NelsonPine®
Laminated Veneer Lumber LVL

FRAMING SOLUTIONS

NP FRAME LVL 8
NP FRAME LVL 11
NP FRAME LVL 13

FLOOR BEARERS
FLOOR JOISTS
STUD FRAMES

LINTELS
RAFTERS

NP Frame LVL 8

WIDTH (MM)	THICKNESS (MM)
90	45
140	45
190	45
240	45
290	45
300	45

NP Frame LVL 11

WIDTH (MM)	THICKNESS (MM)	
90	45	-
140	45	-
150	-	90
190	45	-
200	-	90
240	45	90
300	45	90
360	45	90
400	45	90
460	45	90
610	45	90

NP Frame LVL 13

WIDTH (MM)	THICKNESS (MM)	
150	45	63
170	45	63
200	45	63
240	45	63
300	45	63
360	45	63
400	45	63
460	45	63
610	45	63

NP Frame LVL 8

NP Frame LVL 8 is commonly utilised within frame and truss manufacturing. It is straight, and available in a limited range of smaller sectional sizes with the advantage of long length offerings.

NP FRAME LVL 8 LIMIT STATE DESIGN CHARACTERISTIC VALUES (TABLE 1)

PROPERTY		EDGE (MPa)	FLAT (MPa)
Modulus of Elasticity	MoE	8000	8000
Modulus of Rigidity	G	400	400
Bending Strength [1]	f'b	30.0	30.0
Tension Parallel to Grain [2]	f't	20.0	20.0
Compression Parallel to Grain	f'c	30.0	30.0
Compression Perpendicular to Grain	f'p	7.0	-
Shear	f's	5.0	3.0

[1] For 95mm in depth. Refer to Table 9 for adjustment factor above 95mm depth.

[2] For 150mm in depth. Refer to Table 9 for adjustment factor above 150mm depth.

NP Frame LVL 11

NP Frame LVL 11 is a multi-purpose structural LVL product and can be used in a range of applications from stud framing to structural applications. It is straight, and available in a wide range of sectional sizes with the advantage of long length offerings.

NP FRAME LVL 11 LIMIT STATE DESIGN CHARACTERISTIC VALUES (TABLE 2)

PROPERTY		EDGE (MPa)	FLAT (MPa)
Modulus of Elasticity	MoE	11000	11000
Modulus of Rigidity	G	550	550
Bending Strength [1]	f'b	38.0	38.0
Tension Parallel to Grain [2]	f't	26.0	26.0
Compression Parallel to Grain	f'c	38.0	38.0
Compression Perpendicular to Grain	f'p	10.0	10.0
Shear	f's	5.0	3.0

[1] For 95mm in depth. Refer to Table 9 for adjustment factor above 95mm depth.

[2] For 150mm in depth. Refer to Table 9 for adjustment factor above 150mm depth.

NP FRAME LVL 11 SECTION SIZES AND DESIGN PROPERTIES (TABLE 3)

SECTION SIZE (mm)	MASS (kg/m)	I_{xx} ($10^6 mm^4$)	EI_{xx} ($10^9 Nmm^2$)	Z_{xx} ($10^3 mm^3$)	$Øf'bZ_{xx}$ (kNm)#
90 x 45	2.3	2.7	30	61	2.1
140 x 45	3.6	10.3	113	147	4.7
190 x 45	4.9	25.7	283	271	8.2
240 x 45	6.2	51.8	570	432	12.7
300 x 45	7.7	101.3	1114	675	19.1
360 x 45	9.2	175.0	1925	972	26.6
400 x 45	10.3	240.0	2640	1200	32.3
460 x 45	11.8	365.0	4015	1587	41.7
610 x 45	15.6	851.2	9363	2791	70.0
150 x 90	7.7	25.3	278	338	10.7
200 x 90	10.3	60.0	660	600	18.1
240 x 90	12.3	103.7	1140	864	25.3
300 x 90	15.4	202.5	2228	1350	38.1
360 x 90	18.5	349.9	3849	1944	53.2
400 x 90	20.5	480.0	5280	2400	64.6
460 x 90	23.6	730.0	8030	3174	83.4
610 x 90	31.3	1702.4	18726	5582	139.9

#Ø =0.9 for Category 2 applications (refer to Table 5. Strength Reduction Factors) Calculation includes the k_{24} Size Factor.

NP Frame LVL 13

NP Frame LVL 13 is a high-strength structural LVL product and is best used for long spans and high strength situations. It is straight, and available in a wide range of larger sectional sizes with the advantage of long length offerings.

NP FRAME LVL 13 LIMIT STATE DESIGN CHARACTERISTIC VALUES (TABLE 4)

PROPERTY		EDGE (MPa)	FLAT (MPa)
Modulus of Elasticity	MoE	13200	13200
Modulus of Rigidity	G	660	660
Bending Strength [1]	f'b	48.0	48.0
Tension Parallel to Grain [2]	f't	33.0	33.0
Compression Parallel to Grain	f'c	38.0	38.0
Compression Perpendicular to Grain	f'p	10.0	12.0
Shear	f's	5.3	3.0

[1] For 95mm in depth. Refer to Table 9 for adjustment factor above 95mm depth.

[2] For 150mm in depth. Refer to Table 9 for adjustment factor above 150mm depth.

NP FRAME LVL 13 SECTION SIZES AND DESIGN PROPERTIES (TABLE 5)

SECTION SIZE (mm)	MASS (kg/m)	I_{xx} ($10^6 mm^4$)	EI_{xx} ($10^9 Nmm^2$)	Z_{xx} ($10^3 mm^3$)	$Øf'bZ_{xx}$ (kNm)#
150 x 45	3.8	12.7	167	169	6.8
170 x 45	4.4	18.4	243	217	8.5
200 x 45	5.1	30.0	396	300	11.4
240 x 45	6.2	51.8	684	432	16.0
300 x 45	7.7	101.3	1337	675	24.1
360 x 45	9.2	175.0	2309	972	33.6
400 x 45	10.3	240.0	3168	1200	40.8
460 x 45	12.3	365.0	4818	1587	52.7
610 x 45	16.3	851.2	11236	2791	88.4
150 x 63	5.4	17.7	234	236	9.5
170 x 63	6.4	25.8	340	303	11.9
200 x 63	7.2	42.0	554	420	16.0
240 x 63	8.6	72.6	958	605	22.4
300 x 63	10.8	141.8	1871	945	33.7
360 x 63	12.9	244.9	3233	1361	47.1
400 x 63	14.4	336.0	4435	1680	57.1
460 x 63	17.2	511.0	6745	2222	73.8
610 x 63	22.9	1191.7	15730	3907	123.7

#Ø =0.9 for Category 2 applications (refer to Table 5. Strength Reduction Factors) Calculation includes the k_{24} Size Factor.

