span tables

for solid timber members in floors, ceilings and roofs for dwellings

2nd edition

TRADA Technology

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TRADA, the Timber Research and Development Association, is a not-for-profit, membership-based organisation delivering key services to members in support of its two main aims of building markets for timber and increasing specification. Membership encompasses companies and individuals across the entire timber supply/use chain, from foresters and sawmillers, through merchants and manufacturers, to architects, engineers and specifiers.

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Preface

These span tables for solid timber members in floors, ceilings and roofs (excluding trussed rafters) for dwellings have been produced by TRADA Technology Ltd in support of the Building Regulations 2000 for England and Wales.

The span tables replace those which were included in earlier editions of *Approved Document A: Structure*. They have been calculated in accordance with current Regulations and relevant Standards as detailed in the text. This second edition includes tables for trimmers and trimming joists as well as additional sizes that were not in the first edition.

This document solely deals with the loadbearing capacity of the solid timber members. There are many other aspects which must be considered in designing a floor, ceiling or roof which are not included here. In preparing this document we have assumed that the complete design will be undertaken by a competent person. The appropriate sections of the Regulations and relevant Standards should be consulted for guidance.

An increasing range of structural timber composites and engineered timber components is now available. They have the advantage of being available in long lengths and deep sections for large spans, they combine high strength with light weight and are manufactured to produce consistent structural properties and low moisture contents.

Products readily available include:

- Glued laminated timber – Glulam
  British Standards cover the manufacture and requirements for glued laminated timber. The design of components manufactured in accordance with these requirements is covered in *BS 5268-2: 2002 Code of practice for structural timber design. Permissible stress design materials and workmanship*.
- Laminated veneer lumber – LVL
  British Standards cover specifications and requirements for LVL. Material properties for the design of LVL components are available from third party approval certificates or from the product manufacturers.

Proprietary products which are not covered by British Standards, such as those listed below, are approved for use in the UK through European Technical Approvals or through independent third party product certification schemes. Design information is available from the approval certificates or from the manufacturers.

- Parallel strand lumber – PSL
- Laminated strand lumber – LSL
- Engineered components including components such as I-joists, manufactured with the flanges made of softwood or laminated veneer lumber (LVL) and the webs of plywood, oriented strand board or hardboard. Other configurations which combine timber flanges with metal strutting webs are also available.

1.0 Introduction

1.0.1 This document gives section sizes and spans of certain timber members for floors, ceilings, traditional pitched roofs (excluding trussed rafter roofs) and flat roofs which support the imposed loads shown in *Table 1.1*. It applies to buildings up to three storeys in height above ground level, used as single occupancy dwellings.

Table 1.1 Imposed loads for floors, ceilings and roofs

Member	Imposed loads not exceeding:	
	UDL (kN/m^2)	Concentrated load (kN)
Floor joists	1.5	1.4
Ceiling joists & binders	0.25	0.9
Rafters & purlins supporting rafters	0.75 or 1.0 *	0.9
Purlins supporting rafters	0.75 or 1.0 *	0.9
Flat roof joists: access limited access unlimited	0.75 or 1.0 * 1.5	0.9 1.8
Purlins supporting sheeting or cladding	0.75 or 1.0 *	0.9
* See *Table 3.1*		

1.0.2 The figures and sketches in this document are illustrative only and do not show detailed construction arrangements.

1.0.3 *Figure 1.1* illustrates some of the members included in this document and *Table 1.2* provides a key to the members included in the tables.

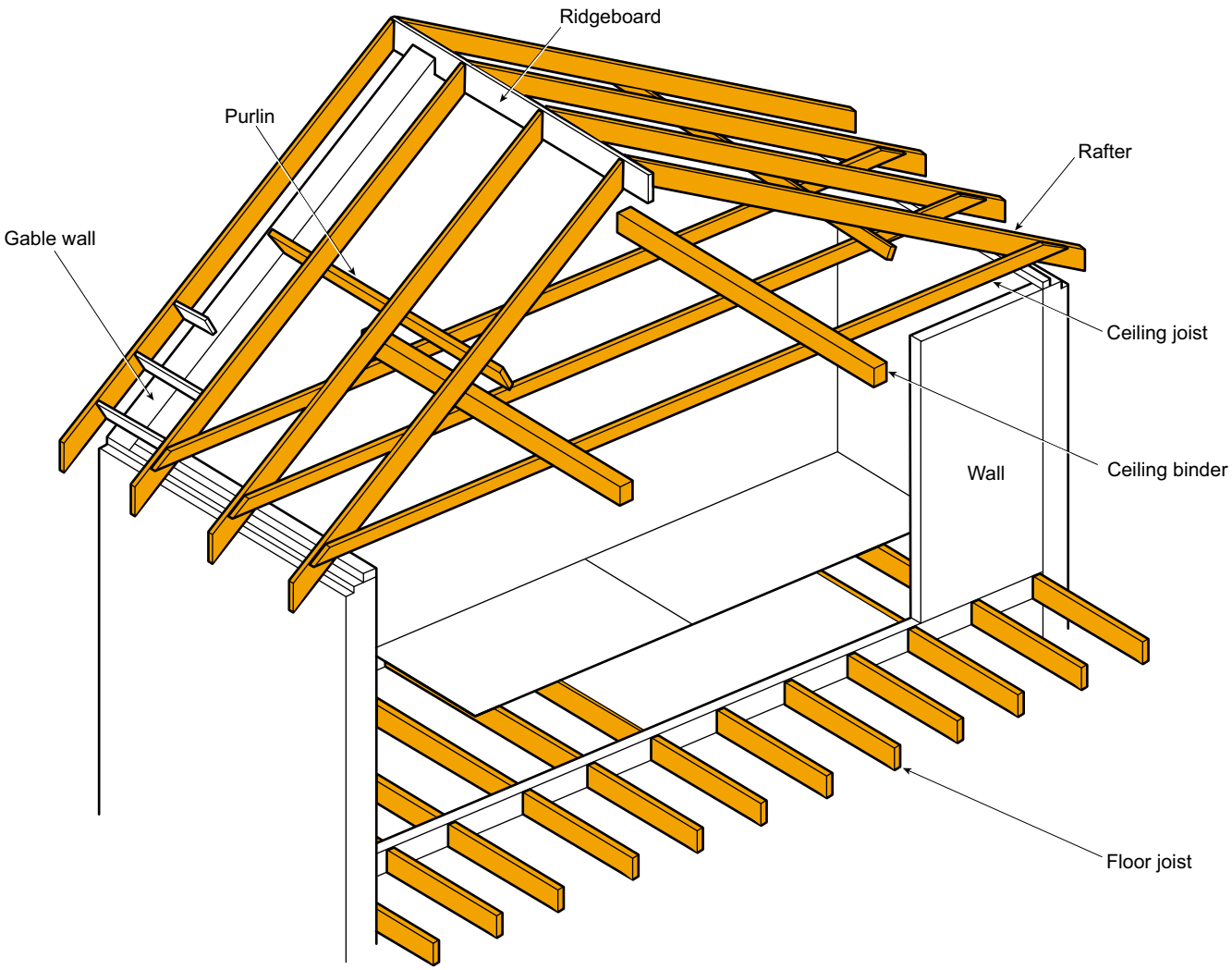


Figure 1.1 Key to members included in the span tables

Table 1.2 Summary of tables

Construction	Timber members	Imposed loading not exceeding kN/m^2	Strength classes	
			C16	C24
Floors	Joists	1.50	Table 4.1	Table 4.2
	Trimmers	1.50	Table 4.3	Table 4.4
	Trimming joists	1.50	Table 4.5	Table 4.6
	Fixings for double member trimmers		Table 4.7	
	Fixings for double member trimming joists		Table 4.8	
	Loads supported at each end of double member trimmer: no incoming partition		Table 4.9	
	Loads supported at each end of double member trimmer: with incoming partition		Table 4.10	
Ceilings	Joists	0.25	Table 5.1	Table 5.2
	Binders	0.25	Table 5.3	Table 5.4
Pitched roofs: Slope of 15° or more but less than 22.5°	Rafters	0.75	Table 6.1	Table 6.2
	Purlins	0.75	Table 6.3	Table 6.4
	Rafters	1.00	Table 6.5	Table 6.6
	Purlins	1.00	Table 6.7	Table 6.8
Pitched roofs: Slope of 22.5° or more but less than 30°	Rafters	0.75	Table 6.9	Table 6.10
	Purlins	0.75	Table 6.11	Table 6.12
	Rafters	1.00	Table 6.13	Table 6.14
	Purlins	1.00	Table 6.15	Table 6.16
Pitched roofs: Slope of 30° to 45°	Rafters	0.75	Table 6.17	Table 6.18
	Purlins	0.75	Table 6.19	Table 6.20
	Rafters	1.00	Table 6.21	Table 6.22
	Purlins	1.00	Table 6.23	Table 6.24
Pitched roofs: Roof sheeting or cladding for roofs with a slope of 10° to 35° inclusive	Purlins	0.75	Table 6.25	Table 6.26
		1.00	Table 6.27	Table 6.28
Flat roofs: Access for maintenance only	Joists	0.75	Table 7.1	Table 7.2
		1.00	Table 7.3	Table 7.4
Flat roofs: Full access allowed	Joists	1.50	Table 7.5	Table 7.6

2.0 Timber specifications

2.0.1 Species and grade combinations which satisfy strength classes C16 and C24 to which these span tables relate are shown in *Table 2.1* below and are also given in *BS 5268-2: 2002*.

An explanation of strength classes and strength grading is given in the *TRADA Wood Information Sheet 4-7 Timber strength grading and strength classes.*

Table 2.1 Common species/grade combinations which satisfy strength classes C16 and C24

Species	Origin	Grading rule	C16	C18†	C22†	C24
Redwood	Europe	BS 4978	GS			SS
		BS EN 14081-1	machine graded direct to strength class			
Whitewood	Europe	BS 4978	GS			SS
		BS EN 14081-1	machine graded direct to strength class			
Douglas fir	UK	BS 4978		SS		
		BS EN 14081-1	machine graded direct to strength class			
British pine	UK	BS 4978			SS	
		BS EN 14081-1	machine graded direct to strength class			
British spruce	UK	BS 4978		SS		
		BS EN 14081-1	machine graded direct to strength class			
Larch	UK	BS 4978	GS			SS
		BS EN 14081-1	machine graded direct to strength class			
Sitka spruce		BS 4978		SS		
		J & P*	Sel			
Douglas fir-larch	Canada, USA	BS 4978	GS			SS
		J & P*	No1, No2			Sel
		BS EN 14081-1	machine graded direct to strength class			
		NAMSR**	1450f-1.3E			1800f-1.6E
Hem fir	Canada, USA	BS 4978	GS			SS
		J & P*	No1, No2			Sel
		BS EN 14081-1	machine graded direct to strength class			
		NAMSR**	1450f-1.3E			1800f-1.6E
Spruce-pine-fir	Canada, USA	BS 4978	GS			SS
		J & P*	No1, No2			Sel
		BS EN 14081-1	machine graded direct to strength class			
		NAMSR**	1450f-1.3E			1800f-1.6E
Western whitewoods	USA	BS 4978		SS		
		J & P*		Sel		
Southern pine	USA	BS 4978		GS		SS
		J & P*	No3		No1, No2	Sel
		BS EN 14081-1	machine graded direct to strength class			
		NAMSR**	1450f-1.3E			1800f-1.6E
Western red cedar	Canada	BS 4978		SS		

† For C18 or C22 grade timber, the tables for C16 timber should be used.
* J & P: Joist and plank grades to NGLA (National Lumber Grades Authority, Canada) and NGRDL (National Grading Rules for Dimension Lumber, USA) rules.
** NAMSR : North American machine stress-rated lumber.

2.0.2 A species grade combination from a higher strength class may be used where a lower strength class has been specified.

2.0.3 These span tables apply to dry-graded timber in dry environments as defined by service classes 1 or 2 to *BS 5268-2: 2002*. The timber is graded at an average moisture content of 20%, with no reading to exceed 24%. The timber should be transported, stored and installed in the building so that this level of moisture content is not exceeded.

The timber should be marked with the following information:

- the species or species combination and grade, and/or the strength class
- information to identify the company responsible for the grading
- information to identify the certification body overseeing the grading
- the grading rule eg *BS 4978, BS EN 14081-1*
- the word DRY or if kiln dried, KD – or whether surfaced dry or green in North America.

2.0.4 Target sizes and permissible deviations should be in accordance with *BS EN 336: 2003*.

2.0.5 Wane, as allowed in *BS 5268-2: 2002*, is permitted in all the section sizes included in the Tables.

2.1 Timber availability

2.1.1 The section sizes shown in these span tables are those customarily available in the UK. However, not all the sizes shown are always held in stock at timber and builders' merchants. Designers and specifiers should check on availability before specifying a particular size and should note that non-stock sizes may attract additional cost.

3.0 Design considerations

3.1 Loading

3.1.1 The imposed loads indicated in the span tables have been derived in accordance with *BS 6399-1: 1996* and *BS 6399-3: 1998*.

3.1.2 In the use of Tables in Sections 6 and 7, the snow loading zones applicable to roofs at particular sites are given in *Figure 3.1*.

3.1.3 The imposed roof loads shown in *Table 3.1* are applicable only to small buildings as defined in *BS 6399-3: 1998 Clause 4.3.2*.

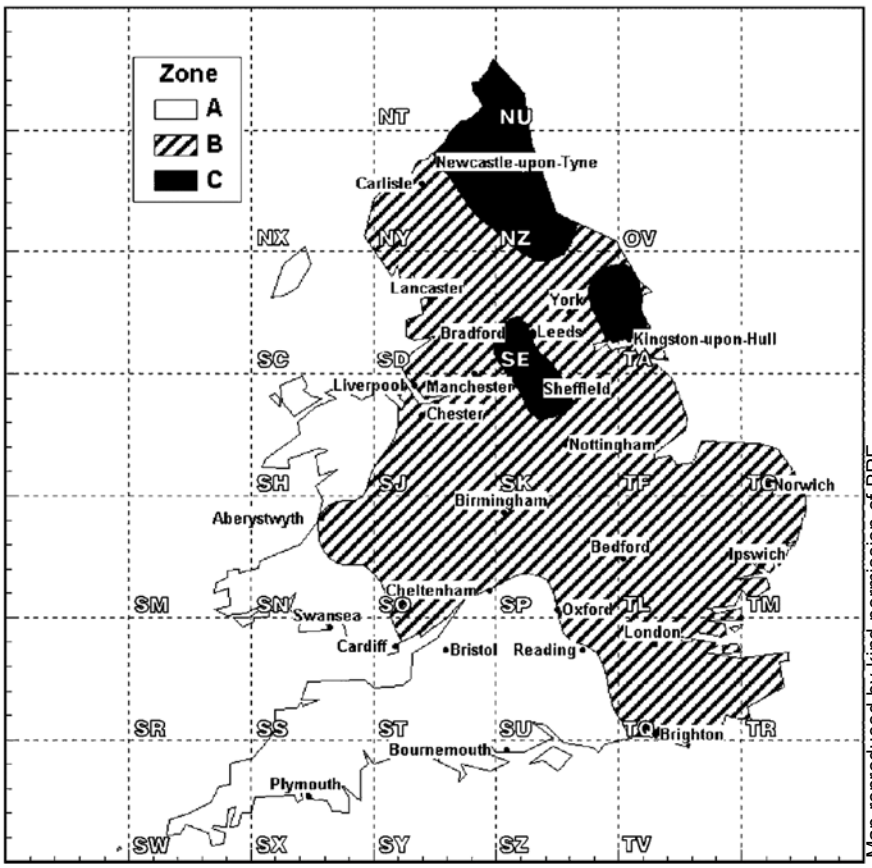


Figure 3.1 Snow roof loading zones

Table 3.1 Imposed snow roof loads for the zones defined in Figure 3.1

Zone	Imposed roof loads (kN/m^2)	
	Altitudes not exceeding 100m	**Altitudes exceeding 100m but not exceeding 200m**
A	0.75	0.75
B	0.75	1.00
C	0.75	Use *BS 6399-3*
Note: For altitudes greater than 200m refer to guidance given in *BS 6399-3*.		

3.2 Construction and basic workmanship recommendations

3.2.1 Workmanship should comply with the relevant requirements of *BS 5268-2: 2002*.

3.2.2 Adequate connections between members should be provided, as specified by the building designer.

3.2.3 Notches and holes in simply supported floor and ceiling joists should be within the following limits:

Notches should be not deeper than 0.125 times the depth of a joist and should not be cut closer to the support than 0.07 of the span, nor further away than 0.25 times the span.

Holes should have a diameter not greater than 0.25 times the depth of a joist and should be drilled at the joist centreline. They should be not less than 3 diameters (centre to centre) apart and should be located between 0.25 and 0.4 times the span from the support.

Notches or holes should not be cut in rafters, purlins or binders unless approved by the building designer.

Rafters restrained by ceiling ties at eaves level may be birdsmouthed at supports to a depth not exceeding one third of the rafter depth.

3.2.4 Floor joists should be restrained at supports and points along the span using timber herringbone strutting or solid timber blocking, positioned as shown in *Table 3.2*. Proprietary herringbone strutting systems are also available; they should be used in accordance with the manufacturer's instructions.

Table 3.2 Strutting or blocking of joists

Joist span (m)	Rows of strutting or blocking between supports
Up to 2.5	None
2.5 to 4.5	1 at mid span
Over 4.5	2 at one third span positions

3.2.4.1 Timber herringbone strutting should be at least 38 x 38mm but should not be used where the distance between joists is greater than 3 times their depth.

3.2.4.2 Solid blocking should be at least 38mm thick.

3.2.4.3 Strutting and blocking should extend at least three-quarters of the joist depth.

3.2.4.4 At each end of a row of strutting the outer joist should be blocked solidly at the perimeter wall.

3.2.5 A traditional cut timber roof (ie one made using rafters, purlins and ceiling joists) generally has sufficient built in resistance to instability and wind forces. However, the building designer should consider whether the provision of bracing is appropriate, especially in the case of single-hipped and non-hipped roofs to detached houses with a pitch greater than 40°. Where required, bracing should be equivalent to that recommended for trussed rafter roofs in *BS 5268-3: 1998* or *Annex H* of *BS 8103-3: 1996*.

4.0 Tables of sizes of timber floor members

4.1 Floor joists

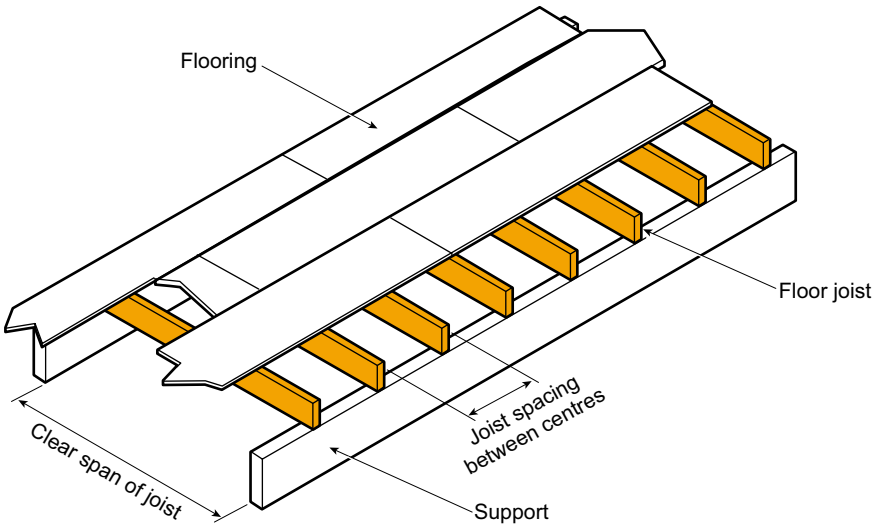


Figure 4.1 Floor joists arrangement

4.1.1 *Tables 4.1* and *4.2* give permissible clear spans of simply supported domestic floor joists of solid timber for specified loadings, sizes and spacings calculated in accordance with *BS 5268-7.1: 1989*.

