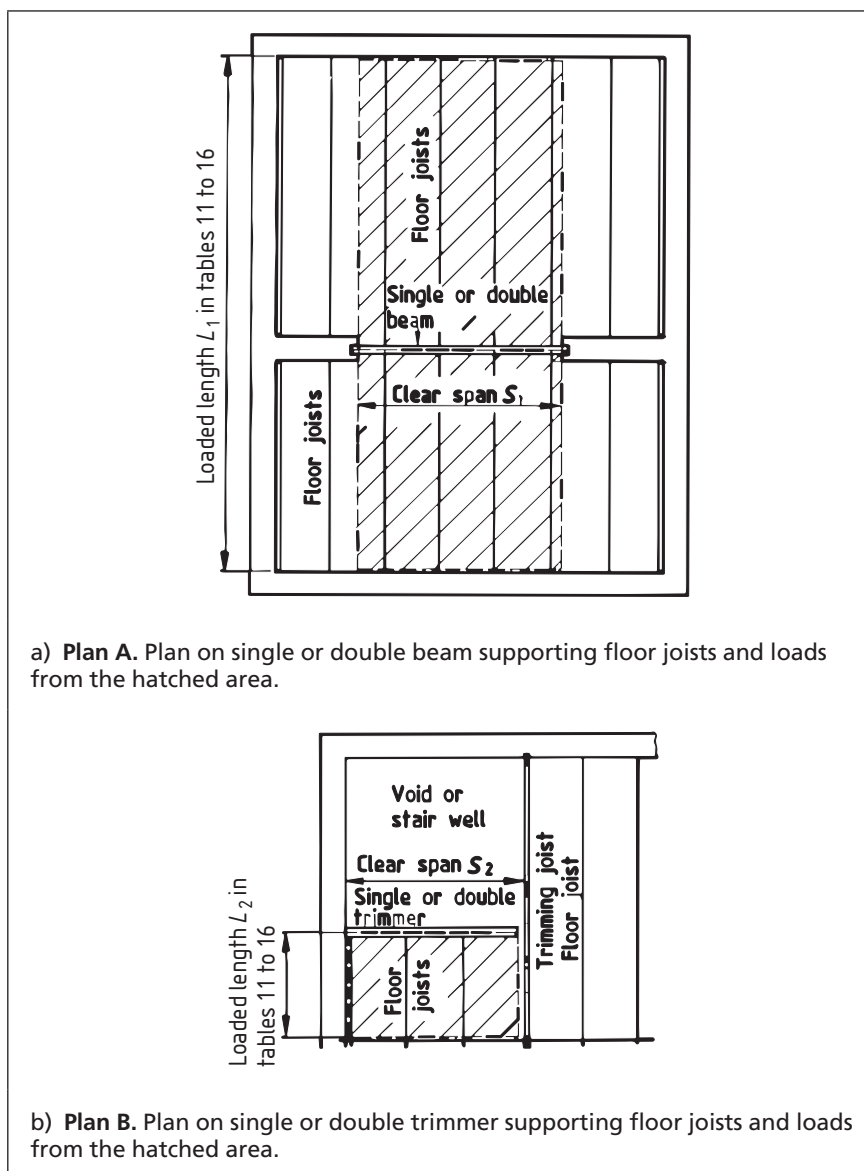


Figure 13 Typical steel hanger details

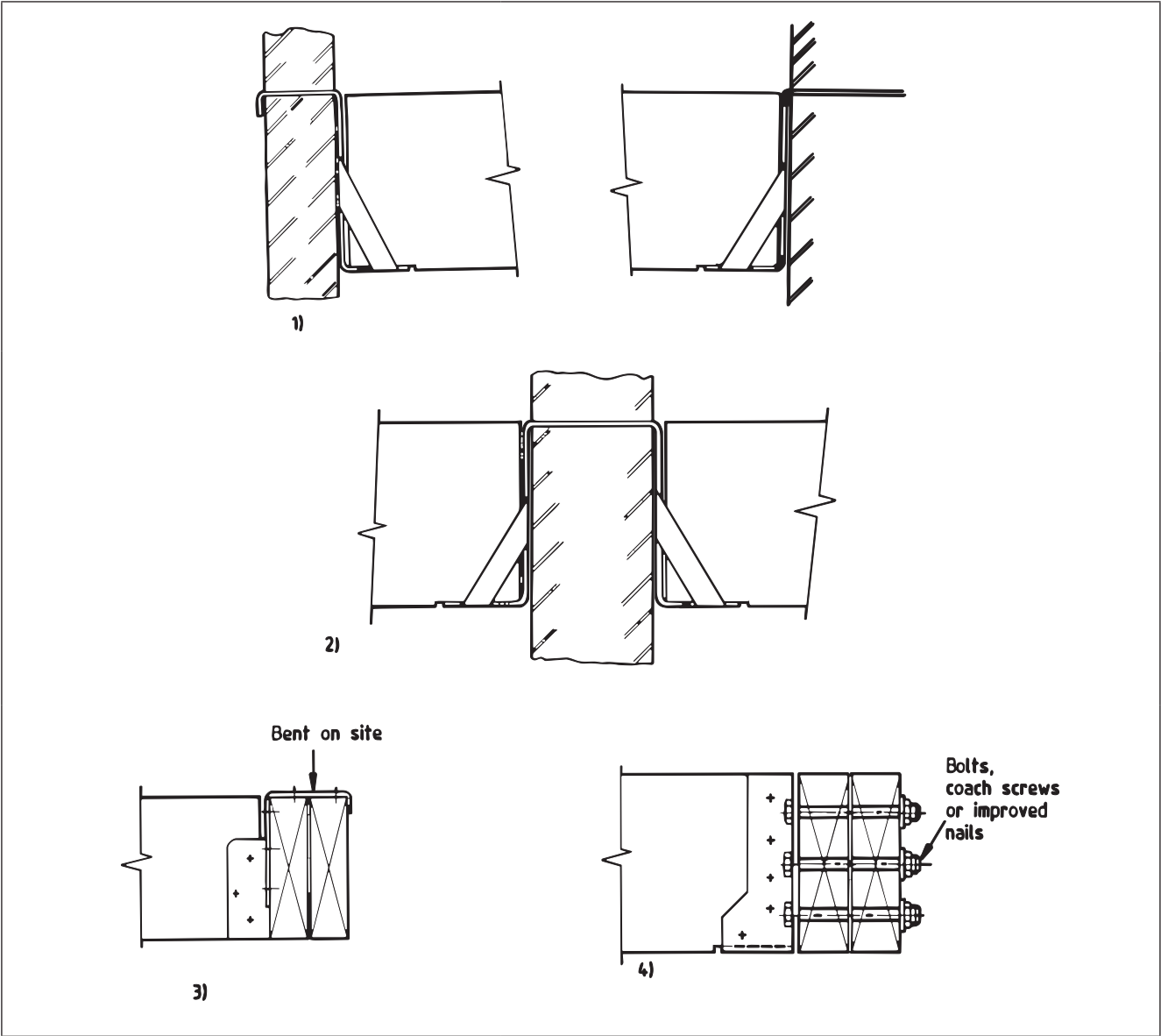


Table 11 Permissible clear spans of single-member beams or trimmers which support floor joists, and floors with no partitions. Timber of strength class C16

C16 Single-members		No partitions											
Size of beam or trimmer ^{A)} Single-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 97	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 120	1.903	—	—	—	—	—	—	—	—	—	—	—
	38 × 145	2.289	—	—	—	—	—	—	—	—	—	—	—
	38 × 170	2.643	1.983	—	—	—	—	—	—	—	—	—	—
	38 × 195	3.027	2.255	1.833	—	—	—	—	—	—	—	—	—
	38 × 220	3.409	2.524	2.052	—	—	—	—	—	—	—	—	—
	47 × 72	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 97	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 120	2.048	—	—	—	—	—	—	—	—	—	—	—
	47 × 145	2.462	1.927	—	—	—	—	—	—	—	—	—	—
	47 × 170	2.842	2.208	—	—	—	—	—	—	—	—	—	—
	47 × 195	3.253	2.510	2.044	—	—	—	—	—	—	—	—	—
	47 × 220	3.662	2.809	2.289	1.974	—	—	—	—	—	—	—	—
	63 × 145	2.716	2.145	1.821	—	—	—	—	—	—	—	—	—
	63 × 170	3.133	2.477	2.087	1.803	—	—	—	—	—	—	—	—
	63 × 195	3.584	2.837	2.372	2.050	1.828	—	—	—	—	—	—	—
	63 × 220	4.033	3.197	2.655	2.295	2.047	1.862	—	—	—	—	—	—
	75 × 195	3.793	3.013	2.589	2.240	1.999	1.820	—	—	—	—	—	—
	75 × 220	4.265	3.394	2.897	2.507	2.239	2.038	1.881	—	—	—	—	—
CLS/ALS sizes	38 × 89	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 140	2.181	—	—	—	—	—	—	—	—	—	—	—
	38 × 184	2.858	2.136	—	—	—	—	—	—	—	—	—	—
	38 × 235	3.638	2.685	2.183	1.879	—	—	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 63 mm.

If wane is not permitted, the minimum design bearing length is 33 mm.

See also 6.6.2.

A) Check the availability of section sizes.

Table 12 Permissible clear spans of double-member beams or trimmers which support floor joists, and floors with no partitions. Timber of strength class C16

C16 Double-members		No partitions											
Size of beam or trimmer ^{A)} Double-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.023	2.397	2.082	1.818	—	—	—	—	—	—	—	—
	76 × 170	3.485	2.768	2.405	2.083	1.860	—	—	—	—	—	—	—
	76 × 195	3.985	3.170	2.736	2.369	2.115	1.926	—	—	—	—	—	—
	76 × 220	4.481	3.570	3.061	2.651	2.360	2.157	1.992	1.858	—	—	—	—
	94 × 147	3.237	2.577	2.243	2.024	1.808	—	—	—	—	—	—	—
	94 × 170	3.730	2.975	2.590	2.319	2.072	1.889	—	—	—	—	—	—
	94 × 195	4.262	3.405	2.967	2.636	2.356	2.148	1.985	1.853	—	—	—	—
	94 × 220	4.790	3.834	3.343	2.949	2.637	2.405	2.223	2.075	1.952	1.848	—	—
	126 × 145	3.551	2.842	2.481	2.247	2.078	1.912	—	—	—	—	—	—
	126 × 170	4.087	3.279	2.864	2.595	2.400	2.191	2.207	1.894	—	—	—	—
	126 × 195	4.664	3.751	3.279	2.972	2.729	2.491	2.305	2.154	2.028	1.921	1.829	—
	126 × 220	5.236	4.220	3.692	3.349	3.053	2.788	2.580	2.411	2.271	2.151	2.048	1.958
	150 × 145	3.747	3.010	2.631	2.386	2.209	2.072	1.932	1.806	—	—	—	—
	150 × 170	4.309	3.470	3.037	2.756	2.552	2.392	2.214	2.069	1.949	1.847	—	—
	150 × 195	4.914	3.968	3.476	3.155	2.923	2.718	2.517	2.353	2.217	2.101	2.001	1.913
	150 × 220	5.512	4.462	3.913	3.554	3.293	3.041	2.816	2.634	2.482	2.352	2.240	2.143
CLS/ALS sizes	76 × 89	1.844	—	—	—	—	—	—	—	—	—	—	—
	76 × 140	2.881	2.284	1.983	—	—	—	—	—	—	—	—	—
	76 × 184	3.765	2.993	2.592	2.244	2.003	1.824	—	—	—	—	—	—
	76 × 235	4.778	3.810	3.255	2.820	2.519	2.295	2.119	1.977	1.858	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 63 mm.

If wane is not permitted, the minimum design bearing length is 33 mm.

See also 6.6.2.

^{A)} Check the availability of section sizes.

Table 13 Permissible clear spans of single-member beams or trimmers which support floor joists, and floors with no partitions. Timber of strength class C24

C24 Single-members		No partitions											
Size of beam or trimmer ^{A)} Single-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 97	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 120	1.990	—	—	—	—	—	—	—	—	—	—	—
	38 × 145	2.394	1.876	—	—	—	—	—	—	—	—	—	—
	38 × 170	2.764	2.168	1.868	—	—	—	—	—	—	—	—	—
	38 × 195	3.164	2.485	2.141	—	—	—	—	—	—	—	—	—
	38 × 220	3.563	2.800	2.413	1.900	—	—	—	—	—	—	—	—
	47 × 72	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 97	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 120	2.140	—	—	—	—	—	—	—	—	—	—	—
	47 × 145	2.573	2.025	—	—	—	—	—	—	—	—	—	—
	47 × 170	2.969	2.339	2.021	1.815	—	—	—	—	—	—	—	—
	47 × 195	3.398	2.680	2.316	2.081	—	—	—	—	—	—	—	—
	47 × 220	3.825	3.020	2.611	2.346	1.880	—	—	—	—	—	—	—
	63 × 145	2.836	2.244	1.945	—	—	—	—	—	—	—	—	—
	63 × 170	3.271	2.591	2.247	2.025	1.864	—	—	—	—	—	—	—
	63 × 195	3.741	2.968	2.575	2.321	2.136	1.867	—	—	—	—	—	—
	63 × 220	4.208	3.343	2.902	2.616	2.409	2.103	—	—	—	—	—	—
	75 × 195	3.957	3.150	2.739	2.473	2.280	2.130	1.906	—	—	—	—	—
	75 × 220	4.449	3.547	3.086	2.787	2.570	2.401	2.147	1.875	—	—	—	—
CLS/ALS sizes	38 × 89	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 140	2.281	—	—	—	—	—	—	—	—	—	—	—
	38 × 184	2.988	2.345	2.021	—	—	—	—	—	—	—	—	—
	38 × 235	3.802	2.990	2.577	2.028	—	—	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 67 mm.

If wane is not permitted, the minimum design bearing length is 35 mm.

See also 6.6.2.

^{A)} Check the availability of section sizes.

Table 14 Permissible clear spans of double-member beams or trimmers which support floor joists, and floors with no partitions. Timber of strength class C24

C24 Double-members		No partitions											
Size of beam or trimmer ^{A)} Double-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.154	2.506	2.179	1.968	1.815	—	—	—	—	—	—	—
	76 × 170	3.636	2.893	2.517	2.273	2.097	1.961	1.851	—	—	—	—	—
	76 × 195	4.156	3.313	2.883	2.605	2.404	2.248	2.120	1.860	—	—	—	—
	76 × 220	4.673	3.731	3.249	2.936	2.710	2.534	2.375	2.096	1.859	—	—	—
	94 × 145	3.377	2.693	2.346	2.122	1.960	1.835	—	—	—	—	—	—
	94 × 170	3.890	3.108	2.709	2.451	2.265	2.121	2.004	1.907	—	—	—	—
	94 × 195	4.443	3.557	3.103	2.809	2.595	2.430	2.297	2.186	2.048	1.840	—	—
	94 × 220	4.991	4.004	3.495	3.165	2.295	2.740	2.590	2.465	2.307	2.073	1.882	—
	126 × 145	3.700	2.968	2.593	2.350	2.175	2.039	1.930	1.839	—	—	—	—
	126 × 170	4.258	3.423	2.993	2.714	2.512	2.356	2.230	2.125	2.035	1.957	1.889	—
	126 × 195	4.857	3.914	3.426	3.108	2.878	2.700	2.555	2.435	2.333	2.244	2.165	2.059
	126 × 220	5.450	4.403	3.857	3.501	3.243	3.042	2.880	2.745	2.630	2.529	2.441	2.319
	150 × 145	3.902	3.141	2.749	2.495	2.311	2.169	2.054	1.958	1.877	1.806	—	—
	150 × 170	4.486	3.621	3.172	2.881	2.669	2.505	2.373	2.263	2.169	2.087	2.015	1.931
	150 × 195	5.113	4.139	3.630	3.298	3.057	2.870	2.719	2.593	2.486	2.392	2.310	2.237
	150 × 220	5.733	4.654	4.086	3.714	3.444	3.234	3.064	2.923	2.802	2.697	2.604	2.522
CLS/ALS sizes	76 × 89	1.926	—	—	—	—	—	—	—	—	—	—	—
	76 × 140	3.007	2.388	2.076	1.875	—	—	—	—	—	—	—	—
	76 × 184	3.928	3.129	2.722	2.459	2.269	2.122	2.003	—	—	—	—	—
	76 × 235	4.981	3.981	3.468	3.135	2.893	2.706	2.526	2.237	1.985	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 67 mm.

If wane is not permitted, the minimum design bearing length is 35 mm.

See also 6.6.2.

^{A)} Check the availability of section sizes.

Table 15 Permissible clear spans of double-member beams or trimmers which support floor joists, and floors supporting non load-bearing lightweight partitions. Timber of strength class C16

C16 Double-members		Lightweight partitions											
Size of beam or trimmer ^{A)} Double-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	2.369	1.913	—	—	—	—	—	—	—	—	—	—
	76 × 170	2.753	2.228	1.851	—	—	—	—	—	—	—	—	—
	76 × 195	3.169	2.567	2.140	1.856	—	—	—	—	—	—	—	—
	76 × 220	3.583	2.903	2.429	2.112	1.881	—	—	—	—	—	—	—
	94 × 145	2.556	2.148	—	—	—	—	—	—	—	—	—	—
	94 × 170	2.967	2.503	2.090	1.812	—	—	—	—	—	—	—	—
	94 × 195	3.412	2.881	2.413	2.100	1.872	—	—	—	—	—	—	—
	94 × 220	3.856	3.253	2.734	2.385	2.131	1.934	—	—	—	—	—	—
	126 × 145	2.830	2.393	2.115	1.837	—	—	—	—	—	—	—	—
	126 × 170	3.281	2.784	2.462	2.146	1.916	—	—	—	—	—	—	—
	126 × 195	3.769	3.209	2.835	2.479	2.218	2.017	1.856	—	—	—	—	—
	126 × 220	4.254	3.632	3.205	2.809	2.519	2.295	2.115	1.966	1.841	—	—	—
	150 × 145	3.003	2.548	2.267	2.030	1.812	—	—	—	—	—	—	—
	150 × 170	3.479	2.962	2.641	2.367	2.118	1.926	—	—	—	—	—	—
	150 × 195	3.993	3.411	3.048	2.730	2.449	2.231	2.056	1.912	—	—	—	—
	150 × 220	4.504	3.858	3.453	3.089	2.776	2.534	2.339	2.178	2.042	1.925	1.823	—
CLS/ALS sizes	76 × 140	2.252	1.817	—	—	—	—	—	—	—	—	—	—
	76 × 184	2.986	2.418	2.013	—	—	—	—	—	—	—	—	—
	76 × 235	3.831	3.103	2.601	2.265	2.019	—	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 54 mm.

If wane is not permitted, the minimum design bearing length is 28 mm.

See also 6.6.2.

^{A)} Check the availability of section sizes.

Table 16 Permissible clear spans of double-member beams or trimmers which support floor joists, and floors supporting non load-bearing partitions. Timber of strength class C24

C24 Double-members		Lightweight partitions											
Size of beam or trimmer ^{A)} Double-member mm × mm		Loaded length, L_1 in plan A or L_2 in plan B in Figure 12 m											
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		Clear spans, S_1 in plan A or S_2 in plan B in Figure 12 m											
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	2.482	2.083	1.837	—	—	—	—	—	—	—	—	—
	76 × 170	2.883	2.428	2.148	1.950	—	—	—	—	—	—	—	—
	76 × 195	3.317	2.802	2.484	2.259	1.900	—	—	—	—	—	—	—
	76 × 220	3.749	3.176	2.821	2.569	2.226	—	—	—	—	—	—	—
	94 × 145	2.675	2.254	1.996	1.814	—	—	—	—	—	—	—	—
	94 × 170	3.105	2.625	2.330	2.121	1.962	—	—	—	—	—	—	—
	94 × 195	3.569	3.028	2.693	2.456	2.275	2.026	—	—	—	—	—	—
	94 × 220	4.031	3.429	3.055	2.790	2.587	2.362	1.964	—	—	—	—	—
	126 × 145	2.960	2.508	2.229	2.033	1.884	—	—	—	—	—	—	—
	126 × 170	3.430	2.917	2.599	2.374	2.203	2.066	1.953	—	—	—	—	—
	126 × 195	3.938	3.360	2.999	2.744	2.549	2.394	2.265	2.103	1.808	—	—	—
	126 × 220	4.443	3.801	3.399	3.114	2.896	2.721	2.576	2.401	2.127	1.857	—	—
	150 × 145	3.139	2.668	2.377	2.172	2.016	1.891	—	—	—	—	—	—
	150 × 170	3.635	3.101	2.769	2.534	2.355	2.212	2.094	1.993	1.890	—	—	—
	150 × 195	4.170	3.569	3.193	2.927	2.723	2.560	2.425	2.311	2.192	2.005	—	—
	150 × 220	4.701	4.035	3.616	3.319	3.091	2.908	2.757	2.629	2.492	2.350	2.084	1.859
CLS/ALS sizes	76 × 140	2.360	1.977	—	—	—	—	—	—	—	—	—	—
	76 × 184	3.126	2.638	2.336	2.123	—	—	—	—	—	—	—	—
	76 × 235	4.008	3.400	3.023	2.753	2.421	1.948	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 60 mm.

If wane is not permitted, the minimum design bearing length is 31 mm.

See also 6.6.2.

A) Check the availability of section sizes.

6.7 Trimming joists: Notes to Table 17, Table 18, Table 19 and Table 20

NOTE 1 The overall size of the double trimming joists shown in Figure 14 will support load from the area shown hatched in plans C and D, including the following loads:

- load from the trimmer and floor joists;
- a dead load not exceeding 0.5 kN/m^2 ;
- an imposed load not exceeding 1.5 kN/m^2 ;
- and, in the case of Table 19 and Table 20, loads from non load-bearing lightweight partitions weighing not more than 0.8 kN/m run at spacings as close as those likely to occur in practice.

Examples of some typical floor constructions and their respective dead loadings are given in Annex L.

NOTE 2 The section sizes given in the tables are either sawn across the timber thickness in accordance with tolerance class 1 of BS EN 336 and processed in accordance with tolerance class 2 across the timber width (joist depth), or are CLS/ALS processed sizes in accordance with tolerance class 2, to provide level surfaces for ease of ceiling lining and the fixing of structural decking. BS EN 336 tolerances are as follows:

- a) on a sawn thickness not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a processed thickness of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- c) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.7.1 Trimming joists in Table 17, Table 18, Table 19 and Table 20 are double-members and should be fixed together with their tops flush. Unless justified by specialist calculation, the fixings should be by nailing as follows.

Overall width of double-member	Nail length and diameter	Nominal centres of nails
mm	mm × mm	mm
76	75 × 3.8	300
94	90 × 4.2	300
126	125 × 5.5	300
150	150 × 6.0	300

NOTE These values are relevant only where the span of floor joists or trimmer, which is supported by a trimming joist, does not exceed 6 m. The centres quoted apply where two rows of nails in line are used. If staggered nailing is used, the values refer to the centres in one row.

6.7.2 Unless justified by specialist calculation, the minimum design bearing length at supports should be as stated at the base of each table.

NOTE It might be necessary to provide longer bearing to accommodate fixings or simply for practical reasons such as construction tolerances.

If a trimming joist is supported by a hanger, it is strongly recommended that a structural designer be consulted or that a proprietary design of hanger be used. If the end of a trimming joist is supported on masonry, the end bearing should be at least 90 mm to provide restraint to the masonry wall. Also, where the bearing is on masonry, the bearing area provided should conform to BS 8103-2.

6.7.3 Notching or drilling of a trimming joist should not be carried out unless justified by specialist calculation.

NOTE The design of the trimming joists has been based on BS 5268-2 This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

For guidance on fixing a trimmer to a trimming joist by a hanger, see Figure 13. Where a trimmer is supported by a hanger, it is strongly recommended that a proprietary hanger be used or a specialist designer consulted. It is also recommended that consideration be given to preventing rotation of the trimming joist, e.g. by a fixing into the trimming joist near the bottom of the hanger.

Connections of joists to trimmers or trimming joists and of trimmer to trimming joist, (see Figure 14) should be by:

- a) a proprietary joist hanger of adequate capacity; or
- b) a connection justified by specialist calculation.

Typical joist hangers are shown in Figure 13.

Figure 14 Plans relating to Table 17, Table 18, Table 19 and Table 20

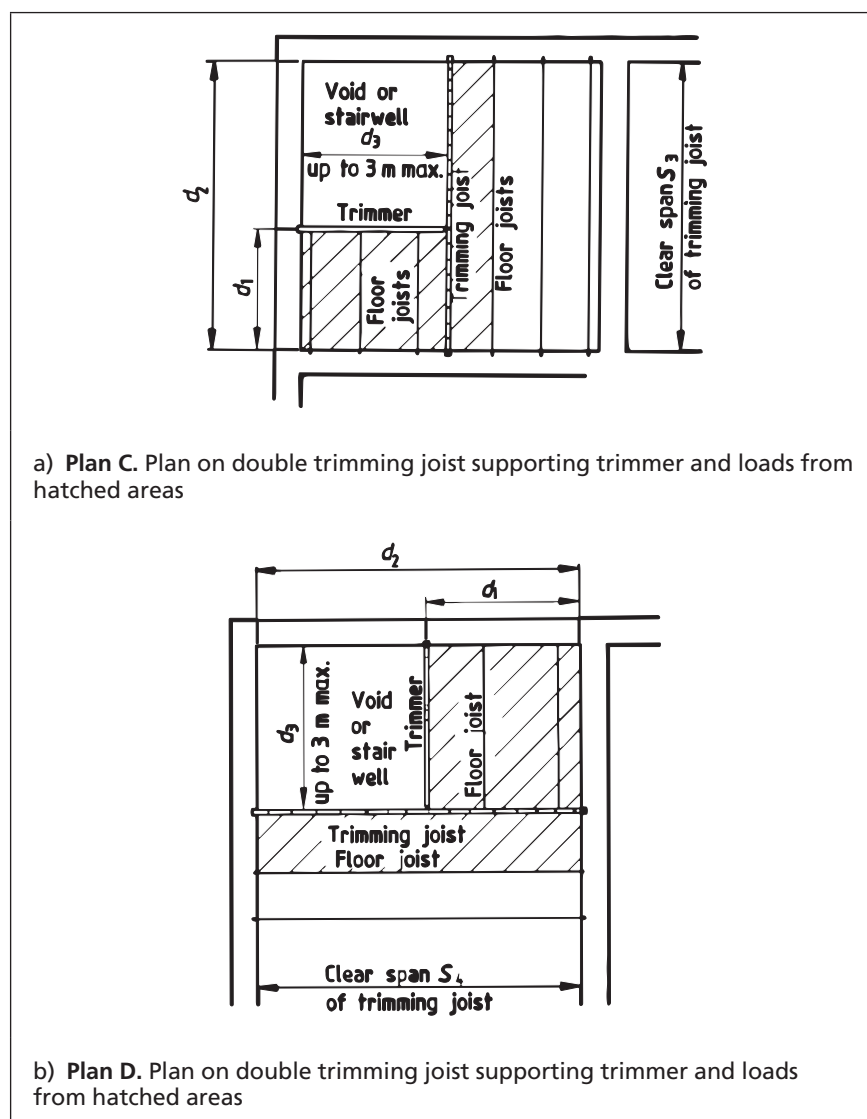


Table 17 Permissible clear spans of trimming joists which support a trimmer, loading area as shown in plans C or D in Figure 14, but no partitions. Timber of strength class C16

C16		No partitions								
Size of trimming joist ^{A)} mm × mm		For ratios of d_1/d_2 up to 0.25			For ratios of d_1/d_2 greater than 0.25 but less than 0.5			For ratios of d_1/d_2 greater than 0.5 but less than 0.75		
		Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m		
		1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
		Clear spans, S_3 in plan C or S_4 in plan D in Figure 14 m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.334	3.158	3.012	3.021	2.702	2.482	3.012	2.692	2.410
	76 × 170	3.841	3.639	3.473	3.483	3.118	2.866	3.473	3.106	2.760
	76 × 195	4.387	4.159	3.971	3.983	3.569	3.272	3.971	3.555	3.135
	76 × 220	4.929	4.676	4.466	4.479	4.017	3.658	4.466	4.001	3.505
	94 × 145	3.564	3.379	3.226	3.236	2.900	2.667	3.226	2.888	2.655
	94 × 170	4.102	3.892	3.717	3.728	3.345	3.078	3.717	3.331	3.063
	94 × 195	4.682	4.444	4.248	4.260	3.826	3.523	4.248	3.810	3.477
	94 × 220	5.255	4.992	4.774	4.788	4.304	3.965	4.774	4.287	3.887
	126 × 145	3.898	3.701	3.539	3.549	3.190	2.940	3.539	3.177	2.926
	126 × 170	4.480	4.258	4.073	4.085	3.676	3.390	4.073	3.661	3.374
	126 × 195	5.105	4.856	4.649	4.662	4.201	3.877	4.649	4.184	3.859
	126 × 220	5.722	5.448	5.219	5.234	4.722	4.361	5.219	4.703	4.341
	150 × 145	4.105	3.902	3.734	3.745	3.373	3.112	3.734	3.358	3.096
	150 × 170	4.713	4.485	4.295	4.307	3.884	3.587	4.295	3.868	3.569
	150 × 195	5.365	5.110	4.898	4.912	4.436	4.100	4.898	4.418	4.080
	150 × 220	6.008	5.728	5.494	5.509	4.983	4.609	5.494	4.963	4.588
CLS/ALS sizes	76 × 140	3.179	3.010	2.871	2.880	2.575	2.365	2.871	2.565	2.303
	76 × 184	4.147	3.931	3.752	3.763	3.371	3.098	3.752	3.358	2.970
	76 × 235	5.252	4.984	4.762	4.775	4.284	3.888	4.762	4.268	3.726

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 25 mm.

If wane is not permitted, the minimum design bearing length is 13 mm.

See also Note 4 to Table 17, Table 18, Table 19 and Table 20.

^{A)} Double-members. Check the availability of section sizes.

^{B)} For values of d_3 other than 1.0 m, 2.0 m or 3.0 m, interpolation is permitted.

Table 18 Permissible clear spans of trimming joists which support a trimmer, loading area as shown in plans C or D in Figure 14, but no partitions. Timber of strength class C24

C24		No partitions								
Size of trimming joist ^{A)} mm × mm		For ratios of d_1/d_2 up to 0.25			For ratios of d_1/d_2 greater than 0.25 but less than 0.5			For ratios of d_1/d_2 greater than 0.5 but less than 0.75		
		Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m		
		1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
		Clear spans, S_3 in plan C or S_4 in plan D in Figure 14 m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.477	3.294	3.143	3.153	2.823	2.594	3.143	2.811	2.583
	76 × 170	4.003	3.795	3.624	3.634	3.257	2.995	3.624	3.244	2.981
	76 × 195	4.571	4.336	4.142	4.154	3.726	3.428	4.142	3.711	3.413
	76 × 220	5.134	4.873	4.657	4.670	4.193	3.860	4.657	4.177	3.843
	94 × 145	3.714	3.523	3.365	3.375	3.028	2.786	3.365	3.015	2.773
	94 × 170	4.273	4.056	3.876	3.888	3.491	3.215	3.876	3.477	3.200
	94 × 195	4.874	4.630	4.427	4.440	3.992	3.678	4.427	3.976	3.662
	94 × 220	5.469	5.199	4.974	4.989	4.490	4.140	4.974	4.472	4.121
	126 × 145	4.058	3.855	3.688	3.699	3.328	3.069	3.688	3.314	3.054
	126 × 170	4.661	4.433	4.243	4.256	3.834	3.538	4.243	3.818	3.521
	126 × 195	5.309	5.054	4.841	4.855	4.380	4.045	4.841	4.362	4.026
	126 × 220	5.948	5.667	5.432	5.448	4.922	4.549	5.432	4.901	4.528
	150 × 145	4.270	4.062	3.889	3.901	3.516	3.247	3.889	3.501	3.230
	150 × 170	4.900	4.666	4.471	4.484	4.049	3.741	4.471	4.031	3.723
	150 × 195	5.575	5.314	5.096	5.111	4.622	4.275	5.096	4.603	4.255
	150 × 220	6.239	5.954	5.714	5.730	5.190	4.805	5.714	5.169	4.782
CLS/ALS sizes	76 × 140	3.316	3.141	2.997	3.006	2.690	2.472	2.997	2.680	2.461
	76 × 184	4.322	4.099	3.914	3.926	3.520	3.238	3.914	3.506	3.223
	76 × 235	5.469	5.193	4.964	4.979	4.472	4.118	4.964	4.455	4.100

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 27 mm.

If wane is not permitted, the minimum design bearing length is 14 mm.

See also 6.7.2.

^{A)} Double-members. Check the availability of section sizes.

^{B)} For values of d_3 other than 1.0 m, 2.0 m or 3.0 m, interpolation is permitted.

Table 19 Permissible clear spans of trimming joists which support a trimmer, loading area as shown in plans C or D in Figure 14, and non load-bearing partitions. Timber of strength class C16

C16		Lightweight partitions								
Size of trimming joist ^{A)} mm × mm		For ratios of d_1/d_2 up to 0.25			For ratios of d_1/d_2 greater than 0.25 but less than 0.5			For ratios of d_1/d_2 greater than 0.5 but less than 0.75		
		Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m		
		1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
		Clear spans, S_3 in plan C or S_4 in plan D in Figure 14 m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.026	2.770	2.566	2.559	2.192	1.869	2.453	2.109	1.832
	76 × 170	3.512	3.233	3.011	2.975	2.559	2.197	2.844	2.448	2.138
	76 × 195	4.036	3.734	3.491	3.425	2.952	2.550	3.268	2.812	2.466
	76 × 220	4.557	4.233	3.970	3.874	3.342	2.901	3.691	3.172	2.792
	94 × 145	3.251	2.988	2.779	2.758	2.448	2.120	2.641	2.368	2.067
	94 × 170	3.769	3.482	3.253	3.203	2.858	2.484	3.061	2.743	2.406
	94 × 195	4.326	4.016	3.766	3.684	3.302	2.876	3.515	3.146	2.771
	94 × 220	4.879	4.547	4.276	4.163	3.743	3.264	3.966	3.545	3.132
	126 × 145	3.580	3.307	3.089	3.051	2.723	2.487	2.919	2.663	2.431
	126 × 170	4.141	3.846	3.607	3.538	3.174	2.908	3.379	3.093	2.822
	126 × 195	4.745	4.427	4.167	4.063	3.661	3.365	3.875	3.557	3.241
	126 × 220	5.343	5.002	4.722	4.586	4.145	3.820	4.369	4.020	3.656
	150 × 145	3.784	3.507	3.284	3.235	2.897	2.897	3.094	2.829	2.628
	150 × 170	4.373	4.073	3.829	3.748	3.373	3.373	3.579	3.283	3.057
	150 × 195	5.004	4.681	4.416	4.301	3.886	3.886	4.102	3.774	3.521
	150 × 220	5.628	5.284	4.999	4.849	4.397	4.397	4.622	4.261	3.983
CLS/ALS sizes	76 × 140	2.878	2.629	2.429	2.432	2.080	1.769	2.333	2.005	1.739
	76 × 184	3.806	3.514	3.280	3.227	2.780	2.395	3.082	2.652	2.322
	76 × 235	4.868	4.530	4.255	4.142	3.574	3.110	3.944	3.387	2.986

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 32 mm.

If wane is not permitted, the minimum design bearing length is 16 mm.

See also 6.7.2.

^{A)} Double-members. Check the availability of section sizes.

^{B)} For values of d_3 other than 1.0 m, 2.0 m or 3.0 m, interpolation is permitted.

Table 20 Permissible clear spans of trimming joists which support a trimmer, loading area as shown in plans C or D in Figure 14, and non load-bearing partitions. Timber of strength class C24

C24		Lightweight partitions								
Size of trimming joist ^{A)} mm × mm		For ratios of d_1/d_2 up to 0.25			For ratios of d_1/d_2 greater than 0.25 but less than 0.5			For ratios of d_1/d_2 greater than 0.5 but less than 0.75		
		Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m			Dimension d_3 ^{B)} m		
		1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
		Clear spans, S_3 in plan C or S_4 in plan D in Figure 14 m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	76 × 145	3.164	2.903	2.697	2.680	2.374	2.155	2.567	2.330	2.151
	76 × 170	3.670	3.386	3.159	3.114	2.773	2.527	2.976	2.710	2.509
	76 × 195	4.216	3.908	3.659	3.583	3.206	2.931	3.418	3.122	2.897
	76 × 220	4.758	4.427	4.158	4.051	3.638	3.335	3.859	3.534	3.295
	94 × 145	3.397	3.129	2.915	2.886	2.568	2.339	2.763	2.515	2.327
	94 × 170	3.935	3.644	3.409	3.350	2.996	2.739	3.200	2.922	2.711
	94 × 195	4.515	4.199	3.943	3.852	3.459	3.172	3.673	3.364	3.128
	94 × 220	5.089	4.751	4.475	4.350	3.921	3.605	4.144	3.804	3.544
	126 × 145	3.736	3.459	3.236	3.189	2.853	2.610	3.050	2.787	2.587
	126 × 170	4.319	4.019	3.775	3.696	3.323	3.050	3.529	3.235	3.010
	126 × 195	4.946	4.622	4.357	4.243	3.830	3.526	4.047	3.720	3.468
	126 × 220	5.565	5.219	4.934	4.786	4.335	4.001	4.560	4.202	3.925
	150 × 145	3.946	3.665	3.437	3.380	3.034	2.781	3.232	2.959	2.752
	150 × 170	4.557	4.252	4.004	3.913	3.529	3.246	3.736	3.432	3.199
	150 × 195	5.211	4.884	4.614	4.488	4.063	3.749	4.281	3.943	3.683
	150 × 220	5.857	5.508	5.218	5.058	4.595	4.250	4.821	4.451	4.164
CLS/ALS sizes	76 × 140	3.010	2.756	2.556	2.547	2.253	2.042	2.442	2.214	2.042
	76 × 184	3.976	3.679	3.439	3.377	3.016	2.754	3.224	2.941	2.720
	76 × 235	5.081	4.737	4.456	4.331	3.896	3.577	4.123	3.780	3.517

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 35 mm.

If wane is not permitted, the minimum design bearing length is 18 mm.

See also 6.7.2.

^{A)} Double-members. Check the availability of section sizes.

^{B)} For values of d_3 other than 1.0 m, 2.0 m or 3.0 m, interpolation is permitted.

6.8 Ceiling joists, and binders supporting ceiling joists: Notes to Table 21, Table 22, Table 23 and Table 24

NOTE 1 The sizes, spacings and spans given will support the dead loads stated in the tables, together with an imposed load not exceeding 0.25 kN/m² and a concentrated load of 0.9 kN acting together.

NOTE 2 In calculating the ceiling joist sizes, no account has been taken of trimming (e.g. around flues) or other loads (e.g. water tanks).

NOTE 3 When the spacing of binders is unequal:

- a) the binder section size can be determined for the average of A + B, see Figure 15;
- b) the section sizes for the ceiling joists can be determined for the greatest spacing between binders, or between a binder and a wallplate.

NOTE 4 The section sizes given in the tables are either sawn across the timber thickness in accordance with tolerance class 1 of BS EN 336 processed in accordance with tolerance class 2 across the timber width (joist depth), or are CLS/ALS processed sizes in accordance with tolerance class 2, to provide level surfaces for ease of ceiling linings. For binder sections the timber width (binder depth) is a sawn dimension to tolerance class 1. BS EN 336 tolerances are as follows:

- a) on a sawn thickness or depth of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a sawn depth greater than 100 mm (tolerance class 1):
 - 2 mm;
 - + 4 mm;
- c) on a processed thickness or depth of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- d) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.8.1 The minimum bearing length at supports for ceiling joists should be 35 mm if wane is permitted to the grade limit, or 20 mm if wane is not permitted.

NOTE However, it is normal for ceiling joists to run across at least the full width of the wallplate to accommodate the fixings between ceiling joist and rafters.

6.8.2 Notching or drilling of a binder or ceiling joist should not be carried out unless justified by specialist calculation.