For larger sectional sizes, refer to NP Design's professional design feature.

Structural Reliability

Structural properties for NP Frame LVL 8, 11 and 13 have been determined by testing in accordance with the requirements of AS/NZS 4357.0:2005 Structural Laminated Veneer Lumber. Characteristic stress are calculated in accordance with AS/NZS 4063.2:2010. NelsonPine LVL characteristic stresses comply with the New Zealand building code through clause C2.3 in NZS 3603:1993. The modulus of elasticity is an average value which includes an allowance for shear deformation. Because of the low variability a lower bound MoE is not required.

Design Considerations for Span Tables

Design Loads and Limits

DEAD LOADS

The roof masses given below and used in the design span tables include for standard types of cladding and ceiling linings and for rafters.

ROOFS	FLOORS
Light Sheet Roof – with ceiling = 40kg/m^2	Particle Board = 30kg/m^2
Terracotta Tile Roof – with ceiling = 90kg/m	Particle Board – with underfloor ceiling = 42kg/m^2

LIVE LOADS

The live loads considered in the tables are those used in NZS 3604:2011; Timber Framed Buildings. Some examples are given below:

- Roof Live Load: 0.25kPa Distributed load, 1.0kN Concentrated load (for strength checks only).
- Floor Live Load: 1.5kPa, 2.0kPa, 3.0kPa Distributed load (for floor joists), 1.5kPa Distributed load (for bearers and lintels), 1.0kN Concentrated load.
- Ceiling Live Load: 1.0kN Concentrated load (for strength checks only).

WIND LOADS

Data determined from NP Design software apply only to Low, Medium, High and Very High wind zones, determined in accordance with clause 5.2.1 of NZS 3604:2011. The design wind speeds considered for these areas are shown below:

WIND ZONE	MAXIMUM DESIGN WIND SPEED (M/S)	
	ULTIMATE LIMIT STATE	SERVICEABILITY LIMIT STATE
Low	32	26
Medium	37	30
High	44	35
Very High	50	40

SNOW LOADS

In accordance with NZS 3604:2011, snow loads up to 0.9kPa have been considered in the preparation of these tables. Therefore, these tables apply to all areas with snow loading up to 0.9kPa. Reference should be made to Figure 15.1 of NZS 3604:2011; Timber Framed Buildings to determine the geographical areas covered by these design span tables.

Using Double Section Members

The use of double section members (except pole bearers) relies on the effective load transfer between members in order to ensure that the two beams act together as a single member.

As a minimum requirement, double members should be nailed together with 2.80Ø nails, one from each side at 200mm centres along the length of the member. The nails should be staggered over the depth of the beam and their lengths should be sufficient to penetrate more than 90% of the combined member thickness. The top and bottom faces of the individual members must be carefully aligned to ensure that the applied loads are equally shared between the two members.

Where a double member is supporting another at right angles to its span, the minimum requirement for nailing will not be sufficient to transfer the loads in the immediate area of the beam connection. Here, suitable proprietary fixings can be used provided nailing to the combined members is with nails of suitable length to penetrate more than 90% of its combined thickness.

Minimum Bearing Lengths

The span lengths provided in the tables are generally governed by limiting deflections and bending moments. In order to achieve these spans, the bearing length at the supports must be provided where specified in the tables. For continuous spans, the bearing lengths given with each table are for the internal supports. For the end supports, the minimum bearing requirements specified for single span members should not be satisfied. Similarly, where an overhang is required, at the support between the overhang and the adjacent back span the minimum bearing lengths for the continuous span members should be adopted.

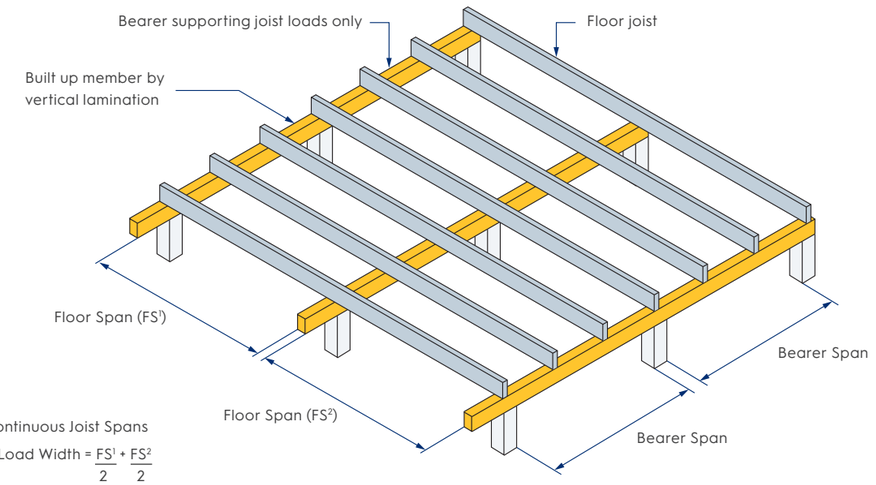
Continuous Spans

For a member to be considered ‘continuous’ it shall span at least 2 adjacent spans such that 1 is greater than or equal to 0.75 x Span 2.

The major span is taken from the continuous span table e.g if span 2 = 6.0 then span 1 is greater or equal to 4.5m Otherwise each span is to be considered ‘single’.

Floor Bearers

A Floor Bearer is a beam required to support floor joists. The joists may be on top of, level with, or below the bearer.



For Continuous Joist Spans

Floor Load Width = $\frac{FS^1}{2} + \frac{FS^2}{2}$

Floor Dead Load - without ceiling - 30kg/m²

BASIC LOADING DATA

Flooring = Particle Board (30kg/m²)

Wind Area = Very High

Floor Live Load = Domestic Std (1.5,1.8)

Wind Design Strength Pressure = 1.5kPa

Wind Servicability Pressure = 1.0584 kPa

Min End Bearing Length = 45mm

Min Intermediate Bearing = 65mm

DIMENSIONAL DATA

Joist Spacing = 45mm

Top Edge Restraint = 45mm

Bottom Edge Restraint = nil

DESIGN DEFLECTION LIMITS

Dead Load - Span/300 or 12mm max

Live Load - Span/360 or 9mm max

Floor Joist Spacing - The tables have been designed assuming the supported floor joists are spaced at a maximum of 600mm centres.