4.1.2 The method of calculation makes no allowance for any contribution of the flooring to the load resistance of the joists.

4.1.3 The sizes, spacing and spans given in *Tables 4.1* to *4.6* will support the dead loads stated in the tables together with an imposed load not exceeding 1.5 kN/m^2.

Note: These span tables follow exactly the procedure set out in *BS 5268-7.1*. When *BS 5268-7.1* was published the loading code *BS 6399-1* said that for domestic floors the point load of 1.5kN could be ignored, so *BS 5268-7.1* does not apply this. The exemption was probably because for spans over 2.4m the 1.5kN point load never governs the span with domestic floor loading. For spans less than 2.4m *BS 5268-7.1* uses a more onerous UDL called a “slab load”.

4.1.4 For dead loads the traditional assumption was that:

0.25 kN/m^2 was for suspended ground floors with no plasterboard or partition allowance;

0.5 kN/m^2 was for intermediate floors with no partition allowance;

1.25 kN/m^2 was for party or compartment floors with no partition allowance.

However, with modern materials and insulation requirements it is likely that today’s floors weigh more than the above, eg 0.6 kN/m^2 for an intermediate floor. Calculate the actual weight of the floor and use the appropriate column in *Table 4.1* or *4.2*.

Note: TRADA’s Timber Sizer software allows the exact weight of floor to be entered or a partition to be included, to produce the most economical solution. For more information visit www.trada.co.uk/software.

4.1.5 *Tables 4.1* and *4.2* make no allowance for concentrated or line loads applied by partitions, trimmers or other similar causes. Lightweight, non-loadbearing partitions which weigh no more than 0.8 kN (81.5kg) per metre run and are parallel to the joists may be supported by one or two additional joists placed immediately beneath them. The partitions should be fixed through the floor decking into the joist(s) beneath. For the unshaded areas of *Tables 4.1* and *4.2*, one additional joist is sufficient; for the shaded areas, two additional joists are required. For similar lightweight partitions which run at right-angles to the joists, the maximum spans in the Tables should be reduced by 10%. The UDL produced by a full bath can exceed the 1.5 kN/m^2 imposed load for which normal floor joists are designed. Therefore all joists beneath a bath should be doubled. For all other additional loads, joist sizes should be calculated by a competent person.

Note: On the extreme left-hand side of the tables, where joist spacings are at 400mm, the dead load and imposed UDL are only 0.7 kN/m. This is because each joist only has to carry 400mm of floor load. At the tabulated spans, 0.7 kN/m + the self-weight of the joist is the maximum load that one of these joists can support. Since a partition can weigh 0.8 kN/m, one additional joist will not be strong enough to support it plus its own self-weight, so two additional joists are needed. However, at 600mm spacing, each joist is supporting over 1.1 kN/m so one similar additional joist is easily able to support a partition weighing 0.8 kN/m.

4.1.6 Unless justified by specialist calculation, the minimum bearing length at supports for floor joists should be 40mm. However, it may sometimes be necessary to provide longer bearing to accommodate fixings or for other practical reasons.

4.1.7 Notching and drilling of floor joists should not exceed the limits given in clause 3.2.3.

4.1.8 The section sizes of floor joists given in *Tables 4.1* to *4.6* should be machined on the width, ie the depth of the joist, or be ALS or CLS; to the tolerance classes specified in *BS EN 336: 2003, Tables NA 3* and *NA 4* respectively, to enable floors and ceilings to be laid to a level finish.

Table 4.1 Permissible clear spans for domestic floor joists

Imposed load not exceeding 1.5 kN/m^2

Strength Class C16 **Service Class 1 or 2**

Size of joist		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.25			F_d more than 0.25 but not more than 0.5			F_d more than 0.5 but not more than 1.25		
		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.84	1.70	1.31	1.73	1.56	1.22	1.43	1.31	1.04
38	120	2.45	2.34	1.88	2.33	2.17	1.72	1.91	1.76	1.42
38	145	2.96	2.84	2.49	2.83	2.69	2.30	2.43	2.26	1.84
38	170	3.46	3.33	2.89	3.30	3.12	2.70	2.82	2.66	2.28
38	195	3.96	3.78	3.28	3.75	3.54	3.07	3.21	3.03	2.62
38	220	4.46	4.23	3.67	4.20	3.96	3.44	3.59	3.39	2.93
44	97	1.97	1.86	1.50	1.87	1.77	1.39	1.59	1.46	1.17
44	120	2.58	2.47	2.14	2.46	2.36	1.94	2.12	1.95	1.58
44	145	3.11	2.99	2.68	2.97	2.85	2.51	2.62	2.47	2.05
44	170	3.63	3.49	3.11	3.48	3.34	2.91	3.03	2.86	2.48
44	195	4.16	4.00	3.53	3.98	3.81	3.30	3.45	3.25	2.82
44	220	4.68	4.51	3.95	4.48	4.26	3.70	3.86	3.64	3.16
47	97	2.03	1.92	1.59	1.93	1.82	1.47	1.67	1.53	1.23
47	120	2.63	2.53	2.26	2.52	2.42	2.05	2.22	2.05	1.66
47	145	3.17	3.05	2.77	3.04	2.92	2.59	2.70	2.55	2.15
47	170	3.71	3.57	3.21	3.55	3.42	3.00	3.14	2.96	2.56
47	195	4.25	4.09	3.64	4.07	3.91	3.41	3.56	3.36	2.91
47	220	4.75	4.61	4.08	4.58	4.39	3.82	3.99	3.76	3.26
50	97	2.10	1.98	1.68	1.98	1.88	1.55	1.75	1.61	1.29
50	120	2.69	2.58	2.33	2.57	2.47	2.15	2.29	2.14	1.74
50	145	3.24	3.12	2.83	3.10	2.98	2.67	2.78	2.63	2.24
50	170	3.79	3.65	3.31	3.63	3.49	3.10	3.23	3.05	2.64
50	195	4.34	4.17	3.76	4.15	3.99	3.52	3.67	3.47	3.01
50	220	4.82	4.69	4.20	4.67	4.50	3.94	4.11	3.88	3.36
63	97	2.33	2.21	1.93	2.20	2.09	1.83	1.94	1.85	1.54
63	120	2.90	2.79	2.54	2.78	2.67	2.42	2.50	2.40	2.05
63	145	3.50	3.36	3.06	3.35	3.22	2.92	3.01	2.89	2.56
63	170	4.09	3.93	3.58	3.91	3.77	3.42	3.52	3.39	2.97
63	195	4.67	4.50	4.10	4.48	4.31	3.92	4.03	3.88	3.37
63	220	5.10	4.96	4.61	4.94	4.80	4.41	4.54	4.34	3.77
75	120	3.07	2.96	2.69	2.94	2.83	2.57	2.65	2.54	2.29
75	145	3.70	3.56	3.24	3.54	3.41	3.10	3.19	3.07	2.78
75	170	4.32	4.16	3.79	4.14	3.99	3.63	3.73	3.59	3.23
75	195	4.87	4.73	4.34	4.72	4.56	4.15	4.27	4.11	3.67
75	220	5.32	5.17	4.82	5.15	5.01	4.67	4.77	4.63	4.11
ALS/CLS										
38	140	2.86	2.74	2.41	2.73	2.60	2.18	2.34	2.16	1.76
38	184	3.74	3.58	3.11	3.56	3.36	2.91	3.04	2.87	2.48
38	235	4.73	4.50	3.91	4.46	4.21	3.66	3.82	3.60	3.12
89	184	4.86	4.73	4.33	4.71	4.55	4.15	4.27	4.11	3.73
89	235	5.80	5.65	5.28	5.63	5.47	5.11	5.22	5.07	4.72

See clause 4.1.5

Table 4.2 Permissible clear spans for domestic floor joists

Imposed load not exceeding 1.5 kN/m²

Strength Class C24 **Service Class 1 or 2**

Size of joist		Dead loads F_d (kN/m²) excluding self-weight of joist								
		F_d not more than 0.25			F_d more than 0.25 but not more than 0.5			F_d more than 0.5 but not more than 1.25		
		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	2.03	1.91	1.66	1.92	1.82	1.58	1.70	1.62	1.36
38	120	2.63	2.52	2.25	2.51	2.41	2.12	2.22	2.11	1.83
38	145	3.17	3.05	2.76	3.03	2.91	2.64	2.72	2.61	2.36
38	170	3.71	3.56	3.23	3.55	3.41	3.09	3.18	3.06	2.74
38	195	4.24	4.08	3.71	4.06	3.90	3.54	3.65	3.50	3.12
38	220	4.75	4.60	4.17	4.57	4.40	3.99	4.11	3.95	3.49
44	97	2.17	2.06	1.79	2.05	1.95	1.70	1.82	1.72	1.52
44	120	2.76	2.65	2.41	2.64	2.54	2.27	2.36	2.25	1.99
44	145	3.33	3.20	2.90	3.18	3.06	2.77	2.86	2.75	2.49
44	170	3.89	3.74	3.40	3.72	3.58	3.25	3.35	3.21	2.91
44	195	4.45	4.28	3.89	4.26	4.10	3.72	3.83	3.68	3.34
44	220	4.92	4.78	4.39	4.76	4.62	4.19	4.32	4.15	3.75
47	97	2.24	2.12	1.85	2.12	2.01	1.75	1.87	1.78	1.56
47	120	2.82	2.71	2.46	2.70	2.59	2.34	2.42	2.31	2.05
47	145	3.40	3.27	2.97	3.25	3.13	2.84	2.92	2.81	2.54
47	170	3.98	3.83	3.48	3.81	3.66	3.32	3.42	3.29	2.98
47	195	4.55	4.38	3.98	4.36	4.19	3.81	3.92	3.77	3.41
47	220	5.00	4.86	4.48	4.84	4.70	4.29	4.41	4.24	3.85
50	97	2.31	2.18	1.90	2.18	2.06	1.81	1.92	1.82	1.61
50	120	2.88	2.77	2.51	2.75	2.65	2.40	2.47	2.37	2.10
50	145	3.47	3.34	3.03	3.32	3.19	2.90	2.98	2.87	2.60
50	170	4.06	3.90	3.55	3.88	3.74	3.39	3.49	3.36	3.04
50	195	4.64	4.47	4.06	4.45	4.28	3.89	4.00	3.85	3.49
50	220	5.07	4.93	4.58	4.91	4.77	4.38	4.51	4.33	3.93
63	97	2.52	2.42	2.13	2.41	2.29	2.01	2.12	2.01	1.78
63	120	3.11	2.99	2.72	2.97	2.86	2.60	2.67	2.57	2.32
63	145	3.74	3.60	3.28	3.58	3.45	3.13	3.22	3.10	2.81
63	170	4.37	4.21	3.83	4.19	4.03	3.67	3.77	3.63	3.29
63	195	4.91	4.77	4.39	4.76	4.61	4.20	4.32	4.15	3.77
63	220	5.36	5.21	4.86	5.19	5.05	4.71	4.81	4.67	4.25
75	120	3.29	3.16	2.88	3.15	3.03	2.75	2.83	2.73	2.47
75	145	3.96	3.81	3.47	3.79	3.65	3.32	3.42	3.29	2.98
75	170	4.62	4.45	4.06	4.43	4.27	3.88	4.00	3.84	3.49
75	195	5.12	4.98	4.64	4.96	4.82	4.45	4.57	4.40	4.00
75	220	5.59	5.43	5.07	5.41	5.26	4.91	5.02	4.88	4.51
ALS/CLS										
38	140	3.06	2.94	2.67	2.93	2.81	2.55	2.63	2.52	2.25
38	184	4.01	3.85	3.50	3.83	3.69	3.34	3.44	3.31	2.95
38	235	4.98	4.84	4.46	4.82	4.68	4.26	4.39	4.21	3.71
89	184	5.11	4.97	4.64	4.95	4.81	4.44	4.57	4.40	4.00
89	235	6.09	5.93	5.55	5.91	5.75	5.37	5.49	5.33	4.97

See clause 4.1.5

4.2 Trimmers and trimming joists

4.2.1 *Tables 4.3* and *4.4* give spans for trimmers while *Tables 4.5* and *4.6* give spans for trimming joists. The deflection limit is 0.003 x span, but not more than 14mm. The tables make allowance for supporting lightweight non-loadbearing internal partitions and are therefore conservative for situations where no partitions occur. The span tables are designed to take account of all common opening sizes in domestic floors. Where openings fall outside the range of *Tables 4.3* to *4.6*, trimmers and trimming joists should be calculated in accordance with *BS 5268-2: 2002*.

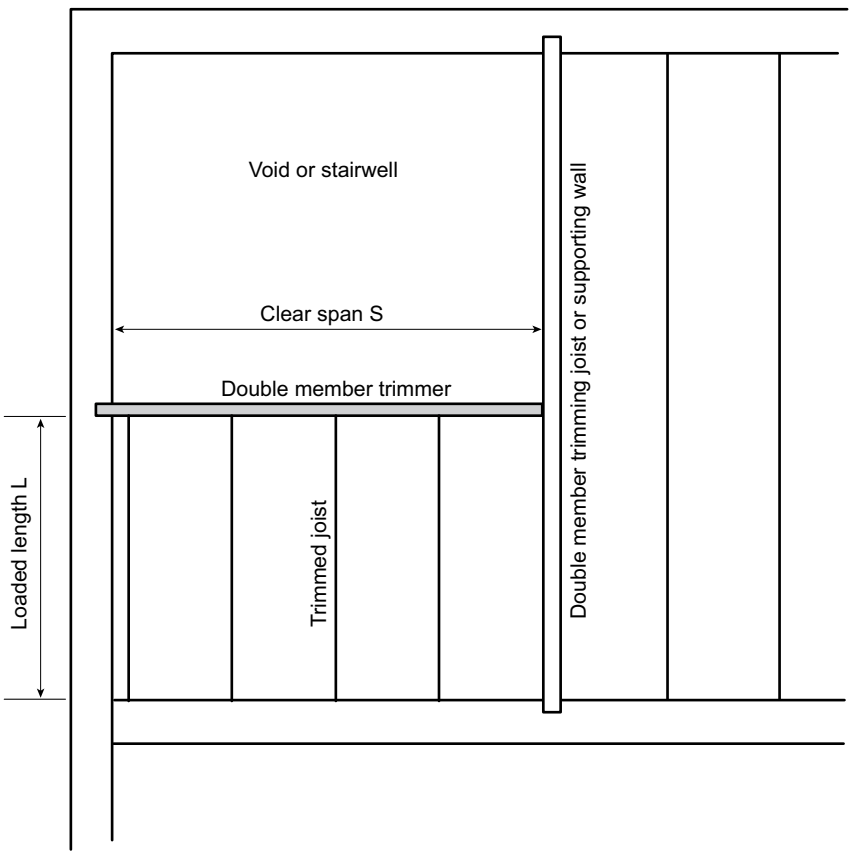


Figure 4.2 Plan on double member trimmer supporting trimmed joists

Notes to Tables 4.3 and 4.4

The sizes of the double member trimmer shown in *Figure 4.2* will support loads from the following:

- The trimmed floor joists; and
- A lightweight non-loadbearing partition weighing not more than 81.5 kg/m run (0.8 kN/m run) supported on the double member trimmer, and one supported on and parallel to the trimmed joists with an additional joist beneath it, either at the centre or at the end of the trimmer; and
- An imposed load not exceeding 1.5 kN/m^2, or 1.4 kN at the centre or end of the trimmer.

The dead load of the floor construction should not exceed 0.5 kN/m^2, excluding joist self-weight; this is taken into account in the span calculation.

The two joists should be securely fixed together, see clause 4.2.2.

No notching or drilling of a trimmer should be carried out unless calculated in accordance with *BS 5268-2: 2002*, except as necessary to accommodate the flanges of joist hangers.

The design has been based on *BS 5268-7.1: 1989*.

Table 4.3 Permissible clear spans of trimmers which support trimmed joists and non-loadbearing lightweight partitions

Imposed load not exceeding 1.5 kN/m^2

Strength class C16 **Service Class 1 or 2**

Size of trimmer (mm)	Loaded length (m) L on *Figure 4.2*					
	1.0	2.0	3.0	4.0	5.0	6.0
	Clear spans (m) S on *Figure 4.2*					
2 x 38 x 145	2.20	1.85	1.49	1.19	0.67	0.33
2 x 38 x 170	2.71	2.19	1.77	1.44	0.88	0.46
2 x 38 x 195	3.17	2.52	2.04	1.68	1.10	0.61
2 x 38 x 220	3.59	2.85	2.32	1.91	1.33	0.77
2 x 44 x 145	2.38	2.01	1.62	1.32	0.87	0.46
2 x 44 x 170	2.89	2.38	1.92	1.58	1.13	0.63
2 x 44 x 195	3.34	2.73	2.22	1.83	1.39	0.81
2 x 44 x 220	3.78	3.09	2.52	2.08	1.65	0.99
2 x 47 x 145	2.45	2.09	1.68	1.38	0.97	0.53
2 x 47 x 170	2.97	2.46	2.00	1.64	1.25	0.72
2 x 47 x 195	3.42	2.83	2.31	1.90	1.53	0.91
2 x 47 x 220	3.87	3.20	2.61	2.16	1.78	1.11
2 x 50 x 145	2.52	2.15	1.75	1.43	1.08	0.60
2 x 50 x 170	3.04	2.54	2.07	1.70	1.37	0.80
2 x 50 x 195	3.50	2.92	2.39	1.97	1.62	1.01
2 x 50 x 220	3.95	3.31	2.70	2.24	1.85	1.23
2 x 63 x 145	2.77	2.34	1.99	1.64	1.35	0.92
2 x 63 x 170	3.29	2.76	2.35	1.95	1.60	1.19
2 x 63 x 195	3.78	3.18	2.71	2.25	1.86	1.46
2 x 63 x 220	4.27	3.60	3.07	2.56	2.12	1.73
2 x 75 x 145	2.96	2.49	2.17	1.82	1.50	1.22
2 x 75 x 170	3.49	2.94	2.57	2.15	1.78	1.46
2 x 75 x 195	4.01	3.38	2.96	2.49	2.06	1.70
2 x 75 x 220	4.53	3.83	3.36	2.82	2.34	1.94
CLS/ALS						
2 x 38 x 140	2.10	1.76	1.43	1.12	0.62	0.30
2 x 38 x 184	2.99	2.38	1.92	1.58	1.01	0.55
2 x 38 x 235	3.84	3.05	2.49	2.05	1.46	0.86
2 x 89 x 184	4.01	3.38	2.97	2.57	2.14	1.77
2 x 89 x 235	4.99	4.34	3.82	3.31	2.76	2.30
Interpolation is permitted for values between given loaded lengths (L)						

Table 4.4 Permissible clear spans of trimmers which support trimmed joists and non-loadbearing lightweight partitions

