

Posi-STRUT™



June 2008

Posi-STRUT™ TRUSS SYSTEMS Manual

Posi-STRUT™ is available only through GANG-NAIL
Fabricators throughout New Zealand

Refer to the MiTek New Zealand website for up to date Posi-STRUT
information and a GANG-NAIL Fabricator listing

www.mitek.nz.co.nz



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Producer Statement - PS1- Design

ISSUED BY: MiTek New Zealand Ltd

TO BE SUPPLIED TO: Building Consent Authorities in New Zealand

IN RESPECT OF: Posi-STRUT Design Manual, June 2008

AT: Various Locations in New Zealand

MiTek New Zealand Ltd has provided engineering design services in respect of the requirements of Clause B1 of the NZ Building Code for

All Part only as specified – Posi-STRUT trusses

of the proposed building work.

The selection charts within this design manual have been prepared in accordance with **Compliance Documents and Verification Method B1/VM1** of the NZ Building Code and in accordance with sound and widely accepted engineering principles.

On behalf of MiTek New Zealand Ltd, and subject to:

1. The verification of the design assumptions within this manual
2. All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that the use of Posi-STRUT trusses in the building, if constructed in accordance with the drawings, specifications and other documents provided, will comply with the relevant provisions of the Building Code.

MiTek New Zealand Ltd holds a current policy of Professional Indemnity Insurance of not less than \$500,000.

On behalf of MiTek New Zealand Ltd

Date: December 2008



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Introduction

The GANG-NAIL Posi-STRUT system is a light, economical method of providing large clear spans in rafter, purlin and floor joist situations. Frames and supports can be spaced further apart to facilitate open spaces below.

The heart of the Posi-STRUT truss is the GANG-NAIL Posi-STRUT web. This is a folded metal web with nail plates at the pointed ends. The metal web is pressed onto timber chords to form a parallel chord truss.

This manual contains the necessary design selection, fabrication and construction information sufficient to detail most projects. MiTek New Zealand Ltd provides a design service for applications outside this manual. Special designs are available for

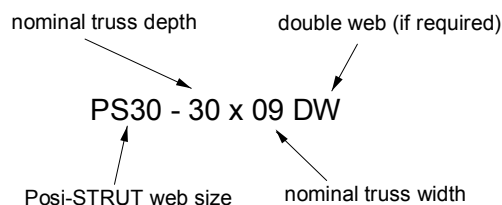
- cantilever trusses,
- trusses supporting load bearing walls,
- trusses with different chord sizes or orientation,
- multi-span trusses,
- trusses supporting unusual loads.

Advantages of Posi-STRUT

- Services (electrical, plumbing, vacuum systems) are easily run through the trusses without the need to drill holes, weakening the floor.
- Light to lift and fast to install.
- Greater spans for a given depth than solid timber joists.
- Camber is built in, resulting in a flat ceiling line.
- Shrinkage problems through using green timber are eliminated.
- Strongbacks run through the trusses, providing more effective load sharing than solid noggings.
- The ceiling can be fixed directly to the underside of the Posi-STRUT trusses, saving time and materials.
- Competes with other floor systems on price.

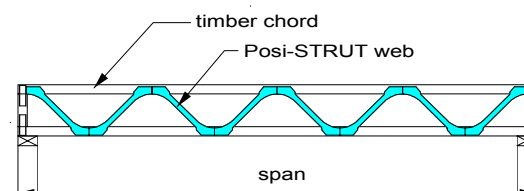
Definitions

Truss code



Span

The span is defined as the distance between the outside faces of the walls.



Design Loads

Refer NZS 3604 and AS/NZS 1170.

Posi-STRUT trusses supporting load-bearing walls are not covered by these selection charts and require special design.

Dead loads

Heavy Roof Rafter	0.65 kPa
Light Roof Rafter	0.25 kPa
Light Roof Purlin	0.20 kPa
Ceiling	0.20 kPa
Floor (1.5 kPa LL) + ceiling	0.40 kPa
Floor (3.0 kPa LL) + ceiling	0.50 kPa

Live loads

	Distributed	Conc.
Roof, maintenance	0.25 kPa	1.0 kN
Floor, domestic	1.5 kPa	1.8 kN
Floor, office	3.0 kPa	2.7 kN
Floor, public use	3.0 kPa	2.7 kN

Wind loads

	Design Wind Speed	q _u
Low	32 m/s	0.61 kPa
Medium	37 m/s	0.82 kPa
High	44 m/s	1.16 kPa
Very High	50 m/s	1.50 kPa

Combined pressure coefficients C_p = 1.2 max.

Snow loads

0.5 kPa and 1.0 kPa
Special design is required for higher snow loads.

Deflection Criteria

Refer also to BRANZ guidelines.

Floors

Span/600	10mm maximum under live load only. Short term load. (for liveliness control)
Span/600	15mm maximum under permanent long term load. (G+0.4Q, including creep)

Rafters

Span/400	15mm maximum under permanent long term load
Span/333	under wind load (with ceiling)
Span/167	under wind load (without ceiling)

Purlins

Span/400	15mm maximum under long term load
Span/167	under wind load

Cantilevers

Span/300	8mm maximum under dead and live load
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Design Strength

Trusses are designed to the Limit State Design provisions of AS/NZS 1170 and NZS 3603.

Timber stresses

Timber properties to Table 2.3 NZS 3603:1993 Amendment 4

Timber Grade	Bending Strength f _b (MPa)	Compression Strength f _c (MPa)	Tension Strength f _t (MPa)	Modulus of Elasticity E (GPa)
MSG8	14.0	18.0	6.0	8.0
MSG10	20.0	20.0	8.0	10.0
MSG12	28.0	25.0	14.0	12.0

Modification factors

K ₁	Load Case
0.6	Dead load only
0.8	Dead load and floor live load
0.8	Dead load and snow load
1.0	Dead load and roof live load
1.0	Dead load and wind load

Durability

This Section covers the durability of parallel chord Posi-STRUT floor trusses to support a light timber floor. Posi-STRUT webs are manufactured from 0.91mm ASTM A446 Grade A steel, with a Z275 galvanised coating. The webs are pressed into timber by accredited GANG-NAIL fabricators to form a parallel chord truss. GANG-NAIL toothed metal connectors (G300 steel with Z275 galvanised coating) are also used in the manufacture of the trusses to fix the timber members together.

Midfloor System

Posi-STRUT floor trusses used in midfloor situations are completely closed in and usually require no further protection to satisfy 50 year durability requirements.

Instructions on the Use of Charts

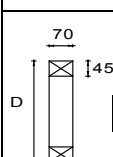
The selection charts are based on maximum span tables. All spans for rafters (and purlins) are measured along the slope, not horizontal spans. First determine the load condition for the truss, for example floor live load, or type of roof material, wind zone and snow zone.

Based on different truss spacings, the maximum spans for different truss sizes can be selected. Maximum truss spans for intermediate truss spacings may be obtained by interpolating between the published results. Extrapolation beyond maximum and minimum spacings is not permitted.

With snow loads, the wind zone category has to be determined as well in order to use the selection charts. For snow loads over 1.0 kPa, please contact MiTek Design Office for assistance.

Example:

Domestic Floor = 1.5 kPa Live Load, timber MSG8
Truss Spacing = 450mm. Required span = 4.0 m

Maximum Span (m) at Spacing = S					
Domestic Floor - 1.5 kPa Live Load					
Truss Code	D mm	Machine Stress Graded MSG8			
		Spacing "S" mm			
		400	450	600	
	PS20-21x07	217	3.3	3.2	2.8
	PS25-25x07	249	3.9	3.7	3.1
	PS30-30x07	303	4.4	4.2	3.6
	PS40-40x07	413	5.3	4.9	4.3

Maximum allowable span exceeds the required span of 4.0m, therefore use PS30-30x07.

The correct truss type is the one whose maximum allowable span selected from the charts equals or exceeds the required span. Spans in bold and shaded indicate double webs for fabrication. It is important to write 'DW' beside the truss code to indicate the double web requirement.

A number of end support details are possible with Posi-STRUT trusses and it is advisable to show the type required for your application. Several possible types of support details are shown in the Detailing Section of this Manual (page 23), which are by no means exhaustive. Consult the MiTek Design Office if you are looking for an alternative detail.

Special web positions may be possible to incorporate ducting around mid-span (page 22). It is necessary to specify this requirement where duct sizes over 100mm diameter are anticipated.

Details of fire rating and acoustic rating systems can be found on pages 32 to 34.

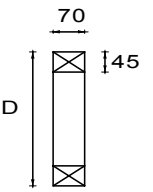
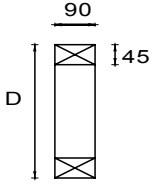
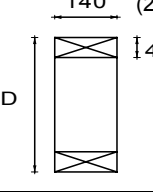
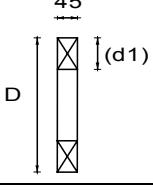
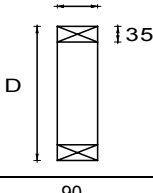
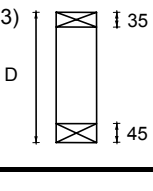
Floor Stiffness

The dynamic response of a floor system to foot traffic and other moving loads is dependant on many factors such as the floor plan of supported walls, applied load, furniture layout, dynamic response of the support structure, etc. The comfort and expectations of occupants also varies widely. Posi-STRUT floor trusses are designed to conform to the vibration requirements of the New Zealand Standard AS/NZS 1170. When selecting Posi-STRUT trusses consideration should be given to the springiness of the floor. Generally the floor stiffness provided by trusses selected from the tables and designed in MiTek 20/20™ meets the expectations of most occupants.

In situations where the trusses are near their maximum span and there are no internal non-loadbearing walls, above or below the floor, the maximum span from the Posi-STRUT manual should be reduced by multiplying by 0.9.

We recommend the use of Posi-STRUT Back Brace to provide positive fixing between the truss and the strongback (see page 28).

Floor Trusses

Maximum Span (m) at Spacing = S								
Domestic Floor - 1.5 kPa Live Load								
	Truss Code	D mm	Machine Stress Graded MSG8			Machine Stress Graded MSG10 ⁽¹⁾		
			Spacing "S" mm			Spacing "S" mm		
			400	450	600	400	450	600
	PS20-21x07	217	3.3	3.2	2.8	4.2	3.9	3.3
	PS25-25x07	249	3.9	3.7	3.1	4.5	4.3	3.7
	PS30-30x07	303	4.4	4.2	3.6	5.2	4.9	4.2
	PS40-40x07	413	5.3	4.9	4.3	6.2	5.8	5.0
	PS20-21x09	217	4.1	3.8	3.2	4.6	4.4	3.8
	PS25-25x09	249	4.5	4.2	3.6	5.1	4.9	4.2
	PS30-30x09	303	5.1	4.8	4.1	5.8	5.5	4.8
	PS40-40x09	413	6.1	5.6	4.9	7.1	6.7	5.6
	PS20-21x14	217	4.9	4.7	4.1	5.3	5.1	4.1
	PS25-25x14	249	5.5	5.2	4.5	5.9	5.7	5.1
	PS30-30x14	303	6.3	5.9	5.1	6.7	6.5	6.0
	PS40-40x14	413	7.6	7.1	6.0	7.9	7.6	7.1
	PS40-45x05	D/(d1) 463/(70)	5.5	5.1	4.5	6.4	6.0	5.2
	PS40-50x05	503/(90)	6.4	6.0	5.2	7.3	7.0	6.0
	PS40-60x05	603/(140)	8.3	7.8	6.8	9.0	8.7	7.8
	PS20-19x09	197	3.3	3.2	2.5	4.0	3.8	3.2
	PS25-23x09	229	3.8	3.6	3.1	4.4	4.2	3.6
	PS30-28x09	283	4.4	4.1	3.6	5.1	4.8	4.1
	PS40-39x09	393	5.3	4.7	4.0	6.1	5.7	4.8
	PS25-24x09	239	4.4	4.1	3.2	4.8	4.6	4.1
	PS30-29x09	293	5.0	4.6	3.9	5.6	5.4	4.5

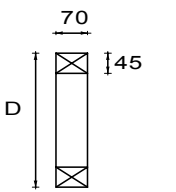
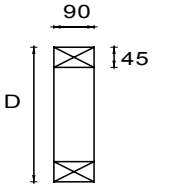
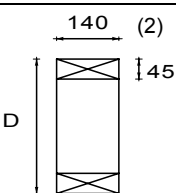
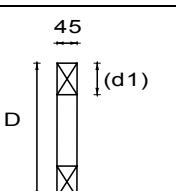
(1) When specifying check the availability of MSG10 timber.

(2) 140mm wide trusses may not be available from all fabricators.

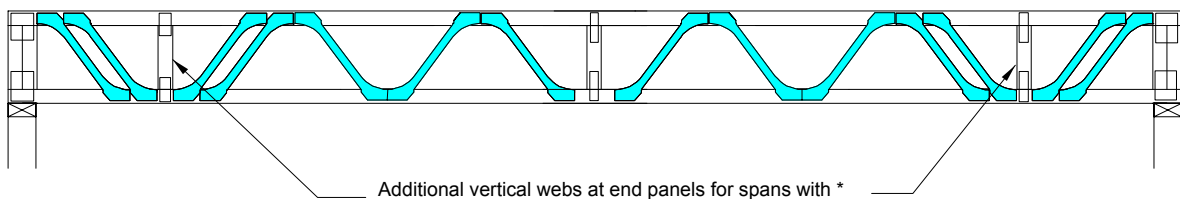
(3) These sizes are useful to match solid timber joist sizes.