Concentrated Loads - No allowance has been made in the tables for floor joists supporting concentrated loads from load bearing walls.

Single Span

LVL 8 | LVL 11 | LVL 13

FLOOR LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	1800	**2800**	**3700**	**4700**	**5400**
1200	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1600	**2600**	**3500**	**4500**	**5100**
1500	2/140x45	2/190x45	2/240x45		
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	200x63	240x63	300x63	360x63
	1500	**2400**	**3300**	**4300**	**4900**
1800	2/140x45	2/190x45	2/240x45		
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1500	**2300**	**3100**	**4100**	**4700**
2100	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1400	**2200**	**3000**	**4000**	**4500**
2400	2/140x45	2/190x45	2/240x45		
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1300	**2000**	**2800**	**3700**	**4300**
3000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1200	**1800**	**2500**	**3500**	**4000**
4000	2/140x45	2/190x45	2/240x45		
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63*	360x63*
	1100	**1700**	**2300**	**3200**	**3800**
5000	2/140x45	2/190x45	2/240x45	2/290x45*	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/240x45	2/200x45	2/300x45	2/300x45
	150x63	150x63	200x63	300x63*	360x63*

Table values relate to Allowable Maximum Span in mm

* denotes member must have a minimum 65mm bearing length at the two supports.

Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Continuous Span

LVL 8 | LVL 11 | LVL 13

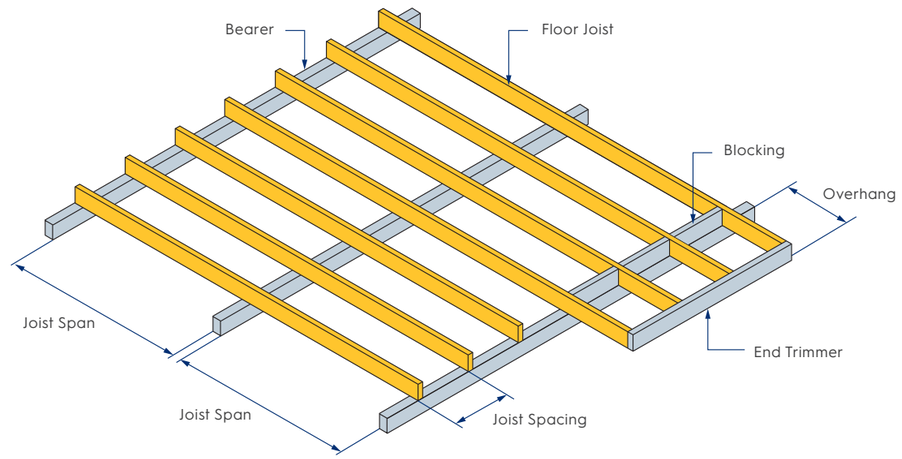
FLOOR LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	2100	**3200**	**4200**	**5200**	**5900**
1200	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1900	**3000**	**3900**	**4900**	**5600**
1500	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	200x63	240x63	300x63	360x63
	1800	**2800**	**3800**	**4700**	**5400**
1800	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	240x63	300x63	360x63*
	1700	**2700**	**3600**	**4500**	**5100**
2100	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	200x63	300x63#	360x63#
	1600	**2600**	**3500**	**4300**	**5000**
2400	2/140x45	2/190x45	2/240x45	2/240x45*	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	200x63	300x63	360x63
	1500	**2400**	**3200**	**4100**	**4700**
3000	2/140x45	2/190x45	2/240x45*	2/290x45#	
	2/90x45	2/140x45	2/190x45	300x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	150x63	150x63	200x63	300x63#	360x63#
	1400	**1800**	**2500**	**3500**	**4000**
4000	2/140x45	2/190x45	2/240x45		
	2/90x45	2/140x45	2/190x45	300x90#	300x90#
	2/150x45	2/150x45	2/200x45	2/240x45*	2/300x45#
	150x63	150x63	200x63#		
	1300	**1700**	**2300**	**3200**	**3800**
5000	2/140x45	2/190x45	2/240x45#		
	2/90x45	2/140x45	2/190x45	300x90#	300x90#
	2/150x45	2/240x45	2/200x45*	2/240x45#	2/300x45#
	150x63	150x63	240x63		

Table values relate to Allowable Maximum Span in mm
* denotes member must have a minimum 65mm bearing length at the two supports.
# denotes member must have a minimum 115mm bearing length at the internal support.

Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Floor Joists

A Floor Joist is one of a number of parallel members required to support flooring.



Floor Dead Load - with ceiling - 40kg/m²

BASIC LOADING DATA

Basic Loading Data

Roofing = Sheet (20kg/m²)

Ceiling = 13mm P'Board (20kg/m²)

Flooring = Particle Board (30kg/m²)

Underfloor Ceiling = 10mm P'Board (12kg/m²)

Floor Live Load = Domestic Std (1.5,1.8kPa)

Wind Area = Very High

Wind Design Strength Pressure = 1.5kPa

Wind Servicability Pressure = 1.0584 kPa

Min End Bearing Length = 30mm

Min Intermediate Bearing = 45mm

AS1684.1 Dynamics for 1.0kN static load

Flooring Material - The above tables allow for a timber flooring material only.

External Use - Where overhanging joists are to be used in an external application such as a balcony, the members must be fully protected from the weather, or treated to an H3.2 level.