Imposed load 1.5 kN/m^2

Strength class C24 **Service Class 1 or 2**

Size of trimmer (mm)	Loaded length (m) L on *Figure 4.2*					
	1.0	2.0	3.0	4.0	5.0	6.0
	Clear spans (m) S on *Figure 4.2*					
2 x 38 x 145	2.46	2.10	1.81	1.28	0.73	0.36
2 x 38 x 170	2.97	2.48	2.14	1.60	0.95	0.51
2 x 38 x 195	3.43	2.86	2.47	1.93	1.18	0.66
2 x 38 x 220	3.87	3.24	2.80	2.26	1.42	0.82
2 x 44 x 145	2.61	2.21	1.92	1.58	0.94	0.50
2 x 44 x 170	3.13	2.62	2.27	1.92	1.21	0.68
2 x 44 x 195	3.60	3.02	2.63	2.22	1.48	0.87
2 x 44 x 220	4.07	3.42	2.98	2.52	1.75	1.06
2 x 47 x 145	2.68	2.27	1.97	1.68	1.05	0.57
2 x 47 x 170	3.21	2.68	2.33	1.99	1.33	0.77
2 x 47 x 195	3.69	3.09	2.69	2.31	1.63	0.97
2 x 47 x 220	4.17	3.50	3.06	2.62	1.92	1.18
2 x 50 x 145	2.75	2.32	2.02	1.74	1.15	0.64
2 x 50 x 170	3.28	2.74	2.39	2.07	1.46	0.86
2 x 50 x 195	3.77	3.16	2.76	2.39	1.77	1.08
2 x 50 x 220	4.26	3.58	3.13	2.71	2.08	1.30
2 x 63 x 145	3.02	2.53	2.20	1.94	1.63	0.98
2 x 63 x 170	3.55	2.98	2.60	2.29	1.94	1.26
2 x 63 x 195	4.07	3.43	3.00	2.65	2.25	1.54
2 x 63 x 220	4.60	3.88	3.40	3.01	2.56	1.82
2 x 75 x 145	3.20	2.69	2.35	2.07	1.81	1.29
2 x 75 x 170	3.76	3.17	2.77	2.45	2.15	1.63
2 x 75 x 195	4.32	3.65	3.20	2.83	2.49	1.97
2 x 75 x 220	4.81	4.13	3.62	3.21	2.82	2.31
CLS/ALS						
2 x 38 x 140	2.35	2.02	1.74	1.21	0.68	0.33
2 x 38 x 184	3.23	2.69	2.33	1.79	1.08	0.59
2 x 38 x 235	4.14	3.47	3.00	2.45	1.56	0.92
2 x 89 x 184	4.31	3.65	3.20	2.84	2.51	2.14
2 x 89 x 235	5.27	4.67	4.12	3.66	3.24	2.77
Interpolation is permitted for values between given loaded lengths (L)						

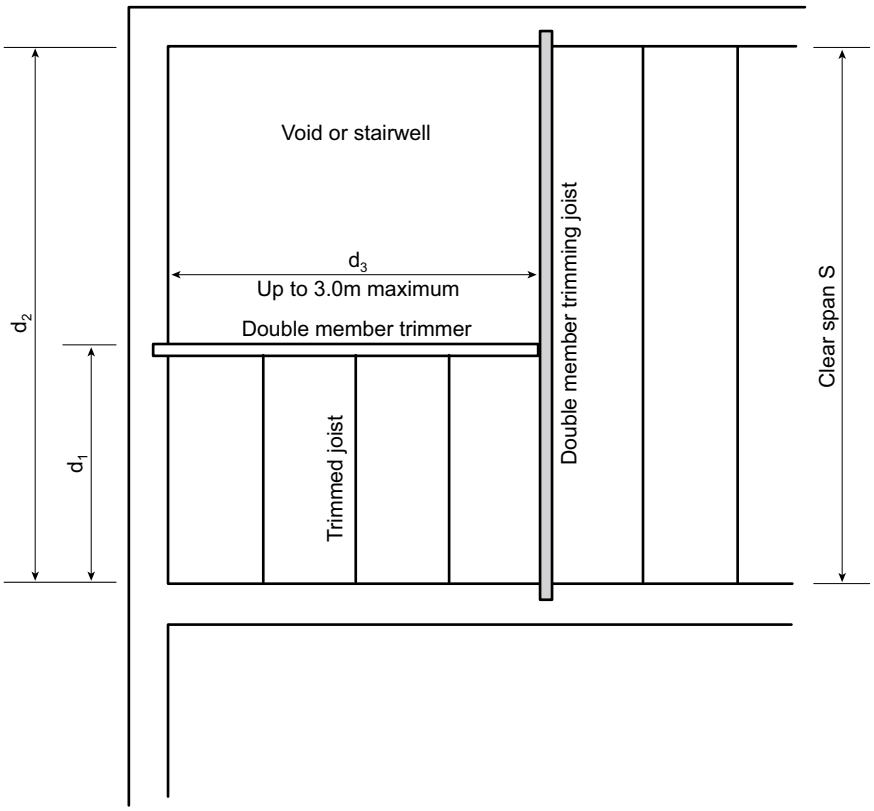


Figure 4.3 Plan on double member trimming joist supporting double member trimmer

Notes to Tables 4.5 and 4.6

The sizes of the double member trimming joists shown in *Figure 4.3* will support loads from the following:

- The double member trimmer; and
- A lightweight non-loadbearing partition weighing not more than 81.5 kg/m run (0.8 kN/m run) supported on the double member trimmer, and one supported on the double member trimming joist over length d_1 only; and
- An imposed load not exceeding 1.5 kN/m^2, or 1.4kN at the centre or end of the trimming joist

The dead load of the floor construction should not exceed 0.5 kN/m^2, excluding joist self-weight; this is taken into account in the span calculation.

The two joists should be securely fixed together, see clause 4.2.2.

No notching or drilling of a trimmer should be carried out unless calculated in accordance with *BS 5268-2: 2002*, except as necessary to accommodate the flanges of joist hangers.

The design has been based on *BS 5268-7.1: 1989*.

Table 4.5 Permissible clear spans of trimming joists which support a trimmer and non-loadbearing lightweight partitions

Strength class C16 **Service Class 1 or 2**

Size of trimming joist (mm)	See *Figure 4.3* for positions of d_1, d_2, d_3 and S								
	d_1/d_2 not more than 0.25			d_1/d_2 more than 0.25 but not more than 0.5			d_1/d_2 more than 0.5 but not more than 0.75		
	Dimension d_3 (m)			Dimension d_3 (m)			Dimension d_3 (m)		
	1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
	Clear spans (m) S on *Figure 4.3*								
2 x 38 x 145	2.28	2.15	1.98	2.23	1.98	1.72	2.25	1.95	1.70
2 x 38 x 170	2.76	2.62	2.38	2.71	2.35	2.04	2.65	2.30	2.02
2 x 38 x 195	3.25	3.10	2.94	3.12	2.71	2.37	3.05	2.64	2.33
2 x 38 x 220	3.79	3.63	3.34	3.53	3.07	2.69	3.44	2.97	2.64
2 x 44 x 145	2.42	2.29	2.17	2.38	2.15	1.87	2.38	2.12	1.85
2 x 44 x 170	2.94	2.79	2.60	2.86	2.55	2.22	2.79	2.49	2.19
2 x 44 x 195	3.45	3.29	3.19	3.29	2.94	2.57	3.21	2.85	2.53
2 x 44 x 220	4.01	3.82	3.62	3.72	3.32	2.92	3.62	3.21	2.84
2 x 47 x 145	2.49	2.36	2.24	2.44	2.24	1.95	2.43	2.20	1.93
2 x 47 x 170	3.02	2.87	2.84	2.92	2.64	2.31	2.86	2.58	2.28
2 x 47 x 195	3.55	3.38	3.29	3.37	3.04	2.67	3.28	2.95	2.62
2 x 47 x 220	4.10	3.91	3.74	3.81	3.44	3.03	3.71	3.32	2.94
2 x 50 x 145	2.56	2.42	2.30	2.51	2.30	2.01	2.49	2.27	1.99
2 x 50 x 170	3.09	2.94	2.91	2.99	2.72	2.39	2.92	2.65	2.35
2 x 50 x 195	3.68	3.46	3.37	3.44	3.14	2.76	3.35	3.05	2.69
2 x 50 x 220	4.19	3.99	3.82	3.89	3.56	3.14	3.79	3.43	3.04
2 x 63 x 145	2.81	2.67	2.54	2.75	2.50	2.30	2.69	2.49	2.27
2 x 63 x 170	3.39	3.23	3.17	3.24	2.96	2.72	3.16	2.92	2.65
2 x 63 x 195	4.01	3.82	3.66	3.73	3.42	3.14	3.63	3.36	3.05
2 x 63 x 220	4.52	4.32	4.14	4.20	3.87	3.56	4.09	3.80	3.44
2 x 75 x 145	3.01	2.87	2.84	2.92	2.67	2.46	2.86	2.65	2.47
2 x 75 x 170	3.67	3.46	3.37	3.44	3.15	2.92	3.36	3.11	2.90
2 x 75 x 195	4.25	4.06	3.89	3.95	3.63	3.38	3.85	3.57	3.34
2 x 75 x 220	4.75	4.58	4.40	4.46	4.10	3.83	4.34	4.02	3.77
CLS/ALS									
2 x 38 x 140	2.18	2.05	1.90	2.14	1.91	1.65	2.16	1.88	1.64
2 x 38 x 184	3.04	2.89	1.98	2.94	2.55	2.22	2.87	2.49	2.19
2 x 38 x 235	4.07	3.88	3.58	3.78	3.28	2.88	3.66	3.17	2.80
2 x 89 x 184	4.24	4.05	3.88	3.95	3.63	3.38	3.85	3.57	3.34
2 x 89 x 235	5.20	5.04	4.90	4.94	4.65	4.34	4.83	4.55	4.26

For values of d_3 between 1.0m and 3.0m interpolation is permitted

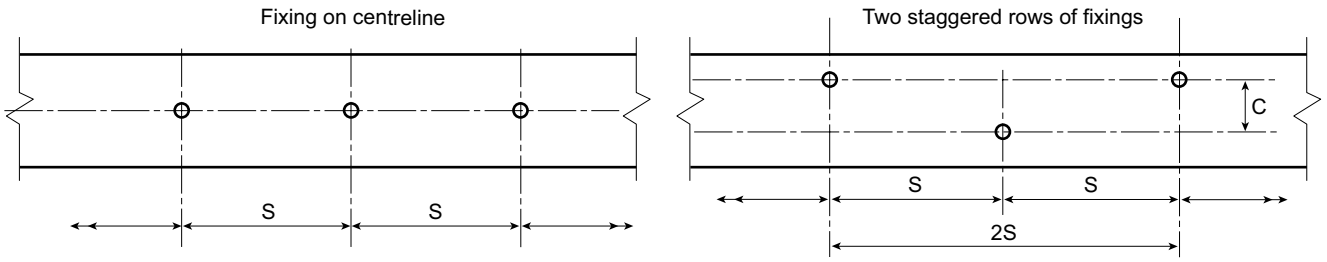
Table 4.6 Permissible clear spans of trimming joists which support a trimmer and non-loadbearing lightweight partitions

Strength class C24 **Service Class 1 or 2**

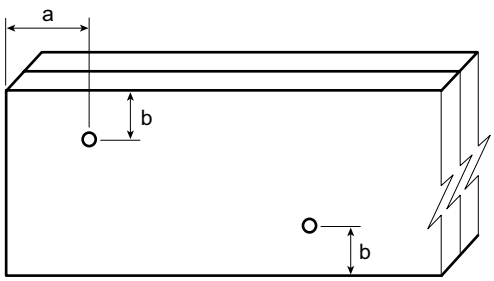
Size of trimming joist (mm)	See *Figure 4.3* for positions of d_1, d_2, d_3 and S								
	d_1/d_2 not more than 0.25			d_1/d_2 more than 0.25 but not more than 0.5			d_1/d_2 more than 0.5 but not more than 0.75		
	Dimension d_3 (m)			Dimension d_3 (m)			Dimension d_3 (m)		
	1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
	Clear spans (m) S on *Figure 4.3*								
2 x 38 x 145	2.53	2.43	2.33	2.45	2.25	2.06	2.43	2.24	2.07
2 x 38 x 170	3.06	2.95	2.84	2.93	2.66	2.45	2.86	2.64	2.45
2 x 38 x 195	3.59	3.46	3.29	3.37	3.08	2.84	3.29	3.03	2.79
2 x 38 x 220	4.11	3.91	3.74	3.81	3.49	3.23	3.71	3.43	3.16
2 x 44 x 145	2.69	2.58	2.49	2.60	2.37	2.18	2.56	2.36	2.19
2 x 44 x 170	3.25	3.13	3.01	3.08	2.81	2.59	3.01	2.78	2.59
2 x 44 x 195	3.81	3.64	3.47	3.55	3.25	3.00	3.46	3.20	2.98
2 x 44 x 220	4.32	4.12	3.94	4.01	3.68	3.41	3.91	3.62	3.38
2 x 47 x 145	2.76	2.66	2.56	2.67	2.43	2.24	2.62	2.42	2.25
2 x 47 x 170	3.33	3.21	3.08	3.16	2.88	2.66	3.08	2.84	2.65
2 x 47 x 195	3.90	3.72	3.56	3.63	3.32	3.08	3.54	3.27	3.05
2 x 47 x 220	4.41	4.21	4.03	4.10	3.77	3.50	3.99	3.70	3.46
2 x 50 x 145	2.83	2.72	2.62	2.74	2.49	2.29	2.68	2.47	2.30
2 x 50 x 170	3.42	3.29	3.15	3.22	2.94	2.72	3.15	2.90	2.71
2 x 50 x 195	3.99	3.81	3.64	3.71	3.40	3.15	3.61	3.34	3.12
2 x 50 x 220	4.51	4.30	4.12	4.19	3.85	3.58	4.07	3.78	3.54
2 x 63 x 145	3.11	2.99	2.89	2.97	2.71	2.50	2.90	2.68	2.50
2 x 63 x 170	3.73	3.58	3.42	3.49	3.20	2.96	3.41	3.15	2.94
2 x 63 x 195	4.31	4.12	3.95	4.01	3.69	3.42	3.91	3.63	3.39
2 x 63 x 220	4.81	4.65	4.46	4.53	4.16	3.89	4.40	4.07	3.84
2 x 75 x 145	3.32	3.21	3.08	3.15	2.88	2.66	3.08	2.84	2.65
2 x 75 x 170	3.98	3.80	3.63	3.70	3.40	3.16	3.61	3.35	3.13
2 x 75 x 195	4.57	4.37	4.18	4.25	3.92	3.65	4.13	3.85	3.60
2 x 75 x 220	5.02	4.86	4.71	4.76	4.42	4.12	4.66	4.32	4.05
CLS/ALS									
2 x 38 x 140	2.43	2.33	2.23	2.34	2.16	1.98	2.35	2.16	2.00
2 x 38 x 184	3.36	3.24	3.10	3.18	2.89	2.67	3.10	2.86	2.64
2 x 38 x 235	4.39	4.19	4.00	4.07	3.74	3.46	3.97	3.67	3.37
2 x 89 x 184	4.55	4.36	4.18	4.24	3.92	3.65	4.13	3.85	3.60
2 x 89 x 235	5.48	5.32	5.17	5.21	4.91	4.67	5.10	4.83	4.58
For values of d_3 between 1.0 m and 3.0 m interpolation is permitted									

4.2.2 Double member trimmers and trimming joists should be securely fixed together as shown in *Figure 4.4* and detailed in *Table 4.7* for trimmers and in *Table 4.8* for trimming joists.

4.2.3 As a minimum the fixing centres for double member trimming joists should be at centres of no more than twice the joist spacing. There should be at least one fastener per double joist.



S = spacing from *Tables 4.7* and *4.8*



Fixing type	Minimum dimension (mm)		
	a	b	c
Nail (without pre-drilled hole)	20d	5d	10d
Bolt	4d	4d	4d
51 mm connector	92 mm	35 mm	*
d – diameter of nail or bolt * – the spacings given in Table 4.9 provide adequate distance between connectors			

Figure 4.4 Fixings – spacing, edge and end distances

Table 4.7 Fixings for double member trimmers

		Trimmed joists span (m)					
		1.0	2.0	3.0	4.0	5.0	6.0
Nail diameter and length (mm)	**Member thickness (mm)**	**Fixing centres, S on *Figure 4.4* (mm)**					
3.75 x 75	2 x 38	635	295	180	115	65[a]	30[a]
4.00 x 90	2 x 47	800	375	225	145	85	40[a]
5.00 x 125	2 x 63	1165	545	330	210	120	60[a]
5.00 x 125	2 x 75	1150	535	325	210	120	60[a]
Bolt diameter (mm)[b]							
M12[c]	2 x 38	2070	965	585	375	215	105
M12[c]	2 x 47	2555	1195	725	465	265	135
M12[c]	2 x 63	3430	1600	970	625	360	180
M16[d]	2 x 75	5000	2335	1415	910	520	260
Double-sided toothed plate connectors between joists on M12 bolts (mm)[b,c]							
51	2 x 38	3935	1840	1115	715	410	205
51	2 x 47	3985	1865	1125	725	415	210
51	2 x 63	4380	2045	1240	795	460	230
51	2 x 75	4380	2045	1240	795	460	230

[a] Spacings fall below the minimum recommendation in *BS 5268-2: 2002* of 20d for nails on centre line; two staggered rows should be used

[b] Each trimmer should be fixed in line with a minimum of two bolts or connectors at 1/3 span positions

[c] Minimum 3 mm x 38 mm M12 washers should be provided under bolt head and nut, or 3 mm x 50 mm M12 washers if square connectors are used

[d] Minimum 4 mm x 48 mm M16 washers should be provided under bolt head and nut

Table 4.8 Fixings for double member trimming joists

Nail diameter and length (mm)	Member thickness (mm)	Fixing spacing (mm)
3.75 x 75	2 x 38	150
4.00 x 90	2 x 44, 47 or 50	200
5.00 x 125	2 x 63	300
5.00 x 125	2 x 75	300
Bolt diameter (mm)		
M12[a]	2 x 38 to 75	600
Double-sided toothed plate connectors between joists on M12 bolts (mm)[a]		
51	2 x 38	1200

[a] Members should be fixed together with a minimum of two bolts or connectors at 1/3rd span positions. M12 steel washers at least 3 mm x 38 mm should be provided under the bolt head and nut, or 3 mm x 50 mm M12 washers if square connectors are used

4.2.4 The loads which need to be supported from each end of the double member trimmer are given in *Tables 4.9* and *4.10*. The trimmer supports a lightweight partition weighing not more than 0.8 kN/m along its full length. In *Table 4.10* it also supports one end of an incoming partition and an additional joist parallel to the supported joists on the supported floor. Where the trimmer is supported off a double member trimming joist, the connection should be designed in accordance with *BS 5268-2: 2002* to ensure that the load from the trimmer is distributed equally between the members of the trimming joist at, or immediately adjacent to the connection. The fixings for this connection are required in addition to those given in *Table 4.8*.

Table 4.9 Loads to be supported at each end of double member trimmer, without incoming partition

Trimmer spans S on *Figure 4.2* (m)	Trimmed joist span, L, on *Figure 4.2* (m)					
	1	2	3	4	5	6
	Required support capacity (kN)					
1.0	1.1	1.1	1.1	1.2	1.3	1.5
1.5	1.8	1.8	1.9	2.0	2.3	2.6
2.0	2.5	2.6	2.7	2.9	3.2	3.7
2.5	3.2	3.3	3.5	3.7	4.2	
3.0	4.0	4.1	4.3	4.7		
3.5	4.7	4.9	5.2			
4.0	5.5	5.7				
4.5	6.3					
5.0	7.1					

Table 4.10 Loads to be supported at each end of double member trimmer, with incoming partition

Trimmer spans S on *Figure 4.2* (m)	Trimmed joist span, L, on *Figure 4.2* (m)					
	1	2	3	4	5	6
	Required support capacity (kN)					
1.0	1.5	1.5	1.6	1.7	1.9	2.2
1.5	2.2	2.3	2.3	2.5	2.8	3.2
2.0	2.9	3.0	3.1	3.4	3.8	4.3
2.5	3.6	3.7	3.9	4.2	4.8	
3.0	4.4	4.5	4.7	5.1		
3.5	5.1	5.3	5.6			
4.0	5.9	6.2				
4.5	6.8					
5.0	7.5					

5.0 Tables of sizes of ceiling members

5.1 Ceiling joists and binders supporting ceiling joists

5.1.1 *Tables 5.1* to *5.4* give permissible clear spans of simply supported ceiling joists and single span ceiling binders of solid timber used in traditional pitched roof constructions (ie excluding trussed rafter roofs) under specified loading, sizing and spacing conditions.

