

Posi-STRUT® Floor System

INTRODUCTION

Posi-STRUT® range of products are parallel chord trusses using timber chords “on flat” and the unique Posi-STRUT® metal webs.

Posi-TRUSS is a made to order parallel chorded truss commonly used as long span floor joists. They provide an economical and high quality floor structure which is easily assembled and provides excellent access for plumbing, electrical services and air conditioning ducts. Posi-TRUSS may also be used for long span rafters or purlins to carry tile or steel deck roofing.

As Posi-TRUSSES are designed and manufactured to order for specific projects, they can incorporate internal beams and special support conditions.

Posi-JOIST® and Posi-PLUS® trusses incorporate special trimmable ends and are available ex stock. Posi-JOIST® and Posi-PLUS® are designed specifically for use as floor joists in domestic type structures and should not be used for other applications without advice from a qualified engineer.

The Posi-STRUT® range of products are available in nominal 200, 250, 300 and 400mm depth. Actual overall truss depth depends on timber sizes used for the chords, and is provided in the design tables enclosed. Posi-STRUTS® make more efficient use of timber than conventional joists, as they have timber concentrated at the top and bottom of the truss where it works most efficiently. This concept is similar to that of steel universal beams, where the majority of steel is located in the flanges. The efficient use of timber, combined with the strength of the Posi-STRUT® webs, make the Posi-STRUT® range of products very lightweight, yet strong structural members.

ADVANTAGES

Posi-STRUTS® offer the following advantages over solid joists:

- Plumbing, electrical conduit and other services can be run between chords and webs.
- No drilling or notching required to accommodate services.
- Additional width available for fixing flooring.
- Ceiling material can be fixed directly to the truss bottom chords.
- Larger clear spans.
- Internal load bearing walls, piers or stumps and bearers can be reduced or eliminated.
- Shrinkage problems sometimes encountered with unseasoned solid timber are reduced or eliminated.
- Lightweight and easy to handle.
- Posi-JOIST® and Posi-PLUS® trusses may be trimmed to length on site.
- Load sharing ability.
- Strongback bracing increases floor stiffness and reduces squeaky floors.
- Optional top chord support reduces on-site labour.
- With Posi-Purlins, roof and ceiling can be fixed direct.
- Top chord hanging.

DEFINITIONS

Loadbearing Partition Walls - walls which carry roof and/or upper floor loads in addition to their own self weight and wall lining.

Non-Load bearing Partition Walls - walls which impart self weight only to supporting structure.

Platform Flooring - flooring fitted continuously from external wall to external wall prior to the installation of internal partition walls.

Fitted Flooring - flooring fitted for each room after internal walls have been installed.

Strongbacks - bracing members running at right angles to Posi-STRUTS® which provide load sharing between adjacent members.

LSD - Limit State Design.

FLOOR STIFFNESS

The dynamic response of floor systems to foot traffic and other moving loads is dependant on many factors such as the floor plan of supported walls, applied load, furniture layout, etc. The comfort and expectations of occupants also varies widely and is very personal.

Posi-STRUTS® have been designed so that the maximum span recommended in Tables 1 to 4 conforms to the vibration standard set out in AS1684.1-1999, Residential Timber-Framed Construction, Part 1 - design criteria.

When selecting a Posi-STRUT® for your application consideration should be given to the springiness of the floor. Generally the floor stiffness provided by the Tables meets the expectations of most occupants. Where Posi-STRUTS® are near their maximum span for large open areas like rumpus rooms and family rooms, or where additional floor stiffness is required the maximum spans given in Tables 1 to 6 should be reduced.

FLOOR LOADING

Posi-STRUTS® have been designed for the following Dead and Live Loads.

Dead Loads - are due to the mass of the structure and permanent fixtures. An allowance has been made in these designs for the following permanent loads:

Flooring - 22 mm Particle board flooring or equivalent plywood.

Ceiling - 13 mm plasterboard direct or 10 mm plasterboard on battens.

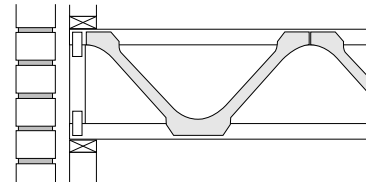
Floor covering - normal floor covering loads e.g. carpets or vinyl tiles. If, clay or heavy ceramic tiles are to be used, on large areas (i.e. greater than 3 square metres), further professional advice should be sought before commencing construction.

Live Loads - are temporary loads due to furniture or people which may vary over time.

Posi-STRUT® floor systems in this manual have been designed for 1.5 kPa which is suitable for domestic floor only. For commercial or public buildings seek advice from your Posi-STRUT® supplier.

Note: The Posi-STRUT® span chart tables attached, are not designed to support load bearing walls. All roof loads to be supported by external wall only. For Posi-STRUTS® that must support load bearing walls, contact your nearest MiTek office.

SPAN CHARTS FOR BOTTOM CHORD SUPPORT FLOOR TRUSSES



Note:

1. All charts designed using LSD method.
2. Minimum Joint Group JD5.

Maximum Spans for 35 mm thick timber

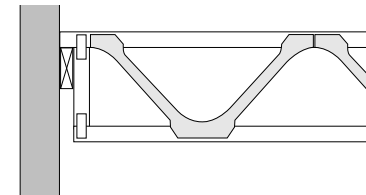
Posi-STRUT® Size	Timber Size (mm x mm)	Overall Depth (mm)	450 mm Posi-STRUT® Centres						600 mm Posi-STRUT® Centres							
			Timber Grade													
			F5	F8	F11	F17	MGP10	MGP12	MGP15	F5	F8	F11	F17	MGP10	MGP12	MGP15
PSW3520	35 x 70	197	1100	3800	4000	4400	3600*	4300	4600	-	3400	3700	4000	3100*	3800	4100
	35 x 90	197	3800	4200	4400	4800	4100	4600	4900	3300	3800	4000	4300	3400	4200	4300
PSW3525	35 x 70	248	2900*	4600	4900	5200	4200*	5100	5300	1100	4200	4400	4800	3400*	4700	4900
	35 x 90	248	4500	5000	5200	5500	4600	5400	5700	3900	4600	4800	5100	4100	5000	5200
PSW3530	35 x 70	302	3700*	5300	5400	5800	4600*	5700	5900	1100	4800	5000	5400	4100*	5300	5500
	35 x 90	302	5000	5600	5800	6200	5300	6100	6300	4400	5200	5400	5800	4500	5600	5900

*Important Note: For spans in the range of 1100 to 2600, top chords may require to be a minimum grade of F8 or MGP12 to conform to AS1170.1-1997.