DIMENSIONAL DATA

Top Edge Restraint = continuous restraint

Bottom Edge Restraint = nil

DESIGN DEFLECTION LIMITS

Dead Load - Span/300 or 15mm max

Live Load - Span/360 or 9mm max

Dynamic Criteria - 1kN Point Load 2mm max

DESIGN DEFLECTION LIMITS - OVERHANG

Dead Load - Overhang/180 or 6mm max

Live Load - Overhang/180 or 4.5mm max

Single Span

LVL 8 | LVL 11 | LVL 13

FLOOR LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	1700	**2800**	**3900**	**5200**	**6000**
400	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	300x45
		150x63	200x63	240x63	300x63
	1600	**2700**	**3700**	**5100**	**5800**
450	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	300x45
		150x63	200x63	240x63	300x63
	1600	**2600**	**3600**	**4700**	**5400**
600	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	360x45
		150x63	200x63	240x63	300x63

Table values relate to Allowable Maximum Span in mm

Continuous Span

LVL 8 | LVL 11 | LVL 13

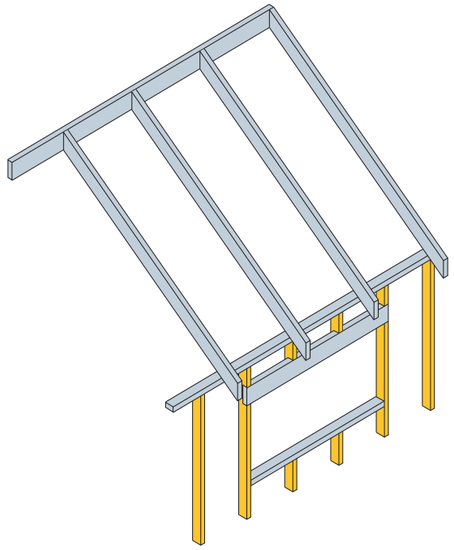
FLOOR LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	1900	**3100**	**4400**	**5700**	**6600**
400	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	300x45
		150x63	200x63	240x63	300x63
	1800	**3000**	**4200**	**5600**	**6400**
450	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	300x45
		150x63	200x63	240x63	300x63
	1800	**2900**	**4100**	**5200**	**5900**
600	140x45	190x45	240x45		
	90x45	140x45	190x45	200x90	240x90
	150x45	150x45	200x45	240x45	300x45
		150x63	200x63	240x63	300x63

Table values relate to Allowable Maximum Span in mm

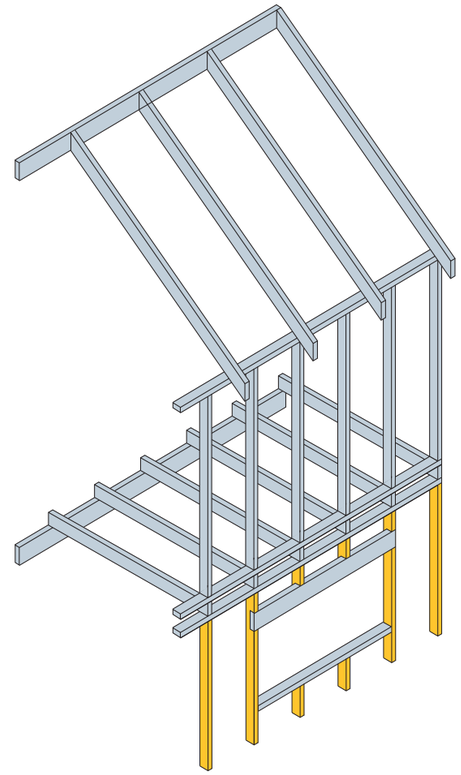
Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Stud Frames

SINGLE STORY STUD FRAMING



LOWER OF TWO LEVELS STUD FRAMING



NELSONPINE LVL STUD TABLE - SINGLE STOREY

Sg = 2.5kPa, Light and Heavy roof, Medium Weight Cladding (0.55kPa), Roof Load Width <6.0m (12.0m span), Eaves up to 750mm.

Maximum Stud Height (m) and Spacing (mm)

LVL8

LVL11

LVL13

WIND ZONE	2.4M					2.7M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45 90x45
VERY HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45 90x45
HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45
MEDIUM	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45

WIND ZONE	3.0M					3.3M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	90x45	90x45	90x45	140x45 90x45	140x45	90x45	90x45	140x45	140x45	190x45
VERY HIGH	90x45	90x45	90x45	140x45 90x45	140x45	90x45	90x45	140x45 90x45	140x45	140x45
HIGH	90x45	90x45	90x45	90x45	140x45 90x45	90x45	90x45	90x45	140x45 90x45	140x45
MEDIUM	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45	140x45 90x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45

WIND ZONE	3.6M					3.9M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	140x45 90x45	140x45 90x45	140x45	140x45	190x45 140x45	140x45	140x45	140x45	140x45	190x45 150x45
VERY HIGH	90x45	140x45 90x45	140x45	140x45	140x45	140x45 90x45	140x45	140x45	140x45	190x45 140x45
HIGH	90x45	90x45	140x45 90x45	140x45	140x45	90x45	140x45 90x45	140x45	140x45	140x45
MEDIUM	90x45	90x45	90x45	140x45 90x45	140x45	90x45	90x45	140x45 90x45	140x45	140x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	90x45	140x45	90x45	90x45	90x45	140x45 90x45	140x45

WIND ZONE	4.2M					4.8M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	140x45	140x45	140x45	190x45 140x45	190x45	140x45	190x45 140x45	190x45	190x45	190x45
VERY HIGH	140x45	140x45	140x45	190x45 140x45	190x45	140x45	140x45	190x45 150x45	190x45	190x45
HIGH	140x45 90x45	140x45	140x45	140x45	190x45 140x45	140x45	140x45	190x45 140x45	190x45 150x45	190x45
MEDIUM	90x45	140x45 90x45	140x45	140x45	140x45	140x45	140x45	140x45	140x45	190x45 150x45
LOWER & INTERNAL WALLS	90x45	90x45	140x45 90x45	140x45	140x45	140x45 90x45	140x45	140x45	140x45	190x45 140x45

WIND ZONE	5.4M					6.0M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	190x45 140x45	190x45	190x45	200x45		190x45	190x45			
VERY HIGH	190x45 140x45	190x45 150x45	190x45	190x45		190x45	190x45	200x45		
HIGH	140x45	190x45 140x45	190x45	190x45	200x45	190x45 150x45	190x45	190x45	200x45	
MEDIUM	140x45	140x45	190x45 140x45	190x45 150x45	190x45	140x45	190x45 140x45	190x45 140x45	190x45	200x45
LOWER & INTERNAL WALLS	140x45	140x45	140x45	190x45 140x45	190x45	140x45	140x45	190x45 140x45	190x45	190x45

NELSONPINE LVL STUD TABLE - LOWER OF TWO LEVELS

Sg = 2.5kPa, Light and Heavy roof, Medium Weight Wall Cladding (0.55kPa), Roof Load Width <6.0m (12.0m Span), Eaves up to 750mm, Floor Load width 2kPa <3.0m (6.0m span.