5.1.2 In *Figure 5.1*, the binders support the joists, so the connections between them need to be designed and installed properly to ensure that half the load on the two adjacent spans of joist can be transferred to the binder where it crosses the joists. Suitable nailed metal plate fixtures are recommended to ensure a good fixing.

5.1.3 Permissible clear spans have been calculated in accordance with *BS 5268-7.3: 1989* and *BS 5268-7.4: 1989*. Permissible clear span is the largest of: the clear distance between the first wall plate and first binder, the clear distances between binders, and the clear distance between last binder and second wall plate. The ceiling joists may be continuous or composed of shorter lengths, joined at the binder.

5.1.4 The method of calculating ceiling joist sizes does not take account of trimming (eg around flues) or other loads (eg water tanks).

5.1.5 The sizes, spacing and spans given in *Tables 5.1* to *5.4* will support the dead loads stated in the tables together with an imposed load not exceeding 0.25 kN/m^2 and a concentrated load of 0.9kN, acting together.

5.1.6 Lateral support should be provided in accordance with *BS 5268-2: 2002, Table 19*. Therefore, unless additional is provided, eg boarding fastened to the upper surface of the ceiling joists, the depth to breadth ratio of the joists and binders should not exceed 4:1.

5.1.7 The minimum bearing length at supports for ceiling joists and binders should be 35mm. 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.

5.1.8 Notching or drilling of ceiling joists and binders should not be carried out unless justified by specialist calculation.

5.1.9 The section sizes and tolerance classes of ceiling joists given in *Tables 5.1* and *5.2* should be machined on the width, ie the depth of the joist, or be ALS or CLS, to the tolerance classes specified in *BS EN 336: 2003, Tables NA 3* and *NA 4* respectively.

5.1.10 The section sizes of ceiling binders given in *Tables 5.3* and *5.4* should be sawn sections; or be machined on the width, ie the depth of the binder, or be ALS or CLS; to the tolerance classes specified in *BS EN 336: 2003, Tables NA 2, NA 3* and *NA 4* respectively.

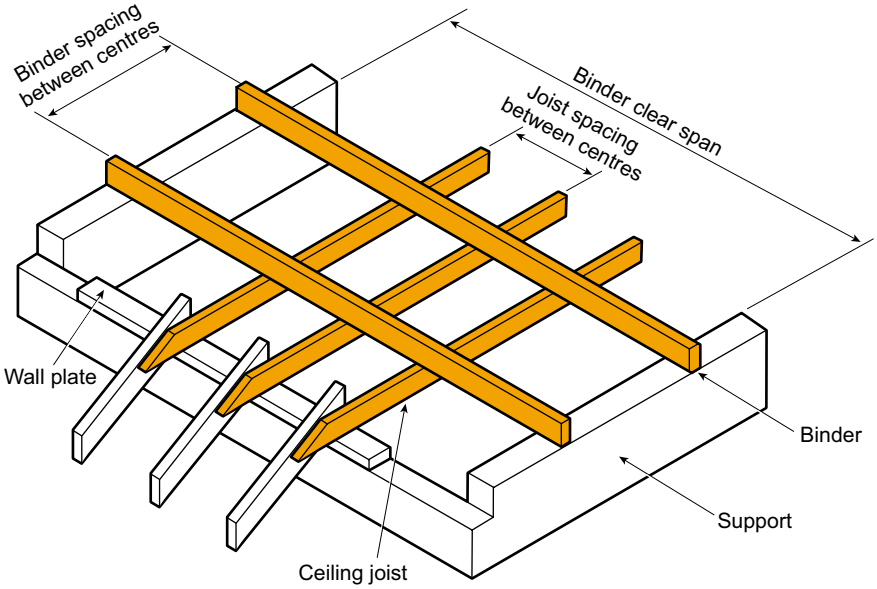


Figure 5.1 Ceiling joists and binder arrangement

Table 5.1 Permissible clear spans for ceiling joists

Imposed load not exceeding 0.25 kN/m^2

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist					
		F_d not more than 0.25			F_d more than 0.25 but not more than 0.5		
Size of purlin		Spacing of joists (mm)					
Breadth (mm)	Depth (mm)	400	450	600	400	450	600
		Maximum clear span (m)					
38	72	1.15	1.14	1.11	1.11	1.10	1.06
38	97	1.74	1.72	1.67	1.67	1.65	1.58
38	120	2.33	2.29	2.21	2.21	2.17	2.08
38	145	2.98	2.94	2.82	2.82	2.76	2.62
38	170	3.66	3.60	3.43	3.43	3.36	3.18
38	195	4.34	4.26	4.05	4.05	3.97	3.74
38	220	5.03	4.93	4.68	4.68	4.57	4.30
44	72	1.23	1.22	1.19	1.19	1.18	1.14
44	97	1.87	1.85	1.79	1.79	1.76	1.69
44	120	2.49	2.45	2.36	2.36	2.32	2.21
44	145	3.18	3.13	3.00	3.00	2.94	2.79
44	170	3.89	3.82	3.65	3.65	3.57	3.37
44	195	4.61	4.52	4.30	4.30	4.20	3.96
44	220	5.33	5.23	4.96	4.96	4.84	4.55
47	72	1.27	1.26	1.23	1.23	1.22	1.18
47	97	1.93	1.90	1.84	1.84	1.81	1.74
47	120	2.56	2.52	2.43	2.43	2.38	2.27
47	145	3.27	3.22	3.08	3.08	3.02	2.87
47	170	4.00	3.93	3.74	3.74	3.67	3.46
47	195	4.73	4.64	4.41	4.41	4.31	4.07
47	220	5.47	5.36	5.08	5.08	4.96	4.67
ALS/CLS							
38	89	1.55	1.53	1.49	1.49	1.47	1.41
38	140	2.85	2.81	2.69	2.69	2.64	2.51
38	184	4.04	3.97	3.78	3.78	3.70	3.49

Table 5.2 Permissible clear spans for ceiling joists

Imposed load not exceeding 0.25 kN/m^2

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist					
		F_d not more than 0.25			F_d more than 0.25 but not more than 0.5		
Size of purlin		Spacing of joists (mm)					
Breadth (mm)	Depth (mm)	400	450	600	400	450	600
		Maximum clear span (m)					
38	72	1.27	1.26	1.23	1.23	1.21	1.17
38	97	1.92	1.90	1.83	1.83	1.81	1.73
38	120	2.55	2.52	2.42	2.42	2.38	2.27
38	145	3.26	3.21	3.07	3.07	3.01	2.86
38	170	3.99	3.92	3.74	3.74	3.66	3.46
38	195	4.73	4.64	4.40	4.40	4.31	4.06
38	220	5.46	5.36	5.08	5.08	4.96	4.66
44	72	1.36	1.35	1.32	1.32	1.30	1.26
44	97	2.05	2.03	1.96	1.96	1.93	1.85
44	120	2.72	2.68	2.58	2.58	2.53	2.41
44	145	3.47	3.42	3.27	3.27	3.20	3.03
44	170	4.24	4.16	3.96	3.96	3.88	3.66
44	195	5.01	4.91	4.66	4.66	4.56	4.29
44	220	5.78	5.66	5.37	5.37	5.24	4.92
47	72	1.41	1.39	1.36	1.36	1.34	1.29
47	97	2.12	2.09	2.02	2.02	1.99	1.90
47	120	2.80	2.76	2.65	2.65	2.60	2.48
47	145	3.57	3.51	3.36	3.36	3.29	3.12
47	170	4.35	4.27	4.07	4.07	3.98	3.76
47	195	5.14	5.04	4.78	4.78	4.68	4.40
47	220	5.93	5.81	5.50	5.50	5.37	5.05
ALS/CLS							
38	89	1.71	1.69	1.64	1.64	1.61	1.55
38	140	3.12	3.07	2.94	2.94	2.89	2.74
38	184	4.40	4.32	4.11	4.11	4.02	3.79

Table 5.3 Permissible clear spans for ceiling binders

Imposed load not exceeding 0.25 kN/m^2

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)											
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50					
Size of binder		Spacing of binders (mm)											
Breadth (mm)	Depth (mm)	1200	1500	1800	2100	2400	2700	1200	1500	1800	2100	2400	2700
		Maximum clear span (m)											
44	150	2.14	2.03	1.94	1.86			1.96	1.84				
44	175	2.56	2.42	2.31	2.21	2.13	2.06	2.33	2.19	2.08	1.99	1.91	1.84
44	200	2.98	2.82	2.68	2.57	2.47	2.38	2.71	2.54	2.41	2.30	2.21	2.13
47	150	2.20	2.08	1.99	1.91	1.84		2.01	1.89	1.80			
47	175	2.63	2.49	2.37	2.27	2.19	2.11	2.39	2.25	2.14	2.04	1.96	1.89
47	200	3.06	2.89	2.75	2.63	2.53	2.45	2.78	2.61	2.47	2.36	2.27	2.18
63	125	2.00	1.90	1.82				1.84					
63	150	2.48	2.35	2.24	2.15	2.07	2.00	2.26	2.13	2.03	1.94	1.86	
63	175	2.95	2.79	2.66	2.55	2.46	2.37	2.69	2.53	2.40	2.29	2.20	2.12
63	200	3.43	3.24	3.08	2.95	2.84	2.74	3.11	2.92	2.77	2.65	2.54	2.45
63	225	3.91	3.68	3.50	3.35	3.22	3.11	3.54	3.32	3.14	3.00	2.88	2.77
75	125	2.15	2.04	1.95	1.88	1.81		1.97	1.86				
75	150	2.65	2.51	2.40	2.30	2.22	2.15	2.42	2.28	2.17	2.07	1.99	1.92
75	175	3.16	2.98	2.84	2.72	2.62	2.54	2.87	2.70	2.56	2.45	2.35	2.27
75	200	3.66	3.45	3.29	3.15	3.03	2.93	3.32	3.12	2.96	2.83	2.71	2.62
75	225	4.16	3.93	3.73	3.57	3.44	3.32	3.77	3.54	3.36	3.20	3.07	2.96

Table 5.4 Permissible clear spans for ceiling binders

Imposed load not exceeding 0.25 kN/m^2

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)											
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50					
Size of binder		Spacing of binders (mm)											
Breadth (mm)	Depth (mm)	1200	1500	1800	2100	2400	2700	1200	1500	1800	2100	2400	2700
		Maximum clear span (m)											
44	150	2.33	2.21	2.11	2.02	1.95	1.89	2.13	2.01	1.91	1.82		
44	175	2.78	2.63	2.51	2.40	2.31	2.23	2.53	2.38	2.26	2.16	2.07	2.00
44	200	3.24	3.05	2.91	2.78	2.68	2.58	2.94	2.76	2.62	2.50	2.39	2.31
47	150	2.39	2.27	2.16	2.08	2.00	1.94	2.19	2.06	1.96	1.87	1.80	
47	175	2.86	2.70	2.57	2.46	2.37	2.29	2.60	2.45	2.32	2.22	2.13	2.05
47	200	3.32	3.13	2.98	2.85	2.74	2.65	3.01	2.83	2.68	2.56	2.46	2.37
63	125	2.18	2.07	1.98	1.90	1.83		2.00	1.89				
63	150	2.69	2.54	2.43	2.33	2.24	2.17	2.45	2.31	2.20	2.10	2.02	1.95
63	175	3.20	3.02	2.88	2.76	2.66	2.57	2.91	2.74	2.60	2.48	2.38	2.30
63	200	3.71	3.50	3.33	3.19	3.07	2.96	3.37	3.16	3.00	2.86	2.75	2.65
63	225	4.22	3.97	3.78	3.62	3.48	3.36	3.82	3.59	3.40	3.24	3.11	3.00
75	125	2.33	2.21	2.12	2.03	1.96	1.90	2.14	2.02	1.92	1.84		
75	150	2.87	2.72	2.59	2.49	2.40	2.32	2.62	2.47	2.35	2.25	2.16	2.08
75	175	3.41	3.23	3.07	2.94	2.84	2.74	3.11	2.92	2.77	2.65	2.55	2.46
75	200	3.95	3.73	3.55	3.40	3.27	3.16	3.59	3.37	3.20	3.05	2.93	2.83
75	225	4.49	4.23	4.03	3.85	3.71	3.58	4.07	3.82	3.62	3.46	3.32	3.20

6.0 Tables of sizes of pitched roof members

6.1 Rafters and purlins supporting rafters

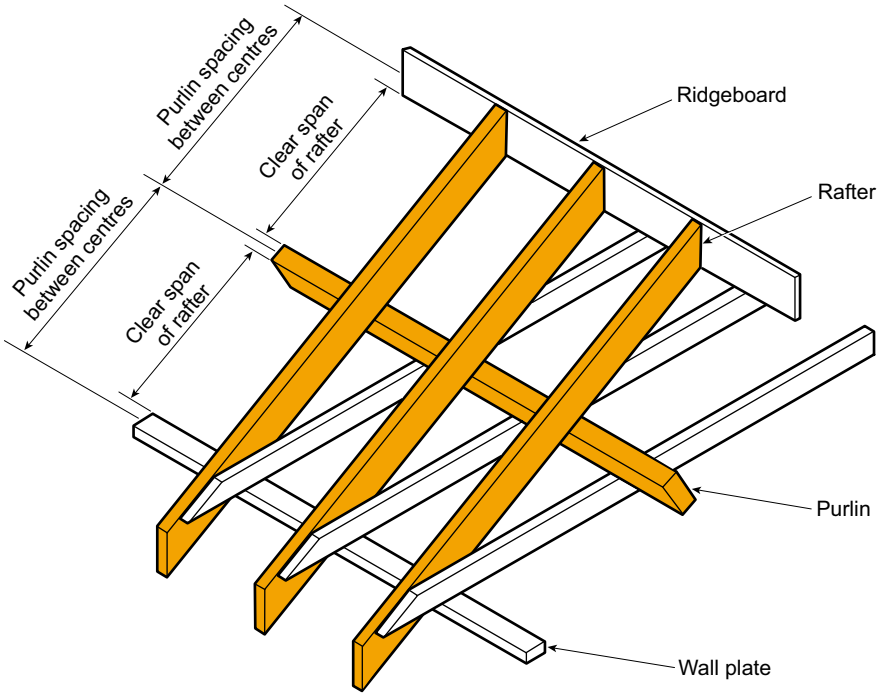


Figure 6.1 Typical rafters and purlin arrangement

6.1.1 *Tables 6.1* to *6.24* give permissible clear spans of simply supported rafters and purlins of solid timber used in traditional pitched roof constructions with a slope from 15° to 45° under specified loading, sizing and spacing conditions.

6.1.2 These span tables do not apply to trussed rafter roofs.

6.1.3 Permissible clear spans have been calculated in accordance with *BS 5268-7.5: 1990*, and *BS 5268-7.6: 1990*. It is assumed that the rafters are non-continuous over the purlins, but they may be continuous. It is assumed that the purlins are single span members but they may be continuous over a support.

6.1.4 When the spans of the rafters or purlins are unequal the section sizes should be determined by the longest span. For a purlin spanning between two supporting walls, the clear span is taken as the largest of: the clear distance between the first gable wall (or post) and first rafter, the clear distances between rafters, and the clear distance between last rafter and second gable wall (or post).

6.1.5 For *Tables 6.1* to *6.24* the values have been calculated according to *BS 5268-7* with an upper limit on the roof slope of 75° for the imposed snow load. This is not in accordance with *BS 6399-3* which sets the upper limit at 60°.

6.1.6 The method of calculation makes no allowance for any contribution of other parts of the roof structure or covering to the load carrying capacity of the rafters although it is assumed that the tiling battens are capable of providing lateral load distribution and lateral support.

6.1.7 The span tables cover “canted” purlins installed perpendicular to the slope of the roof. Horizontal thrust transmitted by the rafters is assumed to be restrained by the ceiling joists or other suitable means.

6.1.8 The sizes, spacing and spans given in *Tables 6.1* to *6.24* will support the dead loads stated in the tables together with either an imposed load of 0.75 kN/m^2 or 1.0 kN/m^2 or a concentrated load of 0.9kN. The dead load is measured on slope and the snow load is measured on plan. See *Figure 3.1* and *Table 3.1* for guidance on the snow load relevant for a particular site.

6.1.9 For the purlins lateral support should be provided in accordance with *BS 5268-2: 2002, Table 19*. Therefore, unless additional support is provided, their depth to breadth ratio should not exceed 4:1.

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

6.1.11 Unless justified by specialist calculation, the minimum bearing length at supports for rafters should be 35mm and 50mm for purlins. However it may sometimes be necessary to provide longer bearing to accommodate fixings or for practical reasons.

6.1.12 The section sizes of rafters and purlins given in *Tables 6.1* to *6.24* should be sawn sections; or be machined on the width, ie the depth of the rafter or purlin, or be ALS or CLS; to the tolerance classes specified in *BS EN 336: 2003, Tables NA 2, NA 3* and *NA 4* respectively.