(4) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

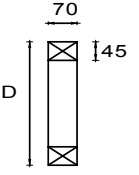
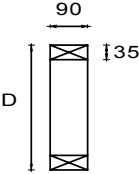
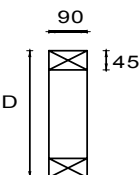
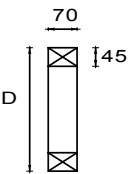
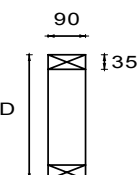
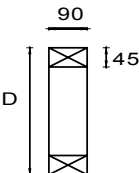
Floor Trusses

Maximum Span (m) at Spacing = S								
Office or Public Use Floor - 3.0 kPa Live Load								
	Truss Code	D mm	Machine Stress Graded MSG8			Machine Stress Graded MSG10 ⁽¹⁾		
			Spacing "S" mm			Spacing "S" mm		
			400	450	600	400	450	600
	PS20-21x07	217	2.4	-	-	2.9	-	-
	PS25-25x07	249	2.6	2.5	1.9	3.3	3.2	2.6
	PS30-30x07	303	3.2	3.1	2.5	3.8	3.5	3.1
	PS40-40x07	413	4.0	3.5	3.0*	4.1	4.0	3.6*
	PS20-21x09	217	3.0	-	-	3.0	-	-
	PS25-25x09	249	3.3	2.9	2.6	3.7	3.5	3.1
	PS30-30x09	303	3.7	3.5	2.9	4.2	4.0	3.5
	PS40-40x09	413	4.4	4.0	3.6*	5.1*	4.6*	3.9*
	PS20-21x14	217	3.0	-	-	3.0	-	-
	PS25-25x14	249	4.0	3.7	3.3	4.7	4.4	3.6
	PS30-30x14	303	4.6	4.3	3.6	5.3	5.0	4.0
	PS40-40x14	413	5.4	5.2	4.0*	6.2	5.7	4.0
	PS40-45x05	D/(d1) 463/(70)	3.9	3.7	2.9	4.7	4.2	3.7
	PS40-50x05	503/(90)	4.7	4.4	3.8	5.4	5.1	4.4
	PS40-60x05	603/(140)	6.1	5.7	5.0	7.0	6.6	5.4

- (1) When specifying check the availability of MSG10 timber.
- (2) 140mm wide trusses may not be available from all fabricators.
- (3) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).
- (4) Spans with * indicate additional vertical webs are required at end panels (see below).

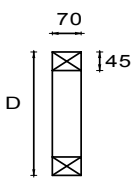
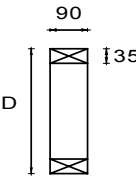
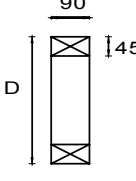


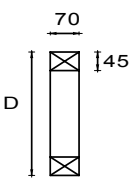
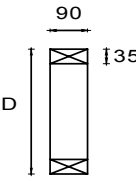
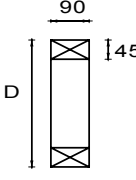
Purlin Trusses

Maximum Span (m) at Spacing = S							
Light Roof - Low/Medium Wind - Grade MSG8							
	Truss Code	D mm	Without Ceiling				
			Spacing "S" mm				
			600	900	1200	1500	1800
	PS20-21x07	217	5.8	5.2	4.5	4.0	3.7
	PS25-25x07	249	6.3	5.7	4.9	4.4	4.0
	PS30-30x07	303	7.1	6.4	5.6	4.9	4.5
	PS40-40x07	413	8.5	7.6	6.6	5.9	5.4
	PS20-19x09	197	5.6	5.1	4.4	3.9	3.6
	PS25-23x09	229	6.2	5.6	4.8	4.3	3.9
	PS30-28x09	283	7.0	6.3	5.5	4.9	4.4
	PS40-39x09	393	8.4	7.5	6.7	6.0	5.3
	PS20-21x09	217	6.2	5.6	5.1	4.5	4.2
	PS25-25x09	249	6.7	6.1	5.6	5.0	4.5
	PS30-30x09	303	7.6	6.8	6.3	5.7	5.2
	PS40-40x09	413	9.0	8.1	7.5	6.9	6.2
Maximum Span (m) at Spacing = S							
Light Roof - High/Very High Wind - Grade MSG8							
	Truss Code	D mm	Without Ceiling				
			Spacing "S" mm				
			600	900	1200	1500	1800
	PS20-21x07	217	4.4	3.5	3.1	2.7	2.4
	PS25-25x07	249	4.7	3.8	3.3	3.0	2.6
	PS30-30x07	303	5.3	4.3	3.7	3.3	3.0
	PS40-40x07	413	6.3	5.2	4.5	4.1	3.4
	PS20-19x09	197	4.4	3.6	3.0	2.5	1.9
	PS25-23x09	229	5.0	4.0	3.2	2.7	2.0
	PS30-28x09	283	5.6	4.4	3.8	3.1	2.5
	PS40-39x09	393	6.6	5.2	4.3	3.7	3.2
	PS20-21x09	217	5.4	4.3	3.7	3.2	3.0
	PS25-25x09	249	5.7	4.7	4.0	3.6	3.1
	PS30-30x09	303	6.6	5.4	4.4	4.0	3.6
	PS40-40x09	413	7.8	6.3	5.4	4.7	4.2

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

Purlin Trusses

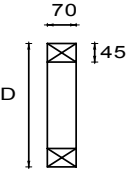
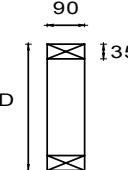
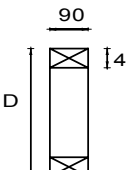
Maximum Span (m) at Spacing = S							
Light Roof - 0.5 kPa Snow Load - Low/Med Wind - MSG8							
	Truss Code	D mm	Without Ceiling				
			Spacing "S" mm				
			600	900	1200	1500	1800
	PS20-21x07	217	5.3	4.2	3.7	3.3	3.0
	PS25-25x07	249	5.7	4.5	4.0	3.4	3.3
	PS30-30x07	303	6.4	5.2	4.5	4.0	3.7
	PS40-40x07	413	7.7	6.3	5.5	4.8	4.4
	PS20-19x09	197	5.0	4.1	3.4	3.2	2.9
	PS25-23x09	229	5.6	4.5	3.9	3.3	3.2
	PS30-28x09	283	6.3	5.1	4.5	3.9	3.6
	PS40-39x09	393	7.6	6.2	5.4	4.8	4.4
	PS20-21x09	217	5.8	4.8	4.1	3.7	3.3
	PS25-25x09	249	6.4	5.2	4.5	4.0	3.7
	PS30-30x09	303	7.3	5.8	5.1	4.5	4.2
	PS40-40x09	413	8.6	7.1	6.2	5.5	5.0

Maximum Span (m) at Spacing = S							
Light Roof - 0.5 kPa Snow Load - High/Very High Wind - MSG8							
	Truss Code	D mm	Without Ceiling				
			Spacing "S" mm				
			600	900	1200	1500	1800
	PS20-21x07	217	4.4	3.6	3.2	2.8	2.2
	PS25-25x07	249	4.8	3.9	3.4	3.1	2.7
	PS30-30x07	303	5.4	4.4	3.8	3.4	3.0
	PS40-40x07	413	6.4	5.3	4.6	4.2*	3.3*
	PS20-19x09	197	4.5	3.7	3.1	2.5	2.0
	PS25-23x09	229	5.1	4.1	3.3	2.7	2.1
	PS30-28x09	283	5.7	4.5	3.9	3.2	2.2
	PS40-39x09	393	6.6	5.3	4.8*	4.1*	3.2*
	PS20-21x09	217	5.5	4.4	3.8	3.3	3.0
	PS25-25x09	249	5.8	4.8	4.1	3.7	3.2
	PS30-30x09	303	6.7	5.4	4.5	4.1	3.7
	PS40-40x09	413	7.9	6.3	5.4	4.7	4.2*

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

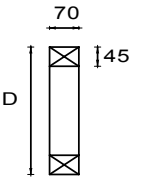
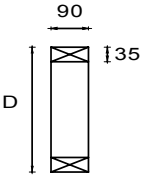
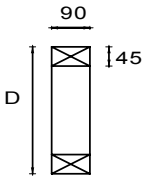
(2) Spans with * indicate additional vertical webs are required at end panels (see page 8).

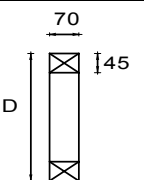
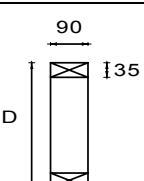
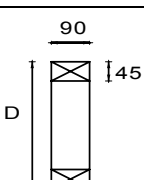
Purlin Trusses

Maximum Span (m) at Spacing = S							
Light Roof -1.0 kPa Snow Load - All Wind - Grade MSG8							
	Truss Code	D mm	Without Ceiling				
			Spacing "S" mm				
			600	900	1200	1500	1800
	PS20-21x07	217	4.1	3.3	2.9	2.6	2.2
	PS25-25x07	249	4.5	3.6	3.2	2.8	2.5
	PS30-30x07	303	5.0	4.1	3.4	3.2	2.9
	PS40-40x07	413	6.0	4.9	4.1	3.8*	3.3*
	PS20-19x09	197	3.9	3.3	2.8	2.5	2.0
	PS25-23x09	229	4.4	3.4	3.1	2.7	2.1
	PS30-28x09	283	4.9	4.0	3.3	3.2	2.2
	PS40-39x09	393	6.0	4.8	4.3*	3.8*	3.2*
	PS20-21x09	217	4.5	3.7	3.2	2.9	2.5
	PS25-25x09	249	5.0	4.1	3.4	3.2	2.9
	PS30-30x09	303	5.7	4.5	4.0	3.6	3.3
	PS40-40x09	413	6.9	5.6	4.8	4.1	3.7

- (1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).
 (2) Spans with * indicate additional vertical webs are required at end panels (see page 8).

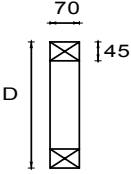
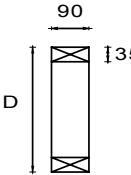
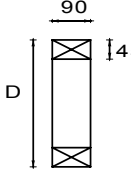
Rafter Trusses

Maximum Span (m) at Spacing = S										
Light Roof - Low/Medium Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm				Spacing "S" mm			
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	5.2	4.5	3.8	3.2	5.3	4.6	3.7	3.3
	PS25-25x07	249	5.6	4.9	4.3	3.4	5.8	5.0	4.1	3.4
	PS30-30x07	303	6.3	5.6	4.8	3.8	6.5	5.6	4.5	4.0
	PS40-40x07	413	7.6	6.7	5.7	4.6	7.7	6.7	5.5	4.8
	PS20-19x09	197	5.0	4.4	3.8	3.1	5.2	4.5	3.6	3.2
	PS25-23x09	229	5.5	4.8	4.2	3.3	5.6	4.9	4.0	3.3
	PS30-28x09	283	6.2	5.5	4.8	3.9	6.4	5.6	4.5	3.9
	PS40-39x09	393	7.5	6.6	5.7	4.5	7.6	6.8	5.4	4.8
	PS20-21x09	217	5.5	5.0	4.4	3.6	5.7	5.2	4.3	3.7
	PS25-25x09	249	6.0	5.4	4.8	3.9	6.2	5.7	4.7	4.0
	PS30-30x09	303	6.7	6.1	5.5	4.4	6.9	6.4	5.3	4.6
	PS40-40x09	413	8.0	7.3	6.4	5.3	8.2	7.6	6.3	5.5

Maximum Span (m) at Spacing = S										
Light Roof - High/Very High Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm				Spacing "S" mm			
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	5.0	4.1	3.4	2.8	3.6	3.2	2.2	1.9
	PS25-25x07	249	5.5	4.4	3.8	3.1	3.9	3.4	2.7	2.0
	PS30-30x07	303	6.2	5.0	4.3	3.3	4.4	3.8	3.0	2.0
	PS40-40x07	413	7.2	5.7	5.0	4.1	5.3	4.5	3.8	2.7
	PS20-19x09	197	4.9	3.9	3.3	2.2	3.7	3.1	2.0	1.3
	PS25-23x09	229	5.4	4.3	3.7	2.7	4.1	3.3	2.1	1.3
	PS30-28x09	283	6.1	4.9	4.2	3.1	4.7	3.9	2.5	1.9
	PS40-39x09	393	7.1	5.5	4.7	2.5	5.3	4.8	3.9	2.6
	PS20-21x09	217	5.5	4.7	4.0	3.2	4.4	3.9	3.0	2.2
	PS25-25x09	249	6.0	5.1	4.4	3.4	4.8	4.1	3.2	2.6
	PS30-30x09	303	6.7	5.7	4.9	3.9	5.4	4.7	3.7	2.9
	PS40-40x09	413	8.0	6.9	5.9	4.2	6.4	5.4	4.2	3.9

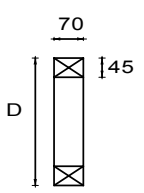
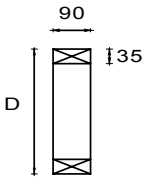
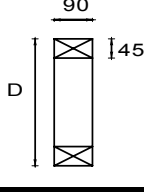
(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

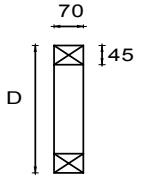
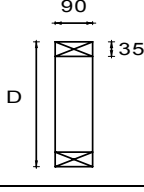
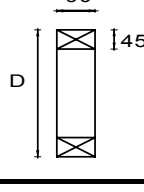
Rafter Trusses

Maximum Span (m) at Spacing = S								
Heavy Roof - All Wind - Grade MSG8								
	Truss Code	D mm	With Ceiling			Without Ceiling		
			Spacing "S" mm			Spacing "S" mm		
			600	900	1200	600	900	1200
	PS20-21x07	217	4.0	3.3	2.8	4.5	3.6	3.2
	PS25-25x07	249	4.4	3.6	3.1	4.8	3.9	3.3
	PS30-30x07	303	5.0	4.0	3.4	5.5	4.5	3.9
	PS40-40x07	413	6.0	4.8	4.1	6.6	5.4	4.6
	PS20-19x09	197	3.9	3.2	2.7	4.4	3.4	3.1
	PS25-23x09	229	4.3	3.4	3.0	4.6	3.9	3.3
	PS30-28x09	283	4.9	3.9	3.4	5.4	4.4	3.8
	PS40-39x09	393	5.7	4.7	4.1	6.5	5.3	4.6
	PS20-21x09	217	4.5	3.7	3.2	4.9	4.1	3.4
	PS25-25x09	249	5.0	4.0	3.4	5.3	4.5	3.9
	PS30-30x09	303	5.6	4.6	3.9	6.0	5.1	4.4
	PS40-40x09	413	6.7	5.5	4.7	7.1	6.1	5.3

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

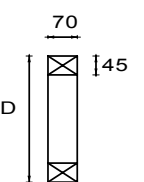
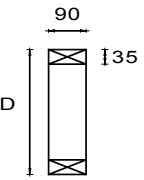
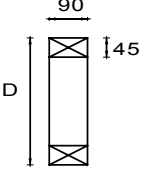
Rafter Trusses