NOTE 1 Permissible clear spans have been calculated in accordance with BS 5268-7.3 and BS 5268-7.4. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1. In Table 21 and Table 23, the permissible clear spans are based on ceiling joists simply supported between binders or between a binder and wallplate. In Table 22 and Table 24, the permissible clear spans for the binders are based on the assumption that the ceiling joists can be continuous.

NOTE 2 Sizes of ceiling joists and binders are limited generally to those where the depth-to-thickness ratio does not exceed 4.47 mm × 195 mm and 47 mm × 200 mm sizes, which have depth-to-thickness ratios of 4.15 and 4.25, are however included.

Figure 15 Ceiling joists and binders

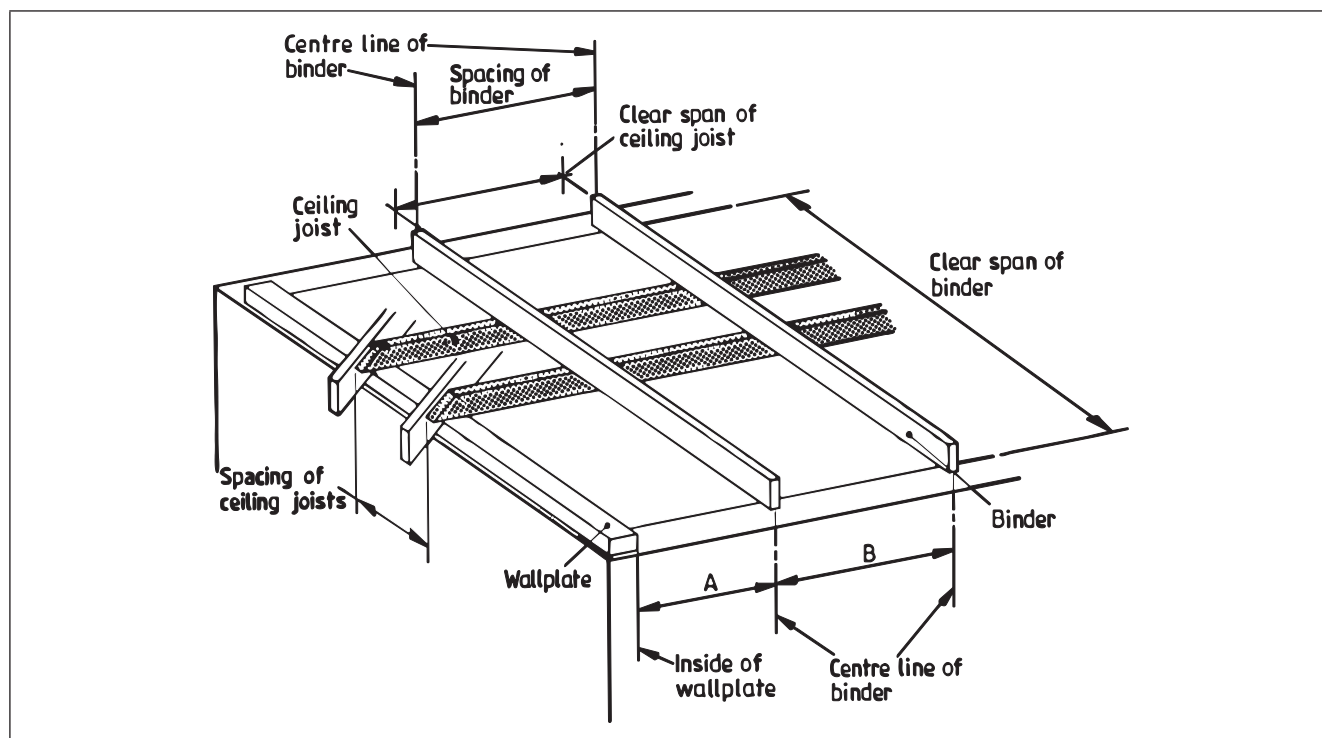


Table 21 Permissible clear spans for ceiling joists. Timber of strength class C16

Size of joist ^{A)} mm × mm		Dead load kN/m ²					
		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
		Maximum clear span of joist m					
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.145	1.135	1.108	1.108	1.096	1.058
	38 × 97	1.737	1.718	1.665	1.665	1.641	1.577
	38 × 120	2.367	2.335	2.250	2.250	2.212	2.112
	38 × 145	3.019	2.973	2.850	2.850	2.796	2.658
	47 × 72	1.271	1.260	1.228	1.228	1.214	1.174
	47 × 97	1.918	1.896	1.835	1.835	1.807	1.734
	47 × 120	2.601	2.565	2.467	2.467	2.424	2.312
	47 × 145	3.304	3.251	3.114	3.114	3.054	2.899
	47 × 170	3.959	3.892	3.715	3.715	3.638	3.443
	47 × 195	4.676	4.591	4.371	4.371	4.276	4.035
CLS/ALS sizes	38 × 89	1.543	1.527	1.483	1.483	1.463	1.409
	38 × 140	2.835	2.793	2.681	2.681	2.632	2.504

Minimum design bearing length

See Note 2 to 6.8.2 for bearing length required.

^{A)} Check the availability of section sizes.

Table 22 Permissible clear spans for binders and relates to Table 21. Timber of strength class C16

C16													
Size of binder ^{A)} mm × mm		Dead load kN/m ²											
		Not more than 0.25						More than 0.25 but not more than 0.50					
		Spacing of binders = $\frac{A+B}{2}$ (see 6.8 Note 3 and Figure 15) mm											
		1 200	1 500	1 800	2 100	2 400	2 700	1 200	1 500	1 800	2 100	2 400	2 700
		Maximum clear span of binder m											
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 125	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 150	1.984	1.881	—	—	—	—	1.820	—	—	—	—	—
	47 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 125	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 150	2.167	2.054	1.961	1.882	1.814	—	1.987	1.873	—	—	—	—
	47 × 175	2.589	2.448	2.333	2.236	2.153	2.080	2.365	2.225	2.112	2.017	1.937	1.867
	47 × 200	3.011	2.842	2.705	2.590	2.492	2.406	2.744	2.577	2.443	2.332	2.237	2.155
	63 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	63 × 125	1.972	1.874	—	—	—	—	1.815	—	—	—	—	—
	63 × 150	2.436	2.308	2.203	2.115	2.038	1.972	2.233	2.105	2.001	1.914	1.840	—
	63 × 175	2.901	2.743	2.614	2.506	2.414	2.333	2.651	2.494	2.368	2.263	2.173	2.096
	63 × 200	3.366	3.178	3.025	2.898	2.788	2.693	3.068	2.883	2.735	2.611	2.507	2.416
	63 × 225	3.830	3.612	3.435	3.288	3.163	3.053	3.485	3.271	3.101	2.959	2.839	2.735
	75 × 125	2.115	2.009	1.921	1.847	—	—	1.946	1.838	—	—	—	—
	75 × 150	2.607	2.469	3.357	2.262	2.181	2.110	2.388	2.251	2.140	2.048	1.969	1.900
	75 × 175	3.099	2.930	2.792	2.677	2.579	2.493	2.831	2.664	2.530	2.418	2.323	2.241
	75 × 200	3.590	3.389	3.227	3.092	2.976	2.875	3.273	3.076	2.919	2.788	2.677	2.581
	75 × 225	4.078	3.848	3.661	3.505	3.372	3.257	3.713	3.487	3.307	3.157	3.030	2.920
CLS/ALS sizes	38 × 89	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 140	1.828	—	—	—	—	—	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 49 mm.

If wane is not permitted, the minimum design bearing length is 38 mm.

A) Check the availability of section sizes.

Table 23 Permissible clear spans for ceiling joists. Timber of strength class C24

Size of joist ^{A)} mm × mm		Dead load kN/m ²					
		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
		Maximum clear span of joist m					
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.214	1.203	1.174	1.174	1.160	1.123
	38 × 97	1.836	1.815	1.758	1.758	1.732	1.663
	38 × 120	2.496	2.461	2.369	2.369	2.329	2.222
	38 × 145	3.177	3.127	2.996	2.996	2.939	2.791
	47 × 72	1.346	1.334	1.299	1.299	1.283	1.241
	47 × 97	2.025	2.000	1.934	1.934	1.904	1.826
	47 × 120	2.739	2.699	2.595	2.595	2.549	2.429
	47 × 145	3.471	3.415	3.269	3.269	3.205	3.041
	47 × 170	4.152	4.081	3.894	3.894	3.813	3.606
	47 × 195	4.896	4.806	4.574	4.574	4.474	4.221
CLS/ALS sizes	38 × 89	1.632	1.615	1.567	1.567	1.546	1.488
	38 × 140	2.985	2.939	2.819	2.819	2.767	2.631

Minimum design bearing length

See 6.8.1 for bearing length required.

^{A)} Check the availability of section sizes.

Table 24 Permissible clear spans for binders and relates to Table 23. Timber of strength class C24

Size of binder ^{A)} mm × mm		Dead load kN/m ²											
		Not more than 0.25						More than 0.25 but not more than 0.50					
		Spacing of binders = $\frac{A+B}{2}$ (see Note 3 and Figure 15) mm											
		1 200	1 500	1 800	2 100	2 400	2 700	1 200	1 500	1 800	2 100	2 400	2 700
		Maximum clear span of joist m											
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 125	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 150	2.088	1.978	1.888	1.812	—	—	1.916	1.806	—	—	—	—
	47 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 125	1.839	—	—	—	—	—	—	—	—	—	—	—
	47 × 150	2.276	2.157	2.058	1.975	1.904	1.841	2.088	1.968	1.870	—	—	—
	47 × 175	2.716	2.567	2.446	2.344	2.257	2.181	2.483	2.335	2.216	2.117	2.033	1.959
	47 × 200	3.155	2.978	2.834	2.713	2.610	2.520	2.877	2.702	2.562	2.446	2.346	2.261
	63 × 100	—	—	—	—	—	—	—	—	—	—	—	—
	63 × 125	2.072	1.967	1.881	1.808	—	—	1.907	1.802	—	—	—	—
	63 × 150	2.555	2.420	2.309	2.216	2.135	2.065	2.342	2.207	2.098	2.007	1.930	1.862
	63 × 175	3.039	2.872	2.737	2.623	2.526	2.441	2.778	2.613	2.481	2.371	2.277	2.196
	63 × 200	3.521	3.324	3.164	3.030	2.916	2.816	3.212	3.018	2.863	2.734	2.625	2.530
	63 × 225	4.003	3.774	3.590	3.436	3.305	3.19	3.646	3.423	3.244	3.097	2.972	2.863
	75 × 125	2.220	2.107	2.014	1.936	1.868	1.809	2.042	1.929	1.837	—	—	—
	75 × 150	2.731	2.586	2.468	2.368	2.282	2.208	2.504	2.359	2.243	2.146	2.063	1.991
	75 × 175	3.242	3.065	2.920	2.800	2.696	2.606	2.964	2.789	2.648	2.532	2.432	2.346
	75 × 200	3.752	3.542	3.372	3.230	3.109	3.004	3.424	3.218	3.053	2.917	2.801	2.701
	75 × 225	4.259	4.017	3.822	3.660	3.521	3.401	3.881	3.646	3.457	3.301	3.169	3.055
CLS/ALS sizes	38 × 89	—	—	—	—	—	—	—	—	—	—	—	—
	38 × 140	1.925	1.826	—	—	—	—	—	—	—	—	—	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 53 mm.

If wane is not permitted, the minimum design bearing length is 37 mm.

^{A)} Check the availability of section sizes.

6.9 Rafters and purlins supporting rafters imposed load 0.75 kN/m^2 : Notes to Table 25 to Table 36

NOTE The sizes, spacings and spans given will support the dead loads stated in the tables, and either an imposed load of 0.75 kN/m^2 or a concentrated load of 0.9 kN . See Annex M for guidance on the snow load relevant for a particular site.

BS EN 1991-1-3 permits a reduction in imposed roof loading for slopes greater than 30° . This reduction is not relevant, however, to Table 29, Table 30, Table 35 and Table 36 because the tabulated spans are based on a slope of 30° as giving the most onerous case for the range of slopes between 30° and 45° .

6.9.1 When dimensions A and B in Figure 16 are not equal, the section sizes for the rafters should be determined for the greater dimension. When the span of purlins is unequal, the section sizes for the purlin should be determined for each span or for the longest span.

NOTE The design spacing for purlins is $\frac{A+B}{2}$ (see Figure 16).

6.9.2 A rafter, or purlin, should not be notched or drilled unless justified by specialist calculation.

NOTE 1 This does not apply to the birdsmouthing of a rafter to a depth not exceeding one-third of the depth of the rafter.

NOTE 2 Permissible clear spans have been calculated in accordance with BS 5268-7.5 and BS 5268-7.6. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

In the tables for rafters, the permissible clear spans are for rafters simply supported between a purlin and wallplate or between a purlin and the ridgeboard. However, in the tables for purlins, the permissible clear spans are based on the assumption that the rafters are to be continuous.

6.9.3 The two sections of double purlin should be fixed together with flush tops, to act as one piece.

Figure 16 Typical rafter and purlin arrangement

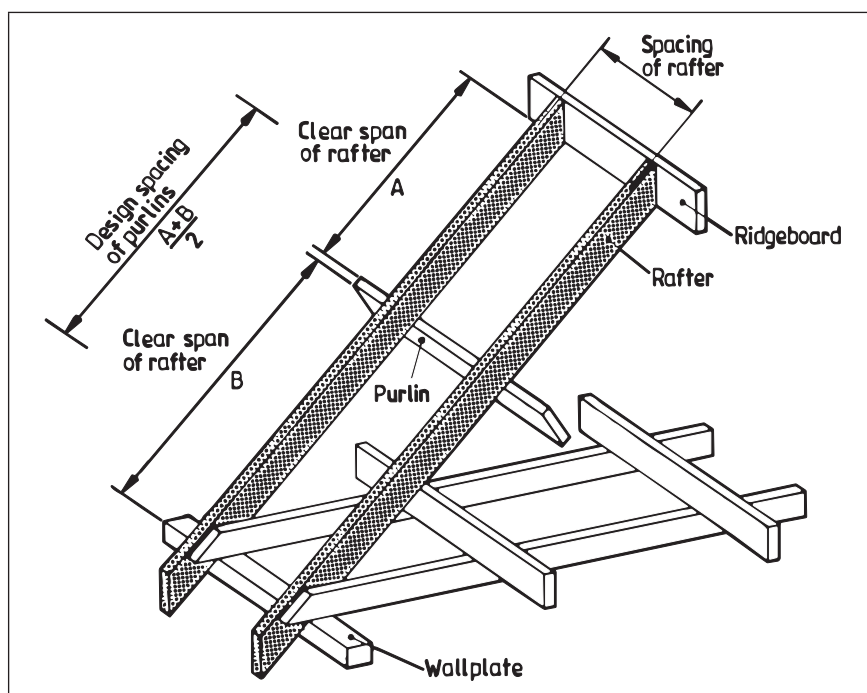


Table 25 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C16. Imposed loading of 0.75 kN/m²

C16-0.75 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.095	2.048	1.929	1.929	1.877	1.747	1.801	1.747	1.613
	38 × 125	2.894	2.787	2.534	2.631	2.552	2.341	2.435	2.354	2.154
	38 × 150	3.465	3.335	3.034	3.262	3.138	2.780	3.077	2.963	2.573
	47 × 100	2.461	2.399	2.182	2.253	2.189	2.030	2.096	2.030	1.867
	47 × 125	3.103	2.987	2.719	2.922	2.812	2.557	2.776	2.671	2.406
	47 × 150	3.708	3.572	3.254	3.495	3.364	3.061	3.322	3.196	2.857
CLS/ALS sizes	38 × 89	1.755	1.720	1.628	1.628	1.588	1.485	1.528	1.485	1.378
	38 × 140	3.238	3.116	2.834	3.048	2.932	2.605	2.820	2.721	2.411

^{A)} Check the availability of section sizes.

Table 26 Permissible clear spans for purlins supporting rafters and relates to Table 25. Timber of strength class C16. Imposed loading of 0.75 kN/m²
C16-0.75 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.860	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.168	2.029	1.916	1.823	—	—	2.035	1.902	—	—	—	—	1.926	—	—	—	—	—
	47 x 200	2.475	2.317	2.189	2.082	1.960	1.856	2.323	2.172	2.039	1.903	—	—	2.200	2.045	1.889	—	—	—
	47 x 225	2.782	2.604	2.461	2.326	2.189	2.073	2.612	2.442	2.277	2.126	2.000	1.893	2.473	2.284	2.110	1.968	1.850	—
	47 x 250	3.088	2.891	2.732	2.567	2.416	2.288	2.900	2.712	2.514	2.347	2.208	2.090	2.746	2.521	2.329	2.173	2.043	1.915
	47 x 275	3.394	3.178	3.003	2.807	2.642	2.502	3.187	2.973	2.749	2.566	2.414	2.285	3.019	2.757	2.547	2.376	2.234	2.104
	47 x 300	3.699	3.464	3.258	3.045	2.866	2.715	3.474	3.225	2.982	2.784	2.620	2.480	3.281	2.991	2.763	2.578	2.425	2.293
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 150	2.064	1.935	1.831	—	—	—	1.941	1.817	—	—	—	—	—	1.840	—	—	—	—	—
63 x 175	2.406	2.255	2.134	2.033	1.946	1.871	2.262	2.118	2.002	1.906	1.823	—	—	2.144	2.007	1.895	1.802	—	1.827
63 x 200	2.746	2.575	2.436	2.321	2.223	2.137	2.582	2.419	2.287	2.177	2.083	1.973	2.449	2.292	2.165	2.051	1.930	2.156	2.041
63 x 225	3.086	2.894	2.739	2.609	2.499	2.403	2.902	2.719	2.571	2.447	2.327	2.204	2.752	2.576	2.434	2.290	2.156	2.380	2.253
63 x 250	3.424	3.212	3.040	2.897	2.774	2.660	3.221	3.018	2.854	2.717	2.568	2.433	3.055	2.860	2.702	2.528	2.380	2.602	2.464
63 x 275	3.762	3.530	3.341	3.184	3.050	2.908	3.540	3.317	3.137	2.981	2.808	2.660	3.358	3.144	2.959	2.764	2.602	2.464	2.674
63 x 300	4.100	3.847	3.642	3.471	3.325	3.155	3.858	3.616	3.420	3.234	3.046	2.886	3.660	3.427	3.210	2.999	2.823	2.674	2.674
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 26 Permissible clear spans for purlins supporting rafters and relates to Table 25. Timber of strength class C16. Imposed loading of 0.75 kN/m²
(continued)

C16-0.75 15° to 22½°

Size of purlin ^{A)} mm × mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 × 125	1.831	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 × 150	2.194	2.059	1.949	1.858	—	—	2.064	1.935	1.831	—	—	—	—	—	—	—	—	—
	75 × 175	2.557	2.399	2.272	2.165	2.075	1.996	2.406	2.255	2.134	2.033	1.946	1.871	2.283	2.138	2.021	1.924	1.841	—
	75 × 200	2.918	2.738	2.593	2.473	2.369	2.280	2.746	2.575	2.436	2.321	2.223	2.137	2.606	2.442	2.309	2.198	2.103	2.000
	75 × 225	3.278	3.077	2.915	2.779	2.663	2.563	3.086	2.894	2.739	2.609	2.499	2.403	2.929	2.744	2.595	2.471	2.358	2.234
	75 × 250	3.637	3.415	3.235	3.085	2.957	2.846	3.424	3.212	3.040	2.897	2.775	2.660	3.251	3.047	2.881	2.743	2.602	2.466
	75 × 275	3.995	3.752	3.555	3.391	3.250	3.128	3.762	3.530	3.341	3.184	3.050	2.908	3.572	3.348	3.167	3.016	2.845	2.696
75 × 300	4.352	4.088	3.874	3.695	3.543	3.410	4.100	3.847	3.642	3.471	3.325	3.155	3.893	3.649	3.452	3.277	3.087	2.925	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	Double- members																		
	94 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	94 × 125	2.073	1.947	1.845	—	—	—	1.953	1.832	—	—	—	—	1.854	—	—	—	—	—
	94 × 150	2.484	2.333	2.212	2.111	2.025	1.950	2.340	2.196	2.081	1.984	1.902	1.831	2.222	2.085	1.974	1.881	1.803	—
	94 × 175	2.893	2.718	2.577	2.460	2.360	2.273	2.726	2.559	2.425	2.313	2.217	2.135	2.589	2.430	2.300	2.193	2.101	2.022
	94 × 200	3.300	3.102	2.941	2.808	2.694	2.595	3.110	2.921	2.768	2.641	2.532	2.438	2.956	2.774	2.627	2.504	2.400	2.309
	94 × 225	3.706	3.485	3.305	3.155	3.028	2.917	3.494	3.282	3.111	2.968	2.846	2.740	3.321	3.117	2.952	2.815	2.698	2.596
	94 × 250	4.111	3.866	3.668	3.502	3.361	3.238	3.877	3.642	3.453	3.294	3.159	3.042	3.685	3.460	3.277	3.125	2.995	2.883
94 × 275	4.515	4.247	4.030	3.848	3.693	3.559	4.258	4.002	3.794	3.620	3.473	3.344	4.049	3.802	3.602	3.435	3.292	3.169	
94 × 300	4.917	4.626	4.390	4.193	4.025	3.879	4.639	4.360	4.135	3.946	3.785	3.645	4.411	4.143	3.925	3.744	3.589	3.447	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-0.75 15° to 22½°

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 27 Permissible clear spans for common or jack rafters for roofs having a pitch more than $22\frac{1}{2}^\circ$ but not more than 30° . Timber of strength class C16. Imposed loading of 0.75 kN/m^2

C16-0.75 $22\frac{1}{2}^\circ$ to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.178	2.131	2.008	2.008	1.955	1.821	1.877	1.821	1.683
	38 × 125	2.966	2.855	2.596	2.741	2.659	2.435	2.539	2.455	2.248
	38 × 150	3.548	3.415	3.108	3.335	3.209	2.917	3.165	3.044	2.716
	47 × 100	2.552	2.456	2.234	2.346	2.281	2.097	2.184	2.116	1.948
	47 × 125	3.177	3.059	2.785	2.988	2.875	2.615	2.836	2.728	2.479
	47 × 150	3.796	3.657	3.333	3.573	3.440	3.131	3.393	3.265	2.969
CLS/ALS sizes	38 × 89	1.824	1.788	1.694	1.694	1.653	1.548	1.591	1.548	1.437
	38 × 140	3.316	3.191	2.903	3.117	2.998	2.724	2.941	2.839	2.545

^{A)} Check the availability of section sizes.

Table 28 Permissible clear spans for purlins supporting rafters and relates to Table 27. Timber of strength class C16. Imposed loading of 0.75 kN/m²

C16-0.75 22½° to 30°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.907	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.222	2.081	1.966	1.871	—	—	2.084	1.949	1.840	—	—	—	1.971	1.842	—	—	—	—
	47 x 200	2.537	2.376	2.246	2.137	2.031	1.924	2.380	2.226	2.101	1.969	1.852	—	2.251	2.104	1.951	1.820	—	—
	47 x 225	2.852	2.671	2.525	2.403	2.268	2.149	2.675	2.502	2.355	2.199	2.069	1.959	2.531	2.359	2.179	2.033	1.912	1.809
	47 x 250	3.166	2.965	2.803	2.660	2.504	2.372	2.970	2.778	2.600	2.427	2.284	2.162	2.810	2.604	2.405	2.245	2.111	1.997
	47 x 275	3.479	3.259	3.082	2.908	2.738	2.594	3.264	3.054	2.842	2.654	2.498	2.365	3.089	2.847	2.630	2.455	2.309	2.185
	47 x 300	3.792	3.553	3.359	3.155	2.971	2.814	3.558	3.330	3.084	2.880	2.710	2.566	3.368	3.088	2.854	2.664	2.505	2.371
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	2.116	1.984	1.877	—	—	—	1.986	1.861	—	—	—	—	1.882	—	—	—	—	—
	63 x 175	2.465	2.312	2.188	2.085	1.997	1.920	2.315	2.169	2.051	1.953	1.869	—	2.193	2.053	1.940	1.845	—	—
	63 x 200	2.814	2.639	2.498	2.381	2.280	2.193	2.643	2.477	2.342	2.230	2.134	2.041	2.505	2.345	2.216	2.108	1.993	1.888
	63 x 225	3.162	2.966	2.808	2.676	2.564	2.466	2.971	2.784	2.633	2.507	2.400	2.280	2.815	2.636	2.491	2.365	2.226	2.108
	63 x 250	3.509	3.293	3.117	2.971	2.846	2.738	3.297	3.091	2.923	2.784	2.656	2.516	3.125	2.926	2.766	2.611	2.458	2.328
	63 x 275	3.855	3.618	3.426	3.266	3.129	3.010	3.623	3.397	3.213	3.060	2.904	2.751	3.435	3.217	3.040	2.854	2.687	2.545
	63 x 300	4.201	3.943	3.734	3.560	3.411	3.268	3.949	3.702	3.503	3.336	3.150	2.985	3.743	3.506	3.314	3.097	2.916	2.762

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-0.75 22½° to 30°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-0.75 22½° to 30°

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 29 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C16. Imposed loading of 0.75 kN/m²

C16-0.75 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.282	2.232	2.102	2.102	2.046	1.905	1.964	1.905	1.759
	38 × 125	3.069	2.954	2.687	2.865	2.769	2.516	2.653	2.564	2.348
	38 × 150	3.670	3.534	3.217	2.444	3.314	3.014	3.264	3.140	2.852
	47 × 100	2.640	2.541	2.313	2.453	2.383	2.166	2.282	2.211	2.035
	47 × 125	3.286	3.165	2.882	3.085	2.969	2.701	2.924	2.814	2.557
	47 × 150	3.926	3.783	3.449	3.689	3.552	3.234	3.499	3.367	3.062
CLS/ALS sizes	38 × 89	1.912	1.874	1.774	1.774	1.731	1.620	1.666	1.620	1.503
	38 × 140	3.430	3.302	3.005	3.218	3.097	2.815	3.050	2.933	2.664

^{A)} Check the availability of section sizes.

Table 30 Permissible clear spans for purlins supporting rafters and relates to Table 29. Timber of strength class C16. Imposed loading of 0.75 kN/m² C16-0.75 30° to 45°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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					
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.976	1.851	—	—	—	1.850	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.303	2.158	2.040	1.942	1.858	2.156	2.018	1.906	1.812	—	—	2.038	1.905	—	—	—	—
	47 x 200	2.630	2.464	2.330	2.218	2.123	2.463	2.304	2.177	2.067	1.945	1.841	2.327	2.176	2.044	1.907	—	—
	47 x 225	2.956	2.770	2.619	2.494	2.387	2.768	2.591	2.447	2.308	2.172	2.057	2.616	2.446	2.283	2.131	2.004	1.897
	47 x 250	3.281	3.075	2.908	2.769	2.636	3.073	2.877	2.718	2.548	2.398	2.271	2.905	2.717	2.520	2.352	2.213	2.094
	47 x 275	3.606	3.380	3.197	3.044	2.882	3.378	3.162	2.983	2.786	2.623	2.483	3.193	2.981	2.755	2.572	2.420	2.290
	47 x 300	3.930	3.684	3.485	3.319	3.127	2.963	3.682	3.447	3.236	3.023	2.846	2.695	3.481	3.234	2.989	2.791	2.626
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	1.829	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	2.191	2.055	1.946	1.855	—	2.054	1.925	1.821	—	—	—	1.944	1.820	—	—	—	—
	63 x 175	2.553	2.395	2.268	2.162	2.071	2.394	2.244	2.123	2.022	1.936	1.861	2.266	2.122	2.006	1.909	1.826	—
	63 x 200	2.915	2.735	2.590	2.469	2.365	2.733	2.562	2.424	2.309	2.211	2.126	2.587	2.423	2.291	2.180	2.086	1.977
	63 x 225	3.275	3.073	2.911	2.775	2.659	3.072	2.880	2.725	2.596	2.486	2.390	2.908	2.724	2.575	2.451	2.332	2.209
	63 x 250	3.634	3.411	3.231	3.081	2.953	3.409	3.197	3.025	2.882	2.760	2.641	3.228	3.024	2.859	2.722	2.574	2.439
	63 x 275	3.993	3.749	3.551	3.386	3.245	3.746	3.514	3.325	3.168	3.034	2.887	3.547	3.324	3.143	2.989	2.815	2.667
	63 x 300	4.350	4.085	3.870	3.691	3.538	4.083	3.830	3.625	3.454	3.305	3.133	3.866	3.623	3.427	3.243	3.054	2.893

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 30 Permissible clear spans for purlins supporting rafters and relates to Table 29. Timber of strength class C16. Imposed loading of 0.75 kN/m²
(continued)

C16-0.75 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	1.943	1.823	—	—	—	—	1.822	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.328	2.185	2.070	1.974	1.893	1.822	2.184	2.048	1.939	1.848	—	—	2.068	1.938	1.833	—	—	—
	75 x 175	2.712	2.546	2.413	2.301	2.206	2.124	2.545	2.387	2.260	2.154	2.064	1.986	2.410	2.259	2.137	2.036	1.949	1.874
	75 x 200	3.095	2.907	2.754	2.627	2.519	2.425	2.905	2.726	2.581	2.460	2.357	2.268	2.752	2.580	2.441	2.325	2.226	2.141
	75 x 225	3.477	3.266	3.095	2.953	2.832	2.727	3.264	3.063	2.901	2.765	2.650	2.550	3.092	2.900	2.744	2.614	2.503	2.407
	75 x 250	3.857	3.624	3.436	3.278	3.144	3.027	3.622	3.400	3.220	3.070	2.942	2.831	3.432	3.219	3.046	2.902	2.780	2.667
	75 x 275	4.237	3.982	3.775	3.603	3.455	3.327	3.980	3.736	3.539	3.375	3.234	3.112	3.771	3.537	3.348	3.190	3.056	2.916
	75 x 300	4.615	4.338	4.114	3.926	3.766	3.627	4.336	4.071	3.857	3.678	3.526	3.393	4.110	3.856	3.650	3.478	3.331	3.163
Double- members																			
94 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125	2.198	2.065	1.958	1.869	—	—	—	2.064	1.938	1.836	—	—	—	1.956	1.836	—	—	—	—
94 x 150	2.632	2.474	2.346	2.240	2.150	2.071	2.473	2.473	2.322	2.201	2.100	2.014	1.940	2.344	2.200	2.084	1.987	1.905	1.834
94 x 175	3.065	2.882	2.734	2.611	2.505	2.414	2.880	2.880	2.706	2.565	2.448	2.348	2.261	2.731	2.564	2.429	2.317	2.221	2.138
94 x 200	3.497	3.289	3.120	2.980	2.860	2.757	3.287	3.287	3.089	2.928	2.795	2.681	2.582	3.117	2.927	2.773	2.645	2.536	2.442
94 x 225	3.927	3.694	3.506	3.349	3.214	3.098	3.692	3.692	3.470	3.291	3.141	3.013	2.903	3.502	3.289	3.117	2.974	2.851	2.745
94 x 250	4.356	4.099	3.890	3.716	3.568	3.439	4.096	4.096	3.851	3.652	3.487	3.345	3.223	3.886	3.651	3.460	3.301	3.166	3.048
94 x 275	4.783	4.502	4.274	4.083	3.921	3.779	4.499	4.499	4.231	4.013	3.831	3.677	3.542	4.270	4.011	3.802	3.628	3.480	3.350
94 x 300	5.209	4.904	4.656	4.449	4.273	4.119	4.901	4.901	4.609	4.373	4.176	4.007	3.861	4.652	4.371	4.144	3.955	3.793	3.652

C16-0.75 30° to 45°

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 31 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C24. Imposed loading of 0.75 kN/m²

C24-0.75 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.418	2.326	2.114	2.275	2.187	1.986	2.159	2.076	1.884
	38 × 125	3.011	2.898	2.636	2.834	2.727	2.478	2.692	2.589	2.350
	38 × 150	3.600	3.467	3.156	3.391	3.263	2.967	3.222	3.099	2.815
	47 × 100	2.591	2.494	2.269	2.439	2.347	2.133	2.317	2.228	2.024
	47 × 125	3.224	3.105	2.828	3.037	2.924	2.660	2.887	2.777	2.525
	47 × 150	3.852	3.711	3.383	3.361	3.497	3.184	3.453	3.323	3.023
CLS/ALS	38 × 89	2.155	2.073	1.884	2.027	1.949	1.769	1.924	1.849	1.678
	38 × 140	3.365	3.240	2.948	3.169	3.049	2.772	3.010	2.895	2.629

^{A)} Check the availability of section sizes.

Table 32 Permissible clear spans for purlins supporting rafters and relates to Table 31. Timber of strength class C24. Imposed loading of 0.75 kN/m²
C24-0.75 15° to 22½°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																			
	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	
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																			
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000		
	Maximum clear span of purlin m																			
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 150	1.944	1.820	—	—	—	1.826	—	—	—	—	—	—	—	—	—	—	—		
	47 x 175	2.265	2.122	2.005	1.909	1.826	2.128	1.991	1.880	—	—	—	2.017	1.885	—	—	—	—		
	47 x 200	2.586	2.423	2.290	2.180	2.086	2.431	2.274	2.148	2.042	1.952	1.874	2.303	2.153	2.031	1.930	1.808	—		
	47 x 225	2.907	2.723	2.575	2.451	2.345	2.253	2.557	2.415	2.296	2.195	2.107	2.589	2.420	2.284	2.170	2.031	1.824		
	47 x 250	3.227	3.023	2.859	2.721	2.604	2.502	3.033	2.839	2.681	2.550	2.438	2.340	2.875	2.688	2.536	2.410	2.254		
	47 x 275	3.546	3.323	3.142	2.992	2.863	2.751	3.334	3.120	2.948	2.803	2.680	2.573	3.160	2.955	2.788	2.650	2.477		
	47 x 300	3.865	3.622	3.425	3.261	3.121	2.999	3.634	3.402	3.214	3.057	2.923	2.806	2.445	3.221	3.040	2.889	2.699		
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
63 x 150	2.156	2.022	1.914	1.824	—	—	2.028	1.900	—	—	—	—	1.924	1.802	—	—	—	—		
63 x 175	2.512	2.356	2.230	2.126	2.036	1.959	2.364	2.215	2.095	1.995	1.910	1.836	2.243	2.100	1.985	1.889	1.807	—		
63 x 200	2.867	2.690	2.547	2.427	2.325	2.237	2.698	2.529	2.393	2.279	2.181	1.097	2.561	2.398	2.267	2.157	2.064	1.982		
63 x 225	3.221	3.023	2.862	2.728	2.614	2.515	3.032	2.843	2.689	2.562	2.452	2.358	2.878	2.696	2.548	2.425	2.320	2.229		
63 x 250	3.575	3.355	3.177	3.029	2.903	2.793	3.366	3.156	2.986	2.844	2.723	2.618	3.195	2.993	2.829	2.693	2.577	2.476		
63 x 275	3.927	3.687	3.492	3.329	3.190	3.070	3.698	3.468	3.282	3.126	2.994	2.878	3.511	3.289	3.110	2.961	2.833	2.722		
63 x 300	4.279	4.017	3.806	3.629	3.478	3.347	4.030	3.780	3.577	3.408	3.264	3.138	3.826	3.586	3.391	3.228	3.089	2.968		
Minimum design bearing length																				

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 32 Permissible clear spans for purlins supporting rafters and relates to Table 31. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	1.912	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.291	2.150	2.036	1.942	1.861	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 175	2.668	2.505	2.373	2.363	2.170	2.088	2.157	2.022	1.914	1.824	—	—	2.048	2.236	1.919	1.815	—	—	—
	75 x 200	3.045	2.859	2.709	2.584	2.477	2.385	2.868	2.691	2.548	2.428	2.326	2.238	2.724	2.553	2.416	2.301	2.203	2.118	1.854
	75 x 225	3.420	3.212	3.044	2.904	2.785	2.681	3.222	3.024	2.863	2.729	2.615	2.516	3.061	2.870	2.716	2.587	2.477	2.381	2.118
	75 x 250	3.795	3.565	3.379	3.224	3.091	2.976	3.576	3.356	3.179	3.030	2.904	2.794	3.397	3.186	3.015	2.872	2.750	2.644	2.381
	75 x 275	4.168	3.916	3.713	3.543	3.397	3.271	3.929	3.688	3.493	3.330	3.192	3.071	3.733	3.501	3.313	3.157	3.023	2.907	2.644
	75 x 300	4.540	4.267	4.046	3.861	3.703	3.566	4.280	4.019	3.807	3.630	3.479	3.348	4.068	3.816	3.612	3.442	3.296	3.170	2.907
Double-members																				
Minimum design bearing length	94 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	94 x 125	2.163	2.032	1.927	1.839	—	—	2.038	1.914	1.813	—	—	—	1.937	1.817	—	—	—	—	—
	94 x 150	2.590	2.435	2.309	2.204	2.115	2.037	2.442	2.293	2.173	2.074	1.989	1.915	2.321	2.178	2.063	1.968	1.886	1.815	1.615
	94 x 175	3.017	2.836	2.690	2.568	2.465	2.375	2.845	2.672	2.533	2.417	2.318	2.232	2.704	2.538	2.405	2.293	2.198	2.116	1.916
	94 x 200	3.441	3.236	3.070	2.932	2.814	2.711	3.246	3.050	2.891	2.759	2.647	2.549	3.086	2.898	2.746	2.619	2.511	2.417	2.217
	94 x 225	3.864	3.635	3.449	3.294	3.162	3.047	3.646	3.426	3.249	3.101	2.975	2.865	3.467	3.256	3.086	2.943	2.822	2.717	2.517
	94 x 250	4.286	4.032	3.827	3.656	3.510	3.382	4.045	3.802	3.606	3.442	3.302	3.181	3.847	3.614	3.425	3.268	3.133	3.017	2.817
	94 x 275	4.706	4.429	4.204	4.017	3.856	3.717	4.442	4.177	3.962	3.782	3.629	3.496	4.226	3.971	3.764	3.591	3.444	3.316	3.116
	94 x 300	5.124	4.824	4.580	4.377	4.202	4.051	4.839	4.551	4.317	4.122	3.956	3.811	4.604	4.327	4.102	3.914	3.754	3.615	3.415

Table 32 Permissible clear spans for purlins supporting rafters and relates to Table 31. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 15° to 22½°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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					
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16)																	
	mm																	
	Maximum clear span of purlin m																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
CLS/ALS sizes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.206	2.063	1.948	1.852	—	—	2.070	1.934	1.824	—	—	—	1.959	1.828	—	—	—	—
	2.812	2.631	2.485	2.362	2.258	2.127	2.640	2.467	2.327	2.210	1.985	—	2.499	2.332	2.197	1.925	—	—
	3.405	3.187	3.010	2.862	2.736	2.574	3.197	2.988	2.819	2.677	2.402	2.158	3.027	2.826	2.663	2.330	2.066	1.854
Minimum design bearing length																		
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																		
If wane is not permitted, the minimum design bearing length is 59 mm.																		
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																		

Table 33 Permissible clear spans for common or jack rafters for roofs having a pitch more than $22\frac{1}{2}^\circ$ but not more than 30° . Timber of strength class C24. Imposed loading of 0.75 kN/m^2

C24-0.75 $22\frac{1}{2}^\circ$ to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.476	2.382	2.166	2.326	2.237	2.032	2.206	2.121	1.925
	38 × 125	3.083	2.968	2.700	2.898	2.789	2.534	2.750	2.645	2.402
	38 × 150	3.686	3.550	3.232	3.467	3.337	3.035	3.291	3.166	2.877
	47 × 100	2.652	2.553	2.324	2.494	2.400	2.182	2.367	2.277	2.068
	47 × 125	3.300	3.179	2.896	3.105	2.989	2.720	2.949	2.837	2.580
	47 × 150	3.943	3.799	3.464	3.712	3.575	3.256	3.527	3.395	3.089
CLS/ALS sizes	38 × 89	2.207	2.123	1.930	2.073	1.994	1.810	1.966	1.890	1.715
	38 × 140	3.446	3.317	3.020	3.240	3.118	2.835	3.075	2.958	2.687

^{A)} Check the availability of section sizes.

