

FIRMLOK[®] STRUCTURAL BEAMS

QUICK SELECTION GUIDE
FOR HOME IMPROVEMENT PATIOS,
CARPORTS AND AWNINGS

LYSAGHT



Contents

1.0	General Data	2
1.1	FIRMLOK® Structural Beams	2
1.2	FIRMLOK® Components	3
1.3	FIRMLOK® Quick Selection Tables	4
1.4	Design conditions and notes for the tables	5

PART A

2.0	Cladding	6
2.1	Cladding Selection	6
2.2	Cladding Types and Recommended Fixing Patterns for Home Improvement Applications	7
2.3	Cladding Fasteners	7
2.4	Roof Cladding Span Tables	8

PART B

3.0	Flat Structures	11
3.1	Quick Selection Tables	11
3.2	Key Plan for Flat Structures	12
3.3	Connection Details	13
3.4	Table Index	15
3.5	Quick Selection Tables:	
	Purlins - Table 1	16
	Headbeams Supporting Sheeting - Tables 2A, 2B, 2C	17
	Rafters - Tables 3A, 3B, 3C & 3D	20
	Headbeams Supporting Rafters - Tables 4A & 4B	24
	Attachment Loads - Table 5	26
3.6	Typical Flat Structure Type	27
3.7	Design Examples: Flat Structures	28

PART C

4.0	Pitched Structures	33
4.1	Tables for Pitched Structures	33
4.2	Key Plan for Pitched Structures	34
4.3	Connection Details	35
4.4	Quick Selection Tables	39
	Collar-Tie - Table 6A & 6B	39
	Portal Frame Rafter - Tables 7A & 7B	41
	Purlin - Tables 8A & 8B	43
4.5	Design Examples: Pitched Structures	45

LYSAGHT FIRMLOK® STRUCTURAL BEAMS

1. General Data

1.1 FIRMLOK® STRUCTURAL BEAMS

FIRMLOK® structural beams consist of two interlocking C-sections. They are light, strong and universal in their application. A range of connection types and accessories allows you to erect your project with ease.

FIRMLOK® is uniform in quality, it doesn't warp or split and it doesn't need painting. Consistent straightness simplifies alignment. LYSAGHT FIRMLOK® beams are available in three sizes 100mm, 150mm and 200mm deep depending on your application and aesthetic preference.

This publication demonstrates FIRMLOK® in its application as roofing members, combined with our range of roof sheeting. Typical applications include patios, carports and awnings.

MATERIAL SPECIFICATIONS

Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel complies with AS 1397:2011 G550, AM125 (550 MPa minimum yield stress, 125g/m² minimum coating mass).

COLORBOND® is pre-painted steel for exterior roofing and walling. It is the most widely used. The painting complies with AS/NZS 2728:2013 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397:2011. Minimum yield strengths are G550 (550 MPa). Minimum coating mass is AM100 (100g/m²).

The base metal thicknesses are 0.55, 0.75 and 1.00mm.

COLOURS

FIRMLOK® beams are available in ZINCALUME® steel and a range of COLORBOND® steel colours.

The FIRMLOK® universal brackets are also available powder coated to match the COLORBOND® steel colours.

LENGTHS

Stock lengths may vary from state to state. Please enquire at your local distribution outlet for available lengths.

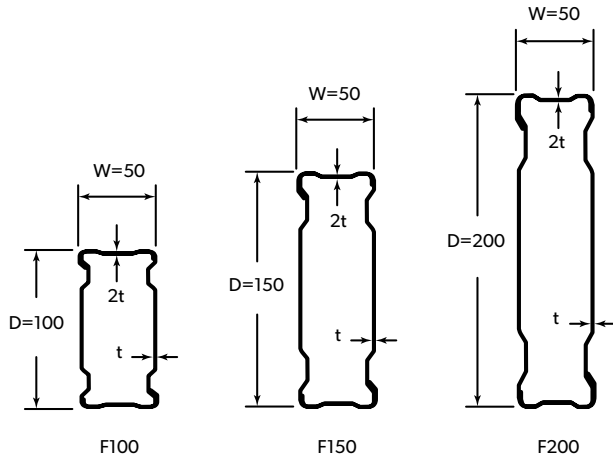
Alternatively, FIRMLOK® may be ordered to length (maximum length at 12000mm). Extended lead times may apply.

FIRMLOK® SECTION PROPERTIES

FIRMLOK® Section	Mass ZINCALUME® / (COLORBOND®) kg/m	Nominal Dimension D X W mm	Web Thickness t mm	Full Section Area A mm ²	Moment of Inertia		Section Modulus		Radius of Gyration	
					I _x mm ⁴	I _y mm ⁴	Z _x mm ³	Z _y mm ³	r _x mm	r _y mm
F10011	1.87 (1.90)	100 X 50	0.55	234	347000	81000	7050	3230	38.5	18.6
F15015	3.13 (3.17)	150 X 50	0.75	393	1256000	152000	16910	6068	56.5	19.7
F20020	4.95 (5.00)	200 X 50	1	620	3374000	258000	33990	10300	73.8	20.4

Notes:

1. Depth and width are nominal dimensions.
2. All section properties are based on gross section.



IDENTIFICATION

The format of the number code is:

F xxx xx

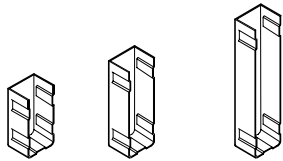
F = FIRMLOK®

xxx = Section depth D (mm)

xx = 2 t x 10 (mm)

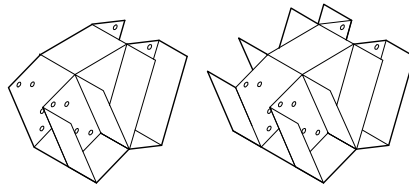
1.2 FIRMLOK® COMPONENTS

Not all components available in all regions – contact your nearest Lysaght branch for more information.



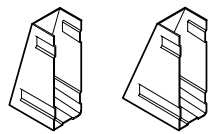
Universal Connector

FLUB100ZL05 – 100 purlin / rail
FLUB150ZL05 – 150 purlin / rail
FLUB200ZL05 – 200 purlin / rail



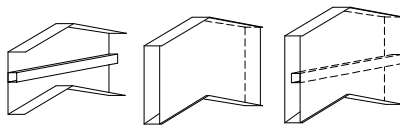
Delta Integrated Connector (22.5° pitch only)

CC10 – 100 rafter & purlin, end frame
CC15X – 150 rafter & purlin, end frame
CCD10 – 100 rafter & purlin, internal frame
CCD10X – 150 rafter & purlin, internal frame



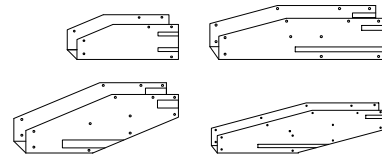
Rafter Connector

FLUB100ZL15 – 15° pitch, 100 rafter
FLUB150ZL15 – 15° pitch, 150 rafter
FLUB200ZL15 – 15° pitch, 200 rafter
FLUB100ZL225 – 22.5° pitch, 100 rafter
FLUB150ZL225 – 22.5° pitch, 150 rafter
FLUB200ZL225 – 22.5° pitch, 200 rafter



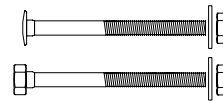
Apex Connector

FLAB100Z15 – 15° pitch, 100 rafter
FLAB150Z15 – 15° pitch, 150 rafter
FLAB200Z15 – 15° pitch, 200 rafter
FLAB100Z225 – 22.5° pitch, 100 rafter
FLAB150Z225 – 22.5° pitch, 150 rafter
FLAB200Z225 – 22.5° pitch, 200 rafter



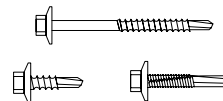
Collar-tie Connector

CTC10 – 22.5° pitch, 100 collar-tie
CTC15 – 22.5° pitch, 150 collar-tie
CTC1015 – 15° pitch, 100 collar-tie
CTC1515 – 15° pitch, 150 collar-tie



Bolt

M8/M10 cup/hex head bolts,
standard /Nylock nut & washer,
Grade 4.6 / S



Metal screw

12g-14x20mm hex head tek
12g-24x32mm hex head tek
12g-14x80mm hex head tek

Note: for cladding fasteners, refer to cladding section of this document.

Some component are subjected to availability, check with your local Lysaght branch.

1.3 FIRMLOK® QUICK SELECTION TABLES

INTRODUCTION

FIRMLOK® “Quick Selection Tables” provide an easy tool for determining the roof layout of your structure, using FIRMLOK® beams and lysaght cladding.

This guide is divided into sections: Cladding Selection, Flat Structures and Pitched Structures. Each section comprises of diagrams and span tables. The diagrams assist with selecting your structure type and the tables determine the size of each member based on loading.

When using the Quick Selection Tables, member designation is important.

- Purlins run at 90° to the ribs of your cladding and the cladding is screwed to them.
- Rafters generally run parallel to the ribs on your cladding and have purlins attached
- Headbeams support the upper and lower edge of the roof and are supported by posts.

USING QUICK SELECTION TABLES

The Quick Selection tables have been developed to be comprehensive and flexible, whilst remaining easy to use. The three sections allow you to design most typical structures with little effort.

Note: The sections for free-standing structures can be used to design similar attached structures, provided correct design of attachment to existing structure is performed.

To begin, you will need to determine:

Structure Type (Flat or Pitched): This will indicate which section of the “Quick Selection Tables” is appropriate to your design.

Wind classification (N1, N2, N3 or N4) and wind blocking:

It is important to know the wind class for your area and structure. Refer to Australian Standards AS4055 - 2012 Wind loads for housing for wind classification. Alternatively, seek guidance from a qualified engineer or builder.

Structure size: The structure size is the overall width and length of the intended structure in plan view.

This is all the information you need to begin designing your structure. An experienced user will have no problems using the tables to design each structure. You may wish to refer to the example at the end of each section.



Attached Flat Structure



Free-standing Flat Structure



Attached Pitched Structure

1.4 DESIGN CONDITIONS AND NOTES FOR THE TABLES

GENERAL

This document is an engineering aid to help in the design of carports, awnings and patio covers by designers. This document gives all the information to design an economical structure based on the wind classification, wind blocking and geometry of the structure.

DESIGN STANDARDS

FIRMLOK® "Quick Selection Tables" have been prepared in accordance with the appropriate Australian Standards. Cladding, beam and connection capacities are based on limit state design and testing at LYSAGHT® Research and Technology. The following standards have been referenced:

- AS/NZS 4600: 2005 Cold formed steel structures
- AS/NZS 1170.0 - 2002 Part 0: General principles
- AS/NZS 1170.1 - 2002 Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2 - 2011 Part 2: Wind Actions
- AS 4055 - 2012 Wind loads for housing
- AS 1562.1 - 1992 Design and installation of sheet roof and wall cladding Part 1: Metal
- AS 4040.2 - 1992 Methods of testing sheet roof and wall cladding – Resistance to wind pressure for non-cyclonic regions
- NCC - Building code of Australia (BCA) (current edition)

WIND

The tables presented in this brochure are for attached/freestanding awnings and pitched structures in normal wind (non-cyclonic) for wind classifications N1, N2, N3 and N4.

Design Wind speeds and wind pressure coefficient factors used to calculate the design net pressures have been derived from AS/NZS 1170.2-2011: Structural Design Actions Part 2: Wind Actions. For residential application, the wind classification system from AS 4055-2012: Wind Loads for Housing has been adopted for user convenience. For each structural configuration, five wind loading situations have been considered:

1B - one side blocked, typically attached to one side of an existing house or 0/4 sides blocked.

2B - two sides blocked, typically attached to two sides of an existing house

3B - three sides blocked, typically attached to three sides of an existing house; a "U" shaped configuration.

The structures with flat roof must have a roof slope greater than 2 degs and no greater than 10 degrees. Roof slopes higher than 10 degrees may experience greater wind loads than used in the design. Pitched roofs have been designed for 15 and 22.5 degrees.

WIND CLASSIFICATION NOTATION TO AS 4055 & NCC-BCA

NCC - BCA Wind Class	Legacy Wind Speed Notation	Permissible Stress Wind Speed Vp (m/s)	Serviceability Wind Speed Vs (m/s)	Ultimate Wind Speed Vu (m/s)	Ultimate Wind Pressure (kPa)
N1	W28	28	26	34	0.69
N2	W33	33	26	40	0.96
N3	W41	41	32	50	1.50
N4	W50	50	39	61	2.23

LOADS

The structure is designed for the following loads:

- Wind Loads: as described above.
- Dead Loads: Self weight of both sheeting and FIRMLOK® beam have been considered. No allowance for ceilings or other dead loads uniformly distributed or point loads have been made.
- Live Loads: A Live Load of 0.25 kPa has been considered on the beams. A concentrated live load of 1.1kN factored up, has been considered on each beam individually.

DEFLECTION

Deflection limits adopted for the design of FIRMLOK® beams are:

- Dead Load: Span/300 for beams with a maximum of 20mm
- Wind Load: Span/150 for serviceability wind pressure
- Live Load: Not Applicable

ATTACHED AND FREESTANDING AWNINGS

The capacity of the existing structure to withstand the additional loads arising from the attached awning must be verified by a competent person, an engineer or builder. It's advised to check with your local government authority to determine any specific requirements or rules for the attachment to existing structures.

Awnings have not been designed to account for any additional rainwater runoff, other than that falling directly onto its roof area. Rainwater must not be distributed from existing roofs onto the awning.

The quick selection tables have been created based on design and tested using LYSAGHT® components.

CONNECTIONS FOR STRUCTURES

When a beam is designed for strength, the connection at the ends of the beam must be checked against its strength. There are several connection types which are considered in the span tables. Beams are always connected to each other with FIRMLOK® universal connectors. These brackets connect to the beams basically with a bolt and one or two teks to the supported beam or post.

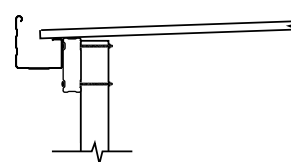
Bolts are used on the beam to beam connectors to distribute the load to the two sides of the supporting beam. The bolts are used with the post to take the higher loads from big spanning beams. The connection capacities for beams are based on a member supported by a member of the same size. If the supporting member is bigger the connection capacity may be stronger than indicated in the tables.

There are two main types of connections for beams to posts: Post behind beam using bolts and Post to side of beam using brackets. The connection capacities are based on extensive testing at our NATA registered laboratory.

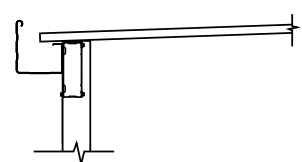
For pitched structures, portal frame rafter and collar-tie truss frames and their immediate supports (e.g. post, existing structure etc.) are assumed to be connected as simple, moment free pinned connections.

Portal frame rafters are assumed to be laterally restrained by purlins only at eave, apex and internally where indicated on the relevant diagrams.

Post behind beam - bolted



Post to side of beam with brackets



PART A

2.0 Cladding

2.1 CLADDING SELECTION

- The tables presented in this section are for non-cyclonic conditions only.
- Wind Loads: Design Wind speeds have been based on the classification system used in AS4055:2012. Factors used to calculate the design net pressures have been derived from AS1170.2:2011. Five wind blocking cases relevant to home improvement structures have been considered.
- Flat roofs must have a roof slope no greater than 10 degrees and no less than 2 degrees. Roof slopes beyond 10 degrees may experience greater wind loads than have been designed for. Refer to the minimum roof pitch table.
- Pitched roofs have been designed for two slopes, 15 and 22.5 degrees.
- Dead Loads: Self weight of sheeting only has been considered.
- Live Load: No general live load has been used. As the sheet spans are for 'No Foot Traffic', i.e. no person is allowed to walk on the sheeting. Where spans have been reduced for foot traffic, the sheeting has been tested for a person weighing up to 110kg. Where the spans are used for no foot traffic, a sign should be attached to the inside of the beams.

The tables give the spans for wind pressure, termed "foot traffic - NO" and the span for foot traffic, termed "foot traffic - YES". The sheeting has been tested in accordance to AS 4040.2 with serviceability deflection limit of $\text{Span}/120 + \text{Fastener Pitch}/30$. LYSAGHT FLATDEK® cladding spans may result in noticeable deflections under maximum loads. In situations where deflections are deemed critical, spans should be reduced to the walkable spans e.g. in a screen room.

NON-CYCLONIC AREAS

The information in this section for cladding is suitable for use only in areas where a tropical cyclone is unlikely to occur as defined in AS 1170.2:2011.



CLADDING AVAILABILITY

Not all sheeting available nationally. Please check availability with your local Lysaght branch.

MINIMUM ROOF PITCH AND MAXIMUM SHEET OVERHANG

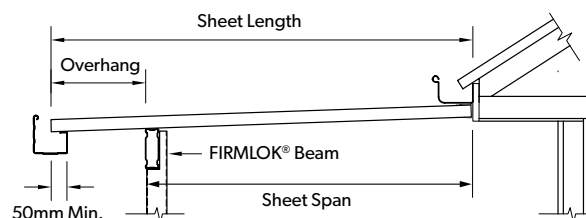
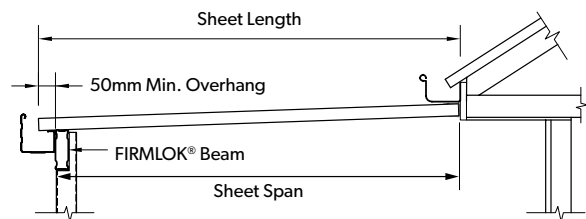
Lysaght Roofing	Minimum Fall (mm/m) / Roof Pitch	Maximum overhang No foot traffic** (mm)
0.42mm CUSTOM ORB®	50 / 3°	300
0.40mm CUSTOM ORB ACCENT 21®	50 / 3°	400
0.42mm SPANDEK®	35 / 2°	630
0.42mm TRIMDEK®	35 / 2°	430
0.42mm FLATDEK® *	25 / 1.5°	630
0.42mm FLATDEK® II *	35 / 2°	630
0.48mm KLIP-LOK® 406	25 / 1.5°	600
0.42mm KLIP-LOK CLASSIC® 700	25 / 1.5°	530
0.42mm KLIPLOK 700HS	25 / 1.5°	530

* To achieve 1.5° pitch, it is recommended to build a gutter around the perimeter of the flat roof.

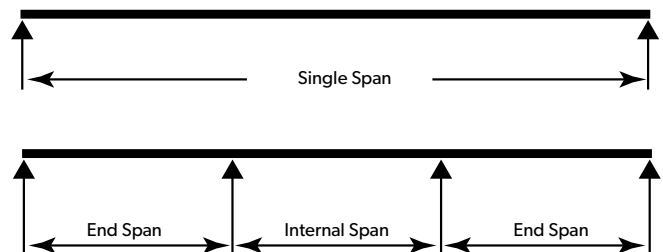
** These spans are only applicable for overhanging sheets attached with a gutter or an angle stiffener.

For gutter and roof maintenance, always walk on the support beams, do not walk on the sheets overhang or use the overhang sheets as support. See diagrams below. Maximum roof pitch for a flat structure is 10°. The maximum span for maintenance foot traffic on sheet overhang is 100mm for all sheets.

Cladding Overhang and Spans

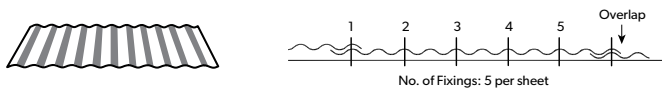


Cladding Span Types

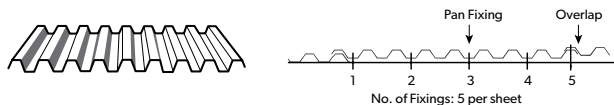


2.2 CLADDING TYPES AND RECOMMENDED FIXING PATTERNS FOR HOME IMPROVEMENT APPLICATIONS

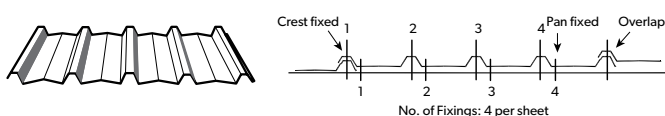
CUSTOM ORB® / CUSTOM ORB ACCENT 21®



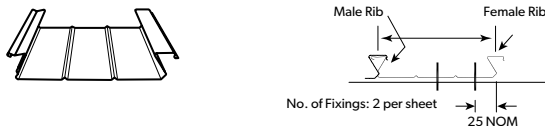
SPANDEK®



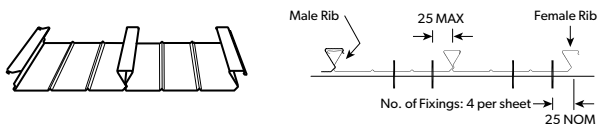
TRIMDEK®



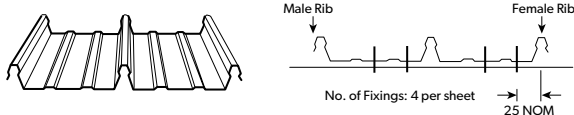
FLATDEK®



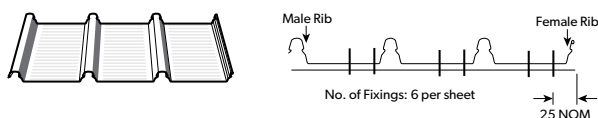
FLATDEK® II



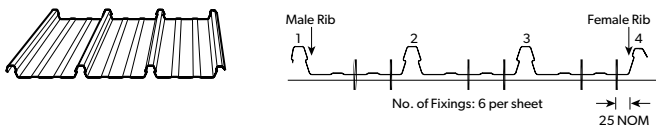
KLIP-LOK® 406



KLIP-LOK 700 HI-STRENGTH®



KLIP-LOK CLASSIC® 700



Notes:

At side-laps, pan fix to female rib. For wide pan cladding such as FLATDEK® or KLIP-LOK®, position 1 fastener at centre and 1 fastener next to the rib in each pan. If translucent sheeting is used as light panels, there must be at least 2 metal sheets between each translucent sheet. The light panels must be stitched to the side of the metal sheets if the spans from the tables are used.

2.3 CLADDING FASTENERS

Lysaght Claddings	Flat Roof	Pitched Roof		
	Fix to Purlin	Fix to Purlin	Fix to Rail	Fix to Ridge
CUSTOM ORB® CUSTOM ORB ACCENT 21®	#12-14x39 AutoTeks® #12-14x45* (Crest fixed)	#12-14x39 AutoTeks® #12-14x45* (Crest fixed)	#12-14x39 AutoTeks® #12-14x50 AutoTeks® #12-14x45* M6-11x50 RoofZips (Crest fixed)	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)
SPANDEK® TRIMDEK®	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)	#12-14x39 AutoTeks® #12-14x45* M6-11x50 RoofZips® (Crest fixed)	#12-14x65* M6-11x65 RoofZips® (Crest fixed)	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)
FLATDEK®/ FLATDEK® II KLIP-LOK® 406 KLIP-LOK 700 HI-STRENGTH®/ KLIPLOK CLASSIC®	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)	#12-14x39 AutoTeks® #12-14x45* (Crest fixed)	#12-14x20 Metal Tek® #12-14x25 AutoTeks® (Pan fixed)

Notes:

All screws to have hex head with EDPM seal, minimum coating class is Class 4 to AS3566. Tek®, AutoTeks® and RoofZips® are registered trademarks of Buildex.

* Fully threaded equivalent fastener.

2.4 ROOF CLADDING SPAN TABLES

N1 & N2 - 0/1/4 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3600	2600	3600	2100	3600	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N1 & N2 - 2 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3600	2600	3600	2100	3600	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N1 & N2 - 3 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3600	2600	3600	2100	3600	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

Notes:

- All spans are in mm.
- The "No Foot Traffic" span range is designed for the condition where no person is allowed to walk on the roof. The design criteria includes deflection due to self weight, maximum wind pressure and fastener capacity based on FIRMLOK® beams. A sticker must be placed on the supporting beams which has the No Foot Traffic sign on it.
- The 'FOOT TRAFFIC' spans were derived from testing carried out for home improvement type structures only. The foot traffic spans have been tested for a person with a weight up to 110kg. This design criteria is different to the testing criteria in AS 4040.1:1992.
- The above tables can be used for sheets with bigger thickness of the same LYSAGHT® profile and material specification.
- All sheeting materials are G550 grade steel with COLORBOND® or ZINCALUME® steel.
- For cladding with foot traffic, use the smaller of the two spans given in the tables (YES = foot traffic, NO = no foot traffic).
- For more details on LYSAGHT® claddings, refer to the individual product brochures by visiting www.lysaght.com.
- *KL700HS, if sheet span ≥ 2400 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*TRIMDEK® & SPANDEK®, if sheet span ≥ 2000 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*CUSTOM ORB®, if sheet span ≥ 1500 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.

N3 - 0/1/4 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3600	2600	3600	2100	3600	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N3 - 2 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3000	2600	3000	2100	3000	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3565	2600	3580	2100	3565	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3000	2600	2760	2100	3000	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N3 - 3 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3000	2600	3000	2100	3000	2600	3000	2100
KLIP-LOK CLASSIC® 700 0.42	3000	2600	3000	2100	3000	2600	3000	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3000	2600	3000	2100	3000	2600	3000	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

Notes:

- All spans are in mm.
- The "No Foot Traffic" span range is designed for the condition where no person is allowed to walk on the roof. The design criteria includes deflection due to self weight, maximum wind pressure and fastener capacity based on FIRMLOK® beams. A sticker must be placed on the supporting beams which has the No Foot Traffic sign on it.
- The 'FOOT TRAFFIC' spans were derived from testing carried out for home improvement type structures only. The foot traffic spans have been tested for a person with a weight up to 110kg. This design criteria is different to the testing criteria in AS 4040.1:1992.
- The above tables can be used for sheets with bigger thickness of the same LYSAGHT® profile and material specification.
- All sheeting materials are G550 grade steel with COLORBOND® or ZINCALUME® steel.
- For cladding with foot traffic, use the smaller of the two spans given in the tables (YES = foot traffic, NO = no foot traffic).
- For more details on LYSAGHT® claddings, refer to the individual product brochures by visiting www.lysaght.com.
- *KL700HS, if sheet span $\geq$ 2400mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*TRIMDEK® & SPANDEK®, if sheet span $\geq$ 2000mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*CUSTOM ORB®, if sheet span $\geq$ 1500mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.

N4 - 0/1/4 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4500	2600	4500	2100	4000	2600	3300	2100
FLATDEK® II 0.42	4000	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK CLASSIC® 700 0.42	3600	2600	3600	2100	3600	2600	3300	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	3600	2600	3600	2100	3600	2600	3300	2100
SPANDEK® 0.42 *	3000	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N4 - 2 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1800	1200	1800	900	1800	1200	1800	900
FLATDEK® 0.42	4300	2600	4340	2100	4000	2600	3300	2100
FLATDEK® II 0.42	3605	2600	4000	2100	3500	2600	3000	2100
KLIP-LOK® 406 0.48	2250	2600	2250	2100	2250	2600	2250	2100
KLIP-LOK CLASSIC® 700 0.42	2250	2600	2250	2100	2250	2600	2250	2100
KLIP-LOK 700 HI-STRENGTH® 0.42 *	2250	2600	2250	2100	2250	2600	2250	2100
SPANDEK® 0.42 *	2950	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2700	2000	2400	1300	2100	2000	2100	1300

N4 - 3 SIDES BLOCKED

Lysaght Claddings	Flat Roof				Pitched Roof			
	End / Int. Span		Single Span		End / Int. Span		Single Span	
	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes	Foot Traffic No	Yes
CUSTOM ORB® 0.42 *	1800	1200	1800	900	1800	1200	1800	900
CUSTOM ORB ACCENT 21® 0.40	1530	1200	1800	900	1530	1200	1800	900
FLATDEK® 0.42	3730	2600	3875	2100	3730	2600	3300	2100
FLATDEK® II 0.42	3005	2600	3875	2100	3005	2600	3000	2100
KLIP-LOK® 406 0.48	1785	1785	1785	1785	1785	1785	1785	1785
KLIP-LOK CLASSIC® 700 0.42	1785	1785	1785	1785	1785	1785	1785	1785
KLIP-LOK 700 HI-STRENGTH® 0.42 *	1785	1785	1785	1785	1785	1785	1785	1785
SPANDEK® 0.42 *	2420	1800	3000	1300	2400	1800	2400	1300
TRIMDEK® 0.42 *	2450	2000	2400	1300	2100	2000	2100	1300

Notes:

- All spans are in mm.
- The "No Foot Traffic" span range is designed for the condition where no person is allowed to walk on the roof. The design criteria includes deflection due to self weight, maximum wind pressure and fastener capacity based on FIRMLOK® beams. A sticker must be placed on the supporting beams which has the No Foot Traffic sign on it.
- The 'FOOT TRAFFIC' spans were derived from testing carried out for home improvement type structures only. The foot traffic spans have been tested for a person with a weight up to 110kg. This design criteria is different to the testing criteria in AS 4040.1:1992.
- The above tables can be used for sheets with bigger thickness of the same LYSAGHT® profile and material specification.
- All sheeting materials are G550 grade steel with COLORBOND® or ZINCALUME® steel.
- For cladding with foot traffic, use the smaller of the two spans given in the tables (YES = foot traffic, NO = no foot traffic).
- For more details on LYSAGHT® claddings, refer to the individual product brochures by visiting www.lysaght.com.
- *KL700HS, if sheet span ≥ 2400 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*TRIMDEK® & SPANDEK®, if sheet span ≥ 2000 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.
*CUSTOM ORB®, if sheet span ≥ 1500 mm, provide 1 rivet/screw at the side-lap at mid-span to keep sheets together.