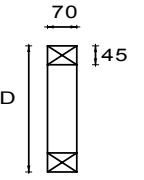
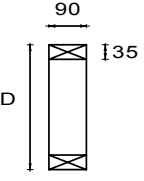
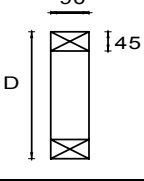
Maximum Span (m) at Spacing = S										
Light Roof - 0.5 kPa Snow Load - Low/Medium Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm				Spacing "S" mm			
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	4.7	3.8	3.3	2.7	4.2	3.7	3.0	2.6
	PS25-25x07	249	5.2	4.2	3.7	3.0	4.5	4.0	3.3	2.8
	PS30-30x07	303	5.8	4.8	4.2	3.3	5.2	4.5	3.7	3.2
	PS40-40x07	413	7.0	5.7	4.9	4.0	6.3	5.5	4.4	3.9
	PS20-19x09	197	4.6	3.8	3.3	2.6	4.1	3.4	2.9	2.5
	PS25-23x09	229	5.0	4.2	3.6	2.8	4.5	3.9	3.2	2.8
	PS30-28x09	283	5.8	4.6	4.0	3.3	5.1	4.5	3.6	3.2
	PS40-39x09	393	7.0	5.6	4.8	4.0	6.2	5.4	4.4	3.8
	PS20-21x09	217	5.4	4.4	3.8	3.1	4.8	4.1	3.3	2.9
	PS25-25x09	249	5.8	4.8	4.2	3.3	5.2	4.5	3.7	3.2
	PS30-30x09	303	6.7	5.4	4.6	3.8	5.8	5.1	4.2	3.6
	PS40-40x09	413	7.9	6.4	5.6	4.6	7.1	6.2	5.0	4.1

Maximum Span (m) at Spacing = S										
Light Roof - 0.5 kPa Snow Load - High/Very High Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm				Spacing "S" mm			
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	4.7	3.8	3.3	2.7	3.6	3.2	2.2	1.9
	PS25-25x07	249	5.2	4.2	3.7	3.0	3.9	3.4	2.7	2.0
	PS30-30x07	303	5.8	4.8	4.2	3.3	4.4	3.8	3.0	2.0
	PS40-40x07	413	7.0	5.6	4.9	4.1	5.3	4.2	3.9	3.2
	PS20-19x09	197	4.6	3.8	3.3	2.5	3.7	3.1	2.0	1.1
	PS25-23x09	229	5.0	4.2	3.6	2.7	4.1	3.3	2.1	1.1
	PS30-28x09	283	5.8	4.6	4.0	3.1	4.5	3.9	2.5	1.9
	PS40-39x09	393	7.0	5.5	4.7	4.0	5.3	4.8	3.2	2.6
	PS20-21x09	217	5.4	4.4	3.8	3.1	4.4	3.8	3.0	2.2
	PS25-25x09	249	5.8	4.8	4.2	3.3	4.8	4.1	3.2	2.6
	PS30-30x09	303	6.7	5.4	4.6	3.8	5.4	4.5	3.7	2.9
	PS40-40x09	413	8.0	6.5	5.6	4.2	6.3	5.4	4.2	3.4

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

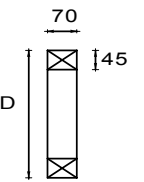
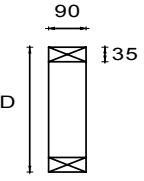
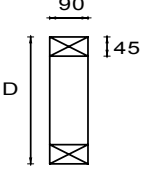
Rafter Trusses

Maximum Span (m) at Spacing = S								
Heavy Roof - 0.5 kPa Snow Load - Low/Medium Wind - Grade MSG8								
	Truss Code	D mm	With Ceiling			Without Ceiling		
			Spacing "S" mm			Spacing "S" mm		
			600	900	1200	600	900	1200
	PS20-21x07	217	4.0	3.3	2.8	4.2	3.3	3.0
	PS25-25x07	249	4.4	3.4	3.1	4.5	3.8	3.3
	PS30-30x07	303	4.9	4.0	3.4	5.2	4.3	3.7
	PS40-40x07	413	5.7	4.8	4.1	6.3	5.1	4.1
	PS20-19x09	197	3.9	3.2	2.7	4.1	3.3	2.9
	PS25-23x09	229	4.3	3.4	3.0	4.5	3.7	3.2
	PS30-28x09	283	4.9	3.9	3.3	5.1	4.2	3.4
	PS40-39x09	393	5.7	4.7	4.1	6.2	5.0	4.1
	PS20-21x09	217	4.5	3.7	3.2	4.8	3.9	3.3
	PS25-25x09	249	4.9	4.0	3.4	5.2	4.3	3.7
	PS30-30x09	303	5.6	4.5	3.9	5.8	4.6	4.2
	PS40-40x09	413	6.7	5.5	4.7	7.1	5.6	5.0

Maximum Span (m) at Spacing = S								
Heavy Roof - 0.5 kPa Snow Load - High/Very High Wind - Grade MSG8								
	Truss Code	D mm	With Ceiling			Without Ceiling		
			Spacing "S" mm			Spacing "S" mm		
			600	900	1200	600	900	1200
	PS20-21x07	217	4.0	3.3	2.8	4.2	3.3	3.0
	PS25-25x07	249	4.4	3.4	3.1	4.5	3.8	3.3
	PS30-30x07	303	4.9	4.0	3.4	5.2	4.3	3.7
	PS40-40x07	413	5.7	4.8	4.1	6.3	5.1	4.1
	PS20-19x09	197	3.9	3.2	2.7	4.1	3.3	2.9
	PS25-23x09	229	4.3	3.4	3.0	4.5	3.7	3.2
	PS30-28x09	283	4.9	3.9	3.3	5.1	4.2	3.6
	PS40-39x09	393	5.7	4.7	4.1	6.2	5.0	4.1
	PS20-21x09	217	4.5	3.7	3.2	4.8	3.9	3.3
	PS25-25x09	249	4.9	4.0	3.4	5.2	4.3	3.7
	PS30-30x09	303	5.6	4.5	3.9	5.8	4.6	4.2
	PS40-40x09	413	6.7	5.5	4.7	7.1	5.6	5.0

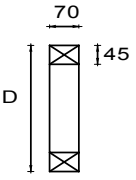
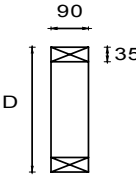
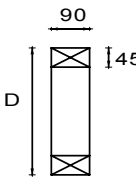
(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

Rafter Trusses

Maximum Span (m) at Spacing = S										
Light Roof - 1.0 kPa Snow Load - All Wind - Grade MSG8										
	Truss Code	D mm	With Ceiling				Without Ceiling			
			Spacing "S" mm				Spacing "S" mm			
			600	900	1200	1800	900	1200	1800	2400
	PS20-21x07	217	3.8	3.2	2.7	2.2	3.3	2.9	2.2	1.8
	PS25-25x07	249	4.2	3.3	3.0	2.5	3.4	3.2	2.5	2.0
	PS30-30x07	303	4.6	3.8	3.3	2.7	4.1	3.4	2.9	2.0
	PS40-40x07	413	5.6	4.6	4.0	3.0	4.9	4.1	3.3	2.7
	PS20-19x09	197	3.7	3.1	2.6	2.2	3.3	2.8	2.0	1.7
	PS25-23x09	229	4.1	3.3	2.9	2.4	3.4	3.1	2.1	1.8
	PS30-28x09	283	4.6	3.8	3.3	2.6	4.0	3.3	2.5	1.9
	PS40-39x09	393	5.6	4.6	4.0	3.3	4.8	3.6	3.2	2.6
	PS20-21x09	217	4.4	3.4	3.0	2.4	3.7	3.2	2.5	2.1
	PS25-25x09	249	4.6	3.9	3.3	2.7	4.1	3.4	2.9	2.5
	PS30-30x09	303	5.4	4.4	3.8	3.1	4.5	4.0	3.3	2.8
	PS40-40x09	413	6.4	5.3	4.6	3.4	5.6	4.8	4.0	3.3

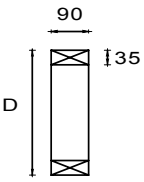
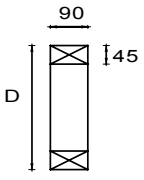
(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

Rafter Trusses

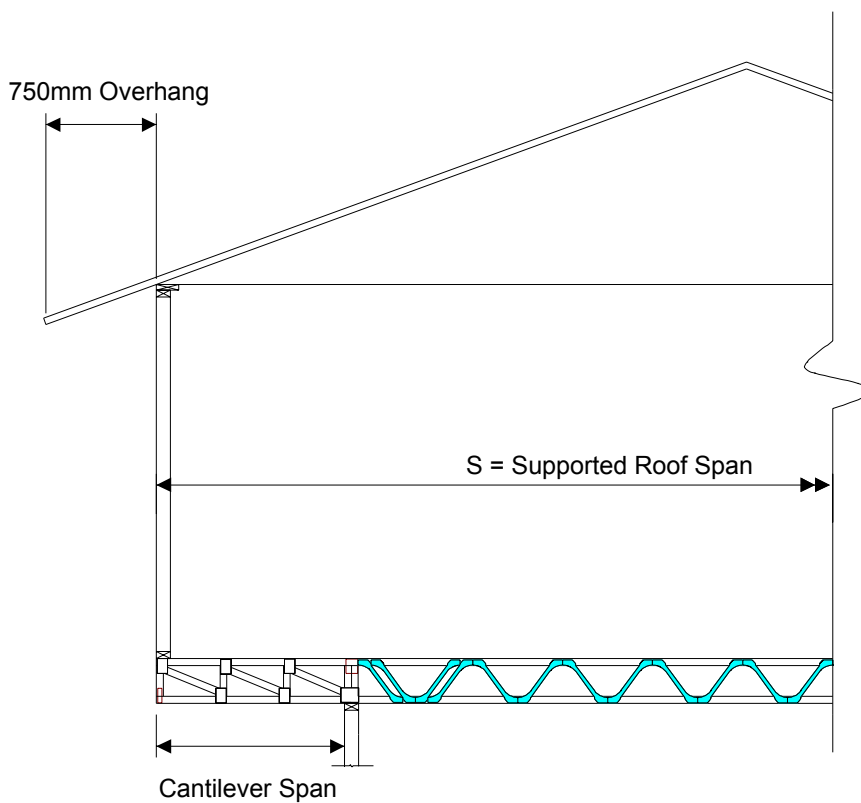
Maximum Span (m) at Spacing = S								
Heavy Roof - 1.0 kPa Snow Load - All Wind - Grade MSG8								
	Truss Code	D mm	With Ceiling			Without Ceiling		
			Spacing "S" mm			Spacing "S" mm		
			600	900	1200	600	900	1200
	PS20-21x07	217	3.4	2.9	2.2	3.4	2.9	2.5
	PS25-25x07	249	3.7	3.1	2.6	3.9	3.2	2.7
	PS30-30x07	303	4.2	3.3	3.0	4.4	3.4	3.1
	PS40-40x07	413	5.0	4.1	3.4	5.3	4.1	3.8
	PS20-19x09	197	3.3	2.7	2.2	3.3	2.8	2.2
	PS25-23x09	229	3.6	3.0	2.5	3.8	3.1	2.7
	PS30-28x09	283	4.2	3.3	2.9	4.3	3.3	3.1
	PS40-39x09	393	4.9	4.1	3.4	5.2	4.1	3.4
	PS20-21x09	217	3.8	3.1	2.7	4.0	3.3	2.8
	PS25-25x09	249	4.2	3.3	3.0	4.4	3.4	3.1
	PS30-30x09	303	4.6	3.9	3.3	5.0	4.0	3.3
	PS40-40x09	413	5.6	4.6	4.0	6.0	4.8	4.1

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

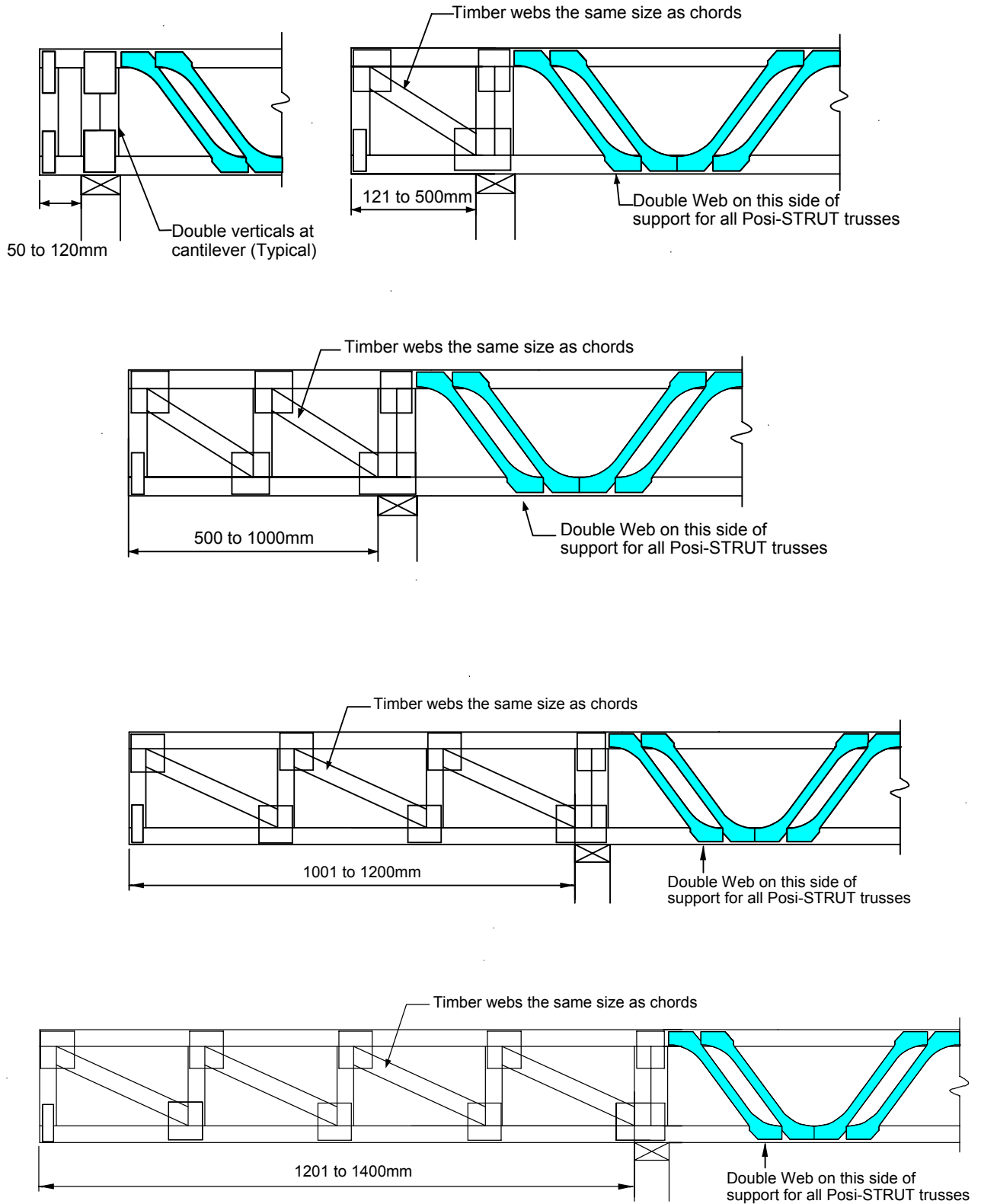
Cantilever Trusses

Maximum Cantilever Span (m) Carrying Roof Span = S											
Domestic Floor - 1.5 kPa Live Load - Grade MSG8											
	Truss Code	D mm	Light Roof with Ceiling				Heavy Roof with Ceiling				
			"S" mm				"S" mm				
			8000		12000		8000		12000		
			Truss Spacing (mm)		Truss Spacing (mm)		Truss Spacing (mm)		Truss Spacing (mm)		
400 600		400 600		400 600		400 600					
	PS20-19x09	197	0.50	0.30	0.30	0.20	0.40	0.25	0.30	0.15	
	PS25-23x09	229	0.60	0.35	0.50	0.30	0.45	0.30	0.35	0.20	
	PS30-28x09	283	0.80	0.50	0.60	0.45	0.60	0.40	0.45	0.30	
	PS40-39x09	393	1.00	0.60	0.80	0.45	0.80	0.45	0.65	0.30	
	PS20-21x09	217	0.75	0.45	0.55	0.35	0.55	0.35	0.45	0.25	
	PS25-25x09	249	0.85	0.55	0.65	0.45	0.65	0.45	0.50	0.30	
	PS30-30x09	303	1.05	0.70	0.85	0.55	0.85	0.55	0.65	0.40	
	PS40-40x09	413	1.35	0.90	1.15	0.70	1.10	0.75	0.90	0.55	

Note: Does not cover girder trusses or other loadings on wall.



