GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ALONG

V06/11

Lines		*Bracing Elements*							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved	
								W	E
558	a	1	3.5		2.4	GS1-N	GIB®	242	210
		2	2		2.4	GS1-N	GIB®	138	120
		3	2.1		2.4	GS1-N	GIB®	145	126
		4	1.7		2.4	GS1-N	GIB®	117	102
498	b	1	2.2		2.4	GS1-N	GIB®	152	132
		2	6.1		2.4	GS1-N	GIB®	421	366
408	c	1	3.5		2.4	GS1-N	GIB®	242	210
		2	1.7		2.4	GS1-N	GIB®	117	102
		3	1.6		2.4	GS1-N	GIB®	110	96

						Wind	Earthq.
Totals Achieved	W	251%	EQ	121%		1684	1464
Concrete Slab						*OK*	*OK*
Totals Required (from Demand)						670	1207

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ACROSS

V06/11

Lines		*Bracing Elements*							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved	
								W	E
748	m	1	1.6		2.4	EP1	Ecoply®	208	208
		2	1.5		2.4	GS1-N	GIB®	104	90
		3	1.8		2.4	GS1-N	GIB®	124	108
		4	2.7		2.4	GS1-N	GIB®	186	162
		5	1.5		2.4	GS1-N	GIB®	104	90
		6	1.5		2.4	GS1-N	GIB®	104	90
666	n	1	2.2		2.4	GS1-N	GIB®	152	132
		2	2		2.4	GS1-N	GIB®	138	120
		3	3.2		2.4	GS1-N	GIB®	221	192
		4	3.7		2.4	GS1-N	GIB®	255	222
648	o	1	3.6		2.4	GS1-N	GIB®	248	216
		2	3.7		2.4	GS1-N	GIB®	255	222
		3	3.5		2.4	GS1-N	GIB®	242	210

					Wind	Earthq.
Totals Achieved	W	238%	EQ	171%	2340	2062
Concrete Slab					*OK*	*OK*
Totals Required (from Demand)					984	1207

F14-06/02

Date	Eng.	Job No.	Sheet No.
10/6/16	MSP	40735	

Project

2 Koruha Close

CALCULATIONS

Portal frame design. using 2004322

Deflection check.

* Vertical deflection - $\Delta max = 5mm$

$Span = 7900mm$

$7900mm / 5mm = Span / 1580$ OK.

* Lateral deflection - $\Delta max = 2.28mm$

$height = 2440mm$

$2440mm / 2.28mm = height / 1070$ O.K.

Strength Check

$M^* = 6.25kNm$ for $1.2G + 1.5Q$

$Le = 2.44m$. (taking a pin at base of leg + using roof as effective pin restraint).

$\phi Mb = 65kNm \times \alpha s$

$= 65kNm \times 0.7$

$= 45.5kNm$

$45.5kNm > 6.25kNm$.

Works O.K.

Check Wind Uplift

$M^* = 7.4kNm$

$Le = 7m$ (no restraint to bottom flange)

$\phi Mb = 65kNm \times \alpha s$

$= 65kNm \times 0.267$

$= 17.4kNm$

$17.4kNm > 7.4kNm$.

Works OK.

F14-06/02

Date	Eng.	Job No.	Sheet No.
10/6/16	MJP	40735	

Project

2 Kanuka Close

CALCULATIONS

Concrete pad design for portal frame.

$P^* = 2.6\ kN$. (SpaceGass)

$\phi Q = 250\ kPa/2 = 125\ kN/m^2$ (Using 1.5 blows @ 300mm)

$2.6\ kN / 125\ kN/m^2 = 0.021\ m^2$

$\sqrt{0.021\ m^2} = 0.145\ m$ if square hole

Using 200UB22 embedded into block 50mm clearance required for steel protection. ∴ mm hole required = 300mm.
Use 400mm ϕ pad. $A = \frac{\pi \times 0.4^2}{4} = 0.126\ m^2$. O.K.

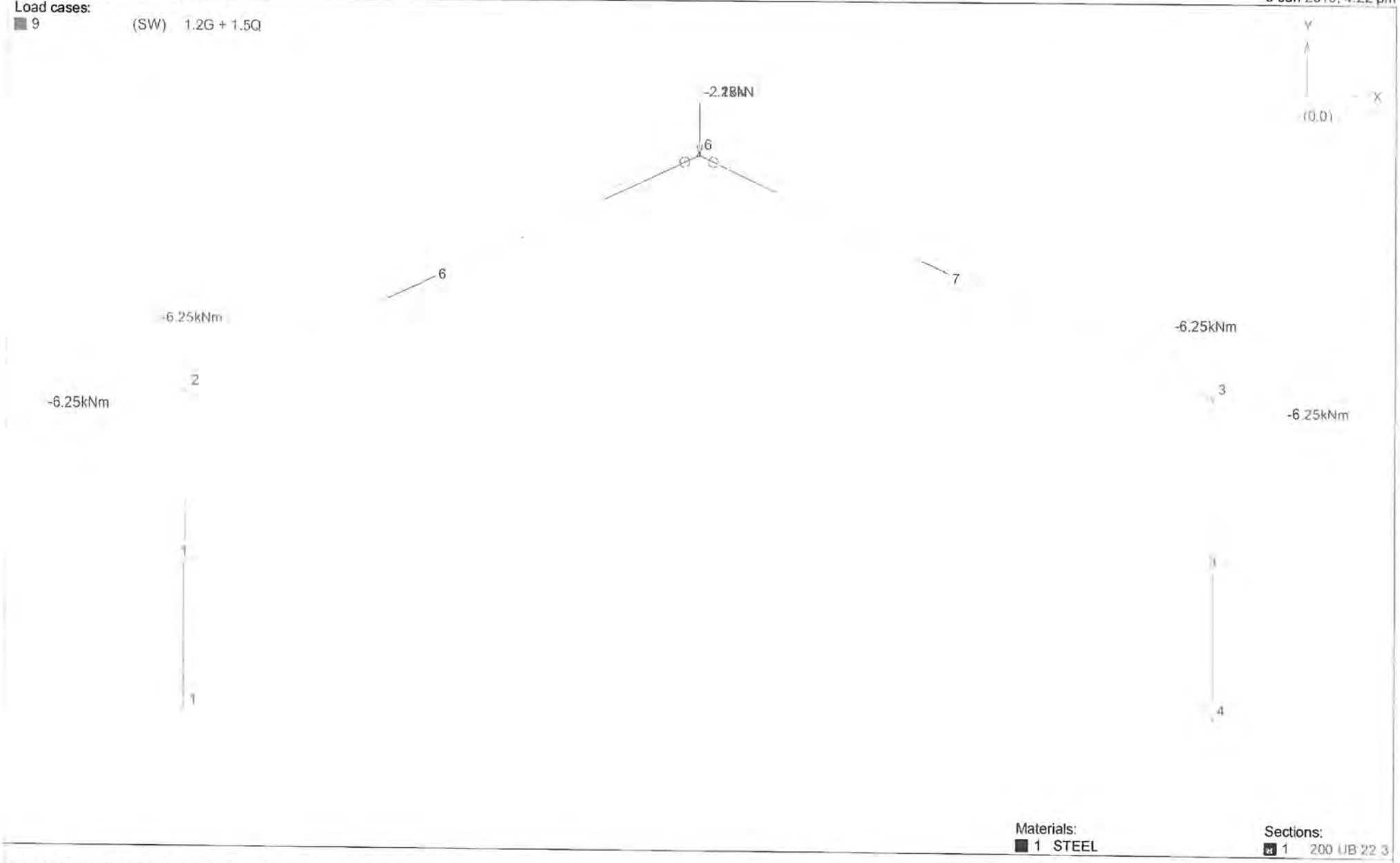
$T^* = -2.4\ kN$ (SpaceGass)

Concrete required $= 2.4\ kN / 24\ kN/m^3 = 0.1\ m^3$.