PART B

3.0 Flat Structures

3.1 QUICK SELECTION TABLES

There are several tables based on the type of member and the way it is loaded together with the connection at the end of the beam. The tables are used to give the span of FIRMLOK® beams for different wind classifications and wind blocking based on the applied load and the load width. The table is organised as shown below:

EXTRACT FROM A SPAN TABLE

The width of loading to be supported by the selected beam.

Wind Blocking	Wind Class	Beam Size	Load Width (mm) 3000
0/1/4 sides	N1/ N2	F100	4800, 1.0
		F200	7500, 1.5
		F300	9250, 2.0

Maximum beam span.

Reaction load at the end of the beam. This is used to work out the total load for the support.

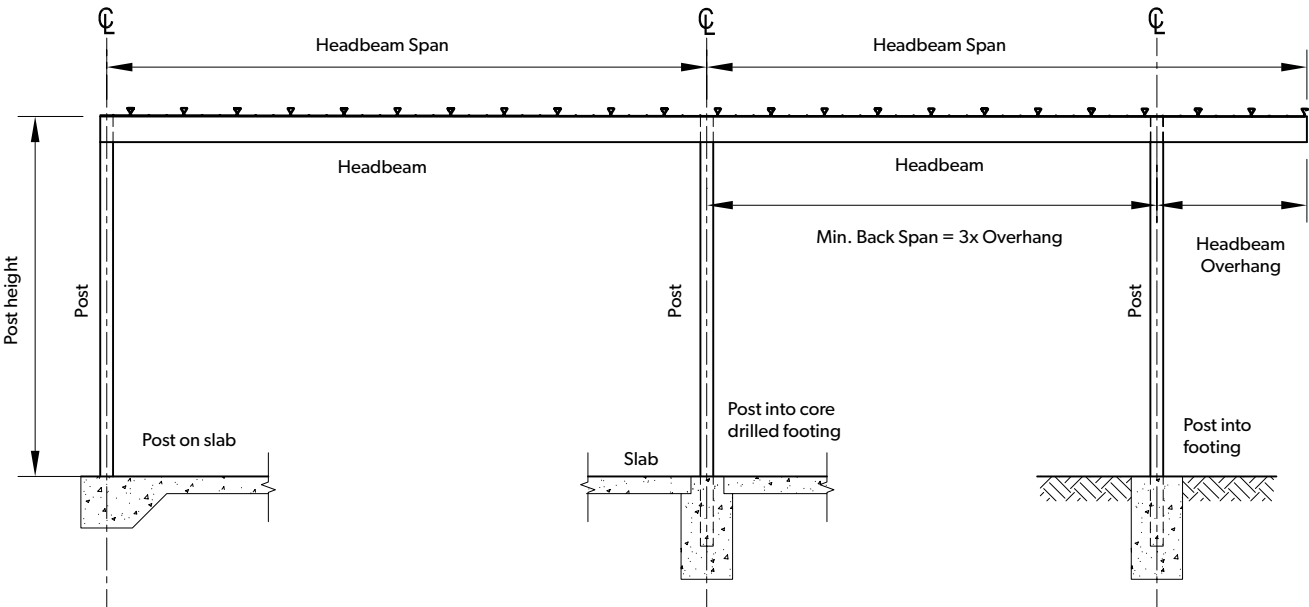
HEADBEAM OVERHANG

Headbeams can have overhang and are tabulated for beams supporting sheeting only. A bolted post behind connection must be used to overhang the headbeam past the supporting post. The headbeam span must be the span shown in the diagram to get the strength of the beam. With this span the post can be moved in creating the overhang. This distance can only be up to the span/4 (one quarter of the span). The maximum overhang each beam can have is given in the overhang table.

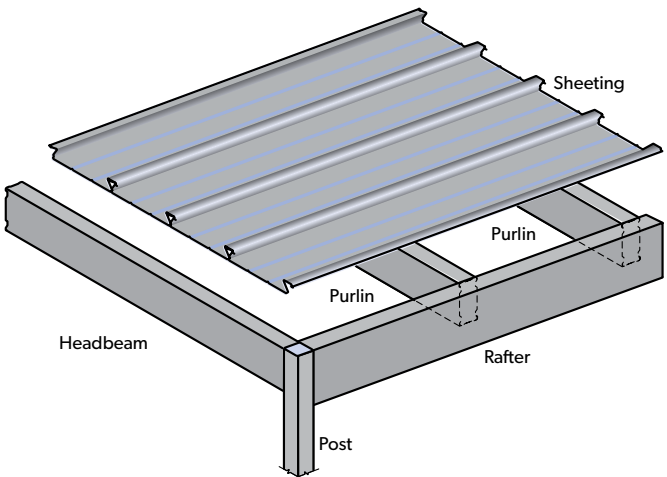
HEADBEAM OVERHANG (MM)

FIRMLOK® Beam Size	Maximum Overhang
F100	1000
F150	1250
F200	1750

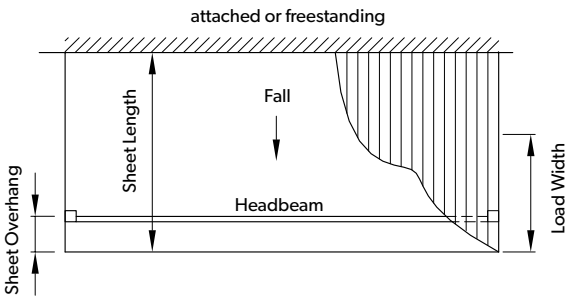
For supporting cladding only.



Basic Terminology



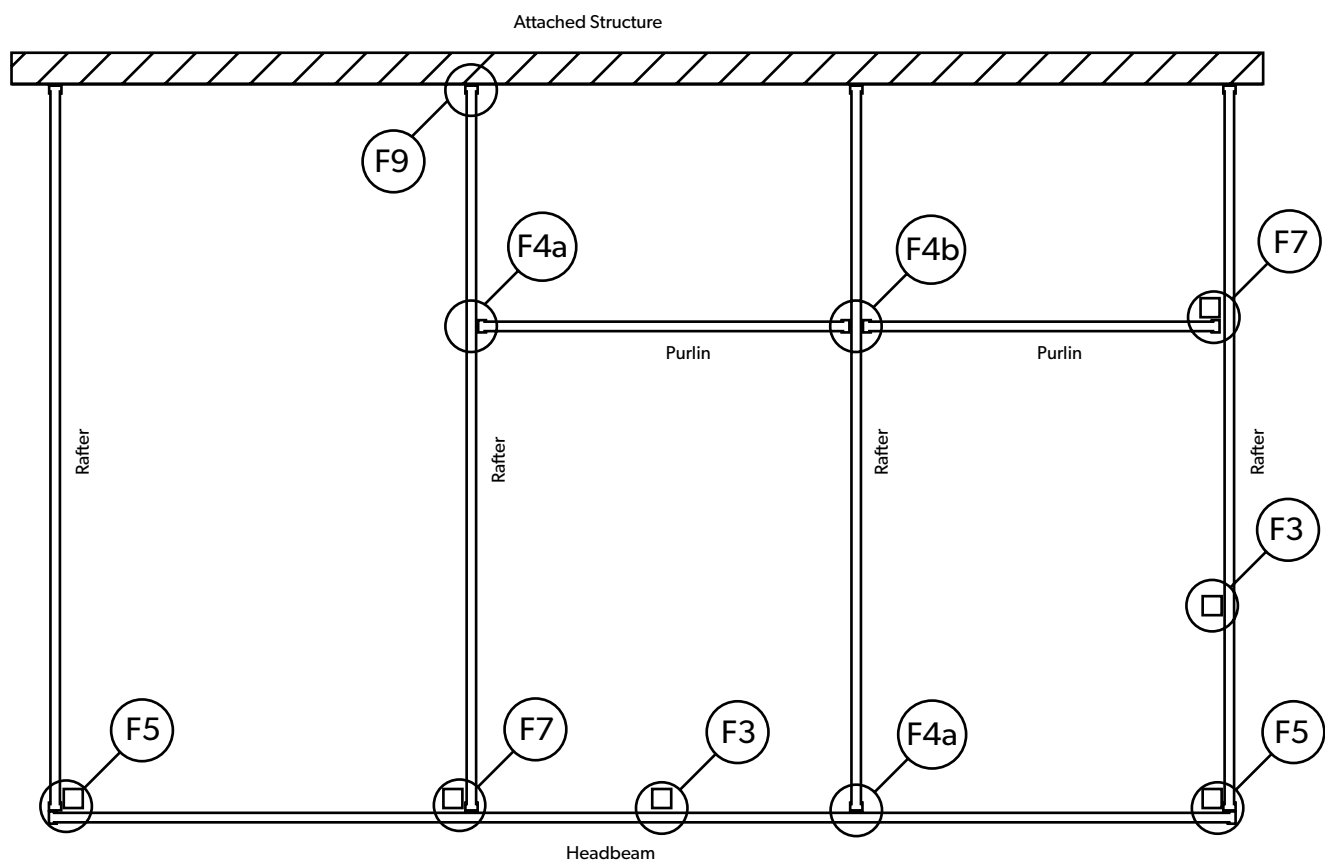
Sheet Overhang



3.2 KEY PLANS FOR FLAT STRUCTURES

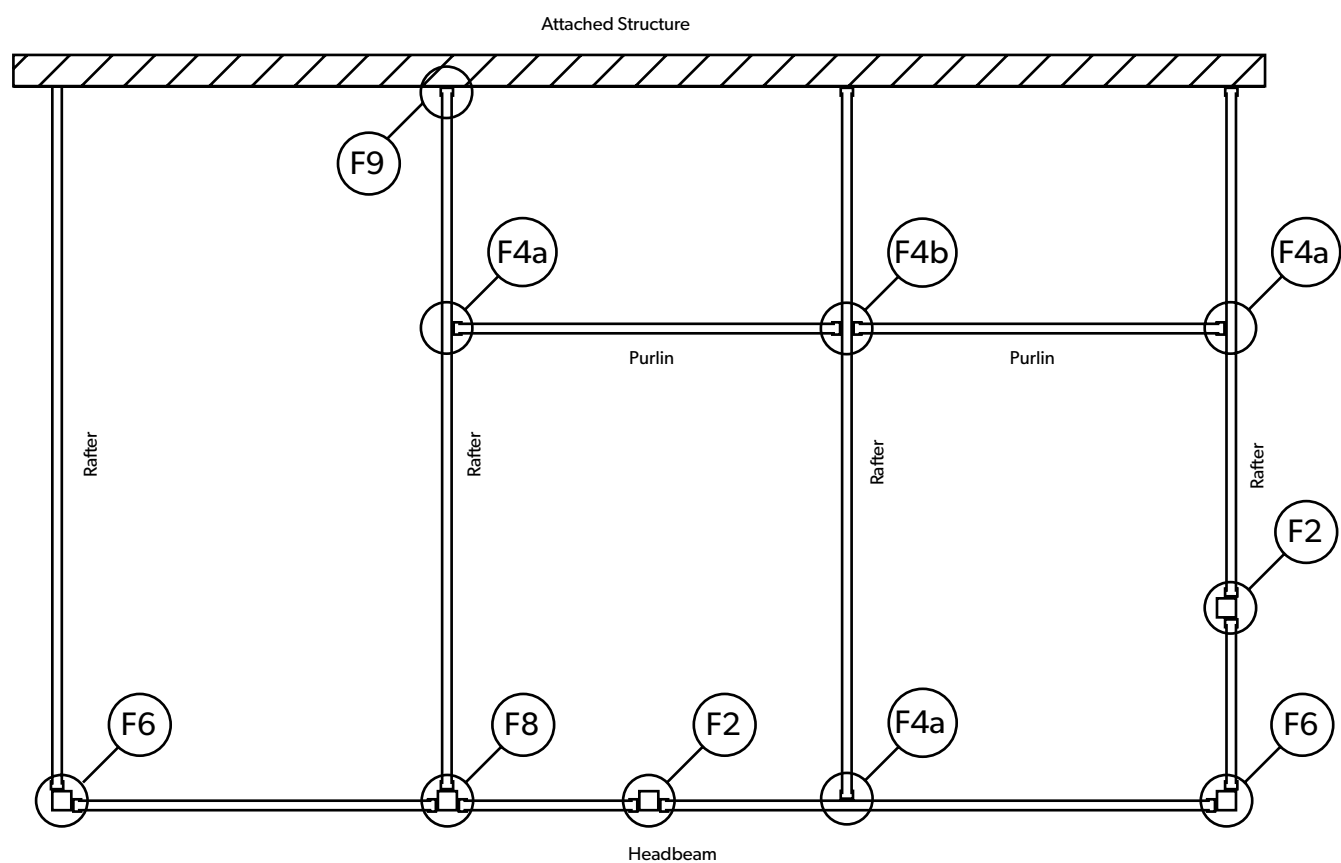
Post Behind Beam Connections

For typical beam to bracket detail, refer to connection (F1) on the following pages.



Beam to Side of Post Connections

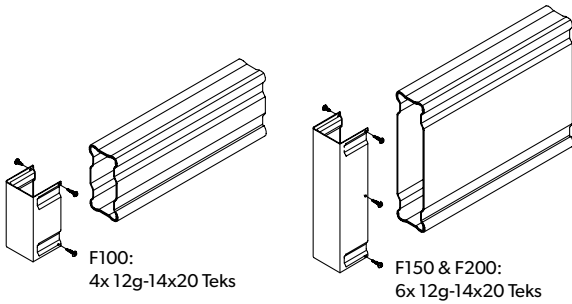
For typical beam to bracket detail, refer to connection (F1) on the following pages.



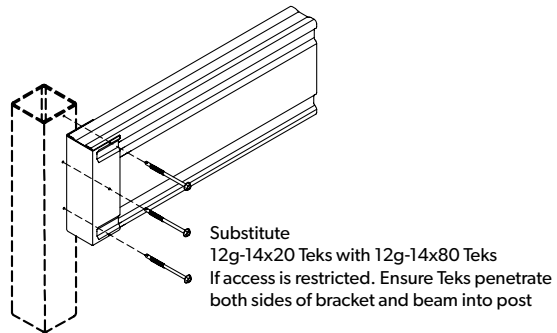
3.3 CONNECTION DETAILS

F1 BRACKET TO BEAM CONNECTIONS

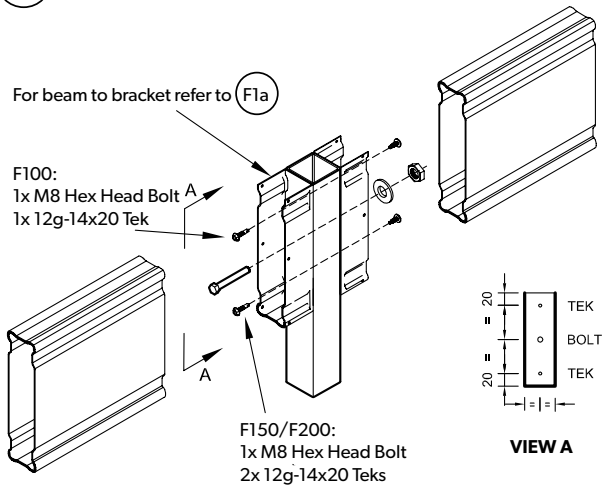
F1a UNIVERSAL BRACKET TO BEAM



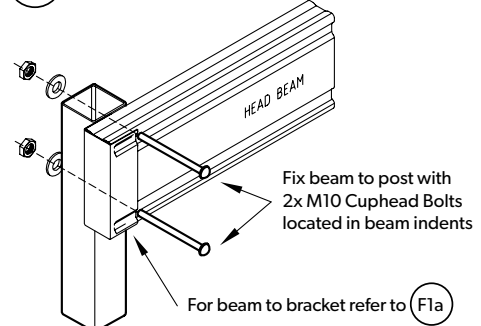
F1b UNIVERSAL BRACKET TO BEAM AT POST



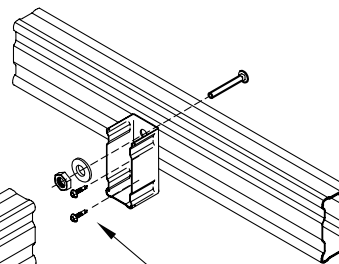
F2 BEAMS TO SIDE OF POST CONNECTION



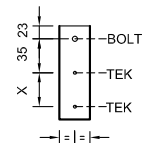
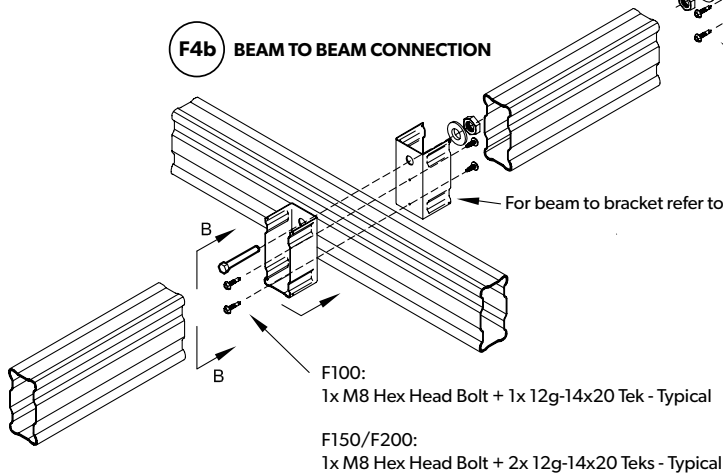
F3 POST BEHIND BEAM CONNECTION



F4a BEAM T - JUNCTION



F4b BEAM TO BEAM CONNECTION

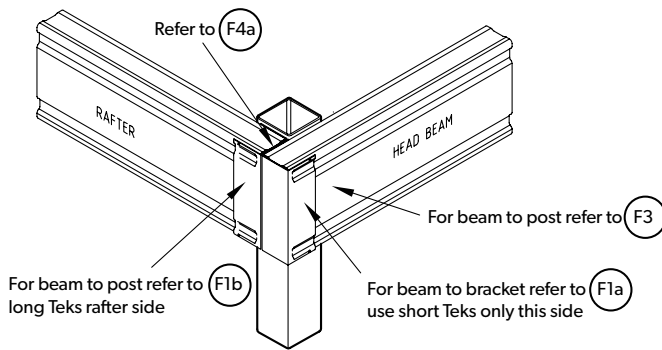


VIEW B

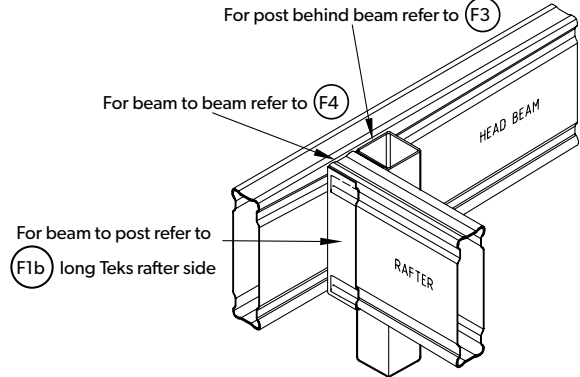
F100, X=N/A
F150, X=35mm
F200, X=50mm

F4 TYPICAL BEAM TO BEAM CONNECTIONS

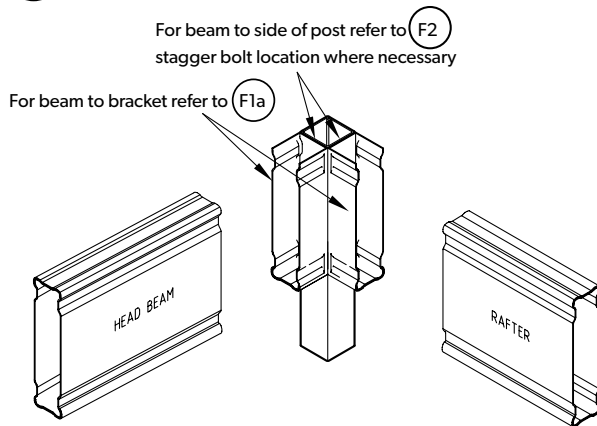
F5 POST BEHIND HEADBEAM AT CORNER WITH RAFTER CONNECTION



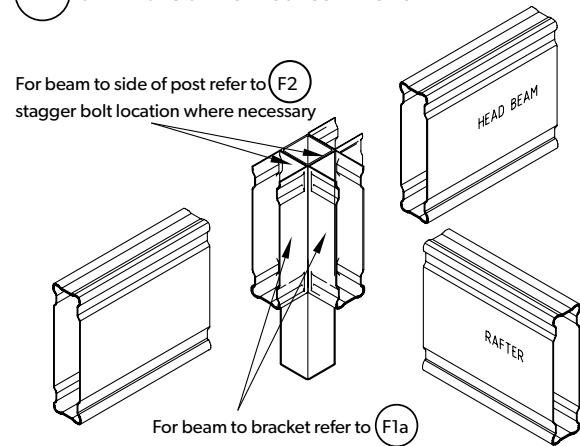
F7 POST BEHIND WITH INCOMING BEAM CONNECTION



F6 BEAMS TO SIDE OF POST AT CORNER CONNECTION

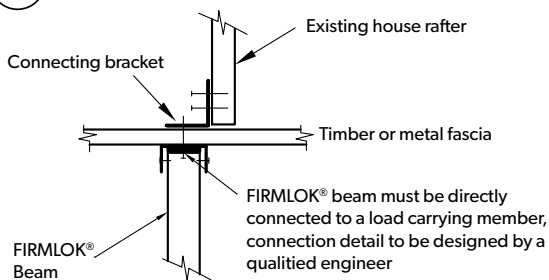


F8 3 BEAMS TO SIDE OF POST CONNECTION

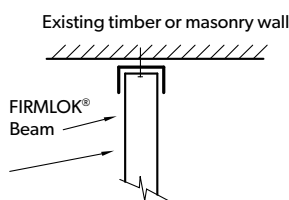


F9 BEAM TO ATTACHED STRUCTURE CONNECTION

F9a BEAM TO EXISTING FASCIA



F9b BEAM TO EXISTING WALL



Notes:

1. All screws are self drilling metal Hex Head Tek's® 12g-14x20 i.e. 12 gauge with 14 TPI, 20 long U.N.O. Values given are: gauge - threads per inch x length in mm. Tek is a trademark of Buildex.
2. The finish for all Tek's is Coating Class 4.
3. All bolts are galvanised M8 steel for beam to beam & beam to side of post connection, Grade 4.6 snug-tight.
4. All bolts are galvanised M10 steel for connections to posts, Grade 4.6 snug-tight.
5. Bolts are either hex head or cuphead; see connection details.
6. Use standard nut and washer in Non-cyclonic areas & Nylock nuts in Cyclonic areas.

3.4 TABLE INDEX

FLAT STRUCTURES - ATTACHED AND FREE STANDING

Table	Beam	Span Type	Supporting	Connection
1	Purlin	Simply supported	Sheeting	Beam to side of beam/post
2A	Headbeam	Simply supported	Sheeting	Beam to side of post
2B	Headbeam	Simply supported	Sheeting	Post bolted behind beam
2C	Headbeam	Multiple continuous	Sheeting	Beam to side of post
3A	Rafter	Simply supported	1 Purlin	Beam to side of post Post bolted behind beam
3B	Rafter	Simply supported	2 Purlins	Beam to side of post Post bolted behind beam
3C	Rafter	Double continuous	1 Purlin	Beam to side of post
3D	Rafter	Double continuous	2 Purlins	Beam to side of post
4A	Headbeam	Simply supported	1 Rafter	Beam to side of post Post bolted behind beam
4B	Headbeam	Simply supported	2 Rafters	Beam to side of post Post bolted behind beam
5	Attachment load	Simply supported	0 Rafters	Attached to fascia or wall

3.5 QUICK SELECTION TABLES

Table 1

Purlin Span and Reaction. Span Type: Simply Supported. Connection: Bracket. Supporting: Sheeting. Flat Structure

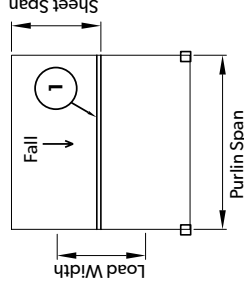
Wind Blocking	Wind Class	Beam Size	Purlin Load Width (mm)													
			≤ 900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	
0/1/4 sides	N1 / N2	F100	5400, 1.5	5000, 1.5	4700, 1.5	4450, 2.0	4250, 2.0	4050, 2.5	3900, 2.5	3800, 2.5	3700, 3.0	3600, 3.0	3500, 3.0	3400, 3.5	3350, 3.5	
		F150	7500, 1.5	7100, 2.0	6750, 2.5	6500, 2.5	6300, 3.0	6100, 3.5	5950, 3.5	5750, 4.0	5600, 4.0	5450, 4.5	5300, 4.5	5200, 5.0	5100, 5.0	
		F200	9250, 2.0	8800, 2.5	8450, 3.0	8150, 3.5	7900, 3.5	7700, 4.0	7500, 4.5	7350, 5.0	7200, 5.5	7050, 5.5	6950, 6.0	6850, 6.5	6700, 6.5	
	N3	F100	5400, 2.0	4900, 2.5	4550, 2.5	4250, 3.0	4050, 3.0	3850, 3.5	3700, 3.5	3550, 4.0	3400, 4.0	3250, 4.5	3150, 4.5	3000, 4.5	2900, 5.0	
		F150	7500, 2.5	7100, 3.0	6750, 3.5	6500, 4.5	6250, 5.0	5950, 5.0	5700, 5.5	5500, 6.0	5350, 6.5	5150, 6.5	4950, 7.0	4750, 7.0	4600, 7.5	
		F200	9250, 3.0	8800, 4.0	8450, 4.5	8150, 5.0	7900, 6.0	7700, 6.5	7500, 7.0	7350, 8.0	7200, 8.5	7050, 9.0	6950, 9.5	6750, 10.0	6550, 10.5	
	N4	F100	4650, 2.5	4200, 3.0	3900, 3.5	3650, 3.5	3450, 4.0	3250, 4.5	3050, 4.5	2900, 5.0	2750, 5.0	2650, 5.5	2450, 5.5	2300, 5.5	2150, 5.5	
		F150	7200, 3.5	6500, 4.5	6000, 5.0	5650, 5.5	5350, 6.0	5100, 6.5	4800, 7.0	4550, 7.5	4350, 8.0	4150, 8.0	4000, 8.5	3850, 9.0	3700, 9.0	
		F200	9250, 4.5	8800, 5.5	8450, 7.0	7900, 7.5	7500, 8.5	7150, 9.5	6850, 10.0	6500, 10.5	6200, 11.0	5900, 11.5	5700, 12.0	5450, 12.5	5300, 13.0	
	2 sides	N1 / N2	F100	4850, 2.0	4400, 2.5	4050, 3.0	3800, 3.5	3600, 3.5	3450, 4.0	3300, 4.5	3150, 4.5	3000, 5.0	2850, 5.0	2750, 5.0	2650, 5.5	2500, 5.5
			F150	7500, 3.0	6800, 4.0	6300, 4.5	5900, 5.0	5600, 5.5	5350, 6.0	5100, 6.5	4950, 7.0	4700, 7.5	4500, 7.5	4300, 8.0	4150, 8.0	4000, 8.5
			F200	9250, 4.0	8800, 5.0	8450, 6.0	8150, 7.0	7850, 7.5	7450, 8.5	7150, 9.0	6900, 9.5	6700, 10.0	6400, 10.5	6150, 11.0	5900, 11.5	5700, 12.0
N3		F100	4150, 3.0	3750, 3.5	3450, 4.0	3200, 4.5	2950, 4.5	2750, 5.0	2600, 5.5	2350, 5.5	2150, 5.5	1950, 5.5	1800, 5.5	1650, 5.5	1550, 5.5	
		F150	6400, 4.5	5800, 5.0	5350, 6.0	5050, 7.0	4700, 7.5	4350, 8.0	4100, 8.0	3900, 8.5	3700, 9.0	3550, 9.5	3400, 10.0	3300, 10.5	3100, 10.5	
		F200	9000, 6.0	8100, 7.0	7500, 8.5	7050, 9.5	6650, 10.5	6200, 11.0	5850, 11.5	5550, 12.0	5300, 13.0	5050, 13.5	4800, 14.0	4450, 13.5	4150, 13.5	
N4		F100	3550, 3.5	3200, 4.5	2850, 5.0	2600, 5.5	2250, 5.5	1950, 5.5	1750, 5.5	1550, 5.5	1400, 5.5	1300, 5.5	1200, 5.5	1100, 5.5	1050, 5.5	
		F150	5500, 5.5	5000, 6.5	4500, 7.5	4100, 8.5	3800, 9.0	3550, 9.5	3350, 10.0	3050, 10.0	2800, 10.5	2550, 10.5	2350, 10.0	2200, 10.5	2050, 10.5	
		F200	7750, 7.5	7000, 9.5	6400, 10.5	5850, 11.5	5400, 12.5	5050, 13.5	4650, 14.0	4150, 14.0	3800, 14.0	3450, 14.0	3200, 14.0	2950, 13.5	2750, 13.5	
3 sides		N1 / N2	F100	4500, 2.5	4100, 3.0	3800, 3.5	3550, 4.0	3350, 4.0	3200, 4.5	3000, 4.5	2850, 5.0	2700, 5.0	2600, 5.5	2400, 5.5	2200, 5.5	2050, 5.5
			F150	7000, 3.5	6350, 4.5	5850, 5.0	5500, 5.5	5200, 6.0	4950, 7.0	4750, 7.5	4500, 7.5	4250, 8.0	4100, 8.5	3950, 8.5	3800, 9.0	3650, 9.5
			F200	9250, 4.5	8800, 6.0	8200, 7.0	7700, 7.5	7300, 8.5	6950, 9.5	6700, 10.0	6400, 10.5	6100, 11.5	5800, 11.5	5600, 12.0	5400, 12.5	5200, 13.0
	N3	F100	3850, 3.5	3500, 4.0	3200, 4.5	2900, 5.0	2700, 5.0	2450, 5.5	2150, 5.5	1950, 5.5	1750, 5.5	1600, 5.5	1500, 5.5	1400, 5.5	1300, 5.5	
		F150	6000, 5.0	5400, 6.0	5000, 7.0	4600, 7.5	4250, 8.0	4000, 8.5	3750, 9.0	3550, 9.5	3400, 10.0	3200, 10.5	2950, 10.5	2750, 10.5	2550, 10.5	
		F200	8400, 6.5	7600, 8.0	7000, 9.5	6550, 10.5	6050, 11.5	5650, 12.0	5350, 13.0	5050, 13.5	4700, 14.0	4300, 13.5	4000, 14.0	3700, 14.0	3450, 14.0	
	N4	F100	3350, 4.0	2900, 5.0	2600, 5.5	2150, 5.5	1850, 5.5	1600, 5.5	1450, 5.5	1300, 5.5	1150, 5.0	1050, 5.0	1000, 5.5	900, 5.0	850, 5.5	
		F150	5150, 6.5	4600, 7.5	4100, 8.5	3750, 9.0	3450, 9.5	3200, 10.5	2850, 10.5	2550, 10.5	2300, 10.0	2100, 10.0	1950, 10.0	1800, 10.0	1700, 10.5	
		F200	7250, 8.5	6550, 10.5	5850, 11.5	5300, 12.5	4900, 13.5	4300, 13.5	3850, 14.0	3450, 14.0	3150, 14.0	2850, 13.5	2650, 14.0	2450, 13.5	2300, 14.0	