Maximum Spans for 45 mm thick timber

Posi-STRUT® Size	Posi-JOIST® Size	Timber Size (mm x mm)	Overall Depth (mm)	450 mm Posi-STRUT® Centres						600 mm Posi-STRUT® Centres							
				Timber Grade													
				F5	F8	F11	F17	MGP10	MGP12	MGP15	F5	F8	F11	F17	MGP10	MGP12	MGP15
PSW4525	PJ25-70	45 x 70	248	4400	4900	5100	5400	4600	5300	5500	3800	4400	4600	5000	4000	4900	5100
	PJ25-90	45 x 90	248	4900	5200	5400	5800	5200	5600	5900	4300	4800	5000	5400	4500	5200	5500
PSW4530	PJ30-70	45 x 70	302	4900	5500	5700	6100	5200	6000	6200	4300	5100	5300	5700	4500	5500	5800
	PJ30-90	45 x 90	302	5500	5800	6000	6500	5800	6300	6600	4800	5400	5600	6000	5100	5900	6100
PSW4540	PJ40-70	45 x 70	412	5900	6500	6700	7200	6200	7100	7400	5200	6100	6300	6700	5500	6600	6800
	PJ40-90	45 x 90	412	6500	6900	7200	7700	7100	7500	7900	5600	6400	6700	7200	6100	7000	7300

SPAN CHARTS FOR TOP CHORD SUPPORT FLOOR TRUSSES



Note:

1. All charts designed using LSD method.
2. Minimum Joint Group JD5.
3. Spans have been produced for 45mm wide top chord bearings.

Maximum Spans for 35 mm thick timber

Posi-STRUT® Size	Timber Size (mm x mm)	Overall Depth (mm)	450 mm Posi-STRUT® Centres						600 mm Posi-STRUT® Centres							
			Timber Grade													
			F5	F8	F11	F17	MGP10	MGP12	MGP15	F5	F8	F11	F17	MGP10	MGP12	MGP15
PSW3520	35 x 70	197	-	3800	3800	4400	-	4200	4500	-	3000*	3600	3900	-	3800	3900
	35 x 90	197	1000	4000	4300	4600	4000	4600	4800	-	3600	3900	3900	-	3900	3900
PSW3525	35 x 70	248	-	4000	4700	5100	-	4900	5200	-	3000*	3700	4700	-	4500	4800
	35 x 90	248	3200#	4900	5000	5400	4600#	5300	5500	-	3900	4600	4900	3500#	4800	5100
PSW3530	35 x 70	302	-	4000	5000	5700	-	5500	5800	-	3000*	3700	5200	-	5100	5300
	35 x 90	302	3300#	5100	5600	6000	5200#	5900	6100	1100	3900	4800	5600	3900#	5400	5700

*Important Note: For spans in the range of 1100 to 2600, top chords may require to be a minimum grade of F11 or MGP12 to conform to AS1170.1-1997.

#Important Note: For spans in the range of 1100 to 2600, top chords may require to be a minimum grade of F8 or MGP12 to conform to AS1170.1-1997.

Maximum Spans for 45 mm thick timber

Posi-STRUT® Size	Timber Size (mm x mm)	Overall Depth (mm)	450 mm Posi-STRUT® Centres						600 mm Posi-STRUT® Centres							
			Timber Grade													
			F5	F8	F11	F17	MGP10	MGP12	MGP15	F5	F8	F11	F17	MGP10	MGP12	MGP15
PSW4525	45 x 70	248	4300	4700	4900	5300	4500	5200	5400	3700*	4300	4500	4900	3900	4800	5000
	45 x 90	248	4700	5100	5300	5600	5100	5500	5700	4200	4700	4800	5200	4500	5000	5200
PSW4530	45 x 70	302	4900	5300	5500	5900	5100	5800	6100	4200*	4900	5000	5500	4500	5300	5600
	45 x 90	302	5300	5700	5900	6300	5800	6200	6500	4700	5200	5400	5600	5000	5700	5600
PSW4540	45 x 70	412	4800*	6300	6500	6000	6100	6900	7200	-	5700	5900	6500	5400	6300	6600
	45 x 90	412	6300	6700	7000	7500	6900	7300	7700	5500	6100	6400	6900	5900	6700	6900

*Important Note: For spans in the range of 1100 to 2600, top chords may require to be a minimum grade of F8 or MGP12 to conform to AS1170.1-1997.

SUPPORTING STRUCTURE

The supporting structure should be checked to ensure that beams, walls and footings are capable of supporting all loads from floors and/or roof.

As Posi-STRUTS® allow the use of large open areas with fewer bracing walls, the stability of the structure should be checked in all cases.

1. Solid Brick Construction

Lateral stability and strength of supporting walls should be checked in accordance with Masonry Code AS3700-1998.

2. Timber Framed Construction

The strength and bracing of timber framed walls supporting Posi-STRUTS® should be checked using SAA Timber Framing Code AS1684-1999 or be designed using AS1720.1-1997.

3. Elevated Building

For traditional elevated buildings where a central row of piers is to be removed, additional bracing may be required to provide stability to the building. This may be provided by designing ground level shear walls at each end of the building, or by using braced partition walls located centrally. If in doubt, consult MiTek Australia Ltd.