Maximum Stud Height (m) and Spacing (mm)

LVL8

LVL11

LVL13

WIND ZONE	2.4M					2.7M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45 90x45	140x45
VERY HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45
HIGH	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45 90x45
MEDIUM	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45

WIND ZONE	3.0M					3.3M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	90x45	140x45 90x45	140x45 90x45	140x45	140x45	90x45	140x45 90x45	140x45	140x45	140x45
VERY HIGH	90x45	90x45	140x45 90x45	140x45	140x45	90x45	140x45 90x45	140x45	140x45	140x45
HIGH	90x45	90x45	90x45	140x45 90x45	140x45	90x45	90x45	140x45 90x45	140x45	140x45
MEDIUM	90x45	90x45	90x45	90x45	140x45 90x45	90x45	90x45	90x45	140x45 90x45	140x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	90x45	140x45 90x45

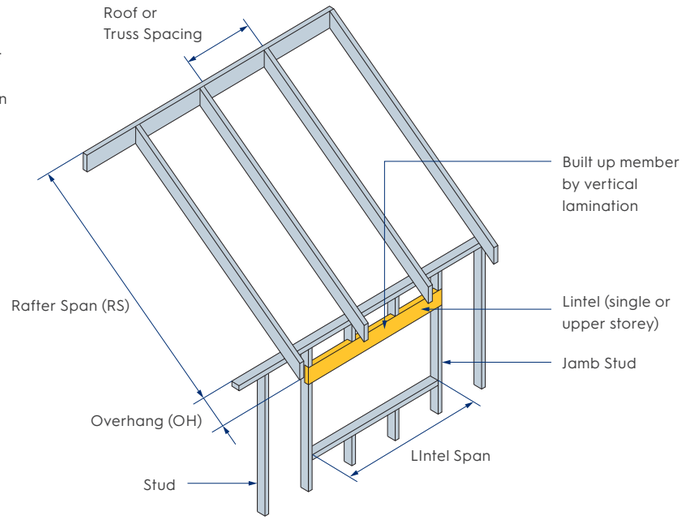
WIND ZONE	3.6M					3.9M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	140x45 90x45	140x45	140x45	140x45	190x45 150x45	140x45	140x45	140x45	190x45 140x45	190x45
VERY HIGH	140x45 90x45	140x45	140x45	140x45	190x45 140x45	140x45	140x45	140x45	190x45 140x45	190x45
HIGH	90x45	140x45 90x45	140x45	140x45	140x45	140x45 90x45	140x45	140x45	140x45	190x45 140x45
MEDIUM	90x45	140x45 90x45	140x45 90x45	140x45	140x45	90x45	140x45 90x45	140x45	140x45	140x45
LOWER & INTERNAL WALLS	90x45	90x45	90x45	140x45 90x45	140x45	90x45	90x45	140x45 90x45	140x45	140x45

WIND ZONE	4.2M					4.8M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	140x45	140x45	190x45 140x45	190x45	190x45	190x45 140x45	190x45 150x45	190x45	190x45	
VERY HIGH	140x45	140x45	190x45 140x45	190x45 150x45	190x45	140x45	190x45 140x45	190x45	190x45	200x45
HIGH	140x45	140x45	140x45	190x45 140x45	190x45	140x45	140x45	190x45 150x45	190x45	190x45
MEDIUM	140x45 90x45	140x45	140x45	140x45	190x45 140x45	140x45	140x45	140x45	190x45 150x45	190x45
LOWER & INTERNAL WALLS	90x45	140x45	140x45	140x45	140x45	140x45	140x45	140x45	140x45	190x45 150x45

WIND ZONE	5.4M					6.0M				
	150 or 2/300	200 or 2/400	300 or 2/600	400	600	150 or 2/300	200 or 2/400	300 or 2/600	400	600
EXTRA HIGH	190x45	190x45	200x45			190x45	200x45			
VERY HIGH	190x45 150x45	190x45	190x45			190x45	190x45			
HIGH	190x45 140x45	190x45 150x45	190x45	190x45		190x45	190x45	200x45		
MEDIUM	140x45	190x45 140x45	190x45	190x45	190x45	190x45 140x45	190x45 150x45	190x45	190x45	
LOWER & INTERNAL WALLS	140x45	140x45	190x45 140x45	190x45 150x45	190x45	140x45	190x45 150x45	190x45	190x45	200x45

Lintels

Lintels are beams contained with load bearing walls over windows or doors. They transfer the vertical loads applied over the opening to the jamb studs on each side.



Roof Load Width = $\frac{RS}{2}$ + OH

Lintel Information

DIMENSIONAL DATA

Roof Pitch = 15.0 deg

Bottom Edge Restraint = nil

BASIC LOADING DATA

Snow Load = 0.9kPa

Wind Area = Very High

Wind Design Strength Pressure = 1.5kPa

Wind Servicability Pressure = 1.0584 kPa

Min End Bearing Length = 60mm

DESIGN DEFLECTION LIMITS

Dead Load - Span/300 or 10mm max

Live Load - Span/360 or 10mm max

TABLE 1: LIGHT SHEET ROOF - WITH CEILING - 40KG/M2 (SINGLE OR UPPER STOREY)

Roofing = Sheet (20kg/m^2)

Ceiling = 13mm P'Board = (20kg/m^2)

TABLE 2: HEAVY TILE ROOF - WITH CEILING - 90KG/M2 (SINGLE OR UPPER STOREY)

Roofing = Terracotta Tiles (70kg/m^2)

Ceiling = 13mm P'Board = (20kg/m^2)

Wall Cladding - No allowance has been made in the tables for the lintels to support a heavy veneer cladding.