Cantilever Truss Details



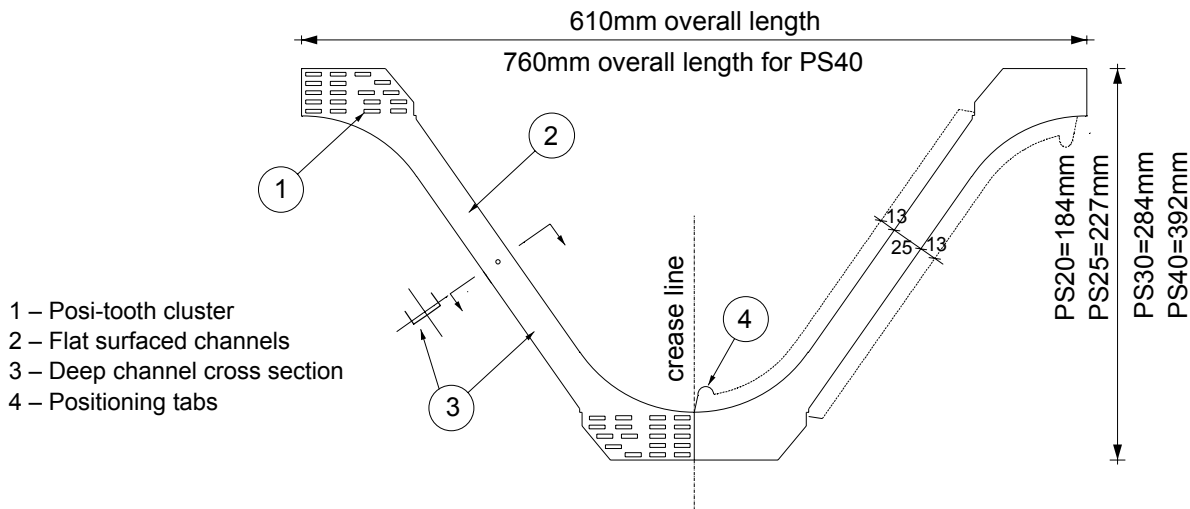
Posi-STRUT Web Sizes

The GANG-NAIL Posi-STRUT is a V-shaped metal web stamped from 0.91mm ASTM A446 Grade A (yield strength 230 MPa, ultimate strength 310 MPa) steel with a Z275 galvanised coating. Posi-STRUT is available in four depths or sizes: PS20, PS25, PS30 and PS40.

The modular length of Posi-STRUT is 610mm (760mm for PS40), which can be split in half at a crease in the middle to form two 305mm (380mm for PS40) half webs. The various depth of sections are as follows:

Web Size	Web Depth	Weight per web	Truss Weight (90x45 chords)	No. of teeth (ends/crotch)
PS20	184mm	0.24 kg	4.85 kg/m	14/28
PS25	227mm	0.29 kg	5.02 kg/m	18/36
PS30	284mm	0.37 kg	5.28 kg/m	20/40
PS40	392mm	0.50 kg	5.72 kg/m	20/40

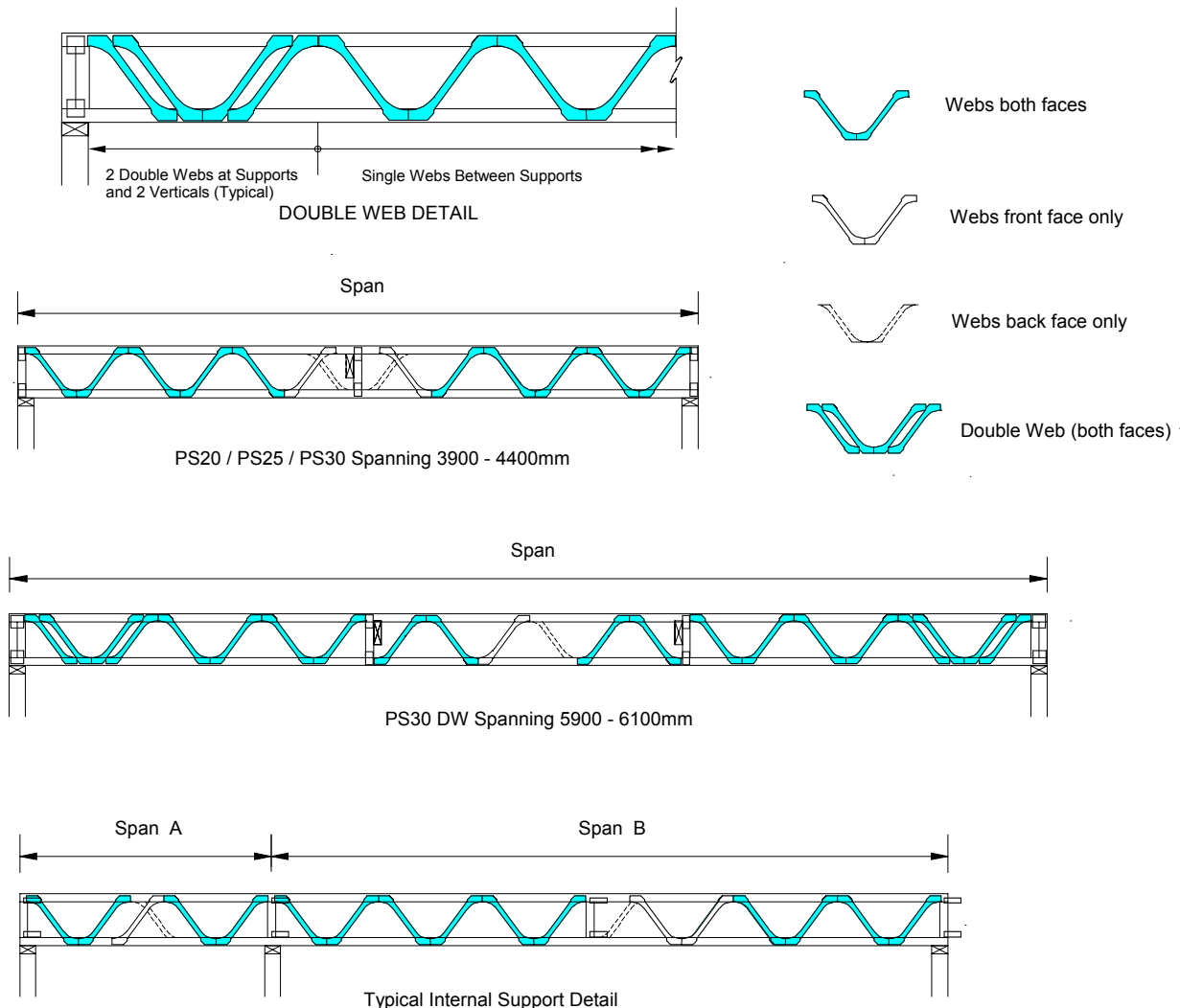
Posi-STRUT metal web



Web Layouts

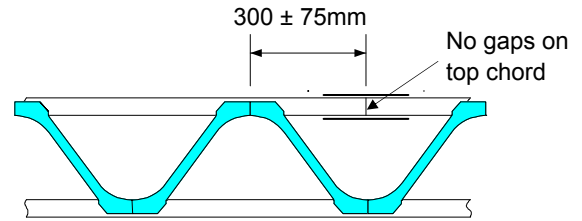
The following rules should be followed when laying out the webs:

1. Always start detailing from the supports and work inwards towards the centre of the span.
2. The first web from a support always meets the top chord, not the bottom chord.
3. A timber web is required at each support and at each strongback location. Strongbacks may also be fixed using Posi-STRUT Back Brace (see page 28).
4. The strongback should be placed hard up against the top chord. On-site the strongback should be clamped against the top chord and nailed. To achieve this, the adjacent Posi-STRUT web should meet the bottom chord at the strongback location.
5. The number of webs required is reduced over the middle of the truss. This is achieved through staggering alternating ½ webs at the middle of the span.
6. The requirement for alternating ½ webs in the middle of the truss allows adjustment to be made to suit the span of the truss.
7. The maximum gap between adjacent webs is 3mm.
8. Where double webs are called up in the selection tables (as bold and shaded area on chart, and/or followed by 'DW' in the truss code) the double webs are required at the vicinity of support locations as shown on the double web detail.



Splicing

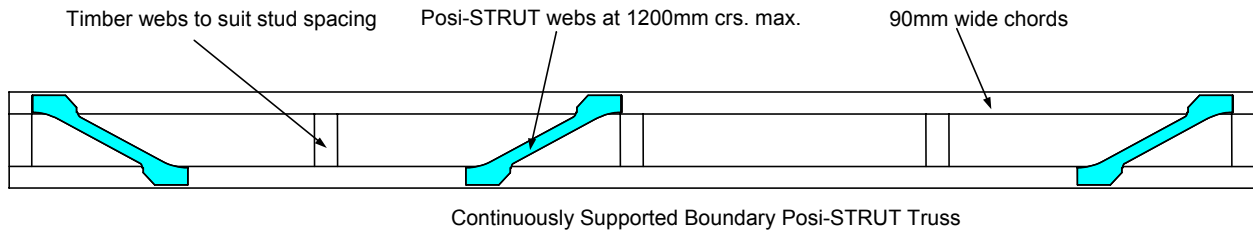
Chord butt splices are pressed symmetrically across the joint on both sides, on the wide faces of the timber chord. These splices are normally applied before assembly as a truss, and should be positioned away from web panel points. Where both top and bottom chords are spliced, splices should occur at opposite ends of the truss.



The ends of top chords to be spliced should be in contact with no gaps. The splice plate size is as designed in MiTek 20/20™ or as shown in adjacent table.

Chord size	Splice Plate Size (MSG8)	Splice Plate Size (MSG10)
70x45	GN16-7x18	GN16-7x27
90x45	GNQ-8x20	GN16-7x27
90x35	GNQ-8x15	GNQ-8x20
140x45	GN16-14x27	GN16-14x27

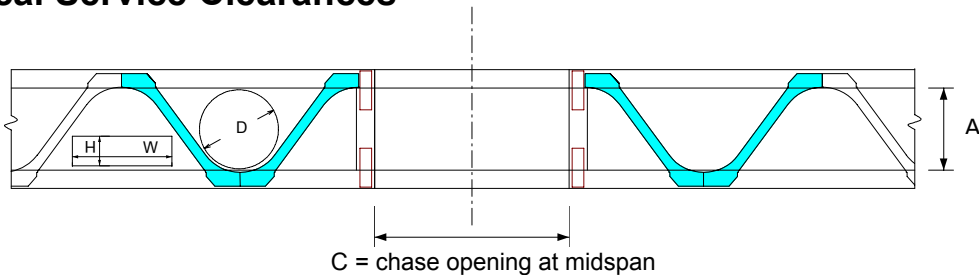
Boundary Trusses



The truss that lies in the wall does not need to have Posi-STRUT webs all along it, it merely needs some bracing webs to keep it square.

Ensure that this truss is labelled so that it will be installed as the boundary truss.

Mechanical Service Clearances

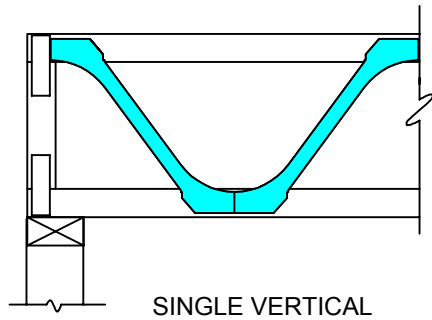


	PS20	PS25	PS30	PS40
A (mm)	127	158	212	322
D (mm)	120	152	203	280
C (mm)	500	500	500	500
H (mm)	W (mm)			
50	280	311	342	494
75	200	260	304	460
100	120	209	260	416
125	-	158	215	377
150	-	69	177	338
175	-	-	139	300
200	-	-	76	258

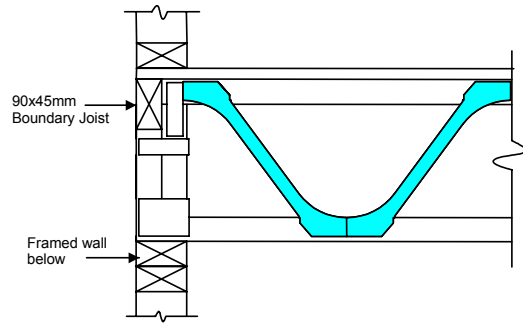
Support Detailing

The Posi-STRUT web is always plated both sides at the top chord over support points whether they be at the ends of trusses or at intermediate locations, unless it is clearly specified otherwise. Various end and intermediate details are shown in 'Rafter and Purlin Truss Detailing' Section.