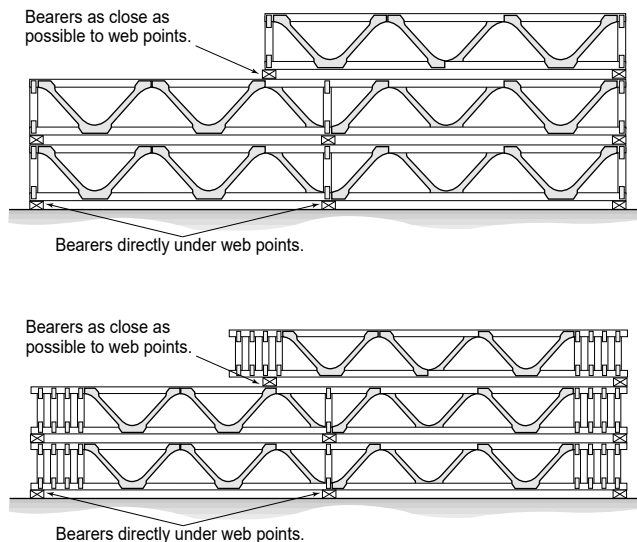
In all of the above cases the stability of the structure relies to some extent on the bracing provided by the panel flooring. For this reason it is important that floor trusses be fixed securely to supporting walls.

All cross walls and end walls should be securely fastened to the outer supporting walls. For timber framed walls use a 50 x 100 mm Strapnail at each intersection. For masonry construction, a continuous timber top plate should be installed and joined to each intersecting top plate at cross walls using 50 x 100 mm Strapnails.

HANDLING AND STORAGE

All Posi-STRUT® components should be strapped and stacked vertically with the bottom chord clear of the ground, supported on bearers located directly under web points. Posi-STRUTS® may be stacked on top of each other with bearers aligned as closely as possible to web panel points.

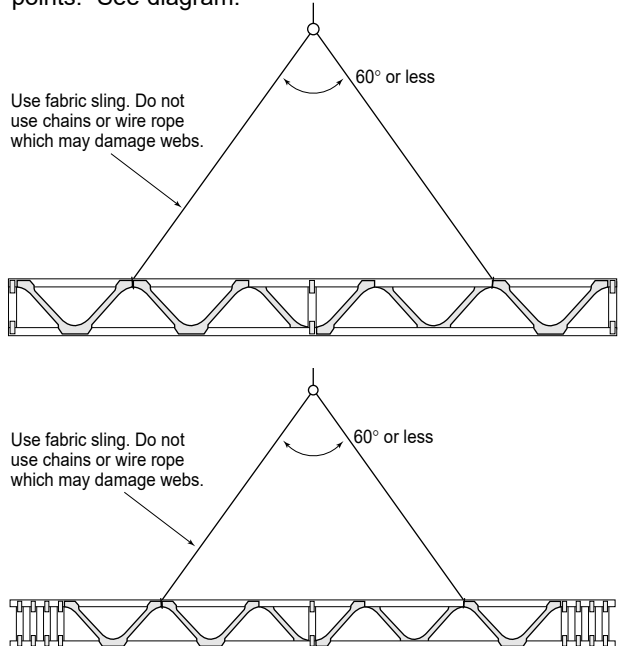
Posi-STRUTS® should not be left exposed to weather for extended periods of time without adequate protection. If covered, ensure adequate air circulation around the trusses.



Typical stacking of Posi-STRUTS®

Care should be taken when handling the Posi-STRUT® to avoid bending, twisting or dropping. Slings should always be attached to the timber chords, and not to the metal webs to avoid buckling.

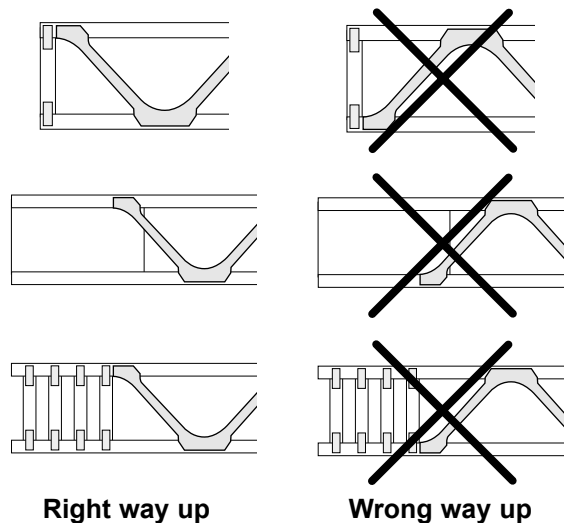
When lifting Posi-STRUTS® with a crane, slings should be attached at panel points closest to the truss quarter points. See diagram.



SET OUT AND PLACEMENT

Posi-STRUTS® are generally placed perpendicular to load bearing supporting walls and should be located so that distance between them does not exceed the designed spacing.

Care should be taken to place the Posi-STRUTS® the right way up. Unless marked otherwise Posi-STRUTS® are always manufactured so that Posi-Web starts at the top chord at each support point. There are occasions where it is necessary to design and manufacture Posi-STRUTS® with the first web starting at bottom chord level. In this case trusses will be marked "THIS WAY UP".



TRIMMING ON SITE

Only Posi-PLUS and Posi-JOIST members can be trimmed to length on site. Posi-TRUSSES are required to be manufactured to the required span for each project. If adjustments to span are required for Posi-TRUSSES you should consult with your supplier.

Trimming limitations for Posi-JOIST®

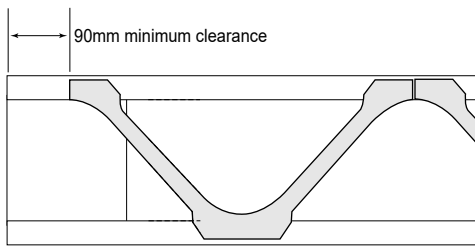
Posi-JOISTS® within the limits specified below may be trimmed each end by up to 335 mm for PJ20, PJ25 and PJ30 and up to 430 mm for PJ40. **Posi-JOISTS® should only be cut at locations between vertical webs.** The following procedure will allow trimming of Posi-JOISTS® to match your exact span.