$0.1\ m^3 / 0.126\ m^2 = 0.8\ m$



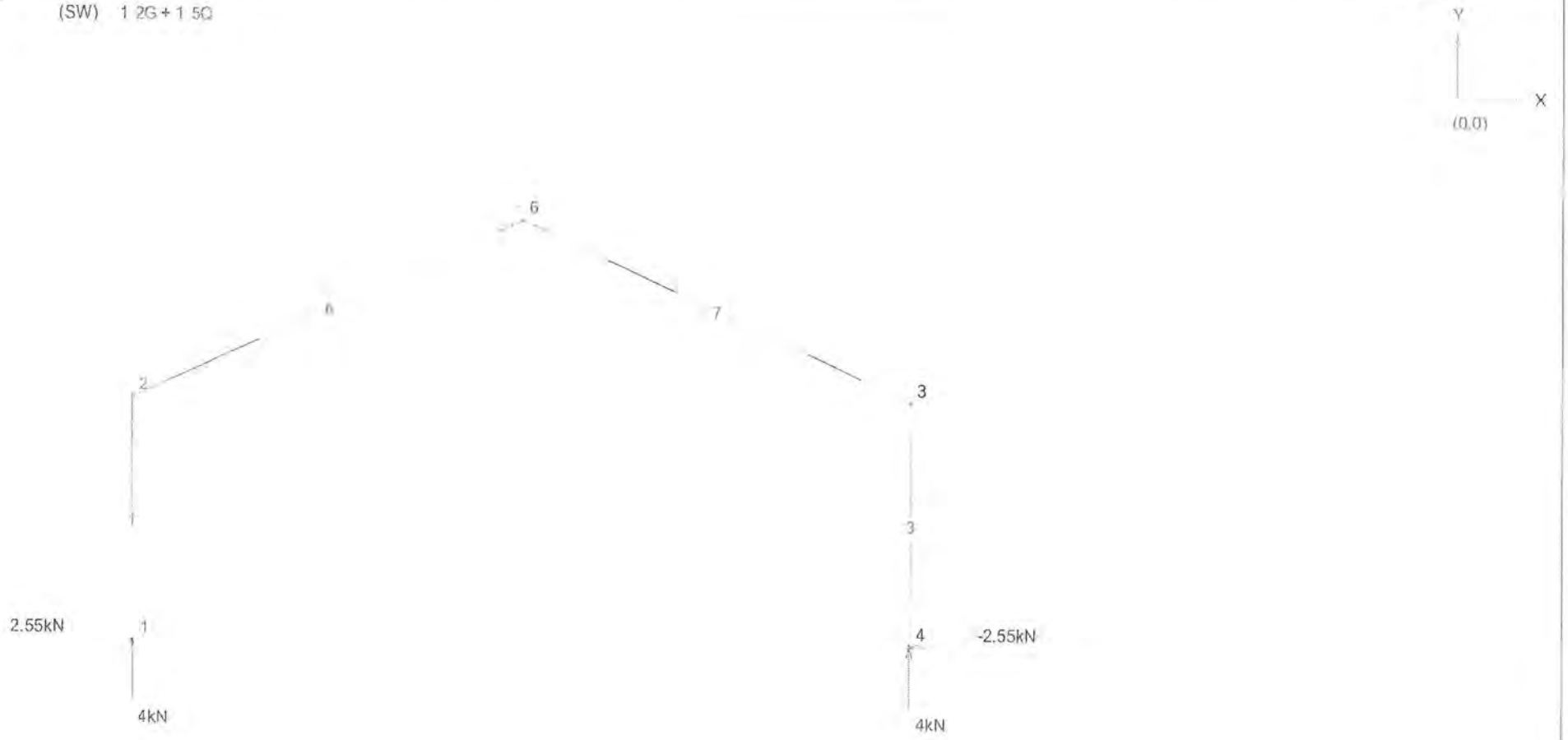
Load cases:
9 (SW) 1.2G + 1.5Q



Materials:
1 STEEL

Sections:
1 200 UB 22.3

Load cases:
9 (SW) 1.2G + 1.5Q

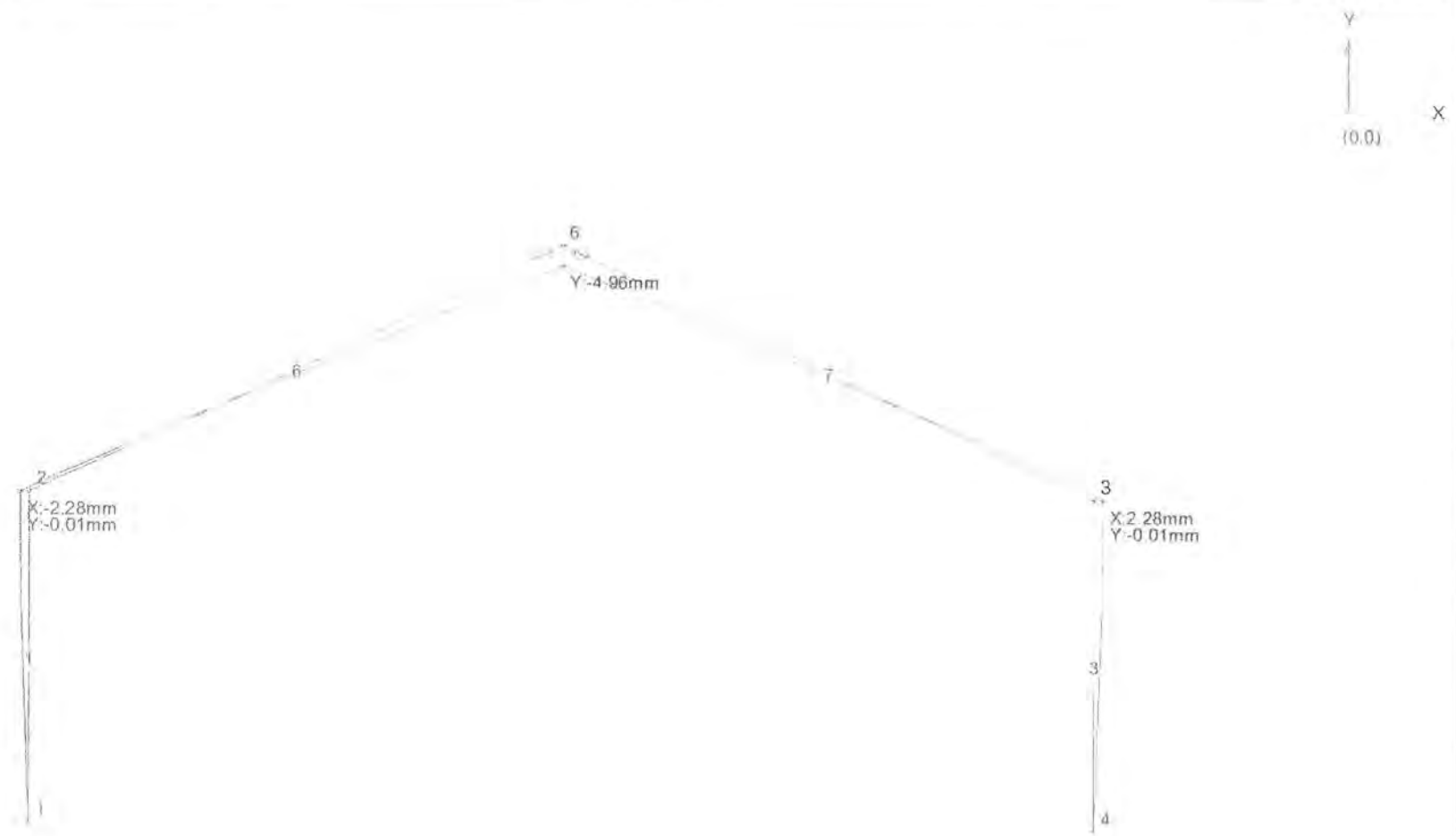


Materials:
1 STEEL

Sections:
1 200 UB 22.3

Job: I:\CERTA\JOBFILES\40700\40735\Design\40735 Portal
Units - Len: m, Sec: mm, Mat: MPa, Dens: T/m^3, Temp: Celsius, Force: kN, Mom: kNm, Mass: T, Acc: g's, Trans: mm, Stress: MPa