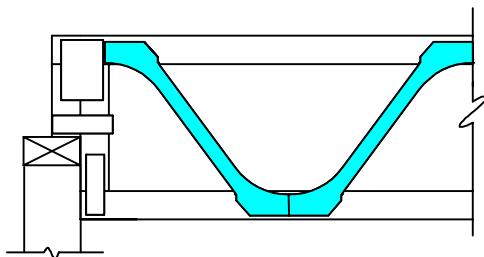
GANG-NAIL connectors for vertical timber webs are typically as shown below.



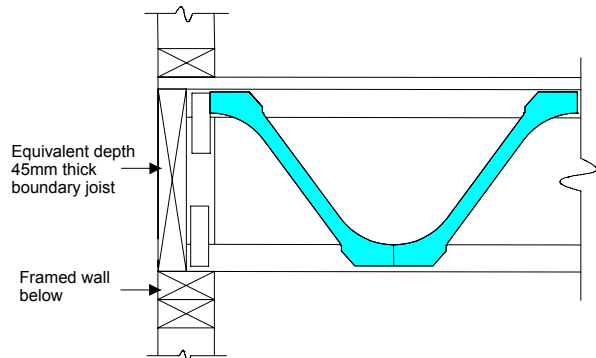
SINGLE VERTICAL



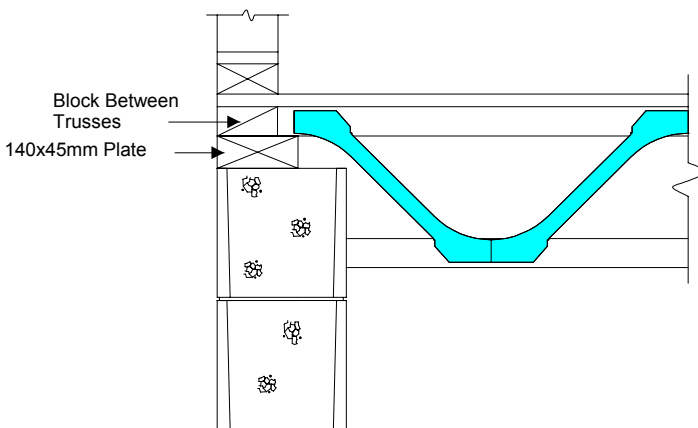
90x45mm Boundary Joist
Framed wall below
BOTTOM SUPPORT TO TIMBER WALL



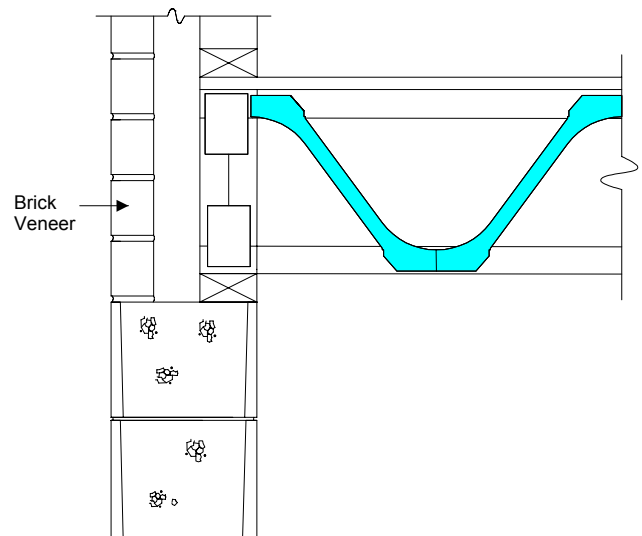
TOP SUPPORT TO TIMBER WALL



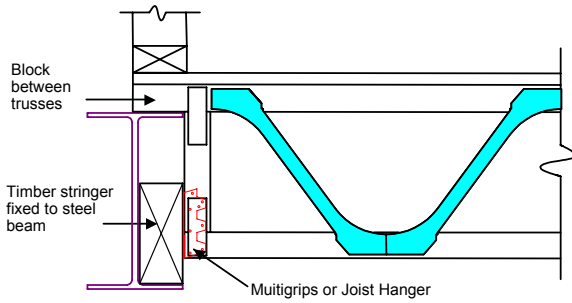
Equivalent depth 45mm thick boundary joist
Framed wall below
BOTTOM SUPPORT TO TIMBER WALL



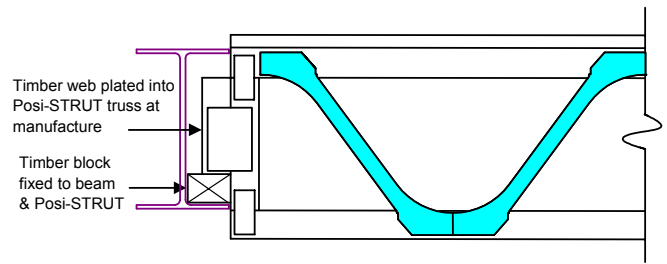
Block Between Trusses
140x45mm Plate
TOP SUPPORT TO BLOCK WALL



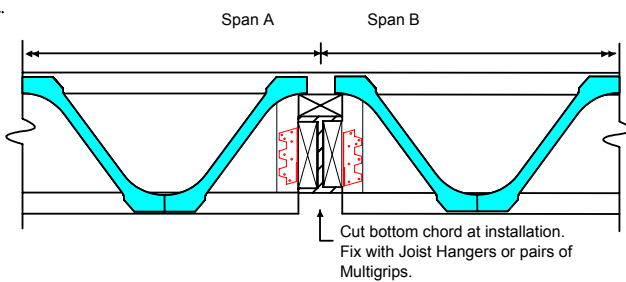
Brick Veneer
BOTTOM SUPPORT TO BLOCK WALL



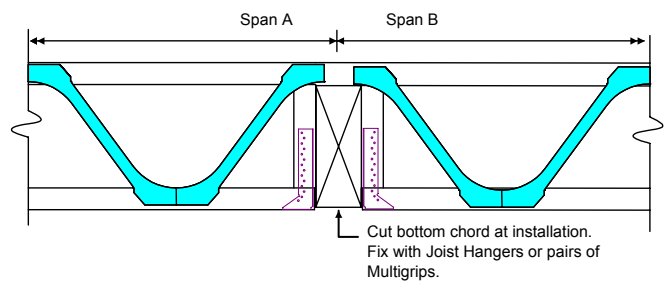
SUPPORT TO STEEL BEAM



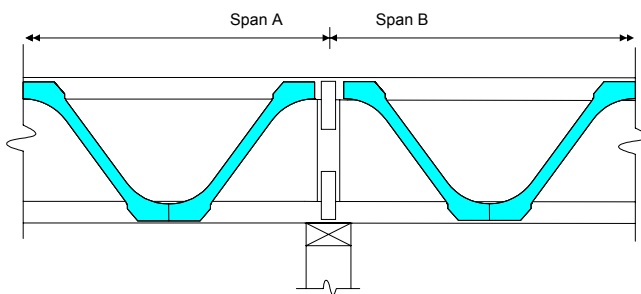
FLUSH WITH TOP OF UB



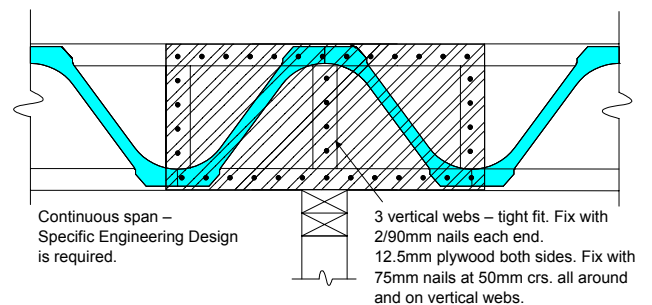
CENTRAL TOP SUPPORT TO STEEL BEAM



CENTRAL TOP SUPPORT TO TIMBER BEAM



CENTRAL BOTTOM SUPPORT TO TIMBER WALL
(RECOMMENDED)



MULTISPAN CENTRAL BOTTOM SUPPORT
(ON SITE FIXING)

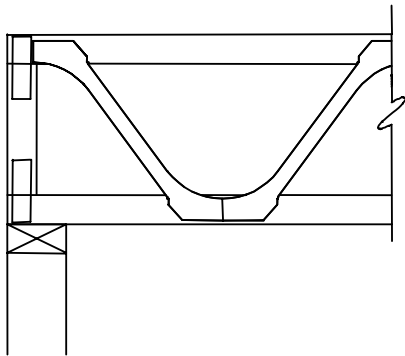
Floor Truss Detailing

Setout & Placement

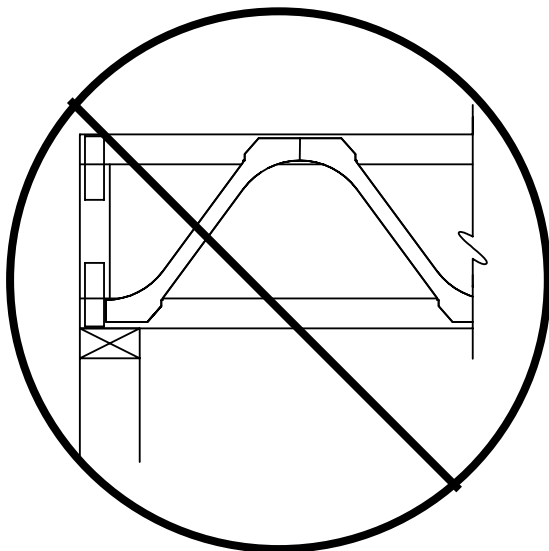
Posi-STRUT floor trusses are generally placed perpendicular to load bearing walls and should be spaced equally between ends of the building. Spacing as centre-to-centre is usually nominated on the job design sheet, and must not be exceeded.

A floor truss layout is also normally supplied by the manufacturer which will show the correct placement of special trusses, double trusses, openings or any other special requirements.

Care should be taken to place the Posi-STRUT truss the right way up. The Posi-STRUT web is always plated on the top chord directly over support points.



Correct Truss Placement



Incorrect Truss Placement

Non-load Bearing Walls

The placing of non-load bearing partitions on floor truss systems may necessitate additional stiffening of the structure. There are three situations:

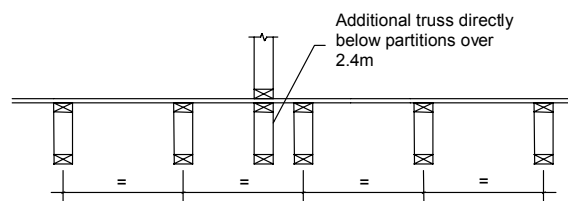
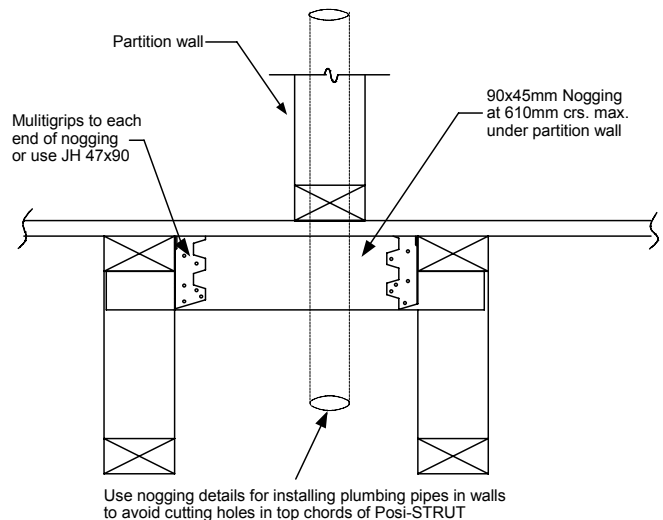
1. If length of partition wall parallel to the trusses does not exceed 2.4 metres, no additional truss support is required. If partition wall falls in between two trusses, noggings are required at 610mm centres (at truss web points) to support wall. Use similar nogging details to allow plumbing pipes through wall.

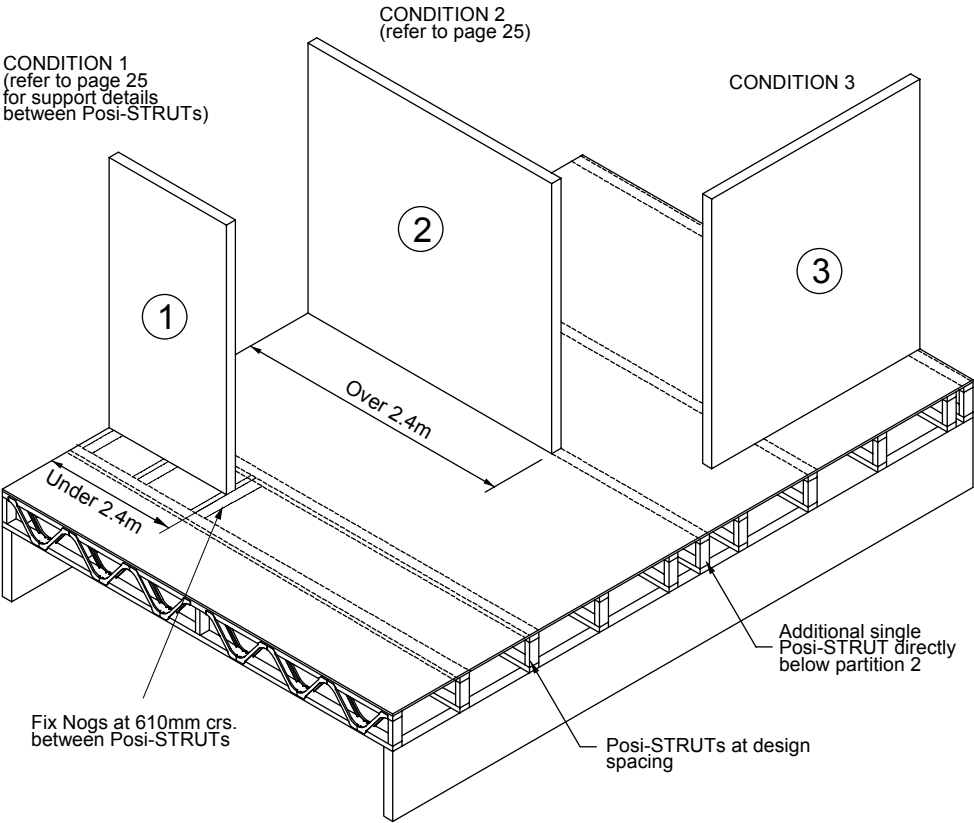
Under normal circumstances top and bottom chords of Posi-STRUT shall not be cut.

2. Where the length of the partition exceeds 2.4 metres, an additional truss is required below the partition.
3. Generally for partitions placed perpendicular to the trusses, no additional support is required.

Load Bearing Walls

Posi-STRUT trusses supporting load bearing walls require **Specific Design** by MiTek New Zealand Ltd. Generally engineered beams within floor space will be required to support load bearing walls.