- Where a supporting wall is to provide support to two abutting Posi-JOISTS®, position Posi-JOISTS® first so that there is equal bearing for each Posi-JOIST®. Also ensure that there is a vertical member located over the supporting wall.
- Check opposite support to ensure that a vertical timber web is also located over the support (allowable misplacement 5mm). Adjust location of truss until it is possible to trim without cutting through verticals.
- Use the first Posi-JOIST® as template for remaining trusses.

Note: Do not cut through vertical webs. It should only be necessary to cut at a position between vertical members.

Trimming limitations for Posi-PLUS®

Posi-PLUS® members may be trimmed at either end to within a minimum distance of 90 mm from the Posi-STRUT® web.



SUPPORTING EXTERNAL WALLS

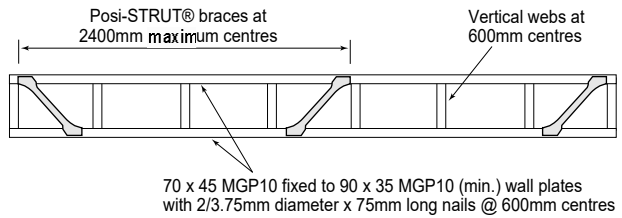
CASE 1. Upper Storey of 2 Storey - for the upper storey of two storey construction, where the lower stud wall provides continuous support, and where wall plates and lintels have been sized in accordance with AS1684 lower storey load bearing walls, standard Posi-STRUTS® may be used to support upper walls where the effective length of roof supported does not exceed that given in Table 5. below.

Posi-STRUT® or Posi-JOIST® Size	Sheet Roof (mm)	Tile Roof (mm)
PSW3520	5,050	3,950
PSW3525	5,550	4,350
PSW3530	6,750	5,300
PSW4525	8,150	6,100
PSW4530	9,000	6,750
PSW4540	7,450	5,600

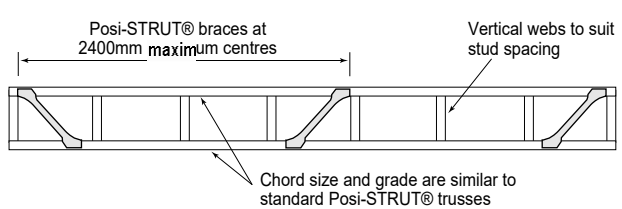
Note: The above table has been determined for sheet roof at 900mm centres and tiled roof at 600mm centres with maximum 25° roof pitch.

Where effective length of roof supported is greater than those in Table 5, F-Frame as specified below, solid bearer or standard Posi-STRUT® with timber verticals inserted under studs may be used.

F-Frame for EL < 3600mm

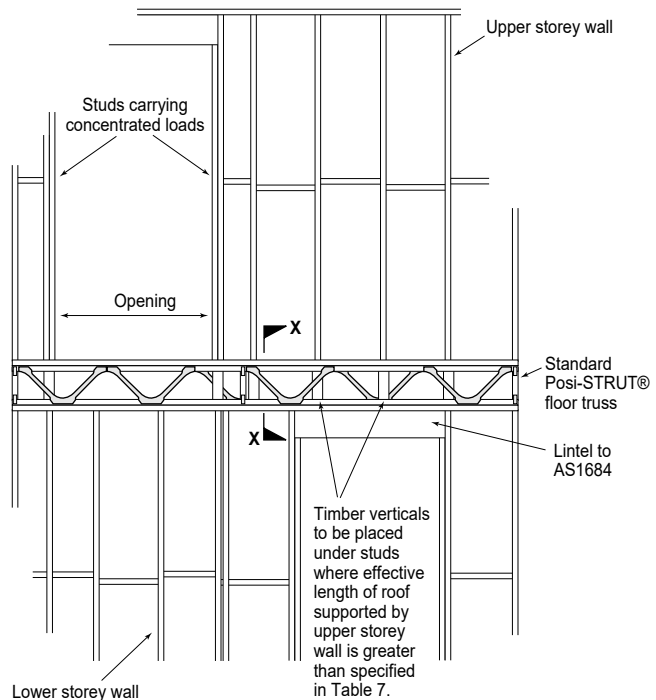


F-Frame for EL > 3600mm

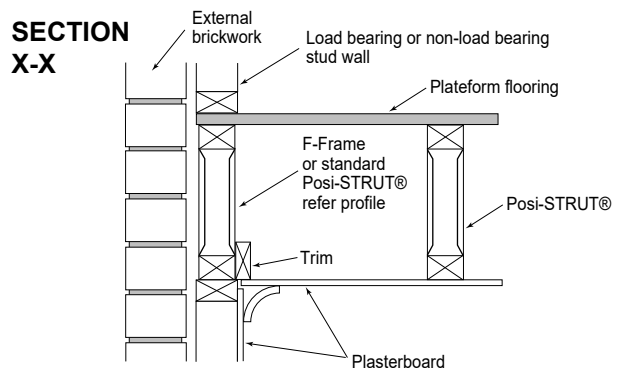


Where there are larger openings in the upper storey wall which cause a concentrated load on the Posi-STRUT® or F-Frame, a suitable timber vertical member should be inserted between the top and bottom chord under the point load to transfer it down to the wall below.

- Note:**
1. Posi-STRUT® chords and F-Frame chords may be considered to act in conjunction with wall plates to form a double plate or ribbon plate.
 2. Where openings are positioned in end walls, lintels are to be sized in accordance with AS1684.



End wall - Upper Storey

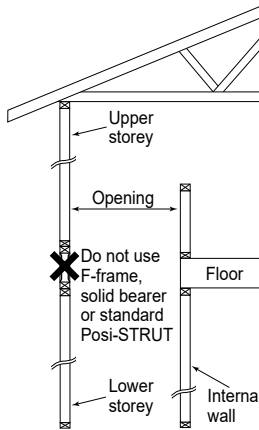


WARNING

Where stair wells or other voids are located adjacent external walls, the stability of the external wall should be checked by a structural engineer.