Single Span

LVL 8 | LVL 11 | LVL 13

TABLE 1

ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	2100	**3200**	**4000**	**4700**	**5500**
1800	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	2000	**3100**	**3900**	**4600**	**5400**
2100	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1900	**3000**	**3800**	**4500**	**5300**
2400	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1800	**2800**	**3600**	**4400**	**5200**
3000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1600	**2600**	**3300**	**4200**	**5000**
4000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/360x45
	1500	**2400**	**3200**	**4000**	**4800**
5000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/360x45

Table values relate to Allowable Maximum Span in mm

Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Single Span

LVL 8 | LVL 11 | LVL 13

TABLE 2

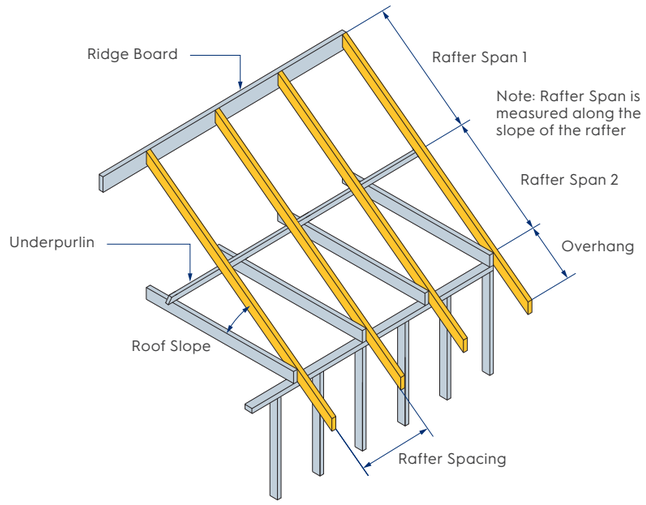
ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	1600	**2600**	**3300**	**4000**	**4700**
1800	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1600	**2400**	**3200**	**3900**	**4600**
2100	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1500	**2300**	**3100**	**3800**	**4500**
2400	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1400	**2200**	**2900**	**3600**	**4300**
3000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1200	**2000**	**2700**	**3400**	**4100**
4000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/300x45
	1200	**1800**	**2500**	**3200**	**3900**
5000	2/140x45	2/190x45	2/240x45	2/290x45	
	2/90x45	2/140x45	2/190x45		2/300x45
	150x90	150x90	200x90	240x90	300x90
	2/150x45	2/150x45	2/200x45	2/240x45	2/360x45

Table values relate to Allowable Maximum Span in mm

Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Rafters

A Rafter is one of a number of parallel members required to support roofing loads via an overlying set of battens or purlins. They are aligned at the roof and run perpendicular to the ridge and top plate.



Rafter Information

DIMENSIONAL DATA

Roof Pitch = 15.0 deg

Top Edge Restraint = 0.9m

Bottom Edge Restraint = 0.45m

BASIC LOADING DATA

Snow Load = 0.9kPa

Wind Area = Very High

Wind Design Strength Pressure = 1.5kPa

Wind Servicability Pressure = 1.0584 kPa

Min End Bearing Length = 36mm

Overhangs - The overhanging rafters must be tied together at their ends by a fascia board. No overhang is to be greater than one half of the adjacent back span.

DESIGN DEFLECTION LIMITS

Dead Load - Span/300 or 200mm max

Live Load - Span/250 or 12.5mm max

Overhang - Span/300 or 10mm max

TABLES 1 & 2: LIGHT SHEET ROOF - WITH CEILING - 40KG/M²

Roofing = Sheet (20kg/m²)

Ceiling = 13mm P'Board = (20kg/m²)

TABLES 3 & 4: HEAVY ROOF TILE - WITH CEILING - 90KG/M²

Roofing = Terracotta Tiles (70kg/m²)

Ceiling = 13mm P'Board = (20kg/m²)

Single Span

LVL 8 | LVL 11 | LVL 13

TABLE 1

ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	2400	**3700**	**4900**	**5200**	**6500**
600	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			150x63	200x63	240x63
	2100	**3200**	**4400**	**4700**	**6000**
900	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			150x63	200x63	240x63
	1900	**3000**	**4000**	**4300**	**5700**
1200	140x45	190x45	240x45	240x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			150x63	200x63	240x63

Continuous Span

LVL 8 | LVL 11 | LVL 13

TABLE 2

ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	3200	**5000**	**6400**	**6700**	**8200**
600	140x45	190x45	240x45	240x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			150x63	200x63	240x63
	2800	**4400**	**5900**	**6200**	**7600**
900	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			200x63	200x63	240x63
	2600	**4000**	**5400**	**5800**	**7200**
1200	140x45	190x45	240x45	240x45	290x45
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
			150x63	200x63	240x63

Table values relate to Allowable Maximum Span in mm

Span tables shown here for NP Frame LVL 8, 11 and 13 are representative for the basic design function in the NP Design program. For specific design options we refer to NP Design's professional design feature.

Single Span

LVL 8 | LVL 11 | LVL 13

TABLE 3

ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	1800	**2900**	**3900**	**4200**	**5500**
600	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	150x63	200x63	240x63
	1600	**2500**	**3400**	**3700**	**4900**
900	140x45	190x45	240x45	240x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	200x63	200x63	240x63
	1500	**2300**	**3100**	**3400**	**4500**
1200	140x45	190x45	240x45	240x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	150x63	200x63	240x63

Continuous Span

LVL 8 | LVL 11 | LVL 13

TABLE 4

ROOF LOAD WIDTH (MM)	MAXIMUM SPAN (MM)				
	2500	**3900**	**5300**	**5700**	**7000**
600	140x45	190x45	240x45	240x45	290x45
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	150x63	200x63	240x63
	2200	**3400**	**4600**	**5000**	**6400**
900	140x45	190x45	240x45	290x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	150x63	200x63	240x63
	2000	**3100**	**4200**	**4600**	**6000**
1200	140x45	190x45	240x45	240x45	
	90x45	140x45	190x45	150x90	200x90
	150x45	150x45	200x45	200x45	300x45
		150x63	150x63	200x63	240x63

Table values relate to Allowable Maximum Span in mm

Structural Design Information

DESIGN STANDARDS

Design loads are to be determined in accordance with AS/NZS 1170:2002. Although design data for NelsonPine LVL is not specifically given in NZS 3603:1993, the general principles can be used, complying with the New Zealand Building Code through Clauses 2.3 and C2.3 of NZS 3603. For specific design in Australia this section is to be read in conjunction with AS1720.1

1. STRENGTH REDUCTION FACTOR

The strength reduction factor for calculating the design of structural members should be taken from Table 6.

TABLE 6. STRENGTH REDUCTION FACTORS
Table extracted from Table 2.1 AS1720.1-2010

	CATEGORY 1	CATEGORY 2	CATEGORY 3
Structural Timber Material	Structural members for houses for which failure would be unlikely to affect an area* greater than 25m^2: OR secondary members in structures other than houses	Primary structural members in structures other than houses: OR elements in houses for which failure would be likely to affect an area* greater than 25m^2	Primary structural members in structures intended to fulfill an essential service or post disaster function
Structural LVL - AS/NZS 4357.0	0.95	0.90	0.80

2. DURATION OF LOAD FACTORS

Duration of load factors k_1 for strength and k_2 for stiffness should be the same as for solid timber in Tables 2.4 and 2.5 of NZS 3603. NelsonPine LVL is a solid veneer product and has similar load duration properties to timber. It is manufactured in the dry condition so will behave like kiln dried solid sawn timber, except that moisture change will be slower because the glue lines provide a barrier to moisture movement.