Table 34 Permissible clear spans for purlins supporting rafters and relates to Table 33. Timber of strength class C24. Imposed loading of 0.75 kN/m²

C24-0.75 22½° to 30°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.992	1.866	—	—	—	—	1.870	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.322	2.175	2.057	1.958	1.874	1.801	2.180	2.040	1.927	1.833	—	—	2.064	1.929	1.821	—	—	—
	47 x 200	2.651	2.484	2.349	2.237	2.141	2.057	2.489	2.329	2.201	2.093	2.002	1.922	2.357	2.204	2.080	1.977	1.889	—
	47 x 225	2.980	2.792	2.641	2.515	2.407	2.313	2.797	2.619	2.474	2.354	2.251	2.161	2.649	2.478	2.339	2.223	2.124	1.944
	47 x 250	3.307	3.100	2.932	2.792	2.673	2.569	3.106	2.908	2.747	2.614	2.500	2.400	2.941	2.751	2.597	2.469	2.359	2.158
	47 x 275	3.635	3.407	3.223	3.069	2.938	2.824	3.413	3.196	3.020	2.874	2.748	2.639	3.233	3.024	2.855	2.714	2.593	2.371
	47 x 300	3.961	3.714	3.513	3.346	3.204	3.079	3.720	3.484	3.293	3.133	2.997	2.878	3.525	3.297	3.113	2.959	2.828	2.584
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	1.843	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	2.209	2.072	1.962	1.870	—	—	2.076	1.946	1.841	—	—	—	1.968	1.843	—	—	—	—
	63 x 175	2.574	2.415	2.286	2.180	2.089	2.010	2.419	2.268	2.145	2.044	1.957	1.881	2.294	2.148	2.031	1.933	1.850	—
	63 x 200	2.937	2.757	2.611	2.489	2.385	2.295	2.762	2.589	2.450	2.334	2.235	2.149	2.619	2.453	2.320	2.208	2.113	2.030
	63 x 225	3.300	3.098	2.934	2.798	2.681	2.580	3.103	2.910	2.754	2.624	2.513	2.416	2.943	2.758	2.608	2.483	2.376	2.283
	63 x 250	3.662	3.438	3.257	3.106	2.977	2.865	3.444	3.231	3.057	2.913	2.790	2.683	3.267	3.062	2.895	2.757	2.638	2.535
	63 x 275	4.023	3.778	3.579	3.414	3.272	3.149	3.785	3.550	3.361	3.202	3.067	2.950	3.590	3.365	3.183	3.030	2.900	2.787
	63 x 300	4.383	4.117	3.901	3.721	3.567	3.433	4.124	3.869	3.663	3.491	3.344	3.216	3.913	3.668	3.469	3.304	3.162	3.039

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 34 Permissible clear spans for purlins supporting rafters and relates to Table 33. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	1.958	1.838	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.346	2.203	2.087	1.990	1.908	1.837	1.841	2.207	1.960	1.868	—	—	2.093	1.962	1.856	—	—	—
	75 x 175	2.733	2.567	2.432	2.320	2.224	2.142	2.571	2.412	2.284	2.177	2.086	—	2.439	2.287	2.164	2.062	1.974	1.898
	75 x 200	3.119	2.929	2.776	2.649	2.540	2.445	2.935	2.754	2.608	2.486	2.383	2.293	2.785	2.611	2.471	2.354	2.255	2.168
	75 x 225	3.503	3.291	3.120	2.977	2.855	2.749	3.297	3.095	2.931	2.795	2.678	2.577	3.129	2.935	2.778	2.647	2.535	2.438
	75 x 250	3.887	3.652	3.463	3.304	3.169	3.052	3.659	3.435	3.254	3.103	2.974	2.862	3.473	3.258	3.084	2.939	2.815	2.707
	75 x 275	4.269	4.012	3.805	3.631	3.483	3.354	4.019	3.774	3.576	3.410	3.269	3.146	3.816	3.580	3.389	3.230	3.094	2.976
	75 x 300	4.650	4.372	4.146	3.957	3.796	3.656	4.379	4.113	3.897	3.717	3.563	3.429	4.158	3.902	3.694	3.521	3.373	3.245
Double- members																			
94 x 100		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125		2.215	2.081	1.974	1.884	1.808	—	2.085	1.958	1.855	—	—	—	1.980	1.858	—	—	—	—
94 x 150		2.653	2.493	2.365	2.258	2.167	2.088	2.498	2.346	2.224	2.122	2.036	1.960	2.372	2.227	2.110	2.012	1.929	1.857
94 x 175		3.089	2.904	2.755	2.631	2.525	2.434	2.909	2.734	2.592	2.473	2.373	2.285	2.764	2.595	2.459	2.345	2.249	2.165
94 x 200		3.523	3.314	3.145	3.003	2.883	2.779	3.320	3.120	2.958	2.824	2.709	2.610	3.154	2.962	2.807	2.678	2.568	2.472
94 x 225		3.956	3.722	3.533	3.375	3.240	3.123	3.729	3.505	3.324	3.173	3.045	2.933	3.543	3.328	3.155	3.010	2.886	2.779
94 x 250		4.388	4.129	3.920	3.745	3.596	3.466	4.136	3.889	3.689	3.522	3.380	3.256	3.932	3.694	3.502	3.341	3.205	3.086
94 x 275		4.818	4.535	4.306	4.115	3.951	3.809	4.543	4.273	4.053	3.871	3.715	3.579	4.319	4.059	3.848	3.672	3.522	3.392
94 x 300		5.246	4.940	4.691	4.483	4.306	4.151	4.948	4.655	4.417	4.218	4.049	3.901	4.705	4.422	4.194	4.002	3.839	3.697
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 34 Permissible clear spans for purlins supporting rafters and relates to Table 33. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 22½° to 30°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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			
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
	Maximum clear span of purlin m																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
CLS/ALS sizes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.262	2.116	1.999	1.901	1.817	—	2.120	1.982	1.870	—	—	—	2.006	1.872	—	—	—	—
	2.884	2.699	2.550	2.425	2.319	2.226	2.704	2.528	2.385	2.266	2.121	1.905	2.558	2.389	2.252	2.052	1.819	—
	3.492	3.269	3.089	2.938	2.809	2.698	3.275	3.062	2.890	2.746	2.567	2.306	3.099	2.894	2.728	2.483	2.202	1.977
Minimum design bearing length																		

Table 35 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C24. Imposed loading of 0.75 kN/m²

C24-0.75 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.562	2.465	2.242	2.402	2.311	2.099	2.275	2.188	1.986
	38 × 125	3.190	3.071	2.795	2.993	2.880	2.618	2.836	2.728	2.478
	38 × 150	3.813	3.672	3.345	3.580	3.446	3.135	3.394	3.265	2.968
	47 × 100	2.744	2.642	2.405	2.575	2.478	2.254	2.440	2.348	2.133
	47 × 125	3.413	3.288	2.997	3.206	3.087	2.810	3.040	2.926	2.661
	47 × 150	4.077	3.929	3.585	3.832	3.691	3.363	3.636	3.500	3.186
CLS/ALS sizes	38 × 89	2.284	2.197	1.998	2.141	2.059	1.870	2.027	1.949	1.769
	38 × 140	3.564	3.432	3.125	3.346	3.220	2.929	3.171	3.051	2.772

^{A)} Check the availability of section sizes.

Table 36 Permissible clear spans for purlins supporting rafters and relates to Table 35. Timber of strength class C24. Imposed loading of 0.75 kN/m²
C24-0.75 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	2.064	1.935	1.830	—	—	—	1.934	1.811	—	—	—	—	1.829	—	—	—	—	—
	47 x 175	2.406	2.255	2.133	2.032	1.945	1.870	2.255	2.111	1.995	1.899	1.816	—	2.132	1.995	1.884	—	—	—
	47 x 200	2.747	2.575	2.436	2.320	2.222	2.136	2.574	2.411	2.279	2.169	2.075	1.993	2.435	2.278	2.152	2.046	1.956	1.877
	47 x 225	3.087	2.894	2.739	2.609	2.498	2.402	2.894	2.710	2.562	2.438	2.333	2.241	2.738	2.562	2.419	2.301	2.199	2.111
	47 x 250	3.427	3.213	3.041	2.897	2.774	2.667	3.212	3.009	2.845	2.708	2.591	2.489	3.039	2.844	2.687	2.555	2.442	2.345
	47 x 275	3.765	3.531	3.342	3.184	3.049	2.932	3.531	3.308	3.127	2.977	2.848	2.736	3.341	3.127	2.954	2.809	2.685	2.578
	47 x 300	4.103	3.849	3.643	3.471	3.325	3.197	3.848	3.606	3.409	3.246	3.106	2.984	3.642	3.409	3.220	3.063	2.928	2.811
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	1.909	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	2.287	2.146	2.033	1.938	1.858	—	2.146	2.012	1.904	1.814	—	—	2.032	1.904	1.801	—	—	—
	63 x 175	2.665	2.501	2.369	2.259	2.166	2.084	2.501	2.345	2.220	2.115	2.026	1.949	2.369	2.219	2.099	1.999	1.913	1.839
	63 x 200	3.041	2.855	2.705	2.580	2.473	2.380	2.855	2.678	2.535	2.415	2.314	2.226	2.704	2.534	2.397	2.283	2.185	2.101
	63 x 225	3.417	3.209	3.040	2.900	2.780	2.676	3.208	3.010	2.849	2.715	2.601	2.502	3.039	2.849	2.695	2.567	2.457	2.362
	63 x 250	3.792	3.561	3.375	3.219	3.086	2.971	3.561	3.341	3.163	3.015	2.889	2.779	3.374	3.163	2.992	2.850	2.729	2.623
	63 x 275	4.165	3.913	3.708	3.538	3.392	3.266	3.912	3.671	3.477	3.314	3.175	3.055	3.707	3.476	3.289	3.133	3.000	2.884
	63 x 300	4.538	4.264	4.042	3.856	3.698	3.560	4.263	4.001	3.789	3.613	3.462	3.331	4.040	3.789	3.585	3.416	3.270	3.144

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 36 Permissible clear spans for purlins supporting rafters and relates to Table 35. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	2.027	1.903	1.804	—	—	—	—	—	—	—	—	—	—	1.803	—	—	—	—
	75 x 150	2.429	2.281	2.162	2.062	1.978	1.905	1.903	2.281	2.140	2.027	1.932	1.852	—	2.161	2.026	1.918	1.827	—
	75 x 175	2.829	2.658	2.519	2.404	2.305	2.220	2.657	2.494	2.362	2.252	2.159	2.159	2.078	2.518	2.362	2.236	2.130	2.041
	75 x 200	3.228	3.033	2.876	2.744	2.632	2.535	3.033	2.847	2.697	2.572	2.465	2.465	2.373	2.875	2.697	2.553	2.433	2.331
	75 x 225	3.626	3.408	3.231	3.084	2.959	2.850	3.407	3.199	3.031	2.891	2.771	2.771	2.668	3.230	3.031	2.869	2.735	2.620
	75 x 250	4.022	3.781	3.586	3.423	3.284	3.164	3.781	3.551	3.365	3.209	3.077	3.077	2.962	3.585	3.364	3.186	3.037	2.910
	75 x 275	4.418	4.154	3.940	3.762	3.610	3.477	4.153	3.901	3.697	3.527	3.382	3.382	3.256	3.939	3.697	3.501	3.338	3.198
	75 x 300	4.812	4.526	4.294	4.100	3.934	3.790	4.525	4.251	4.030	3.845	3.687	3.687	3.550	4.292	4.029	3.816	3.638	3.487
Double- members																			
94 x 100	1.837	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125	2.292	2.154	2.043	1.951	1.872	1.804	2.154	2.023	1.918	1.830	—	—	—	2.042	1.917	1.817	—	—	—
94 x 150	2.744	2.581	2.448	2.338	2.244	2.163	2.580	2.424	2.298	2.194	2.105	2.105	2.028	2.447	2.298	2.178	2.078	1.992	1.918
94 x 175	3.196	3.006	2.852	2.724	2.615	2.521	3.005	2.824	2.678	2.557	2.453	2.453	2.363	2.851	2.678	2.538	2.422	2.322	2.236
94 x 200	3.645	3.429	3.255	3.110	2.986	2.878	3.429	3.223	3.057	2.919	2.801	2.801	2.699	3.254	3.057	2.898	2.765	2.652	2.554
94 x 225	4.093	3.852	3.657	3.494	3.355	3.235	3.851	3.621	3.435	3.280	3.148	3.148	3.033	3.655	3.435	3.256	3.108	2.981	2.871
94 x 250	4.539	4.273	4.057	3.877	3.724	3.590	4.272	4.018	3.812	3.641	3.495	3.495	3.368	4.056	3.812	3.614	3.450	3.310	3.188
94 x 275	4.983	4.692	4.457	4.260	4.092	3.945	4.692	4.414	4.189	4.001	3.840	3.840	3.701	4.455	4.188	3.972	3.791	3.638	3.504
94 x 300	5.426	5.111	4.855	4.641	4.459	4.300	5.110	4.808	4.564	4.360	4.186	4.186	4.034	4.854	4.563	4.328	4.132	3.965	3.820

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 36 Permissible clear spans for purlins supporting rafters and relates to Table 35. Timber of strength class C24. Imposed loading of 0.75 kN/m²
(continued)

C24-0.75 30° to 45°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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			
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Maximum clear span of purlin m																		
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.345	2.195	2.074	1.974	1.888	1.813	2.195	2.052	1.938	1.842	—	—	2.074	1.937	1.827	—	—
	38 x 235	2.989	2.800	2.646	2.518	2.409	2.314	2.799	2.618	2.472	2.350	2.245	2.097	2.645	2.471	2.331	2.214	1.994
	38 x 285	3.619	3.390	3.205	3.050	2.918	2.803	3.390	3.171	2.995	2.847	2.721	2.538	3.204	2.994	2.824	2.682	2.414
Minimum design bearing length																		
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																		
If wane is not permitted, the minimum design bearing length is 59 mm.																		
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																		

6.10 Rafters and purlins supporting rafters imposed load 1.00 kN/m²: Notes to Table 34 to Table 48

NOTE The sizes, spacings and spans given will support the dead loads stated in the tables, and either an imposed load of 1.00 kN/m² or a concentrated load of 0.9 kN. See Annex M for guidance on the snow load relevant for a particular site. BS EN 1991-1-3 permits a reduction in imposed roof loading for slopes greater than 30°. This reduction is not relevant, however, to Table 41, Table 42, Table 47 and Table 48 because the tabulated spans are based on a slope of 30° as giving the most onerous case for the range of slopes between 30° and 45°.

6.10.1 When dimensions A and B in Figure 16 are not equal, the section size for the rafters should be determined for the greater dimension. When the span of purlins is unequal, the section size for the purlin should be determined for each span or for the longest span.

NOTE 1 The design spacing for purlins is $\frac{A+B}{2}$ (see Figure 16).

NOTE 2 The section sizes given in the tables are either sawn across the timber thickness and width (member depth) in accordance with tolerance class 1 of BS EN 336, or are CLS/ALS processed sizes in accordance with tolerance class 2. BS EN 336 tolerances are as follows:

- a) on a sawn thickness or depth of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a sawn depth of greater than 100 mm (tolerance class 1):
 - 2 mm;
 - + 4 mm;
- c) on a processed thickness or depth of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- d) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.10.2 A rafter, or purlin, should not be notched or drilled unless justified by specialist calculation. This does not apply to the birdsmouthing of a rafter to a depth not exceeding one-third of the depth of the rafter.

NOTE 4 Permissible clear spans have been calculated in accordance with BS 5268-7.5 and BS 5268-7.6. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1. In the tables for rafters, the permissible clear spans are for rafters simply supported between a purlin and wallplate or between a purlin and the ridgeboard. However, in the tables for purlins, the permissible clear spans are based on the assumption that the rafters can be continuous.

6.10.3 The two sections of double purlin should be fixed together with flush tops, to act as one piece.

Table 37 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.095	2.048	1.902	1.929	1.877	1.747	1.801	1.747	1.613
	38 × 125	2.731	2.627	2.348	2.592	2.492	2.172	2.435	2.341	2.028
	38 × 150	3.268	3.144	2.788	3.103	2.970	2.579	2.944	2.780	2.410
	47 × 100	2.350	2.261	2.054	2.231	2.146	1.948	2.096	2.030	1.827
	47 × 125	2.298	2.817	2.562	2.781	2.675	2.412	2.659	2.557	2.256
	47 × 150	3.501	3.370	3.067	3.327	3.201	2.864	3.182	3.061	2.679
CLS/ALS sizes	38 × 89	1.755	1.720	1.628	1.628	1.588	1.485	1.528	1.485	1.378
	38 × 140	3.053	2.937	2.612	2.899	2.784	2.417	2.759	2.605	2.258

^{A)} Check the availability of section sizes.

Table 38 Permissible clear spans for purlins supporting rafters and relates to Table 37. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.039	1.906	—	—	—	—	1.929	1.802	—	—	—	—	—	1.838	—	—	—	—	—
	47 x 200	2.328	2.177	2.045	1.909	—	—	2.204	2.050	1.893	—	—	—	—	2.099	1.917	—	—	—	—
	47 x 225	2.617	2.447	2.284	2.132	2.006	1.898	2.477	2.290	2.115	1.973	1.855	—	2.352	2.142	1.977	1.843	—	—	—
	47 x 250	2.905	2.717	2.521	2.353	2.214	2.096	2.751	2.527	2.335	2.178	2.048	1.924	2.596	2.364	2.183	2.035	1.876	—	—
	47 x 275	3.194	2.982	2.756	2.574	2.421	2.292	3.024	2.763	2.553	2.382	2.240	2.114	2.839	2.585	2.387	2.226	2.062	1.850	—
	47 x 300	3.481	3.234	2.990	2.792	2.627	2.487	3.289	2.998	2.770	2.585	2.431	2.299	3.079	2.805	2.590	2.415	2.247	2.017	—
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 150	1.944	1.821	—	—	—	—	1.843	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 175	2.266	2.122	2.006	1.910	1.827	—	2.148	2.010	1.899	1.806	—	—	—	2.049	1.916	1.808	—	—	—	—
63 x 200	2.587	2.424	2.291	2.181	2.087	1.979	2.453	2.295	2.168	2.056	1.935	1.832	1.832	2.340	2.188	2.060	1.923	1.809	—	—
63 x 225	2.908	2.724	2.576	2.452	2.333	2.210	2.757	2.580	2.438	2.296	2.161	2.046	2.046	2.630	2.460	2.300	2.147	2.020	1.912	—
63 x 250	3.227	3.024	2.860	2.723	2.575	2.440	3.060	2.865	2.707	2.534	2.385	2.259	2.259	2.920	2.731	2.539	2.371	2.230	2.111	—
63 x 275	3.547	3.324	3.143	2.990	2.816	2.668	3.364	3.149	2.966	2.771	2.608	2.470	2.470	3.210	3.003	2.776	2.592	2.439	2.309	—
63 x 300	3.865	3.623	3.427	3.243	3.055	2.984	3.666	3.433	3.217	3.006	2.830	2.680	2.680	3.499	3.257	3.012	2.812	2.646	2.505	—

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 38 Permissible clear spans for purlins supporting rafters and relates to Table 37. Timber of strength class C16. Imposed loading of 1.00 kN/m² (continued)

C16-1.00 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.068	1.939	1.834	—	—	—	1.962	1.837	—	—	—	—	1.873	—	—	—	—	—
	75 x 175	2.410	2.260	2.138	2.037	1.950	1.875	2.286	2.142	2.025	1.928	1.845	—	2.183	2.043	1.930	1.836	—	—
	75 x 200	2.751	2.580	2.441	2.326	2.227	2.142	2.610	2.446	2.312	2.201	2.107	2.005	2.492	2.333	2.205	2.097	1.980	1.875
	75 x 225	3.092	2.899	2.744	2.614	2.504	2.408	2.934	2.749	2.600	2.475	2.363	2.239	2.801	2.623	2.478	2.349	2.211	2.094
	75 x 250	3.431	3.218	3.046	2.903	2.780	2.668	3.256	3.052	2.886	2.748	2.609	2.472	3.110	2.912	2.752	2.593	2.441	2.312
	75 x 275	3.770	3.537	3.348	3.190	3.056	2.916	3.578	3.354	3.172	3.021	2.852	2.703	3.417	3.201	3.025	2.835	2.669	2.528
	75 x 300	4.107	3.854	3.649	3.478	3.331	3.164	3.899	3.656	3.458	3.285	3.094	2.932	3.725	3.489	3.291	3.075	2.895	2.743
Double- members																			
94 x 100		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125		1.956	1.836	—	—	—	—	1.857	—	—	—	—	—	—	—	—	—	—	—
94 x 150		2.344	2.200	2.084	1.988	1.906	1.835	2.226	2.088	1.977	1.884	1.806	—	2.127	1.994	1.887	—	—	—
94 x 175		2.731	2.564	2.429	2.317	2.222	2.139	2.594	2.434	2.304	2.197	2.105	2.025	2.479	2.324	2.200	2.096	2.007	1.930
94 x 200		3.116	2.927	2.773	2.646	2.537	2.442	2.960	2.778	2.631	2.508	2.404	2.313	2.830	2.654	2.512	2.393	2.293	2.205
94 x 225		3.501	3.288	3.117	2.974	2.852	2.746	3.326	3.122	2.957	2.820	2.702	2.600	3.180	2.983	2.823	2.691	2.577	2.471
94 x 250		3.884	3.649	3.459	3.301	3.166	3.048	3.691	3.465	3.283	3.130	3.000	2.887	3.529	3.311	3.135	2.987	2.862	2.728
94 x 275		4.266	4.009	3.801	3.628	3.479	3.350	4.055	3.808	3.608	3.441	3.298	3.174	3.878	3.639	3.445	3.284	3.146	2.982
94 x 300		4.647	4.368	4.142	3.954	3.792	3.652	4.418	4.150	3.932	3.750	3.595	3.455	4.226	3.966	3.755	3.580	3.413	3.235
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.00 15° to 22½°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 39 Permissible clear spans for common or jack rafters for roofs having a pitch more than $22\frac{1}{2}^\circ$ but not more than 30° . Timber of strength class C16. Imposed loading of 1.00 kN/m^2

C16-1.00 $22\frac{1}{2}^\circ$ to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.178	2.131	1.961	2.008	1.955	1.821	1.877	1.821	1.683
	38 × 125	2.800	2.693	2.446	2.654	2.552	2.300	2.534	2.435	2.147
	38 × 150	3.350	3.223	2.930	3.177	3.055	2.731	3.034	2.917	2.549
	47 × 100	2.409	2.318	2.106	2.284	2.197	1.995	2.181	2.097	1.903
	47 × 125	3.001	2.888	2.627	2.847	2.739	2.489	2.719	2.615	2.374
	47 × 150	3.588	3.455	3.144	3.406	3.277	2.980	3.254	3.131	2.832
CLS/ALS sizes	38 × 89	1.824	1.788	1.694	1.694	1.653	1.548	1.591	1.548	1.437
	38 × 140	3.130	3.011	2.737	2.968	2.854	2.560	2.834	2.724	2.289

^{A)} Check the availability of section sizes.

Table 40 Permissible clear spans for purlins supporting rafters and relates to Table 39. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.093	1.958	1.848	—	—	—	1.979	1.849	—	—	—	—	—	1.884	—	—	—	—	—
	47 x 200	2.390	2.236	2.111	1.981	1.864	—	2.260	2.112	1.962	1.830	—	—	—	2.152	1.984	1.831	—	—	—
	47 x 225	2.687	2.514	2.370	2.213	2.082	1.971	2.541	2.372	2.191	2.045	1.923	1.819	2.419	2.216	2.046	1.908	—	—	—
	47 x 250	2.983	2.791	2.616	2.443	2.299	2.177	2.822	2.618	2.419	2.257	2.123	2.009	2.685	2.446	2.258	2.107	1.980	1.801	
	47 x 275	3.279	3.068	2.861	2.672	2.514	2.380	3.102	2.862	2.645	2.469	2.322	2.197	2.936	2.674	2.470	2.304	2.166	1.980	
	47 x 300	3.574	3.345	3.103	2.898	2.728	2.583	3.381	3.105	2.870	2.679	2.519	2.384	3.185	2.901	2.680	2.500	2.350	2.158	
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	1.995	1.869	—	—	—	—	1.889	—	—	—	—	—	1.801	—	—	—	—	—	—
	63 x 175	2.325	2.179	2.060	1.962	1.878	1.805	2.202	2.061	1.948	1.853	—	—	2.099	1.963	1.854	—	—	—	—
	63 x 200	2.655	2.488	2.353	2.240	2.144	2.054	2.514	2.354	2.224	2.116	2.004	1.898	2.397	2.242	2.117	1.989	1.871	—	—
	63 x 225	2.984	2.796	2.645	2.519	2.411	2.294	2.826	2.646	2.501	2.378	2.239	2.120	2.694	2.521	2.379	2.222	2.090	1.979	
	63 x 250	3.312	3.104	2.937	2.797	2.673	2.532	3.137	2.938	2.777	2.625	2.471	2.341	2.991	2.799	2.626	2.452	2.308	2.185	
	63 x 275	3.639	3.412	3.228	3.074	2.922	2.769	3.448	3.229	3.052	2.870	2.702	2.560	3.288	3.077	2.871	2.682	2.524	2.389	
	63 x 300	3.966	3.719	3.519	3.352	3.170	3.004	3.758	3.520	3.328	3.114	2.932	2.777	3.584	3.354	3.115	2.909	2.738	2.593	

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 40 Permissible clear spans for purlins supporting rafters and relates to Table 39. Timber of strength class C16. Imposed loading of 1.00 kN/m² (continued)

C16-1.00 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.122	1.990	1.883	—	—	—	2.011	1.884	—	—	—	—	1.918	—	—	—	—	—
	75 x 175	2.473	2.319	2.195	2.091	2.003	1.927	2.343	2.196	2.077	1.977	1.893	1.819	2.235	2.093	1.978	1.882	1.800	—
	75 x 200	2.822	2.647	2.506	2.388	2.288	2.200	2.675	2.507	2.371	2.258	2.162	2.077	2.552	2.390	2.259	2.150	2.048	1.939
	75 x 225	3.171	2.975	2.817	2.685	2.572	2.474	3.006	2.818	2.666	2.539	2.430	2.319	2.868	2.686	2.539	2.417	2.287	2.166
	75 x 250	3.520	3.303	3.127	2.980	2.855	2.747	3.337	3.128	2.960	2.819	2.699	2.560	3.184	2.983	2.820	2.681	2.525	2.392
	75 x 275	3.867	3.629	3.436	3.276	3.139	3.020	3.666	3.438	3.253	3.099	2.954	2.799	3.499	3.278	3.099	2.932	2.761	2.615
	75 x 300	4.213	3.955	3.746	3.571	3.422	3.283	3.996	3.747	3.546	3.378	3.204	3.037	3.814	3.573	3.379	3.180	2.995	2.837
	Double- members																		
94 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125	2.006	1.883	—	—	—	—	1.903	—	—	—	—	—	—	1.816	—	—	—	—	—
94 x 150	2.404	2.257	2.139	2.040	1.956	1.883	2.280	2.139	2.026	1.932	1.851	1.851	—	2.177	2.042	1.932	1.841	—	—
94 x 175	2.800	2.630	2.492	2.378	2.280	2.196	2.657	2.493	2.361	2.252	2.158	2.158	2.077	2.537	2.379	2.252	2.147	2.056	1.978
94 x 200	3.195	3.002	2.845	2.715	2.604	2.507	3.032	3.032	2.846	2.696	2.571	2.465	2.372	2.896	2.717	2.572	2.451	2.348	2.259
94 x 225	3.589	3.373	3.197	3.051	2.927	2.819	3.407	3.407	3.199	3.030	2.890	2.771	2.667	3.254	3.053	2.891	2.756	2.640	2.540
94 x 250	3.982	3.743	3.549	3.387	3.249	3.129	3.780	3.780	3.550	3.364	3.209	3.076	2.961	3.612	3.389	3.210	3.060	2.932	2.821
94 x 275	4.374	4.112	3.899	3.722	3.571	3.439	4.153	3.901	3.697	3.526	3.381	3.255	3.255	3.968	3.725	3.528	3.363	3.223	3.084
94 x 300	4.765	4.480	4.249	4.057	3.892	3.749	4.525	4.251	4.029	3.844	3.686	3.686	3.548	4.324	4.059	3.845	3.666	3.513	3.345
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.00 22½° to 30°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 41 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.282	2.232	2.034	2.102	2.046	1.905	1.964	1.905	1.759
	38 × 125	2.902	2.792	2.537	2.746	2.640	2.397	2.617	2.516	2.264
	38 × 150	3.472	3.341	3.038	3.286	3.161	2.872	3.134	3.014	2.689
	47 × 100	2.497	2.402	2.184	2.363	2.273	2.064	2.253	2.166	1.966
	47 × 125	3.109	2.993	2.723	2.944	2.833	2.575	2.809	2.701	2.453
	47 × 150	3.717	3.580	3.259	3.522	3.390	3.083	3.361	3.234	2.939
CLS/ALS sizes	38 × 89	1.912	1.874	1.774	1.774	1.731	1.620	1.666	1.620	1.503
	38 × 140	3.244	3.121	2.838	3.070	2.953	2.682	2.928	2.815	2.520

^{A)} Check the availability of section sizes.

Table 42 Permissible clear spans for purlins supporting rafters and relates to Table 41. Timber of strength class C16. Imposed loading of 1.00 kN/m²

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																				
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																				
		1 500	1 800	2 100	2 400	2 700	3 000	1 500	1 800	2 100	2 400	2 700	3 000	1 500	1 800	2 100	2 400	2 700	3 000			
		Maximum clear span of purlin m																				
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 150	1.865	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 175	2.174	2.035	1.922	1.828	—	—	2.052	1.919	1.811	—	—	—	1.952	1.823	—	—	—	—	—		
	47 x 200	2.483	2.324	2.195	2.088	1.968	1.863	2.344	2.192	2.064	1.927	1.812	—	2.229	2.082	1.923	—	—	—	—		
	47 x 225	2.791	2.612	2.468	2.335	2.198	2.081	2.635	2.464	2.305	2.152	2.025	1.916	2.506	2.326	2.148	2.005	1.885	—	—		
	47 x 250	3.098	2.901	2.741	2.578	2.427	2.298	2.926	2.736	2.545	2.376	2.235	2.116	2.783	2.568	2.372	2.213	2.081	1.969	—		
	47 x 275	3.405	3.189	3.013	2.819	2.653	2.513	3.216	3.008	2.783	2.598	2.445	2.314	3.059	2.808	2.594	2.420	2.276	2.153	—		
	47 x 300	3.712	3.476	3.273	3.058	2.879	2.727	3.506	3.266	3.019	2.819	2.652	2.511	3.335	3.046	2.814	2.626	2.470	2.337	—		
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	63 x 150	2.071	1.941	1.836	—	—	—	1.957	1.833	—	—	—	—	1.863	—	—	—	—	—	—		
	63 x 175	2.413	2.262	2.140	2.039	1.952	1.877	2.282	2.137	2.020	1.923	1.840	—	2.172	2.033	1.920	1.826	—	—	—		
	63 x 200	2.755	2.583	2.444	2.328	2.230	2.144	2.605	2.440	2.307	2.196	2.101	1.997	2.481	2.322	2.193	2.086	1.965	1.861	—		
	63 x 225	3.096	2.903	2.747	2.617	2.507	2.410	2.928	2.743	2.594	2.469	2.355	2.231	2.788	2.610	2.466	2.332	2.195	2.079	—		
	63 x 250	3.437	3.223	3.050	2.906	2.783	2.672	3.250	3.045	2.880	2.742	2.600	2.463	3.096	2.898	2.738	2.575	2.423	2.295	—		
	63 x 275	3.776	3.542	3.353	3.195	3.060	2.921	3.572	3.347	3.166	3.014	2.843	2.693	3.402	3.186	3.010	2.815	2.650	2.510	—		
	63 x 300	4.115	3.861	3.655	3.483	3.336	3.169	3.893	3.649	3.451	3.275	3.084	2.922	3.709	3.473	3.269	3.054	2.875	2.723	—		

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.00 30° to 45°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.00 30° to 45°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 43 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.279	2.192	1.990	2.163	2.079	1.887	2.067	1.986	1.801
	38 × 125	2.840	2.732	2.482	2.696	2.593	2.354	2.577	2.478	2.248
	38 × 150	3.397	3.269	2.973	3.227	3.104	2.820	3.086	2.967	2.693
	47 × 100	2.444	2.351	2.137	2.321	2.232	2.027	2.219	2.133	1.936
	47 × 125	3.043	3.929	2.665	2.891	2.782	2.529	2.765	2.660	2.416
	47 × 150	3.638	3.503	3.190	3.459	3.329	3.028	3.309	3.184	2.893
CLS/ALS sizes	38 × 89	2.031	1.953	1.773	1.927	1.853	1.680	1.841	1.769	1.604
	38 × 140	3.175	3.055	2.777	3.015	2.900	2.634	2.883	2.772	2.515

^{A)} Check the availability of section sizes.

Table 44 Permissible clear spans for purlins supporting rafters and relates to Table 43. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00 15° to 22½°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																				
	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						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																				
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000			
Maximum clear span of purlin m																					
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	47 x 150	1.830	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	47 x 175	2.133	1.995	1.884	—	—	2.020	1.888	—	—	—	—	1.926	—	—	—	—	—			
	47 x 200	2.435	2.279	2.152	2.046	1.956	1.878	2.307	2.157	2.035	1.933	1.816	2.200	2.054	1.936	—	—	—			
	47 x 225	2.737	2.562	2.420	2.301	2.200	2.112	2.594	2.425	2.288	2.174	2.041	1.833	2.310	2.178	2.017	—	—			
	47 x 250	3.039	2.844	2.687	2.555	2.443	2.345	2.880	2.692	2.541	2.414	2.265	2.035	2.565	2.418	2.239	1.986	—			
	47 x 275	3.340	3.126	2.954	2.809	2.686	2.579	3.165	2.960	2.793	2.654	2.489	2.236	2.820	2.659	2.460	2.182	1.959			
	47 x 300	3.641	3.408	3.220	3.063	2.929	2.812	3.451	3.227	3.046	2.894	2.712	2.437	3.075	2.899	2.681	2.378	2.135			
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	63 x 150	2.032	1.904	1.801	—	—	—	1.927	1.805	—	—	—	—	1.840	—	—	—	—			
	63 x 175	2.368	2.219	2.099	1.999	1.914	1.840	2.247	2.104	1.988	1.892	1.810	—	2.145	1.895	1.802	—	—			
	63 x 200	2.704	2.534	2.397	2.283	2.186	2.101	2.565	2.402	2.271	2.161	2.067	1.986	2.449	2.164	2.058	1.968	1.889			
	63 x 225	3.038	2.848	2.695	2.567	2.457	2.363	2.883	2.700	2.553	2.430	2.324	2.233	2.753	2.433	2.314	2.213	2.124			
	63 x 250	3.372	3.162	2.992	2.850	2.729	2.623	3.200	2.998	2.834	2.698	2.581	2.480	3.056	2.702	2.570	2.457	2.359			
	63 x 275	3.705	3.475	3.288	3.133	3.000	2.884	3.517	3.295	3.116	2.966	2.838	2.727	3.359	2.970	2.826	2.702	2.594			
	63 x 300	4.038	3.787	3.584	3.415	3.270	3.144	3.833	3.592	3.396	3.233	3.094	2.973	3.661	3.239	3.081	2.946	2.829			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C24-1.00 15° to 22½°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C24-1.00 15° to 22½°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 45 Permissible clear spans for common or jack rafters for roofs having a pitch more than $22\frac{1}{2}^\circ$ but not more than 30° . Timber of strength class C24. Imposed loading of 1.00 kN/m^2

C24-1.00 $22\frac{1}{2}^\circ$ to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.336	2.247	2.041	2.214	2.129	1.932	2.114	2.032	1.843
	38 × 125	2.911	2.801	2.546	2.761	2.655	2.411	2.636	2.534	2.300
	38 × 150	3.482	3.352	3.048	3.304	3.178	2.888	3.156	3.035	2.755
	47 × 100	2.505	2.410	2.192	2.376	2.285	2.076	2.269	2.182	1.981
	47 × 125	3.119	3.002	2.732	2.960	2.848	2.589	2.828	2.720	2.471
	47 × 150	3.728	3.590	3.270	3.540	3.407	3.100	3.384	3.256	2.960
CLS/ALS sizes	38 × 89	2.082	2.002	1.818	1.973	1.897	1.721	1.883	1.810	1.641
	38 × 140	3.254	3.132	2.848	2.087	2.969	2.697	2.948	2.835	2.573

^{A)} Check the availability of section sizes.