Scales - Frame: 1:63, Load: None, Disp: None, Moment: None, Shear: None, Axial: None, Torsion: None

Load cases:
■ 7 (SW) G + 0.7Q

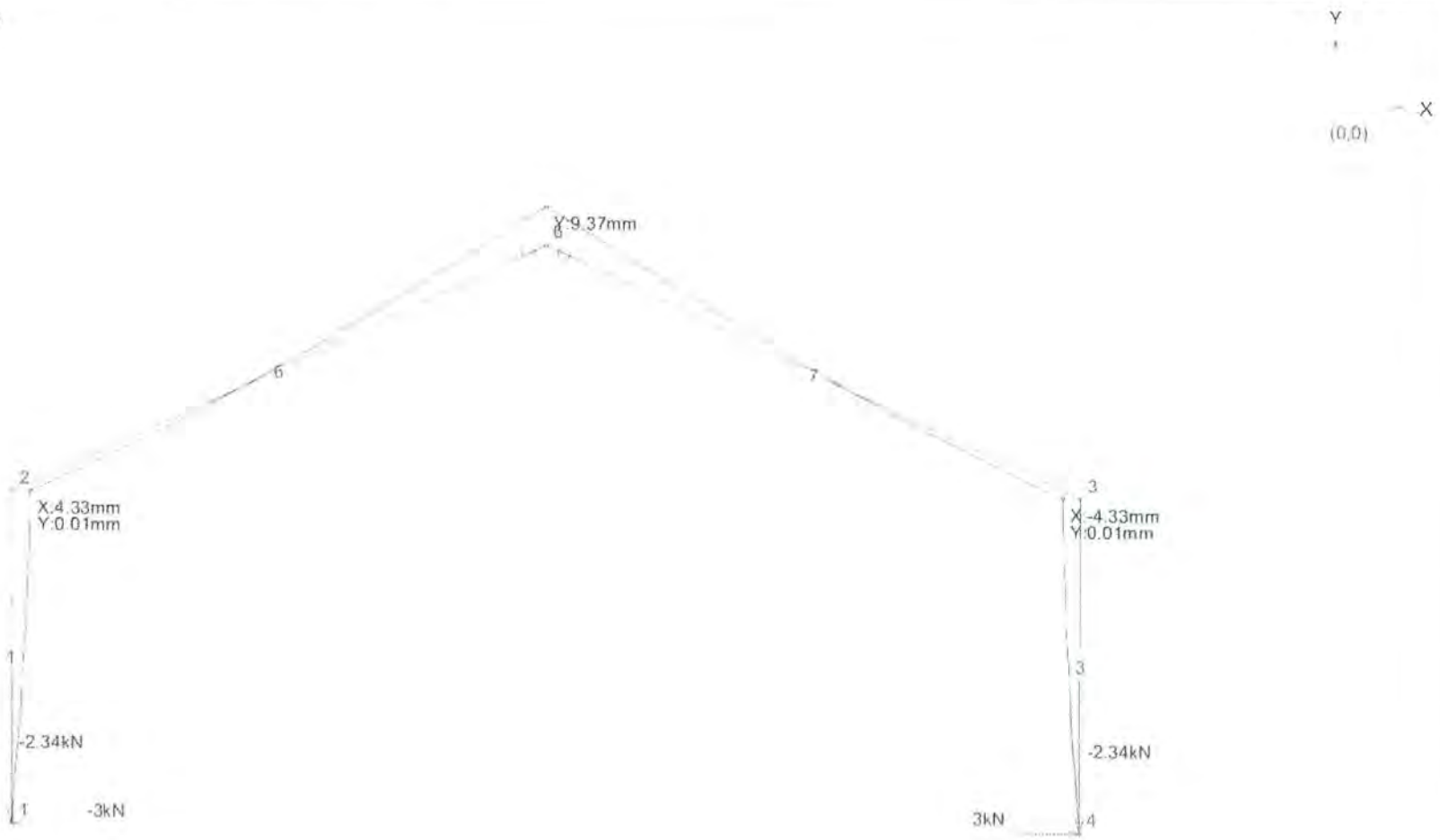


Materials:
■ 1 STEEL

Sections:
■ 1 200 UB 22.3

Job: I:\CERTA\JOBFILES\40700\40735\Design\40735 Portal
Units - Len: m, Sec: mm, Mat: MPa, Dens: T/m^3, Temp: Celsius, Force: kN, Mom: kNm, Mass: T, Acc: g's, Trans: mm, Stress: MPa
Scales - Frame: 1:50, Load: None, Disp: 30, Moment: None, Shear: None, Axial: None, Torsion: None