Generally, F-frames may be used to support upper walls of two storey construction at end walls where floor and ceiling acts as a diaphragm to restrain the external wall against lateral loads.

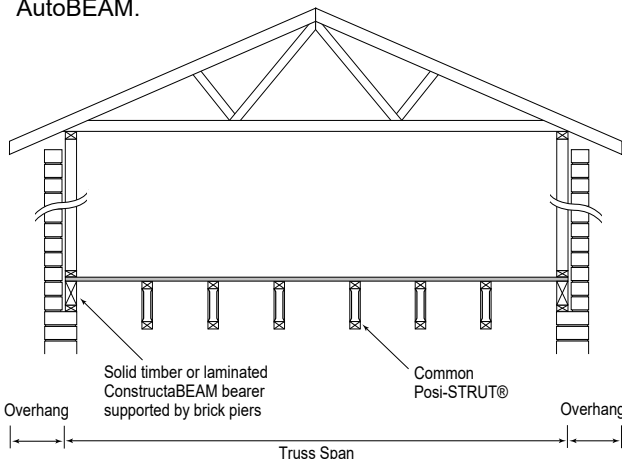
However, F-frames should not be used whenever supporting external walls that have an opening for a void area or staircase as shown. In these cases, the external walls are required to be designed by a structural engineer.



CASE 2. Single Storey - for a single storey construction where continuous support for the end F-Frame is not available, frames using Posi-JOIST® detail may be used provided the roof load (EL) does not exceed that specified in Table 6, and that pier spacing does not exceed 1200 centres.

Posi-JOIST® End Size	Sheet Roof (mm)	Tiled Roof (mm)
PJE25	7200	3600
PJE30	7200	3600
PJE40	7200	3600

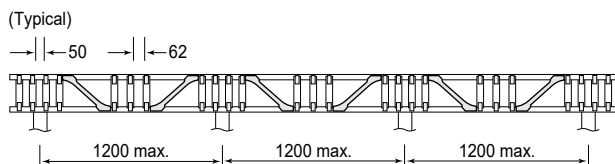
Where the effective length of roof supported exceeds that specified in Table 6, use either solid timber or laminated ConstructaBEAMS to support end wall and roof loads. Bearer sizes to be taken from AS1684-1999, relevant State Timber Framing Code or refer Gang-Nail Span Charts for laminated ConstructaBEAMS or AutoBEAM.



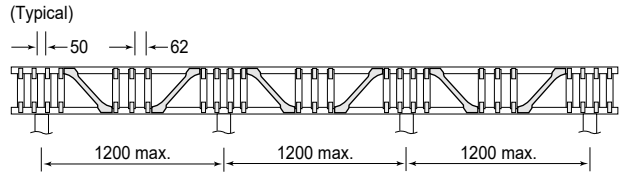
End wall - Single Storey

$$EL = 2 \times \text{Overhang} + \text{Truss Span}$$

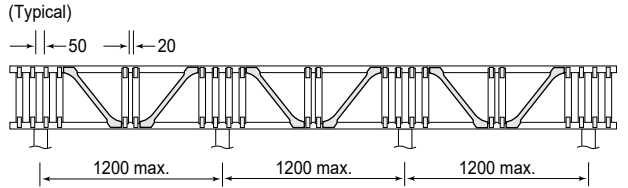
Posi-JOIST END 25 (PJE25)



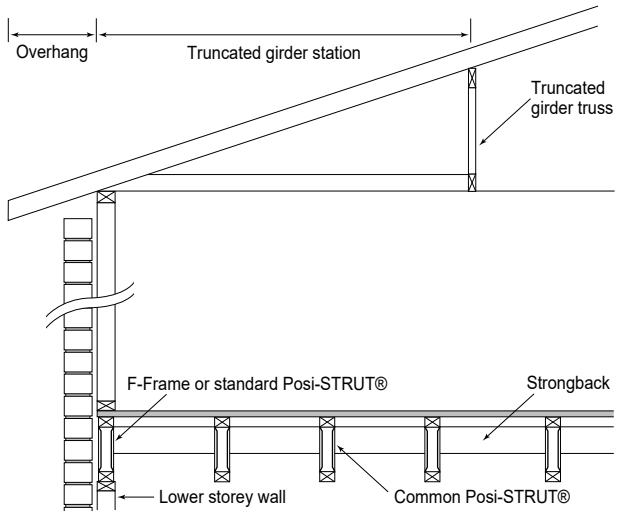
Posi-JOIST END 30 (PJE30)



Posi-JOIST END 40 (PJE40)



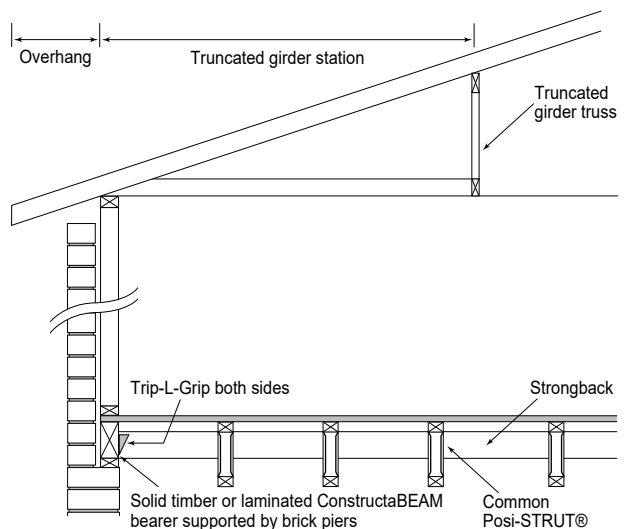
CASE 3. Building with Hip Ends - Both of the above two cases apply, provided the truncated girder truss station does not exceed the effective length of roof supported specified in Table 5.



End wall - Building with Hip End Upper Storey of 2 storey

$$EL = \text{Truncated Girder Truss Station} + 2 \times \text{Overhang}$$

CASE 4. End Walls for Single Storey Buildings with Hip Roof - As for case 2 except $EL = \text{Truncated Girder Station}$.