Table 46 Permissible clear spans for purlins supporting rafters and relates to Table 45. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.878	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.189	2.049	1.936	1.841	—	—	2.072	1.937	1.828	—	—	—	—	1.974	1.844	—	—	—	—
	47 x 200	2.500	2.340	2.211	2.103	2.011	1.931	2.366	2.213	2.088	1.985	1.897	—	2.254	2.106	1.986	1.886	—	—	
	47 x 225	2.810	2.631	2.486	2.365	2.262	2.172	2.660	2.487	2.348	2.232	2.133	1.966	2.534	2.368	2.233	2.121	1.913	—	
	47 x 250	3.119	2.921	2.760	2.626	2.512	2.412	2.953	2.762	2.608	2.479	2.369	2.182	2.814	2.629	2.480	2.356	2.123	1.907	
	47 x 275	3.428	3.211	3.034	2.887	2.761	2.652	3.246	3.036	2.867	2.725	2.604	2.397	3.093	2.891	2.727	2.590	2.333	2.095	
	47 x 300	3.737	3.500	3.308	3.148	3.011	2.892	3.538	3.310	3.126	2.972	2.840	2.613	3.372	3.152	2.973	2.824	2.543	2.284	
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
63 x 150	2.085	1.954	1.849	—	—	—	—	1.975	1.850	—	—	—	—	1.884	—	—	—	—	—	
63 x 175	2.430	2.278	2.155	2.053	1.966	1.890	2.302	2.157	2.039	1.941	1.857	—	—	2.196	2.056	1.942	1.847	—	—	
63 x 200	2.774	2.601	2.461	2.345	2.245	2.159	2.629	2.463	2.329	2.217	2.121	2.039	2.039	2.508	2.347	2.218	2.110	2.018	1.938	
63 x 225	3.117	2.923	2.766	2.636	2.524	2.427	2.954	2.768	2.618	2.492	2.385	2.292	2.292	2.819	2.639	2.494	2.372	2.269	2.179	
63 x 250	3.459	3.245	3.071	2.926	2.803	2.696	3.280	3.073	2.907	2.767	2.649	2.546	2.546	3.129	2.930	2.769	2.635	2.520	2.420	
63 x 275	3.801	3.566	3.376	3.217	3.081	2.963	3.604	3.378	3.195	3.042	2.912	2.799	2.799	3.439	3.221	3.044	2.896	2.770	2.661	
63 x 300	4.142	3.886	3.679	3.507	3.359	3.231	3.928	3.682	3.483	3.317	3.175	3.052	3.052	3.749	3.511	3.319	3.158	3.021	2.901	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 46 Permissible clear spans for purlins supporting rafters and relates to Table 45. Timber of strength class C24. Imposed loading of 1.00 kN/m² (continued)

C24-1.00 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	1.849	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.216	2.079	1.968	1.876	—	—	—	—	—	—	—	—	2.005	1.879	—	—	—	—
	75 x 175	2.582	2.423	2.294	2.187	2.096	2.017	2.449	2.296	2.172	2.070	1.982	1.906	2.337	2.190	2.071	1.972	1.887	1.814
	75 x 200	2.947	2.766	2.620	2.497	2.393	2.303	2.795	2.621	2.481	2.364	2.264	2.177	2.668	2.500	2.365	2.252	2.155	2.072
	75 x 225	3.311	3.108	2.944	2.807	2.691	2.589	3.141	2.946	2.788	2.657	2.545	2.448	2.999	2.811	2.658	2.532	2.423	2.329
	75 x 250	3.674	3.450	3.268	3.116	2.987	2.875	3.486	3.270	3.096	2.950	2.826	2.718	3.329	3.120	2.952	2.811	2.691	2.587
	75 x 275	4.037	3.791	3.591	3.425	3.283	3.160	3.830	3.594	3.402	3.243	3.106	2.988	3.658	3.429	3.244	3.090	2.958	2.844
	75 x 300	4.398	4.131	3.914	3.733	3.579	3.445	4.174	3.914	3.709	3.535	3.386	3.257	3.986	3.728	3.537	3.369	3.225	3.101
Double- members																			
94 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125	2.094	1.966	1.864	—	—	—	—	1.987	1.865	—	—	—	—	1.898	—	—	—	—	—
94 x 150	2.508	2.356	2.234	2.132	2.045	1.969	2.381	2.235	2.117	2.020	1.936	1.864	2.275	2.134	2.021	1.926	1.846	—	—
94 x 175	2.922	2.745	2.603	2.484	2.383	2.295	2.774	2.605	2.468	2.354	2.257	2.173	2.650	2.487	2.355	2.246	2.152	2.071	—
94 x 200	3.334	3.133	2.971	2.836	2.721	2.621	3.166	2.973	2.818	2.688	2.578	2.482	3.025	2.839	2.689	2.564	2.458	2.366	—
94 x 225	3.744	3.520	3.339	3.187	3.058	2.946	3.556	3.341	3.167	3.021	2.897	2.790	3.399	3.191	3.023	2.883	2.763	2.659	—
94 x 250	4.154	3.906	3.705	3.538	3.395	3.271	3.946	3.708	3.515	3.354	3.217	3.098	3.772	3.542	3.356	3.200	3.068	2.953	—
94 x 275	4.562	4.291	4.071	3.887	3.731	3.595	4.335	4.074	3.862	3.686	3.536	3.405	4.144	3.892	3.688	3.518	3.372	3.246	—
94 x 300	4.969	4.674	4.436	4.237	4.066	3.918	4.722	4.439	4.209	4.018	3.854	3.712	4.515	4.241	4.019	3.834	3.676	3.539	—
Minimum design bearing length																			

Table 46 Permissible clear spans for purlins supporting rafters and relates to Table 45. Timber of strength class C24. Imposed loading of 1.00 kN/m²
(continued)

C24-1.00 22½° to 30°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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				
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Maximum clear span of purlin m																		
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.130	1.991	1.879	—	—	2.013	1.880	—	—	—	—	1.916	—	—	—	—	—
	38 x 235	2.717	2.540	2.397	2.277	2.148	1.930	2.568	2.398	2.261	2.074	1.839	2.444	2.280	2.077	1.813	—	—
	38 x 285	3.290	3.076	2.904	2.759	2.600	2.336	3.111	2.906	2.739	2.510	2.227	1.999	2.961	2.514	2.194	1.945	—
Minimum design bearing length																		
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																		
If wane is not permitted, the minimum design bearing length is 59 mm.																		
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																		

Table 47 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.421	2.329	2.116	2.291	2.203	2.000	2.184	2.099	1.904
	38 × 125	3.017	2.903	2.639	2.855	2.746	2.495	2.723	2.618	2.377
	38 × 150	3.608	3.473	3.160	3.417	3.288	2.988	3.260	3.135	2.847
	47 × 100	2.595	2.498	2.272	2.457	2.364	2.148	2.343	2.254	2.047
	47 × 125	3.231	3.111	2.832	3.061	2.945	2.679	2.920	2.810	2.553
	47 × 150	3.862	3.720	3.389	3.660	3.524	3.207	3.494	3.363	3.058
CLS/ALS sizes	38 × 89	2.158	2.076	1.885	2.041	1.963	1.781	1.946	1.870	1.696
	38 × 140	3.372	3.245	2.952	3.193	3.071	2.791	3.045	2.929	2.659

^{A)} Check the availability of section sizes.

Table 48 Permissible clear spans for purlins supporting rafters and relates to Table 47. Timber of strength class C24. Imposed loading of 1.00 kN/m²
C24-1.00 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	1.950	1.826	—	—	—	—	1.842	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.273	2.128	2.012	1.915	1.832	—	2.148	2.009	1.897	1.804	—	—	2.043	1.910	1.802	—	—	—	—
	47 x 200	2.595	2.431	2.298	2.187	2.092	2.010	2.452	2.295	2.167	2.061	1.970	1.891	2.334	2.182	2.059	1.956	1.869	—	—
	47 x 225	2.917	2.733	2.583	2.459	2.353	2.261	2.757	2.580	2.437	2.317	2.216	2.127	2.624	2.453	2.315	2.200	2.102	1.891	1.891
	47 x 250	3.238	3.034	2.868	2.731	2.613	2.511	3.061	2.865	2.706	2.574	2.461	2.362	2.913	2.724	2.571	2.443	2.334	2.099	2.099
	47 x 275	3.559	3.335	3.153	3.002	2.873	2.760	3.364	3.149	2.975	2.830	2.706	2.598	3.202	2.995	2.827	2.686	2.566	2.307	2.307
	47 x 300	3.879	3.635	3.438	3.273	3.132	3.010	3.667	3.433	3.244	3.085	2.950	2.832	3.491	3.265	3.082	2.929	2.799	2.515	2.515
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 125	1.805	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 x 150	2.163	2.028	1.920	1.829	—	—	—	2.046	1.917	1.813	—	—	—	1.949	1.825	—	—	—	—	—
63 x 175	2.521	2.364	2.238	2.133	2.043	1.965	2.385	2.235	2.114	2.013	1.927	1.853	2.272	2.128	2.011	1.914	1.831	—	—	—
63 x 200	2.877	2.699	2.555	2.435	2.333	2.244	2.723	2.552	2.414	2.299	2.201	2.116	2.594	2.430	2.297	2.186	2.092	2.010	2.010	2.010
63 x 225	3.233	3.034	2.872	2.738	2.623	2.523	3.060	2.869	2.714	2.585	2.475	2.379	2.916	2.731	2.582	2.458	2.352	2.260	2.260	2.260
63 x 250	3.589	3.368	3.189	3.040	2.913	2.802	3.397	3.185	3.013	2.870	2.748	2.642	3.237	3.033	2.867	2.729	2.612	2.510	2.510	2.510
63 x 275	3.943	3.701	3.505	3.341	3.202	3.080	3.732	3.500	3.312	3.155	3.021	2.905	3.558	3.333	3.152	3.001	2.871	2.759	2.759	2.759
63 x 300	4.296	4.033	3.820	3.642	3.490	3.358	4.068	3.815	3.611	3.440	3.294	3.167	3.878	3.634	3.436	3.272	3.131	3.009	3.009	3.009

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 48 Permissible clear spans for purlins supporting rafters and relates to Table 47. Timber of strength class C24. Imposed loading of 1.00 kN/m²
(continued)

C24-1.00 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	1.918	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.299	2.157	2.043	1.948	1.867	—	1.815	2.040	1.931	1.840	—	—	—	—	—	—	—	—	—
	75 x 175	2.678	2.514	2.381	2.271	2.177	2.095	2.535	2.378	2.251	2.145	2.055	1.977	2.417	2.266	2.143	2.041	1.955	1.879	
	75 x 200	3.056	2.869	2.719	2.593	2.486	2.393	2.894	2.715	2.570	2.450	2.347	2.258	2.760	2.587	2.448	2.332	2.233	2.147	
	75 x 225	3.434	3.224	3.055	2.914	2.794	2.690	3.252	3.051	2.889	2.754	2.639	2.539	3.101	2.908	2.751	2.621	2.510	2.414	
	75 x 250	3.810	3.579	3.391	3.235	3.102	2.987	3.609	3.387	3.208	3.058	2.930	2.819	3.442	3.228	3.055	2.910	2.787	2.680	
	75 x 275	4.185	3.932	3.727	3.556	3.410	3.283	3.965	3.722	3.525	3.361	3.221	3.099	3.783	3.548	3.358	3.199	3.064	2.947	
75 x 300	4.560	4.285	4.062	3.876	3.717	3.579	4.321	4.057	3.843	3.664	3.511	3.379	4.122	3.867	3.660	3.488	3.341	3.213		
Double- members																				
94 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
94 x 125	2.170	2.039	1.933	1.845	—	—	—	2.056	1.930	1.829	—	—	—	1.962	1.841	—	—	—	—	
94 x 150	2.600	2.443	2.317	2.211	2.122	2.044	2.044	2.464	2.314	2.193	2.092	2.006	1.932	2.351	2.206	2.090	1.993	1.910	1.839	
94 x 175	3.028	2.846	2.699	2.577	2.473	2.383	2.383	2.870	2.696	2.555	2.438	2.339	2.252	2.739	2.571	2.436	2.323	2.227	2.144	
94 x 200	3.455	3.248	3.081	2.942	2.823	2.720	2.720	3.275	3.077	2.917	2.784	2.670	2.572	3.126	2.935	2.781	2.653	2.543	2.448	
94 x 225	3.880	3.649	3.462	3.306	3.173	3.058	3.058	3.680	3.458	3.278	3.129	3.002	2.891	3.513	3.299	3.126	2.982	2.859	2.753	
94 x 250	4.304	4.049	3.842	3.670	3.522	3.395	3.395	4.083	3.837	3.639	3.473	3.332	3.210	3.898	3.661	3.470	3.311	3.175	3.056	
94 x 275	4.727	4.448	4.221	4.032	3.871	3.731	3.731	4.484	4.216	3.999	3.817	3.663	3.528	4.283	4.023	3.814	3.639	3.489	3.360	
94 x 300	5.148	4.845	4.599	4.394	4.219	4.066	4.066	4.885	4.594	4.358	4.160	3.992	3.846	4.666	4.384	4.156	3.966	3.804	3.663	
Minimum design bearing length																				

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 48 Permissible clear spans for purlins supporting rafters and relates to Table 47. Timber of strength class C24. Imposed loading of 1.00 kN/m²
(continued)

C24-1.00 30° to 45°																		
Size of purlin ^{A)} mm x mm	Dead load kN/m ²																	
	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					
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
	Maximum clear span of purlin m																	
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.213	2.070	1.954	1.858	—	—	—	1.840	—	—	—	—	1.985	1.853	—	—	—
	38 x 235	2.822	2.640	2.493	2.370	2.265	2.146	2.089	2.489	2.348	2.230	2.034	1.826	2.533	2.364	2.228	1.996	—
	38 x 285	3.418	3.198	3.020	2.872	2.745	2.597	3.227	3.016	2.845	2.703	2.462	2.211	3.068	2.865	2.700	2.416	1.923
Minimum design bearing length																		

If a wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

6.11 Rafters and purlins supporting rafters; Imposed load 1.25 kN/m²: Notes to Table 49 to Table 60

NOTE The sizes, spacings and spans given will support the dead loads stated in the tables, and either an imposed load of 1.25 kN/m² or a concentrated load of 0.9 kN. See Annex M for guidance on the snow load relevant for a particular site.

BS EN 1991-1-3 permits a reduction in imposed roof loading for slopes greater than 30°. This reduction is not relevant, however, to Table 53, Table 54, Table 59 and Table 60 because the tabulated spans are based on a slope of 30° as giving the most onerous case for the range of slopes between 30° and 45°.

6.11.1 When dimensions A and B in Figure 16 are not equal, the section size for the rafters should be determined for the greater dimension. When the span of purlins is unequal, the section size for the purlin should be determined for each span or for the longest span.

NOTE 1 The design spacing for purlins is $\frac{A+B}{2}$ (see Figure 16.)

NOTE 2 The section sizes given in the tables are either sawn across the timber thickness and width (member depth) in accordance with tolerance class 1 of BS EN 336, or are CLS/ALS processed sizes in accordance with tolerance class 2. BS EN 336 tolerances are as follows:

- a) on a sawn thickness or depth of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a sawn depth of greater than 100 mm (tolerance class 1):
 - 2 mm;
 - + 4 mm;
- c) on a processed thickness or depth not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- d) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.11.2 A rafter, or purlin, should not be notched or drilled unless justified by specialist calculation.

NOTE 1 This does not apply to the birdsmouthing of a rafter to a depth not exceeding one-third of the depth of the rafter.

NOTE 2 Permissible clear spans have been calculated in accordance with BS 5268-7.5 and BS 5268-7.6. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

In the tables for rafters, the permissible clear spans are for rafters simply supported between a purlin and wallplate or between a purlin and the ridgeboard. However, in the tables for purlins, the permissible clear spans are based on the assumption that the rafters can be continuous.

6.11.3 The two sections of double purlin should be fixed together with flush tops, to act as one piece.

Table 49 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.082	2.001	1.763	1.929	1.877	1.646	1.801	1.747	1.548
	38 × 125	2.596	2.496	2.177	2.481	2.346	2.033	2.343	2.211	1.913
	38 × 150	3.108	2.977	2.586	2.950	2.786	2.415	2.782	2.626	2.273
	47 × 100	2.235	2.149	1.951	2.136	2.053	1.831	2.052	1.972	1.724
	47 × 125	2.785	2.679	2.418	2.663	2.560	2.261	2.558	2.455	2.129
	47 × 150	3.333	3.207	2.871	3.187	3.065	2.685	3.063	2.914	2.529
CLS/ALS sizes	38 × 89	1.755	1.720	1.578	1.628	1.588	1.473	1.528	1.485	1.378
	38 × 140	2.904	2.791	2.423	2.765	2.611	2.263	2.608	2.460	2.129

^{A)} Check the availability of section sizes.

Table 50 Permissible clear spans for purlins supporting rafters and relates to Table 49. Timber of strength class C16. Imposed loading of 1.25 kN/m² C16-1.25 15° to 22½°

Size of purlin ^{A)} mm × mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 175	1.933	1.805	—	—	—	—	1.841	—	—	—	—	—	—	—	—	—	—	—
	47 × 200	2.208	2.055	1.898	—	—	—	2.103	1.921	—	—	—	—	—	1.989	1.810	—	—	—
	47 × 225	2.482	2.295	2.120	1.978	1.860	—	2.357	2.146	1.981	1.847	—	—	2.222	2.022	1.865	—	—	—
	47 × 250	2.756	2.534	2.340	2.184	2.053	1.933	2.602	2.369	2.187	2.040	1.884	—	2.452	2.232	2.059	1.889	—	—
	47 × 275	3.029	2.770	2.559	2.388	2.245	2.124	2.845	2.591	2.392	2.231	2.071	1.858	2.682	2.441	2.252	2.076	1.839	—
	47 × 300	3.297	3.005	2.777	2.591	2.437	2.305	3.086	2.811	2.595	2.421	2.257	2.026	2.909	2.648	2.444	2.263	2.005	—
	63 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
63 × 150	1.846	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
63 × 175	2.152	2.014	1.902	1.809	—	—	—	2.052	1.919	1.811	—	—	—	1.967	1.838	—	—	—	
63 × 200	2.457	2.299	2.172	2.061	1.939	1.836	2.344	2.191	2.064	1.927	1.813	—	—	2.247	2.099	1.945	1.815	—	
63 × 225	2.761	2.585	2.442	2.301	2.166	2.051	2.634	2.464	2.305	2.152	2.025	1.916	1.916	2.526	2.352	2.173	2.027	1.906	
63 × 250	3.066	2.870	2.712	2.540	2.391	2.264	2.925	2.736	2.545	2.376	2.235	2.235	2.116	2.804	2.596	2.398	2.238	2.105	
63 × 275	3.369	3.155	2.973	2.778	2.615	2.476	3.215	3.007	2.782	2.598	2.444	2.444	2.314	3.082	2.838	2.622	2.447	2.302	
63 × 300	3.672	3.439	3.225	3.013	2.837	2.687	3.504	3.264	3.018	2.819	2.652	2.652	2.511	3.360	3.079	2.845	2.656	2.498	
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.25 15° to 22½°

Minimum design bearing length

If a flange at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 50 Permissible clear spans for purlins supporting rafters and relates to Table 49. Timber of strength class C16. Imposed loading of 1.25 kN/m²
(continued)

C16-1.25 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²													
		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	
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm													
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000		
		Maximum clear span of purlin m													
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	1.871	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 235	2.354	2.142	1.977	1.838	—	—	2.201	2.002	1.844	—	—	2.073	1.884	—
	38 x 285	2.820	2.568	2.370	2.209	1.972	—	2.637	2.399	2.213	1.946	—	2.485	2.259	1.983
Minimum design bearing length															
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.															
If wane is not permitted, the minimum design bearing length is 61 mm.															
A) Single-members unless otherwise indicated. Check the availability of section sizes.															

Table 51 Permissible clear spans for common or jack rafters for roofs having a pitch more than 22½° but not more than 30°. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25 22½° to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.137	2.054	1.863	2.008	1.955	1.747	1.877	1.821	1.642
	38 × 125	2.664	2.562	2.314	2.542	2.444	2.157	2.439	2.341	2.028
	38 × 150	3.189	3.067	2.747	3.044	2.927	2.562	2.921	2.779	2.409
	47 × 100	2.293	2.205	2.003	2.189	2.104	1.909	2.100	2.019	1.827
	47 × 125	2.857	2.749	2.498	2.728	2.624	2.382	2.619	2.518	2.255
	47 × 150	3.418	3.290	2.991	3.265	3.141	2.845	3.135	3.015	2.678
CLS/ALS sizes	38 × 89	1.824	1.788	1.660	1.694	1.653	1.548	1.591	1.548	1.437
	38 × 140	2.979	2.865	2.574	2.843	2.734	2.401	2.729	2.604	2.257

^{A)} Check the availability of section sizes.

Table 52 Permissible clear spans for purlins supporting rafters and relates to Table 51. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25 22½° to 30°																			
Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	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						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16)																		
	mm																		
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
	Maximum clear span of purlin																		
	m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	47 x 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	47 x 175	1.987	1.857	—	—	—	1.891	—	—	—	—	—	1.808	—	—	—	—	—	
	47 x 200	2.269	2.121	1.973	1.841	—	2.160	1.993	1.840	—	—	—	2.060	1.875	—	—	—	—	
	47 x 225	2.551	2.384	2.203	2.056	1.934	2.428	2.226	2.056	1.917	1.802	—	2.301	2.094	1.933	1.802	—	—	
	47 x 250	2.833	2.632	2.432	2.270	2.135	2.696	2.458	2.270	2.117	1.990	1.819	2.540	2.312	2.134	1.990	—	—	
	47 x 275	3.114	2.878	2.660	2.483	2.335	2.210	2.950	2.687	2.482	2.315	2.176	1.999	2.777	2.529	2.334	2.176	1.973	
	47 x 300	3.395	3.122	2.886	2.694	2.534	2.398	3.200	2.916	2.693	2.512	2.362	2.179	3.013	2.744	2.533	2.361	2.150	1.929
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	1.897	—	—	—	—	1.807	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 175	2.211	2.069	1.956	1.861	—	2.106	1.970	1.860	—	—	—	2.017	1.885	—	—	—	—	—
	63 x 200	2.524	2.363	2.233	2.125	2.016	2.405	2.250	2.125	1.999	1.881	—	2.304	2.153	2.015	1.880	—	—	—
	63 x 225	2.837	2.657	2.511	2.389	2.251	2.704	2.529	2.389	2.232	2.101	1.989	2.590	2.421	2.250	2.100	1.975	1.869	1.869
	63 x 250	3.149	2.949	2.788	2.640	2.485	3.002	2.809	2.639	2.464	2.319	2.196	2.875	2.688	2.484	2.319	2.181	2.064	2.064
	63 x 275	3.461	3.242	3.065	2.886	2.717	3.299	3.087	2.885	2.695	2.536	2.401	3.161	2.939	2.716	2.536	2.385	2.257	2.257
	63 x 300	3.772	3.534	3.341	3.131	2.948	3.596	3.366	3.130	2.924	2.752	2.605	3.446	3.188	2.947	2.751	2.588	2.450	2.450

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 52 Permissible clear spans for purlins supporting rafters and relates to Table 51. Timber of strength class C16. Imposed loading of 1.25 kN/m²
(continued)

C16-1.25 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.018	1.891	—	—	—	—	1.924	1.802	—	—	—	—	—	1.844	—	—	—	—	—
	75 x 175	2.352	2.204	2.085	1.985	1.900	1.827	2.243	2.100	1.985	1.889	1.807	—	—	2.149	2.011	1.900	1.807	—	—
	75 x 200	2.685	2.517	2.381	2.267	2.170	2.086	2.561	2.398	2.267	2.157	2.058	1.949	2.454	2.297	2.170	2.057	1.936	1.833	
	75 x 225	3.018	2.829	2.676	2.549	2.440	2.332	2.878	2.696	2.548	2.425	2.298	2.298	2.177	2.759	2.582	2.439	2.298	2.163	2.048
	75 x 250	3.349	3.140	2.971	2.830	2.710	2.575	3.195	2.993	2.829	2.693	2.537	2.403	3.063	2.867	2.709	2.536	2.387	2.261	
	75 x 275	3.681	3.451	3.266	3.111	2.970	2.815	3.511	3.290	3.110	2.946	2.774	2.628	3.366	3.151	2.969	2.774	2.611	2.472	
	75 x 300	4.011	3.762	3.560	3.391	3.222	3.054	3.826	3.586	3.391	3.196	3.009	2.851	3.669	3.436	3.221	3.009	2.833	2.682	
Double-members																				
94 x 100		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125		1.910	—	—	—	—	—	1.822	—	—	—	—	—	—	—	—	—	—	—	—
94 x 150		2.289	2.148	2.034	1.939	1.859	—	2.184	2.048	1.939	1.848	—	—	2.095	1.964	1.858	—	—	—	—
94 x 175		2.667	2.503	2.371	2.260	2.167	2.085	2.545	2.388	2.260	2.154	2.064	1.985	2.442	2.289	2.166	2.063	1.976	1.900	
94 x 200		3.043	2.857	2.707	2.581	2.474	2.382	2.906	2.726	2.581	2.460	2.357	2.267	2.788	2.614	2.473	2.356	2.257	2.165	
94 x 225		3.420	3.211	3.042	2.901	2.781	2.677	3.265	3.064	2.901	2.765	2.649	2.549	3.133	2.938	2.781	2.649	2.537	2.418	
94 x 250		3.794	3.564	3.377	3.221	3.088	2.973	3.624	3.401	3.220	3.070	2.942	2.831	3.478	3.262	3.087	2.941	2.816	2.669	
94 x 275		4.169	3.916	3.711	3.540	3.394	3.268	3.981	3.737	3.539	3.375	3.234	3.099	3.822	3.585	3.393	3.233	3.079	2.918	
94 x 300		4.542	4.267	4.044	3.859	3.700	3.562	4.338	4.073	3.858	3.679	3.525	3.362	4.165	3.907	3.699	3.525	3.340	3.166	

Table 52 Permissible clear spans for purlins supporting rafters and relates to Table 51. Timber of strength class C16. Imposed loading of 1.25 kN/m²
(continued)

C16-1.25 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
CLS/ALS sizes		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
38 x 140		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
38 x 184		1.930	—	—	—	—	1.815	—	—	—	—	—	—	—	—	—	—	—	—
38 x 235		2.446	2.227	2.056	1.917	—	2.283	2.077	1.916	—	—	—	—	2.148	1.953	—	—	—	—
38 x 285		2.930	2.669	2.464	2.298	2.129	1.910	2.736	2.490	2.297	2.094	1.855	—	2.574	2.341	2.127	1.854	—	—
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.																			
If wane is not permitted, the minimum design bearing length is 61 mm.																			
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																			

Table 53 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.218	2.132	1.935	2.102	2.029	1.840	1.964	1.905	1.736
	38 × 125	2.765	2.659	2.414	2.633	2.532	2.285	2.523	2.425	2.143
	38 × 150	3.309	3.183	2.892	3.153	3.032	2.713	3.022	2.905	2.546
	47 × 100	2.379	2.288	2.079	2.267	2.179	1.979	2.172	2.088	1.894
	47 × 125	2.964	2.852	2.593	2.825	2.718	2.469	2.708	2.604	2.364
	47 × 150	3.546	3.413	3.105	3.381	3.253	2.957	3.242	3.118	2.828
CLS/ALS sizes	38 × 89	1.912	1.874	1.723	1.774	1.731	1.620	1.666	1.620	1.503
	38 × 140	3.091	2.974	2.701	2.945	2.832	2.542	2.822	2.713	2.386

^{A)} Check the availability of section sizes.

Table 54 Permissible clear spans for purlins supporting rafters and relates to Table 53. Timber of strength class C16. Imposed loading of 1.25 kN/m² C16-1.25 30° to 45°

Size of purlin ^{A)} mm × mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 175	2.067	1.933	1.825	—	—	—	1.964	1.835	—	—	—	—	1.877	—	—	—	—	—
	47 × 200	2.361	2.208	2.084	1.947	1.831	—	2.243	2.096	1.941	1.811	—	—	2.143	1.973	1.821	—	—	—
	47 × 225	2.654	2.482	2.329	2.174	2.046	1.936	2.522	2.347	2.168	2.023	1.902	—	2.410	2.204	2.034	1.897	—	—
	47 × 250	2.947	2.756	2.571	2.400	2.258	2.138	2.800	2.591	2.393	2.233	2.100	1.987	2.671	2.433	2.246	2.095	1.969	—
	47 × 275	3.239	3.030	2.811	2.625	2.470	2.338	3.079	2.833	2.617	2.442	2.297	2.173	2.921	2.660	2.456	2.291	2.154	1.958
	47 × 300	3.531	3.299	3.050	2.848	2.680	2.537	3.356	3.073	2.839	2.650	2.492	2.358	3.168	2.886	2.665	2.486	2.337	2.134
	63 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 × 150	1.971	1.846	—	—	—	—	1.875	—	—	—	—	—	—	—	—	—	—	—	—
63 × 175	2.298	2.152	2.035	1.937	1.854	—	2.186	2.046	1.933	1.838	—	—	2.091	1.956	1.846	—	—	—	—
63 × 200	2.623	2.458	2.324	2.212	2.117	2.018	2.496	2.336	2.207	2.100	1.983	1.878	2.388	2.234	2.109	1.978	1.861	—	—
63 × 225	2.949	2.763	2.612	2.487	2.379	2.254	2.806	2.627	2.482	2.353	2.215	2.097	2.685	2.511	2.367	2.210	2.079	1.968	—
63 × 250	3.273	3.067	2.901	2.762	2.626	2.488	3.115	2.916	2.756	2.598	2.445	2.316	2.981	2.788	2.612	2.439	2.295	2.173	—
63 × 275	3.597	3.371	3.189	3.036	2.872	2.721	3.423	3.206	3.030	2.840	2.674	2.532	3.276	3.065	2.856	2.667	2.510	2.376	—
63 × 300	3.920	3.675	3.476	3.308	3.116	2.952	3.732	3.495	3.298	3.081	2.901	2.748	3.571	3.342	3.099	2.894	2.724	2.579	—
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C16-1.25 30° to 45°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 61 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 54 Permissible clear spans for purlins supporting rafters and relates to Table 53. Timber of strength class C16. Imposed loading of 1.25 kN/m²
(continued)

C16-1.25 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.009	1.871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 235	2.563	2.354	2.174	2.028	1.907	—	2.407	2.191	2.022	1.885	—	—	2.260	2.056	1.896	—	—	—
	38 x 285	3.097	2.821	2.606	2.431	2.286	2.134	2.884	2.626	2.424	2.260	2.060	1.849	2.708	2.464	2.273	2.051	1.816	—
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 79 mm.																			
If wane is not permitted, the minimum design bearing length is 61 mm.																			
A) Single-members unless otherwise indicated. Check the availability of section sizes.																			

Table 55 Permissible clear spans for common or jack rafters for roofs having a pitch more than 15° but not more than 22½°. Timber of strength class C24. Imposed loading of 1.25 kN/m²

C24-1.25 15° to 22½°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.166	2.083	1.890	2.070	1.989	1.804	1.988	1.910	1.731
	38 × 125	2.701	2.597	2.358	2.581	2.481	2.251	2.479	2.383	2.160
	38 × 150	3.232	3.109	2.825	3.090	2.971	2.697	2.969	2.854	2.588
	47 × 100	2.324	2.236	2.031	2.222	2.136	1.939	2.135	2.052	1.862
	47 × 125	2.896	2.787	2.533	2.769	2.664	2.419	2.662	2.559	2.323
	47 × 150	3.464	3.334	3.033	3.314	3.188	2.898	3.186	3.064	2.783
CLS/ALS sizes	38 × 89	1.930	1.856	1.683	1.844	1.772	1.606	1.771	1.701	1.541
	38 × 140	3.020	2.905	2.638	2.887	2.776	2.519	2.773	2.666	2.417

^{A)} Check the availability of section sizes.

Table 56 Permissible clear spans for purlins supporting rafters and relates to Table 55. Timber of strength class C24. Imposed loading of 1.25 kN/m² C24-1.25 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																			
		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	
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																			
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000		
		Maximum clear span of purlin m																			
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	47 x 175	2.024	1.892	—	—	—	—	1.929	1.801	—	—	—	—	1.848	—	—	—	—	—		
	47 x 200	2.311	2.160	2.039	1.937	1.825	—	2.203	2.058	1.940	1.803	—	—	2.111	1.969	1.837	—	—	—		
	47 x 225	2.598	2.429	2.292	2.178	2.051	1.842	2.477	2.313	2.181	2.026	—	—	2.373	2.214	2.065	1.802	—	—		
	47 x 250	2.885	2.697	2.545	2.419	2.276	2.045	2.750	2.569	2.422	2.249	1.994	—	2.635	2.459	2.292	2.000	—	—		
	47 x 275	3.171	2.965	2.798	2.659	2.501	2.247	3.023	2.824	2.663	2.471	2.191	1.968	2.897	2.704	2.518	2.198	1.949	—		
	47 x 300	3.457	3.233	3.051	2.900	2.725	2.448	3.296	3.079	2.904	2.692	2.388	2.145	3.158	2.948	2.744	2.395	2.124	1.906		
	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
63 x 150	1.931	1.808	—	—	—	—	1.842	—	—	—	—	—	—	—	—	—	—	—			
63 x 175	2.250	2.107	1.992	1.895	1.813	—	2.148	2.010	1.898	1.805	—	—	2.060	1.926	1.818	—	—	—			
63 x 200	2.569	2.406	2.275	2.165	2.071	1.990	2.452	2.295	2.168	2.062	1.971	1.892	2.352	2.200	2.076	1.973	1.885	—			
63 x 225	2.888	2.705	2.557	2.434	2.329	2.237	2.757	2.580	2.437	2.318	2.216	2.128	2.644	2.473	2.334	2.219	2.120	1.935			
63 x 250	3.205	3.003	2.839	2.703	2.586	2.484	3.060	2.865	2.706	2.574	2.461	2.336	2.936	2.746	2.592	2.464	2.354	2.148			
63 x 275	3.523	3.301	3.121	2.971	2.843	2.731	3.364	3.149	2.975	2.830	2.706	2.598	3.227	3.019	2.850	2.709	2.589	2.360			
63 x 300	3.839	3.598	3.402	3.239	3.100	2.978	3.666	3.433	3.243	3.086	2.951	2.833	3.518	3.291	3.107	2.954	2.823	2.572			
Minimum design bearing length																					

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 56 Permissible clear spans for purlins supporting rafters and relates to Table 55. Timber of strength class C24. Imposed loading of 1.25 kN/m²
(continued)

C24-1.25 15° to 22½°

Size of purlin ^{A)} mm × mm		Dead load kN/m ²																		
		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						
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
		Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 × 150	2.054	1.925	1.821	—	—	—	1.962	1.837	—	—	—	—	1.883	—	—	—	—	—	—
	75 × 175	2.394	2.244	2.123	2.022	1.936	1.861	2.286	2.142	2.025	1.927	1.844	—	2.194	2.054	1.941	1.846	—	—	—
	75 × 200	2.733	2.562	2.424	2.309	2.211	2.126	2.610	2.445	2.312	2.201	2.106	2.024	2.506	2.346	2.216	2.108	2.016	1.936	1.936
	75 × 225	3.071	2.880	2.725	2.596	2.486	2.390	2.934	2.749	2.599	2.474	2.368	2.276	2.816	2.637	2.492	2.371	2.267	2.177	2.177
	75 × 250	3.408	3.196	3.025	2.882	2.760	2.654	3.256	3.052	2.886	2.748	2.630	2.527	3.126	2.927	2.767	2.632	2.518	2.418	2.418
	75 × 275	3.745	3.513	3.325	3.168	3.034	2.917	3.579	3.354	3.172	3.020	2.891	2.778	3.436	3.218	3.041	2.894	2.768	2.659	2.659
	75 × 300	4.081	3.828	3.624	3.453	3.307	3.181	3.900	3.656	3.458	3.293	3.152	3.029	3.745	3.508	3.316	3.155	3.018	2.899	2.899
Double-members																				
94 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 × 125	1.943	1.823	—	—	—	—	—	1.857	—	—	—	—	—	—	—	—	—	—	—	—
94 × 150	2.329	2.186	2.070	1.974	1.892	1.821	2.226	2.088	1.977	1.884	1.805	1.805	—	2.138	2.005	1.897	1.807	—	—	—
94 × 175	2.713	2.547	2.413	2.301	2.206	2.123	2.594	2.434	2.304	2.196	2.105	2.105	2.025	2.492	2.337	2.211	2.107	2.018	1.941	1.941
94 × 200	3.096	2.907	2.755	2.627	2.519	2.425	2.961	2.778	2.631	2.508	2.404	2.404	2.313	2.845	2.668	2.525	2.406	2.305	2.216	2.216
94 × 225	3.478	3.267	3.096	2.953	2.832	2.726	3.327	3.122	2.957	2.819	2.702	2.702	2.600	3.197	2.999	2.838	2.705	2.591	2.492	2.492
94 × 250	3.860	3.626	3.436	3.278	3.144	3.027	3.692	3.466	3.283	3.130	3.000	3.000	2.887	3.548	3.329	3.151	3.003	2.877	2.767	2.767
94 × 275	4.240	3.984	3.776	3.603	3.455	3.327	4.056	3.808	3.608	3.441	3.298	3.298	3.174	3.899	3.658	3.464	3.301	3.163	3.042	3.042
94 × 300	4.619	4.341	4.115	3.927	3.766	3.627	4.420	4.150	3.932	3.750	3.595	3.595	3.460	4.249	3.987	3.775	3.599	3.448	3.317	3.317

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 56 Permissible clear spans for purlins supporting rafters and relates to Table 55. Timber of strength class C24. Imposed loading of 1.25 kN/m²
(continued)

C24-1.25 15° to 22½°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	1.966	1.835	—	—	—	—	1.872	—	—	—	—	—	—	—	—	—	—	—
	38 x 235	2.508	2.341	2.206	1.944	—	—	2.388	2.226	1.951	—	—	—	2.285	2.031	—	—	—	—
	38 x 285	3.038	2.836	2.672	2.353	2.086	1.872	2.893	2.698	2.362	2.061	1.826	—	2.769	2.458	2.100	1.831	—	—
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																			
If wane is not permitted, the minimum design bearing length is 59 mm.																			
A) Single-members unless otherwise indicated. Check the availability of section sizes.																			

Table 57 Permissible clear spans for common or jack rafters for roofs having a pitch more than 22½° but not more than 30°. Timber of strength class C24. Imposed loading of 1.25 kN/m²

C24-1.25 22½° to 30°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.223	2.137	1.940	2.121	2.039	1.849	2.035	1.955	1.772
	38 × 125	2.771	2.665	2.420	2.645	2.543	2.308	2.538	2.440	2.212
	38 × 150	3.316	3.190	2.899	3.166	3.045	2.765	3.039	2.922	2.651
	47 × 100	2.385	2.294	2.084	2.276	2.189	1.988	2.185	2.101	1.906
	47 × 125	2.971	2.859	2.599	2.837	2.729	2.480	2.724	2.620	2.379
	47 × 150	3.553	3.420	3.112	3.395	3.267	2.970	3.261	3.136	2.849
CLS/ALS sizes	38 × 89	1.981	1.904	1.728	1.890	1.816	1.647	1.813	1.742	1.579
	38 × 140	3.098	2.980	2.708	2.958	2.844	2.582	2.839	2.729	2.476

^{A)} Check the availability of section sizes.