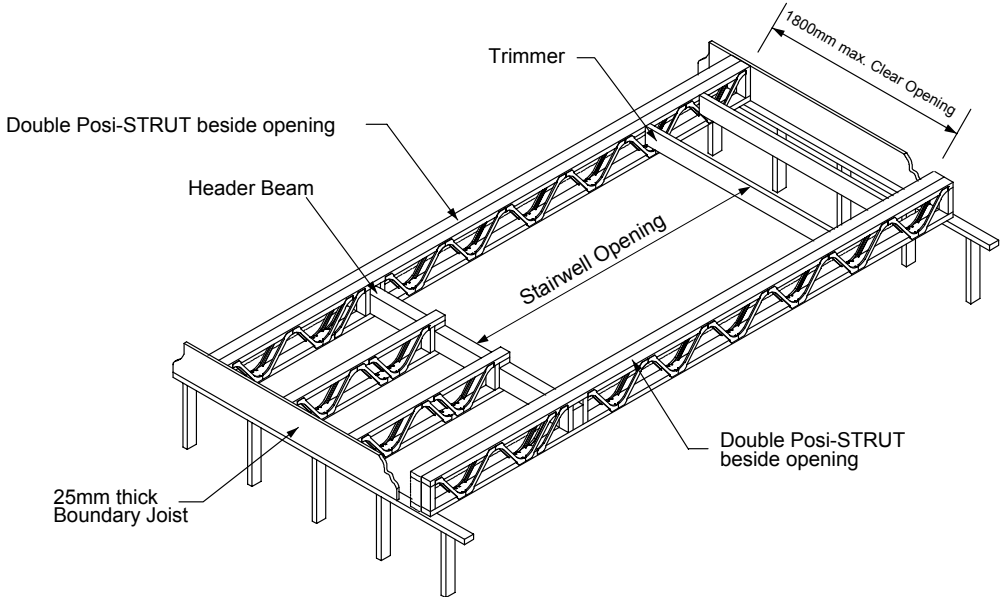
Stairwell Openings

Where openings are required on the upper floor for access due to stairways, it is possible to stop one or more Posi-STRUTs short and support them on headers fixed to adjacent Posi-STRUTs.

Provided not more than two Posi-STRUTs are stopped short, the adjacent Posi-STRUTs can be

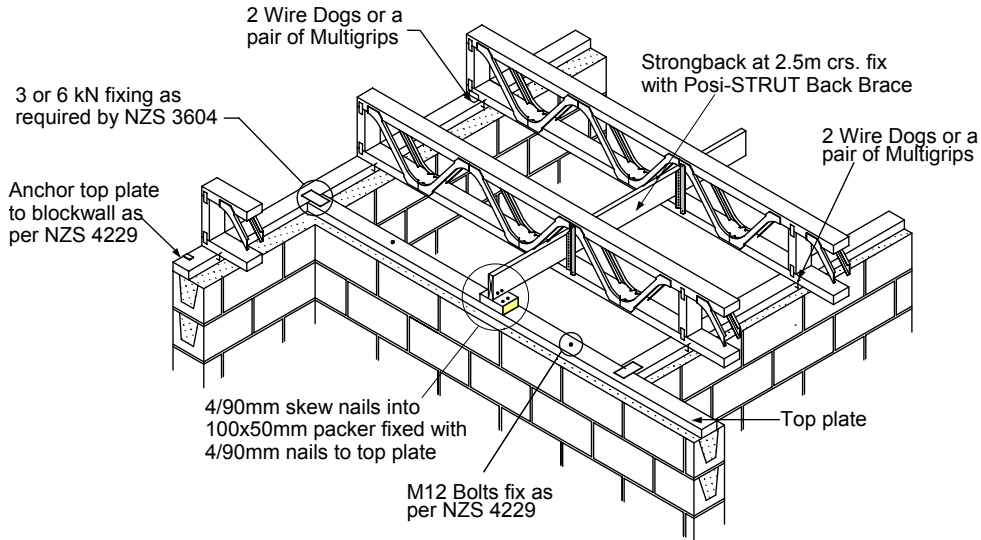
double trusses and the connection of the header to the double Posi-STRUT is as shown.

The recommended header beam size using either solid timber or GANGLAM beam can be obtained from Table 9 in the GANGLAM Selection manual.



Fixings and Connections

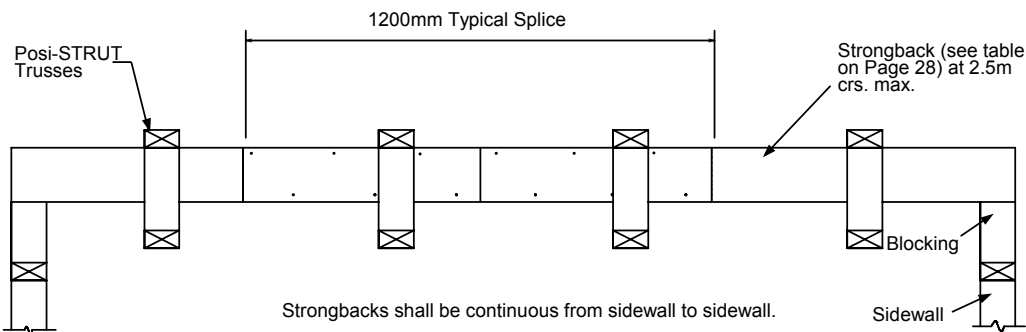
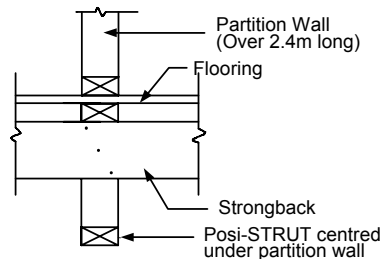
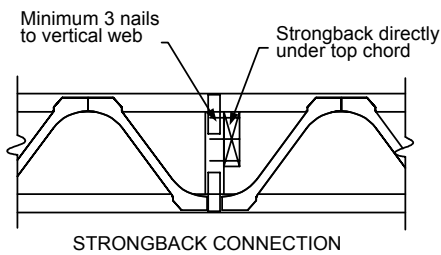
FIXINGS TO TOP PLATE



Strongbacks Selection & Detailing

Strongbacks are required for floor Posi-STRUTs, but can be used for rafters and purlins. They are continuous members fixed to each Posi-STRUT and their primary function is much the same as solid blocking or herringbone strutting, which is to provide load sharing thereby increasing strength and rigidity, and restricting vibration of the floor.

Strongbacks should be placed at right angles to the Posi-STRUT just below the top chord at 2.5m maximum centres in positions as symmetrical as possible between supports. They should also be continuous from sidewall to sidewall. If splicing is necessary, follow the recommended detail shown.

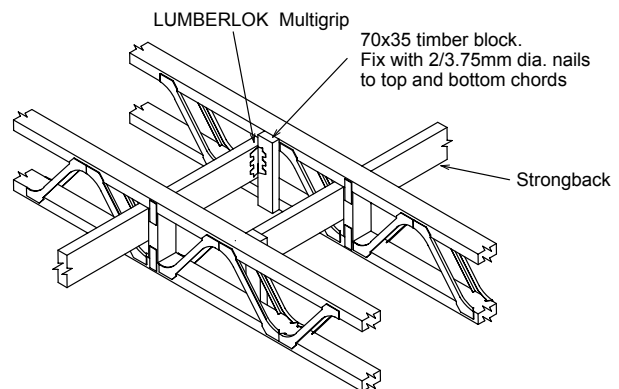
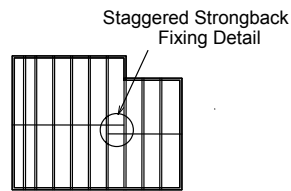


STRONGBACK SPLICE

The recommended sizes of strongbacks are as the following table. We recommend that strongbacks are clamped to the top chord and fixed to vertical webs with 3/90x3.75mm diameter nails. At the end of buildings they should be braced back to top and bottom chords with diagonal strutting as shown or with solid blocking.

Posi-STRUT Size	Recommended Strongback Size
PS20	90x45
PS25	140x45
PS30	140x45
PS40	190x45

Note these are the recommended sizes only, larger strongbacks can be used for prestige floors subject to sufficient depth between the chords of the Posi-STRUT.



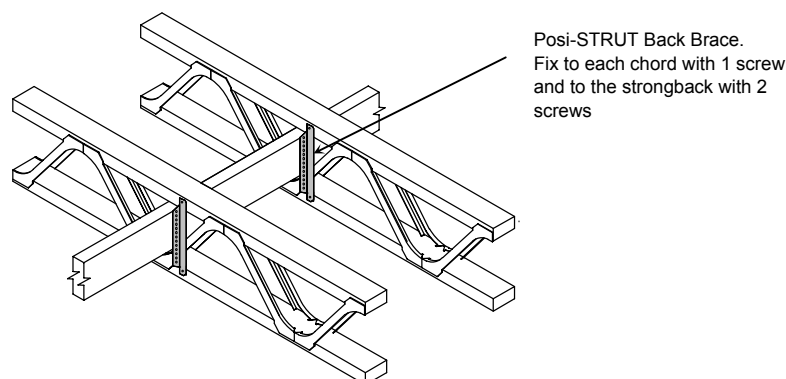
Using Posi-STRUT Back Braces

The Back Brace allows quick and easy fixing of strongbacks to Posi-STRUT trusses without the need for timber vertical webs. The Back Brace also allows a degree of flexibility in the positioning of strongbacks as they do not need to be placed at Posi-STRUT panel points. This enables small variations in span to be accommodated without changing jig settings or strongback locations.

1. Insert strongbacks through trusses in accordance with the floor plan provided by Posi-STRUT truss designer. Ensure that the strongbacks are no greater than 2.5 metres spacing from supports or other strongbacks. Select where possible an opening in the Posi-STRUT which allows the strongback to rest on the bottom chord away from the Posi-STRUT web tooth cluster.

2. Place the Back Brace in position so that the leg with multiple holes is against the strongback and the vertical position is such that the screw holes in the leg against the Posi-STRUT are close to the centres of the timber chords. Fix bottom of Back Brace to bottom chord with 1 screw while maintaining strongback location.
3. Fix Back Brace to strongback with 2 screws, selecting a pre-punched hole which is approximately 30mm from the top and bottom edges of the strongback.
4. Fix Back Brace to top chord with 1 screw through hole provided.

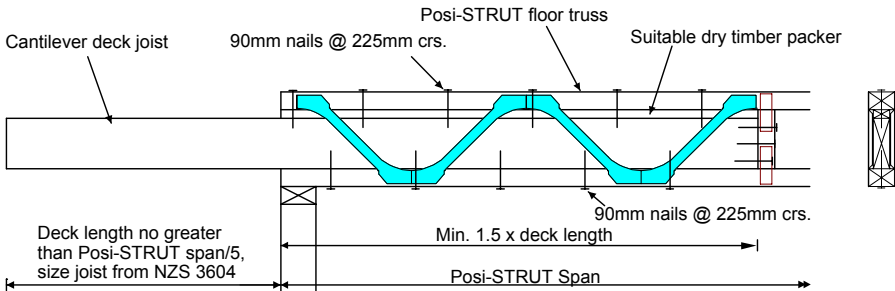
Note: Do not over tighten the screws.



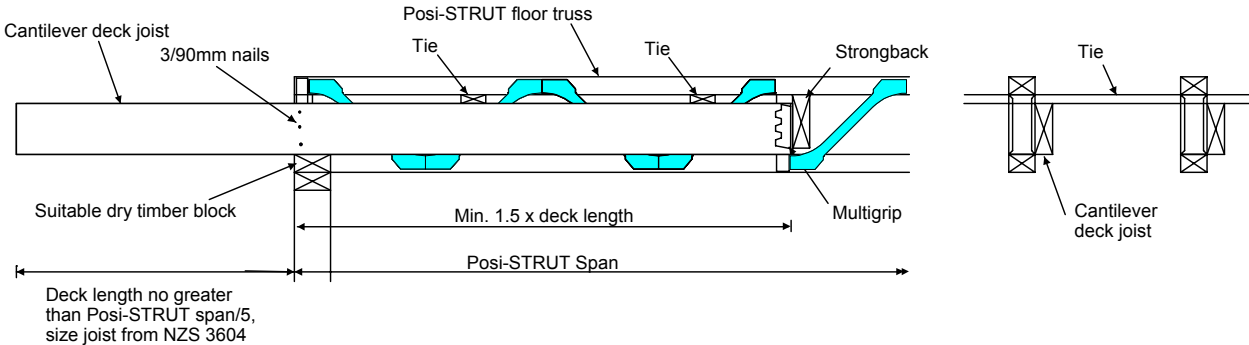
The Back Brace allows quick and easy fixing of the strongbacks to the Posi-STRUT trusses

Cantilevers for Decks

These two details for a cantilevered deck fixed to a Posi-STRUT floor allow for a step down to the deck and the Posi-STRUT is protected from the weather.