3. BEARING AREA FACTOR

The bearing area k_3 is per NZS 3603.

STRENGTH MODIFICATION FACTORS

Because of the low variability in properties of NelsonPine LVL, a number of the k factors do not apply or are different from those in NZS 3603. The strength modification factors for NelsonPine LVL are:

4. LOAD SHARING FACTOR

Because NelsonPine LVL is much less variable than sawn lumber, the load sharing and lamination relationships in NZS 3603 do not apply. Hence, $k_4 = k_5 = k_6 = 1.0$.

5. MOISTURE CONTENT FACTOR

For use of NelsonPine LVL in dry conditions, no modification is required. Where NelsonPine LVL is subject to humid conditions such that the average moisture content would exceed 16% over a 12 month period, the moisture content factor k_{14} in Table 6 should be used for strength calculations. A moisture content exceeding 20% may be subject to a decay hazard, requiring chemical treatment of the NelsonPine LVL or detailing to avoid the high moisture content. NelsonPine LVL responds to moisture a similar way as solid wood, albeit slower as the gluelines inhibit moisture uptake.

TABLE 7. MOISTURE CONTENT FACTOR K_{14}

PROPERTY	<16%	MOISTURE CONTENT 16-25%	>25%
Bending & Compression	1.0	1.53 - 0.033 MC	0.7
Tension & Shear	1.0	1.35 - 0.022 MC	0.8
MoE	1.0	1.35 - 0.022 MC	0.8

6. STABILITY FACTOR

The stability factor k_8 is per NZS 3603.

7. FACE GRAIN ORIENTATION (CURVED OR TAPERED EDGES)

LVL is made from parallel laminated veneer. It is very strong parallel to the grain, but stresses perpendicular to the grain should be avoided, just as in solid timber. Wide sections must be handled carefully.

When a design includes principal stresses parallel to edges which have been cut sloped or curved to the longitudinal grain direction (Figure 1), the grain orientation factor k_{16} for strength given in Table 7 should be used to evaluate strength reduction at the extreme fibre edges. Examples where this might be considered are at the point of highest bending moment in a sloping rafter or column edge, such as at a knee or apex joint in a portal frame. Steep grain slopes should be avoided if possible in tension zones because the strength reduction is severe.

To determine bending deflections k_{16}, the stiffness of sloping sections can be evaluated by integrating (summing) a number of small lengths of changing section depth.

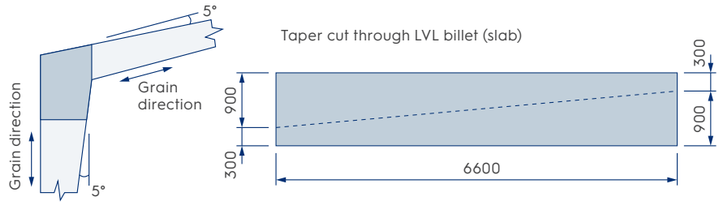
TABLE 8. GRAIN ORIENTATION FACTOR K_{15} AND K_{16} FOR CUT EDGES

ANGLE OF CUT EDGE (°)	0	3	5	10	15	20	30	45
Edge in Tension	1.00	0.92	0.80	0.50	0.31	0.21	0.11	0.06
Edge in Compression	1.00	0.97	0.93	0.79	0.65	0.55	0.42	0.32

FIGURE 1. AN EXAMPLE OF DESIGN FOR SLOPING GRAIN IN NELSONPINE LVL

The taper cut rafter has taper cut through LVL billet (slab) high tensile stress at 5° cut, so use $k_{15} = 0.8$.

The column cut from the same slab has cut edge in compression, so use $k_{15} = 0.93$.



8. SIZE EFFECT FACTOR

A size factor shall be applied to the characteristic strength of NelsonPine LVL in bending and tension parallel to grain as per Table 8. For beams in bending less than 95mm in depth there is no adjustment. For beams deeper than 95mm in bending multiply the characteristic bending strength by $(95/d)^{0.167}$. For beams in tension less than 150mm in depth there is no adjustment. For beams deeper than 150mm multiply the characteristic tension strength by $(150/d)^{0.167}$.

TABLE 9. SIZE FACTOR K_{24} FOR BENDING AND TENSION STRENGTH

	DEPTH OF LVL MEMBER (MM)									
	95	150	200	240	300	360	400	460	610	1220
Bending	1.00	0.97	0.88	0.86	0.83	0.80	0.79	0.77	0.73	0.65
Tension	1.00	1.00	0.95	0.92	0.89	0.86	0.85	0.83	0.79	0.70

For shear and compression the size factor = 1.0

For tension perpendicular to grain, refer to AS 1720.1

9. JOINT GROUP

The Joint Strength Group for NelsonPine LVL depends on the orientation and type of fasteners as per Table 9. For structures that require specific design of joints, this table is to be read in conjunction with NZS3603 Section 4, Joints.

TABLE 10. CLASSIFICATION OF NELSONPINE LVL FOR JOINT DESIGN

GRADE	NAILS & SCREWS IN LATERAL LOAD		NAILS & SCREWS IN WITHDRAWAL		SELF DRILLING SCREWS IN LATERAL LOAD (E.G. TYPE 17)		SELF DRILLING SCREWS IN WITHDRAWAL (E.G. TYPE 17)		BOLTS & COACH SCREWS IN LATERAL LOAD DRILLED INTO FACE	
	Edge	Face	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge
LVL 13	J5	J4	J5	J4	J4	J4	J4/5	J4/5	J3	J2
LVL 11	J5	J4	J5	J4	J4	J4	J4/5	J4/5	J3	J2
LVL 8	J5	J5	J5	J5						

Fasteners in the Face = fasteners that penetrate the face perpendicular to the grain

Fasteners in the Edge = fasteners that penetrate the edge parallel to the glue lines. For tension perpendicular to grain, refer to AS 1720.1

10. FIRE RESISTANCE

Large NelsonPine LVL members have excellent fire resistance on account of the slow and predictable charring rate when exposed to severe fires.
The phenol formaldehyde adhesive used in the manufacture of NelsonPine LVL remains inert during fire exposure. NelsonPine LVL can be designed for fire resistance in the same way as glulam. From studies completed at the University of Canterbury, the design charring rate of NelsonPine LVL in the standard fire test has been shown to be 0.72mm/min

11. CORROSION

Resistance Radiata Pine is relatively inert chemically and under normal conditions, unlike other structural materials it is not subject to chemical change or deterioration. NelsonPine LVL is resistant to most acids, rust and other corrosive situations including hide curing complexes, fertiliser storage and swimming pools.