C24-1.25 22½° to 30°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	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						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																		
	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	Maximum clear span of purlin m																		
	47 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 x 175	2.080	1.945	1.836	—	—	1.980	1.850	—	—	—	—	1.896	—	—	—	—	—	—
	47 x 200	2.375	2.221	2.097	1.993	1.905	2.262	2.113	1.993	1.893	—	—	2.165	2.021	1.905	—	—	—	—
	47 x 225	2.670	2.497	2.358	2.241	2.142	2.543	2.376	2.241	2.129	1.931	—	2.434	2.273	2.142	1.931	—	—	—
	47 x 250	2.965	2.773	2.618	2.489	2.379	2.824	2.639	2.489	2.364	2.144	1.925	2.703	2.524	2.379	2.144	1.901	—	—
	47 x 275	3.259	3.048	2.878	2.736	2.615	3.104	2.901	2.737	2.599	2.356	2.116	2.972	2.775	2.615	2.356	2.089	1.875	—
	47 x 300	3.552	3.324	3.138	2.984	2.852	3.384	3.163	2.984	2.834	2.567	2.306	3.240	3.026	2.852	2.567	2.277	2.044	—
Minimum design bearing length	63 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	63 x 150	1.983	1.857	—	—	—	1.890	—	—	—	—	—	1.812	—	—	—	—	—	—
	63 x 175	2.311	2.165	2.047	1.949	1.865	2.204	2.063	1.949	1.854	—	—	2.112	1.975	1.865	—	—	—	—
	63 x 200	2.639	2.472	2.338	2.226	2.130	2.516	2.356	2.226	2.118	2.025	1.945	2.412	2.256	2.130	2.025	1.936	1.845	—
	63 x 225	2.966	2.779	2.628	2.502	2.395	2.828	2.648	2.502	2.381	2.277	2.187	2.711	2.536	2.395	2.277	2.177	2.074	—
	63 x 250	3.292	3.085	2.918	2.779	2.659	3.140	2.940	2.779	2.644	2.529	2.429	3.010	2.816	2.660	2.529	2.417	2.302	—
	63 x 275	3.618	3.391	3.208	3.054	2.924	3.451	3.232	3.055	2.907	2.780	2.671	3.308	3.096	2.924	2.780	2.658	2.529	—
	63 x 300	3.943	3.696	3.497	3.330	3.188	3.761	3.523	3.330	3.169	3.032	2.912	3.606	3.375	3.188	3.032	2.898	2.756	—

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 58 Permissible clear spans for purlins supporting rafters and relates to Table 57. Timber of strength class C24. Imposed loading of 1.25 kN/m²
(continued)

C24-1.25 22½° to 30°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	75 x 150	2.109	1.977	1.871	—	—	—	2.012	1.885	—	—	—	—	1.929	1.806	—	—	—	—
	75 x 175	2.458	2.305	2.181	2.078	1.990	1.914	2.345	2.197	2.078	1.979	1.894	1.820	2.249	2.106	1.990	1.894	1.812	—
	75 x 200	2.806	2.631	2.490	2.373	2.273	2.186	2.677	2.509	2.373	2.260	2.163	2.079	2.568	2.405	2.273	2.163	2.069	1.988
	75 x 225	3.153	2.957	2.799	2.668	2.555	2.457	3.009	2.820	2.668	2.540	2.432	2.338	2.886	2.703	2.555	2.432	2.327	2.235
	75 x 250	3.499	3.283	3.108	2.962	2.837	2.729	3.340	3.131	2.962	2.821	2.700	2.596	3.204	3.001	2.837	2.701	2.584	2.482
	75 x 275	3.845	3.608	3.416	3.255	3.119	3.000	3.670	3.441	3.255	3.101	2.969	2.854	3.521	3.299	3.119	2.969	2.841	2.729
	75 x 300	4.189	3.932	3.723	3.549	3.400	3.271	4.000	3.750	3.549	3.380	3.237	3.112	3.838	3.596	3.400	3.237	3.097	2.976
Double- members																			
94 x 100		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94 x 125		1.994	1.872	—	—	—	—	1.904	—	—	—	—	—	1.827	—	—	—	—	—
94 x 150		2.390	2.244	2.126	2.027	1.944	1.871	2.282	2.141	2.028	1.933	1.852	—	2.190	2.054	1.944	1.852	—	—
94 x 175		2.784	2.614	2.477	2.363	2.266	2.182	2.659	2.495	2.363	2.253	2.160	2.078	2.552	2.394	2.266	2.160	2.069	1.990
94 x 200		3.177	2.984	2.828	2.698	2.588	2.492	3.035	2.849	2.698	2.573	2.466	2.374	2.914	2.733	2.588	2.466	2.363	2.273
94 x 225		3.569	3.353	3.179	3.033	2.909	2.801	3.410	3.202	3.033	2.892	2.773	2.669	3.274	3.072	2.909	2.773	2.657	2.556
94 x 250		3.960	3.721	3.528	3.367	3.229	3.110	3.784	3.554	3.367	3.211	3.078	2.963	3.634	3.410	3.229	3.078	2.950	2.838
94 x 275		4.350	4.089	3.877	3.700	3.549	3.418	4.158	3.905	3.700	3.529	3.384	3.257	3.993	3.748	3.549	3.384	3.243	3.120
94 x 300		4.739	4.455	4.225	4.033	3.869	3.726	4.530	4.255	4.033	3.847	3.689	3.551	4.351	4.085	3.869	3.689	3.535	3.402
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 58 Permissible clear spans for purlins supporting rafters and relates to Table 57. Timber of strength class C24. Imposed loading of 1.25 kN/m²
(continued)

C24-1.25 22½° to 30°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.022	1.888	—	—	—	—	1.923	—	—	—	—	—	1.839	—	—	—	—	—
	38 x 235	2.579	2.408	2.270	2.097	1.860	—	2.453	2.289	2.098	1.830	—	—	2.346	2.177	1.860	—	—	—
	38 x 285	3.123	2.918	2.751	2.538	2.251	2.021	2.972	2.773	2.538	2.216	1.964	—	2.842	2.634	2.252	1.964	—	—
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																			
If wane is not permitted, the minimum design bearing length is 59 mm.																			
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																			

Table 59 Permissible clear spans for common or jack rafters for roofs having a pitch more than 30° but not more than 45°. Timber of strength class C24. Imposed loading of 1.25 kN/m²

C24-1.25 30° to 45°

Size of rafter ^{A)} mm × mm		Dead load kN/m ²								
		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 rafters mm								
		400	450	600	400	450	600	400	450	600
		Maximum clear span of rafter m								
Sawn sizes in accordance with tolerance class 1 of BS EN 336	38 × 100	2.307	2.218	2.014	2.197	2.112	1.916	2.105	2.023	1.834
	38 × 125	2.875	2.766	2.513	2.739	2.634	2.391	2.625	2.524	2.289
	38 × 150	3.440	3.310	3.009	3.279	3.154	2.865	3.143	3.023	2.743
	47 × 100	2.474	2.380	2.163	2.357	2.267	2.059	2.260	2.173	1.972
	47 × 125	3.081	2.966	2.698	2.938	2.826	2.569	2.817	2.709	2.461
	47 × 150	3.685	3.548	3.229	3.515	3.383	3.076	3.371	3.243	2.947
CLS/ALS sizes	38 × 89	2.055	1.976	1.794	1.957	1.882	1.707	1.875	1.802	1.634
	38 × 140	3.215	3.093	2.811	3.063	2.946	2.676	2.936	2.823	2.562

^{A)} Check the availability of section sizes.

Table 60 Permissible clear spans for purlins supporting rafters and relates to Table 59. Timber of strength class C24. Imposed loading of 1.25 kN/m²
C24-1.25 30° to 45°

Size of purlin ^{A)} mm × mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		Maximum clear span of purlin m																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 150	1.855	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	47 × 175	2.163	2.024	1.911	1.818	—	—	2.056	1.923	1.814	—	—	—	1.966	1.837	—	—	—	—
	47 × 200	2.470	2.311	2.183	2.076	1.985	1.906	2.349	2.196	2.072	1.969	1.881	—	2.246	2.098	1.978	1.878	—	—
	47 × 225	2.776	2.599	2.455	2.335	2.232	2.144	2.640	2.469	2.330	2.214	2.116	1.925	2.525	2.359	2.224	2.112	1.893	—
	47 × 250	3.083	2.885	2.726	2.593	2.479	2.381	2.932	2.742	2.588	2.459	2.350	2.137	2.804	2.619	2.470	2.346	2.101	1.886
	47 × 275	3.388	3.172	2.997	2.851	2.726	2.618	3.223	3.014	2.845	2.704	2.584	2.348	3.082	2.880	2.716	2.580	2.309	2.073
	47 × 300	3.693	3.458	3.267	3.108	2.973	2.854	3.513	3.286	3.102	2.949	2.817	2.559	3.360	3.140	2.962	2.813	2.516	2.260
	63 × 100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63 × 125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
63 × 150	2.061	1.931	1.826	—	—	—	1.961	1.837	—	—	—	—	1.877	—	—	—	—	—	
63 × 175	2.401	2.251	2.129	2.028	1.941	1.866	2.286	2.141	2.024	1.926	1.843	—	2.188	2.048	1.935	1.840	—	1.930	
63 × 200	2.742	2.570	2.431	2.316	2.217	2.132	2.610	2.445	2.311	2.200	2.105	2.023	2.499	2.339	2.210	2.102	2.010	2.170	
63 × 225	3.081	2.889	2.733	2.604	2.493	2.397	2.934	2.748	2.599	2.474	2.367	2.275	2.809	2.630	2.484	2.363	2.260	2.170	
63 × 250	3.420	3.207	3.035	2.891	2.768	2.662	3.257	3.052	2.886	2.747	2.629	2.526	3.119	2.920	2.759	2.625	2.510	2.411	
63 × 275	3.758	3.525	3.336	3.178	3.043	2.927	3.579	3.354	3.172	3.020	2.890	2.777	3.428	3.209	3.033	2.886	2.760	2.650	
63 × 300	4.096	3.842	3.636	3.465	3.318	3.191	3.901	3.656	3.458	3.293	3.151	3.028	3.736	3.499	3.307	3.146	3.009	2.890	
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

C24-1.25 30° to 45°

Minimum design bearing length

If wane is not permitted, the minimum design bearing length is 59 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 60 Permissible clear spans for purlins supporting rafters and relates to Table 59. Timber of strength class C24. Imposed loading of 1.25 kN/m²
(continued)

C24-1.25 30° to 45°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		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					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 16) mm																	
		1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span of purlin m																	
CLS/ALS sizes	38 x 140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	38 x 184	2.104	1.966	1.854	—	—	—	—	—	—	—	—	—	—	1.909	—	—	—	—
	38 x 235	2.683	2.508	2.366	2.248	2.075	1.864	2.549	2.380	2.243	2.031	1.801	—	2.435	2.271	2.056	—	—	—
	38 x 285	3.250	3.038	2.867	2.723	2.512	2.256	3.088	2.883	2.718	2.459	2.180	1.957	2.950	2.752	2.488	2.171	1.924	—
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 85 mm.																			
If wane is not permitted, the minimum design bearing length is 59 mm.																			
A) Single-members unless otherwise indicated. Check the availability of section sizes.																			

6.12 Flat roof joists: Notes to Table 61 to Table 68

NOTE 1 The tables relate to roofs with a slope of up to 10° from the horizontal. See Figure 17.

NOTE 2 The sizes, spacings and spans given will support the dead and applied loads stated in the tables. Alternatively, where access is limited to the purposes of maintenance and repair, they will support the dead loads stated in the tables and a concentrated load of 0.9 kN. Where access is not limited to the purposes of maintenance and repair, they will support the dead loads stated in the tables and a concentrated load of 1.8 kN.

Examples of some typical flat roof constructions and their respective dead loadings are given in Annex L. See Annex M for guidance on the snow load relevant for a particular site. See also Figure 17.

NOTE 3 The section sizes given in the tables are either sawn across the timber thickness in accordance with tolerance class 1 of BS EN 336 and processed in accordance with tolerance class 2 across the timber width (joist depth), or are CLS/ALS processed sizes in accordance with tolerance class 2, to provide level surfaces for ease of ceiling lining and the fixing of structural decking. BS EN 336 tolerances are as follows:

- a) on a sawn thickness of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a processed thickness or depth of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- c) on a processed depth greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.12.1 Unless justified by specialist calculation, the minimum design bearing length at supports for flat roof joists should be as stated at the base of each table.

NOTE It might be necessary to provide longer bearing to accommodate fixings, or simply for practical reasons such as construction tolerances.

Where the end of a joist is supported on a steel hanger, if necessary the end should be shaped to fit the hanger neatly as indicated in diagrammatic form in Figure 1, and the gap between the end of the joist and the inside face of the hanger should not exceed 3 mm. If the end of a joist is supported on masonry, the end bearing should be at least 90 mm to provide restraint to the masonry wall.

6.12.2 Notching and drilling of flat roof joists should not exceed the limits given in 6.2.2 and Figure 1.

NOTE Permissible clear spans have been calculated in accordance with BS 5268-7.2. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

Figure 17 Typical flat roof joist arrangement

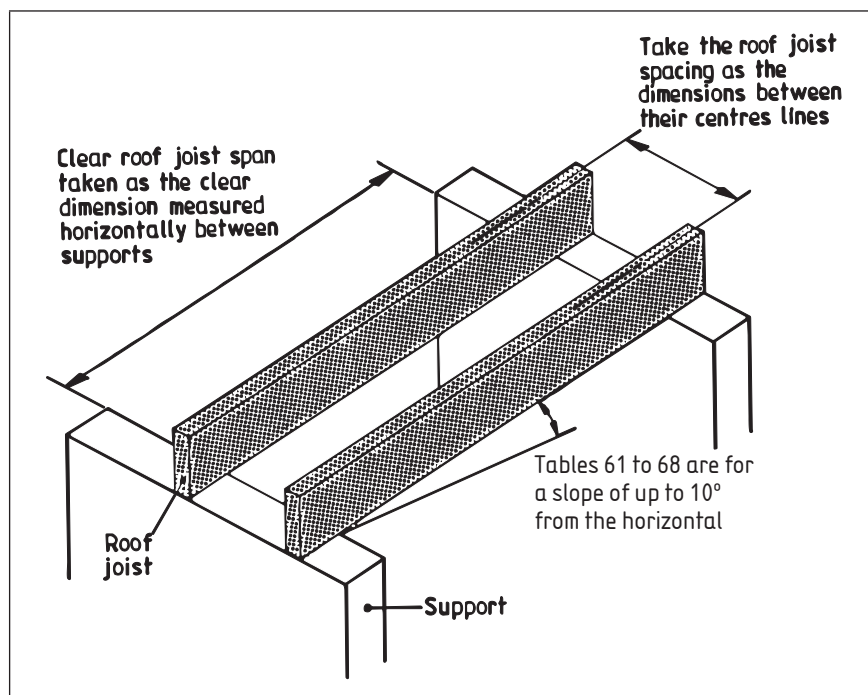


Table 61 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C16. Imposed loading of 0.75 kN/m²

C16-0.75

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.145	1.136	1.109	1.109	1.096	1.063	1.077	1.063	1.024
	38 × 97	1.738	1.719	1.666	1.666	1.642	1.578	1.605	1.578	1.507
	38 × 120	2.368	2.336	2.250	2.250	2.212	2.113	2.155	2.113	2.005
	38 × 145	3.020	2.974	2.851	2.851	2.797	2.659	2.717	2.659	2.511
	38 × 170	3.631	3.571	3.368	3.412	3.342	3.166	3.239	3.166	2.980
	38 × 195	4.303	4.226	3.855	4.025	3.939	3.629	3.810	3.719	3.446
	38 × 220	4.943	4.762	4.340	4.641	4.491	4.087	4.383	4.274	3.881
	47 × 72	1.272	1.260	1.229	1.229	1.214	1.175	1.192	1.175	1.130
	47 × 97	1.919	1.896	1.835	1.835	1.808	1.735	1.765	1.735	1.654
	47 × 120	2.602	2.565	2.468	2.468	2.425	2.313	2.360	2.313	2.192
	47 × 145	3.304	3.252	3.115	3.115	3.055	2.900	2.964	2.900	2.736
	47 × 170	3.960	3.892	3.612	3.716	3.639	3.402	3.525	3.444	3.232
	47 × 195	4.677	4.530	4.132	4.372	4.277	3.893	4.136	4.037	3.700
	47 × 220	5.282	5.093	4.649	4.991	4.808	4.383	4.747	4.577	4.166
	63 × 97	2.190	2.162	2.088	2.088	2.055	1.968	2.005	1.968	1.873
	63 × 120	2.948	2.905	2.790	2.790	2.740	2.609	2.664	2.609	2.469
	63 × 145	3.722	3.662	3.444	3.503	3.434	3.246	3.330	3.256	3.069
	63 × 170	4.439	4.345	3.969	4.161	4.074	3.744	3.945	3.853	3.561
	63 × 195	5.141	4.961	4.537	4.864	4.689	4.282	4.612	4.468	4.074
	63 × 220	5.771	5.572	5.101	5.464	5.270	4.816	5.212	5.024	4.585
	75 × 120	3.168	3.121	2.995	2.995	2.940	2.797	2.857	2.797	2.645
	75 × 145	3.984	3.919	3.640	3.747	3.672	3.435	3.561	3.481	3.268
	75 × 170	4.736	4.583	4.194	4.439	4.334	3.959	4.208	4.110	3.768
	75 × 195	5.415	5.229	4.791	5.129	4.949	4.526	4.894	4.719	4.310
	75 × 220	6.000	5.869	5.383	5.758	5.558	5.088	5.497	5.303	4.847
CLS/ALS sizes	38 × 89	1.543	1.528	1.484	1.484	1.464	1.410	1.433	1.410	1.350
	38 × 140	2.836	2.794	2.682	2.682	2.633	2.505	2.559	2.505	2.369
	38 × 184	4.007	3.937	3.641	3.755	3.676	3.427	3.559	3.476	3.254
	38 × 235	5.271	5.078	4.630	4.975	4.790	4.360	4.726	4.556	4.142

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 26 mm.

If wane is not permitted, the minimum design bearing length is 22 mm.

^{A)} Check the availability of section sizes.

Table 62 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.145	1.136	1.109	1.109	1.096	1.063	1.077	1.063	1.024
	38 × 97	1.738	1.719	1.666	1.666	1.642	1.578	1.605	1.578	1.507
	38 × 120	2.368	2.336	2.250	2.250	2.212	2.113	2.155	2.113	2.005
	38 × 145	3.020	2.974	2.746	2.851	2.797	2.606	2.717	2.659	2.490
	38 × 170	3.624	3.487	3.170	3.412	3.314	3.009	3.239	3.166	2.875
	38 × 195	4.146	3.990	3.629	3.943	3.793	3.446	3.774	3.629	3.293
	38 × 220	4.665	4.491	4.087	4.438	4.271	3.881	4.249	4.087	3.710
	47 × 72	1.272	1.260	1.229	1.229	1.214	1.175	1.192	1.175	1.130
	47 × 97	1.919	1.896	1.835	1.835	1.808	1.735	1.765	1.735	1.654
	47 × 120	2.602	2.565	2.452	2.468	2.425	2.313	2.360	2.313	2.192
	47 × 145	3.304	3.241	2.948	3.115	3.055	2.800	2.964	2.900	2.677
	47 × 170	3.882	3.738	3.402	3.694	3.555	3.232	3.525	3.402	3.091
	47 × 195	4.438	4.274	3.893	4.225	4.067	3.700	4.046	3.893	3.539
	47 × 220	4.991	4.808	4.383	4.753	4.577	4.166	4.554	4.383	3.986
	63 × 97	2.190	2.162	2.088	2.088	2.055	1.968	2.005	1.968	1.873
	63 × 120	2.948	2.905	2.702	2.790	2.740	2.568	2.664	2.609	2.457
	63 × 145	3.697	3.562	3.246	3.503	3.390	3.087	3.330	3.246	2.953
	63 × 170	4.258	4.104	3.744	4.057	3.908	3.561	3.888	3.744	3.408
	63 × 195	4.864	4.689	4.282	4.636	4.468	4.074	4.446	4.282	3.900
	63 × 220	5.464	5.270	4.816	5.212	5.024	4.585	4.999	4.816	4.390
	75 × 120	3.168	3.121	2.861	2.995	2.940	2.720	2.857	2.797	2.603
	75 × 145	3.904	3.763	3.435	3.721	3.585	3.268	3.561	3.435	3.128
	75 × 170	4.494	4.334	3.959	4.285	4.130	3.768	4.110	3.959	3.609
	75 × 195	5.129	4.949	4.526	4.894	4.719	4.310	4.696	4.526	4.128
	75 × 220	5.758	5.558	5.088	5.497	5.303	4.847	5.278	5.088	4.645
CLS/ALS sizes	38 × 89	1.543	1.528	1.484	1.484	1.464	1.410	1.433	1.410	1.350
	38 × 140	2.836	2.794	2.616	2.682	2.633	2.483	2.559	2.505	2.369
	38 × 184	3.917	3.769	3.427	3.725	3.583	3.254	3.559	3.427	3.110
	38 × 235	4.975	4.790	4.360	4.734	4.556	4.142	4.533	4.360	3.960

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 28 mm.

If wane is not permitted, the minimum design bearing length is 24 mm.

^{A)} Check the availability of section sizes.

Table 63 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.145	1.136	1.109	1.109	1.096	1.063	1.077	1.063	1.024
	38 × 97	1.738	1.719	1.666	1.666	1.642	1.578	1.605	1.578	1.507
	38 × 120	2.368	2.336	2.166	2.250	2.212	2.069	2.155	2.113	1.987
	38 × 145	2.986	2.871	2.606	2.851	2.746	2.490	2.717	2.638	2.390
	38 × 170	3.446	3.314	3.009	3.297	3.170	2.875	3.170	3.046	2.761
	38 × 195	3.943	3.793	3.446	3.774	3.629	3.293	3.629	3.488	3.163
	38 × 220	4.438	4.271	3.881	4.249	4.087	3.710	4.087	3.929	3.564
	47 × 72	1.272	1.260	1.229	1.229	1.214	1.175	1.192	1.175	1.130
	47 × 97	1.919	1.896	1.835	1.835	1.808	1.735	1.765	1.735	1.654
	47 × 120	2.602	2.565	2.328	2.468	2.425	2.225	2.360	2.313	2.138
	47 × 145	3.203	3.081	2.800	3.065	2.948	2.677	2.948	2.834	2.572
	47 × 170	3.694	3.555	3.232	3.536	3.402	3.091	3.402	3.272	2.970
	47 × 195	4.225	4.067	3.700	4.046	3.893	3.539	3.893	3.745	3.401
	47 × 220	4.753	4.577	4.166	4.554	4.383	3.986	4.383	4.217	3.831
	63 × 97	2.190	2.162	2.047	2.088	2.055	1.958	2.005	1.968	1.873
	63 × 120	2.933	2.823	2.568	2.790	2.702	2.457	2.664	2.600	2.361
	63 × 145	3.521	3.390	3.087	3.373	3.246	2.953	3.246	3.124	2.839
	63 × 170	4.057	3.908	3.561	3.888	3.744	3.408	3.744	3.603	3.277
	63 × 195	4.636	4.468	4.074	4.446	4.282	3.900	4.282	4.122	3.752
	63 × 220	5.212	5.024	4.585	4.999	4.816	4.390	4.816	4.639	4.224
	75 × 120	3.102	2.987	2.720	2.972	2.861	2.603	2.857	2.753	2.503
	75 × 145	3.721	3.585	3.268	3.567	3.435	3.128	3.435	3.307	3.009
	75 × 170	4.285	4.130	3.768	4.110	3.959	3.609	3.959	3.813	3.472
	75 × 195	4.894	4.719	4.310	4.696	4.526	4.128	4.526	4.360	3.973
	75 × 220	5.497	5.303	4.847	5.278	5.088	4.645	5.088	4.904	4.472
CLS/ALS sizes	38 × 89	1.543	1.528	1.484	1.484	1.464	1.410	1.433	1.410	1.350
	38 × 140	2.836	2.736	2.483	2.682	2.616	2.372	2.559	2.505	2.277
	38 × 184	3.725	3.583	3.254	3.564	3.427	3.110	3.427	3.294	2.987
	38 × 235	4.734	4.556	4.142	4.533	4.360	3.960	4.360	4.193	3.804

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 30 mm.

If wane is not permitted, the minimum design bearing length is 25 mm.

^{A)} Check the availability of section sizes.

Table 64 Permissible clear spans for flat roof joists with access to the roof not limited to the purposes of maintenance and repair. Timber of strength class C16. Imposed loading of 1.50 kN/m²

C16-1.50

Access not limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	0.707	0.703	0.694	0.694	0.689	0.676	0.682	0.676	0.660
	38 × 97	1.211	1.202	1.176	1.176	1.164	1.130	1.145	1.130	1.090
	38 × 120	1.798	1.785	1.736	1.736	1.712	1.647	1.675	1.647	1.573
	38 × 145	2.347	2.327	2.272	2.272	2.246	2.177	2.207	2.177	2.088
	38 × 170	2.876	2.848	2.771	2.771	2.736	2.641	2.681	2.641	2.533
	38 × 195	3.470	3.432	3.293	3.329	3.282	3.156	3.210	3.156	3.017
	38 × 220	4.078	4.030	3.710	3.897	3.838	3.564	3.747	3.680	3.430
	47 × 72	0.869	0.864	0.850	0.850	0.844	0.825	0.833	0.825	0.802
	47 × 97	1.436	1.428	1.404	1.404	1.363	1.362	1.375	1.362	1.210
	47 × 120	2.000	1.986	1.944	1.944	1.925	1.871	1.894	1.871	1.809
	47 × 145	2.601	2.578	2.513	2.513	2.484	2.403	2.438	2.403	2.311
	47 × 170	3.176	3.144	3.056	3.056	3.015	2.907	2.953	2.907	2.784
	47 × 195	3.820	3.777	3.539	3.659	3.605	3.401	3.524	3.463	3.282
	47 × 220	4.477	4.383	3.986	4.271	4.204	3.831	4.102	4.027	3.697
	63 × 97	1.666	1.655	1.625	1.625	1.611	1.572	1.589	1.572	1.526
	63 × 120	2.306	2.287	2.236	2.236	2.212	2.146	2.174	2.146	2.070
	63 × 145	2.981	2.953	2.874	2.874	2.838	2.741	2.783	2.741	2.631
	63 × 170	3.624	3.585	3.408	3.478	3.430	3.277	3.356	3.301	3.157
	63 × 195	4.338	4.286	3.900	4.146	4.084	3.752	3.987	3.917	3.623
	63 × 220	4.999	4.816	4.390	4.821	4.639	4.224	4.624	4.483	4.079
	75 × 120	2.503	2.482	2.423	2.423	2.396	2.322	2.354	2.322	2.237
	75 × 145	3.225	3.193	3.105	3.105	3.065	2.957	3.003	2.957	2.835
	75 × 170	3.908	3.865	3.609	3.747	3.694	3.472	3.611	3.551	3.353
	75 × 195	4.663	4.526	4.128	4.454	4.360	3.973	4.280	4.203	3.838
	75 × 220	5.278	5.088	4.645	5.088	4.904	4.472	4.923	4.742	4.321
CLS/ALS sizes	38 × 89	1.038	1.032	1.012	1.012	1.003	0.977	0.988	0.977	0.946
	38 × 140	2.190	2.173	2.123	2.123	2.101	2.038	2.065	2.038	1.942
	38 × 184	3.206	3.173	3.082	3.082	3.040	2.929	2.976	2.929	2.803
	38 × 235	4.449	4.360	3.960	4.242	4.175	3.804	4.072	3.996	3.647

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 32 mm.

If wane is not permitted, the minimum design bearing length is 27 mm.

^{A)} Check the availability of section sizes.

Table 65 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C24. Imposed loading of 0.75 kN/m²

C24-0.75

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.214	1.204	1.174	1.174	1.161	1.124	1.140	1.124	1.082
	38 × 97	1.837	1.816	1.759	1.759	1.733	1.664	1.693	1.664	1.588
	38 × 120	2.496	2.462	2.370	2.370	2.329	2.223	2.267	2.223	2.108
	38 × 145	3.177	3.128	2.997	2.997	2.939	2.792	2.853	2.792	2.635
	38 × 170	3.814	3.750	3.503	3.580	3.507	3.298	3.398	3.320	3.123
	38 × 195	4.512	4.399	4.009	4.218	4.127	3.775	3.991	3.895	3.586
	38 × 220	5.134	4.947	4.512	4.847	4.668	4.251	4.586	4.441	4.039
	47 × 72	1.347	1.334	1.300	1.300	1.284	1.241	1.259	1.241	1.192
	47 × 97	2.025	2.001	1.935	1.935	1.905	1.826	1.860	1.826	1.740
	47 × 120	2.739	2.700	2.596	2.596	2.549	2.430	2.480	2.430	2.301
	47 × 145	3.472	3.416	3.256	3.269	3.205	3.041	3.110	3.041	2.868
	47 × 170	4.153	4.081	3.755	3.894	3.813	3.538	3.693	3.607	3.363
	47 × 195	4.879	4.704	4.294	4.575	4.441	4.048	4.327	4.223	3.849
	47 × 220	5.482	5.287	4.831	5.182	4.995	4.556	4.938	4.756	4.333
	63 × 97	2.307	2.277	2.198	2.198	2.162	2.069	2.108	2.069	1.968
	63 × 120	3.098	3.052	2.929	2.929	2.876	2.736	2.795	2.736	2.588
	63 × 145	3.903	3.838	3.578	3.670	3.597	3.375	3.487	3.409	3.212
	63 × 170	4.645	4.509	4.123	4.353	4.261	3.891	4.125	4.029	3.702
	63 × 195	5.332	5.147	4.712	5.047	4.868	4.449	4.816	4.640	4.235
	63 × 220	5.983	5.779	5.296	5.668	5.470	5.003	5.409	5.216	4.764
	75 × 120	3.325	3.274	3.141	3.141	3.082	2.931	2.994	2.931	2.770
	75 × 145	4.172	4.103	3.781	3.921	3.842	3.569	3.725	3.641	3.397
	75 × 170	4.924	4.754	4.354	4.638	4.498	4.113	4.396	4.289	3.916
	75 × 195	5.612	5.422	4.973	5.319	5.135	4.700	5.078	4.899	4.477
	75 × 220	6.000	6.000	5.585	5.969	5.765	5.283	5.703	5.503	5.035
CLS/ALS sizes	38 × 89	1.633	1.615	1.568	1.568	1.546	1.488	1.513	1.488	1.424
	38 × 140	2.985	2.940	2.820	2.820	2.768	2.632	2.689	2.632	2.487
	38 × 184	4.205	4.131	3.787	3.937	3.854	3.566	3.730	3.642	3.387
	38 × 235	5.473	5.275	4.813	5.169	4.979	4.535	4.921	4.737	4.310

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 27 mm.

If wane is not permitted, the minimum design bearing length is 19 mm.

^{A)} Check the availability of section sizes.

Table 66 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.214	1.204	1.174	1.174	1.161	1.124	1.140	1.124	1.082
	38 × 97	1.837	1.816	1.759	1.759	1.733	1.664	1.693	1.664	1.588
	38 × 120	2.496	2.462	2.370	2.370	2.329	2.223	2.267	2.223	2.108
	38 × 145	3.177	3.128	2.857	2.997	2.939	2.713	2.853	2.792	2.592
	38 × 170	3.768	3.626	3.298	3.580	3.447	3.132	3.398	3.298	2.994
	38 × 195	4.309	4.148	3.775	4.100	3.945	3.586	3.925	3.775	3.429
	38 × 220	4.847	4.668	4.251	4.614	4.441	4.039	4.418	4.251	3.862
	47 × 72	1.347	1.334	1.300	1.300	1.284	1.241	1.259	1.241	1.192
	47 × 97	2.025	2.001	1.935	1.935	1.905	1.826	1.860	1.826	1.740
	47 × 120	2.739	2.700	2.551	2.596	2.549	2.423	2.480	2.430	2.301
	47 × 145	3.472	3.369	3.066	3.269	3.205	2.914	3.110	3.041	2.786
	47 × 170	4.033	3.884	3.538	3.839	3.696	3.363	3.677	3.538	3.216
	47 × 195	4.610	4.441	4.048	4.390	4.227	3.849	4.206	4.048	3.682
	47 × 220	5.182	4.995	4.556	4.938	4.756	4.333	4.732	4.556	4.147
	63 × 97	2.307	2.277	2.198	2.198	2.162	2.069	2.108	2.069	1.968
	63 × 120	3.098	3.052	2.810	2.929	2.876	2.671	2.795	2.736	2.556
	63 × 145	3.839	3.700	3.375	3.657	3.523	3.210	3.487	3.375	3.072
	63 × 170	4.421	4.262	3.891	4.214	4.060	3.702	4.040	3.891	3.544
	63 × 195	5.047	4.868	4.449	4.814	4.640	4.235	4.617	4.449	4.055
	63 × 220	5.668	5.470	5.003	5.409	5.216	4.764	5.191	5.003	4.564
	75 × 120	3.325	3.259	2.974	3.141	3.082	2.829	2.994	2.931	2.708
	75 × 145	4.052	3.907	3.569	3.863	3.723	3.397	3.705	3.569	3.253
	75 × 170	4.662	4.498	4.113	4.448	4.289	3.916	4.268	4.113	3.751
	75 × 195	5.319	5.135	4.700	5.078	4.899	4.477	4.875	4.700	4.291
	75 × 220	5.969	5.765	5.283	5.703	5.503	5.035	5.477	5.283	4.827
CLS/ALS sizes	38 × 89	1.633	1.615	1.568	1.568	1.546	1.488	1.513	1.488	1.424
	38 × 140	2.985	2.940	2.723	2.820	2.768	2.585	2.689	2.632	2.470
	38 × 184	4.071	3.919	3.566	3.873	3.726	3.387	3.707	3.566	3.238
	38 × 235	5.169	4.979	4.535	4.921	4.737	4.310	4.713	4.535	4.122

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 30 mm.

If wane is not permitted, the minimum design bearing length is 21 mm.

^{A)} Check the availability of section sizes.

Table 67 Permissible clear spans for flat roof joists with access to the roof limited to the purposes of maintenance and repair. Timber of strength class C24. Imposed loading of 1.25 kN/m²

C24-1.25

Access limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	1.214	1.204	1.174	1.174	1.161	1.124	1.140	1.124	1.082
	38 × 97	1.837	1.816	1.759	1.759	1.733	1.664	1.693	1.664	1.588
	38 × 120	2.496	2.462	2.255	2.370	2.329	2.155	2.267	2.223	2.069
	38 × 145	3.106	2.987	2.713	2.972	2.857	2.592	2.853	2.746	2.490
	38 × 170	3.583	3.447	3.132	3.429	3.298	2.994	3.298	3.171	2.876
	38 × 195	4.100	3.945	3.586	3.925	3.775	3.429	3.775	3.630	3.294
	38 × 220	4.614	4.441	4.039	4.418	4.251	3.862	4.251	4.088	3.711
	47 × 72	1.347	1.334	1.300	1.300	1.284	1.241	1.259	1.241	1.192
	47 × 97	2.025	2.001	1.931	1.935	1.905	1.826	1.860	1.826	1.740
	47 × 120	2.739	2.667	2.423	2.596	2.549	2.317	2.480	2.430	2.226
	47 × 145	3.329	3.204	2.914	3.188	3.066	2.786	3.066	2.949	2.677
	47 × 170	3.839	3.696	3.363	3.677	3.538	3.216	3.538	3.403	3.091
	47 × 195	4.390	4.227	3.849	4.206	4.048	3.682	4.048	3.895	3.540
	47 × 220	4.938	4.756	4.333	4.732	4.556	4.147	4.556	4.385	3.987
	63 × 97	2.307	2.277	2.130	2.198	2.162	2.037	2.108	2.069	1.958
	63 × 120	3.048	2.935	2.671	2.920	2.810	2.556	2.795	2.704	2.457
	63 × 145	3.657	3.523	3.210	3.505	3.375	3.072	3.375	3.248	2.954
	63 × 170	4.214	4.060	3.702	4.040	3.891	3.544	3.891	3.746	3.409
	63 × 195	4.814	4.640	4.235	4.617	4.449	4.055	4.449	4.285	3.902
	63 × 220	5.409	5.216	4.764	5.191	5.003	4.564	5.003	4.820	4.393
	75 × 120	3.222	3.104	2.829	3.088	2.974	2.703	2.974	2.862	2.604
	75 × 145	3.863	3.723	3.397	3.705	3.569	3.253	3.569	3.437	3.130
	75 × 170	4.448	4.289	3.916	4.268	4.113	3.751	4.113	3.962	3.611
	75 × 195	5.078	4.899	4.477	4.875	4.700	4.291	4.700	4.529	4.131
	75 × 220	5.703	5.503	5.035	5.477	5.283	4.827	5.283	5.093	4.648
CLS/ALS sizes	38 × 89	1.633	1.615	1.568	1.568	1.546	1.488	1.513	1.488	1.424
	38 × 140	2.960	2.847	2.585	2.820	2.723	2.470	2.689	2.617	2.372
	38 × 184	3.873	3.726	3.387	3.707	3.566	3.238	3.566	3.428	3.110
	38 × 235	4.921	4.737	4.310	4.713	4.535	4.122	4.535	4.362	3.961

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 32 mm.

If wane is not permitted, the minimum design bearing length is 22 mm.

^{A)} Check the availability of section sizes.

Table 68 Permissible clear spans for flat roof joists with access to the roof not limited to the purposes of maintenance and repair. Timber of strength class C24. Imposed loading of 1.50 kN/m²

C24-1.50

Access not limited

Size of joist ^{A)} mm × mm		Dead load kN/m ²								
		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
		Maximum clear span of joist m								
BS EN 336 sizes with sawn thickness to tolerance class 1 and processed depth to tolerance class 2	38 × 72	0.875	0.871	0.861	0.861	0.856	0.843	0.849	0.843	0.826
	38 × 97	1.367	1.359	1.337	1.337	1.327	1.298	1.311	1.298	1.263
	38 × 120	1.908	1.895	1.856	1.856	1.838	1.788	1.809	1.788	1.729
	38 × 145	2.486	2.464	2.404	2.404	2.377	2.301	2.333	2.301	2.214
	38 × 170	3.041	3.011	2.928	2.928	2.889	2.787	2.831	2.787	2.671
	38 × 195	3.663	3.622	3.429	3.511	3.460	3.294	3.383	3.326	3.176
	38 × 220	4.299	4.247	3.862	4.104	4.041	3.711	3.943	3.872	3.580
	47 × 72	0.982	0.978	0.966	0.966	0.960	0.944	0.951	0.944	0.924
	47 × 97	1.526	1.517	1.490	1.490	1.478	1.444	1.459	1.444	1.403
	47 × 120	2.120	2.104	2.058	2.058	2.037	1.979	2.004	1.979	1.911
	47 × 145	2.751	2.725	2.656	2.656	2.623	2.536	2.573	2.536	2.437
	47 × 170	3.354	3.319	3.216	3.223	3.179	3.062	3.112	3.062	2.931
	47 × 195	4.026	3.980	3.682	3.853	3.795	3.540	3.708	3.643	3.417
	47 × 220	4.711	4.556	4.147	4.491	4.385	3.987	4.310	4.230	3.849
	63 × 97	1.766	1.754	1.722	1.722	1.706	1.663	1.682	1.663	1.613
	63 × 120	2.439	2.418	2.362	2.362	2.336	2.265	2.295	2.265	2.183
	63 × 145	3.146	3.116	3.030	3.030	2.992	2.887	2.931	2.887	2.769
	63 × 170	3.818	3.776	3.544	3.661	3.609	3.409	3.529	3.471	3.292
	63 × 195	4.561	4.449	4.055	4.357	4.289	3.902	4.187	4.112	3.769
	63 × 220	5.191	5.003	4.564	5.003	4.820	4.393	4.839	4.660	4.243
	75 × 120	2.644	2.261	2.557	2.557	2.528	2.448	2.482	2.448	2.356
	75 × 145	3.399	3.364	3.253	3.269	3.226	3.110	3.160	3.110	2.980
	75 × 170	4.111	4.065	3.751	3.938	3.881	3.611	3.794	3.729	3.488
	75 × 195	4.785	4.700	4.291	4.673	4.529	4.131	4.489	4.380	3.991
	75 × 220	5.477	5.283	4.827	5.283	5.093	4.648	5.113	4.927	4.493
CLS/ALS sizes	38 × 89	1.203	1.197	1.180	1.180	1.171	1.148	1.158	1.148	1.119
	38 × 140	2.321	2.302	2.248	2.248	2.223	2.155	2.185	2.155	2.077
	38 × 184	3.387	3.351	3.238	3.253	3.208	3.088	3.139	3.088	2.953
	38 × 235	4.686	4.535	4.122	4.464	4.362	3.961	4.282	4.202	3.822

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 34 mm.

If wane is not permitted, the minimum design bearing length is 24 mm.

^{A)} Check the availability of section sizes.

6.13 Purlins supporting decking or sheeting: Notes to Table 69 to Table 74

NOTE 1 The sizes, spacings and spans given will support the dead and applied loads stated in the tables, or the dead loads stated in the tables and a concentrated load of 0.9 kN. See Annex M for guidance on the snow load relevant for a particular site. The design spacing is (see Figure 18). Both BS EN 1991-1-3 permits a reduction in imposed roof loading for slopes over 30°. This reduction is not relevant, however, to Table 69 to Table 74 because the tabulated spans are based on a slope of 10° as giving the most onerous case for the range of spans between 10° and 35°.

NOTE 2 The section sizes given in the tables are either sawn across the timber thickness and width (purlin depth) in accordance with tolerance class 1 of BS EN 336, or are CLS/ALS processed sizes in accordance with tolerance class 2. BS EN 336 tolerances are as follows:

- a) on a sawn thickness or depth of not greater than 100 mm (tolerance class 1):
 - 1 mm;
 - + 3 mm;
- b) on a sawn depth of greater than 100 mm (tolerance class 1):
 - 2 mm;
 - + 4 mm;
- c) on a processed thickness of not greater than 100 mm (tolerance class 2):
 - 1 mm;
 - + 1 mm;
- d) on a processed depth of greater than 100 mm (tolerance class 2):
 - 1.5 mm;
 - + 1.5 mm.

6.13.1 Unless justified by specialist calculation, the minimum design bearing length at supports for purlins supporting sheeting or decking should be as stated at the base of each table.

NOTE It might be necessary to provide longer bearing to accommodate fixings or simply for practical reasons such as construction tolerances.

6.13.2 Notching or drilling of purlins should not be carried out unless justified by specialist calculation.

NOTE Permissible clear spans have been calculated in accordance with BS 5268-7.7. This is compatible with the guidance to be included in the non-contradictory complimentary information (NCCI) to BS EN 1995-1-1.

6.13.3 The tabulated purlin sizes are designed to resist only the load component perpendicular to the roof slope with purlins positioned normal to the roof slope. Designers should satisfy themselves that the roof construction can satisfactorily accommodate the component parallel to the roof slope.