Load cases:
10 (SW) 0.9G + Wn, Up

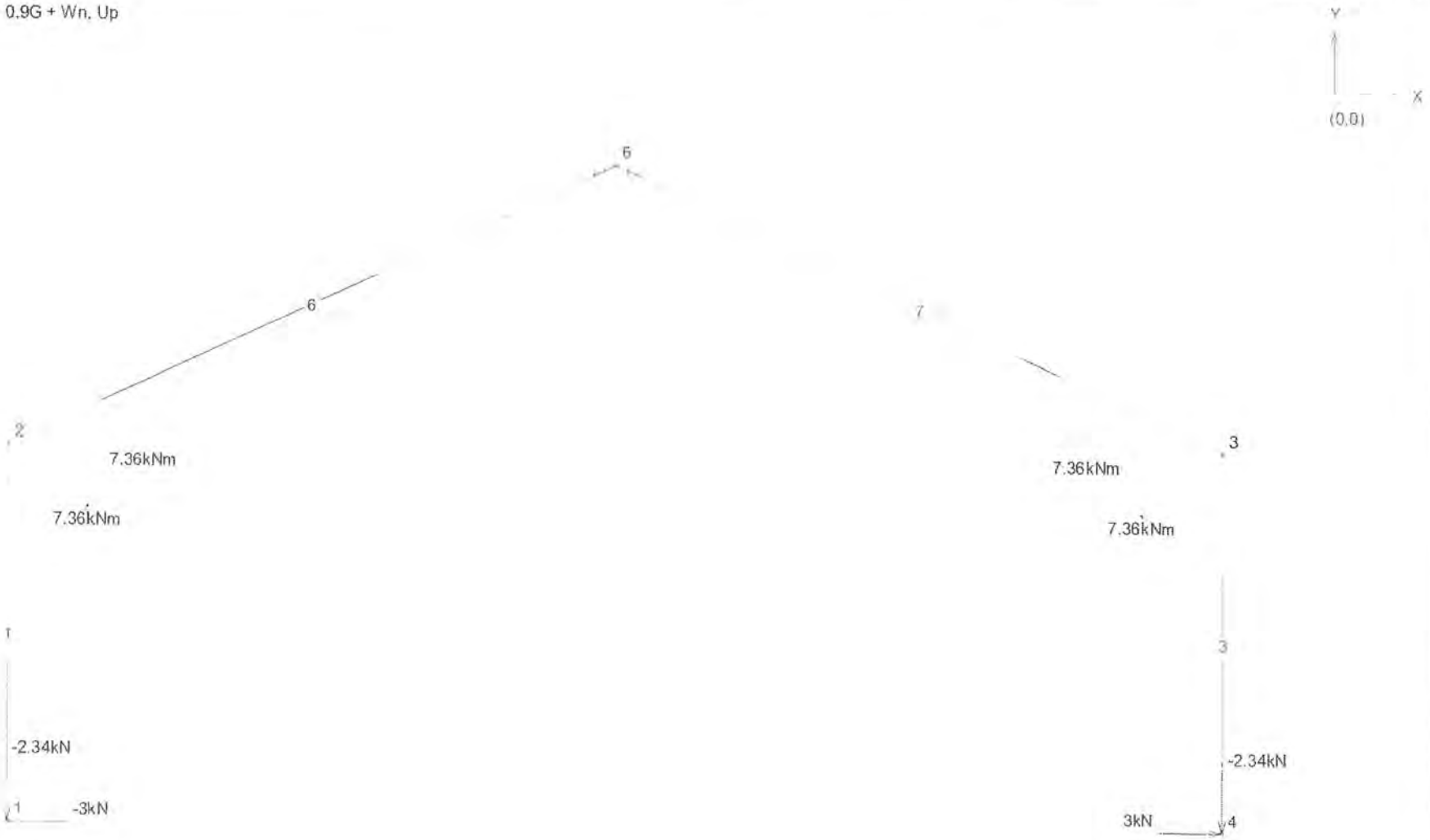


Materials:
1 STEEL

Sections:
1 200 UB 22.3

Job: I:\CERTA\JOBFILES\40700\40735\Design\40735 Portal
Units - Len: m, Sec: mm, Mat: MPa, Dens: T/m^3, Temp: Celsius, Force: kN, Mom: kNm, Mass: T, Acc: g's, Trans: mm, Stress: MPa
Scales - Frame: 1:50, Load: None, Disp: 30, Moment: None, Shear: None, Axial: None, Torsion: None

Load cases:
■ 10 (SW) 0.9G + Wn, Up



Wind Uplift

Materials:
■ 1 STEEL

Sections:
■ 1 200 UB 22.3

F14-06/02

Date	Eng.	Job No.	Sheet No.
10/6/16	MSP	40735	

Project

2 Koruka Close

CALCULATIONS

Calculating deflection of stringer supporting slabs

150×100×6 RHS.

Wind speed = 44m/s

Pressure = $0.6 \times (44m/s)^2 \times 1.2 = 1.39 kPa$

Trib width = 0.9m.

Force = 1.25kN/m

Length = 7.9m

Using 150×100×6 RHS

$$\text{Deflection} = \frac{(0.71 \times 1.25) \times (7900mm)^4}{200{,}000 N/mm^2 \times 81{,}700{,}000 mm^4} \times \frac{5}{384}$$

$= 27.6mm = Span/286$ Works O.K.

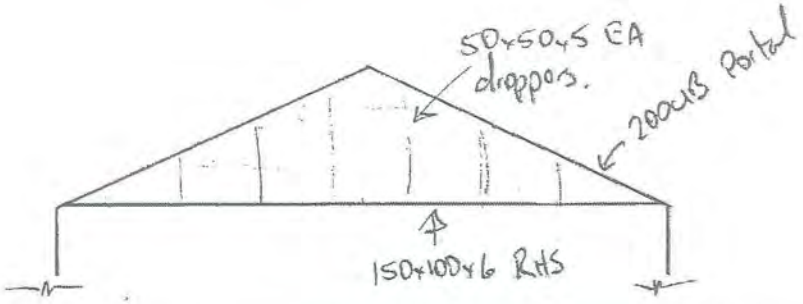
$$M^* = \frac{1.25 kN/m \times (7.9m)^2}{8}$$

$= 9.75 kNm$

$\phi M_b = 40.4 kNm$ (AISC tables)

40.4kNm > 9.75kNm

Works O.K.



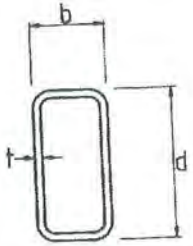
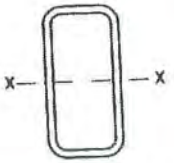


TABLE 4.1 – 1 (1)