MOISTURE CONTENT OF NELSONPINE LVL

When exposed to moisture during construction NelsonPine LVL may swell due to the uptake of moisture, as will sawn timber.

The width of product (90 or 140 mm) will exhibit reversible swell, returning to its original width once the moisture content has reduced to original, however the thickness (45mm) exhibits some irreversible swell due to the slight compression in the hot press during the manufacturing process. The amount of compression released will depend on the highest moisture content that the LVL reaches.

TABLE 11. DIMENSIONAL SWELL: APPROXIMATE DIMENSION OF FRAMING AT A GIVEN MOISTURE CONTENT

MOISTURE CONTENT %	THICKNESS (MM)	WIDTH (MM)	WIDTH (MM)	LENGTH (MM)
10%	44.8	90.0	140.0	2400.0
14%	45.7	90.7	141.1	2400.1
20%	46.5	91.8	142.9	2400.3
29%	47.2	93.5	145.4	2400.8

MOISTURE CONTENT MEASUREMENT IN NELSONPINE LVL (DEVELOPED BY SCION RESEARCH INSTITUTE)

Using a resistance type moisture meter:

1. It is recommended that a resistance type moisture meter with a sliding hammer type electrode is used to test the moisture content of framing.
2. The resistance moisture meter should be calibrated to AS/NZS 1080.1
3. Drive the sliding hammer electrode into the stud, with the probes driven to 1/3 of the depth of the timber being measured (15 mm for 45 mm thick NelsonPine LVL).
4. Take the measurement, and record the measurement and the location of the stud.
5. Test studs approximately mid-height, with the probes parallel to the grain into the inner side of the studs.
6. Repeat from step 3 by testing ten studs throughout the house.
7. After testing ten studs, use Table 3 to convert the moisture meter readings.
8. Acceptable moisture content for closing in a building is typically when nine out of ten corrected measurements are less than or equal to 20% (33% uncorrected reading).
9. In practice, this means 9 out of 10 unconverted meter readings must be 33 or less.

TABLE 12. CONVERSION OF RESISTANCE MOISTURE METER READINGS TO TRUE MOISTURE CONTENT FOR NELSONPINE LVL

IF A RESISTANCE TYPE MOISTURE METER READS:																											
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
CORRECTED MOISTURE CONTENT (%) IS:																											
6	6	7	8	8	9	10	10	11	11	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20

Additional Information

NelsonPine LVL is a sustainably-grown plantation radiata pine engineered wood composite manufactured from rotary peeled veneers, laid up and bonded with parallel grain orientation.

Cross banded NelsonPine LVL includes veneer layers at perpendicular grain orientation to the primary grain direction.

The primary benefits of NelsonPine LVL over sawn timber are:

- Stiffness and visual grade sorting of the veneers allows placement of specific veneer qualities at specific positions in the LVL to optimise visual and structural properties and minimise structural variability.
- The randomisation and dispersion of strength reducing characteristics, such as knots and holes, throughout the veneer layer assembly results in more uniform structural properties.
- LVL is straighter than sawn timber as the LVL cross section is composed of multiple laminates, so does not have concentrated grain disturbances inherent in sawn timber.
- LVL is produced with the capability of longer lengths and wider sectional sizes.

PRODUCT CERTIFICATION

NelsonPine LVL is certified to AS/NZS 4357.0:2005 Structural Laminated Veneer Lumber by the Engineered Wood Products Association of Australasia (EWPAA), a JAS/ANZ accredited certification body. EWPAA's certification with JAS/ANZ is a Type 5 Certification Scheme under the globally recognised standard ISO/IEC 17067:2013 Conformity assessment —Fundamentals of Product Certification and Guidelines for Product Certification Schemes.

The EWPAA's Type 5 certification scheme goes further than the requirements of ISO 17067:2013. It includes ongoing inspection and testing of product in the factory and in the market, as well as auditing of the manufacturing process and management systems. In turn, an independent panel of industry experts' reviews EWPAA's systems and certification activities. This puts the EWPAA certification scheme among the most comprehensive in the building products industry.

Nelson Pine Industries operates a continuous process control system in accordance with the requirements of AS/NZS 4357.0:2005 and the EWPAA Product Certification Scheme. Structural properties published for NelsonPine LVL are determined by independent third-party testing in accordance with the requirements of AS/NZS 4357.0:2005 Structural Laminated Veneer Lumber.

NelsonPine LVL is certified to ISO 9001:2015 Quality Management System by Telarc, New Zealand's leading management systems assessment and certification body under JAS-ANZ accreditation.

LVL is manufactured under a fully quality controlled process.

PRODUCT SPECIFICATION

Veneer Thickness - Nominal 3.6mm

Species - Radiata Pine

Joints - Scarf/overlap/butt

MOISTURE CONTENT

8-15% at time of dispatch

ADHESIVE

Phenolic producing a Type A Bond in accordance with AS/NZS 2754.1

DIMENSIONAL TOLERANCES

Length -0mm, +15mm

Depth -2mm, +2mm

Spring <(L/1000)

STORAGE AND HANDLING

NelsonPine LVL expands in thickness and depth if allowed to get wet. To ensure the full benefits of NelsonPine LVL as a dry, straight and true material are available at the time of installation, the following recommendations regarding storage are made:

1. NelsonPine LVL is kept dry during storage and transport.
2. Stored under a ventilated cover.
3. Stacked clear of the ground on bearers at least every two metres.
4. Bearers to be placed vertically in line to support NelsonPine LVL evenly.
5. Avoid mechanical damage during handling.

NELSON PINE INDUSTRIES LTD

PO Box 3049, Richmond,
Nelson, New Zealand 7050

Phone: 03 543 8800 or 0800 800 438

Website: www.nelsonpine.co.nz