Table 6.1 Permissible clear spans for common or jack rafters

Slope of roof 15° or more but less than 22.5° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.11	2.06	1.94	1.94	1.89	1.75	1.81	1.75	1.62
38	125	2.91	2.80	2.54	2.65	2.57	2.35	2.45	2.37	2.16
38	150	3.49	3.35	3.05	3.28	3.15	2.80	3.10	2.98	2.59
38	195	4.51	4.34	3.92	4.25	4.09	3.58	4.03	3.82	3.31
44	100	2.36	2.30	2.14	2.16	2.10	1.95	2.01	1.95	1.79
44	125	3.06	2.94	2.67	2.88	2.76	2.51	2.71	2.61	2.34
44	150	3.66	3.52	3.20	3.44	3.31	3.00	3.27	3.14	2.78
44	195	4.73	4.56	4.15	4.46	4.29	3.85	4.23	4.07	3.56
47	100	2.48	2.41	2.19	2.27	2.20	2.04	2.11	2.04	1.88
47	125	3.12	3.01	2.73	2.94	2.83	2.57	2.79	2.68	2.42
47	150	3.74	3.60	3.27	3.52	3.38	3.08	3.34	3.21	2.87
47	195	4.83	4.65	4.24	4.55	4.38	3.97	4.33	4.16	3.68
ALS/CLS										
38	89	1.76	1.73	1.63	1.63	1.59	1.49	1.53	1.49	1.38
38	140	3.26	3.13	2.85	3.06	2.95	2.62	2.84	2.74	2.42
38	184	4.26	4.10	3.71	4.01	3.86	3.39	3.81	3.61	3.14

Table 6.2 Permissible clear spans for common or jack rafters

Slope of roof 15° or more but less than 22.5° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.50	2.41	2.18	2.35	2.26	2.05	2.23	2.14	1.95
38	125	3.12	3.00	2.73	2.93	2.82	2.56	2.78	2.68	2.43
38	150	3.73	3.59	3.27	3.51	3.38	3.07	3.33	3.21	2.91
38	195	4.83	4.65	4.23	4.55	4.38	3.98	4.32	4.16	3.77
44	100	2.62	2.53	2.29	2.47	2.37	2.16	2.34	2.25	2.04
44	125	3.27	3.15	2.86	3.08	2.96	2.69	2.92	2.81	2.55
44	150	3.91	3.77	3.43	3.68	3.55	3.22	3.50	3.37	3.06
44	195	5.06	4.87	4.44	4.77	4.59	4.18	4.53	4.36	3.96
47	100	2.68	2.58	2.35	2.52	2.43	2.20	2.40	2.30	2.09
47	125	3.34	3.22	2.93	3.15	3.03	2.75	2.99	2.87	2.61
47	150	4.00	3.85	3.50	3.76	3.62	3.29	3.58	3.44	3.13
47	195	5.17	4.98	4.54	4.87	4.69	4.27	4.63	4.46	4.05
ALS/CLS										
38	89	2.23	2.14	1.95	2.10	2.01	1.83	1.95	1.89	1.73
38	140	3.49	3.35	3.05	3.28	3.15	2.87	3.11	2.99	2.72
38	184	4.56	4.39	4.00	4.29	4.13	3.76	4.08	3.92	3.56

Table 6.3 Permissible clear spans for purlins supporting rafters

Slope of roof 15° or more but less than 22.5° **Imposed load F_i = 0.75 kN/m^2** **Single span**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.09	1.95	1.85				1.96	1.83					1.85					
63	175	2.43	2.28	2.15	2.05	1.97	1.89	2.28	2.14	2.02	1.92	1.84		2.16	2.02	1.91	1.82		
63	200	2.78	2.60	2.46	2.34	2.24	2.16	2.61	2.44	2.31	2.20	2.10	2.00	2.47	2.31	2.18	2.07	1.95	1.85
63	225	3.12	2.92	2.77	2.64	2.52	2.43	2.93	2.74	2.59	2.47	2.35	2.23	2.77	2.60	2.45	2.31	2.18	2.06
63	275	3.81	3.57	3.38	3.22	3.08	2.95	3.58	3.35	3.17	3.01	2.84	2.69	3.39	3.17	2.99	2.79	2.63	2.49
75	125	1.85																	
75	150	2.22	2.08	1.97	1.88			2.08	1.95	1.85				1.97	1.85				
75	175	2.58	2.42	2.29	2.19	2.10	2.02	2.43	2.28	2.15	2.05	1.96	1.89	2.30	2.15	2.04	1.94	1.86	
75	200	2.95	2.77	2.62	2.50	2.39	2.30	2.77	2.60	2.46	2.34	2.24	2.16	2.63	2.46	2.33	2.21	2.12	2.02
75	225	3.32	3.11	2.95	2.81	2.69	2.59	3.12	2.92	2.76	2.63	2.52	2.42	2.95	2.77	2.62	2.49	2.38	2.26

Table 6.4 Permissible clear spans for purlins supporting rafters

Slope of roof 15° or more but less than 22.5° **Imposed load F_i = 0.75 kN/m^2** **Single span**

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.24	2.10	1.99	1.90	1.82		2.11	1.98	1.87				2.00	1.87				
63	175	2.62	2.45	2.32	2.21	2.12	2.04	2.46	2.30	2.18	2.08	1.99	1.91	2.33	2.18	2.06	1.96	1.88	1.80
63	200	2.99	2.80	2.65	2.53	2.42	2.33	2.81	2.63	2.49	2.37	2.27	2.18	2.66	2.49	2.36	2.24	2.15	2.06
63	225	3.36	3.15	2.98	2.84	2.72	2.62	3.16	2.96	2.80	2.67	2.55	2.45	2.99	2.80	2.65	2.52	2.41	2.32
63	275	4.10	3.84	3.64	3.47	3.32	3.20	3.85	3.61	3.42	3.25	3.12	3.00	3.65	3.42	3.23	3.08	2.95	2.83
75	125	1.99	1.87					1.87											
75	150	2.38	2.24	2.12	2.02	1.94	1.87	2.24	2.10	1.99	1.90	1.82		2.13	1.99	1.89			
75	175	2.78	2.61	2.47	2.36	2.26	2.17	2.61	2.45	2.32	2.21	2.12	2.04	2.48	2.32	2.20	2.09	2.00	1.93
75	200	3.17	2.98	2.82	2.69	2.58	2.48	2.98	2.80	2.65	2.53	2.42	2.33	2.83	2.65	2.51	2.39	2.29	2.20
75	225	3.57	3.35	3.17	3.03	2.90	2.79	3.35	3.15	2.98	2.84	2.72	2.62	3.18	2.98	2.82	2.69	2.57	2.48

Table 6.5 Permissible clear spans for common or jack rafters

Slope of roof 15° or more but not more than 22.5° **Imposed load F_i = 1.00 kN/m^2** **Single span**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.11	2.06	1.91	1.94	1.89	1.75	1.81	1.75	1.62
38	125	2.74	2.64	2.36	2.60	2.50	2.18	2.45	2.35	2.04
38	150	3.29	3.16	2.80	3.12	2.99	2.59	2.96	2.80	2.42
38	195	4.26	4.09	3.59	4.04	3.83	3.32	3.79	3.58	3.10
44	100	2.31	2.22	2.02	2.16	2.10	1.90	2.01	1.95	1.77
44	125	2.88	2.77	2.52	2.73	2.63	2.35	2.61	2.51	2.19
44	150	3.45	3.32	3.01	3.27	3.15	2.79	3.13	3.00	2.61
44	195	4.47	4.30	3.86	4.24	4.08	3.57	4.06	3.85	3.34
47	100	2.36	2.27	2.06	2.24	2.15	1.95	2.11	2.04	1.83
47	125	2.94	2.83	2.57	2.79	2.69	2.42	2.67	2.57	2.27
47	150	3.52	3.39	3.08	3.35	3.22	2.88	3.20	3.08	2.69
47	195	4.56	4.39	3.98	4.33	4.17	3.69	4.14	3.97	3.45
ALS/CLS										
38	89	1.76	1.73	1.63	1.63	1.59	1.49	1.53	1.49	1.38
38	140	3.07	2.95	2.63	2.91	2.80	2.43	2.78	2.62	2.27
38	184	4.02	3.87	3.40	3.82	3.62	3.14	3.59	3.39	2.94

Table 6.6 Permissible clear spans for common or jack rafters

Slope of roof 15.0° or more but less than 22.5° **Imposed load F_i = 1.00 kN/m^2** **Single span**

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.36	2.27	2.06	2.24	2.15	1.95	2.14	2.05	1.86
38	125	2.94	2.83	2.57	2.79	2.68	2.43	2.66	2.56	2.32
38	150	3.52	3.38	3.07	3.34	3.21	2.91	3.19	3.07	2.78
38	195	4.56	4.38	3.99	4.33	4.16	3.78	4.14	3.98	3.61
44	100	2.47	2.38	2.16	2.35	2.26	2.05	2.24	2.16	1.96
44	125	3.08	2.97	2.70	2.93	2.82	2.56	2.80	2.69	2.44
44	150	3.69	3.55	3.23	3.51	3.37	3.06	3.35	3.22	2.93
44	195	4.78	4.60	4.18	4.54	4.37	3.97	4.34	4.18	3.79
47	100	2.53	2.43	2.21	2.40	2.31	2.09	2.29	2.20	2.00
47	125	3.15	3.03	2.76	2.99	2.88	2.61	2.86	2.75	2.50
47	150	3.77	3.63	3.30	3.58	3.45	3.13	3.43	3.29	2.99
47	195	4.88	4.70	4.28	4.64	4.46	4.06	4.44	4.27	3.88
ALS/CLS										
38	89	2.10	2.02	1.83	1.99	1.91	1.74	1.90	1.83	1.66
38	140	3.29	3.16	2.87	3.12	3.00	2.72	2.98	2.87	2.60
38	184	4.30	4.14	3.76	4.09	3.93	3.57	3.91	3.76	3.41

Table 6.7 Permissible clear spans for purlins supporting rafters

Slope of roof 15° or more but less than 22.5° **Imposed load F_i = 1.00 kN/m^2** **Single span**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	1.96	1.84					1.86											
63	175	2.29	2.14	2.02	1.93	1.84		2.16	2.03	1.91	1.82			2.06	1.93	1.82			
63	200	2.61	2.45	2.31	2.20	2.10	2.00	2.47	2.31	2.19	2.08	1.95	1.85	2.36	2.20	2.08	1.94	1.82	
63	225	2.94	2.75	2.60	2.47	2.36	2.24	2.78	2.60	2.46	2.32	2.18	2.07	2.65	2.48	2.32	2.17	2.04	1.93
63	275	3.58	3.36	3.17	3.02	2.85	2.70	3.39	3.18	3.00	2.80	2.64	2.50	3.24	3.03	2.80	2.62	2.46	2.33
75	150	2.09	1.96	1.85				1.98	1.85					1.89					
75	175	2.43	2.28	2.16	2.05	1.97	1.89	2.30	2.16	2.04	1.94	1.86		2.20	2.06	1.94	1.85		
75	200	2.78	2.60	2.46	2.35	2.25	2.16	2.63	2.47	2.33	2.22	2.12	2.03	2.51	2.35	2.22	2.11	2.00	1.89
75	225	3.12	2.93	2.77	2.64	2.53	2.43	2.96	2.77	2.62	2.49	2.39	2.26	2.82	2.64	2.50	2.37	2.23	2.11

Table 6.8 Permissible clear spans for purlins supporting rafters

Slope of roof 15° or more but less than 22.5° **Imposed load F_i = 1.00 kN/m^2** **Single span**

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.11	1.98	1.87				2.00	1.87					1.91					
63	175	2.46	2.31	2.18	2.08	1.99	1.91	2.33	2.19	2.07	1.97	1.88	1.81	2.23	2.08	1.97	1.87		
63	200	2.81	2.64	2.49	2.38	2.27	2.19	2.67	2.50	2.36	2.25	2.15	2.06	2.54	2.38	2.25	2.14	2.04	1.96
63	225	3.16	2.96	2.80	2.67	2.56	2.46	3.00	2.81	2.65	2.53	2.42	2.32	2.86	2.68	2.53	2.40	2.30	2.20
63	275	3.86	3.62	3.42	3.26	3.12	3.00	3.66	3.43	3.24	3.08	2.95	2.84	3.49	3.27	3.09	2.94	2.81	2.69
75	125	1.87																	
75	150	2.25	2.11	1.99	1.90	1.82		2.13	2.00	1.89				2.03	1.90	1.80			
75	175	2.62	2.46	2.32	2.22	2.12	2.04	2.48	2.33	2.20	2.10	2.01	1.93	2.37	2.22	2.10	2.00	1.91	1.84
75	200	2.99	2.80	2.66	2.53	2.42	2.33	2.84	2.66	2.51	2.40	2.29	2.21	2.71	2.54	2.40	2.28	2.18	2.10
75	225	3.36	3.15	2.99	2.85	2.73	2.62	3.19	2.99	2.83	2.69	2.58	2.48	3.04	2.85	2.70	2.57	2.46	2.36

Table 6.9 Permissible clear spans for common or jack rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.19	2.14	2.02	2.02	1.96	1.83	1.88	1.83	1.69
38	125	2.98	2.87	2.61	2.76	2.68	2.44	2.55	2.47	2.26
38	150	3.57	3.44	3.12	3.35	3.23	2.93	3.18	3.06	2.73
38	195	4.62	4.45	4.05	4.34	4.18	3.78	4.12	3.96	3.50
44	100	2.45	2.40	2.19	2.25	2.19	2.03	2.10	2.03	1.87
44	125	3.13	3.01	2.74	2.94	2.83	2.57	2.79	2.68	2.43
44	150	3.75	3.60	3.28	3.52	3.39	3.08	3.34	3.21	2.92
44	195	4.85	4.67	4.25	4.56	4.39	3.99	4.33	4.16	3.76
47	100	2.57	2.47	2.24	2.36	2.29	2.10	2.20	2.13	1.96
47	125	3.20	3.08	2.80	3.01	2.89	2.63	2.85	2.74	2.49
47	150	3.83	3.68	3.35	3.60	3.46	3.15	3.41	3.28	2.98
47	195	4.95	4.77	4.34	4.66	4.48	4.08	4.42	4.25	3.87
ALS/CLS										
38	89	1.83	1.80	1.70	1.70	1.66	1.55	1.60	1.55	1.44
38	140	3.34	3.21	2.92	3.13	3.01	2.73	2.96	2.86	2.56
38	184	4.37	4.20	3.82	4.10	3.95	3.58	3.89	3.74	3.31

Table 6.10 Permissible clear spans for common or jack rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.56	2.46	2.24	2.40	2.31	2.10	2.28	2.19	1.99
38	125	3.19	3.07	2.79	3.00	2.88	2.62	2.84	2.73	2.48
38	150	3.82	3.68	3.34	3.59	3.45	3.14	3.41	3.28	2.97
38	195	4.94	4.76	4.33	4.65	4.47	4.07	4.41	4.25	3.86
44	100	2.69	2.59	2.35	2.52	2.43	2.21	2.39	2.30	2.09
44	125	3.35	3.22	2.93	3.15	3.03	2.75	2.99	2.87	2.61
44	150	4.01	3.86	3.51	3.77	3.63	3.30	3.58	3.44	3.12
44	195	5.18	4.99	4.55	4.88	4.69	4.27	4.63	4.46	4.05
47	100	2.75	2.64	2.40	2.58	2.48	2.25	2.45	2.35	2.14
47	125	3.42	3.29	3.00	3.22	3.09	2.81	3.05	2.94	2.67
47	150	4.09	3.94	3.59	3.85	3.70	3.37	3.65	3.52	3.19
47	195	5.29	5.10	4.65	4.98	4.79	4.37	4.73	4.55	4.14
ALS/CLS										
38	89	2.28	2.19	1.99	2.14	2.06	1.87	2.03	1.95	1.77
38	140	3.57	3.44	3.12	3.35	3.23	2.93	3.18	3.06	2.78
38	184	4.67	4.50	4.09	4.39	4.23	3.84	4.17	4.01	3.64

Table 6.11 Permissible clear spans for purlins supporting rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.14	2.00	1.90	1.81			2.00	1.88					1.90					
63	175	2.49	2.34	2.21	2.11	2.02	1.94	2.34	2.19	2.07	1.97	1.88	1.81	2.21	2.07	1.95	1.86		
63	200	2.84	2.67	2.52	2.41	2.30	2.22	2.67	2.50	2.36	2.25	2.15	2.06	2.52	2.36	2.23	2.12	2.01	1.91
63	225	3.20	3.00	2.84	2.70	2.59	2.49	3.00	2.81	2.66	2.53	2.42	2.31	2.84	2.66	2.51	2.39	2.25	2.13
63	275	3.90	3.66	3.46	3.30	3.16	3.04	3.66	3.43	3.24	3.09	2.94	2.79	3.47	3.24	3.07	2.89	2.72	2.57
75	125	1.90																	
75	150	2.27	2.13	2.02	1.92	1.84		2.13	2.00	1.89	1.80			2.02	1.89				
75	175	2.65	2.48	2.35	2.24	2.15	2.07	2.48	2.33	2.20	2.10	2.01	1.93	2.35	2.20	2.08	1.98	1.90	1.83
75	200	3.02	2.84	2.69	2.56	2.46	2.36	2.84	2.66	2.52	2.40	2.30	2.21	2.69	2.52	2.38	2.27	2.17	2.09
75	225	3.40	3.19	3.02	2.88	2.76	2.66	3.19	2.99	2.83	2.70	2.58	2.48	3.02	2.83	2.68	2.55	2.44	2.33

Table 6.12 Permissible clear spans for purlins supporting rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (mm)																	
63	150	2.30	2.16	2.04	1.95	1.87		2.16	2.02	1.91	1.82			2.04	1.91	1.81			
63	175	2.68	2.51	2.38	2.27	2.18	2.09	2.52	2.36	2.23	2.13	2.04	1.96	2.38	2.23	2.11	2.01	1.92	1.85
63	200	3.06	2.87	2.72	2.59	2.48	2.39	2.87	2.69	2.55	2.43	2.33	2.24	2.72	2.55	2.41	2.30	2.20	2.11
63	225	3.44	3.23	3.06	2.91	2.79	2.69	3.23	3.03	2.87	2.73	2.61	2.51	3.06	2.87	2.71	2.58	2.47	2.37
63	275	4.20	3.94	3.73	3.56	3.41	3.28	3.94	3.70	3.50	3.33	3.19	3.07	3.73	3.50	3.31	3.15	3.02	2.90
75	125	2.04	1.91	1.81				1.91						1.81					
75	150	2.44	2.29	2.17	2.07	1.99	1.91	2.29	2.15	2.04	1.94	1.86		2.17	2.04	1.93	1.84		
75	175	2.85	2.67	2.53	2.42	2.32	2.23	2.67	2.51	2.38	2.26	2.17	2.09	2.53	2.38	2.25	2.14	2.05	1.97
75	200	3.25	3.05	2.89	2.76	2.65	2.55	3.05	2.87	2.71	2.59	2.48	2.38	2.89	2.71	2.57	2.45	2.34	2.25
75	225	3.65	3.43	3.25	3.10	2.97	2.86	3.43	3.22	3.05	2.91	2.79	2.68	3.25	3.05	2.89	2.75	2.64	2.53

Table 6.13 Permissible clear spans for common or jack rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.19	2.14	1.97	2.02	1.96	1.83	1.88	1.83	1.69
38	125	2.81	2.70	2.45	2.67	2.56	2.31	2.54	2.44	2.15
38	150	3.37	3.24	2.94	3.19	3.07	2.74	3.05	2.93	2.56
38	195	4.36	4.20	3.81	4.14	3.98	3.52	3.95	3.78	3.28
44	100	2.37	2.28	2.07	2.24	2.16	1.96	2.10	2.03	1.87
44	125	2.95	2.84	2.58	2.80	2.69	2.44	2.67	2.57	2.32
44	150	3.54	3.40	3.09	3.35	3.22	2.93	3.20	3.08	2.75
44	195	4.58	4.41	4.01	4.34	4.18	3.78	4.15	3.99	3.53
47	100	2.42	2.33	2.11	2.29	2.21	2.00	2.19	2.10	1.91
47	125	3.02	2.90	2.64	2.86	2.75	2.50	2.73	2.63	2.38
47	150	3.61	3.48	3.16	3.43	3.29	2.99	3.27	3.15	2.85
47	195	4.68	4.50	4.09	4.44	4.27	3.88	4.24	4.08	3.64
ALS/CLS										
38	89	1.83	1.80	1.70	1.70	1.66	1.55	1.60	1.55	1.44
38	140	3.15	3.03	2.75	2.98	2.87	2.57	2.85	2.73	2.40
38	184	4.12	3.96	3.60	3.91	3.76	3.33	3.73	3.58	3.11

Table 6.14 Permissible clear spans for common or jack rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.42	2.32	2.11	2.29	2.20	2.00	2.18	2.10	1.90
38	125	3.01	2.90	2.63	2.86	2.74	2.49	2.73	2.62	2.38
38	150	3.61	3.47	3.15	3.42	3.29	2.99	3.26	3.14	2.85
38	195	4.67	4.49	4.09	4.43	4.26	3.87	4.23	4.07	3.69
44	100	2.54	2.44	2.22	2.40	2.31	2.10	2.29	2.21	2.00
44	125	3.16	3.04	2.76	3.00	2.88	2.62	2.86	2.75	2.50
44	150	3.78	3.64	3.31	3.59	3.45	3.14	3.43	3.30	2.99
44	195	4.90	4.71	4.29	4.65	4.47	4.07	4.44	4.27	3.88
47	100	2.59	2.49	2.26	2.46	2.36	2.14	2.35	2.25	2.05
47	125	3.23	3.11	2.83	3.06	2.95	2.68	2.93	2.81	2.55
47	150	3.87	3.72	3.38	3.67	3.53	3.21	3.50	3.37	3.06
47	195	5.00	4.82	4.38	4.75	4.57	4.16	4.54	4.37	3.97
ALS/CLS										
38	89	2.15	2.07	1.88	2.04	1.96	1.78	1.95	1.87	1.69
38	140	3.37	3.24	2.94	3.19	3.07	2.79	3.05	2.93	2.66
38	184	4.41	4.24	3.86	4.18	4.02	3.65	4.00	3.84	3.49