DESIGN MOMENT CAPACITIES FOR MEMBERS WITHOUT FULL LATERAL RESTRAINT

RECTANGULAR HOLLOW SECTIONS: GRADE C350

bending about x–axis



Designation d b t	Mass per m	Design Moment Capacities ϕM_b (kNm) Effective Length (L_e) in metres												FLR
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	m
mm mm mm	kg/m															
250 x150 x 9.0 RHS	51.8	168	168	168	168	168	168	168	165	163	162	161	160	159	157	7.81
6.0 RHS	35.6	118	118	118	118	118	118	118	116	115	114	113	112	111	111	7.99
5.0 RHS	29.9	94.4	94.4	94.4	94.4	94.4	94.4	94.4	94.4	92.2	91.6	91.0	90.4	89.8	89.1	8.05
200 x100 x 9.0 RHS	37.7	92.4	92.4	92.4	92.4	90.4	89.3	88.3	87.2	86.2	85.1	84.1	83.1	82.1	81.2	4.28
6.0 RHS	26.2	66.2	66.2	66.2	66.2	64.8	64.1	63.3	62.6	61.8	61.1	60.4	59.7	59.0	58.3	4.43
5.0 RHS	22.1	56.5	56.5	56.5	56.5	55.3	54.7	54.0	53.4	52.8	52.1	51.5	50.9	50.3	49.8	4.48
4.0 RHS	17.9	46.2	46.2	46.2	46.2	45.3	44.7	44.2	43.7	43.2	42.7	42.2	41.7	41.2	40.8	4.53
150 x100 x 6.0 RHS	21.4	42.3	42.3	42.3	42.3	42.3	41.3	40.8	40.4	40.0	39.6	39.1	38.7	38.3	37.9	5.71
5.0 RHS	18.2	36.3	36.3	36.3	36.3	36.3	35.4	35.0	34.6	34.3	33.9	33.6	33.2	32.9	32.5	5.78
4.0 RHS	14.8	29.8	29.8	29.8	29.8	29.8	29.1	28.8	28.5	28.2	27.9	27.6	27.3	27.0	26.8	5.85
150 x 50 x 5.0 RHS	14.2	24.8	24.3	23.6	22.9	22.2	21.6	20.9	20.3	19.7	19.2	18.6	18.1	17.6	17.1	1.47
4.0 RHS	11.6	20.6	20.2	19.6	19.0	18.5	17.9	17.4	16.9	16.5	16.0	15.5	15.1	14.7	14.3	1.50
3.0 RHS	8.96	16.2	15.9	15.4	15.0	14.5	14.1	13.7	13.3	13.0	12.6	12.2	11.9	11.6	11.3	1.53
125 x 75 x 6.0 RHS	16.7	26.5	26.5	26.5	26.0	25.6	25.2	24.9	24.5	24.1	23.8	23.4	23.1	22.8	22.4	3.81
5.0 RHS	14.2	22.9	22.9	22.9	22.5	22.1	21.8	21.5	21.2	20.9	20.6	20.3	20.0	19.7	19.4	3.87
4.0 RHS	11.6	19.0	19.0	19.0	18.6	18.3	18.1	17.8	17.6	17.3	17.1	16.8	16.6	16.3	16.1	3.93
3.0 RHS	8.96	14.9	14.9	14.9	14.9	14.4	14.2	14.0	13.8	13.6	13.4	13.2	13.0	12.8	12.6	4.00
100 x 50 x 6.0 RHS	12.0	14.3	14.3	13.8	13.4	13.1	12.8	12.5	12.2	11.9	11.6	11.3	11.1	10.8	10.6	2.06
5.0 RHS	10.3	12.5	12.5	12.1	11.8	11.5	11.3	11.0	10.7	10.5	10.2	9.99	9.75	9.53	9.31	2.11
4.0 RHS	8.49	10.5	10.5	10.2	9.93	9.70	9.47	9.25	9.03	8.82	8.62	8.42	8.23	8.04	7.86	2.16
3.5 RHS	7.53	9.43	9.43	9.12	8.91	8.70	8.50	8.30	8.10	7.92	7.73	7.56	7.38	7.22	7.06	2.19
3.0 RHS	6.60	8.40	8.40	8.12	7.93	7.74	7.56	7.38	7.21	7.04	6.88	6.72	6.57	6.42	6.27	2.22
2.5 RHS	5.56	7.14	7.14	6.91	6.75	6.59	6.44	6.29	6.14	6.00	5.86	5.73	5.60	5.47	5.35	2.24
2.0 RHS	4.50	5.83	5.83	5.64	5.51	5.38	5.26	5.14	5.02	4.90	4.79	4.68	4.58	4.47	4.37	2.27

Notes:
1. $\phi = 0.9$
2. FLR – segment lengths of Full Lateral Restraint (Clause 5.3.2.4 of AS 4100) with $\beta_m = -1.0$
3. Values to the left of the solid line are segment lengths with full lateral restraint.
4. α_s calculated in accordance with Clause 5.6.1.4 of AS 4100
5. $\alpha_m = 1.0$

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Date	Eng.	Job No.	Sheet No.
13/6/16	MJP	40735	

Project

2 Koruka Close.

CALCULATIONS

Check droppers to stringer Using 50×50×5 EA.

Maximum drop = 1.8m ∴ $L^* = 1.8m$.

Spacing = 900mm

Pressure = 1.39kPa (see stringer calcs)

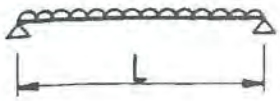
$M^* = (1.39 kN/m^2 \times 0.9m) \times (1.8m)^2/8 = 0.506 kNm$

$\phi M_s = 0.508 kNm$ (AISC tables)

$0.508 kNm > 0.506 kNm$

Works O.K.

Wind pressure will be reduced because of shielding from building, however have calculated as full load.



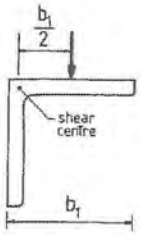


TABLE 8.2-7(2)

EQUAL ANGLES GRADE 250

MAXIMUM DESIGN LOADS FOR BEAMS WITHOUT FULL LATERAL RESTRAINT
leg down

W^*_L Maximum Design Load based on Moment or Shear/Torsion
W^*_{S1} Serviceability Load based on Deflection Limit of Span/250 or First Yield
W^*_{S2} Serviceability Load based on Deflection Limit of Span/500 or First Yield