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the purlin span in mm, the 2nd value in the table is the reaction (kN) on the supporting rafter.
- The reaction is based on 1 purlin span and 2 rafter supports. For 2 or more simply span purlins, double (2x) the reaction for internal rafters.
- Purlin span = spacing of rafters.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 1

Purlin supporting sheeting.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 2A

Headbeam Span and Reaction, Span Type: Simply Supported, Connection: Bracket, Supporting: Sheeting, Flat Structure

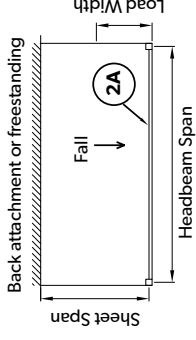
Wind Blocking	Wind Class	Beam Size	Headbeam Load Width (mm)												
			≤ 900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500
0/1/4 sides	N1 / N2	F100	5400, 1.5	5000, 1.5	4700, 1.5	4450, 2.0	4250, 2.0	4050, 2.5	3900, 2.5	3800, 2.5	3700, 3.0	3600, 3.0	3500, 3.0	3400, 3.5	3300, 3.5
		F150	7500, 1.5	7100, 2.0	6700, 2.5	6500, 2.5	6300, 3.0	6100, 3.5	5950, 3.5	5750, 4.0	5600, 4.0	5450, 4.5	5300, 4.5	5200, 5.0	5100, 5.0
		F200	9250, 2.0	8800, 2.5	8450, 3.0	8050, 3.0	7900, 3.5	7700, 4.0	7500, 4.5	7350, 5.0	7200, 5.5	7050, 5.5	6950, 6.0	6850, 6.5	6700, 6.5
	N3	F100	5400, 2.0	4900, 2.5	4550, 2.5	4250, 3.0	4050, 3.0	3850, 3.5	3700, 3.5	3550, 4.0	3400, 4.0	3250, 4.5	3150, 4.5	3000, 4.5	2900, 5.0
		F150	7500, 2.5	7100, 3.0	6750, 3.5	6500, 4.5	6250, 5.0	5950, 5.0	5700, 5.5	5500, 6.0	5350, 6.5	5150, 6.5	4900, 7.0	4750, 7.0	4600, 7.5
		F200	9250, 3.0	8800, 4.0	8450, 4.5	8050, 5.0	7900, 6.0	7700, 6.5	7500, 7.0	7350, 8.0	7200, 8.5	7050, 9.0	6950, 9.5	6750, 10.0	6550, 10.5
	N4	F100	4650, 2.5	4200, 3.0	3900, 3.5	3650, 3.5	3450, 4.0	3250, 4.5	3050, 4.5	2900, 5.0	2750, 5.0	2650, 5.5	2450, 5.5	2300, 5.5	2150, 5.5
		F150	7200, 3.5	6500, 4.5	6000, 5.0	5600, 5.5	5300, 6.0	5100, 6.5	4800, 7.0	4550, 7.5	4300, 8.0	4150, 8.0	4000, 8.5	3850, 9.0	3700, 9.0
		F200	9250, 4.5	8800, 5.5	8450, 7.0	7900, 7.5	7500, 8.5	7150, 9.5	6850, 10.0	6500, 10.5	6200, 11.0	5900, 11.5	5700, 12.0	5450, 12.5	5300, 13.0
2 sides	N1 / N2	F100	4850, 2.0	4400, 2.5	4050, 3.0	3800, 3.5	3600, 3.5	3450, 4.0	3300, 4.5	3150, 4.5	3000, 5.0	2850, 5.0	2700, 5.0	2650, 5.5	2500, 5.5
		F150	7500, 3.0	6800, 4.0	6300, 4.5	5900, 5.0	5600, 5.5	5350, 6.0	5050, 6.5	4950, 7.0	4700, 7.5	4500, 7.5	4300, 8.0	4150, 8.0	4000, 8.5
		F200	9250, 4.0	8800, 5.0	8450, 6.0	8050, 6.5	7850, 7.5	7450, 8.5	7150, 9.0	6900, 9.5	6700, 10.0	6300, 10.5	6150, 11.0	5900, 11.5	5700, 12.0
	N3	F100	4150, 3.0	3750, 3.5	3450, 4.0	3200, 4.5	2950, 4.5	2750, 5.0	2600, 5.5	2350, 5.5	2150, 5.5	1950, 5.5	1750, 5.0	1650, 5.5	1550, 5.5
		F150	6400, 4.5	5800, 5.0	5350, 6.0	5050, 7.0	4700, 7.5	4200, 7.5	4050, 8.0	3850, 8.5	3700, 9.0	3550, 9.5	3400, 10.0	3300, 10.5	3150, 10.5
		F200	9000, 6.0	8100, 7.0	7500, 8.5	7050, 9.5	6550, 10.0	6200, 11.0	5850, 11.5	5550, 12.0	5300, 13.0	5050, 13.5	4850, 14.0	4700, 14.5	4500, 15.0
	N4	F100	3500, 3.5	3200, 4.5	2850, 5.0	2600, 5.5	2250, 5.5	1950, 5.5	1750, 5.5	1550, 5.5	1400, 5.5	1300, 5.5	1200, 5.5	1100, 5.5	1050, 5.5
		F150	5500, 5.5	5000, 6.5	4500, 7.5	4100, 8.5	3800, 9.0	3500, 9.5	3350, 10.0	3150, 10.5	2850, 10.5	2600, 10.5	2400, 10.5	2200, 10.5	2050, 10.5
		F200	7750, 7.5	7000, 9.5	6400, 10.5	5850, 11.5	5400, 12.5	5050, 13.5	4750, 14.0	4500, 15.0	4300, 15.5	4100, 16.5	3850, 16.5	3550, 16.5	3300, 16.5
3 sides	N1 / N2	F100	4500, 2.5	4100, 3.0	3800, 3.5	3400, 3.5	3350, 4.0	3200, 4.5	2950, 4.5	2850, 5.0	2700, 5.0	2600, 5.5	2400, 5.5	2200, 5.5	2050, 5.5
		F150	7000, 3.5	6350, 4.5	5800, 5.0	5500, 5.5	5200, 6.0	4950, 7.0	4750, 7.5	4500, 7.5	4250, 8.0	4100, 8.5	3950, 8.5	3800, 9.0	3650, 9.5
		F200	9250, 4.5	8800, 6.0	8200, 7.0	7650, 7.5	7300, 8.5	6950, 9.5	6700, 10.0	6400, 10.5	6100, 11.5	5800, 11.5	5600, 12.0	5400, 12.5	5200, 13.0
	N3	F100	3850, 3.5	3500, 4.0	3200, 4.5	2900, 5.0	2700, 5.0	2450, 5.5	2100, 5.0	1950, 5.5	1750, 5.5	1600, 5.5	1500, 5.5	1400, 5.5	1300, 5.5
		F150	6000, 5.0	5400, 6.0	5000, 7.0	4600, 7.5	4250, 8.0	4000, 8.5	3750, 9.0	3550, 9.5	3400, 10.0	3250, 10.5	3000, 10.5	2800, 10.5	2600, 10.5
		F200	8400, 6.5	7600, 8.0	7000, 9.5	6550, 10.5	5950, 11.0	5650, 12.0	5350, 13.0	5050, 13.5	4800, 14.0	4600, 14.5	4400, 15.0	4250, 16.0	4100, 16.5
	N4	F100	3350, 4.0	2900, 5.0	2600, 5.5	2150, 5.5	1850, 5.5	1600, 5.5	1450, 5.5	1300, 5.5	1150, 5.0	1050, 5.0	1000, 5.5	900, 5.0	800, 5.0
		F150	5100, 6.0	4600, 7.5	4100, 8.5	3750, 9.0	3450, 9.5	3250, 10.5	2900, 10.5	2600, 10.5	2350, 10.5	2150, 10.5	2000, 10.5	1850, 10.5	1700, 10.5
		F200	7250, 8.5	6550, 10.5	5850, 11.5	5300, 12.5	4900, 13.5	4600, 14.5	4350, 15.5	4100, 16.5	3750, 16.5	3450, 16.5	3200, 16.5	2950, 16.5	2750, 16.5

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the headbeam span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The post reaction is based on 1 headbeam span and 2 supports. For 2 or more simply span headbeams, double (2x) the post reaction for internal posts.
- Headbeam span = spacing of supports.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 2A

Head beam, no rafters bracket to side of post.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 2B

Headbeam Span and Reaction, Span Type: Simply Supported, Connection: Bolted, Supporting: Sheeting, Flat Structure

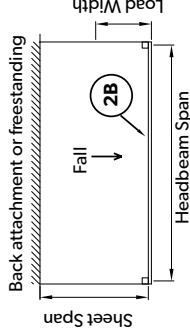
Wind Blocking	Wind Class	Beam Size	Headbeam Load Width (mm)													
			≤ 900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	
0/1/4 sides	N1 / N2	F100	5400, 1.5	5000, 1.5	4700, 1.5	4450, 2.0	4250, 2.0	4050, 2.5	3900, 2.5	3800, 2.5	3700, 3.0	3600, 3.0	3500, 3.0	3400, 3.5	3300, 3.5	
		F150	7500, 1.5	7100, 2.0	6700, 2.5	6500, 2.5	6300, 3.0	6100, 3.5	5950, 3.5	5750, 4.0	5600, 4.0	5450, 4.5	5300, 4.5	5200, 5.0	5100, 5.0	
		F200	9250, 2.0	8800, 2.5	8450, 3.0	8050, 3.0	7900, 3.5	7700, 4.0	7500, 4.5	7350, 5.0	7200, 5.5	7050, 5.5	6950, 6.0	6850, 6.5	6700, 6.5	
	N3	F100	5400, 2.0	4900, 2.5	4550, 2.5	4250, 3.0	4050, 3.0	3850, 3.5	3700, 3.5	3550, 4.0	3400, 4.0	3250, 4.5	3150, 4.5	3000, 4.5	2900, 5.0	
		F150	7500, 2.5	7100, 3.0	6750, 3.5	6500, 4.5	6250, 5.0	5950, 5.0	5700, 5.5	5500, 6.0	5350, 6.5	5150, 6.5	4900, 7.0	4750, 7.0	4600, 7.5	
		F200	9250, 3.0	8800, 4.0	8450, 4.5	8050, 5.0	7900, 6.0	7700, 6.5	7500, 7.0	7350, 8.0	7200, 8.5	7050, 9.0	6950, 9.5	6750, 10.0	6550, 10.5	
	N4	F100	4650, 2.5	4200, 3.0	3900, 3.5	3650, 3.5	3450, 4.0	3250, 4.5	3050, 4.5	2900, 5.0	2750, 5.0	2650, 5.5	2550, 5.5	2450, 5.5	2350, 6.0	
		F150	7200, 3.5	6500, 4.5	6000, 5.0	5600, 5.5	5300, 6.0	5100, 6.5	4800, 7.0	4550, 7.5	4300, 8.0	4150, 8.0	4000, 8.5	3850, 9.0	3700, 9.0	
		F200	9250, 4.5	8800, 5.5	8450, 7.0	7900, 7.5	7500, 8.5	7150, 9.5	6850, 10.0	6500, 10.5	6200, 11.0	5900, 11.5	5700, 12.0	5450, 12.5	5300, 13.0	
	2 sides	N1 / N2	F100	4850, 2.0	4400, 2.5	4050, 3.0	3800, 3.5	3600, 3.5	3450, 4.0	3300, 4.5	3150, 4.5	3000, 5.0	2850, 5.0	2700, 5.0	2650, 5.5	2550, 5.5
			F150	7500, 3.0	6800, 4.0	6300, 4.5	5900, 5.0	5600, 5.5	5350, 6.0	5050, 6.5	4950, 7.0	4700, 7.5	4500, 7.5	4300, 8.0	4150, 8.0	4000, 8.5
			F200	9250, 4.0	8800, 5.0	8450, 6.0	8050, 6.5	7850, 7.5	7450, 8.5	7150, 9.0	6900, 9.5	6700, 10.0	6300, 10.5	6150, 11.0	5900, 11.5	5700, 12.0
N3		F100	4150, 3.0	3750, 3.5	3450, 4.0	3200, 4.5	2950, 4.5	2750, 5.0	2600, 5.5	2450, 5.5	2350, 6.0	2250, 6.0	2150, 6.5	2100, 6.5	2000, 7.0	
		F150	6400, 4.5	5800, 5.0	5350, 6.0	5050, 7.0	4700, 7.5	4200, 7.5	4050, 8.0	3850, 8.5	3700, 9.0	3550, 9.5	3400, 10.0	3300, 10.5	3150, 10.5	
		F200	9000, 6.0	8100, 7.0	7500, 8.5	7050, 9.5	6550, 10.0	6200, 11.0	5850, 11.5	5550, 12.0	5300, 13.0	5050, 13.5	4850, 14.0	4700, 14.5	4500, 15.0	
N4		F100	3500, 3.5	3200, 4.5	2850, 5.0	2600, 5.5	2400, 5.5	2250, 6.0	2100, 6.5	2000, 7.0	1800, 6.5	1650, 6.5	1500, 6.5	1400, 6.5	1300, 6.5	
		F150	5500, 5.5	5000, 6.5	4500, 7.5	4100, 8.5	3800, 9.0	3500, 9.5	3350, 10.0	3150, 10.5	2850, 10.5	2600, 10.5	2400, 10.5	2200, 10.5	2050, 10.5	
		F200	7750, 7.5	7000, 9.5	6400, 10.5	5850, 11.5	5400, 12.5	5050, 13.5	4750, 14.0	4500, 15.0	4300, 15.5	4100, 16.5	3850, 16.5	3550, 16.5	3300, 16.5	
3 sides		N1 / N2	F100	4500, 2.5	4100, 3.0	3800, 3.5	3400, 3.5	3350, 4.0	3200, 4.5	2950, 4.5	2850, 5.0	2700, 5.0	2600, 5.5	2500, 5.5	2400, 6.0	2300, 6.0
			F150	7000, 3.5	6350, 4.5	5800, 5.0	5500, 5.5	5200, 6.0	4950, 7.0	4750, 7.5	4500, 7.5	4250, 8.0	4100, 8.5	3950, 8.5	3800, 9.0	3650, 9.5
			F200	9250, 4.5	8800, 6.0	8200, 7.0	7650, 7.5	7300, 8.5	6950, 9.5	6700, 10.0	6400, 10.5	6100, 11.5	5800, 11.5	5600, 12.0	5400, 12.5	5200, 13.0
	N3	F100	3850, 3.5	3500, 4.0	3200, 4.5	2900, 5.0	2700, 5.0	2500, 5.5	2350, 6.0	2250, 6.0	2150, 6.5	1950, 6.5	1900, 6.5	1750, 6.5	1650, 7.0	
		F150	6000, 5.0	5400, 6.0	5000, 7.0	4600, 7.5	4250, 8.0	4000, 8.5	3750, 9.0	3550, 9.5	3400, 10.0	3250, 10.5	3000, 10.5	2800, 10.5	2600, 10.5	
		F200	8400, 6.5	7600, 8.0	7000, 9.5	6550, 10.5	5950, 11.0	5650, 12.0	5350, 13.0	5050, 13.5	4800, 14.0	4600, 14.5	4400, 15.0	4250, 16.0	4100, 16.5	
	N4	F100	3350, 4.0	2900, 5.0	2600, 5.5	2350, 6.0	2200, 6.5	2050, 6.5	1850, 7.0	1650, 7.0	1500, 7.0	1350, 6.5	1250, 6.5	1150, 6.5	1100, 7.0	
		F150	5100, 6.0	4600, 7.5	4100, 8.5	3750, 9.0	3450, 9.5	3250, 10.5	2900, 10.5	2600, 10.5	2350, 10.5	2150, 10.5	2000, 10.5	1850, 10.5	1700, 10.5	
		F200	7250, 8.5	6550, 10.5	5850, 11.5	5300, 12.5	4900, 13.5	4600, 14.5	4350, 15.5	4100, 16.5	3750, 16.5	3450, 16.5	3200, 16.5	2950, 16.5	2750, 16.5	

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the headbeam span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The post reaction is based on 1 headbeam span and 2 supports. For 2 or more simply span headbeams, double (2x) the post reaction for internal posts.
- Headbeam span = spacing of supports.
- Attachment load is the uniformly design distributed load in kN/m acting on the attachment structure e.g. existing wall.

Diagram 2B

Head beam, no rafters post bolted behind.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 2C

Headbeam Span and Reaction, Span Type: Double/Multiple Continuous, Connection: Bolted, Supporting: Sheeting, Flat Structure

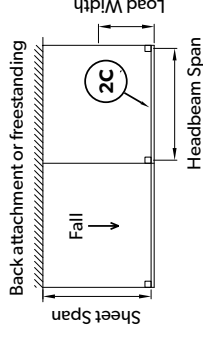
Wind Blocking	Wind Class	Beam Size	Headbeam Load Width (mm)												
			≤ 900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500
0/1/4 sides	N1 / N2	F100	6950, 3.5	6350, 4.5	5650, 4.5	5050, 5.0	4700, 5.5	4350, 6.0	4100, 6.0	3850, 6.5	3650, 6.5	3450, 7.0	3300, 7.0	3150, 7.5	2950, 7.5
		F150	9350, 4.5	8850, 5.5	8450, 7.0	8000, 8.0	7300, 8.5	6750, 9.0	6400, 9.5	6000, 10.0	5700, 10.5	5400, 10.5	5150, 11.0	4900, 11.5	4700, 11.5
		F200	11500, 5.0	11000, 7.0	10600, 8.5	10200, 9.5	9900, 11.0	9650, 12.5	9150, 13.0	8650, 14.0	8200, 14.5	7700, 15.0	7450, 15.5	7050, 16.0	6600, 16.0
		F100	6350, 5.0	5400, 6.0	4750, 6.5	4300, 7.0	3900, 7.5	3600, 8.0	3350, 8.0	3150, 8.5	2950, 9.0	2800, 9.0	2600, 9.0	2500, 9.5	2400, 9.5
		F150	9350, 7.5	8600, 9.0	7550, 10.0	6800, 11.0	6200, 11.5	5700, 12.0	5250, 12.5	4950, 13.0	4650, 13.5	4400, 14.0	4100, 14.0	4000, 15.0	3800, 15.0
		F200	11550, 9.0	11000, 11.5	10600, 13.5	9800, 15.0	9000, 16.5	8300, 17.5	7750, 18.5	7250, 19.0	6600, 19.0	5950, 19.0	5550, 19.0	5150, 19.0	4800, 19.0
	N4	F100	5050, 6.0	4250, 7.0	3750, 7.5	3350, 8.0	3000, 8.5	2750, 9.0	2450, 9.0	2400, 10.0	2250, 10.0	2100, 10.5	1950, 10.5	1850, 10.5	1700, 10.5
		F150	7950, 9.5	6750, 11.0	5900, 12.0	5250, 12.5	4750, 13.5	4350, 14.0	4050, 15.0	3750, 15.0	3500, 15.5	3300, 16.0	3100, 16.5	2950, 16.5	2800, 17.0
		F200	11550, 13.5	9750, 15.5	8550, 17.0	7700, 18.5	6850, 19.0	5850, 18.5	5300, 19.0	4750, 19.0	4300, 19.0	3950, 19.0	3600, 19.0	3300, 18.5	3150, 19.0
		F100	5500, 6.0	4650, 6.5	4100, 7.0	3650, 7.5	3350, 8.0	3050, 8.5	2850, 9.0	2650, 9.5	2500, 9.5	2350, 10.0	2200, 10.0	2100, 10.5	2000, 10.5
		F150	8700, 9.0	7400, 10.0	6450, 11.0	5800, 12.0	5250, 12.5	4850, 13.5	4500, 14.0	4200, 14.5	3900, 15.0	3700, 15.5	3500, 15.5	3300, 16.0	3100, 16.0
		F200	11550, 11.5	10700, 14.5	9400, 16.0	8450, 17.0	7700, 18.5	7000, 19.0	6200, 19.0	5550, 19.0	5050, 19.0	4650, 19.0	4250, 19.0	3950, 19.0	3700, 19.0
N3	F100	4200, 7.0	3550, 8.0	3100, 8.5	2750, 9.0	2450, 9.5	2250, 10.0	2050, 10.5	1900, 10.5	1700, 10.5	1550, 10.5	1450, 10.5	1350, 10.5	1250, 10.5	
	F150	6650, 11.0	5600, 12.5	4800, 13.0	4300, 14.0	3900, 15.0	3550, 15.5	3250, 16.0	3000, 16.5	2800, 17.0	2600, 17.0	2450, 17.5	2250, 17.5	2100, 17.5	
	F200	9650, 15.5	8150, 17.5	7050, 19.0	5800, 19.0	5000, 19.0	4350, 19.0	3850, 19.0	3500, 19.0	3150, 19.0	2900, 19.0	2650, 19.0	2450, 19.0	2300, 19.0	
	F100	3300, 8.5	2750, 9.0	2350, 10.0	2050, 10.5	1800, 10.5	1550, 10.5	1350, 10.0	1250, 10.5	1150, 10.5	1050, 10.5	950, 10.5	900, 10.5	800, 10.0	
	F150	4950, 12.5	4200, 14.0	3700, 15.5	3250, 16.0	2900, 17.0	2600, 17.0	2350, 17.5	2100, 17.5	1900, 17.5	1750, 17.5	1600, 17.5	1500, 17.5	1400, 17.5	
	F200	7550, 18.5	5850, 19.0	4650, 19.0	3850, 19.0	3300, 19.0	2900, 19.0	2550, 19.0	2300, 19.0	2100, 19.0	1900, 19.0	1750, 19.0	1600, 18.5	1500, 18.5	
3 sides	N1 / N2	F100	4900, 6.0	4150, 7.0	3650, 7.5	3250, 8.5	2950, 9.0	2700, 9.0	2450, 9.5	2350, 10.0	2200, 10.0	2050, 10.5	1900, 10.5	1750, 10.5	1650, 10.5
		F150	7800, 9.5	6600, 11.0	5750, 12.0	5150, 13.0	4650, 13.5	4300, 14.5	3950, 15.0	3700, 15.5	3450, 16.0	3250, 16.5	3050, 16.5	2900, 17.0	2750, 17.5
		F200	11300, 13.5	9600, 15.5	8250, 17.0	7550, 18.5	6600, 19.0	5750, 19.0	5100, 19.0	4600, 19.0	4150, 19.0	3800, 19.0	3500, 19.0	3200, 18.5	3050, 19.0
		F100	3750, 7.5	3050, 8.0	2750, 9.0	2400, 9.5	2150, 10.0	1950, 10.5	1750, 10.5	1550, 10.5	1400, 10.5	1300, 10.5	1200, 10.5	1100, 10.5	1050, 10.5
		F150	5950, 12.0	5000, 13.0	4300, 14.0	3800, 15.0	3350, 15.5	3050, 16.0	2850, 17.0	2600, 17.5	2400, 17.5	2200, 17.5	2000, 17.5	1850, 17.0	1750, 17.5
		F200	8650, 17.0	7300, 19.0	5800, 19.0	4850, 19.0	4150, 19.0	3600, 19.0	3200, 19.0	2850, 19.0	2600, 19.0	2400, 19.0	2200, 19.0	2050, 19.0	1900, 19.0
	N4	F100	2900, 9.0	2400, 9.5	2050, 10.5	1750, 10.5	1500, 10.5	1300, 10.5	1150, 10.5	1050, 10.5	950, 10.5	850, 10.5	800, 10.5	750, 10.5	700, 10.5
		F150	4600, 13.5	3800, 15.0	3250, 16.0	2850, 17.0	2500, 17.5	2150, 17.0	1900, 17.0	1750, 17.5	1550, 17.0	1450, 17.5	1350, 17.5	1250, 17.5	1150, 17.0
		F200	6500, 19.0	4850, 19.0	3850, 19.0	3200, 19.0	2750, 19.0	2400, 19.0	2100, 19.0	1900, 19.0	1700, 18.5	1550, 18.5	1450, 19.0	1350, 19.0	1200, 18.0

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the purlin span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The post reactions in Table 2C are based on the reaction in an internal support of a 2 equal continuous spans with 3 supports. For end posts, multiply the post reaction in table 2C by 0.4.
- Headbeam span = spacing of supports.
- Attachment load is the uniformly design distributed load in kN/m acting on the attachment structure e.g. existing wall.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 2C

Continuous headbeam, post bolted behind.



General Notes:

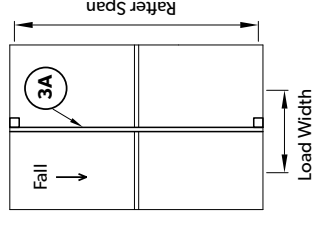
- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 3A

Rafter Span and Reaction, Span Type: Simply Supported, Connection: Bracket Or Bolted, Supporting: 1 Purlin, Flat Structure

Diagram 3A

Rafter supporting one purlin.