Table 6.15 Permissible clear spans for purlins supporting rafters

Slope of roof 22.5° or more but less than 30.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.01	1.89					1.90						1.81					
63	175	2.35	2.20	2.08	1.98	1.89	1.82	2.22	2.08	1.96	1.87			2.11	1.98	1.87			
63	200	2.68	2.51	2.37	2.26	2.16	2.08	2.53	2.37	2.24	2.13	2.02	1.92	2.41	2.26	2.13	2.01	1.89	
63	225	3.01	2.82	2.67	2.54	2.43	2.32	2.85	2.67	2.52	2.40	2.26	2.14	2.71	2.54	2.40	2.24	2.11	2.00
63	275	3.68	3.45	3.26	3.10	2.96	2.80	3.48	3.26	3.08	2.90	2.73	2.59	3.31	3.10	2.90	2.71	2.55	2.41
75	150	2.14	2.01	1.90	1.81			2.03	1.90					1.93	1.81				
75	175	2.50	2.34	2.21	2.11	2.02	1.94	2.36	2.21	2.09	1.99	1.91	1.83	2.25	2.11	1.99	1.89	1.81	
75	200	2.85	2.67	2.53	2.41	2.31	2.22	2.70	2.53	2.39	2.28	2.18	2.09	2.57	2.41	2.27	2.16	2.07	1.96
75	225	3.20	3.00	2.84	2.71	2.60	2.50	3.03	2.84	2.69	2.56	2.45	2.34	2.89	2.71	2.56	2.43	2.31	2.19

Table 6.16 Permissible clear spans for purlins supporting rafters

Slope of roof 22.5° or more but not more than 30.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.17	2.03	1.92	1.83			2.05	1.92	1.82				1.96	1.83				
63	175	2.53	2.37	2.24	2.14	2.05	1.97	2.39	2.24	2.12	2.02	1.93	1.86	2.28	2.13	2.02	1.92	1.84	
63	200	2.89	2.71	2.56	2.44	2.34	2.25	2.73	2.56	2.42	2.30	2.21	2.12	2.60	2.44	2.30	2.19	2.10	2.01
63	225	3.24	3.04	2.88	2.74	2.63	2.53	3.07	2.88	2.72	2.59	2.48	2.38	2.93	2.74	2.59	2.46	2.36	2.26
63	275	3.96	3.71	3.51	3.35	3.21	3.08	3.75	3.51	3.32	3.16	3.03	2.91	3.57	3.35	3.16	3.01	2.88	2.77
75	125	1.92	1.80					1.82											
75	150	2.30	2.16	2.05	1.95	1.87		2.18	2.05	1.94	1.84			2.08	1.95	1.84			
75	175	2.69	2.52	2.39	2.27	2.18	2.10	2.54	2.39	2.26	2.15	2.06	1.98	2.43	2.27	2.15	2.05	1.96	1.88
75	200	3.07	2.88	2.73	2.60	2.49	2.40	2.91	2.72	2.58	2.46	2.35	2.26	2.77	2.60	2.46	2.34	2.24	2.15
75	225	3.45	3.23	3.06	2.92	2.80	2.69	3.27	3.06	2.90	2.76	2.65	2.54	3.12	2.92	2.76	2.63	2.52	2.42

Table 6.17 Permissible clear spans for common or jack rafters

Slope of roof 30.0° or more but less than 45.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.30	2.24	2.11	2.11	2.06	1.91	1.97	1.91	1.77
38	125	3.09	2.97	2.70	2.89	2.78	2.52	2.67	2.58	2.36
38	150	3.70	3.56	3.23	3.46	3.33	3.03	3.28	3.15	2.86
38	195	4.78	4.60	4.19	4.49	4.32	3.92	4.25	4.09	3.68
44	100	2.57	2.50	2.27	2.35	2.29	2.12	2.19	2.12	1.95
44	125	3.24	3.12	2.83	3.04	2.92	2.65	2.88	2.76	2.51
44	150	3.88	3.73	3.39	3.64	3.50	3.18	3.44	3.31	3.01
44	195	5.01	4.83	4.40	4.71	4.53	4.12	4.46	4.29	3.90
47	100	2.66	2.55	2.32	2.47	2.39	2.17	2.29	2.22	2.04
47	125	3.31	3.18	2.90	3.10	2.98	2.71	2.94	2.83	2.57
47	150	3.96	3.81	3.47	3.71	3.57	3.25	3.52	3.39	3.08
47	195	5.12	4.93	4.49	4.81	4.63	4.21	4.56	4.39	3.99
ALS/CLS										
38	89	1.92	1.88	1.78	1.78	1.74	1.63	1.67	1.63	1.51
38	140	3.45	3.32	3.02	3.24	3.11	2.83	3.06	2.95	2.67
38	184	4.52	4.35	3.96	4.24	4.08	3.70	4.01	3.86	3.48

Table 6.18 Permissible clear spans for common or jack rafters

Slope of roof 30.0° or more but less than 45.0° Imposed load F_i = 0.75 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.65	2.55	2.32	2.48	2.39	2.17	2.35	2.26	2.05
38	125	3.30	3.18	2.89	3.10	2.98	2.71	2.93	2.82	2.56
38	150	3.95	3.81	3.46	3.71	3.57	3.24	3.51	3.38	3.07
38	195	5.11	4.92	4.49	4.80	4.62	4.20	4.55	4.38	3.98
44	100	2.78	2.68	2.43	2.61	2.51	2.28	2.47	2.37	2.16
44	125	3.47	3.34	3.03	3.25	3.13	2.84	3.08	2.96	2.69
44	150	4.14	3.99	3.63	3.89	3.74	3.40	3.69	3.55	3.22
44	195	5.36	5.16	4.71	5.03	4.85	4.41	4.77	4.59	4.18
47	100	2.84	2.73	2.49	2.66	2.56	2.33	2.52	2.43	2.20
47	125	3.54	3.41	3.10	3.32	3.20	2.91	3.15	3.03	2.75
47	150	4.23	4.08	3.71	3.97	3.82	3.48	3.77	3.62	3.29
47	195	5.47	5.27	4.81	5.14	4.95	4.51	4.88	4.69	4.27
ALS/CLS										
38	89	2.36	2.27	2.06	2.21	2.13	1.93	2.09	2.01	1.83
38	140	3.69	3.56	3.23	3.46	3.33	3.03	3.28	3.16	2.86
38	184	4.83	4.65	4.24	4.53	4.36	3.97	4.30	4.13	3.76

Table 6.19 Permissible clear spans for purlins supporting rafters

Slope of roof 30.0° or more but not more than 45.0° **Imposed load F_i = 0.75 kN/m^2** **Single span**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.21	2.08	1.97	1.87			2.07	1.94	1.84				1.96	1.83				
63	175	2.58	2.42	2.29	2.18	2.09	2.01	2.42	2.26	2.14	2.04	1.95	1.88	2.28	2.14	2.02	1.92	1.84	
63	200	2.95	2.76	2.62	2.49	2.39	2.30	2.76	2.59	2.45	2.33	2.23	2.14	2.61	2.44	2.31	2.20	2.10	2.00
63	225	3.31	3.11	2.94	2.80	2.69	2.59	3.10	2.91	2.75	2.62	2.51	2.41	2.93	2.75	2.60	2.47	2.36	2.23
63	275	4.04	3.79	3.59	3.42	3.28	3.16	3.79	3.55	3.36	3.20	3.06	2.92	3.58	3.35	3.17	3.02	2.85	2.70
75	125	1.96	1.84					1.84											
75	150	2.35	2.21	2.09	1.99	1.91	1.84	2.20	2.07	1.96	1.86			2.08	1.95	1.85			
75	175	2.74	2.57	2.44	2.33	2.23	2.15	2.57	2.41	2.28	2.17	2.08	2.00	2.43	2.28	2.15	2.05	1.96	1.89
75	200	3.13	2.94	2.78	2.66	2.55	2.45	2.93	2.75	2.60	2.48	2.38	2.29	2.78	2.60	2.46	2.34	2.24	2.16
75	225	3.52	3.30	3.13	2.99	2.86	2.76	3.30	3.09	2.93	2.79	2.67	2.57	3.12	2.92	2.77	2.64	2.52	2.43

Table 6.20 Permissible clear spans for purlins supporting rafters

Slope of roof 30.0° or more but not more than 45.0° **Imposed load F_i = 0.75 kN/m^2** **Single span**

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.38	2.24	2.12	2.02	1.93	1.86	2.23	2.09	1.98	1.89	1.81		2.11	1.98	1.87			
63	175	2.78	2.61	2.47	2.35	2.26	2.17	2.60	2.44	2.31	2.20	2.11	2.03	2.46	2.31	2.18	2.08	1.99	1.91
63	200	3.17	2.97	2.82	2.69	2.58	2.48	2.97	2.79	2.64	2.51	2.41	2.32	2.81	2.63	2.49	2.37	2.27	2.18
63	225	3.56	3.34	3.17	3.02	2.90	2.79	3.34	3.13	2.96	2.83	2.71	2.60	3.16	2.96	2.80	2.67	2.55	2.46
63	275	4.35	4.08	3.87	3.69	3.54	3.40	4.07	3.82	3.62	3.45	3.31	3.18	3.86	3.61	3.42	3.26	3.12	3.00
75	125	2.11	1.98	1.88				1.98	1.86					1.87					
75	150	2.53	2.38	2.25	2.15	2.06	1.98	2.37	2.23	2.11	2.01	1.93	1.85	2.25	2.11	1.99	1.90	1.82	
75	175	2.95	2.77	2.62	2.50	2.40	2.31	2.76	2.59	2.46	2.34	2.25	2.16	2.62	2.45	2.32	2.21	2.12	2.04
75	200	3.37	3.16	3.00	2.86	2.74	2.64	3.16	2.96	2.81	2.68	2.56	2.47	2.99	2.80	2.65	2.53	2.42	2.33
75	225	3.78	3.55	3.37	3.21	3.08	2.97	3.55	3.33	3.15	3.01	2.88	2.78	3.36	3.15	2.98	2.84	2.72	2.62

Table 6.21 Permissible clear spans for common or jack rafters

Slope of roof 30.0° or more but less than 45.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.30	2.24	2.04	2.11	2.06	1.91	1.97	1.91	1.77
38	125	2.92	2.80	2.55	2.76	2.65	2.40	2.63	2.52	2.27
38	150	3.49	3.36	3.05	3.30	3.18	2.88	3.15	3.03	2.70
38	195	4.52	4.35	3.96	4.28	4.12	3.71	4.08	3.92	3.46
44	100	2.45	2.36	2.14	2.32	2.23	2.02	2.19	2.12	1.93
44	125	3.06	2.94	2.67	2.90	2.78	2.53	2.76	2.65	2.41
44	150	3.66	3.53	3.20	3.47	3.33	3.03	3.31	3.18	2.88
44	195	4.74	4.57	4.15	4.49	4.32	3.93	4.28	4.12	3.72
47	100	2.51	2.41	2.19	2.37	2.28	2.07	2.26	2.17	1.97
47	125	3.13	3.01	2.73	2.96	2.85	2.58	2.82	2.71	2.46
47	150	3.74	3.60	3.28	3.54	3.41	3.10	3.38	3.25	2.95
47	195	4.84	4.66	4.24	4.59	4.42	4.01	4.38	4.21	3.83
ALS/CLS										
38	89	1.92	1.88	1.78	1.78	1.74	1.63	1.67	1.63	1.51
38	140	3.26	3.14	2.85	3.08	2.97	2.69	2.94	2.83	2.53
38	184	4.27	4.11	3.73	4.04	3.89	3.52	3.85	3.70	3.28

Table 6.22 Permissible clear spans for common or jack rafters

Slope of roof 30.0° or more but less than 45.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)								
		F_d not more than 0.5			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of rafter		Spacing of rafters (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	100	2.50	2.41	2.19	2.37	2.28	2.07	2.26	2.17	1.97
38	125	3.12	3.00	2.73	2.95	2.84	2.58	2.82	2.71	2.45
38	150	3.74	3.60	3.27	3.54	3.40	3.09	3.37	3.24	2.94
38	195	4.84	4.66	4.24	4.58	4.41	4.01	4.37	4.20	3.82
44	100	2.63	2.53	2.30	2.49	2.39	2.17	2.37	2.28	2.07
44	125	3.28	3.15	2.87	3.10	2.98	2.71	2.96	2.84	2.58
44	150	3.92	3.77	3.43	3.71	3.57	3.25	3.54	3.40	3.09
44	195	5.07	4.88	4.45	4.81	4.62	4.21	4.59	4.41	4.01
47	100	2.69	2.58	2.35	2.54	2.44	2.22	2.42	2.33	2.11
47	125	3.35	3.22	2.93	3.17	3.05	2.77	3.02	2.91	2.64
47	150	4.01	3.86	3.51	3.79	3.65	3.32	3.62	3.48	3.16
47	195	5.18	4.99	4.54	4.91	4.73	4.30	4.69	4.51	4.10
ALS/CLS										
38	89	2.23	2.14	1.95	2.11	2.03	1.84	2.01	1.93	1.75
38	140	3.49	3.36	3.05	3.30	3.18	2.88	3.15	3.03	2.75
38	184	4.57	4.40	4.00	4.33	4.16	3.78	4.13	3.97	3.60

Table 6.23 Permissible clear spans for purlins supporting rafters

Slope of roof 30.0° or more but not more than 45.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C16 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.09	1.96	1.85				1.97	1.85					1.88					
63	175	2.44	2.28	2.16	2.06	1.97	1.89	2.30	2.15	2.04	1.94	1.85		2.19	2.05	1.93	1.84		
63	200	2.78	2.61	2.47	2.35	2.25	2.16	2.63	2.46	2.33	2.21	2.12	2.02	2.50	2.34	2.21	2.10	1.98	1.88
63	225	3.13	2.93	2.77	2.64	2.53	2.43	2.95	2.77	2.61	2.49	2.38	2.25	2.81	2.63	2.48	2.35	2.22	2.10
63	275	3.82	3.58	3.39	3.23	3.09	2.96	3.60	3.38	3.19	3.04	2.87	2.72	3.43	3.21	3.03	2.84	2.68	2.53
75	125	1.85																	
75	150	2.22	2.08	1.97	1.88	1.80		2.10	1.97	1.86				2.00	1.87				
75	175	2.59	2.43	2.30	2.19	2.10	2.02	2.45	2.29	2.17	2.07	1.98	1.90	2.33	2.18	2.06	1.96	1.88	1.81
75	200	2.96	2.77	2.63	2.50	2.40	2.31	2.79	2.62	2.48	2.36	2.26	2.17	2.66	2.49	2.36	2.24	2.15	2.06
75	225	3.32	3.12	2.95	2.81	2.70	2.59	3.14	2.94	2.79	2.65	2.54	2.44	2.99	2.80	2.65	2.52	2.41	2.30

Table 6.24 Permissible clear spans for purlins supporting rafters

Slope of roof 30.0° or more but not more than 45.0° Imposed load F_i = 1.00 kN/m^2 Single span

Strength Class C24 Service Class 1 or 2

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.5						F_d more than 0.5 but not more than 0.75						F_d more than 0.75 but not more than 1.00					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000	1500	1800	2100	2400	2700	3000
		Maximum clear span (m)																	
63	150	2.25	2.11	2.00	1.90	1.82		2.13	1.99	1.88				2.02	1.89				
63	175	2.62	2.46	2.33	2.22	2.13	2.04	2.48	2.32	2.20	2.09	2.00	1.93	2.36	2.21	2.09	1.99	1.90	1.83
63	200	2.99	2.81	2.66	2.53	2.43	2.34	2.83	2.65	2.51	2.39	2.29	2.20	2.69	2.52	2.39	2.27	2.17	2.09
63	225	3.37	3.16	2.99	2.85	2.73	2.63	3.18	2.98	2.82	2.69	2.57	2.47	3.03	2.84	2.68	2.55	2.44	2.35
75	125	1.99	1.87					1.89											
75	150	2.39	2.24	2.12	2.03	1.94	1.87	2.26	2.12	2.01	1.91	1.83		2.15	2.02	1.91	1.82		
75	175	2.79	2.62	2.48	2.36	2.26	2.18	2.64	2.47	2.34	2.23	2.14	2.06	2.51	2.35	2.23	2.12	2.03	1.95
75	200	3.18	2.99	2.83	2.70	2.59	2.49	3.01	2.82	2.67	2.55	2.44	2.35	2.87	2.69	2.54	2.42	2.32	2.23
75	225	3.58	3.36	3.18	3.03	2.91	2.80	3.38	3.17	3.00	2.86	2.74	2.64	3.22	3.02	2.86	2.72	2.61	2.51

6.2 Purlins supporting roof sheeting or cladding

6.2.1 *Tables 6.25* to *6.28* give permissible clear spans for “canted” purlins supporting roof sheeting or cladding where the roof slope is from 10° to 35° inclusive.

6.2.2 Permissible clear spans have been calculated in accordance with *BS 5268-7.7: 1990*.

6.2.3 The sizes, spacing and spans given will support the dead and imposed loads stated in the tables and a concentrated load of 0.9kN.

6.2.4 Lateral support should be provided in accordance with *BS 5268-2: 2002, Table 19*. In the absence of printed guidance from the manufacturer, it should be assumed that expanded polyurethane and other low density insulating materials will not provide such support, so that with these materials the depth to breadth ratio of the purlins should not exceed 4:1.

6.2.5 Unless justified by specialist calculation, the minimum bearing length at supports for purlins should be 50mm. It may be necessary to provide longer bearing to accommodate fixings or for practical reasons.

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

6.2.7 The section sizes of purlins given in *Tables 6.25* to *6.28* should be sawn sections; or be machined on the width, ie the depth of the binder, or be ALS or CLS; to the tolerance classes specified in *BS EN 336: 2003, Tables NA 2, NA 3* and *NA 4* respectively.