Deck joint built into Posi-STRUT



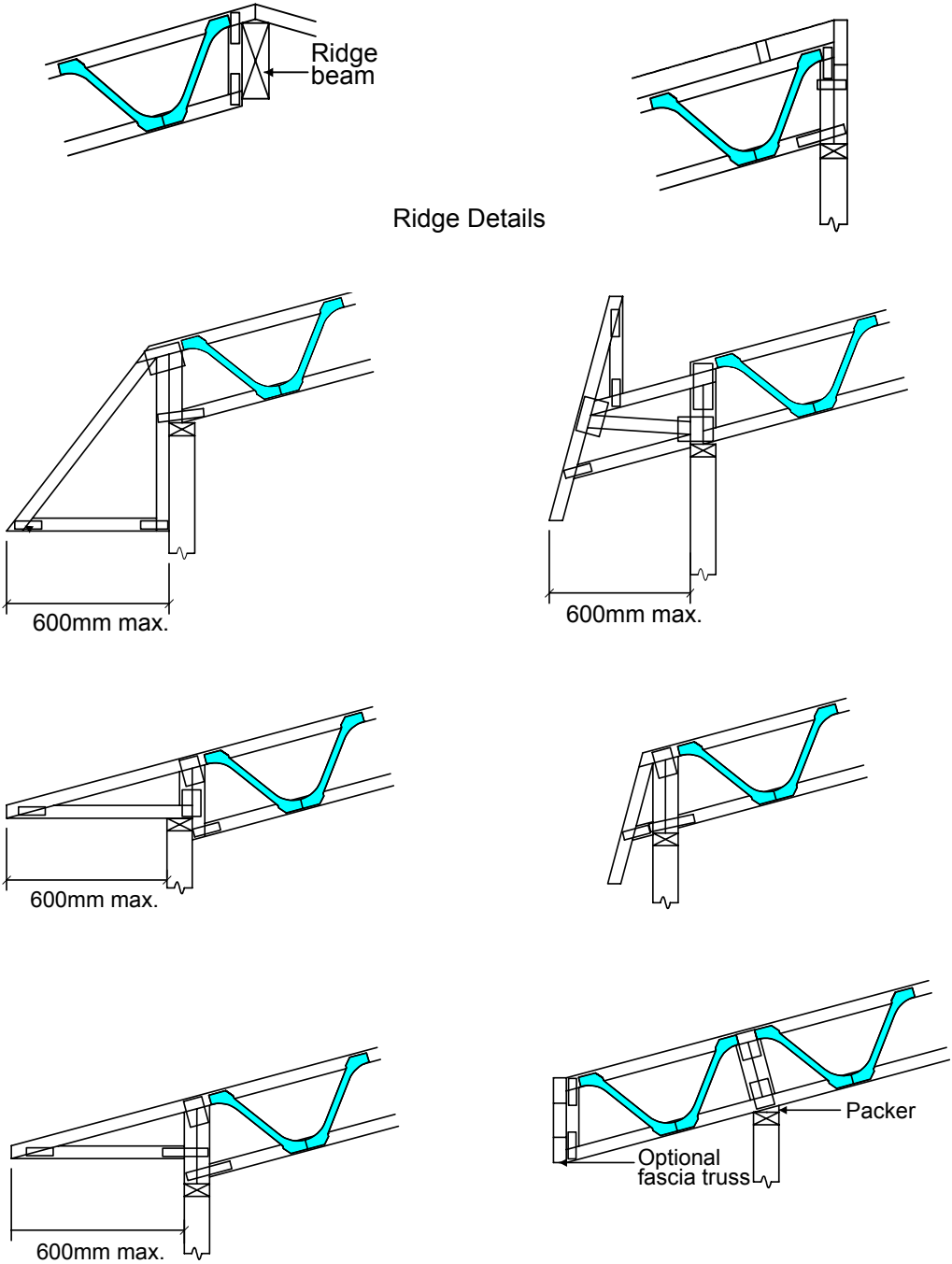
Deck joint fixed to side of Posi-STRUT

Rafter & Purlin Truss Detailing

Rafter End Details

There is a large number of possible details for the ends of rafter trusses depending on style of eaves and fixing requirements.

Some typical end support construction details suitable for Posi-STRUT rafters up to around 30 degrees pitch are shown as follows:



Rafter End Details

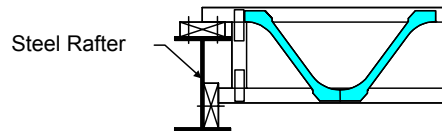
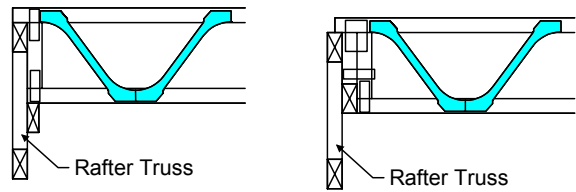
NOTE - Maximum pitch for rafters is 30 degrees

Purlin End Details

Depending on the end support, there is a wide number of possible end fixing details for Posi-STRUT purlins.

Posi-STRUT purlins may be set out vertically upright between supports, or perpendicular to the pitched rafter support. In the latter case, where the rafter pitch exceeds 5 degrees, it is necessary to fix both top and bottom chords at the support and to provide sufficient lateral support at midspan to prevent Posi-STRUT twisting under gravity.

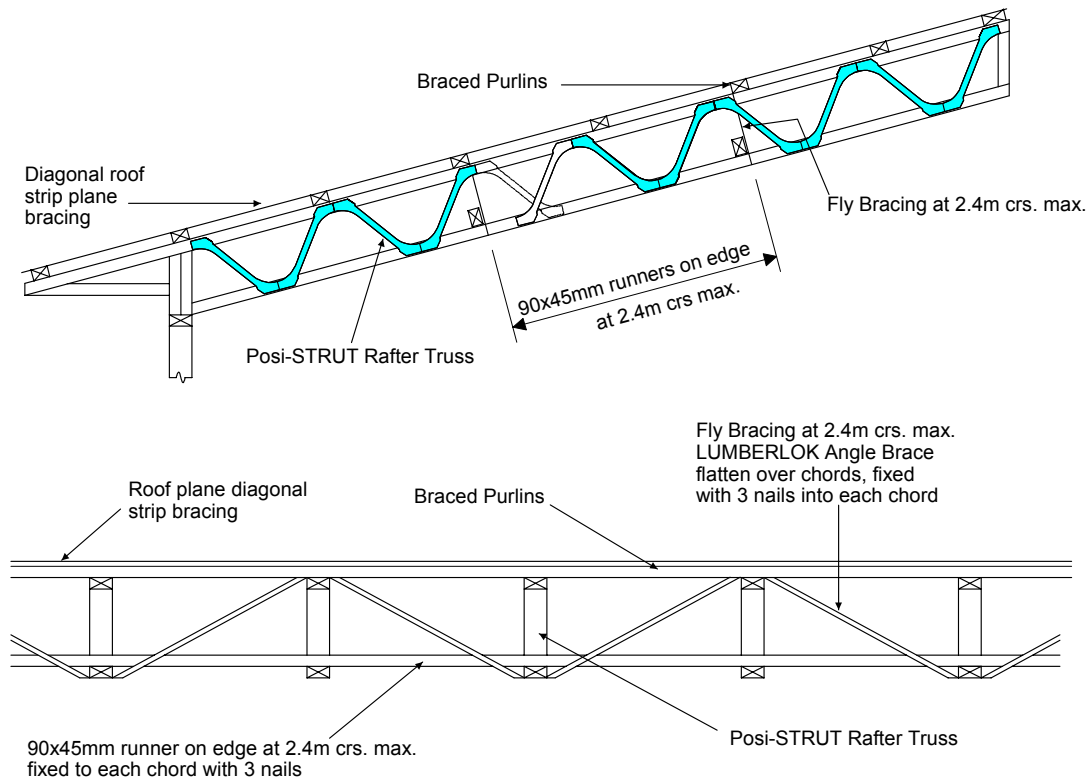
Some common details (by no means exhaustive) for ends of Posi-STRUT purlins are shown as follows:



Stability Bracing

The following details cover ancillary bracing for truss stability only, and not roof bracing for the total roof or building structure, which will have to be separately designed.

The top chord stability is provided by purlins. The bottom chord needs to be restrained during wind uplift. Ceiling battens fixed to bottom chord will provide this restraint. Otherwise specific design will be required. Generally 90x45mm runners at alternate purlin spacing may be sufficient.



Fire Resistance Rating

There are two systems for **fire rating** Posi-STRUT floor truss systems:

1. **The GBPS system.** The GIB Fyrelite® is fixed to a 600mm grid of ceiling strapping and noggings.
2. **The GBUC or Winstone Universal Ceilings system.** More layers of GIB Fyrelite® can be fixed directly to the underside of the Posi-STRUT trusses. Refer to the "GIB® Fire Rated Systems, 2006" published by Winstones Wallboards Ltd.

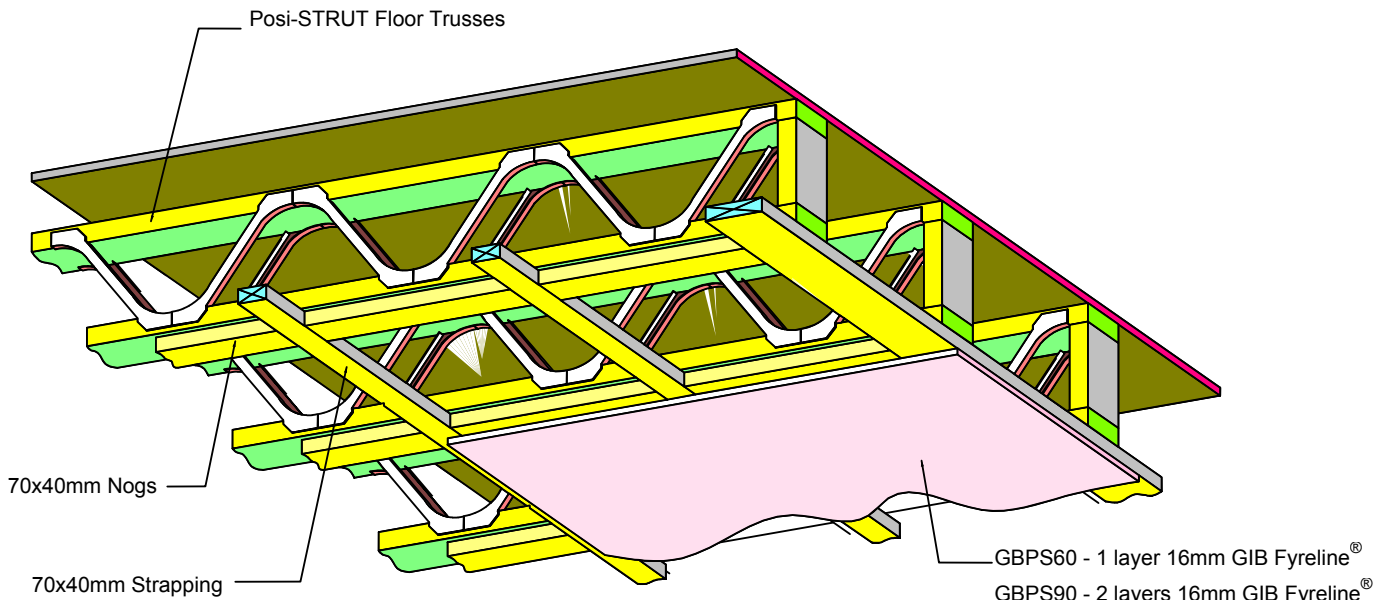
Inter-tenancy floors usually require both fire resistance and sound rating. The GBDFFA and GBSCA systems are suitable for use with Posi-STRUT trusses. Refer to the "GIB® Noise Control Systems, 2006" published by Winstones Wallboards Ltd.

The GBPS30, GBPS60, GBPS90 Systems

Specification	Fire Resistance Rating	Lining Requirement
GBPS30	30/30/30 (30 minutes)	1 layer 13mm GIB Fyrelite®
GBPS60	60/60/60 (60 minutes)	1 layer 16mm GIB Fyrelite®
GBPS90	90/90/90 (90 minutes)	2 layers 16mm GIB Fyrelite®

Floor Framing

The fire rated system is for Posi-STRUT floor trusses using Posi-STRUT PS20, PS25, PS30 or PS40 webs with 90x35mm, 90x45mm, 70x45mm or 140x45mm timber chords. Trusses should not be spaced at greater than 600mm centres. 75x40mm ceiling strapping at maximum 600mm centres should be fixed to the bottom chords, perpendicular to the orientation of the trusses. 75x40mm nogs parallel to the trusses should be fixed to the bottom chord of the trusses.



THE GBPS60 AND GBPS90 SYSTEM

For the GBPS30 specification the ceiling strapping can be omitted, with the GIB Fyreline® fixed directly to the underside of the trusses and to 75x40mm nogs at 600mm crs. max.

Flooring

The flooring shall be 20mm thick particle board. The flooring shall be nailed to the Posi -STRUT trusses with 60x2.8mm galvanised jolt head nails at 150mm centres to all sheet edges and 300mm centres to intermediate trusses.

Ceiling Lining

Ceiling lining is as shown in above table. GIB Fyreline® shall be fixed at right angles to the floor trusses. For GBPS90 the joints of the second layer are to be offset 600mm from the first layer. All joints must occur on joists, solid strutting or nogs.

Fixing

Single layer ceiling sheets shall be fixed with:

51mm x 7g GIB® Grabber® drywall screws at 150mm centres around the perimeter of each sheet and fixed at 200mm centres across each batten or nog.

For the GBPS90 system, the second layer of GIB Fyreline® shall be fixed with:

76mm x 8g GIB® Grabber® drywall screws at 150mm centres around the perimeter of each sheet and fixed at 200mm centres across each batten or nog.

Corners

The internal angle between ceilings and walls shall be protected by GIB Cove fixed with GIB Cove adhesive, or with corners filled and taped in accordance with the "GIB® Site Guide, 2006".

Jointing

All joints must occur on joists, solid strutting or nogs. To achieve the FRR and strong flush joints for painted surfaces, the jointing and finishing of joints and fastener heads must be carried out in accordance with the "GIB® Site Guide, 2006".

The GBUC30, GBUC60, GBUC90 Systems

Specification	Fire Resistance Rating	Lining Requirement
GBUC30	30/30/30 (30 minutes)	1 layer 16mm GIB Fyreline®
GBUC60	60/60/60 (60 minutes)	1 layer 16mm GIB Fyreline® and 1 layer 13mm GIB Fyreline®
GBUC90	90/90/90 (90 minutes)	2 layers 19mm GIB Fyreline®

Floor Framing

The fire rated system is for Posi-STRUT floor trusses using Posi-STRUT PS20, PS25, PS30 or PS40 webs with 90x35mm, 90x45mm, 70x45mm or 140x45mm timber chords. Trusses should not be spaced at greater than 600mm centres. Ceiling strapping and nogs are not required.

Flooring

Any flooring material that meets structural criteria for strength and serviceability may be used.

Ceiling Lining

Ceiling lining is as shown in above table. The first layer of GIB Fyreline® shall be fixed at right angles to the floor trusses. Where a second layer is required the joints of the second layer are to be offset 600mm from the first layer. All sheet end joints must occur over solid framing.

Fixing

First layer of GIB Fyreline® - fix with 41mm x 6g GIB® Grabber® drywall screws.

Second layer GIB Fyreline® - fix with 51mm x 7g GIB® Grabber® drywall screws.

Fixing centres: At 200mm centres along each intermediate truss, and at 200mm centres to framing members at sheet end joints.

Corners

The internal angle between ceilings and walls shall be protected by GIB® Cove fixed with GIB® Cove adhesive, or with corners filled and taped in accordance with the “GIB® Site Guide, 2006”.

Jointing

All fastener heads in the second layer to be stopped and all sheet joints in the second layer to be tape reinforced and stopped in accordance with the “GIB® Site Guide, 2006”.

Posi-STRUT Truss Selection

Using a fire rated ceiling system places a higher load on the Posi-STRUT floor trusses because the Fyreline is heavier. Use the following table to select which selection chart to use in the Posi-STRUT manual.