Wind Blocking	Wind Class	Beam Size	Rafter Load Width (mm)												
			≤ 1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800
0/1/4 sides	N1 / N2	F100	5150, 1.0	4850, 1.0	4550, 1.0	4350, 1.0	4150, 1.5	4000, 1.5	3900, 1.5	3750, 1.5	3650, 1.5	3550, 1.5	3450, 1.5	3350, 2.0	3250, 2.0
		F150	7300, 1.0	6950, 1.5	6700, 1.5	6500, 1.5	6300, 2.0	6150, 2.0	6000, 2.0	5800, 2.0	5650, 2.5	5500, 2.5	5400, 2.5	5250, 2.5	5100, 3.0
		F200	9050, 1.0	8700, 1.5	8400, 1.5	8150, 2.0	7950, 2.0	7750, 2.5	7600, 2.5	7450, 2.5	7300, 3.0	7150, 3.0	7050, 3.5	6950, 3.5	6850, 3.5
	N3	F100	5150, 1.5	4850, 1.5	4550, 1.5	4300, 2.0	4050, 2.0	3800, 2.0	3600, 2.0	3450, 2.0	3300, 2.5	3150, 2.5	3050, 2.5	2950, 2.5	2850, 2.5
		F150	7300, 1.5	6950, 2.0	6700, 2.5	6500, 2.5	6150, 2.5	5800, 3.0	5550, 3.0	5300, 3.0	5100, 3.5	4900, 3.5	4750, 3.5	4600, 4.0	4450, 4.0
		F200	9050, 2.0	8700, 2.5	8400, 2.5	8150, 3.0	7950, 3.5	7750, 3.5	7550, 4.0	7200, 4.0	6950, 4.5	6700, 4.5	6500, 5.0	6300, 5.0	6100, 5.0
	N4	F100	4550, 1.5	4150, 2.0	3750, 2.0	3500, 2.0	3250, 2.5	3050, 2.5	2900, 2.5	2800, 2.5	2650, 2.5	2500, 3.0	2350, 3.0	2150, 3.0	2050, 3.0
		F150	6950, 2.5	6300, 2.5	5750, 3.0	5350, 3.0	5050, 3.5	4750, 3.5	4550, 4.0	4350, 4.0	4150, 4.0	4000, 4.5	3850, 4.5	3750, 4.5	3600, 5.0
		F200	9050, 3.0	8500, 3.5	7850, 4.0	7300, 4.0	6900, 4.5	6550, 5.0	6250, 5.0	5950, 5.5	5750, 5.5	5500, 6.0	5350, 6.0	5150, 6.5	5000, 6.5
2 sides	N1 / N2	F100	4800, 1.5	4450, 1.5	4100, 2.0	3800, 2.0	3550, 2.0	3350, 2.5	3150, 2.5	3000, 2.5	2900, 2.5	2750, 2.5	2650, 2.5	2550, 3.0	2400, 3.0
		F150	7300, 2.0	6750, 2.5	6200, 2.5	5800, 3.0	5450, 3.0	5150, 3.5	4900, 3.5	4700, 3.5	4500, 4.0	4350, 4.0	4200, 4.0	4050, 4.5	3900, 4.5
		F200	9050, 2.5	8700, 3.0	8400, 3.5	7850, 4.0	7400, 4.0	7000, 4.5	6700, 4.5	6400, 5.0	6150, 5.0	5950, 5.5	5750, 5.5	5550, 6.0	5400, 6.0
	N3	F100	3950, 2.0	3550, 2.0	3200, 2.5	3000, 2.5	2800, 2.5	2650, 3.0	2400, 3.0	2150, 3.0	2000, 3.0	1850, 3.0	1700, 3.0	1600, 3.0	1500, 3.0
		F150	6050, 3.0	5450, 3.0	5000, 3.5	4650, 3.5	4350, 4.0	4100, 4.0	3900, 4.5	3750, 4.5	3600, 5.0	3450, 5.0	3300, 5.0	3100, 5.0	2900, 5.0
		F200	8200, 3.5	7400, 4.0	6850, 4.5	6350, 5.0	6000, 5.5	5650, 5.5	5400, 6.0	5150, 6.5	4950, 6.5	4800, 7.0	4450, 7.0	4200, 7.0	3900, 7.0
	N4	F100	3200, 2.5	2850, 2.5	2600, 3.0	2250, 3.0	1950, 3.0	1750, 3.0	1600, 3.0	1450, 3.0	1300, 2.5	1200, 2.5	1150, 3.0	1050, 3.0	1000, 3.0
		F150	5000, 3.5	4500, 4.0	4100, 4.0	3800, 4.5	3550, 5.0	3350, 5.0	3100, 5.5	2800, 5.0	2550, 5.0	2350, 5.0	2200, 5.0	2050, 5.0	1950, 5.5
		F200	6800, 4.5	6150, 5.0	5650, 5.5	5250, 6.0	4950, 6.5	4600, 7.0	4150, 7.0	3800, 7.0	3450, 7.0	3200, 7.0	2950, 7.0	2750, 7.0	2600, 7.0
3 sides	N1 / N2	F100	4450, 1.5	4050, 2.0	3700, 2.0	3450, 2.0	3200, 2.5	3000, 2.5	2850, 2.5	2750, 2.5	2600, 3.0	2400, 3.0	2250, 3.0	2100, 3.0	1950, 3.0
		F150	6850, 2.5	6200, 2.5	5700, 3.0	5300, 3.0	4950, 3.5	4700, 3.5	4450, 4.0	4250, 4.0	4100, 4.0	3950, 4.5	3800, 4.5	3650, 4.5	3550, 5.0
		F200	9050, 3.0	8400, 3.5	7750, 4.0	7200, 4.0	6800, 4.5	6450, 5.0	6150, 5.0	5850, 5.5	5650, 5.5	5450, 6.0	5250, 6.0	5100, 6.5	4950, 6.5
	N3	F100	3600, 2.0	3200, 2.5	2950, 2.5	2700, 2.5	2450, 3.0	2200, 3.0	1950, 3.0	1800, 3.0	1650, 3.0	1500, 2.5	1400, 3.0	1300, 2.5	1250, 3.0
		F150	5550, 3.0	5000, 3.5	4550, 4.0	4250, 4.0	4000, 4.5	3750, 4.5	3550, 5.0	3400, 5.0	3200, 5.0	2950, 5.0	2750, 5.0	2550, 5.0	2400, 5.0
		F200	7550, 4.0	6800, 4.5	6250, 5.0	5850, 5.5	5500, 6.0	5200, 6.5	4950, 6.5	4700, 7.0	4300, 7.0	4000, 7.0	3700, 7.0	3450, 7.0	3250, 7.0
	N4	F100	2900, 2.5	2600, 3.0	2200, 3.0	1850, 3.0	1650, 3.0	1450, 3.0	1300, 3.0	1200, 3.0	1100, 3.0	1000, 3.0	950, 3.0	850, 2.5	800, 2.5
		F150	4550, 4.0	4100, 4.0	3750, 4.5	3450, 5.0	3200, 5.0	2850, 5.0	2550, 5.0	2300, 5.0	2150, 5.5	1950, 5.0	1800, 5.0	1700, 5.0	1600, 5.0
		F200	6250, 5.0	5650, 5.5	5200, 6.5	4850, 7.0	4300, 7.0	3850, 7.0	3450, 7.0	3150, 7.0	2850, 7.0	2650, 7.0	2450, 7.0	2300, 7.0	2150, 7.0

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the rafter span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The support reaction is based on 1 rafter span and 2 supports.
- Rafter span = spacing of supports.

General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 3B

Rafter Span and Reaction, Span Type: Simply Supported, Connection: Bracket Or Bolted, Supporting: 2 Purlins, Flat Structure

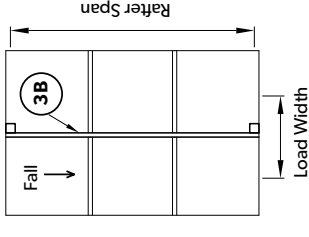
Wind Blocking	Wind Class	Beam Size	Rafter Load Width (mm)													
0/1/4 sides	N1 / N2	F100	≤ 1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800	
		F150	4900, 1.0	4550, 1.0	4300, 1.5	4100, 1.5	3900, 1.5	3750, 1.5	3650, 1.5	3500, 2.0	3400, 2.0	3300, 2.0	3250, 2.0	3150, 2.0	3100, 2.0	
		F200	7050, 1.5	6700, 1.5	6450, 2.0	6250, 2.0	6050, 2.0	5850, 2.5	5650, 2.5	5500, 2.5	5350, 3.0	5200, 3.0	5100, 3.0	4950, 3.5	4850, 3.5	
	N3	F100	8800, 1.5	8450, 2.0	8150, 2.0	7900, 2.5	7700, 2.5	7500, 3.0	7300, 3.0	7150, 3.5	7000, 3.5	6900, 4.0	6800, 4.0	6650, 4.5	6550, 4.5	
		F150	4900, 1.5	4550, 2.0	4300, 2.0	4100, 2.0	3900, 2.5	3750, 2.5	3650, 2.5	3500, 3.0	3400, 3.0	3300, 3.0	3250, 3.5	3150, 3.5	3050, 3.5	
		F200	7050, 2.0	6700, 2.5	6450, 3.0	6250, 3.0	6050, 3.5	5850, 4.0	5650, 4.0	5500, 4.5	5350, 4.5	5200, 5.0	5100, 5.0	4950, 5.5	4800, 5.5	
	N4	F100	8800, 2.5	8450, 3.0	8150, 3.5	7900, 4.0	7700, 4.5	7500, 5.0	7300, 5.0	7150, 5.5	7000, 6.0	6900, 6.5	6800, 6.5	6650, 7.0	6550, 7.5	
		F150	4400, 2.0	4100, 2.5	3850, 2.5	3650, 3.0	3500, 3.0	3300, 3.5	3100, 3.5	2950, 3.5	2850, 4.0	2750, 4.0	2650, 4.0	2550, 4.0	2450, 4.5	
		F200	6800, 3.0	6250, 3.5	5900, 4.0	5600, 4.5	5350, 4.5	5150, 5.0	4900, 5.5	4650, 5.5	4450, 6.0	4300, 6.0	4150, 6.5	4000, 6.5	3850, 6.5	
	2 sides	N1 / N2	F100	8800, 4.0	8450, 4.5	8150, 5.5	7800, 6.0	7450, 6.5	7150, 7.0	6850, 7.5	6550, 7.5	6250, 8.0	6050, 8.5	5800, 8.5	5650, 9.0	5450, 9.5
			F150	4600, 2.0	4250, 2.0	4000, 2.5	3800, 2.5	3650, 3.0	3500, 3.0	3400, 3.0	3250, 3.5	3100, 3.5	2950, 3.5	2850, 4.0	2750, 4.0	2700, 4.0
			F200	7050, 2.5	6600, 3.0	6150, 3.5	5850, 4.0	5600, 4.0	5350, 4.5	5200, 5.0	5000, 5.0	4850, 5.5	4650, 5.5	4500, 6.0	4350, 6.0	4200, 6.0
N3		F100	8800, 3.0	8450, 4.0	8150, 4.5	7900, 5.0	7700, 5.5	7500, 6.0	7200, 6.5	7000, 7.0	6750, 7.5	6500, 7.5	6300, 8.0	6100, 8.5	5900, 8.5	
		F150	3900, 2.5	3650, 3.0	3400, 3.0	3200, 3.5	3000, 3.5	2800, 4.0	2650, 4.0	2550, 4.0	2450, 4.5	2350, 4.5	2250, 4.5	2200, 5.0	2100, 5.0	
		F200	6050, 3.5	5600, 4.0	5250, 4.5	5000, 5.0	4700, 5.5	4400, 6.0	4200, 6.0	4000, 6.5	3800, 6.5	3650, 7.0	3550, 7.5	3400, 7.5	3300, 8.0	
N4		F100	8450, 5.0	7800, 5.5	7350, 6.5	6950, 7.0	6550, 7.5	6200, 8.0	5900, 8.5	5650, 9.0	5400, 9.5	5200, 10.0	5000, 10.0	4800, 10.5	4650, 11.0	
		F150	3400, 3.0	3050, 3.5	2800, 4.0	2600, 4.0	2400, 4.5	2300, 4.5	2150, 5.0	2050, 5.0	1950, 5.5	1850, 5.5	1700, 5.5	1600, 5.5	1500, 5.5	
		F200	5200, 4.5	4800, 5.5	4400, 6.0	4050, 6.5	3800, 7.0	3600, 7.0	3400, 7.5	3250, 8.0	3100, 8.0	3000, 8.5	2900, 9.0	2800, 9.5	2700, 9.5	
3 sides		N1 / N2	F100	7250, 6.5	6750, 7.5	6200, 8.0	5750, 9.0	5350, 9.5	5050, 10.0	4800, 10.5	4600, 11.0	4400, 11.5	4200, 12.0	4050, 12.5	3950, 13.0	3800, 13.5
			F150	4300, 2.0	3950, 2.5	3750, 2.5	3550, 3.0	3400, 3.0	3250, 3.5	3050, 3.5	2950, 3.5	2800, 4.0	2700, 4.0	2600, 4.0	2500, 4.5	2450, 4.5
			F200	6600, 3.0	6100, 3.5	5750, 4.0	5450, 4.5	5200, 4.5	5000, 5.0	4800, 5.5	4600, 5.5	4400, 6.0	4200, 6.0	4050, 6.5	3950, 6.5	3800, 7.0
	N3	F100	8800, 4.0	8450, 4.5	8050, 5.5	7600, 6.0	7250, 6.5	6950, 7.0	6700, 7.5	6450, 8.0	6150, 8.0	5950, 8.5	5750, 9.0	5550, 9.0	5350, 9.5	
		F150	3650, 2.5	3400, 3.0	3150, 3.5	2900, 3.5	2700, 4.0	2550, 4.0	2400, 4.5	2300, 4.5	2200, 5.0	2100, 5.0	2050, 5.0	2000, 5.5	1850, 5.5	
		F200	5650, 4.0	5200, 4.5	4900, 5.5	4550, 5.5	4250, 6.0	4000, 6.5	3800, 7.0	3650, 7.5	3500, 7.5	3350, 7.5	3200, 8.0	3100, 8.0	3000, 8.5	
	N4	F100	7900, 5.5	7300, 6.5	6850, 7.5	6400, 8.0	6000, 8.5	5650, 9.0	5350, 9.5	5100, 10.0	4900, 10.5	4700, 11.0	4550, 11.0	4400, 11.5	4250, 12.0	
		F150	3100, 3.5	2800, 4.0	2550, 4.0	2350, 4.5	2200, 5.0	2100, 5.0	1950, 5.5	1800, 5.5	1650, 5.5	1500, 5.5	1400, 5.5	1300, 5.0	1250, 5.5	
		F200	4850, 5.5	4400, 6.0	4000, 6.5	3700, 7.0	3450, 7.5	3250, 8.0	3100, 8.5	2950, 8.5	2850, 9.0	2700, 9.5	2600, 9.5	2550, 10.0	2400, 10.0	
	F200	6800, 7.0	6200, 8.0	5650, 9.0	5250, 10.0	4900, 10.5	4600, 11.0	4400, 11.5	4200, 12.0	4000, 12.5	3850, 13.0	3700, 13.5	3450, 13.5	3250, 13.5		

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the rafter span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The support reaction is based on 1 purlin span and 2 supports.
- Rafter span = spacing of supports.

Diagram 3B

Rafter supporting two purlins.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 3C

Rafter Span And Reaction, Span Type: Double/Multiple Continuous, Connection: Bolted, Supporting: 1 Purlin, Flat Structure

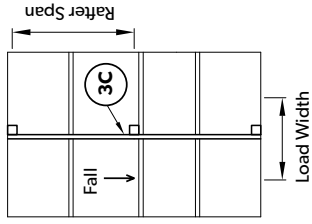
Wind Blocking	Wind Class	Beam Size	Rafter Load Width (mm)												
			≤ 1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800
0/1/4 sides	N1 / N2	F100	6600, 2.5	6300, 3.0	5850, 3.0	5450, 3.5	5100, 3.5	4750, 4.0	4500, 4.0	4300, 4.5	4100, 4.5	3900, 4.5	3750, 4.5	3650, 5.0	3500, 5.0
		F150	9000, 3.0	8600, 3.5	8250, 4.5	8000, 5.0	7700, 5.5	7300, 6.0	6950, 6.0	6650, 6.5	6400, 7.0	6200, 7.0	5950, 7.5	5700, 7.5	5500, 8.0
		F200	11150, 3.5	10750, 4.5	10350, 5.0	10050, 6.0	9800, 6.5	9550, 7.5	9300, 8.0	8950, 8.5	8600, 9.0	8350, 9.5	8050, 9.5	7850, 10.0	7600, 10.5
		F100	6200, 3.5	5600, 4.0	5050, 4.5	4700, 5.0	4350, 5.0	4100, 5.5	3900, 5.5	3700, 6.0	3500, 6.0	3350, 6.5	3250, 6.5	3100, 7.0	3000, 7.0
		F150	9000, 5.0	8350, 6.0	7700, 6.5	7150, 7.0	6750, 8.0	6400, 8.5	6050, 8.5	5750, 9.0	5500, 9.5	5250, 10.0	5050, 10.0	4850, 10.5	4700, 11.0
		F200	11150, 6.0	10750, 7.5	10250, 8.5	9600, 9.5	9050, 10.0	8600, 11.0	8200, 11.5	7900, 12.5	7600, 13.0	7300, 13.5	7100, 14.0	6850, 14.5	6650, 15.0
	N4	F100	5050, 4.5	4450, 5.0	4050, 5.5	3750, 6.0	3500, 6.5	3250, 6.5	3100, 7.0	2950, 7.0	2700, 7.0	2500, 7.0	2350, 7.5	2150, 7.0	2050, 7.5
		F150	7600, 6.5	6900, 7.5	6350, 8.5	5850, 9.0	5450, 9.5	5100, 10.0	4800, 10.5	4550, 11.0	4350, 11.5	4150, 12.0	4000, 12.5	3800, 12.5	3700, 13.0
		F200	10150, 8.5	9250, 10.0	8550, 11.0	8000, 12.0	7550, 13.0	7150, 14.0	6800, 15.0	6550, 15.5	6250, 16.5	5950, 17.0	5750, 17.5	5500, 18.0	5300, 18.5
		F100	5450, 4.0	4850, 4.5	4400, 5.0	4050, 5.5	3800, 6.0	3550, 6.0	3350, 6.5	3200, 6.5	3050, 7.0	2900, 7.0	2750, 7.5	2550, 7.0	2400, 7.5
		F150	8200, 6.0	7400, 7.0	6800, 7.5	6350, 8.5	5950, 9.0	5550, 9.5	5250, 10.0	5000, 10.5	4750, 10.5	4550, 11.0	4350, 11.5	4200, 12.0	4050, 12.0
		F200	10850, 8.0	9900, 9.0	9150, 10.0	8550, 11.0	8100, 12.0	7650, 12.5	7300, 13.5	7000, 14.5	6750, 15.0	6500, 15.5	6250, 16.0	6050, 17.0	5800, 17.0
2 sides	N1 / N2	F100	4250, 5.0	3800, 6.0	3450, 6.5	3150, 6.5	2950, 7.0	2650, 7.0	2400, 7.5	2150, 7.0	2000, 7.5	1850, 7.5	1700, 7.0	1600, 7.0	1500, 7.0
		F150	6600, 8.0	5950, 9.0	5400, 9.5	4950, 10.5	4600, 11.0	4300, 11.5	4050, 12.0	3800, 12.5	3650, 13.0	3450, 13.5	3300, 14.0	3100, 14.0	2900, 14.0
		F200	8900, 10.5	8100, 12.0	7450, 13.0	6950, 14.5	6550, 15.5	6150, 16.5	5800, 17.0	5500, 18.0	5200, 18.5	4800, 18.5	4450, 18.5	4200, 18.5	3900, 18.5
		F100	3450, 6.5	3050, 7.0	2650, 7.5	2250, 7.0	1950, 7.0	1750, 7.0	1600, 7.5	1450, 7.5	1300, 7.0	1200, 7.0	1150, 7.5	1050, 7.0	1000, 7.5
		F150	5350, 9.5	4750, 10.5	4300, 11.5	3900, 12.5	3600, 13.0	3350, 13.5	3100, 14.0	2800, 14.0	2550, 14.0	2350, 14.0	2200, 14.0	2050, 14.0	1950, 14.0
		F200	7450, 13.0	6750, 15.0	6150, 16.5	5650, 17.5	5200, 18.5	4600, 18.5	4150, 18.5	3800, 19.0	3450, 18.5	3200, 18.5	2950, 18.5	2750, 18.5	2600, 18.5
	N1 / N2	F100	4950, 4.5	4400, 5.0	4000, 5.5	3700, 6.0	3400, 6.5	3200, 6.5	3050, 7.0	2850, 7.0	2600, 7.0	2400, 7.0	2250, 7.0	2100, 7.0	1950, 7.0
		F150	7500, 7.0	6800, 7.5	6250, 8.5	5750, 9.0	5350, 9.5	5000, 10.0	4700, 10.5	4500, 11.5	4250, 11.5	4050, 12.0	3900, 12.5	3750, 13.0	3600, 13.0
		F200	10050, 9.0	9100, 10.0	8400, 11.0	7850, 12.5	7400, 13.0	7050, 14.0	6700, 15.0	6450, 16.0	6150, 16.5	5850, 17.0	5600, 17.5	5400, 18.5	5150, 18.5
		F100	3850, 5.5	3450, 6.5	3100, 7.0	2800, 7.0	2450, 7.0	2200, 7.5	1950, 7.0	1800, 7.0	1650, 7.0	1500, 7.0	1400, 7.0	1300, 7.0	1250, 7.5
		F150	6050, 8.5	5350, 9.5	4850, 10.5	4450, 11.5	4100, 12.0	3850, 12.5	3600, 13.0	3400, 13.5	3200, 14.0	2950, 14.0	2750, 14.0	2550, 14.0	2400, 14.0
		F200	8200, 11.5	7450, 13.0	6850, 14.5	6400, 16.0	5950, 17.0	5550, 18.0	5200, 18.5	4700, 18.5	4300, 18.5	4000, 18.5	3700, 18.5	3450, 18.5	3250, 18.5
N4	F100	3100, 7.0	2600, 7.0	2200, 7.5	1850, 7.0	1650, 7.5	1450, 7.0	1300, 7.0	1200, 7.5	1100, 7.5	1000, 7.0	950, 7.5	850, 7.0	800, 7.0	
	F150	4850, 10.5	4250, 11.5	3850, 12.5	3500, 13.5	3200, 14.0	2850, 14.0	2550, 14.0	2300, 14.0	2150, 14.0	1950, 14.0	1800, 13.5	1700, 14.0	1600, 14.0	
	F200	6850, 14.5	6150, 16.5	5550, 18.0	4900, 18.5	4300, 18.5	3850, 18.5	3450, 18.5	3150, 19.0	2850, 18.5	2650, 18.5	2450, 18.5	2300, 18.5	2150, 18.5	

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the rafter span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The support reactions in the above table are based on the reaction in an internal support of a 2 equal continuous span beam with 3 supports. For end posts, multiply the post reaction in tables 3C by 0.4.
- Rafter span = spacing of supports.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 3C

Continuous rafter supporting one purlin.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheathing only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 3D

Rafter Span And Reaction, Span Type: Double/Multiple Continuous, Connection: Bolted, Supporting: 2 Purlins, Flat Structure

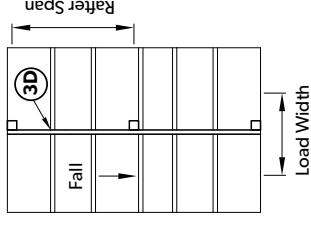
Wind Blocking	Wind Class	Beam Size	Rafter Load Width (mm)												
			≤ 1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800
0/1/4 sides	N1 / N2	F100	6450, 3.0	6050, 3.5	5500, 4.0	5050, 4.0	4700, 4.5	4400, 4.5	4150, 4.5	3950, 5.0	3750, 5.0	3600, 5.5	3450, 5.5	3300, 5.5	3150, 5.5
		F150	8800, 4.0	8400, 4.5	8050, 5.5	7800, 6.0	7350, 6.5	6900, 7.0	6500, 7.5	6200, 7.5	5900, 8.0	5650, 8.5	5400, 8.5	5200, 9.0	5000, 9.0
		F200	10950, 4.5	10500, 5.5	10150, 6.5	9850, 7.5	9550, 8.5	9350, 9.5	9100, 10.0	8850, 11.0	8450, 11.5	8100, 11.5	7750, 12.0	7500, 12.5	7200, 13.0
	N3	F100	6000, 4.5	5300, 5.0	4800, 5.5	4450, 6.0	4100, 6.0	3850, 6.5	3650, 7.0	3450, 7.0	3300, 7.5	3150, 7.5	3000, 8.0	2900, 8.0	2800, 8.0
		F150	8800, 6.5	8350, 7.5	7550, 8.5	6900, 9.0	6400, 9.5	6000, 10.0	5650, 10.5	5350, 11.0	5100, 11.5	4850, 11.5	4650, 12.0	4450, 12.5	4300, 12.5
		F200	10950, 8.0	10500, 9.5	10150, 11.0	9850, 12.5	9250, 13.5	8650, 14.0	8150, 15.0	7700, 15.5	7350, 16.0	7000, 16.5	6700, 17.0	6450, 17.5	6200, 18.0
2 sides	N1 / N2	F100	4750, 5.5	4200, 6.0	3800, 6.5	3500, 7.0	3250, 7.5	3000, 7.5	2850, 8.0	2700, 8.5	2550, 8.5	2450, 9.0	2300, 9.0	2200, 9.5	2150, 9.5
		F150	7450, 8.5	6600, 9.5	5950, 10.0	5450, 11.0	5000, 11.5	4700, 12.0	4400, 12.5	4150, 13.0	3900, 13.0	3750, 13.5	3550, 14.0	3400, 14.5	3250, 14.5
		F200	10500, 11.5	9450, 13.0	8550, 14.5	7850, 15.5	7250, 16.0	6800, 17.0	6400, 18.0	6000, 18.5	5650, 19.0	5250, 19.0	4850, 19.0	4550, 19.0	4250, 19.0
	N3	F100	5200, 5.0	4600, 5.5	4150, 6.0	3800, 6.5	3550, 7.0	3300, 7.0	3100, 7.5	2950, 8.0	2800, 8.0	2700, 8.5	2550, 8.5	2450, 9.0	2350, 9.0
		F150	8150, 8.0	7200, 8.5	6500, 9.5	5950, 10.0	5500, 10.5	5150, 11.0	4850, 11.5	4550, 12.0	4350, 12.5	4150, 13.0	3950, 13.5	3750, 13.5	3600, 14.0
		F200	10950, 10.0	10200, 12.0	9350, 13.5	8600, 14.5	7950, 15.0	7450, 16.0	7000, 16.5	6600, 17.5	6300, 18.0	6000, 18.5	5700, 19.0	5300, 19.0	5000, 19.0
3 sides	N1 / N2	F100	4000, 6.5	3550, 7.0	3200, 7.5	2900, 8.0	2700, 8.5	2500, 8.5	2350, 9.0	2200, 9.5	2100, 9.5	2000, 10.0	1900, 10.0	1800, 10.5	1700, 10.5
		F150	6250, 9.5	5500, 10.5	4950, 11.5	4500, 12.0	4150, 13.0	3850, 13.5	3600, 14.0	3400, 14.5	3200, 15.0	3050, 15.0	2900, 15.5	2750, 16.0	2650, 16.0
		F200	9050, 13.5	7950, 15.0	7200, 16.5	6550, 17.5	6050, 18.5	5550, 19.0	5000, 19.0	4550, 19.0	4150, 19.0	3850, 19.0	3550, 19.0	3300, 19.0	3100, 19.0
	N4	F100	3150, 7.5	2800, 8.0	2500, 9.0	2250, 9.0	2100, 10.0	1900, 10.0	1800, 10.5	1650, 10.5	1500, 10.5	1400, 10.5	1300, 10.5	1200, 10.5	1150, 10.5
		F150	4950, 11.5	4300, 12.5	3850, 13.5	3500, 14.0	3200, 15.0	2950, 15.5	2750, 16.0	2550, 16.5	2400, 16.5	2250, 17.0	2150, 17.5	2000, 17.5	1900, 17.5
		F200	7150, 16.5	6250, 18.0	5500, 19.0	4700, 19.0	4100, 19.0	3650, 19.0	3300, 19.0	3000, 19.0	2750, 19.0	2550, 19.0	2350, 19.0	2200, 19.0	2050, 19.0
3 sides	N1 / N2	F100	4700, 5.5	4150, 6.0	3750, 6.5	3450, 7.0	3150, 7.5	2950, 8.0	2800, 8.0	2650, 8.5	2500, 9.0	2400, 9.0	2250, 9.0	2150, 9.5	2100, 10.0
		F150	7300, 8.5	6450, 9.5	5800, 10.0	5350, 11.0	4900, 11.5	4600, 12.0	4300, 12.5	4050, 13.0	3850, 13.5	3650, 14.0	3500, 14.5	3300, 14.5	3200, 15.0
		F200	10300, 11.5	9300, 13.5	8400, 14.5	7700, 15.5	7150, 16.5	6650, 17.5	6250, 18.0	5900, 19.0	5500, 19.0	5050, 19.0	4700, 19.0	4400, 19.0	4100, 19.0
	N3	F100	3600, 7.0	3200, 7.5	2850, 8.0	2600, 8.5	2400, 9.0	2250, 9.5	2100, 10.0	1950, 10.0	1850, 10.5	1750, 10.5	1600, 10.5	1500, 10.5	1400, 10.5
		F150	5600, 10.5	4950, 11.5	4400, 12.5	4000, 13.0	3700, 14.0	3400, 14.0	3200, 15.0	3000, 15.5	2800, 15.5	2650, 16.0	2500, 16.0	2400, 16.5	2300, 17.0
		F200	8150, 15.0	7150, 16.5	6400, 17.5	5850, 19.0	5150, 19.0	4600, 19.0	4100, 19.0	3750, 19.0	3450, 19.0	3150, 19.0	2950, 19.0	2750, 19.0	2550, 19.0
N4	F100	2850, 8.0	2500, 9.0	2200, 9.5	2000, 10.0	1850, 10.5	1650, 10.5	1500, 10.5	1350, 10.5	1250, 10.5	1150, 10.5	1050, 10.0	1000, 10.5	950, 10.5	
	F150	4400, 12.5	3850, 13.5	3400, 14.5	3050, 15.0	2800, 15.5	2550, 16.0	2400, 17.0	2200, 17.0	2050, 17.0	1900, 17.0	1750, 17.0	1650, 17.0	1550, 17.0	
	F200	6400, 18.0	5500, 19.0	4550, 19.0	3900, 19.0	3400, 19.0	3050, 19.0	2700, 19.0	2450, 19.0	2250, 19.0	2100, 19.0	1950, 19.0	1800, 19.0	1700, 19.0	

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the rafter span in mm, the 2nd value in the table is the tensile reaction (kN) on the support (post).
- The support reactions in the above table are based on the reaction in an internal support of a 2 equal continuous span beam with 3 supports. For end posts, multiply the post reaction in tables 3D by 0.4.
- Rafter span = spacing of supports.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 3D

Continuous rafter supporting two purlins.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 4A

Headbeam Span And Reaction, Span Type: Simply Supported, Connection: Bracket Or Bolted, Supporting: 1 Rafter, Flat Structure