Designation	Mass per metre	W^*_L (kN)/W^*_{S1} (kN)/*W^*_{S2} (kN)* Span in metres							
	kg/m	1	2	3	4	5	6	7	8
100 x 100 x 12EA	17.7	**42.3** 42.3 *39.6*	**28.0** 20.0 *10.2*	**18.7** 9.02 *4.57*	**14.0** 5.11 *2.58*	**11.1** 3.28 *1.65*	**9.25** 2.28 *1.15*	**7.90** 1.68 *0.846*	**6.88** 1.29 *0.648*
10EA	14.2	**27.7** 27.7 *27.7*	**23.1** 16.0 *8.21*	**15.4** 7.22 *3.69*	**11.5** 4.10 *2.09*	**9.15** 2.64 *1.34*	**7.59** 1.84 *0.932*	**6.48** 1.36 *0.686*	**5.59** 1.04 *0.526*
8EA	11.8	**19.3** 19.3 *19.3*	**18.4** 13.0 *6.79*	**12.8** 5.94 *3.06*	**9.56** 3.38 *1.73*	**7.63** 2.18 *1.12*	**6.33** 1.52 *0.777*	**5.34** 1.12 *0.572*	**4.53** 0.863 *0.439*
6EA	9.16	**11.8** 11.8 *11.8*	**11.4** 9.79 *5.19*	**9.90** 4.51 *2.36*	**7.41** 2.59 *1.35*	**5.93** 1.68 *0.867*	**4.88** 1.17 *0.605*	**4.05** 0.867 *0.446*	**3.44** 0.667 *0.342*
90 x 90 x 10EA	12.7	**27.1** 27.1 *23.1*	**18.4** 11.7 *5.95*	**12.2** 5.26 *2.67*	**9.15** 2.98 *1.51*	**7.30** 1.92 *0.966*	**6.05** 1.33 *0.672*	**5.16** 0.980 *0.494*	**4.45** 0.751 *0.379*
8EA	10.6	**18.9** 18.9 *18.9*	**15.5** 9.58 *4.94*	**10.3** 4.34 *2.22*	**7.68** 2.47 *1.26*	**6.11** 1.59 *0.807*	**5.07** 1.11 *0.562*	**4.26** 0.816 *0.413*	**3.62** 0.626 *0.317*
6EA	8.22	**11.7** 11.7 *11.7*	**11.0** 7.28 *3.81*	**8.01** 3.33 *1.73*	**5.99** 1.90 *0.980*	**4.78** 1.23 *0.630*	**3.89** 0.858 *0.439*	**3.22** 0.634 *0.323*	**2.73** 0.487 *0.248*
75 x 75 x 10EA	10.5	**24.6** 20.1 *13.3*	**12.3** 6.69 *3.39*	**8.17** 3.00 *1.51*	**6.11** 1.69 *0.853*	**4.87** 1.09 *0.547*	**4.03** 0.756 *0.380*	**3.44** 0.556 *0.279*	
8EA	8.73	**18.1** 16.8 *11.1*	**10.5** 5.56 *2.83*	**6.98** 2.50 *1.27*	**5.21** 1.42 *0.715*	**4.14** 0.908 *0.458*	**3.43** 0.632 *0.319*		
6EA	6.81	**11.2** 11.2 *8.54*	**8.29** 4.29 *2.21*	**5.51** 1.94 *0.993*	**4.12** 1.10 *0.561*	**3.27** 0.709 *0.360*	**2.63** 0.494 *0.251*		
5EA	5.27	**6.88** 6.88 *6.49*	**6.35** 3.25 *1.70*	**4.26** 1.48 *0.769*	**3.19** 0.846 *0.436*	**2.48** 0.546 *0.280*			
65 x 65 x 10EA	9.02	**18.0** 14.8 *8.66*	**8.98** 4.35 *2.19*	**5.97** 1.95 *0.979*	**4.46** 1.10 *0.552*				
8EA	7.51	**15.5** 12.4 *7.25*	**7.72** 3.64 *1.84*	**5.12** 1.63 *0.823*	**3.83** 0.922 *0.464*				
6EA	5.87	**10.9** 9.76 *5.67*	**6.20** 2.84 *1.45*	**4.11** 1.28 *0.650*	**3.06** 0.724 *0.367*				
5EA	4.56	**6.69** 6.69 *4.36*	**4.84** 2.18 *1.13*	**3.21** 0.988 *0.507*	**2.40** 0.562 *0.287*				
55 x 55 x 6EA	4.93	**8.69** 6.68 *3.42*	**4.33** 1.71 *0.868*	**2.87** 0.768 *0.387*					
5EA	3.84	**6.39** 5.14 *2.66*	**3.43** 1.33 *0.681*	**2.28** 0.599 *0.305*					
50 x 50 x 8EA	5.68	**8.58** 6.37 *3.22*	**4.28** 1.61 *0.812*	**2.84** 0.720 *0.362*					
6EA	4.46	**7.04** 5.01 *2.55*	**3.50** 1.28 *0.645*	**2.32** 0.572 *0.288*					
5EA	3.48	**5.65** 3.88 *2.00*	**2.81** 0.998 *0.508*						
3EA	2.31	**2.85** 2.49 *1.31*	**1.88** 0.655 *0.340*						

WITHOUT FULL LATERAL RESTRAINT

Note: Shading indicates serviceability load governed by yielding.

F14-06/02

Date	Eng.	Job No.	Sheet No.
13/6/16	MJP	40735	

Project

2 Kanuka Close

CALCULATIONS

Design of pad under post for BM2/BM2A.

$P^* = \underset{BM2a}{4.4kN} + \underset{BM2}{2.8kN} = 7.2kN$

Using augered hole

$\phi Q = 100kN/m^2$.

$7.2kN / 100kN/m^2 = 0.072m^2$

$d = \sqrt{\frac{4 \times 0.072m^2}{\pi}}$

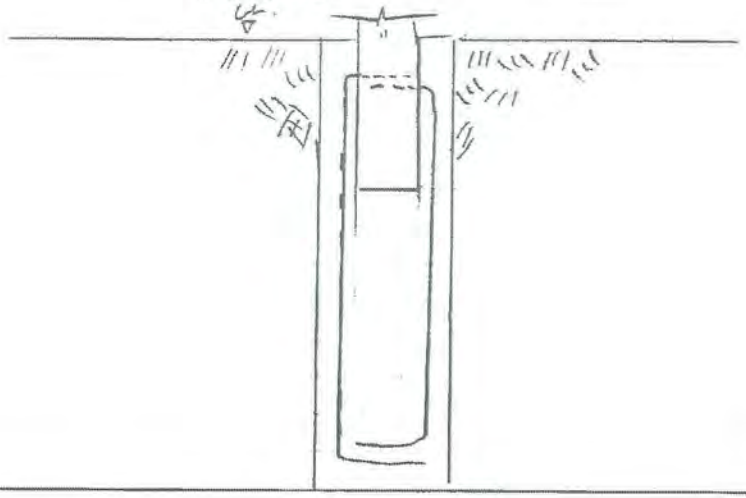
$= 0.3m$ use 350mm ϕ auger.

$T^* = -7.4kN - 1.9kN = -9.3kN$

To resist uplift $\Rightarrow$ $\left(9.3kN / 24kN/m^3\right)$

$= 0.39m^3$

Depth of hole $= 0.39m^3 / 0.35m^2 = 1.2m$ deep.



Site Description:

