SmartFrame *Red Alert* wall framing

- ☑ Strong and light Smart LVL 12
- ☑ JD4 joint group
- ☑ Straight, no twists and warps
- ☑ Coloured Red for easy identification
- ☑ Glue-line H2S treated to AS/NZS 1604.4 (H2 treatment available for North of the Tropic of Capricorn)
- ☑ Sizes 70, 90, 140 and 190 x 35 mm
- ☑ Lengths 2.4 -12.0 m (please check availability on lengths greater than 9.0 m)
- ☑ Precision docking of studs available on request

Design tables

1. Wall studs

Characteristic properties			
Bending	f'_b	46	MPa
Compression parallel	f'_c	30	MPa
Edge shear	f'_s	4.5	MPa
Modulus of Elasticity	E	12,000	MPa

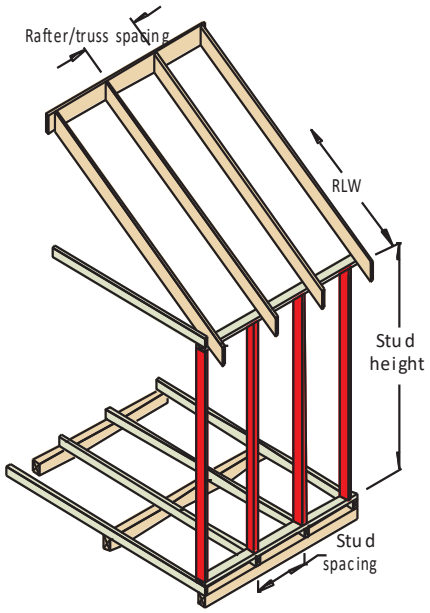
Design loads		
Roof dead load	40	kg/m^2 (sheet)
Roof dead load	90	kg/m^2 (tile)
Roof live load	0.25	kPa
Floor dead load:	40	kg/m^2 (sheet)
Floor live load	1.5	kPa
Wall dead load	30	kg/m^2
Wind speed:	N3	

Design criteria/assumptions:

1) Double studs are nail laminated
2) Reduced f'_b by 40% for notched stud
3) Reduced f'_c & f'_t by 22% for notched stud
4) Studs are assumed laterally restrained by noggings
5) Maximum 450 mm stud spacing
6) Rafter/truss spacing -up to 600 mm for tile & 900 mm for sheet roof
7) Maximum 600 mm floor joist spacing
8) Upper wall height is assumed to be the same as the lower wall height

Common wall studs - (not notched)

Size	Stud height (m)	Maximum recommended RLW (m)	
		Sheet roof (40 kg/m^2) Max 900 mm truss spacing	Tile roof (90 kg/m^2) Max 600 mm truss spacing
70x35	up to 2.7 m	Floor load width up to 4.5 m	
		10.0	8.5
	2.7 - 3.0 m	Floor load width up to 2.0 m	
		3.0	2.5
90x35	up to 3.0 m	Floor load width up to 4.5 m	
		10.0	10.0

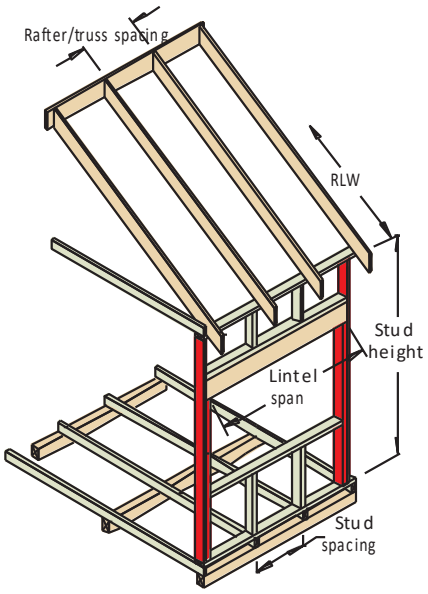


Common wall studs - (maximum 20 mm notch into the depth for bracing element)

Size	Stud height (m)	Maximum recommended RLW (m)	
		Sheet roof (40 kg/m^2) Max 900 mm truss spacing	Tile roof (90kg/m^2) Max 600 mm truss spacing
70x35	up to 2.7 m	Floor load width up to 2.0 m	
		2.5	2.0
	2.7 - 3.0 m	Floor load width up to 2.0 m	
		NS	NS
90x35	up to 2.7 m	Floor load width up to 4.5 m	
		10	10
	2.7 - 3.0 m	Floor load width up to 4.5 m	
		6.7	5.4