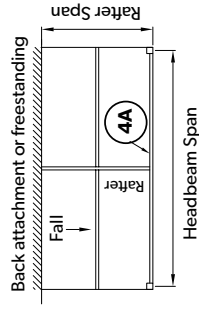
Wind Blocking	Wind Class	Beam Size	Rafter Span (mm)											
			≤ 3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
0/1/4 sides	N1 / N2	F100	4450, 1.0	4300, 1.5	4100, 1.5	4000, 1.5	3850, 1.5	3750, 2.0	3650, 2.0	3550, 2.0	3500, 2.0	3400, 2.0	3350, 2.5	3300, 2.5
		F150	6600, 1.5	6400, 2.0	6250, 2.0	6100, 2.5	5950, 2.5	5800, 2.5	5650, 3.0	5500, 3.0	5400, 3.0	5300, 3.5	5200, 3.5	5100, 3.5
		F200	8250, 2.0	8050, 2.5	7850, 2.5	7700, 3.0	7550, 3.0	7400, 3.5	7250, 3.5	7150, 4.0	7050, 4.0	6950, 4.0	6850, 4.5	6750, 4.5
		N3	4450, 2.0	4300, 2.0	4100, 2.5	4000, 2.5	3850, 2.5	3750, 3.0	3650, 3.0	3500, 3.0	3350, 3.0	3250, 3.5	3150, 3.5	3050, 3.5
	N4	F150	6600, 2.5	6400, 3.0	6250, 3.5	6100, 3.5	5950, 4.0	5800, 4.5	5650, 4.5	5500, 5.0	5300, 5.0	5100, 5.0	4950, 5.5	4750, 5.5
		F200	8250, 3.5	8050, 3.5	7850, 4.0	7700, 4.5	7550, 5.0	7400, 5.5	7250, 5.5	7150, 6.0	7050, 6.5	6950, 7.0	6850, 7.0	6700, 7.5
		F100	4100, 2.5	3850, 3.0	3600, 3.0	3400, 3.0	3200, 3.5	3050, 3.5	2950, 3.5	2800, 4.0	2700, 4.0	2600, 4.0	2550, 4.5	2450, 4.5
		F150	6350, 4.0	6000, 4.5	5650, 4.5	5350, 5.0	5050, 5.0	4800, 5.5	4600, 5.5	4400, 6.0	4250, 6.0	4100, 6.5	4000, 6.5	3850, 6.5
	2 sides	F200	8250, 5.0	8050, 5.5	7850, 6.5	7600, 7.0	7150, 7.0	6800, 7.5	6500, 8.0	6250, 8.0	6000, 8.5	5800, 9.0	5600, 9.0	5400, 9.5
		F100	4350, 2.5	4100, 2.5	3900, 3.0	3700, 3.0	3500, 3.0	3300, 3.5	3200, 3.5	3050, 3.5	2950, 3.5	2850, 4.0	2750, 4.0	2650, 4.0
3 sides	N1 / N2	F150	6600, 3.5	6300, 4.0	6000, 4.0	5750, 4.5	5500, 5.0	5200, 5.0	5000, 5.5	4800, 5.5	4600, 5.5	4450, 6.0	4300, 6.0	4150, 6.0
		F200	8250, 4.0	8050, 5.0	7850, 5.5	7700, 6.0	7550, 6.5	7400, 7.0	7050, 7.5	6750, 7.5	6500, 8.0	6300, 8.0	6050, 8.5	5850, 8.5
		F100	3550, 3.0	3300, 3.5	3050, 3.5	2900, 3.5	2750, 4.0	2600, 4.0	2500, 4.5	2400, 4.5	2300, 4.5	2250, 5.0	2150, 5.0	2100, 5.0
		F150	5600, 4.5	5200, 5.0	4850, 5.5	4550, 5.5	4300, 6.0	4100, 6.5	3950, 6.5	3800, 7.0	3650, 7.0	3500, 7.5	3400, 7.5	3300, 8.0
	N4	F200	7900, 6.5	7350, 7.0	6900, 7.5	6450, 8.0	6100, 8.5	5800, 8.5	5550, 9.0	5350, 9.5	5150, 10.0	4950, 10.0	4800, 10.5	4600, 10.5
		F100	2900, 4.0	2650, 4.0	2500, 4.5	2350, 4.5	2200, 4.5	2100, 5.0	2050, 5.0	1950, 5.5	1800, 5.5	1700, 5.5	1600, 5.5	1500, 5.5
		F150	4550, 5.5	4200, 6.0	3950, 6.5	3700, 7.0	3500, 7.5	3350, 7.5	3200, 8.0	3050, 8.5	2950, 8.5	2850, 9.0	2750, 9.0	2650, 9.5
		F200	6450, 8.0	5950, 8.5	5600, 9.0	5250, 10.0	4950, 10.0	4750, 11.0	4500, 11.0	4350, 11.5	4150, 12.0	4000, 12.5	3900, 13.0	3750, 13.0
	N3	F100	4000, 2.5	3800, 3.0	3550, 3.0	3350, 3.5	3150, 3.5	3000, 3.5	2900, 4.0	2750, 4.0	2650, 4.0	2550, 4.0	2500, 4.5	2400, 4.5
		F150	6200, 4.0	5850, 4.5	5550, 4.5	5250, 5.0	4950, 5.0	4750, 5.5	4550, 6.0	4350, 6.0	4200, 6.0	4050, 6.5	3900, 6.5	3800, 7.0
3 sides	N3	F200	8250, 5.0	8050, 6.0	7800, 6.5	7450, 7.0	7050, 7.5	6700, 7.5	6400, 8.0	6150, 8.5	5900, 8.5	5700, 9.0	5500, 9.0	5300, 9.5
		F100	3250, 3.5	3000, 3.5	2800, 4.0	2650, 4.0	2500, 4.5	2350, 4.5	2250, 4.5	2200, 5.0	2100, 5.0	2050, 5.0	1950, 5.5	1850, 5.5
		F150	5100, 5.0	4700, 5.5	4400, 6.0	4150, 6.5	3900, 6.5	3750, 7.0	3550, 7.0	3450, 7.5	3300, 7.5	3200, 8.0	3100, 8.5	3000, 8.5
		F200	7250, 7.0	6700, 7.5	6250, 8.5	5850, 8.5	5550, 9.0	5300, 9.5	5050, 10.0	4850, 10.5	4650, 11.0	4500, 11.0	4350, 11.5	4200, 12.0
	N4	F100	2600, 4.0	2400, 4.5	2250, 4.5	2150, 5.0	2000, 5.0	1900, 5.5	1750, 5.5	1600, 5.5	1500, 5.5	1400, 5.5	1300, 5.5	1250, 5.5
		F150	4150, 6.5	3800, 6.5	3550, 7.0	3350, 7.5	3200, 8.0	3050, 8.5	2900, 8.5	2800, 9.0	2700, 9.5	2600, 10.0	2500, 10.0	2450, 10.5
		F200	5850, 8.5	5450, 9.5	5050, 10.0	4750, 10.5	4500, 11.0	4300, 12.0	4100, 12.0	3950, 13.0	3800, 13.0	3650, 13.5	3550, 14.0	3400, 14.5
	N3	F100	3250, 3.5	3000, 3.5	2800, 4.0	2650, 4.0	2500, 4.5	2350, 4.5	2250, 4.5	2200, 5.0	2100, 5.0	2050, 5.0	1950, 5.5	1850, 5.5
		F150	5100, 5.0	4700, 5.5	4400, 6.0	4150, 6.5	3900, 6.5	3750, 7.0	3550, 7.0	3450, 7.5	3300, 7.5	3200, 8.0	3100, 8.5	3000, 8.5
		F200	7250, 7.0	6700, 7.5	6250, 8.5	5850, 8.5	5550, 9.0	5300, 9.5	5050, 10.0	4850, 10.5	4650, 11.0	4500, 11.0	4350, 11.5	4200, 12.0

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the headbeam span (mm), the 2nd value in the table is the tensile reaction (kN) on the support (e.g. post).
- The support reaction is based on 1 span and 2 supports.
- Headbeam span = spacing of supports.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 4A

Headbeam supporting one rafter.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 4B

Headbeam Span And Reaction, Span Type: Simply Supported, Connection: Bracket Or Bolted, Supporting: 2 Rafter, Flat Structure

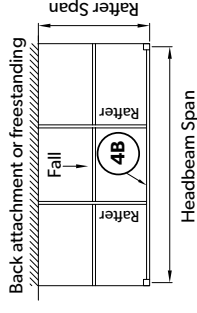
Wind Blocking	Wind Class	Beam Size	Rafter Span (mm)											
			≤ 3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
0/1/4 sides	N1 / N2	F100	4300, 1.5	4100, 1.5	3950, 1.5	3800, 1.5	3700, 2.0	3600, 2.0	3500, 2.0	3400, 2.0	3350, 2.0	3250, 2.5	3200, 2.5	3150, 2.5
		F150	6450, 2.0	6250, 2.0	6100, 2.5	5900, 2.5	5750, 2.5	5600, 3.0	5450, 3.0	5300, 3.0	5200, 3.5	5100, 3.5	5000, 3.5	4900, 4.0
		F200	8100, 2.0	7900, 2.5	7700, 2.5	7550, 3.0	7400, 3.5	7250, 3.5	7100, 4.0	7000, 4.0	6900, 4.5	6800, 4.5	6700, 5.0	6600, 5.0
	N3	F100	4300, 2.0	4100, 2.0	3950, 2.5	3800, 2.5	3700, 3.0	3600, 3.0	3500, 3.0	3400, 3.5	3350, 3.5	3250, 3.5	3200, 4.0	3150, 4.0
		F150	6450, 3.0	6250, 3.5	6100, 3.5	5900, 4.0	5750, 4.5	5600, 4.5	5450, 5.0	5300, 5.0	5200, 5.5	5100, 5.5	5000, 6.0	4900, 6.0
		F200	8100, 3.5	7900, 4.0	7700, 4.5	7550, 5.0	7400, 5.5	7250, 6.0	7100, 6.0	7000, 6.5	6900, 7.0	6800, 7.5	6700, 8.0	6600, 8.0
	N4	F100	4050, 3.0	3850, 3.0	3700, 3.5	3500, 3.5	3300, 4.0	3150, 4.0	3050, 4.0	2900, 4.5	2800, 4.5	2700, 4.5	2600, 4.5	2550, 5.0
		F150	6250, 4.0	5900, 4.5	5650, 5.0	5400, 5.5	5200, 6.0	4950, 6.0	4750, 6.5	4550, 6.5	4400, 7.0	4250, 7.0	4100, 7.5	3950, 7.5
		F200	8100, 5.5	7900, 6.0	7700, 7.0	7550, 7.5	7300, 8.0	7050, 8.5	6750, 9.0	6450, 9.5	6200, 9.5	6000, 10.0	5800, 10.5	5600, 10.5
	2 sides	F100	4300, 2.5	4050, 3.0	3850, 3.0	3700, 3.5	3550, 3.5	3450, 3.5	3300, 4.0	3150, 4.0	3050, 4.0	2950, 4.5	2850, 4.5	2750, 4.5
		F150	6450, 3.5	6200, 4.0	5950, 4.5	5700, 5.0	5500, 5.5	5300, 5.5	5150, 6.0	4950, 6.0	4750, 6.5	4600, 6.5	4450, 7.0	4300, 7.0
	N1 / N2	F200	8100, 4.5	7900, 5.0	7700, 6.0	7550, 6.5	7400, 7.0	7250, 7.5	7100, 8.0	6950, 8.5	6750, 9.0	6500, 9.0	6300, 9.5	6050, 9.5
		F100	3600, 3.5	3400, 3.5	3200, 4.0	3000, 4.0	2850, 4.5	2700, 4.5	2600, 5.0	2500, 5.0	2400, 5.0	2300, 5.5	2150, 5.5	2050, 5.5
		F150	5550, 5.0	5250, 5.5	5000, 6.0	4700, 6.5	4450, 7.0	4250, 7.0	4050, 7.5	3900, 8.0	3750, 8.0	3650, 8.5	3500, 8.5	3400, 9.0
	N3	F200	7750, 7.0	7350, 8.0	7000, 8.5	6700, 9.0	6300, 9.5	6000, 10.0	5750, 10.5	5500, 11.0	5300, 11.0	5100, 11.5	4950, 12.0	4800, 12.5
		F100	3000, 4.5	2750, 4.5	2550, 5.0	2450, 5.0	2300, 5.5	2100, 5.5	1900, 5.5	1750, 5.5	1650, 5.5	1550, 5.5	1450, 5.5	1350, 5.5
		F150	4700, 6.5	4350, 7.0	4050, 7.5	3800, 8.0	3600, 8.5	3450, 8.5	3300, 9.0	3150, 9.5	3050, 10.0	2950, 10.0	2850, 10.5	2700, 10.5
	N4	F200	6650, 9.0	6150, 10.0	5750, 10.5	5400, 11.0	5150, 12.0	4900, 12.5	4650, 12.5	4500, 13.5	4300, 13.5	4150, 14.0	4000, 14.5	3900, 15.0
		F100	3950, 3.0	3750, 3.0	3600, 3.5	3450, 3.5	3250, 4.0	3100, 4.0	3000, 4.5	2850, 4.5	2750, 4.5	2650, 4.5	2600, 5.0	2500, 5.0
		F150	6100, 4.5	5750, 4.5	5500, 5.0	5300, 5.5	5100, 6.0	4900, 6.5	4700, 6.5	4500, 7.0	4350, 7.0	4200, 7.5	4050, 7.5	3900, 7.5
	N3	F200	8100, 5.5	7900, 6.5	7700, 7.0	7350, 7.5	7100, 8.0	6850, 8.5	6600, 9.0	6350, 9.5	6100, 10.0	5900, 10.0	5700, 10.5	5500, 10.5
		F100	3350, 4.0	3100, 4.0	2900, 4.5	2700, 4.5	2600, 5.0	2450, 5.0	2350, 5.5	2200, 5.5	2050, 5.5	1900, 5.5	1800, 5.5	1700, 5.5
	N1 / N2	F150	5150, 5.5	4850, 6.5	4550, 6.5	4250, 7.0	4050, 7.5	3850, 8.0	3700, 8.0	3550, 8.5	3400, 9.0	3300, 9.0	3200, 9.5	3100, 9.5
		F200	7250, 8.0	6850, 8.5	6450, 9.5	6050, 10.0	5750, 10.5	5450, 11.0	5200, 11.5	5000, 12.0	4800, 12.5	4650, 12.5	4500, 13.0	4350, 13.5
		F100	2700, 4.5	2500, 5.0	2350, 5.5	2100, 5.5	1900, 5.5	1700, 5.5	1600, 5.5	1450, 5.5	1350, 5.5	1250, 5.5	1200, 5.5	1100, 5.0
	N4	F150	4250, 7.0	3950, 7.5	3700, 8.0	3450, 8.5	3300, 9.0	3150, 9.5	3000, 10.0	2900, 10.5	2700, 10.5	2500, 10.5	2350, 10.5	2200, 10.5
		F200	6050, 10.0	5600, 11.0	5250, 11.5	4950, 12.5	4650, 13.0	4450, 13.5	4250, 14.0	4050, 14.5	3900, 15.0	3800, 15.5	3650, 16.0	3550, 16.5

Table Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the headbeam span (mm), the 2nd value in the table is the tensile reaction (kN) on the support (e.g. post).
- The support reaction is based on 1 span and 2 supports.
- Headbeam span = spacing of supports.
- Values from 1 sided blocked can be conservatively used for 0 and 4 sides wind blocking.

Diagram 4B

Headbeam supporting two rafters.



General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

Table 5

Attachment Load, Flat Structure

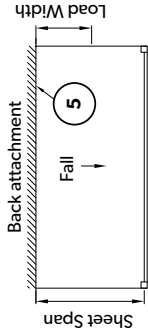
Wind Blocking	Wind Class	Attachment Load Width (mm)												
		≤ 900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500
0/1/4 sides	N1/N2	0.4	0.5	0.6	0.8	0.9	1	1.2	1.3	1.4	1.5	1.7	1.8	1.9
	N3	0.6	0.8	1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2
	N4	0.9	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8
	N1/N2	0.8	1.1	1.4	1.6	1.9	2.2	2.5	2.7	3	3.3	3.6	3.8	4.1
2 sides	N3	1.3	1.7	2.2	2.6	3	3.5	3.9	4.3	4.8	5.2	5.7	6.1	6.5
	N4	2	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2	7.9	8.5	9.2	9.8
3 sides	N1/N2	1	1.3	1.6	2	2.3	2.6	3	3.3	3.6	4	4.3	4.6	5
	N3	1.6	2.1	2.6	3.1	3.7	4.2	4.7	5.2	5.8	6.3	6.8	7.4	7.9
	N4	2.4	3.1	3.9	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11	11.8

Table Notes:

- Attachment load is the uniformly design distributed load in kN/m acting on the attachment structure e.g. existing wall.

Diagram 5

Attachment load.



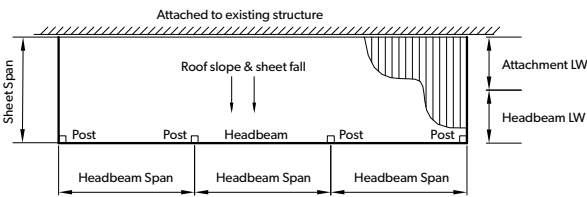
General Notes:

- A simply supported beam means the beam spans between 2 supports (posts or beams).
- A continuous beam means the beam spans past at least 1 internal posts (i.e. beam on 3 or more posts).
- A purlin is a beam which supports sheeting only.
- A rafter runs down the slope (fall) and supports purlins.
- A headbeam supports the lower edge of the roof where the gutter is located.
- The connection column gives how the beam is supported e.g. by a universal bracket bolted to the side of the post or the beam is bolted with the post behind the beam.
- The tables allow for sheet overhang. The sheet overhang is included in the sheet load width.
- The tables and diagrams apply equally to attached or freestanding structures. The tables give the attachment load where applicable.

3.6 TYPICAL FLAT STRUCTURE TYPES

Sample 1

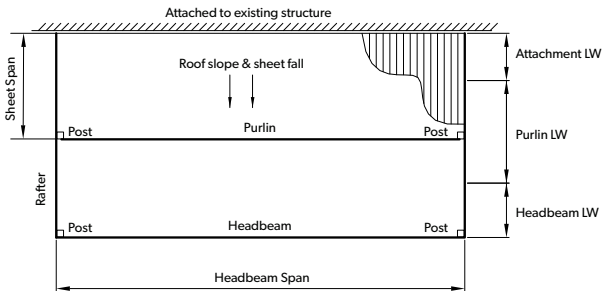
Headbeam, continuous span, sheeting only, attached.



LW = Load Width

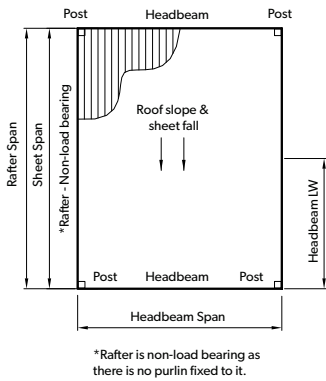
Sample 2

Headbeam, simple span, no intermediate rafters, multiple purlins, attached.



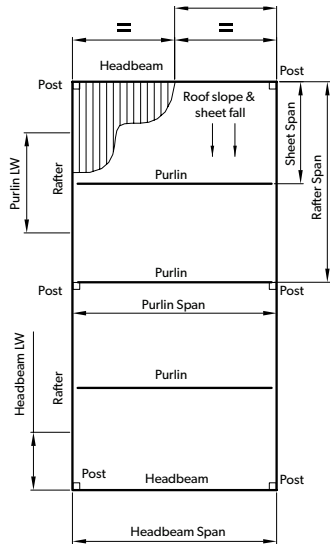
Sample 3

Headbeam, simple span, freestanding.



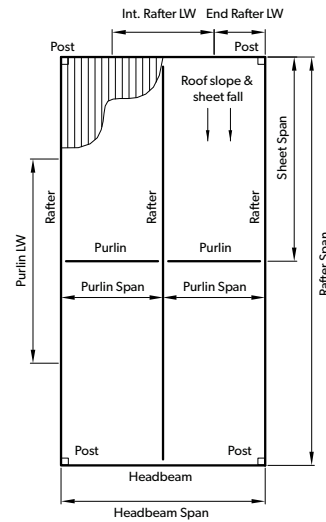
Sample 4

Rafter with multiple purlins, freestanding.



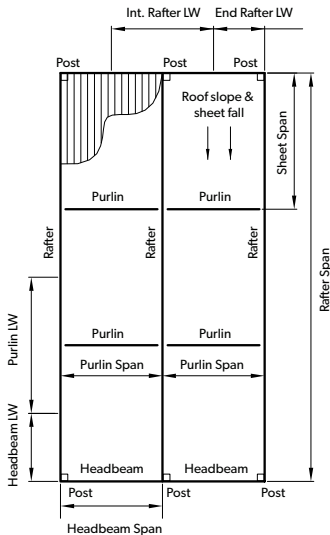
Sample 5

Headbeam supporting rafters, freestanding.



Sample 6

Multiple rafters with multiple purlins, freestanding.



3.7 DESIGN EXAMPLES: FLAT STRUCTURES

EXAMPLES

There are two examples given to show the procedure for designing an awning. Example 1 is a simple attached awning which uses the long spanning capability of FLATDEK® to provide a structure with minimal FIRMLOK® beams.

Example 2 is a bigger freestanding carport with purlins, rafters and headbeams. It has 2 different solutions to illustrate different choices in the awning design configuration.

GENERAL NOTES

The following design parameters are required:

DIMENSIONS

Work out the relevant length, width and height for your structure.

WIND CLASS

Refer to AS4055 or consult your local building authority, engineer or builder to determine if the Wind Category is N1, N2, N3, etc. Refer to the 'Lysaght Design Guide for Wind'.

WIND BLOCKING

From site condition, determine wind blocking (0,1,2,3,4 sides blocked) as defined in Section 1.4.

BEAM CONNECTIONS

Refer to the key diagram and connection details, see different ways to connect FIRMLOK® beams to a support.

ROOF CLADDING

Refer to the cladding selection portion of this guide for claddings and spans. Check sheet overhang if required. Cladding overhang and gutter width must be included in load width calculation when determining beam size and span.

Try out different beam sizes, number of beams and connection types to find the most suitable arrangement for your structure. Interpolation between values of the same category is allowed, in the following examples. For simplicity, the next higher value is used.

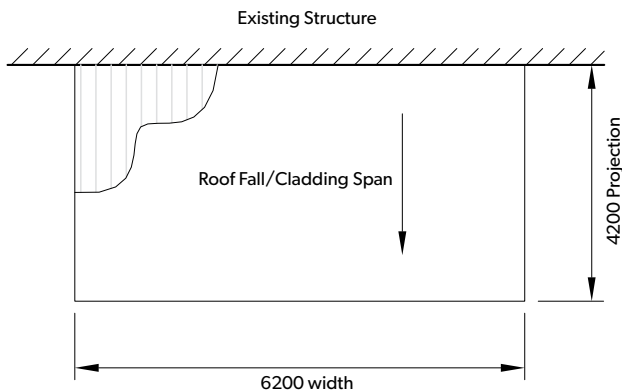
Follow the **Guide** for the design process detailed here.

EXAMPLE 1:

A SIMPLE FLAT AWNING ATTACHED TO THE BACK OF AN EXISTING DWELLING.

Design parameters:

- Wind Class: N3 (W41N)
- Wind Blocking: 1 side blocked
- Projection: 4200
- Width: 6200
- Cladding: No foot traffic, No overhang
- Connection: Beam to side of post



STEP 1: SELECT CLADDING

Refer to roof sheeting span table for wind class N3, 1 side blocked. An economical solution is to try a long span sheeting like FLATDEK® so no purlins or rafters are required. FLATDEK® 0.42mm spans a distance of 4500mm for single/continuous span with no foot traffic, thus FLATDEK® 0.42mm can be used with only a headbeam for the awning. This is a "No Foot Traffic" solution.

STEP 2: DETERMINE BEAM LOAD WIDTH

Half the wind load on the sheeting is taken at the house and the headbeam.

The beam load width is calculated as follows:

Half sheet span $4200 / 2 = 2100$,
 sheeting overhang = 0,
 total load width = $2100 + 0 = 2100$ mm

STEP 3: DETERMINE BEAM SIZE

Refer to the Beam Table Index for the headbeam tables for 1 span simply supported with connection type: Beam to side of post; refer to **Table 2A**. For an awning width = 6200mm, headbeam load width = 2100 mm, wind class: N3 and wind blocking: 1 side blocked, the following beam spans are:

Beam	Span (mm)
F100	4050 < 6200 Not OK
F150	6250 > 6200 OK
F200	7900 > 6200 OK

Minimum suitable beam size is a F150 beam; adopt a F150 for headbeam. Edge beams are optional at the sides of the awning; they don't carry any load. For uniform appearance, use the same size edge beam as the headbeam; for minimum cost, use a F100 beam.

Posts:

The value next to the beam span in the tables is the reaction (load) at the end of the beam acting on the post. This value can be used to design the post. The wind uplift reaction on the post in this example is 5 kN. Please refer to post manufacturer's data for post capacity.

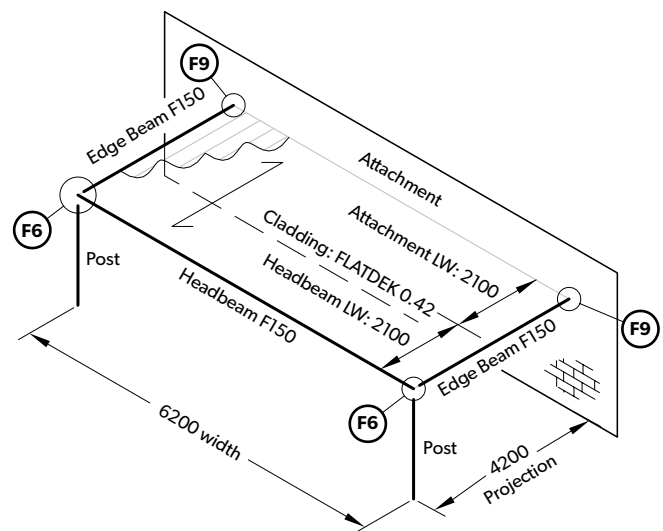
STEP 4 DETERMINE ATTACHMENT LOAD

Use Table 5 to determine the load from the awning transferred to the attached structure. The attachment load is assumed to be uniformly distributed along the attached structure. The attachment load width: $4200\text{mm} / 2 = 2100\text{mm}$. For N3 & 1 side blocked, the attachment load is 1.5 kN/m. Use this load to check the attachment member e.g. receiver channel or beam, the fixings and the supporting structure e.g. wall or fascia and house rafters.

STEP 5 CONNECTION DETAILS

Since the Beam to side of post connection was chosen for the awning, refer to connection F6 for Beam to side of post corner detail and F9 for Beam to attachment detail.

DESIGN OUTCOME



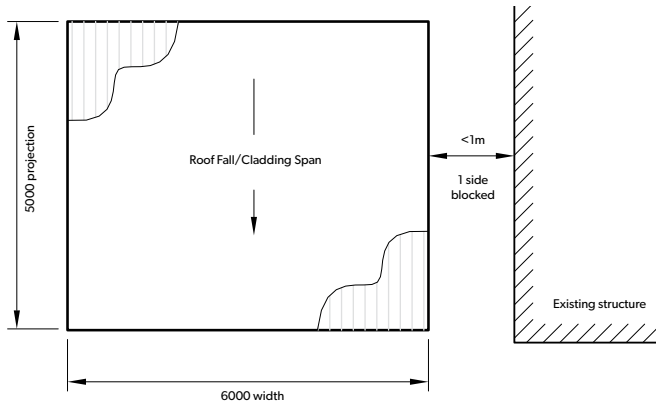
EXAMPLE 2:

A SIMPLE FREE STANDING AWNING NEXT TO AN EXISTING DWELLING.

Design parameters:

- Wind Class: N3 (W41N)
- Wind blocking: 2 sides blocked
- Projection: 6000
- Width: 5000
- Cladding: SPANDEK® 0.42mm, Cladding overhang 0mm
- Connection: Use post behind beam

FREE STANDING AWNING



STEP 1: SELECT CLADDING

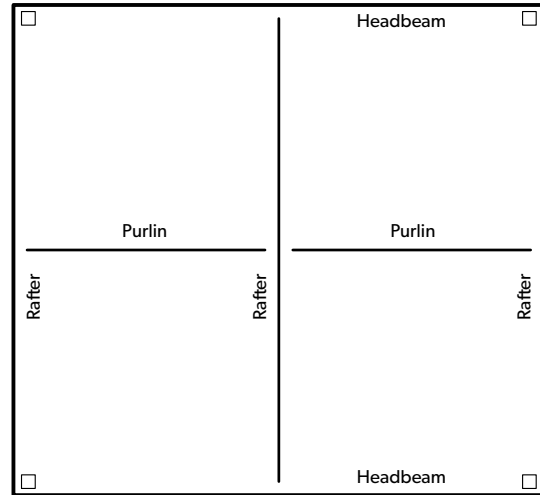
For this example, SPANDEK® 0.42mm was chosen. The cladding span tables for N4 wind with 1 side blocked shows that SPANDEK® can span 3000 mm. The awning projection is 5000 mm, hence the number of purlin spacings is: $5000 / 3000 = 1.67$ i.e. 2 spaces; therefore try 1 intermediate purlin.

STEP 2: DETERMINE PURLIN SIZE

Refer to **Table 1** to look up purlin size and span. The Load width for the purlin is $5000 / 2 = 2500$ hence use 2700 mm without interpolation. In this example, at least 1 row of purlins is required. For N3 and wind blocking on 2 sides, the following single spans are:

Beam	Span (mm)
F100	2600 < 6000 Not OK
F150	4100 < 6000 Not OK
F200	5850 < 6000 Not OK

For a single purlin span arrangement, no span is suitable. Let's add an intermediate rafter to support the purlin and shorten the purlin span. Now the purlin span is $6000 / 2 = 3000$. F150 can span $4100 > 3000$ mm, OK.



2 purlins supported by an intermediate rafter.

Another possible solution is to add an extra row of purlins to reduce the load carried by each purlin. This will be explored as an option later.

STEP 3: DETERMINE RAFTER SIZE

Refer to the Beam Table Index for the rafter tables. For 1 span simply supported with a connection type: Post behind beam and supporting 1 row of internal purlins, refer to **Table 3A**.

Intermediate Rafter:

Awning width = 6000 mm, intermediate rafter load width = $6000 / 2 = 3000$ hence use 3000 mm. For Wind Class: N3 and wind blocking on 2 sides, the following rafter spans are:

Beam	Span (mm)
F100	2400 < 5000 Not OK
F150	3900 < 5000 Not OK
F200	5400 > 5000 OK

Minimum suitable rafter size is a F200 beam. Adopt F200 for the rafter.