6.13.4 The two sections of double purlin should be fixed together with flush tops, to act as one piece.

Figure 18 Purlins supporting sheeting or decking

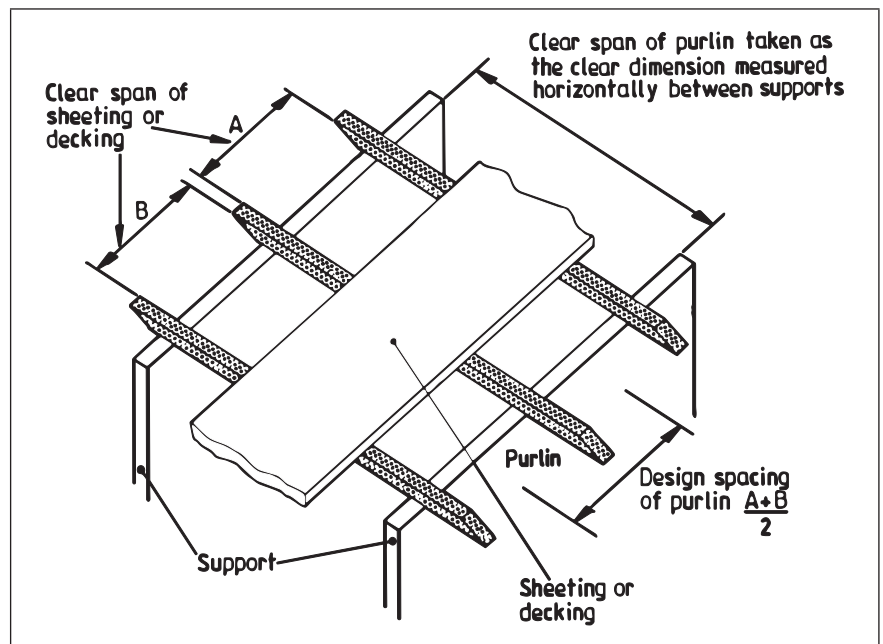


Table 69 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 0.75 kN/m²

C16-0.75 10° to 35°		Dead load kN/m ²																	
Size of purlin ^{A)} mm x mm		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		Maximum clear span of purlin m																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.635	1.586	1.477	1.385	1.311	1.250	1.505	1.438	1.364	1.278	1.209	1.151	1.410	1.335	1.275	1.196	1.130	1.075
	47 x 125	2.197	1.992	1.844	1.730	1.637	1.561	2.002	1.842	1.703	1.596	1.509	1.437	1.859	1.727	1.595	1.493	1.411	1.342
	47 x 150	2.630	2.386	2.209	2.073	1.963	1.871	2.437	2.208	2.042	1.913	1.810	1.724	2.288	2.070	1.912	1.790	1.692	1.610
	47 x 175	3.061	2.779	2.574	2.415	2.287	2.181	2.838	2.572	2.379	2.230	2.110	2.009	2.665	2.412	2.229	2.087	1.972	1.877
	47 x 200	3.490	3.170	2.937	2.757	2.611	2.490	3.237	2.935	2.716	2.546	2.409	2.294	3.041	2.753	2.545	2.383	2.252	2.144
	47 x 225	3.917	3.560	3.300	3.098	2.935	2.799	3.635	3.297	3.052	2.861	2.708	2.579	3.416	3.094	2.860	2.679	2.532	2.410
	47 x 250	4.342	3.948	3.661	3.438	3.257	3.107	4.031	3.658	3.387	3.176	3.006	2.864	3.790	3.433	3.174	2.974	2.812	2.671
	47 x 275	4.766	4.336	4.021	3.777	3.579	3.414	4.426	4.018	3.721	3.490	3.304	3.148	4.162	3.772	3.488	3.269	3.090	2.920
	47 x 300	5.187	4.721	4.381	4.116	3.900	3.721	4.820	4.377	4.054	3.804	3.601	3.431	4.533	4.110	3.802	3.563	3.369	3.167
Minimum design bearing length	63 x 100	1.872	1.765	1.635	1.535	1.455	1.388	1.715	1.636	1.513	1.419	1.343	1.281	1.602	1.515	1.418	1.329	1.258	1.198
	63 x 125	2.422	2.201	2.040	1.916	1.816	1.733	2.247	2.038	1.888	1.771	1.677	1.599	2.101	1.914	1.770	1.660	1.570	1.496
	63 x 150	2.898	2.634	2.443	2.296	2.176	2.077	2.690	2.441	2.262	2.123	2.010	1.917	2.529	2.293	2.122	1.989	1.883	1.794
	63 x 175	3.370	3.066	2.845	2.674	2.535	2.420	3.130	2.843	2.634	2.473	2.343	2.234	2.944	2.670	2.472	2.318	2.194	2.091
	63 x 200	3.840	3.496	3.245	3.051	2.893	2.762	3.568	3.243	3.006	2.823	2.674	2.551	3.358	3.047	2.821	2.647	2.505	2.388
	63 x 225	4.307	3.924	3.644	3.427	3.251	3.104	4.005	3.641	3.377	3.171	3.005	2.867	3.770	3.422	3.170	2.974	2.816	2.684
	63 x 250	4.771	4.350	4.041	3.801	3.607	3.444	4.439	4.038	3.746	3.519	3.336	3.182	4.180	3.797	3.517	3.301	3.126	2.979
	63 x 275	5.233	4.774	4.437	4.175	3.962	3.784	4.871	4.434	4.115	3.866	3.665	3.497	4.588	4.170	3.864	3.627	3.435	3.275
	63 x 300	5.692	5.196	4.832	4.547	4.316	4.123	5.301	4.828	4.482	4.212	3.994	3.811	4.995	4.541	4.210	3.953	3.744	3.569

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 61 mm.

If wane is not permitted, the minimum design bearing length is 47 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 69 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 0.75 kN/m² (continued)

C16-0.75 10° to 35°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	2.023	1.871	1.736	1.631	1.546	1.476	1.849	1.734	1.607	1.508	1.429	1.363	1.725	1.630	1.507	1.414	1.339	1.276
	75 x 125	2.565	2.333	2.165	2.034	1.929	1.842	2.382	2.163	2.005	1.882	1.784	1.702	2.240	2.032	1.881	1.765	1.672	1.594
	75 x 150	3.066	2.792	2.592	2.437	2.312	2.207	2.849	2.590	2.401	2.255	2.138	2.040	2.681	2.434	2.254	2.116	2.004	1.910
	75 x 175	3.565	3.248	3.017	2.837	2.692	2.571	3.315	3.014	2.796	2.627	2.491	2.377	3.120	2.834	2.626	2.465	2.335	2.227
	75 x 200	4.060	3.702	3.440	3.237	3.072	2.934	3.777	3.437	3.190	2.998	2.843	2.713	3.557	3.233	2.996	2.814	2.666	2.542
	75 x 225	4.551	4.153	3.861	3.634	3.450	3.297	4.237	3.859	3.582	3.368	3.194	3.049	3.992	3.630	3.366	3.161	2.995	2.857
	75 x 250	5.039	4.602	4.281	4.031	3.828	3.658	4.695	4.278	3.973	3.736	3.544	3.383	4.425	4.026	3.734	3.508	3.324	3.172
	75 x 275	5.524	5.049	4.699	4.426	4.203	4.018	5.149	4.695	4.363	4.104	3.893	3.718	4.856	4.420	4.101	3.854	3.653	3.485
75 x 300	6.000	5.493	5.115	4.819	4.578	4.377	5.602	5.111	4.751	4.470	4.242	4.051	5.285	4.813	4.467	4.199	3.980	3.798	
Double- members																			
94 x 100	2.319	2.110	1.960	1.843	1.749	1.671	2.150	1.958	1.817	1.707	1.619	1.546	2.000	1.841	1.706	1.603	1.519	1.450	
94 x 125	2.885	2.629	2.443	2.299	2.182	2.085	2.683	2.441	2.266	2.130	2.021	1.930	2.526	2.296	2.129	2.000	1.896	1.810	
94 x 150	3.447	3.144	2.923	2.752	2.613	2.498	3.208	2.921	2.713	2.551	2.421	2.312	3.022	2.748	2.550	2.396	2.272	2.169	
94 x 175	4.004	3.656	3.401	3.203	3.043	2.909	3.729	3.399	3.158	2.971	2.820	2.694	3.515	3.199	2.969	2.791	2.647	2.527	
94 x 200	4.556	4.164	3.876	3.652	3.470	3.319	4.247	3.873	3.601	3.389	3.217	3.074	4.005	3.648	3.387	3.185	3.021	2.885	
94 x 225	5.103	4.669	4.349	4.099	3.897	3.727	4.761	4.346	4.042	3.805	3.613	3.453	4.493	4.094	3.803	3.577	3.394	3.242	
94 x 250	5.646	5.171	4.819	4.545	4.321	4.134	5.272	4.816	4.481	4.220	4.008	3.831	4.977	4.539	4.218	3.969	3.766	3.597	
94 x 275	6.000	5.669	5.287	4.988	4.744	4.539	5.779	5.283	4.919	4.634	4.402	4.209	5.459	4.981	4.631	4.359	4.137	3.952	
94 x 300	6.000	6.000	5.753	5.429	5.165	4.943	6.000	5.748	5.354	5.046	4.795	4.585	5.938	5.422	5.043	4.747	4.507	4.306	
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 61 mm.

If wane is not permitted, the minimum design bearing length is 47 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 69 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 0.75 kN/m² (continued)

C16-0.75 10° to 35°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1 200	1 500	1 800	2 100	2 400	900	1 200	1 500	1 800	2 100	2 400	900	1 200	1 500	1 800	2 100	2 400
		Maximum clear span of purlin m																	
CCLS/ALS sizes	38 x 140	2.286	2.071	1.915	1.795	1.698	1.617	2.104	1.914	1.767	1.654	1.563	1.487	1.949	1.792	1.653	1.546	1.459	1.386
	38 x 184	2.995	2.715	2.512	2.355	2.228	2.122	2.773	2.510	2.319	2.171	2.051	1.952	2.603	2.351	2.170	2.029	1.915	1.796
	38 x 235	3.810	3.457	3.200	3.001	2.840	2.706	3.531	3.198	2.955	2.768	2.616	2.484	3.315	2.997	2.766	2.588	2.421	2.260
	38 x 285	4.603	4.180	3.872	3.632	3.438	3.277	4.269	3.869	3.577	3.351	3.168	2.975	4.010	3.627	3.349	3.134	2.900	2.708
Minimum design bearing length																			

If a wafer at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 61 mm.

If wane is not permitted, the minimum design bearing length is 47 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 70 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.00 kN/m²

C16-1.00 10° to 35°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.635	1.478	1.366	1.280	1.210	1.152	1.505	1.385	1.279	1.197	1.131	1.076	1.410	1.310	1.208	1.130	1.067	1.014
	47 x 125	2.037	1.844	1.705	1.598	1.511	1.439	1.912	1.729	1.597	1.495	1.412	1.344	1.811	1.636	1.509	1.412	1.333	1.267
	47 x 150	2.440	2.210	2.044	1.915	1.812	1.725	2.290	2.072	1.914	1.792	1.693	1.611	2.170	1.961	1.810	1.693	1.598	1.519
	47 x 175	2.841	2.574	2.382	2.232	2.112	2.012	2.668	2.414	2.231	2.089	1.974	1.879	2.528	2.285	2.109	1.973	1.863	1.767
	47 x 200	3.240	2.938	2.719	2.549	2.412	2.297	3.044	2.756	2.547	2.385	2.255	2.146	2.885	2.609	2.408	2.253	2.128	2.003
	47 x 225	3.639	3.300	3.055	2.865	2.711	2.582	3.419	3.096	2.862	2.681	2.535	2.412	3.242	2.932	2.707	2.533	2.392	2.237
	47 x 250	4.035	3.662	3.390	3.180	3.009	2.867	3.793	3.436	3.177	2.977	2.814	2.674	3.597	3.254	3.005	2.813	2.644	2.470
	47 x 275	4.431	4.022	3.725	3.494	3.307	3.151	4.166	3.775	3.492	3.271	3.093	2.924	3.951	3.576	3.303	3.092	2.891	2.700
	47 x 300	4.825	4.382	4.059	3.808	3.605	3.435	4.537	4.114	3.805	3.566	3.372	3.171	4.304	3.897	3.600	3.370	3.136	2.930
	63 x 100	1.804	1.636	1.514	1.420	1.345	1.282	1.695	1.535	1.419	1.330	1.259	1.199	1.602	1.454	1.343	1.258	1.189	1.132
63 x 125	2.249	2.041	1.890	1.773	1.679	1.601	2.114	1.915	1.772	1.661	1.572	1.497	2.004	1.814	1.677	1.571	1.485	1.414	
63 x 150	2.692	2.444	2.264	2.125	2.013	1.919	2.531	2.295	2.123	1.991	1.884	1.796	2.401	2.174	2.010	1.883	1.781	1.696	
63 x 175	3.133	2.846	2.637	2.476	2.345	2.237	2.947	2.673	2.474	2.320	2.196	2.093	2.796	2.533	2.342	2.195	2.076	1.977	
63 x 200	3.572	3.246	3.009	2.826	2.677	2.554	3.361	3.050	2.824	2.649	2.508	2.390	3.189	2.891	2.674	2.506	2.371	2.258	
63 x 225	4.009	3.645	3.380	3.175	3.009	2.870	3.773	3.425	3.173	2.977	2.818	2.686	3.582	3.248	3.005	2.817	2.665	2.538	
63 x 250	4.443	4.042	3.750	3.523	3.339	3.186	4.183	3.800	3.521	3.304	3.129	2.982	3.973	3.603	3.335	3.127	2.959	2.818	
63 x 275	4.876	4.438	4.119	3.870	3.669	3.501	4.592	4.173	3.868	3.630	3.438	3.278	4.362	3.958	3.664	3.436	3.252	3.098	
63 x 300	5.306	4.833	4.486	4.217	3.998	3.815	4.999	4.545	4.214	3.956	3.747	3.573	4.750	4.312	3.993	3.745	3.544	3.377	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 66 mm.

If wane is not permitted, the minimum design bearing length is 51 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 70 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.00 kN/m² (continued)

C16-1.00 10° to 35°																			
Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25							More than 0.25 but not more than 0.5							More than 0.5 but not more than 0.75				
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
Maximum clear span of purlin m																			
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	1.913	1.736	1.608	1.510	1.430	1.365	1.798	1.630	1.509	1.415	1.340	1.277	1.705	1.545	1.429	1.339	1.267	1.207
	75 x 125	2.384	2.165	2.007	1.884	1.786	1.704	2.242	2.034	1.883	1.767	1.673	1.595	2.127	1.928	1.784	1.672	1.583	1.508
	75 x 150	2.852	2.592	2.404	2.258	2.140	2.042	2.683	2.436	2.256	2.117	2.006	1.912	2.547	2.309	2.137	2.004	1.897	1.808
	75 x 175	3.318	3.018	2.799	2.630	2.493	2.379	3.123	2.836	2.628	2.467	2.337	2.229	2.965	2.690	2.490	2.336	2.211	2.107
	75 x 200	3.781	3.441	3.193	3.001	2.846	2.716	3.560	3.235	2.999	2.816	2.668	2.545	3.382	3.069	2.842	2.667	2.525	2.406
	75 x 225	4.241	3.862	3.586	3.371	3.197	3.052	3.996	3.633	3.369	3.164	2.998	2.860	3.796	3.447	3.193	2.996	2.837	2.705
	75 x 250	4.699	4.282	3.977	3.740	3.548	3.387	4.429	4.029	3.737	3.511	3.327	3.174	4.209	3.824	3.543	3.326	3.150	3.003
	75 x 275	5.154	4.700	4.367	4.108	3.897	3.722	4.860	4.424	4.105	3.857	3.656	3.488	4.621	4.200	3.893	3.654	3.461	3.300
75 x 300	5.607	5.116	4.756	4.474	4.246	4.055	5.289	4.817	4.471	4.202	3.984	3.802	5.030	4.574	4.241	3.982	3.772	3.597	
Double- members																			
94 x 100	2.156	1.960	1.819	1.709	1.621	1.548	2.029	1.843	1.708	1.604	1.520	1.451	1.926	1.748	1.619	1.520	1.440	1.373	
94 x 125	2.686	2.443	2.268	2.132	2.023	1.932	2.528	2.298	2.131	2.002	1.898	1.811	2.401	2.180	2.020	1.897	1.797	1.715	
94 x 150	3.211	2.924	2.715	2.554	2.423	2.315	3.025	2.751	2.552	2.398	2.274	2.171	2.874	2.611	2.420	2.273	2.154	2.055	
94 x 175	3.733	3.402	3.161	2.974	2.823	2.696	3.518	3.202	2.972	2.794	2.650	2.530	3.344	3.040	2.819	2.648	2.510	2.395	
94 x 200	4.251	3.877	3.604	3.392	3.220	3.077	4.009	3.651	3.390	3.188	3.024	2.887	3.812	3.467	3.217	3.022	2.865	2.735	
94 x 225	4.765	4.350	4.046	3.809	3.617	3.457	4.496	4.098	3.807	3.580	3.397	3.244	4.277	3.893	3.613	3.396	3.220	3.073	
94 x 250	5.277	4.820	4.486	4.224	4.013	3.835	4.981	4.543	4.222	3.972	3.770	3.601	4.741	4.317	4.008	3.768	3.573	3.411	
94 x 275	5.784	5.288	4.923	4.638	4.407	4.213	5.463	4.986	4.635	4.362	4.141	3.956	5.201	4.739	4.402	4.139	3.926	3.748	
94 x 300	6.000	5.754	5.359	5.051	4.800	4.589	5.943	5.427	5.047	4.751	4.511	4.310	5.660	5.160	4.794	4.509	4.278	4.085	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 66 mm.

If wane is not permitted, the minimum design bearing length is 51 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 70 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.00 kN/m² (continued)

C16-1.00 10° to 35°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																			
	Not more than 0.25				More than 0.25 but not more than 0.5				More than 0.5 but not more than 0.75											
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																			
	Maximum clear span of purlin m																			
	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400								
CLS/ALS sizes	38 x 140	2.118	1.916	1.769	1.656	1.565	1.488	1.987	1.794	1.655	1.547	1.460	1.388	1.880	1.696	1.563	1.459	1.375	1.283	
	38 x 184	2.776	2.512	2.321	2.173	2.054	1.954	2.605	2.354	2.172	2.031	1.917	1.799	2.467	2.226	2.051	1.916	1.778	1.659	
	38 x 235	3.535	3.201	2.959	2.771	2.619	2.488	3.318	3.000	2.769	2.590	2.424	2.263	3.143	2.837	2.616	2.422	2.237	2.088	
	38 x 285	4.274	3.873	3.581	3.355	3.172	2.980	4.013	3.631	3.353	3.137	2.904	2.712	3.803	3.435	3.168	2.902	2.681	2.502	
Minimum design bearing length																				
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 66 mm.																				
If wane is not permitted, the minimum design bearing length is 51 mm.																				
A) Single-members unless otherwise indicated. Check the availability of section sizes.																				

Table 71 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.25 kN/m²

C16-1.25 10° to 35°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.533	1.386	1.280	1.198	1.132	1.077	1.452	1.311	1.209	1.131	1.068	1.015	1.384	1.249	1.151	1.075	1.014	0.963
	47 x 125	1.913	1.730	1.598	1.496	1.414	1.345	1.812	1.637	1.510	1.413	1.334	1.268	1.728	1.560	1.438	1.343	1.267	1.202
	47 x 150	2.292	2.074	1.916	1.794	1.695	1.613	2.172	1.962	1.811	1.694	1.599	1.521	2.071	1.870	1.724	1.611	1.520	1.427
	47 x 175	2.670	2.417	2.233	2.091	1.976	1.880	2.530	2.287	2.111	1.975	1.865	1.769	2.414	2.179	2.010	1.878	1.768	1.650
	47 x 200	3.047	2.758	2.549	2.388	2.257	2.148	2.888	2.611	2.410	2.255	2.130	2.006	2.755	2.488	2.295	2.145	2.004	1.870
	47 x 225	3.422	3.099	2.865	2.684	2.537	2.415	3.244	2.934	2.709	2.535	2.394	2.240	3.096	2.797	2.580	2.412	2.238	2.089
	47 x 250	3.796	3.439	3.180	2.979	2.817	2.678	3.600	3.257	3.008	2.815	2.647	2.473	3.436	3.105	2.864	2.673	2.471	2.306
	47 x 275	4.169	3.779	3.495	3.274	3.096	2.928	3.954	3.579	3.306	3.094	2.894	2.894	2.703	3.775	3.412	3.148	2.923	2.522
	47 x 300	4.541	4.117	3.809	3.569	3.375	3.176	4.308	3.900	3.603	3.373	3.140	2.933	4.113	3.718	3.432	3.170	2.931	2.736
	Minimum design bearing length	63 x 100	1.696	1.536	1.421	1.332	1.260	1.200	1.608	1.455	1.344	1.259	1.190	1.133	1.534	1.387	1.281	1.199	1.133
63 x 125		2.115	1.917	1.773	1.663	1.573	1.499	2.006	1.816	1.678	1.572	1.487	1.415	1.915	1.732	1.599	1.497	1.415	1.346
63 x 150		2.533	2.297	2.125	1.993	1.886	1.797	2.403	2.176	2.012	1.885	1.783	1.697	2.294	2.075	1.917	1.795	1.696	1.614
63 x 175		2.949	2.675	2.476	2.322	2.198	2.095	2.798	2.535	2.344	2.197	2.078	1.979	2.672	2.418	2.235	2.092	1.978	1.882
63 x 200		3.363	3.052	2.826	2.651	2.510	2.392	3.192	2.893	2.676	2.508	2.373	2.260	3.049	2.760	2.551	2.389	2.259	2.149
63 x 225		3.776	3.428	3.175	2.979	2.821	2.689	3.584	3.250	3.007	2.819	2.667	2.540	3.425	3.102	2.867	2.686	2.539	2.416
63 x 250		4.187	3.803	3.524	3.307	3.131	2.985	3.975	3.606	3.338	3.129	2.961	2.820	3.799	3.442	3.183	2.982	2.819	2.681
63 x 275		4.596	4.177	3.871	3.634	3.441	3.281	4.365	3.961	3.667	3.439	3.254	3.100	4.172	3.782	3.497	3.277	3.099	2.931
63 x 300		5.004	4.549	4.217	3.960	3.751	3.576	4.754	4.315	3.996	3.748	3.547	3.379	4.544	4.120	3.812	3.572	3.378	3.179

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 71 mm.

If wane is not permitted, the minimum design bearing length is 55 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 71 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.25 kN/m² (continued)

C16-1.25 10° to 35°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	1.799	1.631	1.510	1.417	1.341	1.279	1.707	1.546	1.430	1.340	1.268	1.208	1.630	1.475	1.363	1.277	1.208	1.150
	75 x 125	2.244	2.035	1.885	1.768	1.675	1.597	2.129	1.929	1.785	1.674	1.584	1.509	2.033	1.841	1.702	1.595	1.508	1.436
	75 x 150	2.686	2.438	2.258	2.119	2.007	1.914	2.549	2.311	2.139	2.006	1.899	1.809	2.435	2.206	2.040	1.912	1.808	1.722
	75 x 175	3.126	2.839	2.631	2.469	2.339	2.231	2.967	2.692	2.492	2.338	2.213	2.109	2.836	2.570	2.377	2.228	2.108	2.008
	75 x 200	3.563	3.238	3.002	2.818	2.670	2.547	3.384	3.071	2.844	2.669	2.527	2.408	3.235	2.933	2.713	2.544	2.407	2.293
	75 x 225	3.999	3.636	3.372	3.167	3.001	2.862	3.799	3.450	3.196	2.999	2.840	2.707	3.632	3.294	3.049	2.859	2.705	2.577
	75 x 250	4.432	4.032	3.741	3.514	3.330	3.177	4.212	3.827	3.546	3.328	3.152	3.005	4.028	3.655	3.384	3.174	3.003	2.861
	75 x 275	4.864	4.428	4.109	3.860	3.659	3.492	4.624	4.203	3.896	3.657	3.464	3.303	4.423	4.015	3.718	3.488	3.301	3.145
	75 x 300	5.294	4.821	4.475	4.206	3.988	3.805	5.034	4.577	4.244	3.985	3.775	3.600	4.816	4.374	4.051	3.801	3.598	3.428
Double- members																			
	94 x 100	2.031	1.844	1.709	1.605	1.522	1.452	1.928	1.749	1.620	1.521	1.441	1.374	1.842	1.670	1.546	1.450	1.373	1.309
	94 x 125	2.530	2.300	2.133	2.004	1.899	1.813	2.403	2.182	2.022	1.898	1.799	1.716	2.297	2.084	1.930	1.811	1.715	1.635
	94 x 150	3.027	2.753	2.554	2.400	2.276	2.173	2.876	2.613	2.422	2.275	2.156	2.057	2.750	2.496	2.312	2.170	2.056	1.960
	94 x 175	3.521	3.204	2.974	2.796	2.652	2.532	3.347	3.042	2.821	2.650	2.512	2.397	3.201	2.907	2.694	2.529	2.396	2.285
	94 x 200	4.012	3.654	3.393	3.190	3.027	2.890	3.815	3.470	3.219	3.025	2.867	2.737	3.650	3.316	3.074	2.887	2.735	2.609
	94 x 225	4.500	4.101	3.810	3.583	3.400	3.247	4.281	3.896	3.616	3.398	3.222	3.075	4.097	3.725	3.454	3.244	3.074	2.932
	94 x 250	4.985	4.546	4.225	3.975	3.773	3.604	4.744	4.320	4.011	3.771	3.576	3.414	4.542	4.131	3.832	3.600	3.412	3.255
	94 x 275	5.468	4.990	4.639	4.366	4.144	3.959	5.205	4.743	4.405	4.142	3.929	3.751	4.985	4.536	4.209	3.955	3.749	3.577
	94 x 300	5.947	5.431	5.052	4.756	4.515	4.314	5.664	5.164	4.797	4.512	4.281	4.088	5.425	4.940	4.585	4.309	4.086	3.899
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 71 mm.

If wane is not permitted, the minimum design bearing length is 55 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 71 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C16. Imposed loading of 1.25 kN/m² (continued)

C16-1.25 10° to 35°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1 200	1 500	1 800	2 100	2 400	900	1 200	1 500	1 800	2 100	2 400	900	1 200	1 500	1 800	2 100	2 400
		Maximum clear span of purlin m																	
C/LS/ALS sizes	38 x 140	1.988	1.796	1.656	1.549	1.462	1.389	1.882	1.697	1.564	1.461	1.377	1.284	1.794	1.616	1.487	1.387	1.283	1.197
	38 x 184	2.607	2.356	2.174	2.033	1.919	1.801	2.468	2.227	2.053	1.918	1.780	1.661	2.353	2.121	1.952	1.798	1.660	1.548
	38 x 235	3.321	3.003	2.772	2.592	2.427	2.266	3.145	2.840	2.618	2.425	2.240	2.090	2.999	2.704	2.484	2.262	2.089	1.948
	38 x 285	4.017	3.634	3.356	3.140	2.908	2.715	3.806	3.438	3.170	2.905	2.684	2.505	3.630	3.274	2.976	2.711	2.503	2.335
Minimum design bearing length																			

If a wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C16, the minimum design bearing length is 71 mm.

If wane is not permitted, the minimum design bearing length is 55 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 72 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 0.75 kN/m²

C24-0.75 10° to 35°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	Maximum clear span of purlin m																		
	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.737	1.669	1.546	1.450	1.373	1.309	1.595	1.524	1.428	1.339	1.267	1.207	1.493	1.413	1.338	1.253	1.185	1.128
	47 x 125	2.295	2.082	1.929	1.810	1.714	1.635	2.117	1.927	1.783	1.672	1.582	1.507	1.964	1.808	1.671	1.565	1.480	1.408
	47 x 150	2.747	2.494	2.311	2.169	2.055	1.960	2.547	2.309	2.137	2.004	1.896	1.807	2.393	2.166	2.003	1.876	1.774	1.689
	47 x 175	3.197	2.904	2.692	2.527	2.395	2.284	2.966	2.690	2.490	2.335	2.210	2.106	2.787	2.524	2.334	2.187	2.068	1.969
	47 x 200	3.644	3.312	3.071	2.885	2.734	2.608	3.382	3.069	2.842	2.666	2.524	2.405	3.179	2.881	2.664	2.497	2.362	2.249
	47 x 225	4.089	3.719	3.450	3.241	3.072	2.931	3.797	3.447	3.193	2.996	2.836	2.704	3.571	3.237	2.994	2.807	2.655	2.528
	47 x 250	4.532	4.125	3.827	3.596	3.409	3.253	4.211	3.824	3.543	3.325	3.149	3.001	3.961	3.592	3.323	3.115	2.947	2.807
	47 x 275	4.973	4.529	4.204	3.951	3.746	3.575	4.622	4.200	3.893	3.654	3.460	3.299	4.349	3.946	3.652	3.424	3.240	3.086
	47 x 300	5.412	4.931	4.579	4.304	4.082	3.896	5.033	4.575	4.241	3.982	3.771	3.596	4.737	4.299	3.980	3.732	3.531	3.364
Minimum design bearing length	63 x 100	1.985	1.844	1.710	1.606	1.522	1.453	1.814	1.708	1.582	1.485	1.406	1.341	1.693	1.600	1.484	1.392	1.317	1.256
	63 x 125	2.529	2.299	2.132	2.004	1.900	1.814	2.347	2.131	1.974	1.853	1.756	1.675	2.207	2.001	1.852	1.738	1.645	1.568
	63 x 150	3.024	2.752	2.554	2.400	2.276	2.173	2.809	2.552	2.365	2.221	2.104	2.007	2.642	2.397	2.220	2.083	1.972	1.880
	63 x 175	3.517	3.202	2.973	2.795	2.652	2.532	3.268	2.971	2.755	2.587	2.452	2.340	3.076	2.792	2.586	2.427	2.298	2.191
	63 x 200	4.006	3.650	3.391	3.189	3.026	2.890	3.725	3.388	3.143	2.953	2.799	2.671	3.507	3.185	2.951	2.770	2.624	2.502
	63 x 225	4.492	4.096	3.807	3.582	3.399	3.247	4.180	3.804	3.530	3.317	3.145	3.002	3.937	3.577	3.316	3.113	2.949	2.812
	63 x 250	4.975	4.540	4.221	3.973	3.771	3.603	4.632	4.218	3.916	3.681	3.490	3.331	4.364	3.968	3.679	3.455	3.273	3.121
	63 x 275	5.455	4.982	4.634	4.363	4.142	3.958	5.082	4.630	4.300	4.043	3.835	3.661	4.790	4.357	4.041	3.795	3.597	3.430
63 x 300	5.932	5.421	5.045	4.751	4.512	4.312	5.530	5.041	4.683	4.405	4.178	3.989	5.214	4.745	4.402	4.136	3.919	3.739	

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 68 mm.

If wane is not permitted, the minimum design bearing length is 48 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 72 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 0.75 kN/m² (continued)

C24-0.75 10° to 35°																			
Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
Maximum clear span of purlin m																			
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	2.143	1.955	1.814	1.705	1.617	1.544	1.954	1.812	1.680	1.578	1.495	1.427	1.821	1.703	1.577	1.480	1.402	1.337
	75 x 125	2.676	2.436	2.262	2.127	2.018	1.927	2.487	2.260	2.096	1.969	1.866	1.781	2.340	2.124	1.968	1.847	1.750	1.669
	75 x 150	3.199	2.915	2.707	2.547	2.417	2.309	2.974	2.705	2.510	2.359	2.236	2.135	2.800	2.544	2.357	2.214	2.097	2.001
	75 x 175	3.718	3.390	3.151	2.965	2.815	2.689	3.459	3.149	2.922	2.747	2.605	2.487	3.258	2.961	2.746	2.579	2.444	2.332
	75 x 200	4.233	3.863	3.592	3.382	3.211	3.069	3.941	3.590	3.333	3.135	2.973	2.839	3.714	3.378	3.133	2.943	2.790	2.662
	75 x 225	4.744	4.333	4.032	3.797	3.606	3.447	4.420	4.029	3.743	3.520	3.340	3.190	4.167	3.792	3.519	3.306	3.135	2.991
	75 x 250	5.251	4.801	4.469	4.210	4.000	3.824	4.896	4.466	4.151	3.905	3.706	3.540	4.618	4.205	3.903	3.669	3.479	3.320
	75 x 275	5.755	5.266	4.904	4.622	4.392	4.200	5.369	4.901	4.557	4.289	4.071	3.889	5.067	4.616	4.286	4.030	3.822	3.648
75 x 300	6.000	5.728	5.338	5.032	4.783	4.575	5.840	5.334	4.961	4.671	4.435	4.237	5.513	5.026	4.669	4.390	4.165	3.976	
Double- members																			
94 x 100	2.419	2.203	2.047	1.926	1.828	1.747		2.249	2.045	1.898	1.785	1.693	1.617	2.107	1.923	1.784	1.676	1.589	1.517
94 x 125	3.009	2.744	2.551	2.401	2.280	2.180		2.800	2.549	2.367	2.226	2.113	2.018	2.637	2.398	2.225	2.091	1.983	1.894
94 x 150	3.593	3.280	3.052	2.874	2.730	2.611		3.346	3.049	2.833	2.666	2.531	2.418	3.154	2.871	2.664	2.505	2.376	2.269
94 x 175	4.172	3.813	3.550	3.345	3.179	3.040		3.889	3.547	3.298	3.104	2.947	2.816	3.668	3.340	3.102	2.918	2.768	2.644
94 x 200	4.746	4.342	4.045	3.813	3.625	3.467		4.428	4.042	3.760	3.540	3.362	3.214	4.178	3.808	3.538	3.329	3.159	3.018
94 x 225	5.315	4.867	4.537	4.279	4.069	3.893		4.962	4.534	4.219	3.974	3.776	3.610	4.685	4.274	3.972	3.738	3.549	3.390
94 x 250	5.878	5.389	5.027	4.743	4.511	4.318		5.493	5.023	4.677	4.407	4.188	4.005	5.189	4.737	4.405	4.147	3.937	3.762
94 x 275	6.000	5.907	5.513	5.204	4.952	4.741		6.000	5.509	5.133	4.838	4.599	4.398	5.690	5.198	4.836	4.554	4.325	4.133
94 x 300	6.000	6.000	5.997	5.663	5.391	5.162		6.000	5.993	5.586	5.268	5.008	4.791	6.000	5.657	5.265	4.959	4.711	4.503

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 68 mm.

If wane is not permitted, the minimum design bearing length is 48 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 72 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 0.75 kN/m² (*continued*)

C24-0.75 10° to 35°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	Maximum clear span of purlin m																		
CLS/ALS sizes	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
	Maximum clear span of purlin m																		
	38 x 140	2.390	2.166	2.004	1.880	1.779	1.695	2.213	2.003	1.851	1.734	1.639	1.560	2.060	1.877	1.733	1.621	1.531	1.456
	38 x 184	3.129	2.839	2.628	2.465	2.334	2.224	2.900	2.626	2.428	2.275	2.151	2.048	2.723	2.462	2.274	2.128	2.010	1.912
38 x 235	3.980	3.614	3.348	3.142	2.975	2.836	3.691	3.345	3.095	2.900	2.743	2.612	3.467	3.138	2.899	2.713	2.564	2.439	
38 x 285	4.807	4.369	4.050	3.802	3.601	3.434	4.461	4.047	3.745	3.511	3.322	3.163	4.193	3.797	3.509	3.286	3.105	2.954	
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 68 mm.																			
If wane is not permitted, the minimum design bearing length is 48 mm.																			
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																			

Table 73 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 1.00 kN/m²

C24-1.00 10° to 35°																			
Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.707	1.546	1.430	1.340	1.268	1.208	1.595	1.449	1.339	1.254	1.186	1.129	1.493	1.372	1.266	1.185	1.119	1.065
	47 x 125	2.129	1.929	1.785	1.673	1.584	1.509	1.999	1.809	1.672	1.566	1.481	1.410	1.895	1.713	1.581	1.480	1.398	1.330
	47 x 150	2.550	2.311	2.139	2.006	1.898	1.809	2.395	2.168	2.004	1.878	1.776	1.691	2.270	2.053	1.896	1.775	1.677	1.595
	47 x 175	2.969	2.693	2.492	2.338	2.213	2.109	2.789	2.526	2.336	2.189	2.070	1.971	2.644	2.392	2.210	2.069	1.955	1.860
	47 x 200	3.386	3.072	2.845	2.669	2.526	2.408	3.182	2.883	2.667	2.499	2.364	2.251	3.018	2.731	2.523	2.363	2.233	2.124
	47 x 225	3.801	3.451	3.196	2.999	2.840	2.707	3.574	3.240	2.997	2.809	2.657	2.530	3.390	3.069	2.836	2.656	2.510	2.388
	47 x 250	4.215	3.828	3.547	3.329	3.152	3.005	3.964	3.595	3.326	3.118	2.950	2.810	3.761	3.406	3.148	2.949	2.787	2.652
	47 x 275	4.627	4.205	3.897	3.658	3.464	3.303	4.353	3.949	3.655	3.427	3.242	3.088	4.131	3.742	3.460	3.241	3.064	2.915
	47 x 300	5.038	4.580	4.246	3.986	3.776	3.600	4.741	4.302	3.983	3.735	3.534	3.367	4.500	4.078	3.771	3.533	3.340	3.179
Minimum design bearing length	63 x 100	1.885	1.710	1.584	1.486	1.408	1.343	1.771	1.605	1.485	1.393	1.319	1.257	1.680	1.521	1.406	1.318	1.247	1.187
	63 x 125	2.350	2.133	1.976	1.855	1.758	1.677	2.209	2.003	1.854	1.739	1.646	1.569	2.095	1.898	1.756	1.646	1.557	1.483
	63 x 150	2.812	2.554	2.368	2.223	2.107	2.010	2.645	2.399	2.222	2.084	1.974	1.882	2.510	2.274	2.104	1.973	1.867	1.778
	63 x 175	3.272	2.974	2.758	2.590	2.455	2.342	3.078	2.794	2.588	2.429	2.300	2.193	2.922	2.649	2.452	2.299	2.176	2.073
	63 x 200	3.729	3.392	3.146	2.956	2.802	2.674	3.510	3.188	2.954	2.773	2.626	2.504	3.333	3.023	2.799	2.625	2.484	2.367
	63 x 225	4.184	3.808	3.534	3.321	3.148	3.005	3.940	3.580	3.318	3.115	2.951	2.814	3.742	3.396	3.145	2.950	2.792	2.661
	63 x 250	4.637	4.222	3.920	3.685	3.494	3.335	4.368	3.971	3.682	3.458	3.276	3.124	4.150	3.768	3.490	3.274	3.100	2.954
	63 x 275	5.087	4.635	4.305	4.047	3.839	3.664	4.794	4.361	4.044	3.799	3.600	3.434	4.556	4.138	3.834	3.598	3.407	3.247
	63 x 300	5.535	5.046	4.688	4.409	4.183	3.993	5.218	4.749	4.406	4.139	3.923	3.742	4.961	4.508	4.178	3.921	3.713	3.539

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 75 mm.