Jamb studs - (not notched)

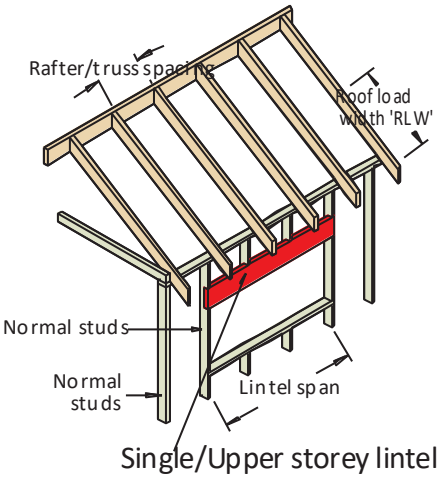
Size	Jamb stud height (m)	Roof load width (m)	Maximum recommended opening width (m)					
			Sheet roof (Max 900 mm truss spacing)			Tile roof (Max 600 mm truss spacing)		
			No floor	2.0 m FLW	4.5 m FLW	No floor	2.0 m FLW	4.5 m FLW
2/70x35	up to 2.7 m	1.5	2.1	1.9	1.6	2.0	1.8	1.5
		4.5	1.7	1.5	1.4	1.6	1.4	1.3
		7.5	1.4	1.3	1.1	1.3	1.2	1.0
	2.7 - 3.0 m	1.5	1.3	1.2	1.1	1.2	1.1	1.0
		4.5	1.1	1.0	0.8	1.0	0.9	0.7
		7.5	0.8	0.7	0.6	0.7	0.6	0.5
2/90x35	up to 2.7 m	1.5	4.1	3.8	3.4	4.0	3.7	3.3
		4.5	3.5	3.2	2.9	3.2	3.0	2.8
		7.5	3.0	2.8	2.6	2.7	2.5	2.3
	2.7 - 3.0 m	1.5	3.2	3.0	2.7	3.1	2.9	2.7
		4.5	2.8	2.6	2.4	2.6	2.5	2.3
		7.5	2.4	2.3	2.1	2.2	2.1	2.0



Studs supporting concentrated loads - (not notched)

Size	Jamb stud height (m)	Maximum recommended roof area supported (m^2)					
		Sheet roof (40 kg/m^2)			Tile roof (90 kg/m^2)		
		No floor	5 m^2 floor	10 m^2 floor	No floor	5 m^2 floor	10 m^2 floor
2/70x35	up to 2.7 m	30	25	22	20	18	15
	2.7 - 3.0 m	16	13	9	12	9	6
2/90x35	up to 2.7 m	44	40	37	31	28	25
	2.7 - 3.0 m	38	34	30	27	24	21

2. Single and upper storey lintels

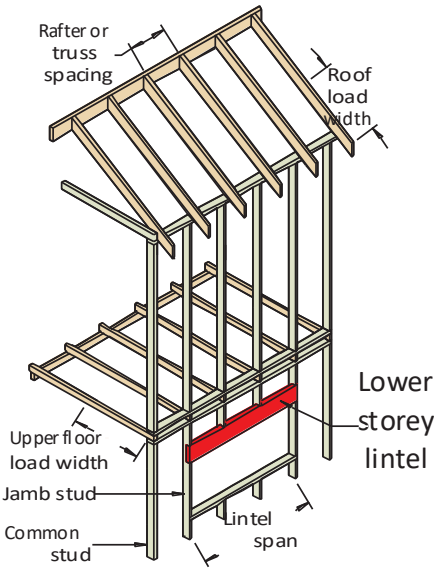


Roof load width (mm)		1500		3000		4500		6000		7500	
Rafter/truss spacing (mm)		600	1200	600	1200	600	1200	600	1200	600	1200
Size DxB (mm)	Roof mass (kg/m^2)	Maximum recommended lintel span (mm)									
90x35	40	1700	1500	1400	NS	NS	NS	NS	NS	NS	NS
	90	1300	NS	1000	NS	NS	NS	NS	NS	NS	NS
140x35	40	2700	2700	2100	2100	1800	NS	1600	NS	NS	NS
	90	2000	2000	1600	1400	1400	NS	NS	NS	NS	NS
190x35	40	3400	3400	2900	2900	2500	2600	2300	1400	1700	NS
	90	2800	2800	2200	2200	1900	1400	1700_5	NS	1100	NS

NOTES :

1. D = member depth, B = member breadth, NS = not suitable.
2. Minimum bearing length = 70 mm at end supports. Subscript values indicate the minimum additional bearing length where required to be greater than 70 mm.