End Rafter:

Awning width = 6000 mm, perimeter rafter load width = $6000 / 4 = 1500$ hence use 1500 mm.

The available rafter spans are:

Beam	Span (mm)
F100	3550 < 5000 Not OK
F150	5450 > 5000 OK
F200	7400 > 5000 OK

Minimum suitable rafter size is a F150 beam. For economy use a F150.

For universal appearance use a F200 beam since intermediate rafter size is a F200. The reaction is 3 kN.

STEP 4: DETERMINE HEADBEAM SIZE

The front and back headbeams are supporting one internal rafter, therefore use **Table 4A** to find the beam size and span. Note this table is different to headbeam Tables 2A, 2B & 2C, because these tables are designed to only carry load directly from the sheeting. For N3 wind, 2 sides blocked and supporting 1 internal rafter with a span of 5000 mm (use rafter span = 5000 mm), the following headbeam spans are:

Beam	Span (mm)
F100	2750 < 6000 Not OK
F150	4300 < 6000 Not OK
F200	6100 = 6000 OK

The only suitable headbeam size is a F200 beam; therefore adopt a F200 for the headbeam. The reaction is 8.5 kN.

Posts:

The value next to the span in the tables is the reaction load acting on the support of the beam ie. the post. This value together with the load from the headbeam can be used to design the post and footings. The total uplift load on the post is: $8.5 + 3 = 11.5$ kN.

This is conservatively high as the reaction load in the tables is for the maximum span of the beam. A more economical post and footing design can be considered by scaling down the reactions based on the ratio of actual span to maximum span; so the uplift load becomes:

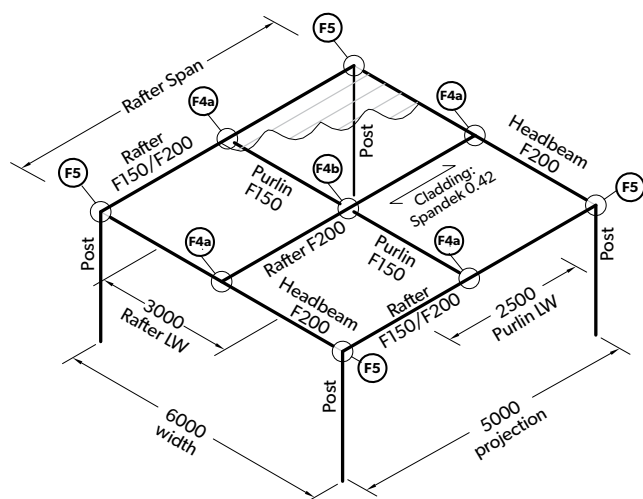
$$3 \times 5000 / 5450 + 8.5 \times 6000 / 6100 = 11.1 \text{ kN (1.11 tonnes)}$$

The post and footing should be designed for these loads and any horizontal wind loads.

STEP 5 CONNECTION DETAILS

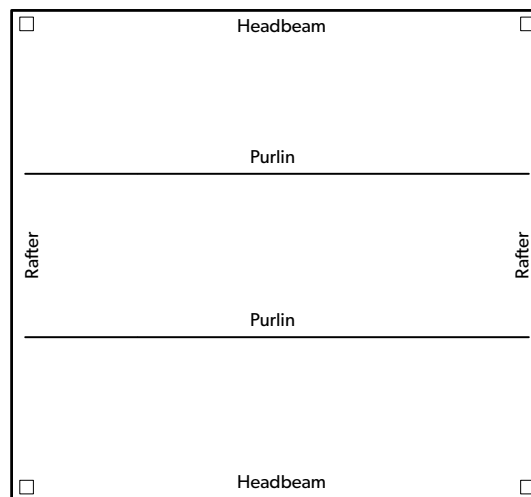
Since a 'post behind beam' connection was selected for the awning, refer to Connection F4 for beam to beam details and connection F5 for corner details.

DESIGN OUTCOME:



ALTERNATE DESIGN: EXAMPLE 2

No intermediate rafter and 1 more purlin



STEP 2 DETERMINE PURLIN SIZE

Continuing from the end of Step 1 in the previous design, now try 2 rows of purlins with no intermediate rafter. Refer to **Table 1** to lookup the purlin size and span. In this case the purlin load width is reduced to $5000 / 3 = 1667$, hence use 1800 mm.

For N3 and 2 sides wind blocking, the following spans are:

Beam	Span (mm)
F100	3200 < 6000 Not OK
F150	5050 < 6000 Not OK
F200	7050 > 6000 OK

The only suitable purlin size is a F200 beam; therefore adopt a F200 for the purlin.

STEP 3 DETERMINE RAFTER SIZE

For 1 rafter with connection type: 'Post behind beam' and supporting 2 purlins, refer to **Table 3B**. For awning projection = 5000, the rafter load width = $6000 / 2 = 3000$, hence use 3000 mm.

For wind class: N3 and wind blocking: 2 sides blocked, the following rafter spans are:

Beam	Span (mm)
F100	2650 < 5000 Not OK
F150	4200 < 5000 Not OK
F200	5900 > 5000 OK

The only suitable beam size is a F200 beam; therefore adopt a F200 for the rafter.

STEP 4 DETERMINE HEADBEAM SIZE

In this design, the head beams are not supporting an internal rafter. The headbeam load width is $(5000 / 3) / 2 = 833$, hence use min. 900mm. For N3 wind, 2 sides blocked, single span headbeam and 'post behind beam' connection, use **Table 2B** to find headbeam size and span.

The available choices are:

Beam	Span (mm)
F100	4150 < 6000 Not OK
F150	6400 > 6000 OK
F200	9000 > 6000 OK

Minimum suitable headbeam size is a F150 beam. For economy, use a F150; for aesthetic appearances use a F200, since the rafter size is a F200.

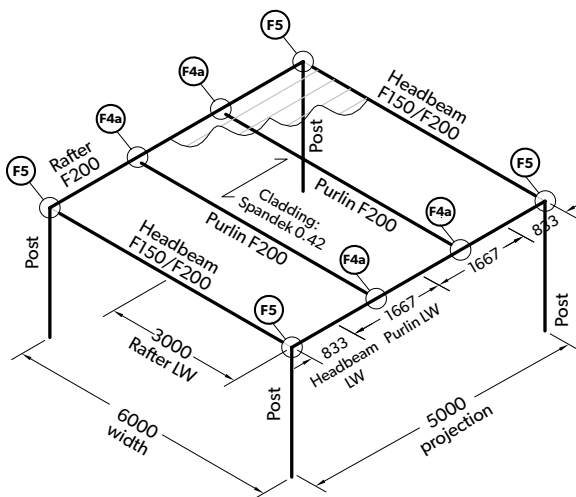
Posts:

The post load is the same as in the previous example.

STEP 5 CONNECTION DETAILS

Since 'Post behind beam' connection was selected for the awning, refer to connection F4 for beam to beam details and connection F5 for the corner beam and post details.

DESIGN OUTCOME:



Note:

Since the purlin spacing is reduced, other claddings could be used. TRIMDEK® has a walkable span of 2000 and SPANDEK® has a walkable span of 1500. Both profiles can take the wind load so there is a choice of sheeting. Based on this, if the roof will be walked on for maintenance then TRIMDEK® should be used. If SPANDEK® is used then the "No Foot Traffic" sign should be fixed to the inside of the headbeams.

PART C

4.0 Pitched Structures

4.1 TABLES FOR PITCHED STRUCTURES

There are 4 rafter load width tables for portal frame and collar-tie rafters for 15° and 22.5° roof pitches.

The tables are used to give the load width of FIRMLOK rafters for different wind classifications, wind blocking and rafter spans. Similarly 2 purlin span tables are provided for pitched structure using similar selection criteria.

EXTRACTION FROM A LOAD WIDTH TABLE

Wind Class	Wind Blocking	Rafter Size	Span (mm) 5000		
No. of int. purlins			0	1	2+
N3	0/1/4 sides	F100	2030	1540	1540
		F150	3950	3150	3390
		F200	5620	5430	6050

The clear span of the rafter/truss between supports.

No. of internal purlins between the eave and apex. For more than 2 int. purlins, select 2+ values.

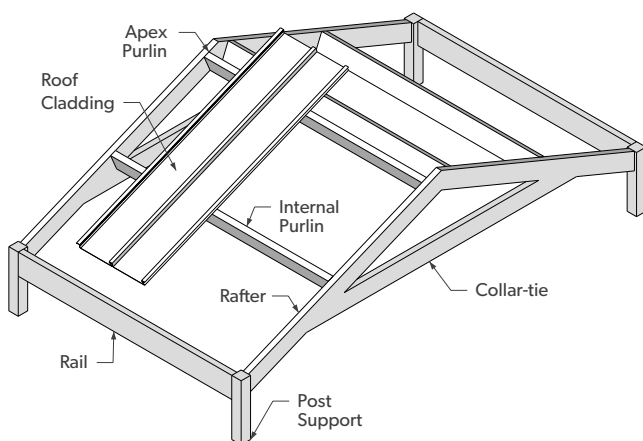
Tributary load width of the rafter/truss frame, see load width tables for more details.

PITCHED STRUCTURES TABLE INDEX

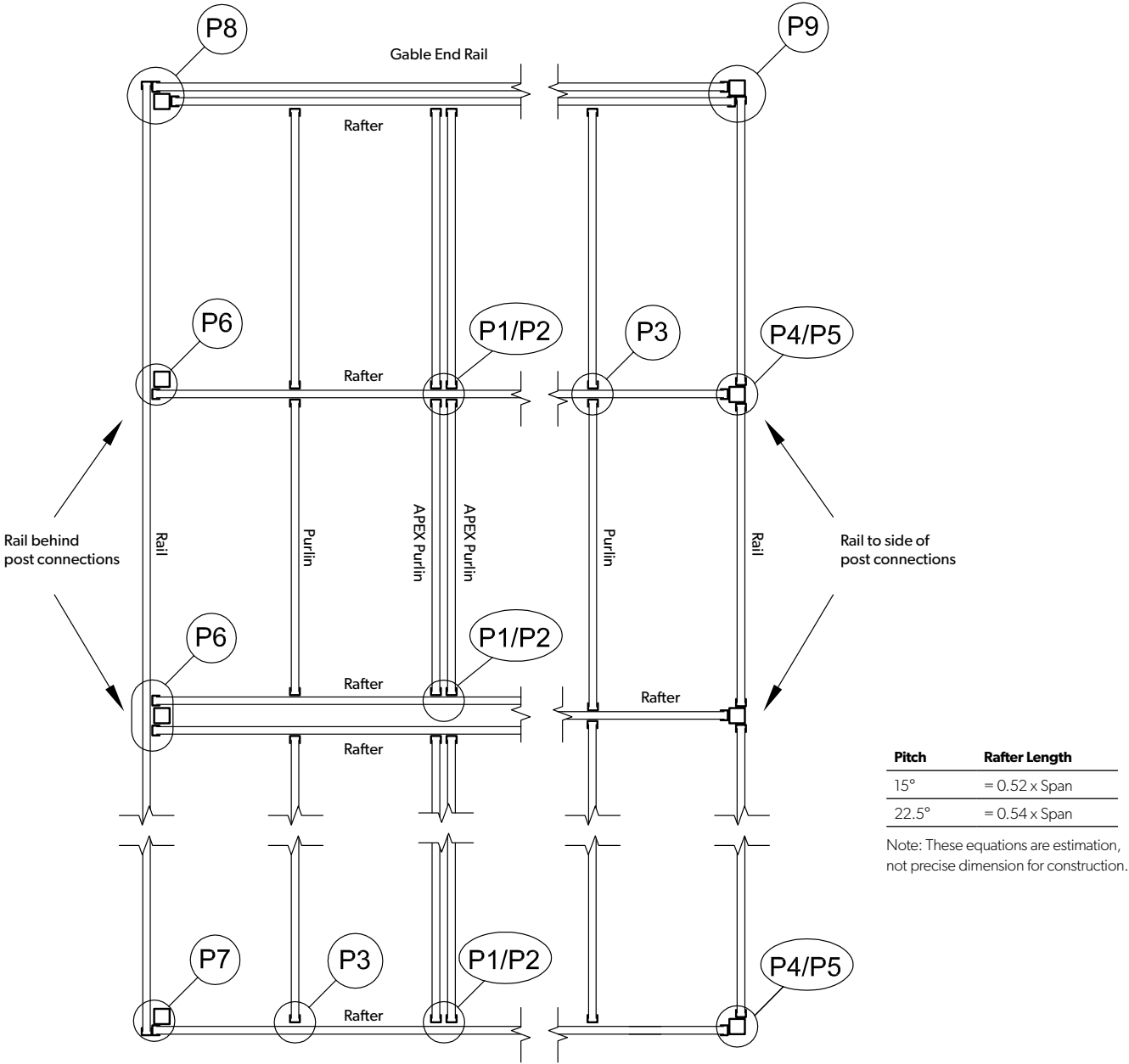
Table	Roof Pitch	Structural Member	Supporting
6A	15°	Collar-tie truss	0, 1, 2+ purlins
6B	22.5°	Collar-tie truss	0, 1, 2+ purlins
7A	15°	Portal frame rafter	0, 1, 2+ purlins
7B	22.5°	Portal frame rafter	0, 1, 2+ purlins
8A	15°	Purlin	Sheeting
8B	22.5°	Purlin	Sheeting

Note: For rail size refer to Pitched structures- component Combination on page 34.

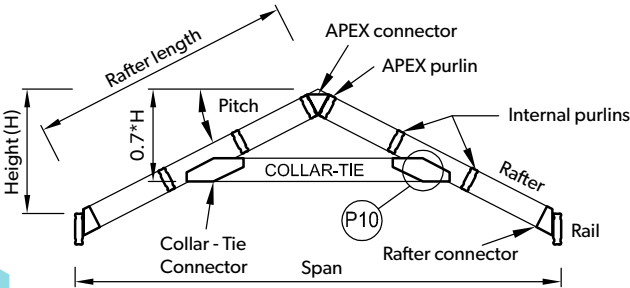
BASIC TERMINOLOGY



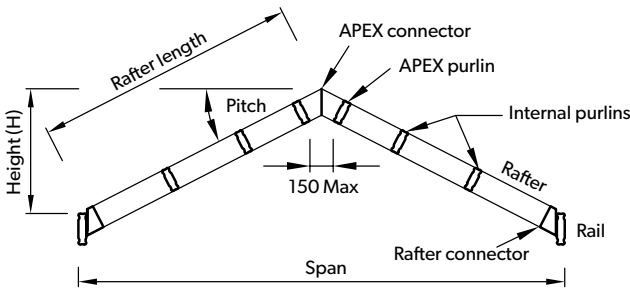
4.2 KEY PLAN FOR PITCHED STRUCTURES



Typical Collar-Tie Truss Elevation



Typical Portal Frame Rafter Elevation



PITCHED STRUCTURES COMPONENT COMBINATIONS (15° & 22.5°)

COLLAR TIE TRUSS

Rafter	Collar Tie	Purlin	Rail	Apex Connector	
				15°	22.5°
F10011	F10011	F10011	F15015, F20020	FLAB	DELTA/ FLAB
F15015	F15015	F10011, F15015	F20020	FLAB	DELTA/ FLAB
F20020	F15015	F15015, F20020	F20020	FLAB	FLAB

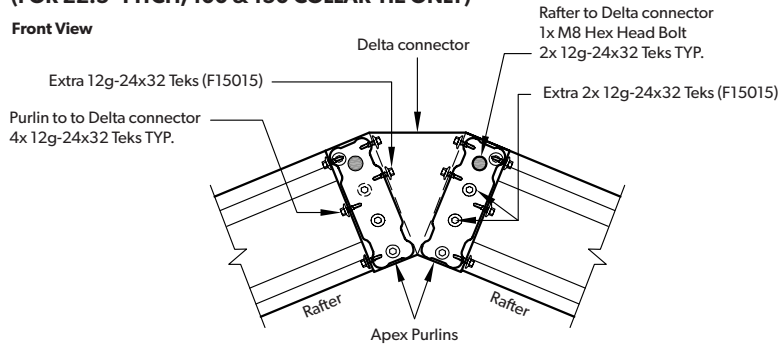
PORTAL FRAME RAFTER

Rafter	Purlin	Rail	Apex Connector	
			15°	22.5°
F10011	F10011	F15015, F20020	FLAB	FLAB
F15015	F10011, F15015	F20020	FLAB	FLAB
F20020	F15015, F20020	F20020	FLAB	FLAB

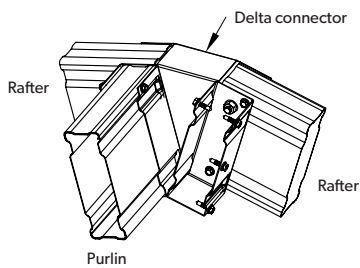
4.3 CONNECTION DETAILS

P1 APEX CONNECTION - INTEGRATED DELTA CONNECTOR (FOR 22.5° PITCH, 100 & 150 COLLAR-TIE ONLY)

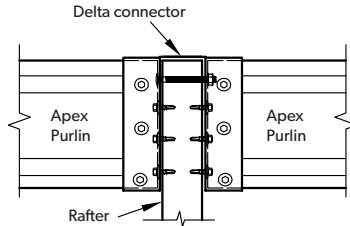
Front View



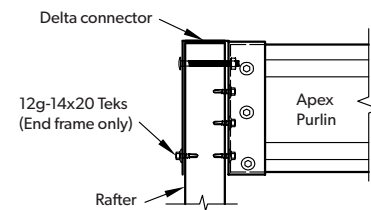
Isometric View



INTERNAL FRAME
Side View

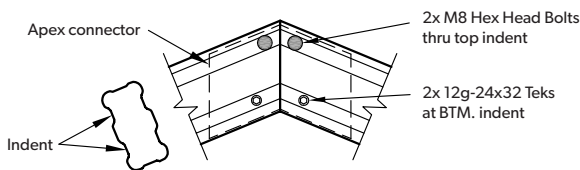


END FRAME
Side View

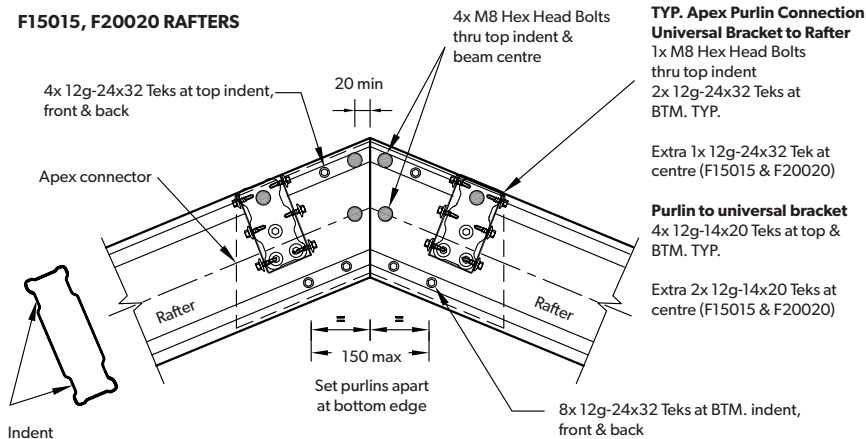


P2 APEX CONNECTION

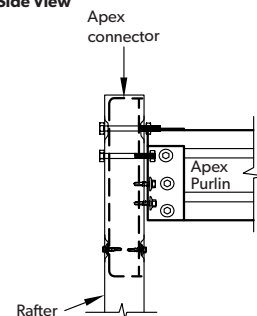
F10011 RAFTER ONLY
Front View



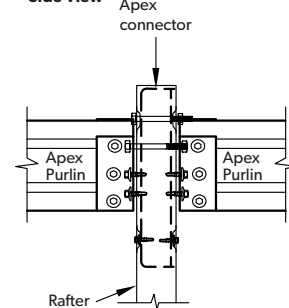
F15015, F20020 RAFTERS



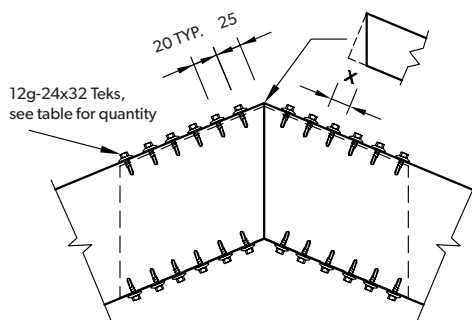
END FRAME
Side View



INTERNAL FRAME
Side View



FIXING AT TOP & BTM FLANGES TYP.



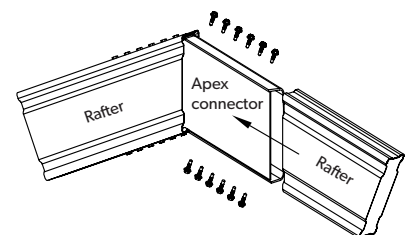
NO. OF SCREW/FLANGE

Rafter Size	Collar Tie	Portal Frame	Total
F10011	3	5	12, 20
F15015	5	5	20
F20020	6	6	24

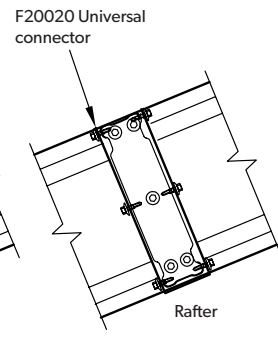
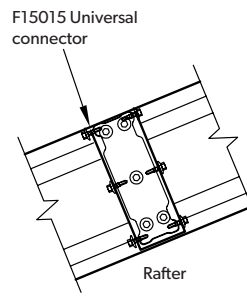
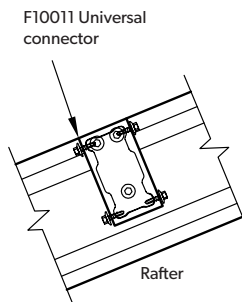
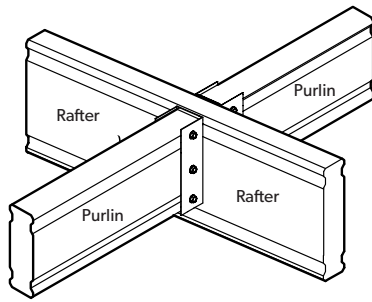
MITRE CUT LENGTH 'X'

Rafter Size	Roof Pitch	
	15°	22.5°
F10011	27	41
F15015	40	61
F20020	54	82

Isometric View



P3 INTERNAL PURLIN CONNECTION



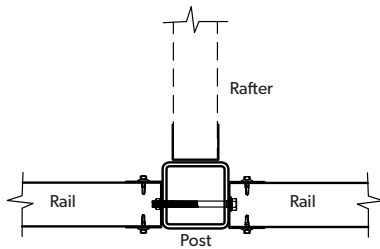
NO. OF FASTENERS IN CONNECTION

Purlin Size	Purlin to UNI. connector	UNI. connector to rafter
F10011	4	3
F15015	6	5
F20020	6	5

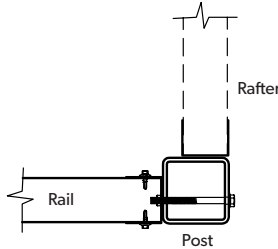
Fastener: 12g-14x20 Tek.

P4 RAIL TO SIDE OF POST CONNECTION

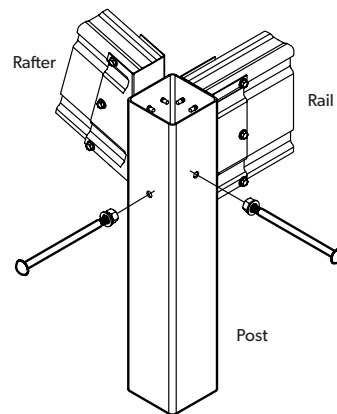
INTERNAL FRAME (RAIL TO POST)
Top View



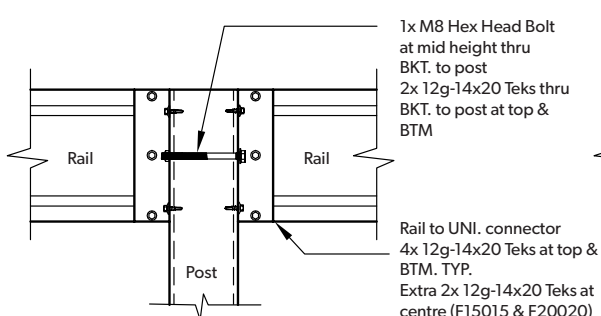
END FRAME (RAIL TO POST)
Top View



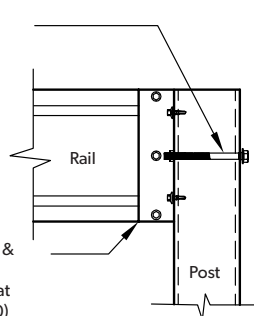
Isometric View



INTERNAL FRAME
Front View



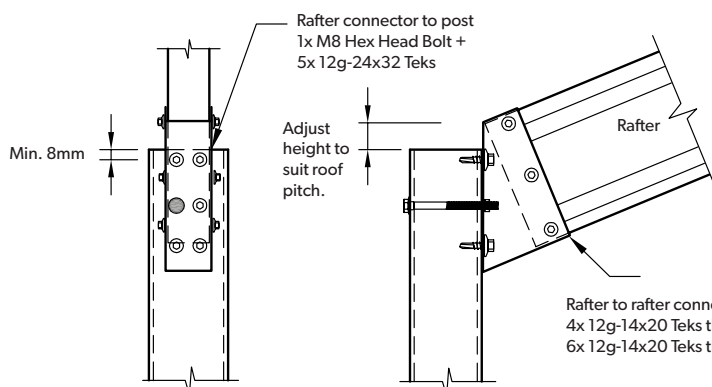
END FRAME
Front View



P5 RAFTER TO POST CONNECTION

Back View

Side View

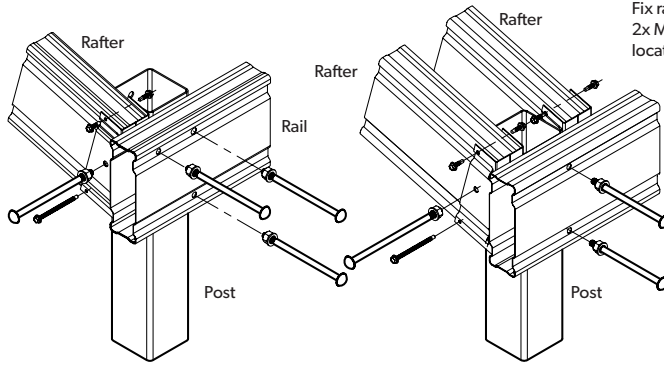


General Note:

1. All screws are self drilling metal hex head Tek® 12g-14x20 ie. 12 gauge with 14 TPI, 20 long U.N.O Values given are: gauge - threads per inch x length in mm. Tek is a registered trademark of Buildex.
2. The finish for all Tek is Coating Class 4.
3. All bolts are galvanised M8 steel, Grade 4.6 snug-tight U.N.O.
4. Bolts are either hex head or cuphead; see connection details.
5. Use Nylock nut and washer.