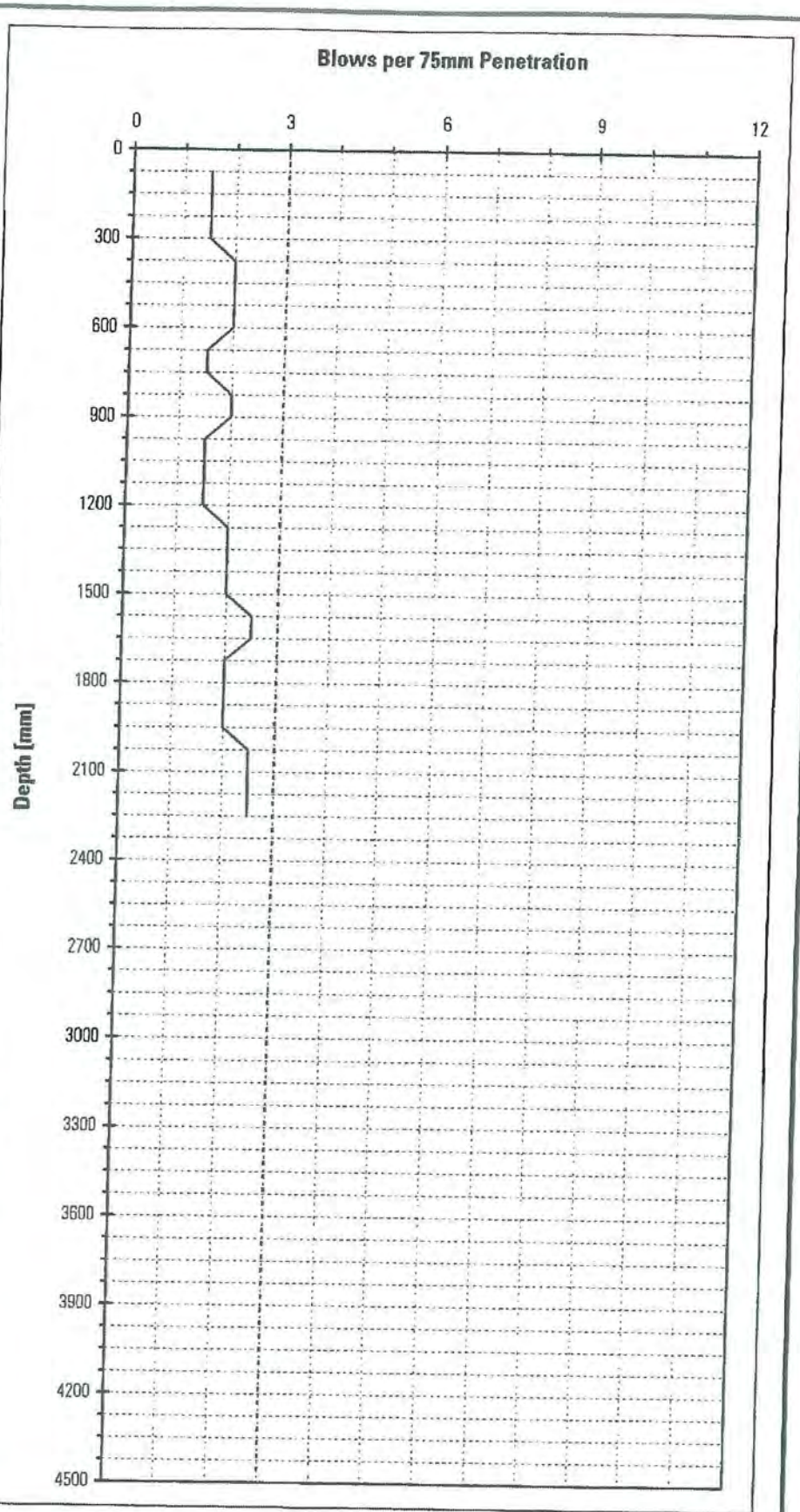
Refer attached site plan.

RL:

Notes:

1.

Depth (mm)	Blows (no.)	Depth (mm)	Blows (no.)
75	1.5	2325	
150	1.5	2400	
225	1.5	2475	
300	1.5	2550	
375	2	2625	
450	2	2700	
525	2	2775	
600	2	2850	
675	1.5	2925	
750	1.5	3000	
825	2	3075	
900	2	3150	
975	1.5	3225	
1050	1.5	3300	
1125	1.5	3375	
1200	1.5	3450	
1275	2	3525	
1350	2	3600	
1425	2	3675	
1500	2	3750	
1575	2.5	3825	
1650	2.5	3900	
1725	2	3975	
1800	2	4050	
1875	2	4125	
1950	2	4200	
2025	2.5	4275	
2100	2.5	4350	
2175	2.5	4425	
2250	2.5	4500	



PROBE DESCRIPTION:
9 kg Hammer falling half a metre to a steel anvil, driving a 16 mm diameter rod fitted with a 20 mm diameter cone.

Connell Wagner

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Paraparaumu
New Zealand

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www.conwag.com

Client: Ferndale Management Trust		SCALA PROBE	
Location: "Ferndale" Ngarara Road, Waikanae		No: SP A	Lot: 6	A4
Tester: SS/JT	Date: 17-Jun-08	Job Number: 153C 35	Rev: 1

Site Description:

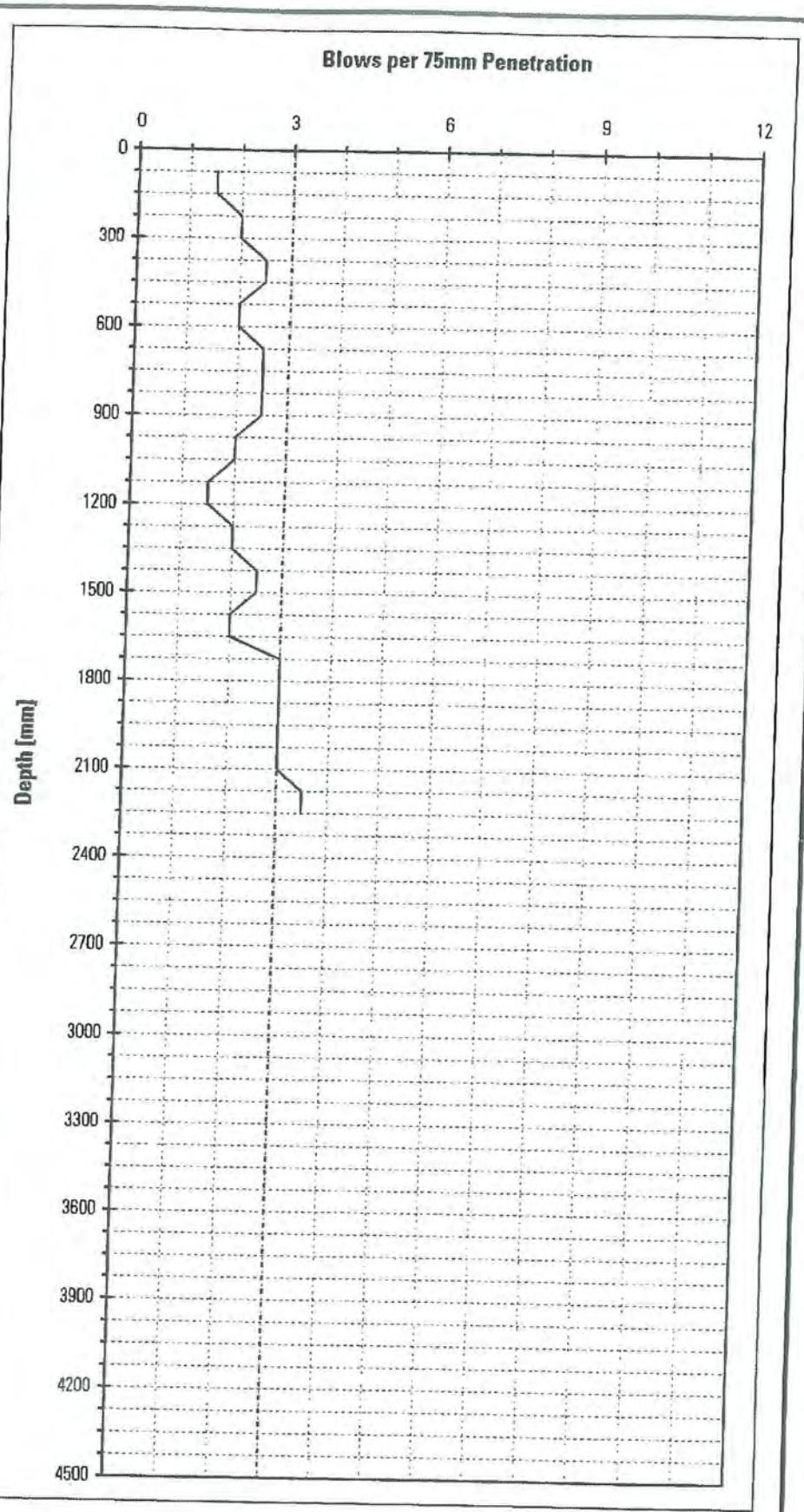
Refer attached site plan.