If wane is not permitted, the minimum design bearing length is 52 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 73 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 1.00 kN/m² (continued)

C24-1.00 10° to 35°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	1.998	1.814	1.682	1.579	1.497	1.428	1.879	1.704	1.578	1.481	1.403	1.338	1.782	1.616	1.495	1.402	1.327	1.265
	75 x 125	2.489	2.262	2.098	1.971	1.869	1.783	2.342	2.126	1.970	1.849	1.752	1.671	2.223	2.016	1.866	1.751	1.657	1.580
	75 x 150	2.977	2.708	2.513	2.361	2.239	2.137	2.803	2.546	2.360	2.216	2.099	2.003	2.661	2.415	2.236	2.098	1.987	1.894
	75 x 175	3.463	3.152	2.926	2.750	2.608	2.490	3.261	2.964	2.748	2.581	2.446	2.334	3.098	2.812	2.605	2.445	2.316	2.208
	75 x 200	3.945	3.593	3.337	3.138	2.977	2.842	3.717	3.380	3.136	2.946	2.792	2.664	3.532	2.208	2.973	2.791	2.644	2.521
	75 x 225	4.424	4.033	3.747	3.524	3.344	3.193	4.171	3.795	3.522	3.309	3.137	2.994	3.964	3.603	3.340	2.136	2.971	2.833
	75 x 250	4.901	4.470	4.155	3.909	3.710	3.544	4.622	4.208	3.907	3.672	3.482	3.323	4.395	3.996	3.706	2.480	3.298	3.145
	75 x 275	5.374	4.906	4.561	4.293	4.075	3.893	5.071	4.620	4.290	4.034	3.825	3.652	4.823	4.388	4.070	3.824	3.624	3.457
	75 x 300	5.845	5.339	4.967	4.676	4.439	4.242	5.517	5.030	4.673	4.394	4.168	3.979	5.250	4.779	4.434	4.166	3.949	3.767
Double- members																			
	94 x 100	2.251	2.047	1.900	1.787	1.695	1.619	2.119	1.925	1.785	1.677	1.590	1.518	2.012	1.827	1.693	1.590	1.507	1.437
	94 x 125	2.802	2.551	2.369	2.228	2.115	2.020	2.639	2.400	2.227	2.093	1.985	1.895	2.508	2.278	2.112	1.984	1.881	1.795
	94 x 150	3.350	3.053	2.836	2.669	2.533	2.420	3.157	2.873	2.667	2.507	2.378	2.271	3.001	2.728	2.530	2.377	2.254	2.151
	94 x 175	3.893	3.551	3.301	3.107	2.950	2.819	3.671	3.343	3.105	2.920	2.771	2.646	3.491	3.176	2.947	2.769	2.626	2.507
	94 x 200	4.432	4.046	3.763	3.544	3.366	3.217	4.182	3.811	3.541	3.332	3.162	3.020	3.978	3.621	3.362	3.160	2.997	2.862
	94 x 225	4.967	4.538	4.224	3.979	3.780	3.614	4.689	4.277	3.976	3.742	3.552	3.393	4.463	4.065	3.775	3.550	3.368	3.216
	94 x 250	5.498	5.028	4.682	4.412	4.192	4.009	5.194	4.741	4.409	4.150	3.941	3.766	4.945	4.507	4.187	3.939	3.737	3.569
	94 x 275	6.000	5.515	5.138	4.843	4.603	4.403	5.695	5.202	4.840	4.557	4.328	4.137	5.425	4.948	4.598	4.326	4.106	3.921
	94 x 300	6.000	5.999	5.592	5.273	5.013	4.796	6.000	5.661	5.269	4.963	4.715	4.507	5.902	5.386	5.007	4.713	4.473	4.273
Minimum design bearing length																			

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 75 mm.

If wane is not permitted, the minimum design bearing length is 52 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

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Table 74 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 1.25 kN/m²

C24-1.25 10° to 35°

Size of purlin ^{A)} mm x mm		Dead load kN/m ²																	
		Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75					
		Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																	
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span of purlin m																	
Sawn sizes in accordance with tolerance class 1 of BS EN 336	47 x 100	1.604	1.451	1.340	1.255	1.187	1.130	1.519	1.373	1.267	1.186	1.120	1.066	1.449	1.308	1.207	1.128	1.065	1.012
	47 x 125	2.001	1.811	1.674	1.568	1.482	1.411	1.896	1.714	1.583	1.481	1.399	1.331	1.809	1.634	1.507	1.409	1.331	1.265
	47 x 150	2.397	2.170	2.006	1.880	1.777	1.692	2.272	2.055	1.898	1.776	1.678	1.596	2.168	1.958	1.807	1.690	1.596	1.517
	47 x 175	2.792	2.529	2.338	2.191	2.072	1.973	2.647	2.394	2.212	2.070	1.956	1.861	2.526	2.283	2.107	1.970	1.860	1.769
	47 x 200	3.185	2.886	2.669	2.502	2.366	2.253	3.020	2.733	2.525	2.364	2.234	2.126	2.883	2.606	2.406	2.250	2.125	2.020
	47 x 225	3.577	3.242	3.000	2.812	2.660	2.533	3.392	3.071	2.838	2.658	2.512	2.390	3.239	2.929	2.704	2.530	2.389	2.272
	47 x 250	3.967	3.598	3.329	3.121	2.953	2.812	3.764	3.409	3.151	2.951	2.789	2.654	3.594	3.251	3.002	2.809	2.653	2.523
	47 x 275	4.357	3.953	3.658	3.430	3.246	3.091	4.134	3.745	3.463	3.243	3.066	2.918	3.948	3.572	3.299	3.088	2.916	2.773
	47 x 300	4.745	4.306	3.987	3.739	3.538	3.370	4.503	4.081	3.774	3.535	3.342	3.181	4.301	3.893	3.596	3.366	3.180	3.024
	63 x 100	1.773	1.607	1.487	1.394	1.320	1.258	1.681	1.522	1.407	1.319	1.248	1.188	1.188	1.605	1.452	1.341	1.256	1.188
63 x 125	2.211	2.005	1.856	1.741	1.648	1.571	2.097	1.900	1.757	1.647	1.558	1.484	2.002	1.812	1.675	1.569	1.483	1.412	
63 x 150	2.647	2.401	2.224	2.086	1.976	1.883	2.511	2.276	2.106	1.974	1.868	1.780	2.399	2.172	2.008	1.881	1.779	1.693	
63 x 175	3.081	2.797	2.591	2.431	2.302	2.195	2.924	2.651	2.454	2.301	2.177	2.074	2.794	2.530	2.340	2.207	2.073	1.974	
63 x 200	3.513	3.191	2.957	2.775	2.628	2.506	3.335	3.026	2.801	2.627	2.486	2.369	3.187	2.888	2.671	2.503	2.368	2.255	
63 x 225	3.943	3.583	3.321	3.118	2.954	2.817	3.745	3.399	3.147	2.952	2.794	2.663	3.579	3.245	3.002	2.814	2.662	2.535	
63 x 250	4.372	3.975	3.685	3.461	3.279	3.127	4.153	3.771	3.492	3.277	3.102	2.957	3.970	3.601	3.332	3.124	2.955	2.814	
63 x 275	4.798	4.364	4.048	3.802	3.603	3.437	4.559	4.142	3.837	3.601	3.409	3.250	4.360	3.955	3.661	3.433	3.248	3.094	
63 x 300	5.223	4.753	4.410	4.143	3.926	3.746	4.964	4.511	4.181	3.924	3.716	3.542	4.748	4.309	3.990	3.741	3.540	3.373	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 81 mm.

If wane is not permitted, the minimum design bearing length is 56 mm.

^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.

Table 74 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 1.25 kN/m² (continued)

C24-1.25 10° to 35°																			
Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25							More than 0.25 but not more than 0.5							More than 0.5 but not more than 0.75				
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
	Maximum clear span of purlin m																		
Sawn sizes in accordance with tolerance class 1 of BS EN 336	75 x 100	1.880	1.706	1.580	1.483	1.404	1.339	1.784	1.617	1.496	1.403	1.328	1.266	1.704	1.543	1.427	1.338	1.266	1.206
	75 x 125	2.344	2.128	1.971	1.851	1.753	1.672	2.225	2.017	1.868	1.752	1.659	1.581	2.125	1.926	1.782	1.670	1.580	1.506
	75 x 150	2.805	2.548	2.362	2.218	2.101	2.004	2.663	2.417	2.238	2.100	1.988	1.896	2.545	2.307	2.135	2.002	1.895	1.805
	75 x 175	3.264	2.966	2.751	2.583	2.448	2.336	3.100	2.814	2.607	2.447	2.317	2.210	2.963	2.688	2.488	2.333	2.209	2.105
	75 x 200	3.720	3.383	3.138	2.948	2.795	2.667	3.534	3.211	2.975	2.793	2.646	2.523	3.380	3.067	2.840	2.664	2.522	2.403
	75 x 225	4.174	3.798	3.525	3.312	3.140	2.997	3.967	3.605	3.342	3.138	2.973	2.836	3.794	3.445	3.190	2.993	2.834	2.701
	75 x 250	4.626	4.212	3.910	3.675	3.485	3.326	4.398	3.999	3.708	3.483	3.300	3.148	4.207	3.821	3.540	3.323	3.146	2.999
	75 x 275	5.075	4.624	4.294	4.037	3.829	3.655	4.827	4.391	4.073	3.826	3.626	3.459	4.619	4.197	3.890	3.651	3.458	3.296
75 x 300	5.522	5.034	4.676	4.398	4.172	3.983	5.254	4.782	4.437	4.169	3.952	3.770	5.029	4.572	4.238	3.979	3.768	3.593	
Double- members																			
94 x 100	2.120	1.927	1.787	1.679	1.592	1.520	2.013	1.828	1.694	1.591	1.508	1.439	1.925	1.746	1.617	1.518	1.438	1.371	
94 x 125	2.642	2.402	2.229	2.095	1.987	1.897	2.510	2.280	2.114	1.986	1.882	1.796	2.400	2.178	2.018	1.895	1.795	1.712	
94 x 150	3.159	2.875	2.669	2.509	2.381	2.273	3.003	2.730	2.532	2.379	2.256	2.153	2.872	2.609	2.418	2.271	2.152	2.053	
94 x 175	3.674	3.346	3.108	2.923	2.773	2.649	3.493	3.178	2.949	2.771	2.628	2.509	3.343	3.038	2.817	2.646	2.508	2.393	
94 x 200	4.185	3.815	3.544	3.334	3.165	3.023	3.981	3.624	3.364	3.163	3.000	2.864	3.811	3.465	3.214	3.020	2.862	2.732	
94 x 225	4.693	4.281	3.979	3.745	3.555	3.396	4.466	4.068	3.778	3.553	3.370	3.128	4.276	3.891	3.610	3.393	3.217	3.070	
94 x 250	5.198	4.745	4.412	4.154	3.944	3.769	4.949	4.511	4.190	3.942	3.740	3.572	4.740	4.315	4.005	3.765	3.570	3.408	
94 x 275	5.699	5.206	4.844	4.561	4.332	4.140	5.428	4.951	4.601	4.329	4.109	3.924	5.201	4.737	4.399	4.136	3.923	3.745	
94 x 300	6.000	5.666	5.274	4.968	4.719	4.511	5.906	5.390	5.011	4.716	4.476	4.276	5.660	5.158	4.791	4.506	4.274	4.081	

Minimum design bearing length

If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 81 mm.

If wane is not permitted, the minimum design bearing length is 56 mm.

A) Single-members unless otherwise indicated. Check the availability of section sizes.

Table 74 Permissible clear spans for purlins supporting sheeting or decking for roofs having a pitch of more than 10° but not more than 35°. Timber of strength class C24. Imposed loading of 1.25 kN/m² (continued)

C24-1.25 10° to 35°

Size of purlin ^{A)} mm x mm	Dead load kN/m ²																		
	Not more than 0.25						More than 0.25 but not more than 0.5						More than 0.5 but not more than 0.75						
	Design spacing of purlins $\frac{A+B}{2}$ (see Figure 18) mm																		
	Maximum clear span of purlin m																		
CLS/ALS sizes	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	
	38 x 140	2.080	1.880	1.736	1.624	1.534	1.459	1.970	1.779	1.640	1.533	1.447	1.374	1.878	1.694	1.560	1.457	1.374	1.301
	38 x 184	2.272	2.467	2.278	2.132	2.014	1.915	2.583	2.334	2.152	2.012	1.899	1.805	2.464	2.223	2.048	1.913	1.804	1.706
38 x 235	3.473	3.143	2.904	2.718	2.569	2.443	3.291	2.975	2.745	2.567	2.423	2.303	3.140	2.834	2.612	2.440	2.301	2.174	
38 x 285	4.200	3.804	3.516	3.292	3.111	2.960	3.982	3.601	3.324	3.109	2.935	2.790	3.800	3.431	3.164	2.956	2.788	2.630	
Minimum design bearing length																			
If wane at end-bearing [see Figure 8 b)] is permitted to the strength class limit, i.e. one-third of thickness for strength class C24, the minimum design bearing length is 81 mm.																			
If wane is not permitted, the minimum design bearing length is 56 mm.																			
^{A)} Single-members unless otherwise indicated. Check the availability of section sizes.																			

7 Trussed rafter pitched roofs

7.1 General

Trussed rafters should be in accordance with BS 5268-3⁷⁾.

Trussed rafters should be delivered to site correctly designed and fabricated, with the timber properly grade-stamped, and preservative-treated if required, and with the name of the manufacturer clearly in evidence on all trusses/trussed rafters.

7.2 Loading

Trussed rafter pitched roofs should be capable of supporting those loadings defined in BS EN 1991-1-3 which are within the scope of BS 8103.

NOTE Buildings subjected to design perimeter wall loadings imposed by the roof structure which are greater than 12 kN/m run are not within the scope of this Part of BS 8103. Design wind criteria for buildings covered by this Part of BS 8103 are given in BS 8103-2.

7.3 Design

Trussed rafters should be designed in accordance with BS 5268-3⁷⁾ to support the design loads stated in 7.2.

7.4 Construction

Trussed rafter roofs should be erected, braced and otherwise constructed in accordance with the recommendations of BS 5268-3⁷⁾. Permanent bracing to trussed rafter roofs should be to that guidance given in BS 5268-3⁷⁾ applicable to maximum 12 m span roofs when considering the scope and uses of BS 8103.

NOTE For single storey annexe buildings designed and constructed within the scope of BS 8103, the recommendations for the permanent bracing of small trussed rafter roofs given in Annex N can be followed.

7.5 Sizes and spacing of tile battens

The sizes and spacing of tile battens should be specified in accordance with Table 75.

Batten lengths should be sufficient to span over not less than three consecutive supports.

The actual batten thickness (smaller dimension) should not be less than that given in the table nor more than 3 mm oversize. Actual batten width should be within ± 3 mm of the basic size.

Battens should be marked and delivered in accordance with BS 5534.

⁷⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

Table 75 Sizes and spacing of tile battens

Material	450 mm span mm	600 mm span mm
Slates (double lap)		
Natural: sized or random	25 × 50	25 × 50
Fibre cement or concrete	25 × 38	25 × 50
Clay and concrete tiles		
Double lap	25 × 38	25 × 38
Single lap	25 × 38	25 × 50

8 Flat roof decking of timber, plywood, particleboard or OSB

8.1 General

8.1.1 Slope

The slope of a flat roof (see 3.3) should be not more than 10° from the horizontal.

It is strongly recommended that the fall be not less than 1 in 40.

8.1.2 Loading

Flat roofs should be adequate to support the loadings specified in BS EN 1991-1-1 and BS EN 1991-1-3.

NOTE 1 Annex M provides simplified snow imposed loadings selection and these snow loads are based on BS EN 1991-1-3 guidance.

NOTE 2 See Tables 61 to Table 68.

8.1.3 Width of support members

Flat roof joists or cross battens supporting timber or wood-based panel decking should be at least 35 mm thick, and 38 mm thick if supporting a plasterboard ceiling.

8.1.4 Span tables for flat roof decking

The relevant span table for flat roof decking should be used, as follows:

- a) for timber boarding, Table 76;
- b) for plywood decking, Table 77;
- c) for particleboard decking, Table 79;
- d) for OSB decking, Table 81.

NOTE When these tables are used in accordance with this standard, no further design checks are necessary.

To determine the snow load for a particular site the recommendations in Annex M should be followed.

8.2 Materials and fixing recommendations

8.2.1 Timber flat roof decking

8.2.1.1 Species and size

Tongued and grooved softwood boarding conforming to 4.1.3 should be of at least the finished thickness shown in Table 76.

8.2.1.2 Fixing

Timber flat roof decking should be fixed in accordance with J.1.

Table 76 **Thickness of tongued and grooved softwood boarding for flat roofs with no permanent access**

Maximum centres of support members mm	Finished thickness of boarding mm
up to 505	16
up to 600	19
<i>NOTE These thicknesses apply when the decking is laid and fixed in accordance with L.1.</i>	

8.2.2 Plywood flat roof decking

8.2.2.1 Species and size

NOTE Table 77 recommends nominal thicknesses in millimetres for plywood (see 4.2 and Annex E) spanning the tabulated centres of roof joists, where the face grain of the plywood is perpendicular to the support members and the boards span three or more joists.

Plywood flat roof decking should be of one of the grades listed in Annex E.

8.2.2.2 Fixing

Plywood flat roof decking should be fixed in accordance with J.3.

Table 77 Thickness of plywood for flat roof decking with no permanent access

Face grain perpendicular to support members. Boards spanning three or more joists.			
Plywood type	Maximum centres of support members		
	mm		
	400	450	600
	Recommended nominal thickness		
	mm		
American construction and industrial plywood: C-D grade exterior: Un-sanded.	12.0	12.0	15.0
American construction and industrial plywood: C-C grade exterior: Un-sanded.	12.0	12.0	15.0
Canadian Douglas fir plywood: select tight face: select and sheathing grades: Un-sanded.	12.5	12.5	15.5
Canadian softwood plywood: select tight face: select and sheathing grades: Un-sanded.	12.5	12.5	15.5
Finnish birch faced plywood: I/I, I/II, etc.: Sanded.	12.0	12.0	15.0
Finnish conifer plywood: I/I, I/II, etc.: Sanded.	13.5	15.0	16.5
Swedish softwood plywood: P30 grade: Un-sanded.	12.5	12.5	16.0

NOTE 1 These thicknesses apply only when the decking is laid and fixed in accordance with J.3.

NOTE 2 Whereas the NHBC Standards, Chapter 7.1, Flat roofs, shows plywood thicknesses for flat roof decking over various spans as thicker than the tabulated values, the thicknesses listed in this table are based on long experience of use with only the plywood types contained in Annex E. NHBC recommended thicknesses can be used for preference when the plywood being used is not one of those contained in Annex E.

8.2.3 Particleboard flat roof decking

8.2.3.1 Type and size

Particleboard flat roof decking should be of type P5 or P7 in accordance with BS EN 312. It is essential that the selection is made according to the category of use given in Table 78.

NOTE 1 Table 79 recommends minimum thicknesses for types of particleboard spanning the centres of roof joists, other thicknesses might be appropriate where supported by performance test or calculated design.

NOTE 2 BS 8217 does not recommend the use of wood particleboard under reinforced bitumen membranes.

8.2.3.2 Fixing

Particleboard flat roof decking should be fixed in accordance with J.3.

Table 78 Selection of particleboard for use in flat roof decking, related to category of use

Roof type	Particleboard grade
<i>Cold deck</i>	
Flat roofs to small garages and other similar unoccupied small buildings without a ceiling.	P5 or P7
Flat roofs to buildings where the insulation occurs below the supporting deck and adequate through-ventilation of the void between the insulation and the deck is provided, and where a vapour check at ceiling level is installed and where high humidity conditions are not likely to occur.	P5 or P7
Flat roofs to buildings as above, but where adequate through-ventilation is not provided, or where high humidity is likely to occur.	Should not be used
<i>Warm deck</i>	
Flat roofs to buildings where the insulation occurs above the supporting deck and the thermal design substantially eliminates the possibility of condensation within the roof.	P5 or P7
Flat roofs to buildings where the insulation occurs above the supporting deck but the thermal design does not eliminate the possibility of condensation, or where occupancy conditions are likely to lead to high humidity.	Should not be used
<i>NOTE</i> BS 8747 does not recommend cold deck flat roof due to the difficulty in providing an effective vapour control layer at ceiling level, the limitation of providing adequate ventilation above the insulation to prevent condensation, and the associated thermal loss.	

Table 79 Maximum recommended centres of support for particleboard in flat roof decking

Application	Minimum board thickness	Maximum centres of support members
	mm	mm
1. Roofs of small garages and similar buildings (without access other than for maintenance and repair)	11	–
	15	450
	18	600
2. Roofs over habitable areas, with access (in addition to that provided for maintenance and repair)	15	–
	18	–
	22	600
3. Roofs over habitable areas where no access (other than that necessary for maintenance and repair) is provided	11	–
	15	–
	18	450
	22	600

NOTE 1 Although the imposed loads in applications 1 and 3 are similar, site experience has shown that the thicknesses quoted for garage and outer buildings provide an adequate construction in these lower-risk situations.

NOTE 2 The recommendations in this table are made on the assumption that the roof is constructed in accordance with accepted design principles for weather resistance and control of condensation within the roof.

NOTE 3 BS 8217 does not recommend the use of wood particleboard under flexible reinforced bitumen membranes.

NOTE 4 Other thicknesses or spans might be appropriate where supported by performance test or calculated design.

8.2.4 OSB flat roof decking

8.2.4.1 Type and size

OSB for flat roof decking should be type OSB/3 or OSB/4 to BS EN 300. It is essential that the selection is made according to the category of use given in Table 81.

NOTE Table 81 recommends minimum thicknesses for types of OSB spanning the centres of roof joists, other thicknesses might be appropriate where supported by performance test or calculated design.

8.2.4.2 Fixing

OSB flat roof decking should be fixed in accordance with J.4.

Different occupancy compartments under a common roof should be taken into account in determining the humidity to be used in the assessment. For example, where there is adequate cross-ventilation between compartments, the occupancy humidity should be determined by assessing that prevailing in each compartment in proportion to the roof areas of the compartments.

If the roof construction necessitates the provision of ventilation, the design should create an unrestricted cross-flow of air through the structure. The rate of ventilation depends on the design and occupancy condition of the building.

Table 80 Selection of OSB for use in flat roof decking, related to category of use

Roof type	OSB grade
<i>Cold decks</i>	
Flat roofs to small garages and other similar unoccupied small buildings without a ceiling	OSB/3 or OSB/4
Flat roofs to buildings where the insulation occurs below the supporting deck and adequate through-ventilation of the void between the insulation and the deck is provided, and where a vapour check at ceiling level is installed and where high humidity conditions are not likely to occur.	OSB/3 or OSB/4
Flat roofs to buildings as above, but where adequate through-ventilation is not provided, or where high humidity is likely to occur.	Should not be used
<i>Warm deck</i>	
Flat roofs to buildings where the insulation occurs above the supporting deck and the thermal design substantially eliminates the possibility of condensation within the roof.	OSB/3 or OSB/4
Flat roofs to buildings where the insulation occurs above the supporting deck but the thermal design does not eliminate the possibility of condensation, or where occupancy conditions are likely to lead to high humidity.	Should not be used
<i>NOTE BS 8747 does not recommend cold deck flat roof owing to the difficulty in providing an effective vapour control layer at ceiling level, the limitation of providing adequate ventilation above the insulation to prevent condensation, and the associated thermal loss.</i>	

Table 81 Maximum recommended centres of support of OSB in flat roof decking

Application	Minimum board thickness	Maximum centres of support members
	mm	mm
1. Roofs of small garages and similar buildings (without access other than for maintenance and repair)	11	400
	15	600
	18	600
2. Roofs over habitable areas, with access (in addition to that provided for maintenance and repair)	15	450
	18	600
	22	600
3. Roofs over habitable areas where no access (other than that necessary for maintenance and repair) is provided	11	450
	15	600
	18	600
	22	600

NOTE 1 Although the imposed load in row 1 and 3 of Table 79 and 81 are similar, site experience has shown that the thicknesses quoted for garages and outbuildings provide an adequate construction in these lower-risk situations.

NOTE 2 The recommendations in this table are made on the assumption that the roof is constructed in accordance with accepted design principles for weather resistance and control of condensation within the roof. If the roof construction necessitates the provision of ventilation, the design can create an unrestricted cross-flow of air through the structure.

NOTE 3 Other thicknesses or spans might be appropriate where supported by performance test or calculated design.

9 Transportation, storage and handling

9.1 Protection of unfixed materials and components

Precautions should be taken during storage, prior to delivery and on site, to minimize changes in moisture content due to the weather.

NOTE Prolonged exposure to rain, damp and direct sunlight can be detrimental to the performance of materials and components.

Materials and components should be stored on dry bases, and stacks should be evenly supported on bearers with spacer sticks at regular intervals. Stacks should be sheeted with tarpaulins or other impervious material so arranged to give full cover, but at the same time to permit free passage of air around and through the stack. Care should be taken not to deform stacked material.

Where materials and other components are required to have low moisture contents, it might not be possible to maintain suitable conditions on site other than for short periods, and deliveries should be arranged accordingly.

9.2 Site storage

Timber-based materials, whether packaged or otherwise, should be stored under cover. Where this is not possible, storage in the original packages should be in accordance with 9.1.

Different occupancy compartments under a common roof should be taken into account in determining the humidity to be used in the assessment.

Timber delivered packaged, i.e. strapped, should not be stored in packaged form for extended periods of time so as it might affect its performance in use.

Where early use is not possible, packages should be opened and the timber should be open-piled and suitably protected, together with any loose timber.

Structural components should be stored undistorted and clear of the ground on levelled trestles, stillages or other suitable bearers. As with timber and wood-based panels, they should be sheeted with tarpaulins or other impervious material in accordance with 9.1.

Particular care should be taken to avoid damage to any materials and components during storage on site.

Wood-based panels should be stacked flat, with all four edges flush, on a level surface. Stacking on edge should be avoided whenever possible.

The ideal surface is a close-boarded or slatted pallet but if this is not possible, the boards should be carefully stacked level on battens of equal thickness at centres not exceeding 600 mm.

Where space will only permit edge stacking of chipboard, the edges should not be permitted to come into direct contact with the floor. Haphazard leaning of chipboard against walls should be avoided.

9.3 Handling

Undue distortion of components during transportation and handling should be avoided.

Care should be taken to prevent damage from chafing or slings.

NOTE 1 The most vulnerable parts of wood-based panels are their edges and corners.

The panels should be carefully handled and, if necessary, additionally protected on site.

NOTE 2 This particularly applies to profiled panels such as tongued and grooved flooring.

When handling panels, it is essential to avoid any contamination of the surface likely to cause permanent damage.

9.4 Protection of installed materials and components

The erection sequence and site storage should be planned so as to minimize the length of time that materials and components are left uncovered.

NOTE Installed timber and components can be subjected temporarily to wetting (which might increase their moisture content) provided that this does not lead to permanent degradation.

Temporary protection might be needed where components are installed before the structure is adequately weatherproofed.

10 Assembly and erection

The method of assembly and erection should ensure that the components are erected as specified by the designer. During assembly and erection, no forces should be applied to the component which could cause the permissible stresses to be exceeded in that or any other component.

Where design assumptions dictate certain methods and sequences of erection, full information concerning these methods and sequences should be shown on the design drawings and be available on site.

11 Durability of materials

11.1 Timber

11.1.1 General considerations

NOTE 1 Good design and construction with appropriate maintenance are essential to ensuring that the intended Use Class given in BS EN 335-1 for timber in service is maintained for the life of the building. Even when preservative treated timber is used, preservation is not a substitute for these aspects. Timber in Use Class 1 is not at risk of fungal decay, but there might be an insect attack risk. Timber in Use Class 2 is at risk of fungal decay and insect attack.

Where the intended environment for timber in construction is Use Class 2 or greater to BS EN 335-1, then timber of adequate natural durability (Durability Class 2 or better to BS EN 350-2) or preservative treated timber to BS 8417, Use Class 2 for a 60 year life, should be used.

NOTE 2 The NHBC (National House-Building Council) has certain requirements which are additional to any requirements in the Building Regulations in the UK [1], [2], [3]. For example, NHBC Standards require timber joists in flat roofs to be preservative treated.

11.1.2 Reducing the risk of fungal attack

NOTE 1 BS EN 335-1 details five use classes and BS 8417 gives recommendations for the preservation of timber, ranging from preservation being considered unnecessary (Use Class 1 only) to preservation being considered essential, for the five use classes and service factors based on safety and economic considerations given in BS 8417:2003, Table 1.

Where the intended environment for timber in construction is Use Class 2 or greater, then timber of adequate natural durability (Durability Class 2 or better to BS EN 350-2) or preservative treated timber to BS 8417, Use Class 2 for a 60 year life, should be used.

NOTE 2 Timber in Use Class 1 is not at risk of fungal decay.

NOTE 3 In the United Kingdom, only preservatives approved under the Control of Pesticide Regulations 1986 (as amended 1997) [9] are permitted for the treatment of timber.

The following British Standards should be consulted for further information on the preservative treatment of structural timbers:

- a) BS 8417, for the preservative treatment of solid timber;
- b) BS EN 636, for the treatment of plywood.

NOTE 4 Additional information on good practice, including cross-references to relevant British and European Standards, is available in 'Industrial Wood Preservation – Specification and Practice' published by the Wood Protection Association [10].

11.1.3 The house longhorn beetle

NOTE 1 The Approved Document Part A – Structure to support Regulation 7 of the Building Regulations 2000 (as amended) (England and Wales) [11] contains guidance on the need to preservative treat softwood timber used in roof construction, or fixed in the roof void (including ceiling joists and wallplates, but not tiling battens) in certain defined areas within the counties of Berkshire, Hampshire and Surrey, where the house longhorn beetle is active.

In the counties of Berkshire, Hampshire and Surrey, timber should be treated with a suitable wood preservative.

NOTE 2 Guidance on suitable preservative treatments is given in the Wood Protection Association's Manual, Industrial Wood Preservation: Specification and Practice [10].

11.2 Plywood

NOTE The plywoods described in Annex E, when used for flooring or flat roof decking in accordance with this Part of BS 8103, can be used without preservative treatment.

11.3 Particleboard

NOTE Particleboard as described in 4.3 and used in flooring or flat roof decking in accordance with this part of BS 8103, can be used without preservative treatment.

11.4 OSB

NOTE OSB as described in 4.4 when used for flooring or flat roof decking in accordance with this part of BS 8103, can be used without preservative treatment.

11.5 Mechanical fasteners

11.5.1 Traditional cut, framed and pitched roofs

Rustproofed or non-ferrous fasteners should be used for traditional cut, framed and pitched roofs.

11.5.2 Trussed rafter roofs

Fasteners used between trussed rafter members, or between trussed rafters and bracing, tiling battens or wallplates, should either be inherently rustproof, or be treated against corrosion by a suitable treatment such as hot-dip galvanizing or sherardizing. Metal fasteners should not be applied to timber until the salts of the preservative treatment cannot leach (7 to 14 days after application).

Fasteners used between trussed rafter members, or between trussed rafters and bracing, tiling battens or wallplates, should conform to the requirements of BS 5268-3⁸⁾.

11.5.3 Steel straps and hangers

Steel straps and hangers should conform to the requirements of BS EN 845-1. Austenitic stainless steel or hot dipped galvanized mild steel components should be used.

11.6 Compatibility of preservatives, fixings and adhesives

All preservatives, fixings and adhesives should be compatible with each other.

NOTE Copper containing treatments can cause corrosion between mild steel and aluminium.

⁸⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

Annex A (normative)

Maximum recommended moisture content at time of erection or fixing

The maximum moisture content at the time of erection or fixing should be as given in Table A.1.

When quality of finish is of prime importance, floors should be laid at moisture content within the range likely to be encountered in service. They should be laid after the initial drying out period is complete.

NOTE For floors where the finished appearance is of less importance or which are intended to be covered, if laid at higher moisture content and earlier in the building process, the less stringent conditions can result in unsightly shrinkage gaps.

Before fixing, it is essential to allow the moisture content of particleboard and oriented strand board (OSB) to adjust to the service conditions, and desirable to allow this to occur for plywood and timber.

Table A.1 Maximum recommended moisture content at time of erection or fixing

Material	Application	Maximum moisture content at time of erection or fixing %
Timber	Except where stated:	
	In a situation which is covered and generally unheated	20
	In a situation which is covered and generally heated	18
	In an internal situation in a continuously heated building	15
	Flooring	See note
	Battens for roof tiling and slating	20
Plywood	Flooring	12
	Flat roof sheathing	12
	Sarking for pitched roofs	12
Particleboard	Flooring	12
	Flat roof decking	12
	Sarking for pitched roofs	12
OSB	Flooring	12
	Flat roof decking	12
	Sarking for pitched roofs	12

NOTE For timber flooring, the range of moisture content at time of laying depends mainly on the type and intensity of heating to be employed in the building. As a guide, normally the following moisture content ranges are encountered for various heating conditions:

unheated: 15 % to 19 %

intermittent heating: 10 % to 14 %

continuous heating: 9 % to 11 %

underfloor heating: 6 % to 8 %

Annex B (normative) Species and grading rules for softwood flooring and flat roof decking

NOTE The text of B.1 and B.3 to B.10 is taken from BS 1297, with the exception of the second paragraph of B.7.1. In cases of dispute, refer to BS 1297. USA spruce-pine-fir can be added to the list given in B.1.

B.1 Species

The species should be one of the following:

- Imported European redwood;
- Imported European whitewood;
- British-grown Corsican pine;
- British-grown Douglas fir;
- British-grown larch;
- British-grown Scots pine;
- Canadian Douglas fir-larch;
- Canadian hem-fir;
- Canadian spruce-pine-fir;
- USA Douglas fir-larch;
- USA hem-fir;
- USA southern pine.

B.2 Grading requirements

Flooring, as installed, should comply with the grading requirements given in B.3 to B.10.

B.3 Sapwood

Bright sapwood is permitted to an unlimited extent. Occasional sapstain is permitted on the face. There is no restriction on the back.

B.4 Decay and insect attack

All pieces should be free from decay and insect attack including attack by Ambrosia Beetle.

B.5 Fissures

Fissures on the face should not exceed 1 mm in width or 300 mm in length, or a depth greater than half the thickness of the piece.

Fissures on the back should be limited only as to their depth, which should not be greater than half the thickness of the piece.

The depth of fissures should be measured by a feeler gauge not exceeding 0.2 mm in thickness. End fissures not exceeding 300 mm in length in one end of the piece, or the equivalent of 300 mm if in both ends, should be permitted in not more than 10 % of the pieces in any one delivery.

B.6 Cup

Cupping should not exceed 1 mm for each 50 mm of width.

B.7 Knots**B.7.1 Sound and tight knots**

The combined widths of all the knots on the face and back at any cross section should not exceed two-thirds of the width of the piece.

In all cases the width of the knot is its dimension measured across the piece to the nearest 1 mm.

B.7.2 Unsound and loose knots

Pieces should be free from unsound knots exceeding 25 mm in diameter, and from loose knots or knot holes exceeding 10 mm in diameter.

B.8 Wane

The face of all pieces should be free from wane.

The back can have wane on both edges, provided that it does not impinge upon either tongue or groove.

B.9 Rate of growth

There should be not less than an average of four growth rings per 25 mm.

B.10 Manufacture

All pieces should be accurately machined to uniform section throughout their length. They should be smoothly finished on the face, showing not less than 10 cutter marks per 30 mm of length, and thickened on the back hit-and-miss to the specified size. Tongues and grooves should provide a well-matched joint with level faces between adjacent pieces when laid.

Annex C (normative) Identification marks for strength-graded timber**C.1 General**

Each piece of graded timber should be clearly and indelibly marked with:

- a) name or identifying mark of producer;
- b) if single species, the species code in accordance with BS EN 13556 (BS EN 14081-1:2005, Table B.1);
- c) if species combination, the species code specified in BS EN 14081-1:2005, Table 4;
- d) the number of the harmonized standard, i.e. BS EN 14081-1;

- e) if machine graded, the letter 'M' and the strength class to BS EN 338 if appropriate, otherwise the letter 'M', the strength grade and the grading standard; and either on the product or in accompanying documentation the code to identify country or region of origin in accordance with BS EN ISO 3166-1;
- f) if visual graded, the strength class as assigned in BS EN 1912 or, if not included in BS EN 1912, the strength grade and grading standard; and either on the product or in accompanying documentation, if the wood is marked with a strength class, the grade and grading standard;
- g) the words 'DRY GRADED' or 'KD' as appropriate.
- h) if preservative treated, additional marking according to EN 15228⁹⁾;
- i) any restriction to a special use.

If the end use of the timber requires marking to be omitted for aesthetic reasons, each batch of timber should be accompanied by a commercial document bearing all the above information.

C.2 Identification marks

The following are typically included in marks used to identify the strength graded timber referred to in Table 1. They assist site staff to check whether the timber which has been delivered is what has been ordered to satisfy design to this part of BS 8103. Marks can vary with changes in standards and form of presentation chosen by the producer.

1. Marks to identify visual graded timber:
 - a) BS 4978 marks:
 - GS; SS and reference to BS 4978
 - b) NLGA/NGRDL marks:
 - i) Structural joists and planks – 'SelStr'; 'No. 1'; 2'; 3'
 - ii) Structural light framing – 'SelStr'; 'No. 1'; 2'; 3'
 - iii) Light framing – 'Const'; 'Std'.
 - iv) Studs – 'Stud' and reference to NLGA/NGRDL
2. Marks to identify machine graded timber:
 - a) The letter 'M'
 - b) 'TR26' – special product grade
 - c) Machine stress-rated (MSR) grades e.g. '1450f-1.3E'; '1800f-1.6E'
3. Marks to identify the strength classes of according to BS EN 336 e.g. C16; C24
4. Marks to identify the species:

PCAB; WPCA	Imported whitewood
PNSY	Imported redwood
WPCE	Canadian spruce-pine-fir
WABA	North American hem-fir
WPSM	North American Douglas fir-larch
WPNE	USA southern pine

⁹⁾ In preparation.

- | | |
|------|---|
| WABB | USA western white woods |
| WPCE | USA spruce-pine-fir |
| WPNN | British-grown Scots pine or Corsican pine |
| WPCS | British-grown Sitka spruce or European spruce |
| PSMN | British-grown Douglas fir |
| WLAD | British-grown larch |
5. Marks that can be used to identify the method of drying:
- | | |
|-----|--------------------|
| KD | kiln drying |
| DRY | kiln or air drying |

Annex D (normative) Species and grading rules for battens for slating and tiling

D.1 Species

Species should conform to BS 5534.

Timber battens and counter-battens should be one of the following species ¹⁰⁾:

- a) imported:
 - redwood (PNSY ¹¹⁾);
 - whitewood (WPCA; PCAB);
 - spruce-pine-fir (USA, Canada) (WPCE);
 - southern pine (USA) (WPNE).
- b) British grown ¹²⁾:
 - larch (WLAD);
 - British pine (WPNN);
 - British spruce (WPCS).

D.2 Identification and documentation

Each delivery of battens should be accompanied by documentation stating at least the following:

- a) name of supplier;
- b) origin (imported or British grown and/or species code as given in D.1);
- c) graded in accordance with BS 5534:2003 ¹³⁾;
- d) size.

¹⁰⁾ The species named are those given in BS 5268-2.

¹¹⁾ The four-letter codes denote the abbreviated species identification given in BS EN 13556.

¹²⁾ For the purpose of this British Standard, 'British grown' species are those grown in the United Kingdom and the Irish Republic.

¹³⁾ Marking BS 5534:2003 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

Annex E (normative) Plywood types and grades**E.1 General**

All wood-based panels for incorporation in permanent works should comply with the requirements of BS EN 13986.

The details for plywood incorporated in this part of BS 8103 are historically based on provenance, species and grades as listed below. With the development of European product standards (ENs), the former customary practice of marking plywood with a 'national identity' has in some cases been replaced by minimum marking requirements in accordance with BS EN 636 (see Annex F); those panels so marked are still required to meet the minimum product requirements as outlined below.

E.2 American construction and industrial plywoods

American construction and industrial plywoods should carry marks that identify the following:

- a) C-D grade exposure 1: grade C group 1 face veneer, grade D group 1 back veneer, grade D group 1 or 2 inner veneer; unsanded; the following wording should be included in the board marking "APA or TECO : C-D exposure 1, PS1-07". The stresses should not be used in conjunction with plywoods marked "butt-jointed centres".
- b) C-C grade: grade C group 1 veneers throughout; unsanded; the following wording should be included in the board marking "APA or TECO: C-C: Exterior, PS1-07".

E.3 Canadian Douglas fir (DFP) and softwood (CSP) plywoods

DFP and CSP plywoods should carry marks that identify the following:

- a) Sheathing grade: grade C veneers throughout; unsanded; marked "CANPLY: Exterior: DFP (or CSP): SHG".
- b) Select grade: grade B face veneer and grade C inner and back veneers; unsanded; marked "CANPLY: Exterior: DFP (or CSP): Select".
- c) Select tight face grade: grade B filled face veneer and grade C inner and back veneers; unsanded; marked "CANPLY: Exterior: DFP (or CSP): Select T.F".