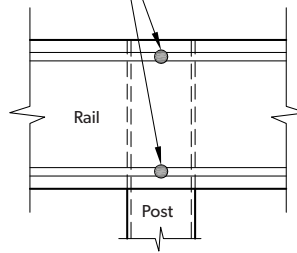
P6 POST BEHIND RAIL CONNECTION

Isometric View



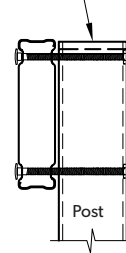
Front View

Fix rail to post with 2x M10 Cuphead Bolts located at beam indents



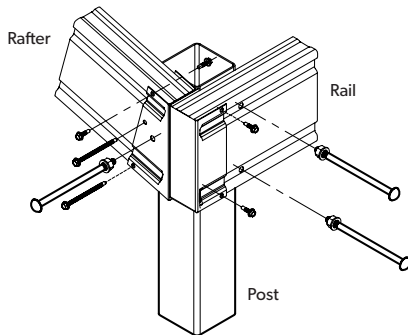
Side View

Post cap may be required to prevent enclosing of post top end (not supplied)

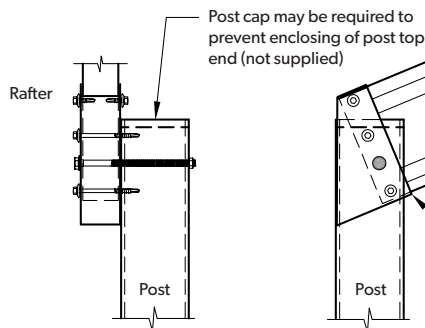


P7 RAFTER TO SIDE OF POST CONNECTION

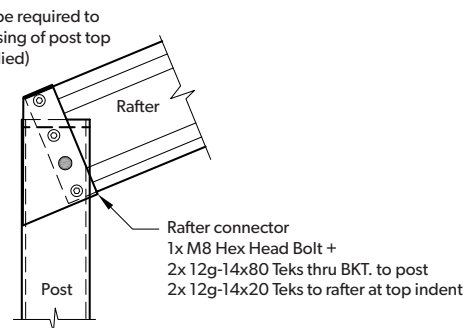
Isometric View



Front View

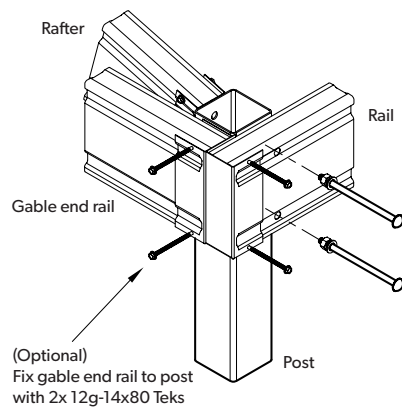


Side View



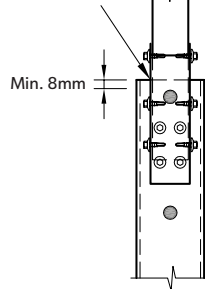
P8 RAFTER TO POST CONNECTION WITH RAIL BEHIND POST

Isometric View



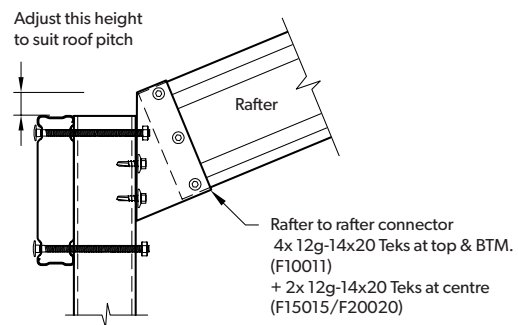
Front View

Rafter connector to post
2x M8 Hex Head Bolt thru rail & post to flub BKT.
+ 4x 12g-24x32 Tek

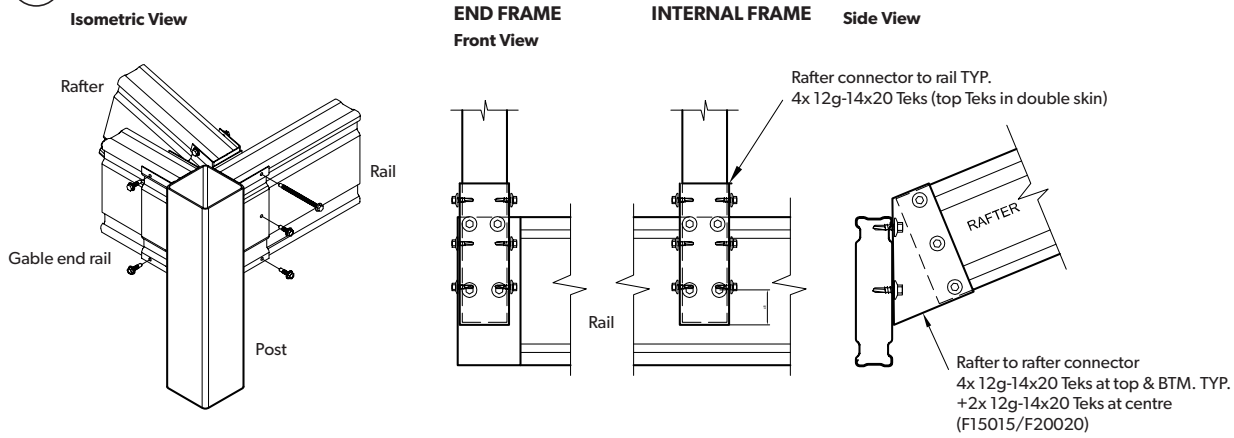


Side View

Adjust this height to suit roof pitch

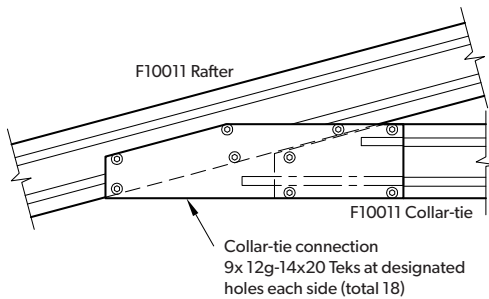


P9 RAFTER TO RAIL CONNECTION

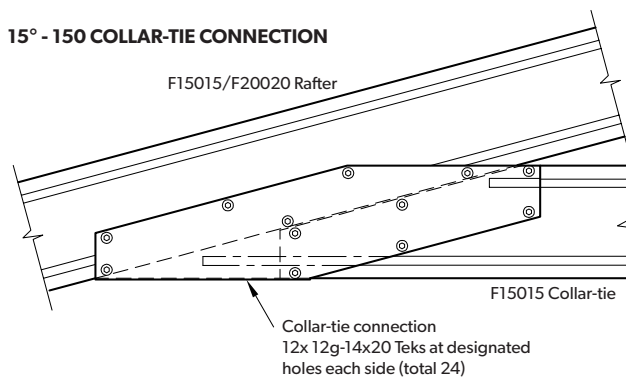


P10 COLLAR-TIE TO RAFTER CONNECTION

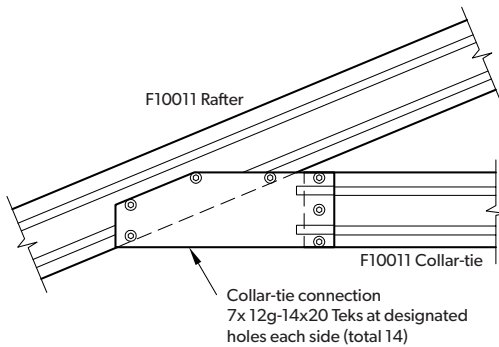
15° - 100 COLLAR-TIE CONNECTION



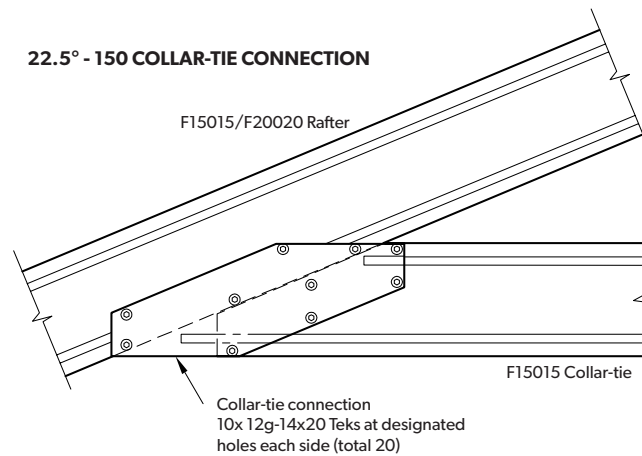
15° - 150 COLLAR-TIE CONNECTION



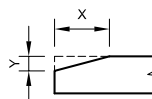
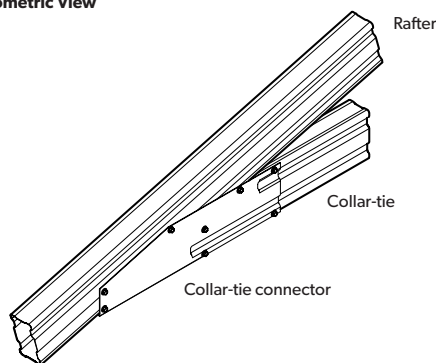
22.5° - 100 COLLAR-TIE CONNECTION



22.5° - 150 COLLAR-TIE CONNECTION



Isometric View



COLLAR-TIE NOTCH CUT LENGTHS

Collar-tie size	Roof Pitch			
	15°		22.5°	
	X	Y	X	Y
F10011	146	40	-	-
F15015	321	87	220	93

Note: These dimensions are estimation, check fit-ness before cutting.

4.4 QUICK SELECTION TABLES

TABLE 6A

Collar-Tie Truss Load Width (mm), Roof Pitch: 15°

Wind Blocking	Wind Class	Rafter Size	Span (mm)						4000			5000			6000			7000			8000			9000			10000			11000		
			≤3000		0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	
No. of int. purlins	0/1/4 sides	F10			6000	6000	4150	4270	4020	2910	2910	2180	2180	1650	1320	1320	1320															
		F150		7500	7500	7500	7500	6230	6430	5950	4520	4690	4590	3590	3660	3200	2890	2950	2010	2060	2120	1400	1450	1450				1000	1050	1050		
		F200		9000	9000	9000	9000	9000	9000	8460	8880	8630	8460	6610	3830	3960	3960	2510	2620	2620	1660	1710	1710				1140	1180	1180			
	N3	F100		5900	4400	4610	3620	2650	2730	2570	1860	1860	1930	1390	1390	1370	1100	1050	840													
		F150		7500	7500	7500	7500	5870	6190	5210	3990	4120	3810	2890	3000	2940	2290	2340	2050	1850	1890	1280	1320	1350	900	930	930	640	670	670		
	N4	F200		9000	9000	9000	8120	8450	8530	6560	6820	6890	5520	5410	5680	4040	4040	4230	2450	2530	2530	1600	1680	1680	1060	1090	1090	730	760	760		
	2 sides	N1 / N2	F100		6000	5030	5190	4150	3010	3140	2910	2110	2210	2180	1590	1590	1580	1220	1220	940	1000	940										
			F150		7500	7500	7500	7500	6660	7040	6030	4520	4720	4360	3350	3430	3370	2650	2650	2320	2130	2130	1450	1500	1500	1000	1050	1050	730	730	770	
F200		9000	9000	9000	9000	9000	9000	9000	9000	7540	7840	7940	6280	6200	6540	4670	4670	4880	2760	2890	2950	1840	1900	1950	1200	1250	1250	820	860	860		
N3		F100		4290	3210	3320	2650	1930	2010	1860	1350	1410	1390	1010	1010	1010	780	780	600	640	600											
		F150		7500	6650	6970	5790	4260	4500	3860	2890	3020	2790	2140	2200	2160	1700	1700	1480	1360	1360	930	960	960	640	670	670					
F200		7940		8150	8260	5950	6190	6270	4820	5020	5080	4020	3970	4180	2980	2980	3120	1770	1850	1890	1180	1210	1250	770	800	800	520	550	550			
3 sides		N4	F100		2880	2160	2230	1780	1290	1350	1250	900	950	930	680	680	670	520	520													
			F150		5400	4470	4680	3890	2860	3020	2590	1940	2030	1870	1440	1470	1450	1140	1140	1000	910	910	620	640	640							
	F200	5330		5480	5550	4000	4160	4210	3240	3370	3410	2700	2660	2810	2000	2000	2100	1180	1240	1270	790	810	840	510	540	540						
	N1 / N2	F100		5700	4190	4520	3520	2510	2640	2510	1810	1810	1840	1340	1340	1360	1070	1000	810	810	810											
		F150		7500	7500	7500	7500	5650	6030	5130	3820	4020	3680	2850	2930	2870	2220	2290	2010	1820	1820	1220	1280	1280	850	900	900	590	640	640		
	F200	9000		9000	9000	9000	7920	8170	8300	6340	6640	6740	5360	5280	5530	3950	3950	4090	2380	2450	2450	1560	1620	1620	1000	1050	1050	680	730	730		
	N3	F100		3640	2680	2890	2250	1600	1690	1600	1150	1150	1180	850	850	870	680	640	520	520	520											
		F150		6760	5680	6010	4910	3620	3860	3280	2440	2570	2360	1820	1870	1830	1420	1470	1280	1160	1160	780	820	820	540	570	570					
F200	6650		6860	6970	5070	5230	5310	4120	4250	4310	3430	3380	3540	2520	2520	2620	1520	1560	1560	1000	1030	1030	640	670	670							
N4	F100		2450	1800	1940	1510	1080	1130	1080	770	770	790	570	570	580																	
	F150		4540	3820	4030	3290	2430	2590	2200	1640	1730	1580	1220	1260	1230	950	980	860	780	780	520	550	550									
F200		4470		4610	4680	3400	3510	3560	2760	2850	2890	2300	2270	2370	1690	1690	1760	1020	1050	1050	670	690	690									

Notes:

- For intermediate span, use interpolation between the values of the same category.
- The values in the table are the maximum design load width in mm.
- Do not use these tables for the design of truss/rafter in roof pitch other than 15 degrees.
- For truss/rafter with 2 or more rows of internal purlins on each side of ridge, select load width in the "2+" columns.
- For truss with F150/F200 rafters, use F150 collar-tie, for F100 rafter, use F10011 collar-tie.

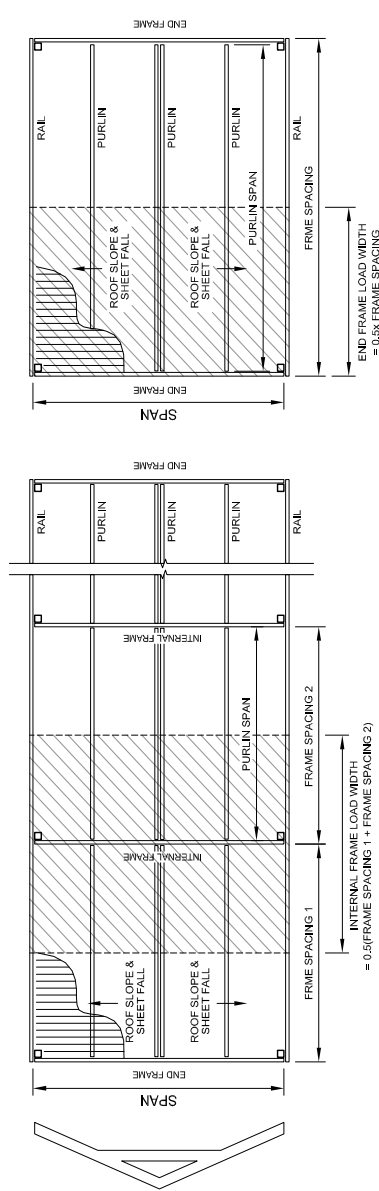


TABLE 6B

Collar-Tie Truss Load Width (mm), Roof Pitch: 22.5°

Wind Blocking	Wind Class	Rafter Size	Span (mm)		4000		5000		6000		7000		8000		9000		10000		11000	
			0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+
No. of int. purlins	0/1/4 sides	F100	5790	5310	5790	4700	3500	3620	3180	2410	2410	2010	1770	1690	1370	1370	1310	960	1080	1020
		F150	7500	7500	7500	7500	6760	7360	6180	4920	5310	4020	3780	3940	2750	2960	2960	1930	2350	2350
		F200	9000	9000	9000	9000	9000	9000	8780	8490	9000	6590	6590	7160	4620	5240	5580	3250	3560	3680
	N3	F100	3700	3390	3700	3010	2240	2310	2030	1540	1540	1280	1130	1080	880	880	830	610	690	650
		F150	7500	6490	6900	5940	4320	4710	3950	3150	3390	2570	2420	2520	1760	1890	1890	1230	1500	1500
		F200	8850	9000	9000	6790	7260	7490	5620	5430	6050	4220	4220	4580	2950	3350	3570	2080	2270	2350
	N4	F100	2490	2280	2490	2020	1500	1550	1370	1030	1030	860	760	720	590	590	560			
		F150	6090	4360	4630	3990	2900	3160	2650	2110	2280	1730	1620	1690	1180	1270	1270	830	1010	1010
		F200	5950	6360	6570	4560	4870	5030	3770	3650	4060	2830	2830	3080	1980	2250	2400	1400	1530	1580
	2 sides	N1 / N2	F100	4020	3700	4020	3250	2410	2530	2410	1730	1640	1690	1200	1200	1310	960	890	900	720
F150			7500	7080	7500	6880	4700	5190	4920	3470	3670	3620	2650	2730	2750	2060	2060	1930	1620	1620
F200			9000	9000	9000	7360	7960	8200	6080	5980	6560	5470	4580	4990	3510	3650	3860	2290	2470	2530
N3		F100	2570	2360	2570	2080	1540	1620	1540	1110	1050	1080	770	770	830	610	570	570		
		F150	6280	4530	4840	4400	3010	3320	3150	2220	2340	2310	1690	1750	1760	1320	1320	1230	1040	1040
		F200	6180	6590	6790	4710	5090	5250	3890	3830	4200	3500	2930	3190	2250	2340	2470	1460	1580	1620
N4		F100	1730	1590	1730	1400	1030	1090	1030	740	700	720	510	510	560					
		F150	4220	3040	3250	2950	2020	2230	2110	1490	1570	1550	1140	1170	1180	880	880	830	700	700
		F200	4150	4420	4560	3160	3420	3520	2610	2570	2820	2350	1970	2140	1510	1570	1660	980	1060	1090
3 sides		N1 / N2	F100	3380	3050	3380	2770	2050	2050	2020	1440	1350	1440	1040	960	1030	750	780	600	600
	F150		7500	5950	6270	5670	3980	4340	4050	2890	3090	2970	2170	2250	2270	1720	1720	1560	1380	1380
	F200		8040	8530	8850	6150	6630	6760	5110	4920	5500	4580	3780	4180	2890	3030	3240	1870	2050	2110
	N3	F100	2160	1950	2160	1770	1310	1310	1290	920	860	920	660	610	660			500		
		F150	5250	3810	4010	3630	2540	2780	2590	1850	1970	1900	1390	1440	1450	1100	1100	1000	880	880
		F200	5150	5460	5660	3940	4240	4320	3270	3150	3520	2930	2420	2670	1850	1940	2070	1190	1310	1350
	N4	F100	1450	1310	1450	1190	880	880	870	620	580	620								
		F150	3520	2560	2690	2430	1710	1860	1740	1240	1320	1280	930	960	970	740	740	670	590	590
		F200	3460	3660	3800	2640	2850	2900	2200	2110	2360	1970	1620	1790	1240	1300	1390	800	880	900

Notes:

- For intermediate span, use interpolation between the values of the same category.
- The values in the table are the maximum design load width in mm.
- Do not use these tables for the design of truss/rafter in roof pitch other than 22.5 degrees.
- For truss/rafter with 2 or more rows of internal purlins on each side of ridge, select load width in the "2+ " columns
- For truss with F150/F200 rafters, use F150 collar-tie, for F100 rafter, use F10011 collar-tie.

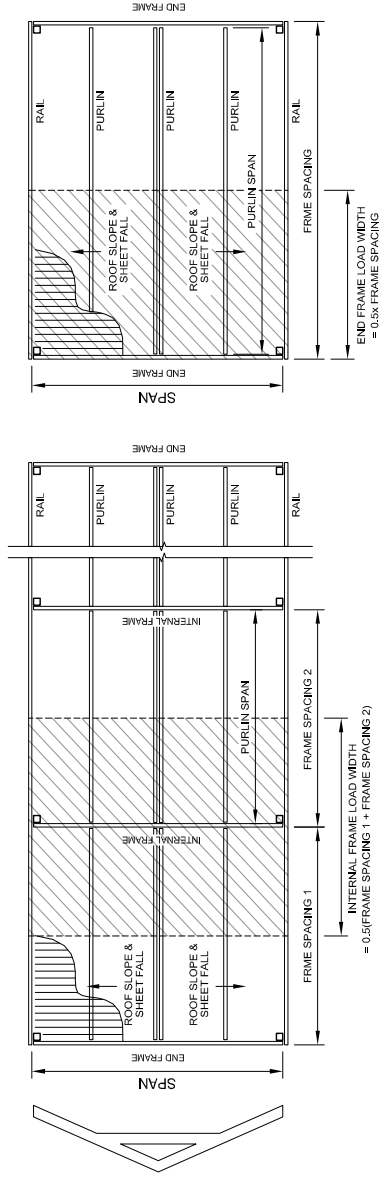


TABLE 7A

Portal Frame Rafter Load Width (mm), Roof Pitch: 15°

Wind Blocking	Wind Class	Rafter Size	Span (mm)																								
			≤3000			4000			5000			6000			7000			8000			9000			10000			
No. of int. purlins	0/1/4 sides	F100	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	
			5860	6000	6000	3390	2890	2890	1710	1500	1400	1000	830	830													
			7500	7500	7500	7500	7500	7500	5130	5430	5330	3520	3180	3100	2290	1940	1940	1500	1320	1250	1060	890	890	750	650	650	
			9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	6790	7790	8040	4880	5310	5240	3580	3580	3450	2730	2510	2450	2110	1810	1760
			3750	4070	4180	2170	1850	1850	1090	960	900	640	530	530													
F150	7500	F200	7500	7500	7500	5150	5630	5790	3280	3470	3410	2250	2030	1980	1470	1240	1240	960	840	800	670	570	570				
			9000	9000	9000	9000	9000	9000	9000	6310	7210	7400	4340	4990	5150	3120	3400	3350	2290	2290	2210	1750	1600	1570	1350	1150	1120
			F100	2520	2740	2810	1460	1240	1240	730	640	600															
			F150	5840	6120	6410	3460	3780	3890	2200	2330	2290	1510	1370	1330	980	830	830	640	560	540						
			F200	9000	9000	9000	6540	7080	7510	4230	4840	4970	2920	3350	3460	2100	2280	2250	1540	1540	1480	1170	1080	1050	900	770	750
2 sides	No. of int. purlins	F100	4360	4690	4690	2510	2130	2130	1200	1100	1100																
			F150	7500	7500	7500	5910	6540	6660	3720	4020	3920	2510	2260	2260	1650	1430	1430	1130	940	940	780	670	670	550		
			F200	9000	9000	9000	9000	9000	9000	7240	8250	8450	4940	5780	5860	3590	3880	3800	2640	2570	2570	2010	1840	1780	1500	1300	1300
			F100	2790	3000	3000	1600	1360	1360	770	700	700															
			F150	6330	6650	6970	3780	4180	4260	2380	2570	2510	1600	1440	1440	1050	910	910	720	600	600	500					
3 sides	No. of int. purlins	F200	9000	9000	9000	7160	7720	8210	4630	5280	5400	3160	3700	3750	2290	2480	2430	1690	1650	1650	1280	1180	1140	960	830	830	
			F100	1870	2010	2010	1080	910	910	510																	
			F150	4250	4470	4680	2540	2810	2860	1600	1730	1680	1080	970	970	710	610	610									
			F200	8000	7850	7930	4810	5190	5510	3110	3540	3630	2120	2480	2520	1540	1660	1630	1130	1100	1100	860	790	760	640	560	560
			F100	3680	4020	4020	2130	1760	1760	1000																	
N1 / N2	No. of int. purlins	F150	7500	7500	7500	5030	5530	5650	3210	3420	3320	2180	1920	1920	1430	1220	1220	940	810	810	670	550	550				
			F200	9000	9000	9000	9000	9000	9000	6130	7040	7140	4190	4860	5030	3010	3300	3230	2260	2200	2130	1730	1560	1500	1300	1100	1100
			F100	2360	2570	2570	1360	1120	1120	640																	
			F150	5360	5680	6010	3210	3540	3620	2060	2180	2120	1390	1230	1230	910	780	780	600	520	520						
			F200	9000	9000	9000	6110	6600	7000	3920	4500	4570	2680	3110	3210	1930	2110	2060	1440	1400	1360	1100	1000	960	830	700	700
N4	No. of int. purlins	F100	1580	1730	1730	910	750	750																			
			F150	3600	3820	4030	2160	2370	2430	1380	1470	1420	930	820	820	610	520	520									
			F200	6770	6700	6770	4110	4430	4700	2630	3020	3070	1800	2090	2160	1290	1420	1390	970	940	910	740	670	640	560	560	

Notes:

- For intermediate span, use interpolation between the values of the same category.
- The values in the table are the maximum design load width in mm.
- Do not use these tables for the design of truss/rafter in roof pitch other than 15 degrees.
- For truss/rafter with 2 or more rows of internal purlins on each side of ridge, select load width in the "2+ " columns

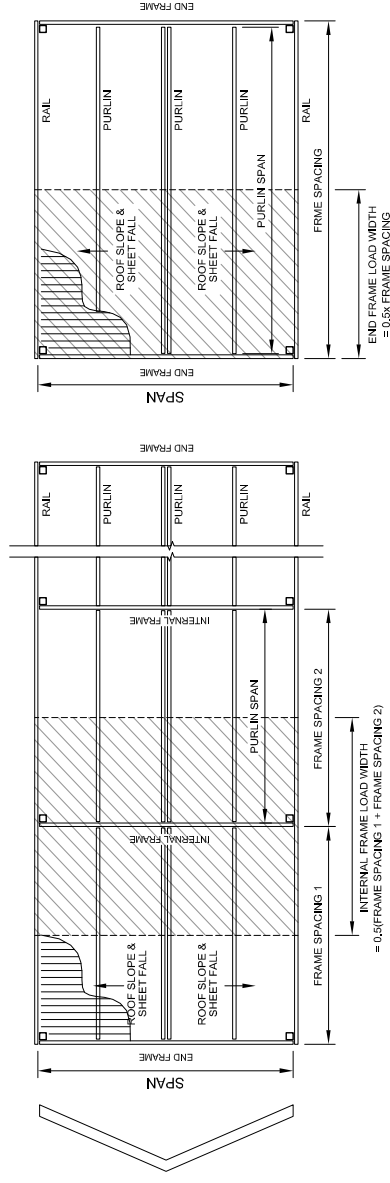


TABLE 7B

Portal Frame Rafter Load Width (mm), Roof Pitch: 22.5°

Wind Blocking	Wind Class	Rafter Size	Span (mm)						4000			5000			6000			7000			8000			9000			10000		
			0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+
No. of int. purlins 0/1/4 sides	NI / N2	F100	4180	4820	4820	2290	2050	2050	1150	1060	1060																		
		F150	7500	7500	7500	5670	6630	6760	3670	3860	3760	2490	2170	2170	1510	1370	1370	690	640	640									
		F200	9000	9000	9000	9000	9000	9000	7050	8400	8690	4820	5790	5870	3440	3720	3650	1930	1710	1710									
		F100	2670	3090	3090	1460	1310	1310	740	670	670																		
		F150	6280	6590	7000	3630	4240	4320	2340	2470	2410	1590	1390	1390	970	880	880	650	570	570									
		F200	9000	9000	9000	6950	7640	8190	4510	5370	5560	3090	3700	3760	2200	2380	2340	1620	1580	1580									
	N4	F100	1790	2070	2070	980	880	880	490																				
		F150	4220	4420	4700	2430	2850	2900	1570	1660	1610	1070	930	930	650	590	590												
		F200	7820	7890	7950	4670	5130	5500	3030	3610	3730	2070	2490	2520	1480	1600	1570	1090	1060	1060									
2 sides	NI / N2	F100	2890	3380	3380	1560	1440	1440																					
		F150	6760	7240	7500	3980	4580	4700	2510	2700	2600	1690	1520	1520	1030	960	960	720	600	600									
		F200	9000	9000	9000	7600	8330	8930	4920	5890	6080	3380	4100	4100	2410	2620	2550	1750	1750	1690									
		F100	1850	2160	2160	1000	920	920																					
		F150	4320	4630	4940	2540	2930	3010	1600	1730	1660	1080	970	970	660	610	610												
		F200	8130	8130	8340	4860	5330	5710	3150	3770	3890	2160	2620	2620	1540	1670	1630	1120	1120	1080									
	N4	F100	1240	1450	1450	670	620	620																					
		F150	2900	3110	3320	1710	1970	2020	1070	1160	1120	720	650	650															
		F200	5460	5460	5600	3270	3580	3840	2110	2530	2610	1450	1760	1760	1030	1120	1090	750	750	720									
3 sides	NI / N2	F100	2410	2730	2890	1320	1200	1200																					
		F150	5630	5950	6430	3250	3860	3860	2120	2220	2220	1440	1280	1280	890	750	750	600											
		F200	9000	9000	9000	6270	7000	7480	4050	4820	5020	2810	3380	3380	2000	2130	2130	1440	1440	1440									
		F100	1540	1750	1850	840	770	770																					
		F150	3600	3810	4120	2080	2470	2470	1350	1420	1420	920	820	820	570														
		F200	6790	6790	6900	4010	4480	4790	2590	3090	3210	1800	2160	2160	1280	1360	1360	920	920	920									
	N4	F100	1030	1170	1240	570	510	510																					
		F150	2420	2560	2760	1400	1660	1660	910	950	950	620	550	550															
		F200		4560	4560	4630	2690	3010	3210	1740	2070	2150	1210	1450	1450	860	910	910	620	620	620								

Notes:

- For intermediate span, use interpolation between the values of the same category.
- The values in the table are the maximum design load width in mm.
- Do not use these tables for the design of truss/rafter in roof pitch other than 22.5 degrees.
- For truss/rafter with 2 or more rows of internal purlins on each side of ridge, select load width in the "2+ " columns

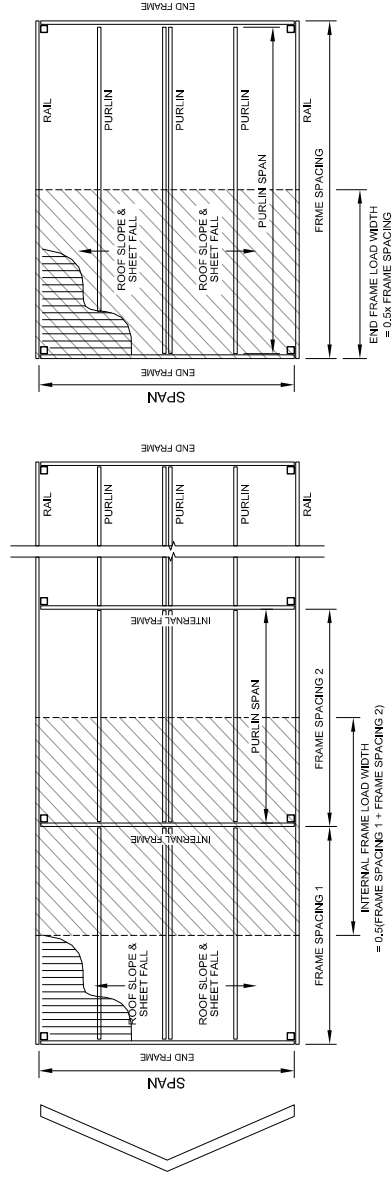


TABLE 8A

Purlin Span and Reaction, Roof Pitch: 15°, Span Type: Simply Supported, Connection: Bracket