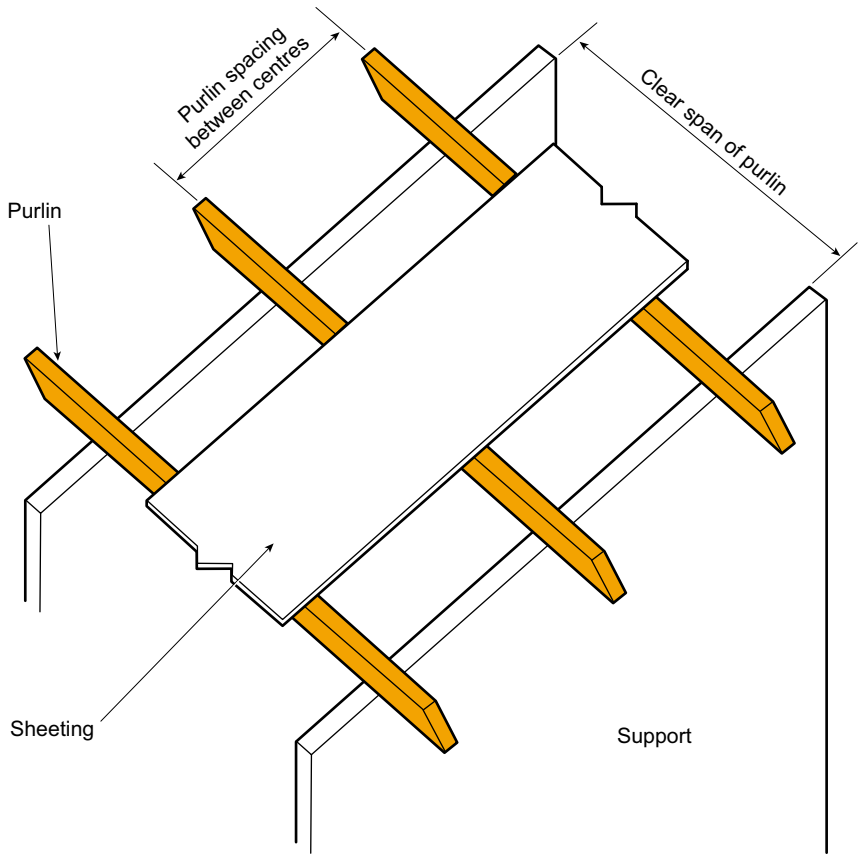


Figure 6.2 Purlins supporting roof sheeting or cladding

Table 6.25 Permissible clear spans for purlins supporting roof sheeting or cladding

Slope of roof 10° to 35° **Imposed load 0.75 kN/m^2**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50						F_d more than 0.5 but not more than 0.75					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span (m)																	
44	100	1.59	1.54	1.45	1.36	1.28	1.22	1.46	1.40	1.33	1.25	1.18	1.12	1.37	1.30	1.24	1.17	1.10	1.05
44	125	2.15	1.95	1.81	1.69	1.60	1.53	1.95	1.80	1.67	1.56	1.48	1.40	1.81	1.69	1.56	1.46	1.38	1.31
44	150	2.58	2.34	2.17	2.03	1.92	1.83	2.39	2.16	2.00	1.87	1.77	1.68	2.24	2.03	1.87	1.75	1.65	1.57
44	175	3.01	2.73	2.52	2.37	2.24	2.13	2.79	2.52	2.33	2.18	2.06	1.96	2.61	2.36	2.18	2.04	1.93	1.83
44	200	3.43	3.11	2.88	2.70	2.56	2.44	3.18	2.88	2.66	2.49	2.36	2.24	2.99	2.70	2.49	2.33	2.20	2.09
44	225	3.86	3.50	3.24	3.04	2.88	2.74	3.57	3.24	2.99	2.80	2.65	2.52	3.35	3.03	2.80	2.62	2.48	2.35
47	100	1.64	1.59	1.48	1.39	1.31	1.25	1.51	1.44	1.37	1.28	1.21	1.15	1.41	1.34	1.28	1.20	1.13	1.08
47	125	2.21	2.00	1.85	1.73	1.64	1.56	2.01	1.85	1.71	1.60	1.51	1.44	1.87	1.73	1.60	1.50	1.41	1.34
47	150	2.64	2.39	2.22	2.08	1.97	1.87	2.45	2.21	2.05	1.92	1.81	1.73	2.30	2.08	1.92	1.79	1.69	1.61
47	175	3.08	2.79	2.58	2.42	2.29	2.19	2.85	2.58	2.39	2.24	2.11	2.01	2.68	2.42	2.23	2.09	1.98	1.88
47	200	3.51	3.18	2.95	2.77	2.62	2.50	3.25	2.95	2.72	2.55	2.41	2.30	3.05	2.76	2.55	2.39	2.26	2.15
47	225	3.94	3.58	3.31	3.11	2.94	2.81	3.65	3.31	3.06	2.87	2.71	2.59	3.43	3.10	2.87	2.69	2.54	2.41
63	100	1.88	1.77	1.64	1.54	1.46	1.39	1.72	1.64	1.52	1.42	1.35	1.28	1.61	1.52	1.42	1.33	1.26	1.20
63	125	2.43	2.21	2.05	1.92	1.82	1.74	2.26	2.05	1.89	1.78	1.68	1.60	2.11	1.92	1.77	1.66	1.57	1.50
63	150	2.91	2.65	2.45	2.30	2.18	2.08	2.70	2.45	2.27	2.13	2.02	1.92	2.54	2.30	2.13	1.99	1.89	1.80
63	175	3.39	3.08	2.86	2.68	2.54	2.43	3.15	2.86	2.64	2.48	2.35	2.24	2.96	2.68	2.48	2.32	2.20	2.10
63	200	3.87	3.52	3.26	3.06	2.90	2.77	3.59	3.26	3.02	2.83	2.68	2.56	3.38	3.06	2.83	2.65	2.51	2.39
63	225	4.34	3.95	3.66	3.44	3.26	3.11	4.03	3.66	3.39	3.18	3.02	2.88	3.79	3.44	3.18	2.98	2.82	2.69

Table 6.26 Permissible clear spans for purlins supporting roof sheeting or cladding

Slope of roof 10° to 35° **Imposed load 0.75 kN/m^2**

Strength Class C24 **Service Class 1 or 2**

Size of purlin		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50						F_d more than 0.5 but not more than 0.75					
		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span (m)																	
44	100	1.76	1.69	1.56	1.46	1.39	1.32	1.62	1.54	1.44	1.35	1.28	1.22	1.51	1.43	1.35	1.26	1.19	1.14
44	125	2.32	2.10	1.95	1.83	1.73	1.65	2.15	1.95	1.80	1.69	1.60	1.52	1.99	1.82	1.69	1.58	1.49	1.42
44	150	2.78	2.52	2.33	2.19	2.07	1.98	2.58	2.33	2.16	2.02	1.91	1.82	2.42	2.19	2.02	1.89	1.79	1.70
44	175	3.24	2.94	2.72	2.55	2.42	2.31	3.00	2.72	2.51	2.36	2.23	2.12	2.82	2.55	2.36	2.21	2.09	1.99
44	200	3.69	3.35	3.11	2.92	2.76	2.63	3.42	3.10	2.87	2.69	2.55	2.43	3.22	2.91	2.69	2.52	2.38	2.27
44	225	4.15	3.77	3.49	3.28	3.10	2.96	3.85	3.49	3.23	3.03	2.86	2.73	3.61	3.27	3.02	2.83	2.68	2.55
47	100	1.82	1.72	1.60	1.50	1.42	1.35	1.66	1.59	1.47	1.38	1.31	1.25	1.55	1.47	1.38	1.29	1.22	1.16
47	125	2.37	2.15	1.99	1.87	1.77	1.69	2.20	1.99	1.84	1.73	1.63	1.56	2.04	1.87	1.73	1.62	1.53	1.45
47	150	2.84	2.58	2.39	2.24	2.12	2.02	2.63	2.39	2.21	2.07	1.96	1.87	2.47	2.24	2.07	1.94	1.83	1.74
47	175	3.31	3.00	2.78	2.61	2.48	2.36	3.07	2.78	2.57	2.41	2.28	2.18	2.88	2.61	2.41	2.26	2.14	2.03
47	200	3.78	3.43	3.18	2.98	2.83	2.70	3.50	3.17	2.94	2.76	2.61	2.49	3.29	2.98	2.75	2.58	2.44	2.32
47	225	4.24	3.85	3.57	3.35	3.18	3.03	3.93	3.57	3.30	3.10	2.93	2.79	3.70	3.35	3.10	2.90	2.74	2.61
63	100	2.08	1.91	1.77	1.66	1.57	1.50	1.89	1.76	1.63	1.53	1.45	1.39	1.76	1.66	1.53	1.44	1.36	1.30
63	125	2.62	2.38	2.20	2.07	1.96	1.87	2.43	2.20	2.04	1.91	1.81	1.73	2.28	2.07	1.91	1.79	1.70	1.62
63	150	3.13	2.85	2.64	2.48	2.35	2.25	2.91	2.64	2.45	2.30	2.17	2.07	2.73	2.48	2.29	2.15	2.04	1.94
63	175	3.65	3.32	3.08	2.89	2.74	2.62	3.39	3.07	2.85	2.67	2.53	2.42	3.18	2.89	2.67	2.51	2.37	2.26
63	200	4.16	3.78	3.51	3.30	3.13	2.99	3.86	3.51	3.25	3.05	2.89	2.76	3.63	3.30	3.05	2.86	2.71	2.59
63	225	4.67	4.25	3.94	3.71	3.52	3.36	4.34	3.94	3.65	3.43	3.25	3.10	4.08	3.70	3.43	3.22	3.05	2.91

Table 6.27 Permissible clear spans for purlins supporting roof sheeting or cladding

Slope of roof 10° to 35° **Imposed load 1.0 kN/m^2**

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50						F_d more than 0.50 but not more than 0.75					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span (m)																	
44	100	1.59	1.45	1.34	1.25	1.18	1.13	1.46	1.36	1.25	1.17	1.10	1.05	1.37	1.28	1.18	1.10	1.04	1.00
44	125	2.00	1.81	1.67	1.56	1.48	1.41	1.87	1.69	1.56	1.46	1.38	1.31	1.77	1.60	1.48	1.38	1.30	1.24
44	150	2.39	2.17	2.00	1.87	1.77	1.69	2.25	2.03	1.87	1.75	1.66	1.57	2.13	1.92	1.77	1.65	1.56	1.48
44	175	2.79	2.52	2.33	2.19	2.07	1.97	2.62	2.37	2.18	2.04	1.93	1.84	2.48	2.24	2.06	1.93	1.82	1.71
44	200	3.18	2.88	2.66	2.50	2.36	2.25	2.99	2.70	2.49	2.33	2.20	2.10	2.83	2.56	2.36	2.20	2.08	1.94
44	225	3.58	3.24	2.99	2.81	2.65	2.53	3.36	3.04	2.80	2.62	2.48	2.35	3.18	2.87	2.65	2.48	2.32	2.17
47	100	1.64	1.48	1.37	1.28	1.21	1.15	1.51	1.39	1.28	1.20	1.13	1.08	1.41	1.31	1.21	1.13	1.07	1.02
47	125	2.04	1.85	1.71	1.60	1.51	1.44	1.92	1.73	1.60	1.50	1.41	1.35	1.82	1.64	1.51	1.41	1.33	1.27
47	150	2.45	2.22	2.05	1.92	1.82	1.73	2.30	2.08	1.92	1.80	1.70	1.61	2.18	1.97	1.81	1.70	1.60	1.52
47	175	2.85	2.58	2.39	2.24	2.12	2.02	2.68	2.42	2.24	2.09	1.98	1.88	2.54	2.29	2.11	1.98	1.87	1.77
47	200	3.26	2.95	2.73	2.56	2.42	2.30	3.06	2.76	2.55	2.39	2.26	2.15	2.90	2.62	2.41	2.26	2.13	2.01
47	225	3.66	3.31	3.07	2.87	2.72	2.59	3.44	3.11	2.87	2.69	2.54	2.42	3.25	2.94	2.71	2.54	2.40	2.24
63	100	1.81	1.64	1.52	1.42	1.35	1.28	1.70	1.54	1.42	1.33	1.26	1.20	1.61	1.46	1.35	1.26	1.19	1.13
63	125	2.26	2.05	1.89	1.78	1.68	1.60	2.12	1.92	1.78	1.66	1.57	1.50	2.01	1.82	1.68	1.57	1.49	1.42
63	150	2.71	2.45	2.27	2.13	2.02	1.92	2.54	2.30	2.13	2.00	1.89	1.80	2.41	2.18	2.01	1.89	1.78	1.70
63	175	3.15	2.86	2.65	2.48	2.35	2.24	2.96	2.68	2.48	2.33	2.20	2.10	2.81	2.54	2.35	2.20	2.08	1.98
63	200	3.59	3.26	3.02	2.84	2.69	2.56	3.38	3.06	2.83	2.66	2.51	2.40	3.20	2.90	2.68	2.51	2.38	2.26
63	225	4.04	3.67	3.40	3.19	3.02	2.88	3.80	3.44	3.18	2.99	2.83	2.69	3.60	3.26	3.02	2.83	2.67	2.54

Table 6.28 Permissible clear spans for purlins supporting roof sheeting or cladding

Slope of roof 10° to 35° **Imposed load 1.0 kN/m^2**

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2)																	
		F_d not more than 0.25						F_d more than 0.25 but not more than 0.50						F_d more than 0.5 but not more than 0.75					
Size of purlin		Spacing of purlins (mm)																	
B'dth (mm)	D'pth (mm)	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum clear span (m)																	
44	100	1.72	1.56	1.44	1.35	1.28	1.22	1.62	1.46	1.35	1.26	1.20	1.14	1.51	1.38	1.28	1.19	1.13	1.07
44	125	2.15	1.95	1.80	1.69	1.60	1.52	2.02	1.83	1.69	1.58	1.49	1.42	1.91	1.73	1.60	1.49	1.41	1.34
44	150	2.58	2.34	2.16	2.02	1.92	1.82	2.42	2.19	2.02	1.89	1.79	1.70	2.29	2.07	1.91	1.79	1.69	1.61
44	175	3.00	2.72	2.52	2.36	2.23	2.13	2.82	2.55	2.36	2.21	2.09	1.99	2.67	2.42	2.23	2.09	1.97	1.87
44	200	3.43	3.11	2.87	2.69	2.55	2.43	3.22	2.91	2.69	2.52	2.38	2.27	3.05	2.76	2.55	2.38	2.25	2.14
44	225	3.85	3.49	3.23	3.03	2.87	2.73	3.62	3.28	3.03	2.84	2.68	2.55	3.43	3.10	2.86	2.68	2.53	2.41
47	100	1.76	1.60	1.48	1.38	1.31	1.25	1.65	1.50	1.38	1.30	1.22	1.17	1.55	1.42	1.31	1.22	1.16	1.10
47	125	2.20	1.99	1.84	1.73	1.64	1.56	2.07	1.87	1.73	1.62	1.53	1.46	1.96	1.77	1.63	1.53	1.44	1.37
47	150	2.64	2.39	2.21	2.07	1.96	1.87	2.48	2.24	2.07	1.94	1.83	1.75	2.35	2.12	1.96	1.83	1.73	1.65
47	175	3.07	2.78	2.58	2.42	2.29	2.18	2.88	2.61	2.41	2.26	2.14	2.04	2.73	2.47	2.28	2.14	2.02	1.92
47	200	3.51	3.18	2.94	2.76	2.61	2.49	3.29	2.98	2.76	2.58	2.44	2.33	3.12	2.82	2.61	2.44	2.31	2.20
47	225	3.94	3.57	3.31	3.10	2.94	2.80	3.70	3.35	3.10	2.90	2.75	2.62	3.51	3.17	2.93	2.75	2.59	2.47
63	100	1.95	1.77	1.64	1.54	1.45	1.39	1.83	1.66	1.53	1.44	1.36	1.30	1.74	1.57	1.45	1.36	1.29	1.23
63	125	2.43	2.20	2.04	1.92	1.82	1.73	2.28	2.07	1.92	1.80	1.70	1.62	2.17	1.96	1.81	1.70	1.61	1.53
63	150	2.91	2.64	2.45	2.30	2.18	2.08	2.74	2.48	2.30	2.15	2.04	1.94	2.60	2.35	2.17	2.04	1.93	1.84
63	175	3.39	3.08	2.85	2.68	2.54	2.42	3.19	2.89	2.68	2.51	2.38	2.27	3.02	2.74	2.53	2.38	2.25	2.14
63	200	3.87	3.51	3.26	3.06	2.90	2.76	3.64	3.30	3.06	2.87	2.71	2.59	3.45	3.13	2.89	2.71	2.57	2.45
63	225	4.34	3.95	3.66	3.44	3.26	3.11	4.08	3.71	3.43	3.22	3.05	2.91	3.88	3.51	3.25	3.05	2.89	2.75

7.0 Tables of sizes of flat roof joists

7.0.1 *Tables 7.1* to *7.6* give permissible clear spans of joists for flat roofs with a slope of up to 10° from the horizontal.

7.0.2 Permissible clear spans have been calculated in accordance with *BS 5268-7.2: 1989*.

7.0.3 The sizes, spacing and spans given will support the dead and imposed loads stated in the tables. In addition, where access is limited to maintenance and repair purposes, they will support the dead loads stated and a concentrated load of 0.9kN. Where access is not limited to maintenance and repair purposes, they will support the dead loads stated and a concentrated load of 1.8kN.

7.0.4 Lateral support should be provided in accordance with *BS 5268-2: 2002*, *Table 19*. In the absence of printed guidance from the manufacturer, it should be assumed that expanded polyurethane and other low density insulating materials will not provide such support, so with these materials the depth to breadth ratio should not exceed 4:1.

7.0.5 Unless justified by specialist calculation, the minimum bearing length at supports should be 40mm. It may be necessary to provide longer bearing to accommodate fixings or for practical reasons.

7.0.6 Notching and drilling of flat roof joists should not exceed the limits given in clause 3.2.3.

7.0.7 The section sizes of joists given in *Tables 7.1* to *7.6* should be machined on the width, ie the depth of the joist, or be ALS or CLS; to the tolerance classes specified in *BS EN 336: 2003, Tables NA 3* and *NA 4* respectively.

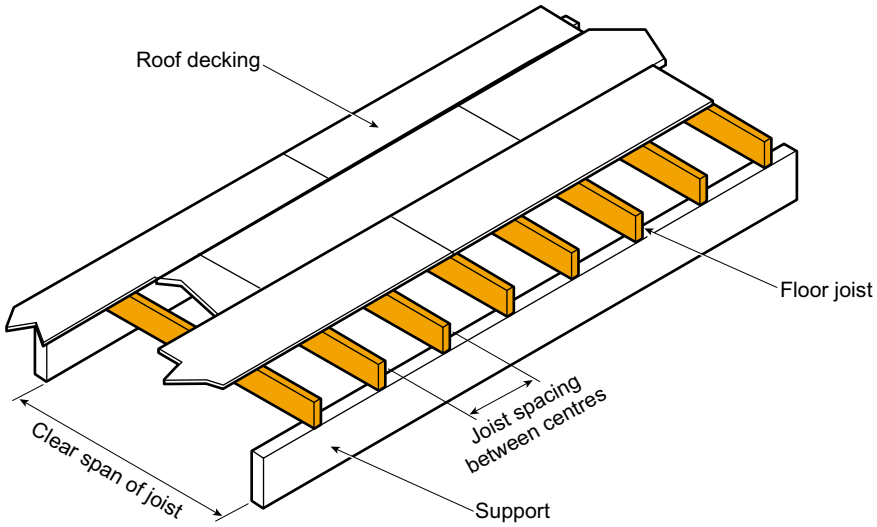


Figure 7.1 Typical flat roof joists arrangement

Table 7.1 Permissible clear spans for joists for flat roofs – access for maintenance and repair only

Imposed load 0.75 kN/m^2

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.74	1.72	1.67	1.67	1.65	1.58	1.61	1.58	1.51
38	120	2.33	2.30	2.21	2.21	2.17	2.08	2.12	2.08	1.97
38	145	2.98	2.94	2.82	2.82	2.76	2.63	2.68	2.63	2.48
38	170	3.66	3.60	3.38	3.43	3.36	3.18	3.26	3.18	2.99
38	195	4.34	4.26	3.88	4.06	3.97	3.65	3.83	3.74	3.46
38	220	4.99	4.80	4.37	4.68	4.52	4.11	4.42	4.30	3.90
44	97	1.87	1.85	1.79	1.79	1.76	1.69	1.72	1.69	1.61
44	120	2.49	2.45	2.36	2.36	2.32	2.21	2.26	2.21	2.10
44	145	3.18	3.13	3.00	3.00	2.94	2.79	2.85	2.79	2.63
44	170	3.89	3.82	3.55	3.65	3.57	3.34	3.46	3.38	3.17
44	195	4.61	4.47	4.07	4.30	4.20	3.83	4.06	3.96	3.64
44	220	5.23	5.03	4.58	4.93	4.75	4.32	4.67	4.51	4.10
47	97	1.93	1.90	1.84	1.84	1.81	1.74	1.77	1.74	1.66
47	120	2.56	2.52	2.43	2.43	2.39	2.27	2.32	2.27	2.16
47	145	3.27	3.22	3.08	3.08	3.02	2.87	2.93	2.87	2.70
47	170	4.00	3.93	3.63	3.75	3.67	3.42	3.55	3.47	3.25
47	195	4.73	4.57	4.16	4.41	4.31	3.92	4.17	4.07	3.72
47	220	5.34	5.14	4.68	5.04	4.85	4.41	4.79	4.61	4.19
63	97	2.20	2.17	2.10	2.10	2.06	1.98	2.01	1.98	1.88
63	120	2.91	2.87	2.75	2.75	2.70	2.57	2.63	2.57	2.43
63	145	3.70	3.64	3.42	3.48	3.41	3.22	3.30	3.23	3.04
63	170	4.50	4.39	4.00	4.21	4.12	3.77	3.98	3.89	3.58
63	195	5.21	5.02	4.58	4.92	4.74	4.31	4.66	4.51	4.10
63	220	5.85	5.64	5.15	5.53	5.33	4.86	5.27	5.07	4.62
75	120	3.13	3.08	2.96	2.96	2.90	2.76	2.82	2.76	2.61
75	145	3.97	3.90	3.62	3.72	3.65	3.41	3.53	3.45	3.24
75	170	4.81	4.64	4.23	4.50	4.38	3.99	4.25	4.15	3.79
75	195	5.50	5.30	4.84	5.19	5.01	4.57	4.95	4.77	4.34
75	220	6.17	5.96	5.45	5.84	5.63	5.14	5.57	5.36	4.89
ALS/CLS										
38	140	2.85	2.81	2.69	2.69	2.64	2.51	2.57	2.51	2.38
38	184	4.04	3.97	3.66	3.78	3.70	3.44	3.58	3.49	3.27
38	235	5.32	5.12	4.66	5.02	4.83	4.38	4.76	4.59	4.16