E.4 Finnish birch, birch-faced and conifer plywoods

Finnish birch, birch-faced and conifer plywoods should carry marks that identify the following:

- a) Birch plywood: III/III, III/IV and IV/IV grades; constructed from birch veneers throughout with face veneer of the grade indicated by the first number, back veneer of the grade indicated by the second number, and with inner veneers of minimum IV grade; sanded; marked "Finply Exterior".
- b) Birch-faced COMBI plywood: III/III, III/IV and IV/IV grades; constructed from birch face veneer of the grade indicated by

the first number, birch back veneer of the grade indicated by the second number and inner veneers firstly of minimum grade IV birch and thereafter of minimum grade IV spruce and birch alternately; sanded; marked "Finnish Birch-Faced Exterior".

- c) Conifer plywood: III/III, III/IV and IV/IV grades: constructed from spruce and pine veneers throughout, the face veneer of the grade indicated by the first number, the back veneer of the grade indicated by the second number and inner veneers of minimum grade IV; sanded; marked "Conifer Exterior".

E.5 Swedish softwood plywood

Swedish softwood plywood should carry marks that identify the following:

P30 grade: constructed from spruce or pine veneers of P30 grade; unsanded; marked "P30 exterior glue", with Trident symbol.

Annex F (normative) Identification marks for plywood

Plywood complying with BS EN 636 should be marked as follows. Each board or package should be clearly marked by the manufacturer by indelible direct printing with at least the following information:

- a) the manufacturer's name, trade mark or identification mark;
- b) the number of the European Standard EN 636 and the conditions of use (-1 for use in dry conditions; -2 for use in humid conditions; -3 for use in exterior conditions);
- c) the letter 'S' indicating for structural applications;
- d) nominal thickness;
- e) formaldehyde class;
- f) batch number or production week and year (optional).

Plywood conforming to BS EN 636 and marketed in any of the territories of the European Economic Area for use in construction applications as defined in the Construction products Directive (89/106/EEC) [12] should be marked according to the requirements of BS EN 13986.

Annex G (normative) Identification marks for particleboard

All wood-based panels for incorporation in permanent works should comply with the requirements of BS EN 13986.

Particleboards complying with BS EN 312 should be marked as follows.

Each panel or package should be clearly marked by the manufacturer by indelible direct printing with at least the following information in this sequence:

- a) the manufacturer's name, trade mark, or identification mark;
- b) the number of the European Standard BS EN 312;
- c) the panel type e.g. P5;
- d) minimum thickness;
- e) formaldehyde class;
- f) batch number, or the production week and year.

Additionally, panels might be colour coded by the vertical application near one corner of a series of colour stripes each 25 mm in width. Colour coding is voluntary (see Table G.1). If applied, it should comply with the system shown in Table G.1. This Part of BS 8103 does not exclude the dyeing of the whole board or of certain layers of the board according to traditional national practices.

Particleboards conforming to BS EN 312 and marketed in any of the territories of the European Economic Area for use in construction applications as defined in the Construction products Directive (89/106/EEC) [12] should be marked according to the requirements of BS EN 13986.

NOTE 1 In certain countries only products of formaldehyde Class E1 are allowed.

NOTE 2 Two colours are used in each case. The first colour defines the panel as either intended for load-bearing applications (either one or two stripes of this colour are used). The second colour identifies the panel as being suitable for use in humid conditions.

Table G.1 Voluntary colour coding for particleboard used in floor and roof decking

Specification	Colour code	Board type
Load-bearing, dry	yellow, yellow, blue	P4
Load-bearing, humid	yellow, yellow, green	P5
Heavy duty load-bearing, dry	yellow, blue	P6
Heavy duty load-bearing, humid	yellow, green	P7

Annex H (normative)

Identification marks for Oriented Strand Board (OSB)

Boards produced in conformity with BS EN 300 should be marked as follows.

Each panel or package should be clearly marked by the manufacturer by indelible direct printing with at least the following information in this sequence:

- manufacturer's name, trade mark, or identification mark;
- number of the British Standard, i.e. BS EN 300;
- panel type e.g. OSB/3;
- minimum thickness;
- major axis (if no length of the panel);
- formaldehyde class;
- batch number, or production week and year.

In addition, colour coding can be voluntarily applied to panels. If applied with the use of colour combinations, it should be according to the system shown in Table H.1; but this part of BS 8103 does not exclude the dyeing of the whole panel or of certain layers of the panel according to traditional national practices.

Boards produced in conformity with BS EN 300 and marketed in any of the territories of the European Economic Area for use in construction applications as defined in the Construction Products

Directive (89/106/EEC) [12] should be marked according to the requirements of BS EN 13986.

NOTE In certain countries only products of formaldehyde class E1 are allowed.

Table H.1 **Voluntary colour coding of OSB types for use as floor and roof decking**

OSB type	Colour code
OSB/2	yellow, yellow, blue
OSB/3	yellow, yellow, green
OSB/4	yellow green

NOTE Two colours are used in each case. The first colour defines the panel as intended for load-bearing applications (either one or two stripes of this colour are used). The second colour identifies the panel as being suitable for use in humid conditions.

Annex I (normative) **Fixing of flooring**

I.1 **Timber flooring**

I.1.1 **General**

For the thicknesses in Table 2 to apply, timber flooring should be laid and fixed in accordance with I.1.2.

I.1.2 **Fixing**

Boards should be pulled together tightly with care.

All end joints should bear directly on a joist or batten to give the maximum bearing area and should be staggered so that end joints are at least two board widths apart. All boards should be face nailed to every joist or batten. For boards not wider than 175 mm, two nails should be used at each floor joist intersection, the nails being positioned between 15 mm and 20 mm from the board edges.

For wider boards, a minimum of three nails should be used, spaced uniformly between the two outer nails. All nails should be punched below the surface. Screws are not used generally for softwood boards on account of the cost and labour involved. However, screws conforming to BS 1210 should be used on softwood for fastening boards over electric cables, over pipe work runs and, in particular, over junction boxes to which access might be needed.

I.2 **Plywood flooring**

I.2.1 **General**

For the thicknesses in Table 3 to apply, plywood flooring should be laid and fixed in accordance with I.2.2.

1.2.2 Fixing

Plywood should be laid with the face grain perpendicular to the supports. Edge support should be provided by noggings, or the edges should be tongued and grooved.

All end joints should occur over joists of at least 38 mm basic thickness or be supported by noggings. Fixing nails should be either:

- a) plain wire nails at least 3.35 mm in diameter and at least 65 mm long, which penetrate at least 40 mm into the support; or
- b) annular-ringed shank nails at least 3.0 mm in diameter and at least 50 mm long, which penetrate at least 32 mm into the support.

Fixing nails should be at centres not exceeding 150 mm along any end or edge, and not exceeding 300 mm along any intermediate support.

Before the centres of joists are set, the dimensions of tongued and grooved plywood panels should be checked to determine whether the stated panel sizes are over-the-tongue or as-laid.

Attention should be paid to tongued and grooved joints as these might be designed with integral allowances for movement and should not be forced tightly together.

Tongued and grooved joints and the joints between boards and supporting softwood timber joists can be optionally glued as good practice construction as a means of reducing movement and potential creaking in service.

Screws conforming to BS 1210 should be used for fastening plywood panels over electric cables, over pipe work runs and, in particular, over junction boxes to which access might be needed. Access panel joints should not be glued.

NOTE Polyvinyl acetate (PVA) adhesive conforming to BS EN 204 has been found satisfactory for this purpose.

1.3 Particleboard flooring

1.3.1 General

For the thicknesses in Table 4 to apply, particleboard should be laid and fixed in accordance with J.1.4 to J.1.5.

1.3.2 Positioning boards over joists and battens

It is essential that square-edged boards are supported continuously along all edges of the boards. This is best achieved by positioning them with their longer edges butt-jointed on the centre line of a joist or batten and supporting the short edges by noggings or counter-battens.

Tongued and grooved boards are usually laid with their longer edges across the supports. It is essential that the joints between the shorter edges are supported along the centre line of a joist or batten.

No support is necessary under the long edges of tongued and grooved boards set between correctly spaced joists.

When using either square-edged or tongued and grooved boards, joints along the shorter edges should be staggered and the board length should be not less than two joist spacings. It is essential that edges around the perimeter of the floor are continuously supported, either on joists or noggings.

I.3.3 Allowing for expansion

It is necessary to allow for expansion by providing a gap wherever boards abut any rigid upstand such as a perimeter wall, column or fireplace surround. This gap should be not less than 10 mm wide. Large floors might need a wider gap and intermediate expansion gaps to allow for an overall expansion of 2 mm per metre length of floor. The expansion gaps should be either:

- a) left open and masked by a skirting or loose cover strip; or
- b) filled with an easily compressible material, such as cork.

A 3 mm gap should be left between each square edge board

It is essential that the gaps are kept free from plaster and mortar droppings and other debris during construction.

I.3.4 Fixing

All boards should be fastened firmly to the supporting timber. Flat headed annular-ringed shank nails and screws have superior holding power and should be used in preference to plain shank nails.

All fixings should be a minimum of 50 mm or 2 times the thickness of the board, whichever is greater; and the diameter of the fixing should be a minimum of 0.16 times the thickness of the board.

Fastenings should be spaced at centres not more than 150 mm along both continuously supported edges and 300 mm along the intermediate supports. Fastenings should be at least 8 mm from the edge of the board.

Nail heads should be punched 2 mm to 3 mm below the surface of the board and screws should pre-drilled and countersunk.

In service class 2 fixings should be corrosion resistant. Corrosion resistant materials include galvanized or sheradized steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Tongued and grooved joints and the joints between boards and supporting softwood timber joists should be glued in accordance with the manufacturer's recommendations as a means of reducing movement and creaking due to floor trafficking. Creaking in use can be further reduced by gluing wood-based panels to supporting timber joists with PVA adhesive.

NOTE Polyvinyl acetate (PVA) adhesive conforming to BS EN 204 has been found satisfactory for this purpose.

Provision should be made for possible expansion of the boards by allowing a gap between the edges of the boards and the perimeter wall or other abutment. The perimeter gap should be 2 mm per metre run, but should be at least 10 mm wide.

I.3.5 Floating floors on continuous support

When tongued and grooved boards are laid on a continuous underlay material supported by a sub-floor, it is essential that all tongued and grooved joints are glued. Special care should be taken to ensure that boards are laid in dry conditions after all wet site operations such as plastering have been completed.

The underside of the boards should be protected with a continuous vapour-control layer placed between the underlying insulation and the particleboard.

NOTE This continuous vapour-control layer is in addition to an effective damp-proof membrane, and is not a replacement for it. Its purpose is to protect the underside of the flooring from the effects of residual moisture in materials above the existing damp-proof membrane. This is particularly important where residual moisture is known to exist; for example, in a recently cast in-situ slab.

I.4 OSB flooring

I.4.1 Positioning boards over joists and battens

OSB panels have a predominantly stronger and stiffer axis in either length or width and should be laid with the strongest edge spanning the joists. If boards are not marked with the preferred laying direction, consult the manufacturers' technical information.

It is essential that square-edged boards are supported continuously along all edges by either joists or noggins.

Tongued and grooved boards are usually laid with their longer edges across the supports. It is essential that the joints between the shorter edges are supported along the centre line of a joist or batten.

No support is necessary under the long edges of tongued and grooved boards set between correctly spaced joists.

When using either square-edged or tongued and grooved boards, joints along the shorter edges should be staggered and the board length should be not less than two joist spacings. It is essential that edges around the perimeter of the floor are continuously supported, either on joists or noggings.

I.4.2 Allowing for expansion

It is necessary to allow for expansion by providing a gap wherever boards abut any rigid upstand such as a perimeter wall, column or fireplace surround. This gap should be not less than 10 mm wide. Large floors might need a wider gap and intermediate expansion gaps to allow for an overall expansion of 2 mm per metre length of floor.

The expansion gaps should be either:

- a) left open and masked by a skirting or loose cover strip; or
- b) filled with an easily compressible material.

A 3 mm gap should be left between each square edge board.

It is essential that the gaps are kept free from plaster and mortar droppings and other debris during construction.

I.4.3 Fixing

All boards should be fastened firmly to the supporting timber. Flat headed annular-ringed shank nails and screws have superior holding power and should be used in preference to plain shank nails.

All fixings should be a minimum of 50 mm or 2 times the thickness of the board, whichever is greater; and the diameter of the fixing should be a minimum of 0.16 times the thickness of the board.

Fastenings should be spaced at centres not more than 150 mm along both continuously supported edges and 300 mm along the intermediate supports. Fastenings should be at least 8 mm from the edge of the board.

Nail heads should be punched 2 mm to 3 mm below the surface of the board and screws should be pre-drilled and countersunk.

In service class 2 fixings should be corrosion resistant. Corrosion resistant materials include galvanized or sheradized steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Tongued and grooved joints and the joints between boards and supporting softwood timber joists should be glued in accordance with the manufacturer's recommendations as a means of reducing movement and creaking due to floor trafficking. Creaking in use can be further reduced by gluing wood-based panels to supporting timber joists with PVA adhesive.

NOTE Polyvinyl acetate (PVA) adhesive conforming to BS EN 204 has been found satisfactory for this purpose.

Provision should be made for possible expansion of the boards by allowing a gap between the edges of the boards and the perimeter wall or other abutment. The perimeter gap should be 2 mm per metre run, but should be at least 10 mm wide.

I.4.4 General

For the thicknesses in Table 5 to apply, OSB should be laid and fixed in accordance with I.4.1 to I.4.3.

I.4.5 Floating floors on continuous support

When tongued and grooved boards are laid on a continuous underlay material supported by a sub-floor, it is essential that all tongued and grooved joints are glued. Special care should be taken to ensure that boards are laid in dry conditions after all wet site operations such as plastering have been completed.

The underside of the boards should be protected with a continuous vapour-control layer placed between the underlying insulation and the OSB.

NOTE This continuous vapour-control layer is in addition to an effective damp-proof membrane, and is not a replacement for it. Its purpose is to protect the underside of the flooring from the effects of residual moisture in materials above the existing damp-proof membrane. This is particularly important where residual moisture is known to exist; for example in a recently cast in-situ slab.

Annex J (normative) Fixing of flat roof decking**J.1 Timber flat roof decking****J.1.1 General**

For the thicknesses in Table 76 to apply, flat roof timber decking should be laid and fixed in accordance with **I.4.2**.

J.1.2 Fixing

Boards should be pulled together and then protected from expansion due to weather. End joints should bear directly on a joist, batten or blocking to give the maximum bearing area to each end and should be staggered so that they are at least two board widths apart. All boards should be face-fixed at every joist, batten or blocking. For boards of no more than 175 mm basic width, two nails should be used at each intersection. For wider boards, a minimum of three nails should be used at each intersection. If three are used, the centre nail should be spaced mid-way between the outer nails. If more than three are used, the inner nails should be spaced uniformly between the outer nails.

J.2 Plywood flat roof decking**J.2.1 General**

For the thicknesses in Table 77 to apply, plywood decking should be laid and fixed in accordance with **J.2.2**.

J.2.2 Fixing

Plywood should be laid with the face grain perpendicular to the supports. Edge support should be provided by noggings, or the edges should be tongued and grooved. A 2 mm gap should be left between board edges.

All end joints should occur over joists of at least 38 mm basic thickness or be supported by noggings. Fixing nails should be either:

- a) plain wire nails at least 3.35 mm in diameter and at least 65 mm long, which penetrate at least 40 mm into the support; or
- b) annular-ringed shank nails at least 3.35 mm in diameter and at least 50 mm long, which penetrate at least 32 mm into the support.

Fixing nails should be at centres not exceeding 150 mm along any end or edge, and not exceeding 300 mm along any intermediate support.

Before the centres of joists are set, the dimensions of tongued and grooved plywood panels should be checked to determine whether the stated panel sizes are over-the-tongue or as-laid.

J.3 Particleboard flat roof decking

J.3.1 General

Laying and fixing instructions differ depending on the covering material to be used. The general recommendations for flooring given in I.3.3 apply also to the majority of flat roof constructions. For the thicknesses in Table 79 to apply, fixing should be in accordance with J.3.4.

J.3.2 Protection of boards

Particleboard should be stored and handled in accordance with Clause 9. During laying it should be protected from the weather and should be dry when the weather-proof membrane is applied.

Alternatively, boards conforming to 8.2.3.1 and protected with a weather-resistant covering, such as pre-felting, a resin-film overlay, or metal foil, might be specified.

It is essential that joints are taped on the day of laying. In this way a temporary protection can be obtained without the need for further covering. The protective layer should not be regarded as part of a bitumen felt specification.

J.3.3 Positioning boards over joists

Square-edged boards should be supported continuously along all edges. It is essential that boards are positioned with their longer edges butt-jointed on the centre line of a joist, and the shorter edges supported by noggings or counter-battens.

Tongued and grooved boards are usually laid with their longer edges across the supports. The joints between the shorter edges should then be supported along the centre line of a joist. No support is necessary under the long edges of tongued and grooved boards between correctly spaced joists.

When using either square-edged or tongued and grooved boards, joints along the shorter edges should be staggered. Edges around the perimeter of the roof deck should be continuously supported, either on joists or noggings.

J.3.4 Fixing

All boards should be fastened firmly to the supporting timber. Flat headed annular-ringed shank nails and screws have superior holding power and should be used in preference to plain shank nails.

All fixings should be a minimum of 50 mm or 2 times the thickness of the board, whichever is greater; and the diameter of the fixing should be a minimum of 0.16 times the thickness of the board.

Fastenings should be spaced at centres not more than 150 mm along both continuously supported edges and 300 mm along the intermediate supports. Fastenings should be at least 8 mm from the edge of the board.

Nail heads should be punched 2 mm to 3 mm below the surface of the board and screws should pre-drilled and countersunk.

In service class 2 fixings should be corrosion resistant. Corrosion resistant materials include galvanized or sheradized steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Provision should be made for possible expansion of the boards by allowing a gap between the edges of the boards and the perimeter wall or other abutment. The perimeter gap should be 2 mm per metre run, but should be at least 10 mm wide.

J.4 OSB flat roof decking

J.4.1 General

Laying and fixing instructions differ depending on the covering material to be used. The general recommendations for flooring given in **J.1.3** also apply to the majority of flat roof constructions. For the thicknesses in Table 81 to apply, fixing should be in accordance with **J.4.4**.

J.4.2 Protection of boards

OSB should be stored and handled in accordance with Clause 9. During laying it should be protected from the weather and should be dry when the weatherproof membrane is applied.

Alternatively, boards conforming to **8.2.4.1** and protected with a weather-resistant covering, such as pre-felting, a resin-film overlay, or metal foil, can be specified.

It is essential that joints are taped on the day of laying. In this way a temporary protection can be obtained without the need for further covering. The protective layer should not be regarded as part of a bitumen felt specification.

J.4.3 Positioning boards over joists

OSB panels have a predominantly stronger and stiffer axis in either length or width and should be laid with the strongest edge spanning the joists. If boards are not marked with the preferred laying direction, consult the manufacturers' technical information. Square edge boards should be continuously supported on all edges either on a joist or with additional noggins.

Tongued and grooved boards are usually laid with their longer edges across the supports. The joints between the shorter edges should then be supported along the centre line of a joist. No support is necessary under the long edges of tongued and grooved boards between correctly spaced joists.

When using either square-edged or tongued and grooved boards, joints along the shorter edges should be staggered. Edges around the perimeter of the roof deck should be continuously supported, either on joists or noggings.

J.4.4 Fixing

All boards should be fastened firmly to the supporting timber. Flat headed annular-ringed shank nails and screws have superior holding power and should be used in preference to plain shank nails.

All fixings should be a minimum of 50 mm or 2 times the thickness of the board, whichever is greater; and the diameter of the fixing should be a minimum of 0.16 times the thickness of the board.

Fastenings should be spaced at centres not more than 150 mm along both continuously supported edges and 300 mm along the intermediate supports. Fastenings should be at least 8 mm from the edge of the board.

Nail heads should be punched 2 mm to 3 mm below the surface of the board and screws should be pre-drilled and countersunk.

In service class 2 fixings should be corrosion resistant. Corrosion resistant materials include galvanized or sheradized steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Provision should be made for possible expansion of the boards by allowing a gap between the edges of the boards and the perimeter wall or other abutment. The perimeter gap should be 2 mm per metre run, but should be at least 10 mm wide.

Annex K (informative) Fixing of battens for roof slating and tiling

K.1 General

In addition to the recommendations of 4.1.7, the ends of battens should be sawn square and butt-jointed centrally on a rafter member, or on end rafters or gable ladders etc., so that adequate bearing and nailing can be provided for each end of the batten. Butt joints in battens should be arranged so that not more than one batten in four is joined on any one rafter member. Battens should not be cantilevered or spliced between rafters.

To reduce hogging, the tops of intermediate separating walls should be finished 25 mm below the underside of the tiling battens. Attention is drawn to the fire-stopping regulations, which require that the space between the top of the wall and the underside of the battens and felt be filled with non-combustible material which is sufficiently compressible to allow for deflections in the trussed rafters.

K.2 Nails

The maximum diameter of nails positioned on the centre line of the batten width, for fixing battens to rafters, should not exceed approximately one tenth of the basic width of the batten.

To fix battens and counter battens, cut nails or wire nails of 3.35 mm (10 gauge) × 65 mm long with smooth, annular-ringed shanks, or helically threaded shanks, should be used.

It is recommended that in coastal areas steel nails be hot-dip galvanized.

Tiling battens should be nailed to every rafter which they cross and on which they are joined.

NOTE The National House-Building Council recommends where the basic wind speed is over 26 m/s (see BS EN 1991-1-4 and its National Annex) ring shank nails are used.

Annex L (informative)

Typical floor and flat roof constructions and their self weight, and self weight of slates and tiles for pitched roof construction

Typical floor and flat roof constructions and their self weight are given in Figure L.1. Typical weights of tiles and slates are shown, for guidance, in Table L.1 but where more accurate weights are available they should be used in preference to the guidance weights given in Table L.1.

Table L.1 Typical weights of tiles and slates as laid up the slope

Material	Weight per unit area kN/m ²	Mass per unit area kg/m ²
Slates:		
Sized	0.43	44
Random	0.85	87
Cement/resin based	0.2	20
Concrete	0.58	59
Tiles:		
Standard interlocking	0.58	59
Heavy	0.78	80
Plain concrete	0.78	80
Plain clay	0.85	87

Figure L.1 Typical floor and flat roof constructions and their self weight, and self weight of slates and tiles for pitched roof construction

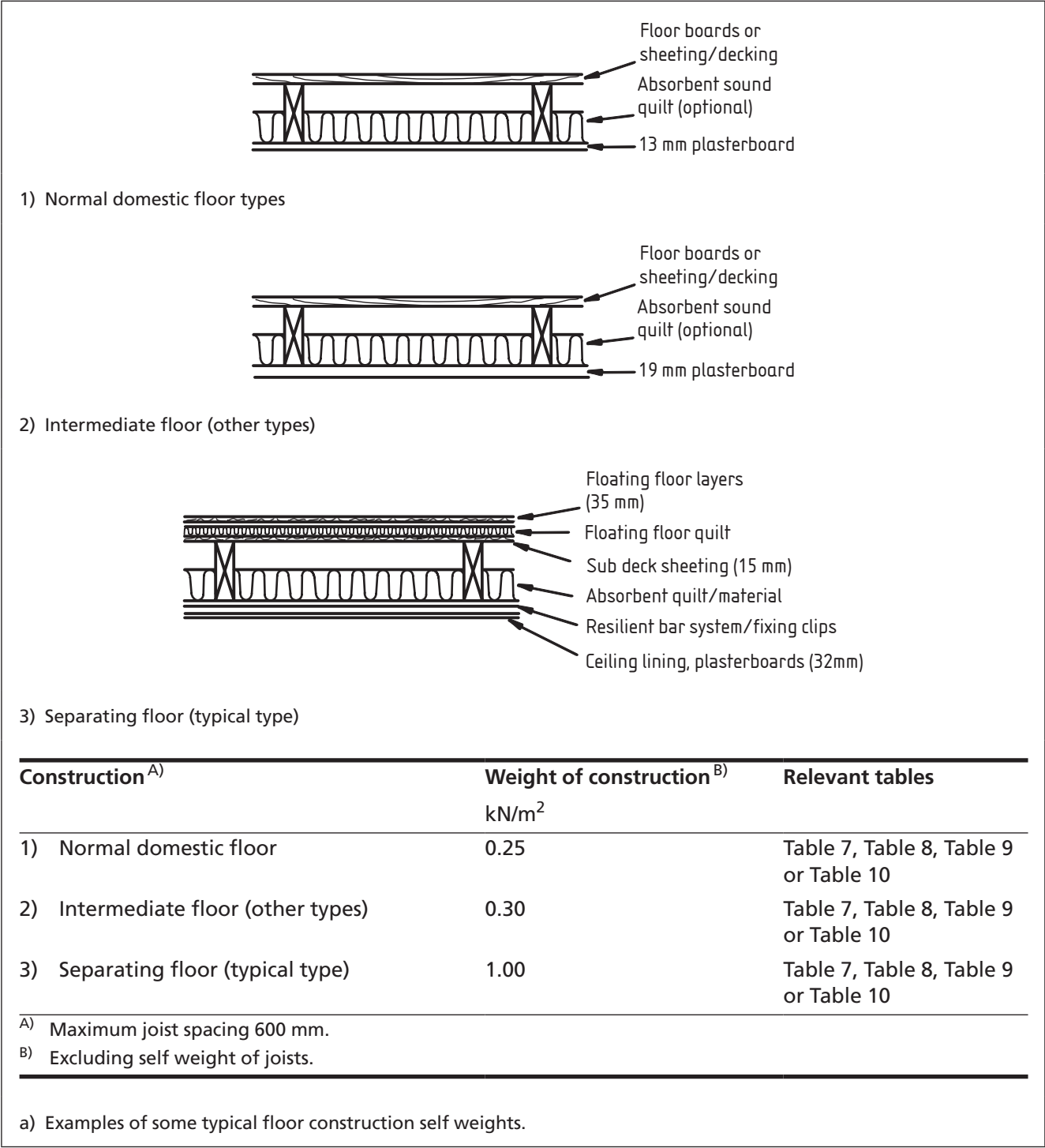


Figure L.1 Typical floor and flat roof constructions and their self weight, and self weight of slates and tiles for pitched roof construction (continued)

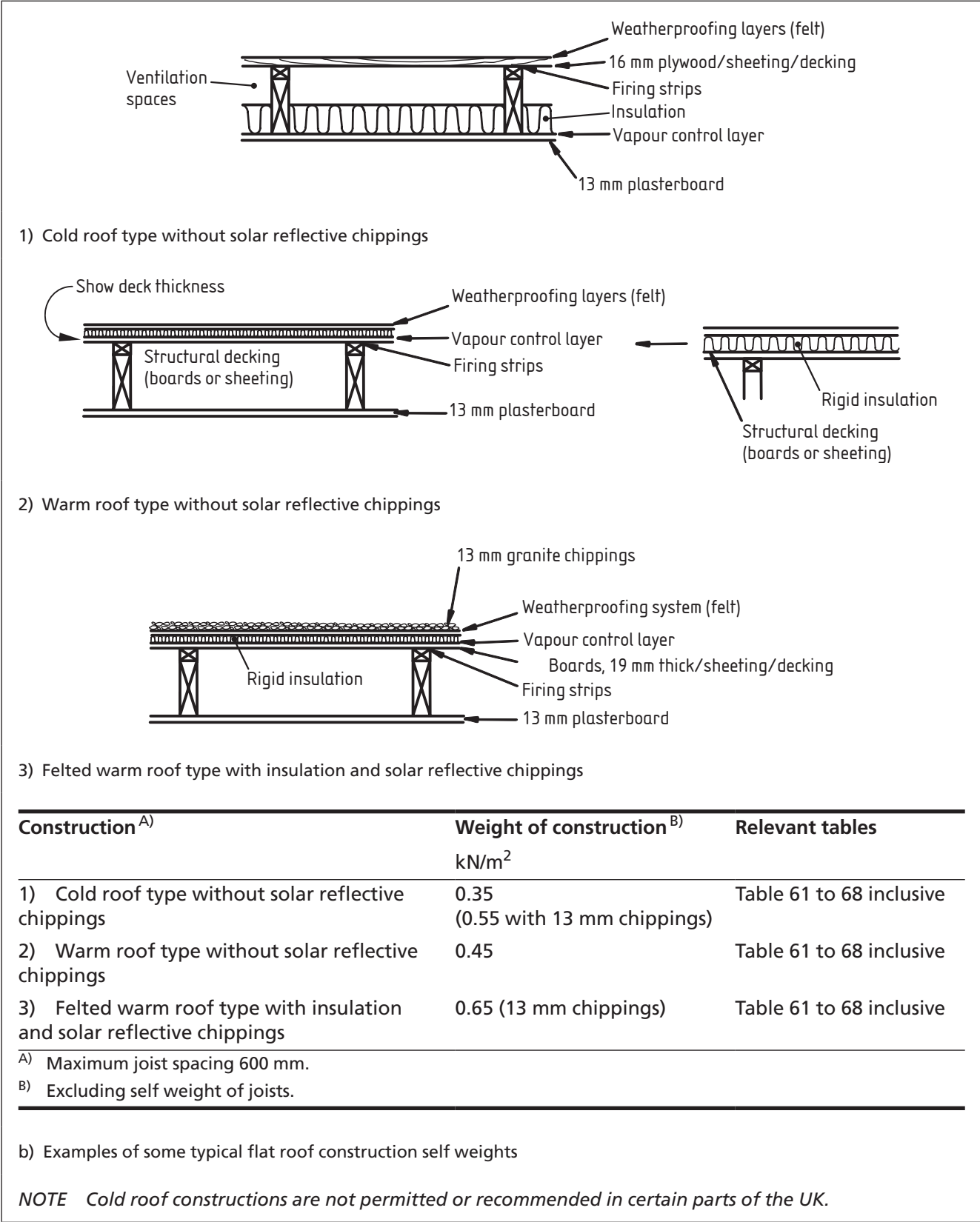
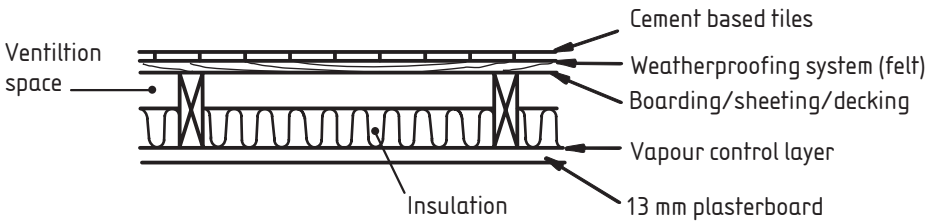
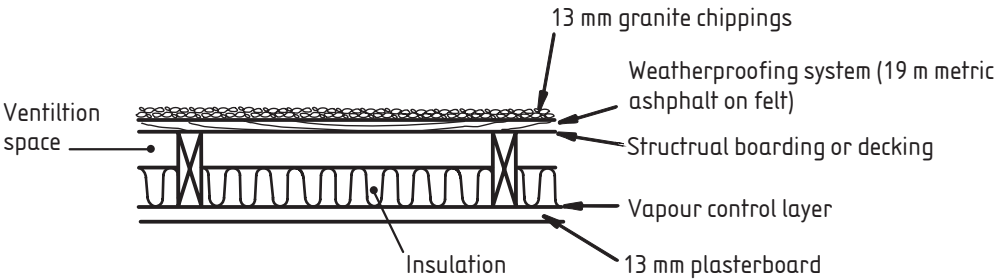


Figure L.1 Typical floor and flat roof constructions and their self weight, and self weight of slates and tiles for pitched roof construction (continued)



4) Cement based tiles on felt and decking (cold roof type)
NOTE Cross battens might be necessary for ventilation.



5) Mastic asphalt topping and chippings (cold roof type)
NOTE Cross battens might be necessary for ventilation.

Construction ^{A)}	Weight of construction ^{B)} kN/m ²	Relevant tables
4) Cement based tiles on felt and decking	0.55	Table 61 to 68 inclusive
5) Mastic asphalt topping and chippings	0.95	Table 61 to 68 inclusive

^{A)} Maximum joist spacing 600 mm.
^{B)} Excluding self weight of joists.

b) Examples of some typical flat roof construction self weights (continued)

Annex M (informative)

Simplified guidance on the imposed snow loading which is relevant for a particular site

Before using the tables in this Part of BS 8103, it is necessary to determine the snow load which is relevant for a particular site. This is determined from the geographical location and the height above sea level.

NOTE 1 In any case of doubt, a building control authority with local knowledge can normally state the height above sea level of a particular site.

From the simplified snow map Figure M.1, decide whether the site is within zone A, B, C, D or E.

Having decided what zone the site is in; use Table M.1 to determine whether an imposed snow load of 0.75 kN/m², 1.00 kN/m², or 1.25 kN/m² is relevant. In Scotland a loading category of 1.50 kN/m² is also relevant.

NOTE 2 The simplified snow map Figure M.1 and the zone snow loads given in Table M.1 are derived from a consideration of the guidance given in BS EN 1991-1-3 together with its UK National Annex. Snow loads derived in Table M.1 are based upon s_k multiplied by a factor 1.25.

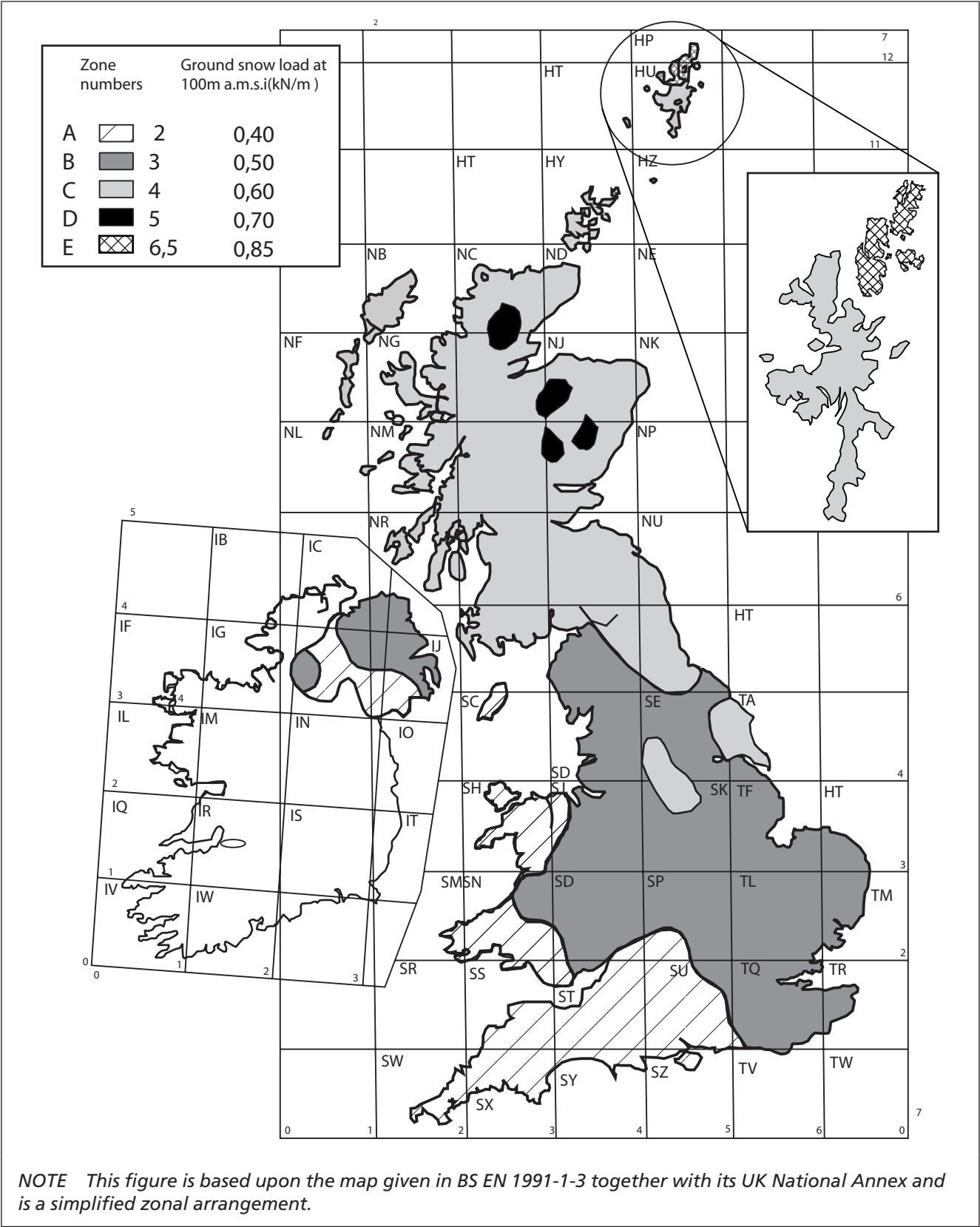
NOTE 3 As an alternative to this simplified and conservative guidance, snow loadings for specific sites can be determined by direct reference to BS EN 1991-1-3.

Table M.1 Imposed snow load in zones A, B, C, D and E

Altitude of site above sea level m	Snow load zone from Figure M.1				
	A	B	C	D	E
	0.40 kN/m ²	0.50 kN/m ²	0.60 kN/m ²	0.70 kN/m ²	0.85 kN/m ²
0 to 100	0.75	0.75	0.75	1.00	1.00
Over 100 up to 150	0.75	0.75	1.00	1.00	1.25
Over 150 up to 200	0.75	1.00	1.00	1.25	1.50
Over 200 up to 250	1.00	1.00	1.25	1.25	1.50
Over 250 up to 300	1.00	1.25	1.25	1.50	—
Over 300 up to 400	1.25	—	1.50	—	—

NOTE Where no value is given, the snow load condition is not covered by this Part of BS 8103.

Figure M.1 Snow load zones A, B, C, D and E



Annex N (informative)

Roof bracing recommendations for small single-storey non-residential buildings and annexes with pitched roofs, within the scope of Annex A of BS 8103-2:2005**N.1 General**

This annex emphasizes the need for, and gives details of, the timber bracing and strapping to be provided along the line of the rafters and the ceiling members of small single-storey non-residential buildings and annexes, with pitched roofs, which are within the scope of Annex A of BS 8103-2:2005.

It provides complimentary guidance to that given in BS 5268-3¹⁴⁾ for this specific purpose and is not intended to replace it.

NOTE Annex A of BS 8103-2:2005 permits single-leaf masonry walls.

The timber bracing and strapping might be necessary at the line of the ceiling members, whether or not ceiling boards are part of the construction, to enhance the structural robustness.

If the cross section has no timber members at ceiling level, a structural designer should be consulted concerning the bracing system at the base of any gable, as recommended by A.1 h) of Annex A of BS 8103-2:2005.

N.2 Diagonal and longitudinal bracing along the line of the rafters, and chevron bracing

Diagonal and longitudinal bracing along the line of the rafters, and chevron bracing, should be based on the requirements given in BS 5268-3¹⁴⁾.

N.3 Diagonal and longitudinal bracing along the line of the ceiling members

Longitudinal bracing members are generally required at each node of the trussed rafter, at a spacing not exceeding 3 m, and should tightly abut each gable and main support wall. In addition, one set of diagonal bracing should be provided, extending from eaves to eaves in the case of a duopitch roof, and from eaves to eaves or from eaves to a main building in the case of a monopitch roof. No diagonal brace should have an angle of less than 35° to the ceiling joists.

All bracing members should conform to and be fixed in accordance with BS 5268-3¹⁴⁾.

N.4 Metal restraint straps

Metal restraint straps conforming to 4.4.7, noggings and packing pieces should be provided along the line of the rafters at each gable, in accordance with Figure 6 b), at centres not exceeding 2 m. If relevant, they should be similarly provided at the main building.

¹⁴⁾ BS 5268-3 will be replaced by BS EN 1995-1-1 and PD 6693-1.

Metal restraint straps conforming to **4.4.7**, noggings and packing pieces should be provided along the line of the ceiling joists at each gable, in accordance with Figure 6 a), at centres not exceeding 2 m. If relevant, they should be similarly provided at the main building.

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