End wall - Building with Hip End Single Storey

$$EL = \text{Truncated Girder Truss Station} + 2 \times \text{Overhang}$$

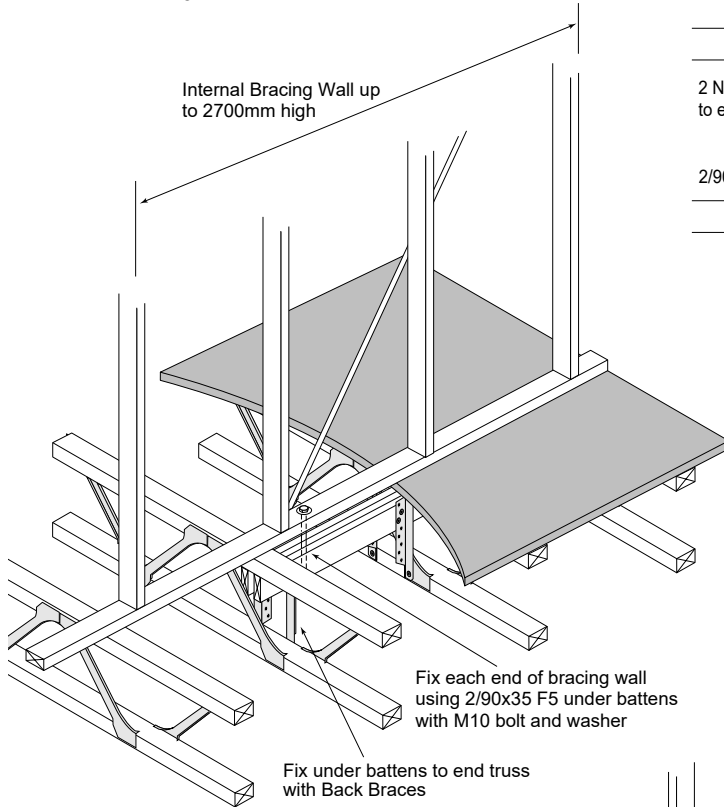
CASE 5. End Walls for Buildings with Gable Roof -
 Similar to that of building with Hip End, except the effective length of roof supported is as follows:

$$EL = 2 \times \text{Verge Overhang} + \text{Truss Spacing}$$

SUPPORTING NON-LOAD BEARING WALLS

Walls Perpendicular to Posi-STRUTS®

Walls placed perpendicular to the Posi-STRUTS® require no additional support. However, for braced walls with bracing capacity of up to 3.0 kN/m and 2700mm high, fix each end of bracing wall using 2/90 x 35 F5 under battens with M10 bolt and washer.