Design Floor Live Load to use in Selection Charts		
Fire System	Floor Loading kPa	
	1.5	3.0
GBPS30	1.5	3.0
GBPS60	3.0	3.0
GBPS90	3.0	SD
GBUC30	1.5	3.0
GBUC60	3.0	SD
GBUC90	3.0	SD

SD denotes Specific Design, contact the MiTek Design Office.

Acoustic Rating

Based on testing performed by Winstones Wallboards Ltd and an opinion provided by Marshall Day Associates (96114RA), the specification for intertenancy floors is as follows:

Specification	STC	IIC		Fire Resistance Rating	Lining requirement to underside of the support frame (GIB Fyreline®)
		Bare Floor	Carpet		
GBDFA30	56	44	71	30/30/30	2 layers 13mm
GBDFA60	55	46	72	60/60/60	2 layers 13mm
GBSCA30	57	46	72	30/30/30	2 layers 13mm
GBSCA60	55	43	72	60/60/60	1 layer 13mm & 1 layer 16mm
GBSCA60a	58	46	72	60/60/60	1 layer 13mm & 1 layer 16mm

Notes:

STC = Sound Transmission Class

IIC = Impact Isolation Class

The GBDFA system uses a “direct fix clip”, screwed onto the Posi-STRUT at 1200 crs. max. This supports steel furring channels. We recommend that the direct fix clips are staggered in order to spread the weight of the ceiling across all trusses.

The GBSCA system uses a suspended ceiling system.

Further details of the fire and acoustic systems can be found in the “GIB® Fire Rated Systems, 2006” and the “GIB® Noise Control Systems, 2006”.

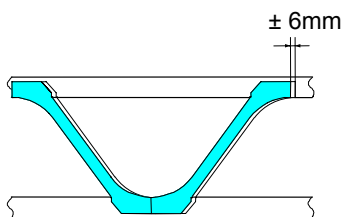
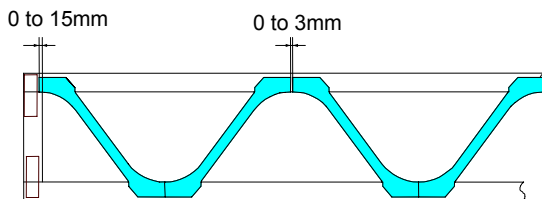
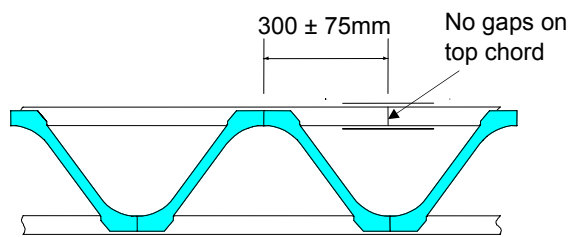
Timber Specification

Radiata Pine or Douglas Fir machine stress graded MSG8, MSG10 or MSG12 to NZS 3622:2004.

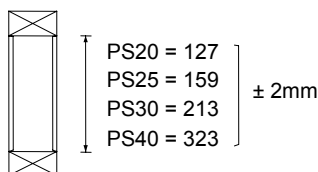
Treatment - TPA Specification H1.1 or none for general floors; H3.1 under bathrooms or as specified in NZS 3602:2003.

Manufacturing Tolerances

The following manufacturing tolerances apply to the fabrication of Posi-STRUT trusses:



Allowable misalignment of near and far side Posi-STRUT webs



Camber

Mid-span camber is normally set at Span/600 but not greater than 15mm for Posi-STRUT floor trusses; Span/500 but not greater than 18mm for Posi-STRUT purlins and rafters. The camber should be reduced for trusses spanning less than the maximum span.

The following are some recommended camber in millimetres for various spans:

Span (mm)	Camber (mm)		
	Span/500 (purlins)	Span/500 (rafters)	Span/600 (floor)
4000	8	8	7
5000	10	10	8
6000	12	12	10
7000	14	14	12
8000	16	16	13
9000	18	18	15

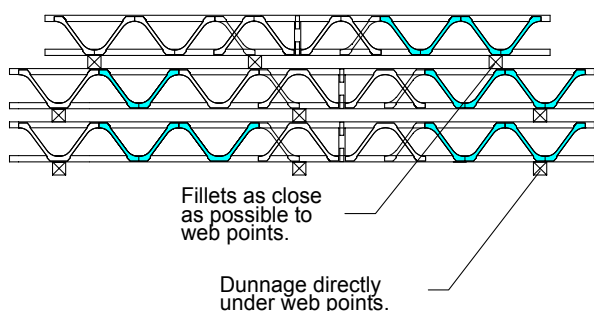
Handling & Storage

Posi-STRUT trusses should be strapped and stacked upright with the bottom chord clear off the ground and on level fillets or dunnage directly underneath web points. Posi-STRUTs may be stacked on top of each other with fillets aligned as closely as possible to web panel points.

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

Care should be taken when handling the Posi-STRUT not to bend, collide, twist or drop. Handling should be confined to the timber chords, and no weight should be applied to the metal webs which could cause buckling.

Any Posi-STRUT damaged in transport or handling cannot be repaired on site without the advice or approval of the manufacturer.



Handling & Storage

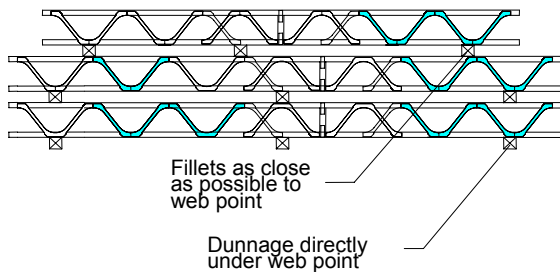
This section is for the builder to use on-site. It may be photocopied and supplied with the Posi-STRUT trusses.

Posi-STRUT trusses should be strapped and stacked upright with the bottom chord clear off the ground and on level fillets or dunnage directly underneath web points. Posi-STRUTs may be stacked on top of each other with fillets aligned as closely as possible to web panel points.

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

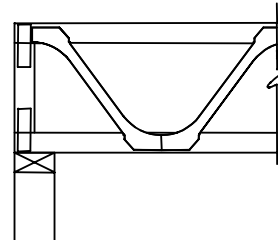
Care should be taken when handling the Posi-STRUT not to bend, collide, twist or drop. Handling should be confined to the timber chords, no weight should be applied to the metal webs which could cause buckling.

Any Posi-STRUT damaged in transport or handling cannot be repaired on site without the advice or approval of the manufacturer and MiTek New Zealand Ltd.

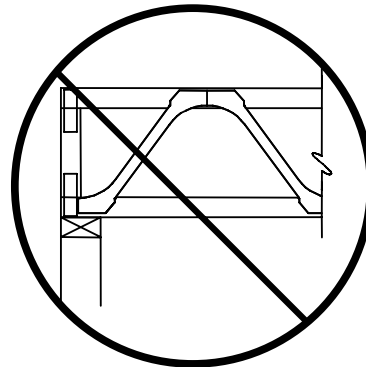


Installation Instructions

Posi-STRUT trusses must be installed the right way up, as shown. The manufacturer's instructions should be followed with regard to load bearing walls.



Correct Truss Placement



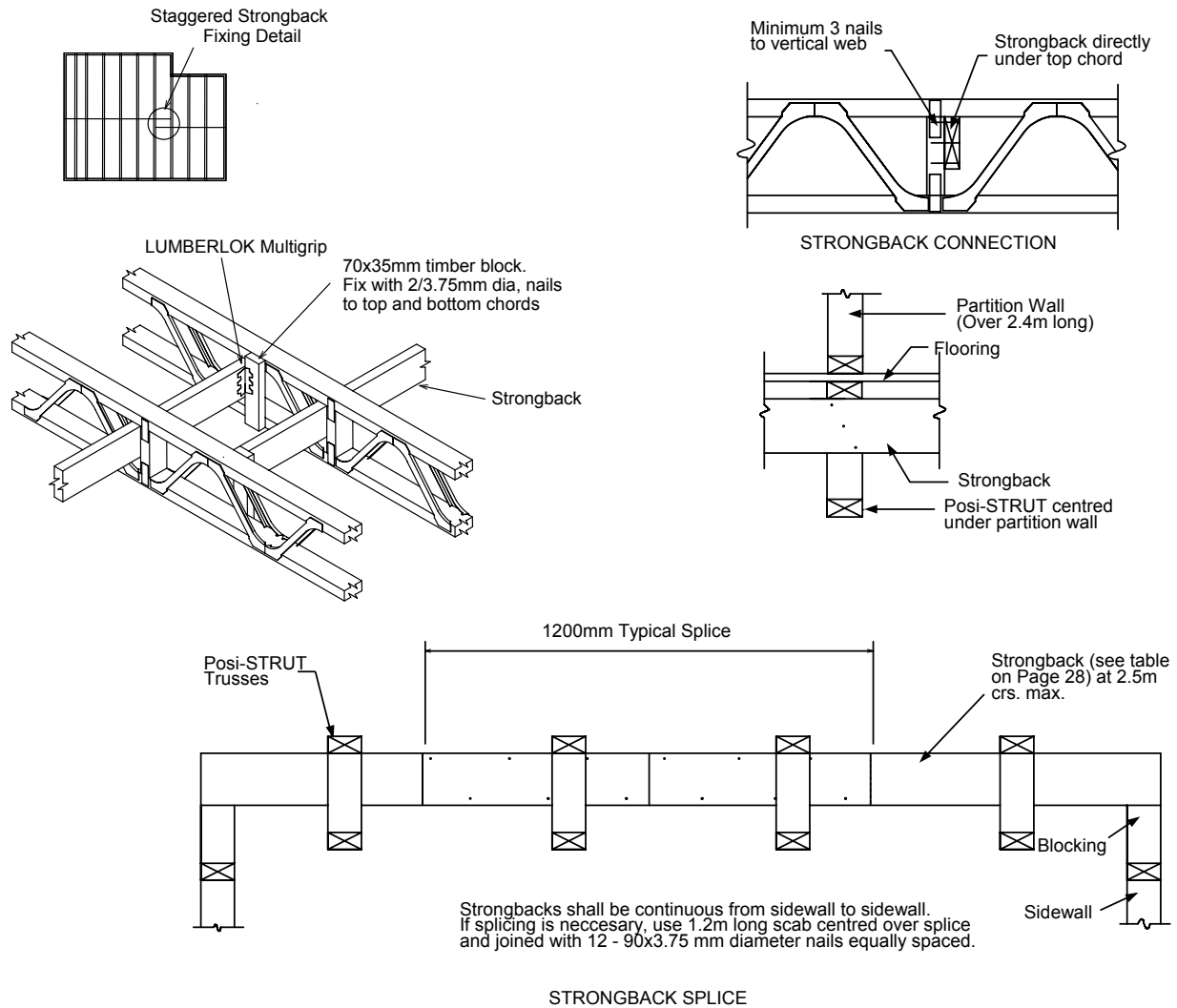
Incorrect Truss Placement
Truss upside down

Strongback Installation

The proper installation of the strongbacks (for floor trusses) is important to minimise floor bounciness. The recommended size of strongback is:

Posi-STRUT	Recommended Strongback size
PS20	90x45
PS25	140x45
PS30	140x45
PS40	190x45

We recommend that strongbacks are clamped to the top chord and fixed to vertical webs with 3/90x3.75mm dia. nails. At the end of buildings they should be braced back to top and bottom chords with diagonal strutting or with solid blocking.



Installing Strongbacks with Back Braces

The Back Brace allows quick and easy fixing of strongbacks to Posi-STRUT trusses without the need for timber vertical webs. The Back Brace also allows a degree of flexibility in the positioning of strongbacks as they do not need to be placed at truss panel points.

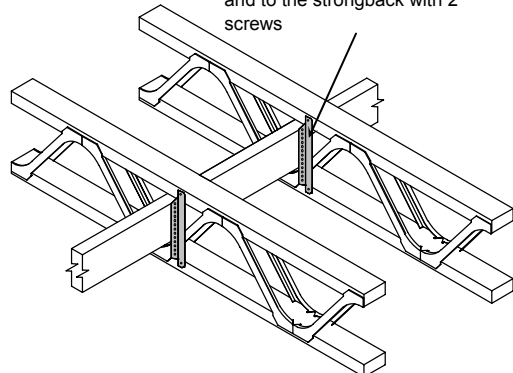
1. Insert strongbacks through the trusses in accordance with the floor plan provided by Posi-STRUT truss designer. Ensure that the strongbacks are no greater than 2.5 metres spacing from supports or other strongbacks. Select where possible an opening in the truss which allows the strongback to rest on the bottom chord away from the Posi-STRUT web tooth cluster.
2. Place the Back Brace in position so that the leg with multiple holes is against the strongback and the vertical position is such that the screw holes in the leg against the Posi-STRUT truss are close to the centres of the timber chords.

Fix bottom of Back Brace to bottom chord with 1 screw while maintaining strongback location.

3. Fix Back Brace to strongback with 2 screws, selecting a pre-punched hole which is approximately 30mm from the top and bottom edges of the strongback. Fix Back Brace to the top chord with 1 screw through hole provided.

Note: Do not over tighten the screws.

Posi-STRUT Back Brace.
Fix to each chord with 1 screw
and to the strongback with 2
screws

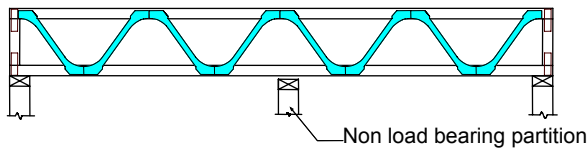


Clearance Over Non-Load Bearing Internal Walls

Posi-STRUT floor trusses on the upper storey of multi-storey dwellings should be kept clear of internal non-load bearing walls of the lower storey.

It is recommended that the Posi-STRUT floor be connected to these internal partition walls in order to provide lateral stability to the wall below with fixings that will also allow the Posi-STRUT trusses to deflect under load.

Internal walls should be level to enable truss camber to provide clearance between the wall and truss.



Do's & Don'ts

1. Posi-STRUTs are not to be modified in any way on site without the approval of the manufacturer.
2. Posi-STRUTs are not to be subject to excessive construction loads e.g. no stacks of concrete tiles or particle board.
3. Remember to install the strongbacks before closing in the ends.

Rafter and Purlin Stability Bracing

The following details cover ancillary bracing for Posi-STRUT stability only, and not roof bracing for the total roof or building structure which will have to be separately detailed.

The top chord stability is provided by purlins. The bottom chord needs to be restrained during wind uplift. Ceiling battens fixed to bottom chord will provide this restraint. Otherwise specific design will be required. Generally 90x45mm runners at alternate purlin spacing may be sufficient.