Table 7.2 Permissible clear spans for joists for flat roofs – access for maintenance and repair only

Imposed load 0.75 kN/m^2

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.92	1.90	1.84	1.84	1.81	1.73	1.76	1.73	1.65
38	120	2.55	2.52	2.42	2.42	2.38	2.27	2.31	2.27	2.15
38	145	3.26	3.21	3.07	3.07	3.01	2.86	2.92	2.86	2.70
38	170	3.99	3.92	3.63	3.74	3.66	3.41	3.54	3.46	3.24
38	195	4.73	4.56	4.15	4.41	4.30	3.91	4.16	4.06	3.71
38	220	5.33	5.14	4.68	5.03	4.84	4.40	4.78	4.60	4.18
44	97	2.05	2.03	1.96	1.96	1.93	1.85	1.88	1.85	1.76
44	120	2.72	2.68	2.58	2.58	2.53	2.41	2.46	2.41	2.28
44	145	3.47	3.42	3.25	3.27	3.20	3.04	3.11	3.04	2.86
44	170	4.24	4.16	3.81	3.96	3.88	3.58	3.75	3.66	3.40
44	195	4.97	4.78	4.36	4.67	4.51	4.10	4.40	4.29	3.90
44	220	5.59	5.38	4.91	5.27	5.08	4.62	5.02	4.83	4.39
47	97	2.12	2.09	2.02	2.02	1.99	1.90	1.94	1.90	1.81
47	120	2.80	2.76	2.65	2.65	2.61	2.48	2.53	2.48	2.35
47	145	3.57	3.51	3.33	3.36	3.29	3.12	3.19	3.12	2.94
47	170	4.35	4.27	3.89	4.07	3.98	3.66	3.85	3.76	3.48
47	195	5.07	4.89	4.45	4.78	4.61	4.19	4.52	4.38	3.98
47	220	5.71	5.50	5.01	5.39	5.19	4.72	5.13	4.93	4.49
63	97	2.41	2.38	2.29	2.29	2.26	2.16	2.20	2.16	2.05
63	120	3.18	3.13	3.00	3.00	2.94	2.80	2.86	2.80	2.64
63	145	4.03	3.96	3.66	3.78	3.70	3.45	3.58	3.50	3.28
63	170	4.87	4.69	4.28	4.56	4.43	4.03	4.31	4.20	3.84
63	195	5.56	5.36	4.90	5.25	5.06	4.62	5.00	4.82	4.39
63	220	6.25	6.03	5.51	5.91	5.69	5.20	5.63	5.42	4.94
75	120	3.42	3.36	3.22	3.22	3.16	3.00	3.06	3.00	2.83
75	145	4.31	4.24	3.87	4.04	3.96	3.65	3.83	3.74	3.47
75	170	5.14	4.95	4.53	4.85	4.68	4.27	4.60	4.46	4.06
75	195	5.86	5.66	5.17	5.55	5.35	4.88	5.29	5.09	4.65
75	220	6.58	6.36	5.82	6.23	6.01	5.49	5.94	5.73	5.23
ALS/CLS										
38	140	3.12	3.07	2.94	2.94	2.89	2.74	2.80	2.74	2.59
38	184	4.40	4.31	3.92	4.11	4.02	3.69	3.89	3.79	3.50
38	235	5.69	5.48	4.99	5.37	5.17	4.70	5.10	4.91	4.46

Table 7.3 Permissible clear spans for joists for flat roofs – access for maintenance and repair only

Imposed load 1.0 kN/m^2

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.74	1.72	1.67	1.67	1.65	1.58	1.61	1.58	1.51
38	120	2.33	2.30	2.21	2.21	2.17	2.08	2.12	2.08	1.97
38	145	2.98	2.94	2.72	2.82	2.76	2.58	2.68	2.63	2.46
38	170	3.65	3.51	3.18	3.43	3.33	3.02	3.26	3.18	2.88
38	195	4.17	4.02	3.65	3.97	3.81	3.46	3.79	3.65	3.31
38	220	4.70	4.52	4.11	4.47	4.30	3.90	4.27	4.11	3.73
44	97	1.87	1.85	1.79	1.79	1.76	1.69	1.72	1.69	1.61
44	120	2.49	2.45	2.36	2.36	2.32	2.21	2.26	2.21	2.10
44	145	3.18	3.13	2.86	3.00	2.94	2.71	2.85	2.79	2.59
44	170	3.83	3.68	3.34	3.64	3.50	3.17	3.46	3.34	3.03
44	195	4.38	4.21	3.83	4.16	4.00	3.64	3.98	3.83	3.48
44	220	4.93	4.75	4.32	4.69	4.51	4.10	4.49	4.32	3.92
47	97	1.93	1.90	1.84	1.84	1.81	1.74	1.77	1.74	1.66
47	120	2.56	2.52	2.42	2.43	2.39	2.27	2.32	2.27	2.16
47	145	3.27	3.22	2.92	3.08	3.02	2.77	2.93	2.87	2.65
47	170	3.91	3.76	3.42	3.72	3.58	3.25	3.55	3.42	3.10
47	195	4.47	4.31	3.92	4.26	4.09	3.72	4.07	3.92	3.55
47	220	5.04	4.85	4.41	4.79	4.61	4.19	4.59	4.41	4.01
63	97	2.20	2.17	2.10	2.10	2.06	1.98	2.01	1.98	1.88
63	120	2.91	2.87	2.67	2.75	2.70	2.54	2.63	2.57	2.43
63	145	3.68	3.54	3.22	3.48	3.37	3.06	3.30	3.22	2.93
63	170	4.30	4.14	3.77	4.09	3.94	3.58	3.92	3.77	3.43
63	195	4.92	4.74	4.31	4.68	4.51	4.10	4.48	4.31	3.92
63	220	5.53	5.33	4.86	5.27	5.07	4.62	5.05	4.86	4.42
75	120	3.13	3.08	2.83	2.96	2.90	2.69	2.82	2.76	2.57
75	145	3.89	3.75	3.41	3.70	3.56	3.24	3.53	3.41	3.10
75	170	4.54	4.38	3.99	4.33	4.17	3.79	4.15	3.99	3.63
75	195	5.19	5.01	4.57	4.95	4.77	4.34	4.74	4.57	4.16
75	220	5.84	5.63	5.14	5.57	5.36	4.89	5.34	5.14	4.68
ALS/CLS										
38	140	2.85	2.81	2.63	2.69	2.64	2.49	2.57	2.51	2.38
38	184	3.94	3.79	3.44	3.75	3.60	3.27	3.58	3.44	3.12
38	235	5.02	4.83	4.38	4.77	4.59	4.16	4.56	4.38	3.98

Table 7.4 Permissible clear spans for joists for flat roofs – access for maintenance and repair only

Imposed load 1.0 kN/m^2

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.92	1.90	1.84	1.84	1.81	1.73	1.76	1.73	1.65
38	120	2.55	2.52	2.42	2.42	2.38	2.27	2.31	2.27	2.15
38	145	3.26	3.21	2.91	3.07	3.01	2.77	2.92	2.86	2.64
38	170	3.90	3.76	3.41	3.71	3.57	3.24	3.54	3.41	3.09
38	195	4.47	4.30	3.91	4.25	4.09	3.71	4.06	3.91	3.55
38	220	5.03	4.84	4.40	4.78	4.60	4.18	4.58	4.40	4.00
44	97	2.05	2.03	1.96	1.96	1.93	1.85	1.88	1.85	1.76
44	120	2.72	2.68	2.54	2.58	2.53	2.41	2.46	2.41	2.28
44	145	3.47	3.37	3.06	3.27	3.20	2.91	3.11	3.04	2.78
44	170	4.10	3.94	3.58	3.89	3.75	3.40	3.73	3.58	3.25
44	195	4.69	4.51	4.10	4.46	4.29	3.90	4.27	4.10	3.73
44	220	5.27	5.08	4.62	5.02	4.83	4.39	4.80	4.62	4.20
47	97	2.12	2.09	2.02	2.02	1.99	1.90	1.94	1.90	1.81
47	120	2.80	2.76	2.60	2.65	2.61	2.46	2.53	2.48	2.35
47	145	3.57	3.44	3.13	3.36	3.27	2.97	3.19	3.12	2.84
47	170	4.18	4.03	3.66	3.98	3.83	3.48	3.81	3.66	3.33
47	195	4.79	4.61	4.19	4.55	4.38	3.98	4.36	4.19	3.81
47	220	5.39	5.19	4.72	5.13	4.93	4.49	4.91	4.72	4.29
63	97	2.41	2.38	2.29	2.29	2.26	2.16	2.20	2.16	2.05
63	120	3.18	3.13	2.86	3.00	2.94	2.72	2.86	2.80	2.60
63	145	3.93	3.79	3.45	3.74	3.60	3.28	3.58	3.45	3.14
63	170	4.60	4.43	4.03	4.38	4.21	3.84	4.19	4.03	3.67
63	195	5.25	5.06	4.62	5.00	4.82	4.39	4.80	4.62	4.20
63	220	5.91	5.69	5.20	5.63	5.42	4.94	5.40	5.20	4.73
75	120	3.42	3.33	3.03	3.22	3.16	2.88	3.06	3.00	2.76
75	145	4.16	4.01	3.65	3.96	3.81	3.47	3.79	3.65	3.32
75	170	4.85	4.68	4.27	4.63	4.46	4.06	4.43	4.27	3.89
75	195	5.55	5.35	4.88	5.29	5.09	4.65	5.07	4.88	4.45
75	220	6.23	6.01	5.49	5.94	5.73	5.23	5.70	5.49	5.01
ALS/CLS										
38	140	3.12	3.07	2.81	2.94	2.89	2.67	2.80	2.74	2.55
38	184	4.22	4.06	3.69	4.01	3.86	3.50	3.84	3.69	3.35
38	235	5.37	5.17	4.70	5.10	4.91	4.46	4.89	4.70	4.27

Table 7.5 Permissible clear spans for joists for flat roofs – unlimited access

Imposed load 1.50 kN/m^2

Strength Class C16 **Service Class 1 or 2**

		Dead loads F_d (kN/m^2) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.21	1.20	1.18	1.18	1.17	1.13	1.15	1.13	1.09
38	120	1.76	1.74	1.69	1.69	1.67	1.61	1.64	1.61	1.54
38	145	2.31	2.29	2.24	2.24	2.21	2.14	2.17	2.14	2.05
38	170	2.89	2.86	2.78	2.78	2.75	2.65	2.69	2.65	2.54
38	195	3.49	3.45	3.31	3.35	3.30	3.17	3.22	3.17	3.03
38	220	4.11	4.06	3.73	3.92	3.86	3.58	3.77	3.70	3.45
44	97	1.39	1.38	1.35	1.35	1.33	1.29	1.31	1.29	1.24
44	120	1.90	1.88	1.84	1.84	1.83	1.78	1.80	1.78	1.72
44	145	2.48	2.46	2.40	2.40	2.37	2.30	2.33	2.30	2.21
44	170	3.10	3.07	2.98	2.98	2.94	2.83	2.88	2.83	2.71
44	195	3.73	3.69	3.48	3.58	3.52	3.34	3.44	3.38	3.22
44	220	4.39	4.32	3.92	4.18	4.12	3.76	4.01	3.94	3.63
47	97	1.44	1.43	1.41	1.41	1.40	1.36	1.38	1.36	1.31
47	120	1.96	1.95	1.90	1.90	1.89	1.83	1.86	1.83	1.77
47	145	2.56	2.54	2.48	2.48	2.45	2.37	2.40	2.37	2.28
47	170	3.19	3.16	3.07	3.07	3.03	2.92	2.97	2.92	2.79
47	195	3.85	3.80	3.55	3.68	3.63	3.41	3.54	3.48	3.29
47	220	4.52	4.41	4.01	4.30	4.24	3.85	4.13	4.05	3.71
63	97	1.67	1.66	1.63	1.63	1.62	1.58	1.59	1.58	1.53
63	120	2.26	2.24	2.19	2.19	2.17	2.11	2.13	2.11	2.03
63	145	2.94	2.92	2.84	2.84	2.80	2.71	2.75	2.71	2.60
63	170	3.65	3.61	3.43	3.50	3.45	3.29	3.38	3.32	3.17
63	195	4.38	4.31	3.92	4.18	4.12	3.77	4.02	3.95	3.64
63	220	5.05	4.86	4.42	4.86	4.67	4.25	4.67	4.51	4.10
75	120	2.46	2.44	2.38	2.38	2.35	2.28	2.31	2.28	2.20
75	145	3.19	3.16	3.07	3.07	3.03	2.92	2.97	2.92	2.80
75	170	3.95	3.90	3.63	3.78	3.72	3.49	3.64	3.58	3.37
75	195	4.72	4.57	4.16	4.50	4.39	4.00	4.32	4.24	3.86
75	220	5.34	5.14	4.68	5.14	4.95	4.50	4.97	4.78	4.35
ALS/CLS										
38	140	2.20	2.18	2.13	2.13	2.11	2.04	2.07	2.04	1.95
38	184	3.22	3.19	3.10	3.10	3.05	2.94	2.99	2.94	2.81
38	235	4.48	4.38	3.98	4.27	4.20	3.82	4.10	4.02	3.67

Table 7.6 Permissible clear spans for joists for flat roofs – unlimited access

Imposed load 1.50 kN/m²

Strength Class C24 **Service Class 1 or 2**

		Dead loads F_d (kN/m²) excluding self-weight of joist								
		F_d not more than 0.50			F_d more than 0.5 but not more than 0.75			F_d more than 0.75 but not more than 1.00		
Size of joist		Spacing of joists (mm)								
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	400	450	600
		Maximum clear span (m)								
38	97	1.43	1.42	1.40	1.40	1.39	1.36	1.37	1.36	1.32
38	120	1.95	1.94	1.90	1.90	1.88	1.83	1.85	1.83	1.77
38	145	2.55	2.53	2.47	2.47	2.44	2.36	2.39	2.36	2.27
38	170	3.19	3.15	3.06	3.06	3.02	2.91	2.96	2.91	2.79
38	195	3.84	3.79	3.55	3.67	3.62	3.41	3.53	3.47	3.28
38	220	4.51	4.40	4.00	4.29	4.22	3.84	4.12	4.04	3.70
44	97	1.55	1.54	1.51	1.51	1.50	1.46	1.48	1.46	1.42
44	120	2.10	2.08	2.04	2.04	2.02	1.96	1.98	1.96	1.89
44	145	2.74	2.71	2.64	2.64	2.61	2.52	2.56	2.52	2.43
44	170	3.41	3.37	3.25	3.27	3.23	3.11	3.16	3.11	2.97
44	195	4.10	4.05	3.73	3.92	3.86	3.58	3.77	3.70	3.45
44	220	4.81	4.62	4.20	4.57	4.44	4.04	4.38	4.29	3.89
47	97	1.60	1.59	1.56	1.56	1.55	1.51	1.53	1.51	1.47
47	120	2.17	2.15	2.10	2.10	2.08	2.02	2.05	2.02	1.95
47	145	2.83	2.80	2.73	2.73	2.69	2.60	2.64	2.60	2.50
47	170	3.51	3.48	3.33	3.37	3.32	3.20	3.25	3.20	3.06
47	195	4.22	4.17	3.81	4.03	3.97	3.66	3.87	3.80	3.53
47	220	4.91	4.72	4.29	4.70	4.54	4.13	4.51	4.39	3.98
63	97	1.85	1.84	1.80	1.80	1.78	1.74	1.76	1.74	1.68
63	120	2.50	2.48	2.42	2.42	2.39	2.31	2.35	2.31	2.23
63	145	3.24	3.20	3.11	3.11	3.07	2.96	3.01	2.96	2.84
63	170	4.01	3.96	3.67	3.83	3.78	3.53	3.69	3.63	3.41
63	195	4.79	4.62	4.20	4.57	4.44	4.04	4.38	4.29	3.90
63	220	5.40	5.20	4.73	5.20	5.00	4.55	5.02	4.83	4.39
75	120	2.71	2.68	2.62	2.62	2.59	2.50	2.54	2.50	2.41
75	145	3.50	3.46	3.32	3.36	3.32	3.19	3.25	3.19	3.06
75	170	4.32	4.27	3.89	4.13	4.07	3.74	3.97	3.90	3.61
75	195	5.07	4.88	4.45	4.88	4.70	4.28	4.70	4.54	4.13
75	220	5.70	5.49	5.01	5.49	5.29	4.82	5.31	5.11	4.66
ALS/CLS										
38	140	2.43	2.41	2.35	2.35	2.32	2.25	2.28	2.25	2.17
38	184	3.55	3.51	3.35	3.40	3.35	3.22	3.28	3.22	3.08
38	235	4.89	4.70	4.27	4.67	4.52	4.10	4.47	4.36	3.95

References

British Standards

BS 4978: 2007	Visual strength grading of softwood. Specification.
BS 5268-2: 2002	Structural use of timber. Code of practice for permissible stress design, materials and workmanship.
BS 5268-3: 1998	Structural use of timber. Code of practice for trussed rafter roofs.
BS 5268-7.1: 1989	Structural use of timber. Recommendations for the calculation basis for span tables. Domestic floor joists.
BS 5268-7.2: 1989	Structural use of timber. Recommendations for the calculation basis for span tables. Joists for flat roofs.
BS 5268-7.3: 1989	Structural use of timber. Recommendations for the calculation basis for span tables. Ceiling joists.
BS 5268-7.4: 1989	Structural use of timber. Recommendations for the calculation basis for span tables. Ceiling binders.
BS 5268-7.5: 1990	Structural use of timber. Recommendations for the calculation basis for span tables. Domestic rafters.
BS 5268-7.6: 1990	Structural use of timber. Recommendations for the calculation basis for span tables. Purlins supporting rafters.
BS 5268-7.7: 1990	Structural use of timber. Recommendations for the calculation basis for span tables. Purlins supporting sheeting or decking.
BS 6399-1: 1996	Loading for buildings. Code of practice for dead and imposed loads.
BS 6399-3: 1988	Loading for buildings. Code of practice for imposed roof loads.
BS 8103-3: 1996	Structural design of low-rise buildings. Code of practice for timber floors and roofs for housing.
BS EN 336: 2003	Structural timber. Sizes, permitted deviations.
BS EN 338: 2003	Structural timber. Strength classes.
BS EN 14081-1: 2005	Timber structures. Strength graded structural timber with rectangular cross section. General requirements.
BS EN 14081-2: 2005	Timber structures. Strength graded structural timber with rectangular cross section. Additional requirements for initial type testing.
BS EN 14081-3: 2005	Timber structures. Strength graded structural timber with rectangular cross section. Additional requirements for factory production control.

Other publications

TRADA Wood Information Sheet 1-25 Structural use of timber: An introduction to BS 5268-2.

TRADA Wood Information Sheet 4-7 Timber strength grading and strength classes.

TRADA Wood Information Sheet 4-29 Dry-graded structural softwood.