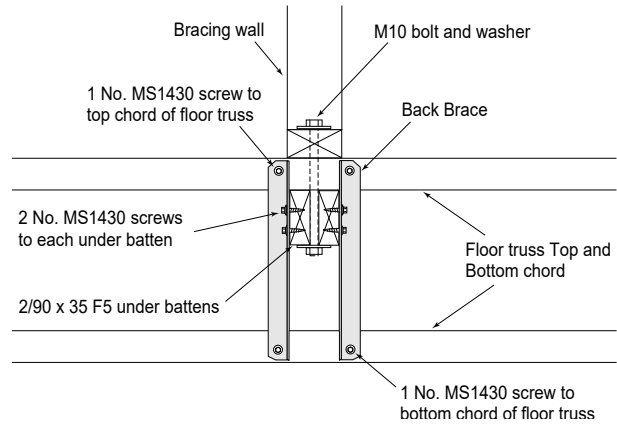


Braced walls perpendicular to trusses with bracing capacity up to 3.0 kN/m

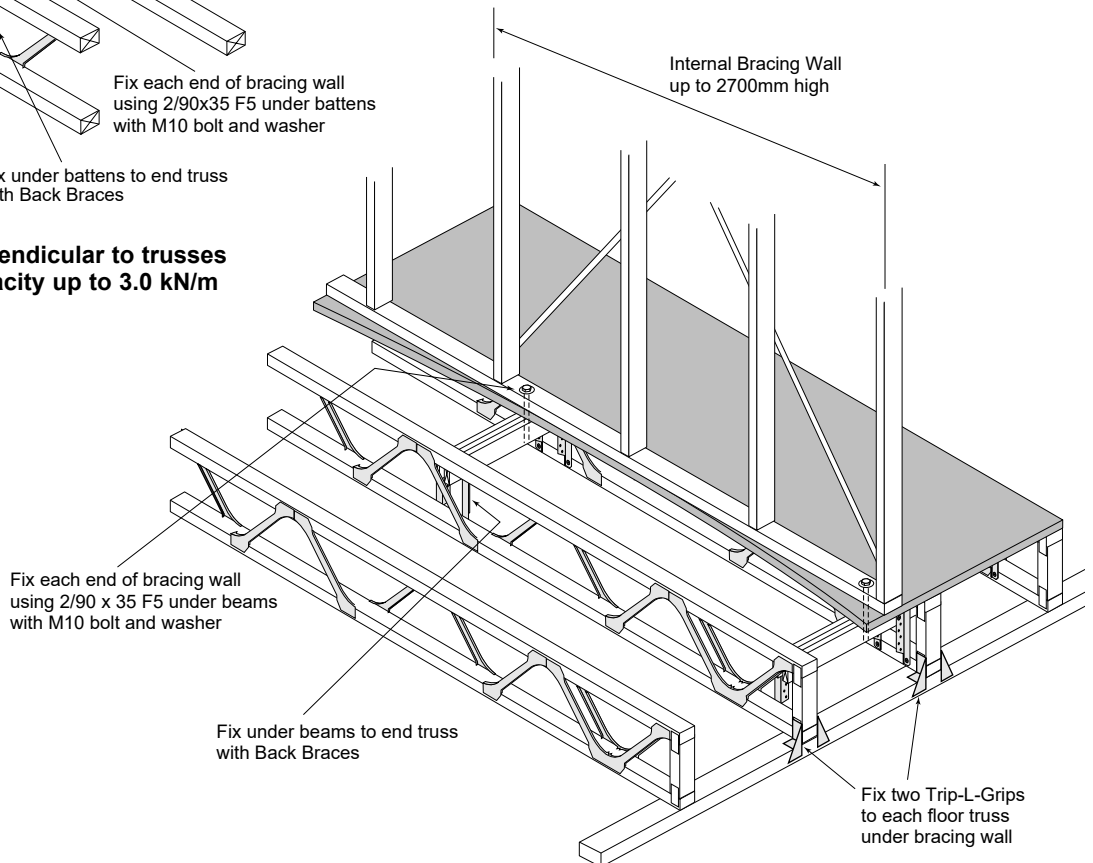
Walls Parallel to Posi-STRUTS®

a) Platform Flooring

Walls placed parallel to the Posi-STRUTS® do not require additional support where a platform floor is to be used and the flooring material is capable of supporting walls. However, for braced walls with bracing capacity of up to 3.0 kN/m and 2700mm high, fix each end of bracing wall using 2/90 x 35 F5 under battens with M10 bolt and washer.



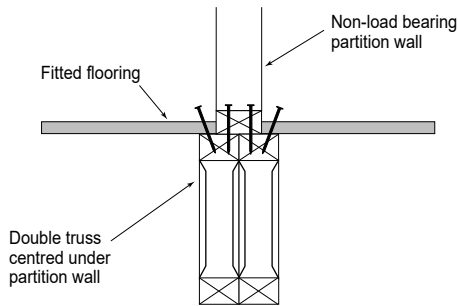
Under batten fixing detail



Bracing walls parallel to trusses with bracing capacity up to 3.0 kN/m

b) Fitted Flooring

Where flooring is fitted to each room after internal walls have been constructed, an additional truss is required below the wall to provide support to both the wall and flooring.



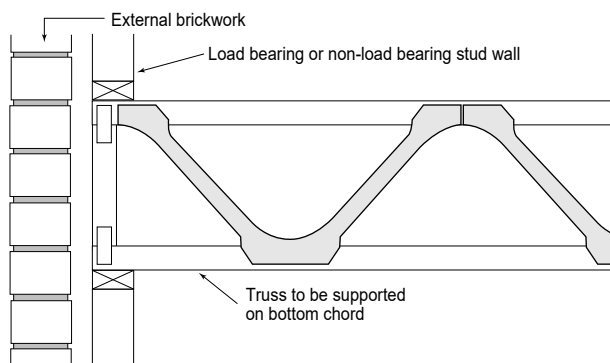
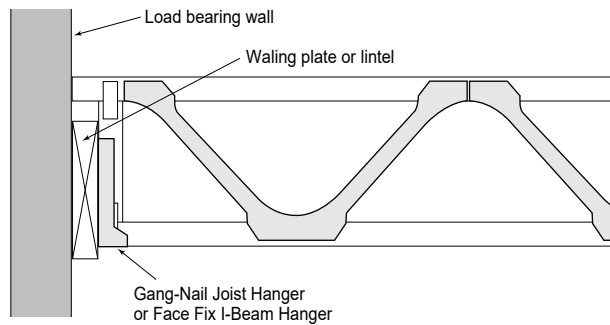
Fitted Flooring

Double trusses used under non-load bearing internal partition walls should be located such that the partition is bearing equally on both trusses. Flooring and strongbacks should be fixed to both trusses.

SUPPORT DETAILS

Posi-STRUT® Bottom Chord Support

Posi-STRUTS® may be supported on their bottom chord as shown



Posi-STRUT® Top Chord Support

The maximum span of top chord supported Posi-STRUTS® may be increased to the maximum span of the bottom chord trusses, if the end vertical web is fastened to the supporting beam with Gang-Nail Trip-L-Grips or if one of the following details are used:

1. Double end vertical web - see Figure 'X'.
2. Timber End Block - see Figure 'Y'.

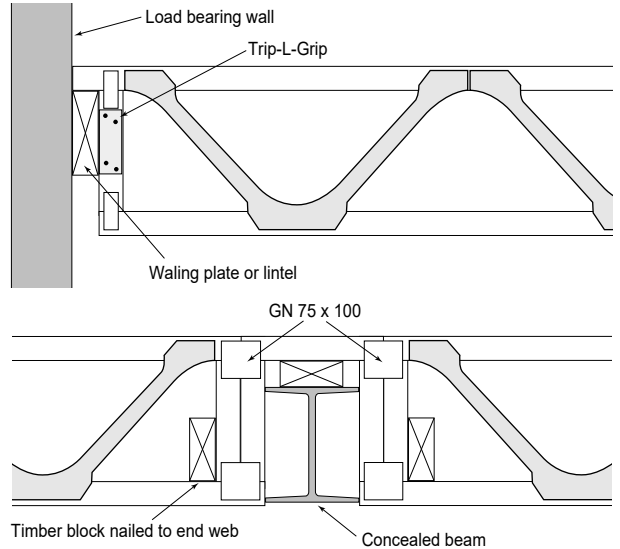


Figure 'X'

Recommended Timber Blocking Sizes				
Posi-STRUT Depth	200	250	300	400
Strongback Size	90 x 35	120 x 35	140 x 35	190 x 35