Wind Blocking	Wind Class	Purlin Size	Purlin Load Width (mm)												
0/1/4 sides	N1 / N2	F100	5350, 1.5	4950, 1.5	4650, 2.0	4400, 2.0	4200, 2.0	4000, 2.5	3850, 2.5	3750, 2.5	3650, 3.0	3550, 3.0	3450, 3.0	3350, 3.5	3300, 3.5
2 sides	N1 / N2	F150	7450, 1.5	7050, 2.0	6700, 2.5	6450, 3.0	6250, 3.0	6050, 3.5	5900, 4.0	5700, 4.0	5550, 4.5	5400, 4.5	5250, 5.0	5150, 5.0	5050, 5.5
		F200	9000, 2.0	8750, 2.5	8400, 3.0	8100, 3.5	7850, 4.0	7650, 4.0	7500, 4.5	7300, 5.0	7150, 5.5	7000, 6.0	6900, 6.0	6750, 6.5	6650, 7.0
		F100	5350, 2.0	4850, 2.5	4500, 2.5	4200, 3.0	4000, 3.5	3800, 3.5	3650, 4.0	3500, 4.0	3350, 4.5	3200, 4.5	3050, 4.5	2950, 4.5	2850, 5.0
		F150	7450, 2.5	7050, 3.0	6700, 4.0	6450, 4.5	6150, 5.0	5900, 5.5	5450, 6.0	5250, 6.5	5150, 7.0	5050, 7.5	4850, 7.5	4650, 7.5	4500, 7.5
	N3	F200	9000, 3.0	8750, 4.0	8400, 4.5	8100, 5.5	7850, 6.0	7650, 7.0	7500, 8.5	7300, 8.0	7150, 8.5	7000, 9.5	6900, 10.0	6650, 10.5	6400, 10.5
		F100	4550, 2.5	4150, 3.0	3850, 3.5	3600, 4.0	3400, 4.0	3200, 4.5	3000, 4.5	2850, 5.0	2700, 5.0	2600, 5.5	2400, 5.5	2200, 5.5	2050, 5.5
		F150	7100, 3.5	6400, 4.5	5900, 5.0	5550, 5.5	5250, 6.5	5000, 7.0	4750, 7.5	4500, 7.5	4250, 8.0	4100, 8.5	3900, 8.5	3800, 9.0	3650, 9.5
		F200	9000, 4.5	8750, 6.0	8300, 7.0	7800, 8.0	7400, 8.5	7050, 9.5	6750, 10.0	6350, 10.5	6050, 11.0	5800, 11.5	5600, 12.0	5350, 12.5	5200, 13.0
	N4	F100	4800, 1.5	4350, 2.0	4000, 2.0	3750, 2.5	3550, 2.5	3400, 3.0	3250, 3.0	3150, 3.0	3050, 3.5	2950, 3.5	2900, 4.0	2800, 4.0	2750, 4.0
		F150	7450, 2.5	6700, 2.5	6200, 3.0	5800, 3.5	5500, 4.0	5250, 4.0	5050, 4.5	4900, 5.0	4700, 5.0	4600, 5.5	4450, 5.5	4350, 6.0	4250, 6.0
		F200	9000, 2.5	8750, 3.5	8400, 4.0	8100, 4.5	7750, 5.0	7400, 5.5	7100, 6.0	6800, 6.5	6600, 7.0	6400, 7.5	6250, 8.0	6050, 8.0	5950, 8.5
		F100	4100, 2.0	3700, 2.5	3400, 3.0	3200, 3.0	3050, 3.5	2900, 3.5	2800, 4.0	2700, 4.5	2600, 4.5	2550, 5.0	2450, 5.0	2400, 5.5	2250, 5.5
3 sides	N1 / N2	F150	6300, 3.0	5700, 3.5	5300, 4.0	4950, 4.5	4700, 5.0	4500, 5.5	4300, 6.0	4150, 6.5	4050, 7.0	3900, 7.5	3800, 7.5	3700, 8.0	3650, 8.5
		F200	8900, 4.0	8000, 5.0	7400, 5.5	6950, 6.5	6600, 7.0	6300, 7.5	6050, 8.5	5850, 9.0	5650, 9.5	5450, 10.0	5350, 10.5	5200, 11.0	5050, 11.5
		F100	3550, 2.5	3200, 3.0	2950, 3.5	2800, 4.0	2650, 4.5	2550, 5.0	2450, 5.5	2250, 5.5	2050, 5.5	1850, 5.5	1700, 5.5	1600, 5.5	1500, 5.5
		F150	5450, 4.0	4950, 4.5	4600, 5.5	4300, 6.0	4100, 7.0	3900, 7.5	3750, 8.0	3600, 8.5	3500, 9.0	3400, 9.5	3300, 10.0	3150, 10.5	2950, 10.5
	N3	F200	7650, 5.5	6900, 6.5	6400, 7.5	6000, 8.5	5700, 9.0	5450, 10.0	5250, 11.0	5050, 11.5	4900, 12.5	4750, 13.0	4600, 14.0	4250, 14.0	3950, 13.5
		F100	4450, 1.5	4050, 2.0	3750, 2.5	3500, 2.5	3350, 3.0	3200, 3.0	3050, 3.5	2950, 3.5	2850, 3.5	2750, 4.0	2700, 4.0	2650, 4.5	2550, 4.5
		F150	6900, 2.5	6250, 3.0	5800, 3.5	5400, 4.0	5150, 4.0	4900, 4.5	4700, 5.0	4550, 5.5	4400, 5.5	4250, 6.0	4150, 6.0	4050, 6.5	3950, 7.0
		F200	9000, 3.0	8750, 4.0	8100, 4.5	7600, 5.0	7200, 5.5	6850, 6.0	6600, 7.0	6350, 7.0	6150, 7.5	5950, 8.0	5800, 8.5	5650, 9.0	5550, 9.5
	N4	F100	3800, 2.5	3450, 2.5	3200, 3.0	3000, 3.5	2850, 4.0	2750, 4.0	2600, 4.5	2550, 5.0	2450, 5.0	2400, 5.5	2200, 5.5	2050, 5.5	1900, 5.5
		F150	5900, 3.5	5350, 4.0	4950, 4.5	4650, 5.0	4400, 5.5	4200, 6.0	4050, 6.5	3900, 7.0	3800, 7.5	3650, 8.0	3550, 8.5	3500, 9.0	3400, 9.5
		F200	8300, 4.5	7500, 5.5	6900, 6.5	6500, 7.0	6150, 8.0	5900, 8.5	5650, 9.0	5450, 10.0	5300, 10.5	5100, 11.0	5000, 12.0	4850, 12.5	4750, 13.0
		F100	3300, 3.0	3000, 3.5	2800, 4.0	2600, 4.5	2500, 5.0	2350, 5.5	2100, 5.5	1900, 5.5	1700, 5.5	1550, 5.5	1450, 5.5	1350, 5.5	1250, 5.5
N4	F150	5100, 4.5	4650, 5.0	4300, 6.0	4050, 7.0	3800, 7.5	3650, 8.0	3500, 8.5	3400, 9.5	3300, 10.0	3100, 10.5	2850, 10.0	2650, 10.0	2500, 10.5	
	F200	7150, 6.0	6450, 7.0	6000, 8.0	5650, 9.5	5350, 10.5	5100, 11.0	4900, 12.0	4750, 13.0	4600, 14.0	4200, 14.0	3900, 14.0	3600, 14.0	3350, 14.0	

Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the purlin span in mm, the 2nd value in the table is the reaction (kN) on the supporting rafter.
- The reaction is based on 1 purlin span and 2 after supports. For 2 or more simply span purlins, double (2x) the reaction for internal rafters.
- Purlin span = spacing of rafters.
- Do not use these tables for the design of purlin in roof pitch other than 15 degrees.

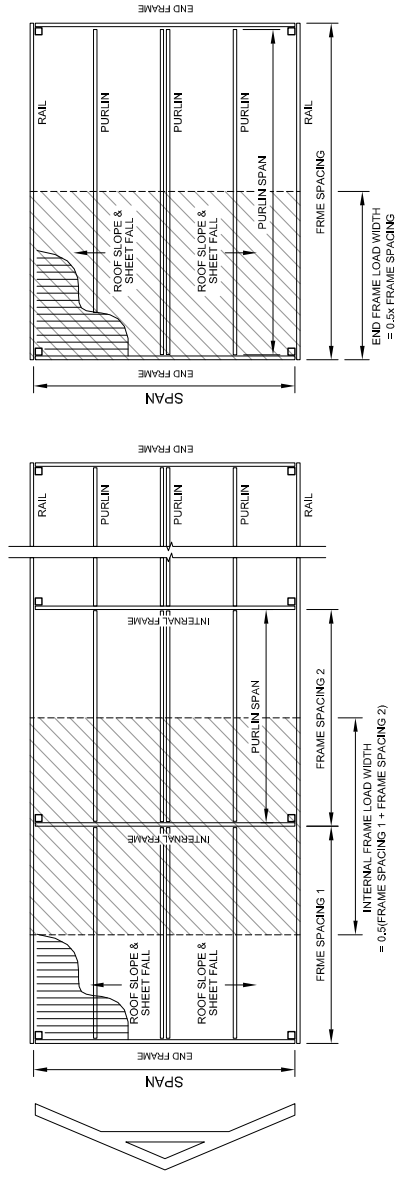


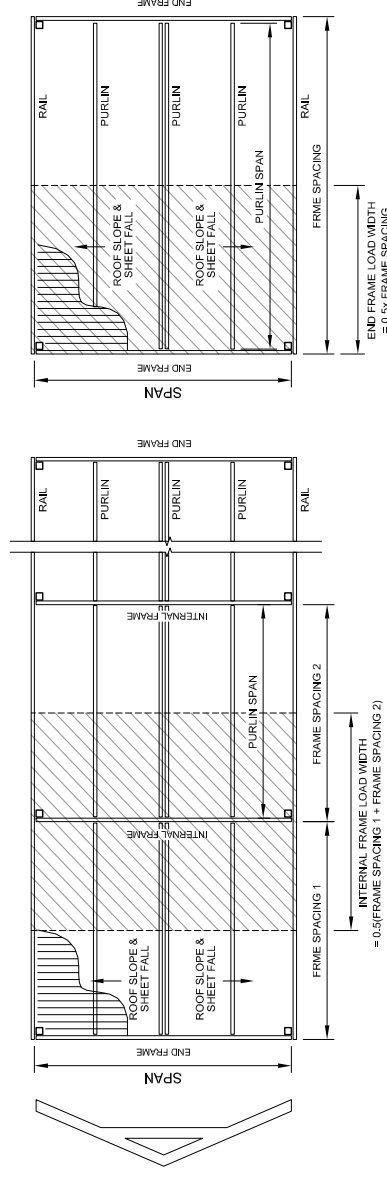
TABLE 8B

Purlin Span and Reaction, Roof Pitch: 22.5°, Span Type: Simply Supported, Connection: Bracket

Wind Blocking	Wind Class	Purlin Size	Purlin Load Width (mm)												
			S900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500
O/1/4 sides	N1 / N2	F100	5300, 2.0	4900, 2.0	4600, 2.5	4350, 3.0	4150, 3.0	3950, 3.5	3800, 3.5	3650, 4.0	3450, 4.0	3300, 4.5	3200, 4.5	3050, 4.5	2950, 4.5
		F150	7400, 2.5	6950, 3.0	6650, 3.5	6400, 4.0	6200, 4.5	6000, 5.0	5800, 5.5	5650, 6.0	5450, 6.5	5250, 6.5	5050, 7.0	4850, 7.0	4700, 7.5
		F200	9000, 3.0	8700, 3.5	8350, 4.5	8050, 5.0	7800, 5.5	7600, 6.5	7400, 7.0	7250, 7.5	7100, 8.0	6950, 8.5	6800, 9.0	6700, 9.5	6600, 10.0
		F100	5300, 3.0	4550, 3.0	4050, 3.5	3700, 4.0	3450, 4.0	3200, 4.5	3000, 4.5	2850, 5.0	2750, 5.0	2600, 5.5	2400, 5.5	2250, 5.5	2100, 5.5
		F150	7400, 4.0	6950, 4.5	6450, 5.5	5850, 6.0	5400, 6.5	5050, 7.0	4750, 7.0	4500, 7.5	4300, 8.0	4100, 8.0	3950, 8.5	3800, 9.0	3700, 9.5
	N4	F200	9000, 4.5	8700, 5.5	8350, 7.0	8050, 8.0	7700, 9.0	7200, 9.5	6800, 10.0	6450, 10.5	6150, 11.0	5850, 11.5	5650, 12.0	5450, 12.5	5250, 13.0
		F100	4300, 3.5	3700, 4.0	3300, 4.5	3000, 4.5	2800, 5.0	2600, 5.5	2300, 5.5	2100, 5.5	1900, 5.5	1750, 5.5	1600, 5.5	1500, 5.5	1400, 5.5
		F150	6750, 5.0	5850, 6.0	5200, 6.5	4750, 7.0	4400, 8.0	4100, 8.5	3850, 8.5	3650, 9.0	3500, 9.5	3350, 10.0	3150, 10.5	2900, 10.0	2700, 10.0
		F200	9000, 6.5	8350, 8.5	7450, 9.5	6750, 10.0	6250, 11.0	5850, 11.5	5500, 12.5	5200, 13.0	4950, 13.5	4600, 13.5	4250, 14.0	3950, 14.0	3700, 14.0
		F150	4700, 2.5	4250, 2.5	3950, 3.0	3700, 3.5	3500, 4.0	3350, 4.0	3150, 4.5	3000, 4.5	2850, 5.0	2750, 5.0	2650, 5.5	2450, 5.5	2300, 5.5
2 sides	N1 / N2	F150	7350, 3.5	6600, 4.0	6100, 4.5	5750, 5.5	5450, 6.0	5200, 6.5	5000, 7.0	4750, 7.0	4500, 7.5	4350, 8.0	4150, 8.0	4000, 8.5	3850, 9.0
		F200	9000, 4.0	8700, 5.0	8350, 6.5	8050, 7.0	7600, 8.0	7250, 8.5	6950, 9.5	6700, 10.0	6450, 10.5	6150, 11.0	5900, 11.5	5700, 12.0	5500, 12.5
		F100	4000, 3.0	3650, 3.5	3350, 4.0	3100, 4.5	2850, 5.0	2650, 5.0	2400, 5.5	2150, 5.5	1950, 5.5	1800, 5.5	1650, 5.5	1550, 5.5	1450, 5.5
		F150	6250, 4.5	5650, 5.5	5200, 6.5	4850, 7.0	4500, 7.5	4200, 8.0	3950, 8.5	3750, 9.0	3550, 9.5	3400, 10.0	3300, 10.5	3050, 10.5	2850, 10.5
		F200	8750, 6.5	7900, 7.5	7300, 8.5	6850, 10.0	6400, 10.5	5950, 11.5	5650, 12.0	5350, 13.0	5100, 13.5	4800, 13.5	4450, 14.0	4100, 13.5	3850, 14.0
	N4	F100	3500, 4.0	3050, 4.5	2750, 5.0	2400, 5.5	2050, 5.5	1800, 5.5	1600, 5.5	1450, 5.5	1300, 5.5	1200, 5.5	1100, 5.5	1000, 5.0	950, 5.5
		F150	5350, 6.0	4850, 7.0	4350, 8.0	3950, 8.5	3650, 9.5	3400, 10.0	3150, 10.5	2850, 10.5	2550, 10.0	2350, 10.0	2150, 10.0	2000, 10.0	1900, 10.5
		F200	7550, 8.0	6800, 10.0	6150, 11.0	5600, 12.0	5200, 13.0	4800, 14.0	4250, 13.5	3850, 14.0	3500, 14.0	3200, 14.0	2950, 14.0	2750, 14.0	2550, 14.0
		F100	4400, 2.5	3950, 3.0	3700, 3.5	3450, 4.0	3250, 4.5	3050, 4.5	2900, 5.0	2750, 5.0	2600, 5.5	2400, 5.5	2200, 5.5	2050, 5.5	1900, 5.5
		F150	6800, 4.0	6150, 4.5	5700, 5.5	5350, 6.0	5050, 6.5	4800, 7.0	4550, 7.5	4300, 8.0	4100, 8.5	3950, 8.5	3750, 9.0	3650, 9.5	3500, 9.5
3 sides	N1 / N2	F200	9000, 5.0	8650, 6.5	8000, 7.5	7500, 8.0	7100, 9.0	6750, 10.0	6450, 10.5	6150, 11.0	5850, 11.5	5600, 12.0	5350, 12.5	5150, 13.0	5000, 13.5
		F100	3750, 3.5	3400, 4.0	3050, 4.5	2800, 5.0	2600, 5.5	2250, 5.5	2000, 5.5	1800, 5.5	1650, 5.5	1500, 5.5	1350, 5.0	1250, 5.0	1200, 5.5
		F150	5800, 5.0	5250, 6.0	4850, 7.0	4400, 7.5	4100, 8.5	3800, 9.0	3600, 9.5	3400, 10.0	3200, 10.0	2950, 10.5	2700, 10.0	2500, 10.0	2350, 10.5
		F200	8150, 7.0	7350, 8.5	6800, 10.0	6300, 11.0	5800, 11.5	5450, 12.5	5100, 13.0	4800, 14.0	4350, 14.0	4000, 14.0	3700, 14.0	3400, 13.5	3200, 14.0
	N4	F100	3250, 4.5	2800, 5.0	2400, 5.5	2000, 5.5	1700, 5.5	1500, 5.5	1300, 5.0	1200, 5.5	1100, 5.5	1000, 5.5	900, 5.0	850, 5.5	800, 5.5
		F150	5050, 6.5	4400, 7.5	3950, 8.5	3600, 9.5	3350, 10.0	2950, 10.5	2600, 10.0	2350, 10.5	2150, 10.5	1950, 10.0	1800, 10.0	1650, 10.0	1550, 10.0
		F200	7050, 9.0	6300, 11.0	5600, 12.0	5100, 13.0	4550, 14.0	4000, 14.0	3550, 14.0	3200, 14.0	2900, 14.0	2650, 14.0	2450, 14.0	2250, 13.5	2100, 13.5

Notes:

- For intermediate load width, use interpolation between the values of the same category.
- The 1st value in the table is the purlin span in mm, the 2nd value in the table is the reaction (kN) on the supporting rafter.
- The reaction is based on 1 purlin span and 2 after supports. For 2 or more simply span purlins, double (2x) the reaction for internal rafters.
- Purlin span = spacing of rafters.
- Do not use these tables for the design of purlin in roof pitch other than 22.5 degrees.



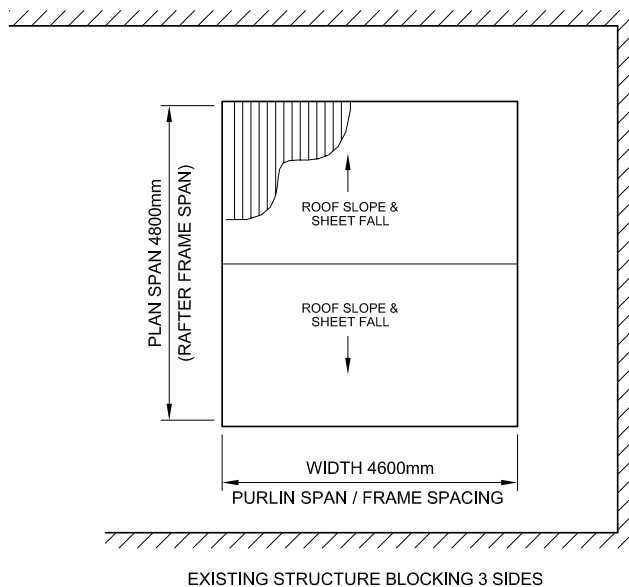
4.5 DESIGN EXAMPLES: PITCHED STRUCTURES

EXAMPLE 3:

A SIMPLE PITCHED ROOF FREESTANDING AWNING WITH 2 COLLAR-TIE FRAMES.

Design Parameters:

- Wind Class: N4 (W50N)
- Wind Blocking: 3 side blocked
- Building Projection (Rafter Span): 4800mm
- Building Width (Frame Spacing/Purlin Span): 4600mm
- Roof Pitch: 15°
- Cladding: FLATDEK® II, No foot traffic
- Connection: Rail behind post



STEP 1: SELECT CLADDING

Cladding span = $0.52 \times \text{rafter span} = 0.52 \times 4800\text{mm} = 2490\text{mm}$. From roof sheeting span table for wind class N4, 3 side blocked, pitched roof and no foot traffic condition, FLATDEK® II 0.42mm can span up to 3000mm without intermediate support, which is suitable for this example.

STEP 2: DETERMINE RAFTER SIZE

For collar-tie truss with 15° roof pitch, use **Table 6A** to select rafter size and frame spacing. From step 1, we know FLATDEK® II 0.42mm can span between the eave and apex without intermediate support. So for wind class N4, 3 sides blocked, 4800mm rafter span (use 5000mm) and 0 row of intermediate purlin, the following collar tie truss load width are available:

Rafter	Truss load width (mm)
F10011	$1080 < 4600/2$ Not OK
F15015	$2200 < 4600/2$ Not OK
F20020	$2760 > 4600/2$ OK

For an overall structure width of 4600mm, the load width of each end rafter frame is $4600/2 = 2300\text{mm}$. therefore F20020 with load width of 2760mm is suitable for this case. The collar-tie strut size is F15015 for 150 or 200 rafters.

STEP 3: DETERMINE PURLIN SIZE

For 15° roof pitch, use **Table 8A** to select purlin size. With no intermediate purlin, the apex/rail purlin load width is $4800/4 = 1200\text{mm}$, the following purlin spans are available.

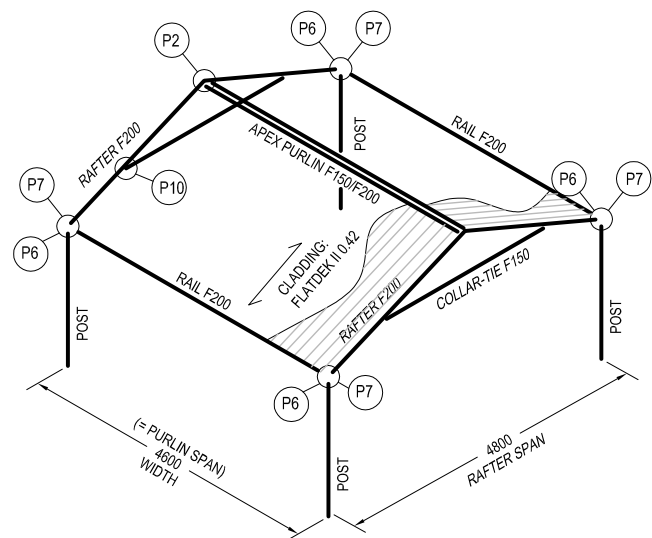
Purlin	Purlin span (mm)
F10011	$3000 < 4600$ Not OK
F15015	$4650 > 4600$ OK
F20020	$6450 > 4600$ OK

Since the collar-tie rafter size is F20020, therefore F15015 and F20020 are both suitable for apex purlins. The rail size should be F20020 as detailed on page 34.

STEP 4: CONNECTION DETAILS

For Apex connection refer to Connection detail P2. For Collar tie to rafter connection refer to detail P10. For rafter to post connection refer to detail P7. For Rail behind Post Connection refer to detail P6.

DESIGN OUTCOME

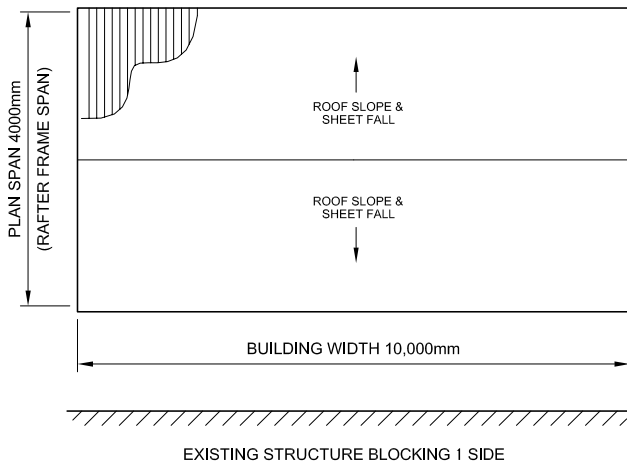


EXAMPLE 4:

A SIMPLE PITCHED ROOF FREESTANDING AWNING WITH 3 PORTAL FRAME RAFTERS.

Design Parameters:

- Wind Class: N3 (W41N)
- Wind Blocking: 1 side blocked
- Building Projection (Rafter Span): 4000mm
- Building Width: 10000mm
- Roof Pitch: 15°
- Cladding: CUSTOM ORB®, No foot traffic
- Connection: Rail to side of post



STEP 1: SELECT CLADDING

Cladding span = $0.52 \times \text{rafter span} = 0.52 \times 4000\text{mm} = 2080\text{mm}$. From roof sheeting span table for wind class N3, 1 side blocked, pitched roof and no foot traffic condition, CUSTOM ORB® 0.42mm can span up to $1800\text{mm} < 2080\text{mm}$, therefore provide 1 row of internal purlin between rail and apex, now the cladding span is $2080 / 2 = 1040\text{mm} < 1800\text{mm}$, ok.

STEP 2: DETERMINE RAFTER SIZE

For portal frame rafter with 15° roof pitch, use **Table 7A** to select rafter size and frame spacing. It is unlikely that 2 frames will be able to support a building width of 10m. Therefore start design selection assuming 3 frames are required. Therefore the internal frame load width is $10,000\text{mm} / 2 = 5000\text{mm}$ and the end frame load width is $5000 / 2 = 2500\text{mm}$. From step 1, we know CUSTOM ORB® 0.42mm requires 1 row of internal purlins. So for wind class N3, 1 sides blocked, 4000mm rafter span and 1 row of internal purlin, the following rafter load width are available:

Rafter	Truss load width (mm)
F10011:	$1850 < 5000$, Not Ok
F15015:	$5630 > 5000$, Ok
F20020:	$9000 > 5000$, Ok

Therefore F15015 rafter is suitable for both end and internal frames. Collar-tie member is not required for portal frame rafter.

STEP 3: DETERMINE PURLIN SIZE

For 15° roof pitch, use **Table 8A** to select purlin size. With 1 intermediate purlin as determined from Step 1, the purlin load width is 1040mm (use 1200mm) and the purlin span is 5000mm, the following purlin spans are available.

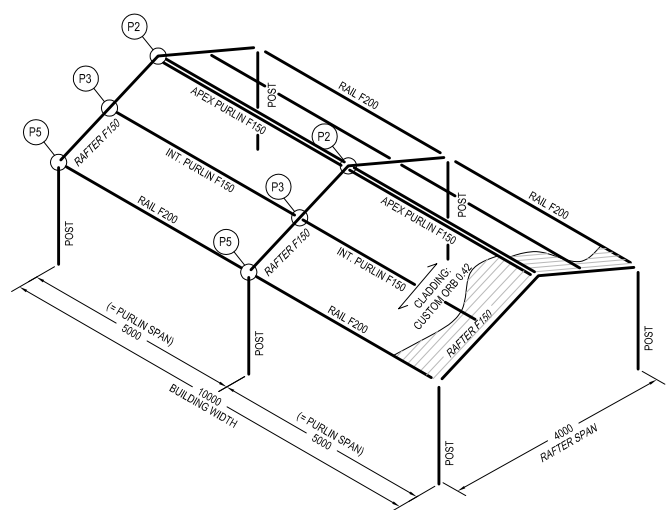
Purlin	Purlin span (mm)
F10011:	$4850 < 5000$, Not Ok
F15015:	$7050 > 5000$, Ok
F20020:	$8750 > 5000$, Ok

Therefore F15015 and F20020 are both suitable. The rail size should be F20020 as detailed on page 34.

STEP 4: CONNECTION DETAILS

For apex connection refer to connection detail P2. For rafter to post and post to rail connections refer to detail P5. For purlin connection refer to detail P3.

DESIGN OUTCOME



PRODUCT DESCRIPTIONS

- All descriptions, specifications, illustrations, drawings, data, dimensions and weights contained in this catalogue, all technical literature and websites containing information from Lysaght are approximations only. They are intended by Lysaght to be a general description for information and identification purposes and do not create a sale by description. Lysaght reserves the right at any time to:

(a) supply Goods with such minor modifications from its drawings and specifications as it sees fit; and
(b) alter specifications shown in its promotional literature to reflect changes made after the date of such publication.

DISCLAIMER, WARRANTIES AND LIMITATION OF LIABILITY

- This publication is intended to be an aid for all trades and professionals involved with specifying and installing Lysaght products and not to be a substitute for professional judgement.
- Terms and conditions of sale available at local Lysaght sales offices.
- Except to the extent to which liability may not lawfully be excluded or limited, BlueScope Steel Limited will not be under or incur any liability to you for any direct or indirect loss or damage (including, without limitation, consequential loss or damage such as loss of profit or anticipated profit, loss of use, damage to goodwill and loss due to delay) however caused (including, without limitation, breach of contract, negligence and/or breach of statute), which you may suffer or incur in connection with this publication.

FOR YOUR NEAREST SUPPLIER VISIT:

WWW.LYSAGHT.COM

FOR SALES ENQUIRIES CALL 13 30 38

FOR TECHNICAL ENQUIRIES CALL 1800 641 417

® product and product brand names are registered trademarks and ™ product and product brand names are trademarks of BlueScope Steel Limited trading as Lysaght.

The LYSAGHT® range of products is exclusively made by or for BlueScope Steel Limited trading as Lysaght.

COLORBOND® steel, ZINCALUME® steel, BlueScope and the BlueScope brand mark are registered trademarks of BlueScope Steel Limited.

© BlueScope Steel Limited January 2020 ABN 16 000 011 058. All rights reserved.



LYT0040-01/20