3. Lower storey lintels



Roof load width (mm)	1500			3000			4500			6000		
Upper floor load width (mm)	1200	2400	3600	1200	2400	3600	1200	2400	3600	1200	2400	3600
Size DxB (mm)	Maximum recommended lintel span (mm)											
	Sheet roof											
140x35	1500	1400	1300	1400	1300	1200	1400	1300	1200	1300	1200	1100
190x35	2100	1900	1700_{15}	2000	1800	1700_{15}	1900	1700_5	160015	1800	1700_{10}	1600_{20}
	Tile roof											
140x35	1400	1300	1200	1300	1200	1100	1200	1100	1100_5	1100	1100_5	1000_{10}
190x35	1900	1800	1600_{15}	1800	1600_{10}	1500_{20}	1600_{10}	1500_{20}	1500_{30}	1500_{20}	1500_{30}	1400_{35}

NOTES :

1. D = member depth, B = member breadth, NS = not suitable.
2. Total upper floor mass of 40 kg/m^2, Total wall mass of 37 kg/m^2, Floor live load of 1.5 kPa, Floor point load of 1.8 kN
3. Minimum bearing length = 70 mm at end supports. Subscript values indicate the minimum additional bearing length where required to be greater than 70 mm

Weather Exposure of LVL wall frames

This document is a subset of the master **SmartLVL Design Guide** which contains a detailed section dealing **with "Durability and exposure to moisture"** for all SmartFrame LVL.

That reference, while not been reproduced in this specific document, is the SmartFrame generic recommendations for the use of LVL in exposed applications, and during temporary exposure during the construction phase.

Only additional or amended recommendations that differ from the master SmartLVL Design Guide for this specific framing use are added in this document.

Supplementary information - wall frame fabricators

LVL will swell if it receives significant moisture ingress, and not all of that swell will be recovered once the LVL's moisture content has stabilised to the equilibrium moisture content typically found in an enclosed house frame in Australia.

For multiple studs, the swelling of individual studs, and the water trapped between touching elements may compound to cause lateral displacement in frames and around openings.

The effect of swell can be reduced by:

1. Keeping the completed frames covered before delivery to site
2. Under sizing the noggings by 1-2 mm to allow for swelling. Exact length would vary based upon climate, season and accuracy of cut
3. Nogging installation:
   - i. Leave end noggings out of wall frames to require the builders to add at the time of lining to reduce the effect of bowing on frame squareness

     Alternatively
   - ii. Install a sliding end nogging at either the top or bottom of the frame that would be fixed onsite by the builder
4. Use the strength of LVL to:
   - i. Increase stud spacing where applicable
   - ii. minimise the amount of multiple studs under concentrated loads
5. If the design calls for trenched top and bottom plates, the trenches should be overcut by 4 mm to accommodate the swell of the stud
6. Consider a solid timber bottom plate to minimise plate swelling.

Supplementary Information - Frame installers

1. LVL frames should be enclosed as quickly as reasonable practical, or installed during extended periods of dry weather, to prevent swelling of the LVL sufficient to generate lateral displacement in frames and around openings
2. Maintain good airflow around framing elements and do not allow water to pool on or around element
3. Ensure that floors can drain by creating drainage holes in the floor substrate
4. Remove bottom plates in door openings as soon as possible to prevent longitudinal swelling in the bottom plate of the frames.
5. Install plasterboard lining 10 mm off the floor as per manufacturers' recommendations to allow for swell that may have occurred in the bottom plate.

Remedial measures for an excessively swelled frame

In the event that framing does get very wet, and construction is to continue immediately, the following remedial steps are recommended:

1. Enclose the frame as soon as possible
2. Knock out noggings in the wall frames to keep the frame end studs straight. Replace noggings before lining once the framing moisture content is below 20%.
3. Do not line the frames until the moisture content is below 20%
4. If planing is deemed necessary, planing of the top and bottom veneers is allowable to return the thickness of the LVL back to original
5. It is NOT recommended to plane back the depth of the LVL as it will shrink back to an undersized member once equalised to internal moisture content conditions.

SMARTFRAME

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