Timber End Block for Top Chord Supported Posi-STRUTS®

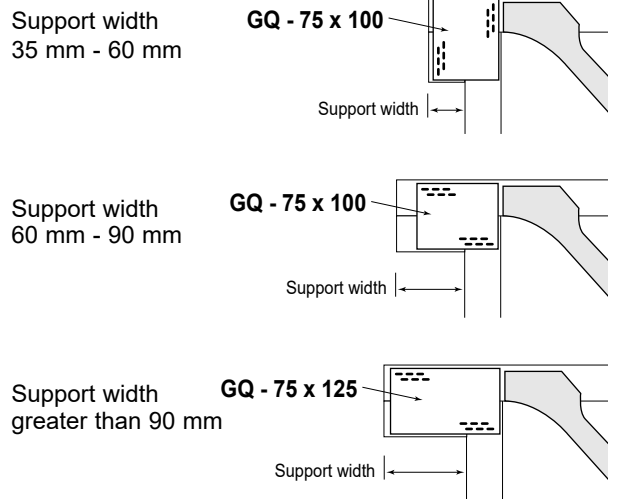
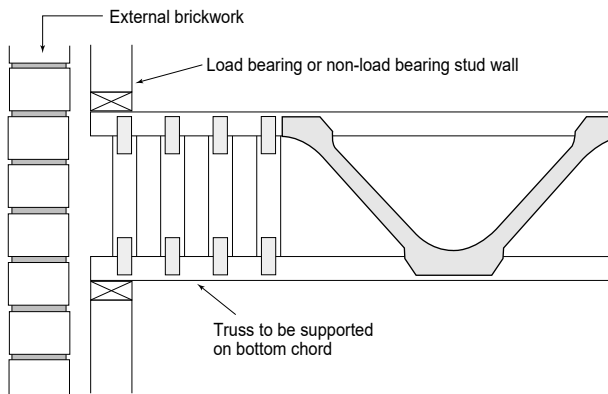


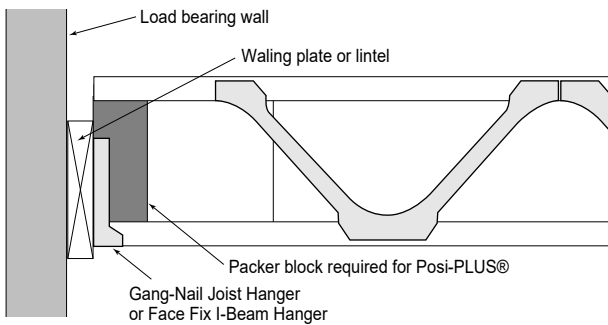
Figure 'Y'

Posi-JOIST® Bottom Chord Support

Posi-JOISTS® should only be supported on their bottom chord as shown.

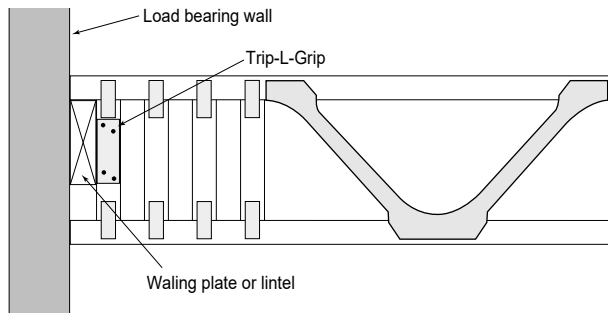


Posi-PLUS® Bottom Chord Support



Posi-JOIST® Top Chord Support

Where it is necessary to support Posi-JOISTS® by the top chord as shown, Trip-L-Grip's are required to fasten the truss end vertical web to face of the supporting beam.

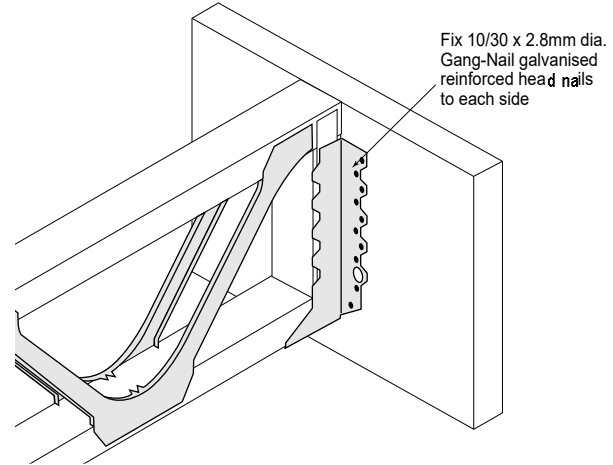


Hangers for Floor Trusses

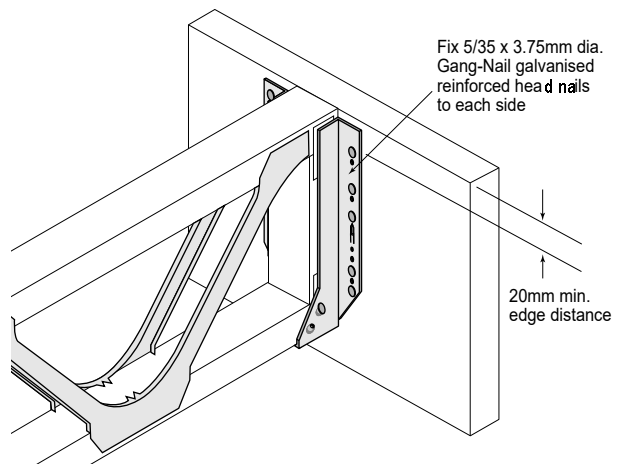
Floor trusses may be supported by Joist Hangers or I-Beam Hangers. The appropriate hanger size for each Posi-STRUT® truss is given in Table 7.

Joist Hangers and I-Beam Hangers fixed as specified below are satisfactory to carry the maximum spans specified in Table 1 and Table 2.

Joist Hanger Fixing



I-Beam Hanger Fixing



Notes:

1. Timber bearer, supporting beam or waling plate to which hangers are fixed to be a minimum joint group of JD4.
2. Ensure the hanger is seated properly with the hanger sitting vertical and all nails are fixed before loading hangers.

Posi-STRUT® sizes	Timber sizes (mm x mm)	Face Fix Hangers
PSW3520	35 x 70 35 x 90	JH70160 JH95150
PSW3525	35 x 70 35 x 90	IBHF24070 IBHF24090
PSW3530	35 x 70 35 x 90	IBHF24070 IBHF24090/IBHF30090
PSW4525	45 x 70 45 x 90	IBHF24070 IBHF24090
PSW4530	45 x 70 45 x 90	IBHF24070 IBHF24090/IBHF30090
PSW4540	45 x 70 45 x 90	IBHF24070 IBHF24090/IBHF30090

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