RL:

Notes:

1.

Depth (mm)	Blows (no.)	Depth (mm)	Blows (no.)
75	1.5	2325	
150	1.5	2400	
225	2	2475	
300	2	2550	
375	2.5	2625	
450	2.5	2700	
525	2	2775	
600	2	2850	
675	2.5	2925	
750	2.5	3000	
825	2.5	3075	
900	2.5	3150	
975	2	3225	
1050	2	3300	
1125	1.5	3375	
1200	1.5	3450	
1275	2	3525	
1350	2	3600	
1425	2.5	3675	
1500	2.5	3750	
1575	2	3825	
1650	2	3900	
1725	3	3975	
1800	3	4050	
1875	3	4125	
1950	3	4200	
2025	3	4275	
2100	3	4350	
2175	3.5	4425	
2250	3.5	4500	



PROBE DESCRIPTION:
9 kg Hammer falling half a metre to a steel anvil, driving a 16 mm diameter rod fitted with a 20 mm diameter cone.

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Client	SCALA PROBE		
Ferndale Management Trust			
Location	No	Lot	A4
"Ferndale" Ngarara Road, Waikanae	SP B	6	
Tester	Date	Job Number	Rev
SS/JT	17-Jun-08	153C 35	1

Site Description:

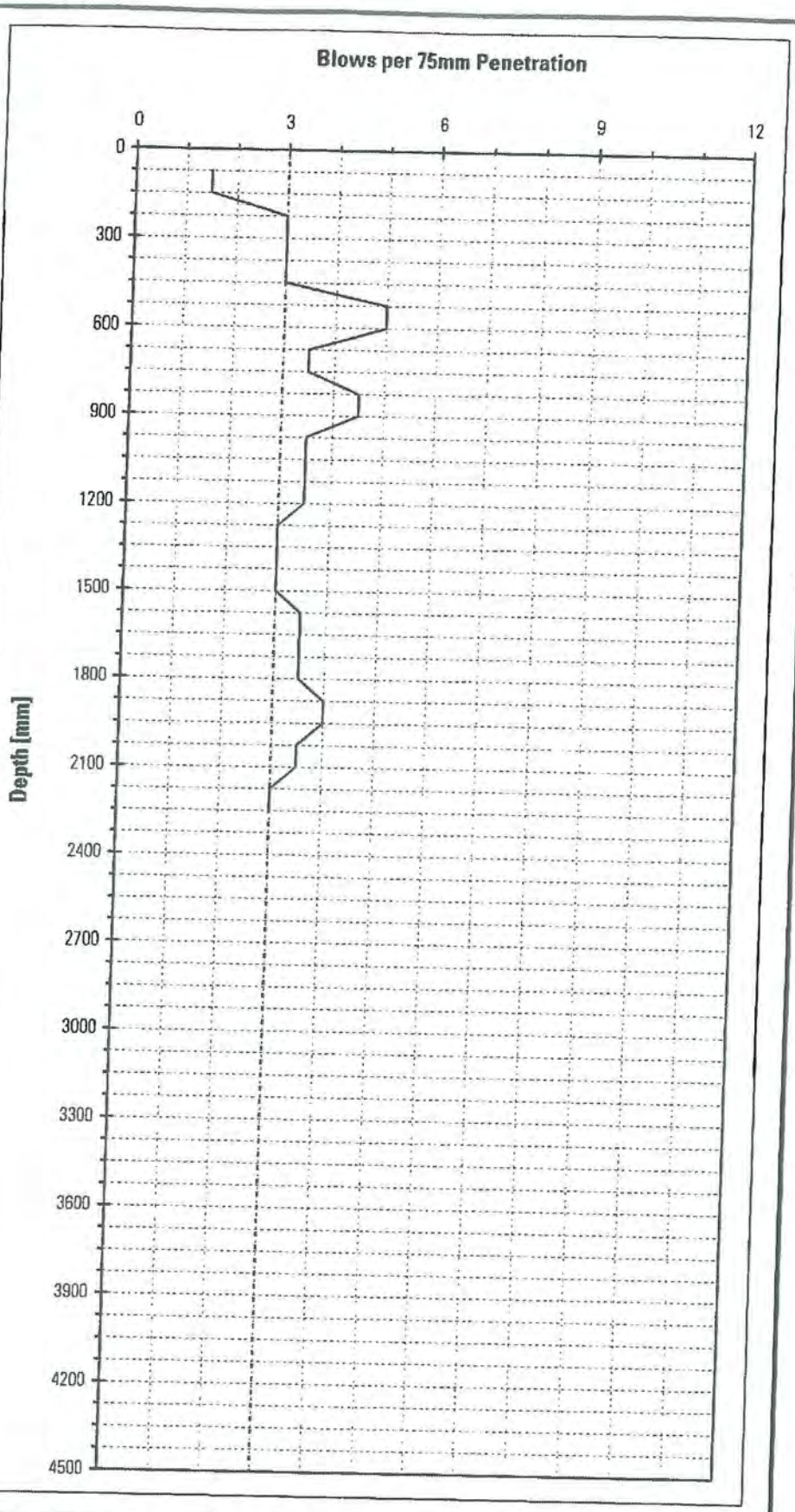
Refer attached site plan.

RL:

Notes:

1.

Depth (mm)	Blows (no.)	Depth (mm)	Blows (no.)
75	1.5	2325	
150	1.5	2400	
225	3	2475	
300	3	2550	
375	3	2625	
450	3	2700	
525	5	2775	
600	5	2850	
675	3.5	2925	
750	3.5	3000	
825	4.5	3075	
900	4.5	3150	
975	3.5	3225	
1050	3.5	3300	
1125	3.5	3375	
1200	3.5	3450	
1275	3	3525	
1350	3	3600	
1425	3	3675	
1500	3	3750	
1575	3.5	3825	
1650	3.5	3900	
1725	3.5	3975	
1800	3.5	4050	
1875	4	4125	
1950	4	4200	
2025	3.5	4275	
2100	3.5	4350	
2175	3	4425	
2250	3	4500	



PROBE DESCRIPTION:
9 kg Hammer falling half a metre to a steel anvil, driving a 16 mm diameter rod fitted with a 20 mm diameter cone.

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www.conwag.com

Client: Ferndale Management Trust		SCALA PROBE	
Location: "Ferndale" Ngarara Road, Waikanae		No: SP C	Lot: 6	A4
Tester: SS/JT	Date: 17-Jun-08	Job Number: 153C 35	Rev: 1

Site Description:

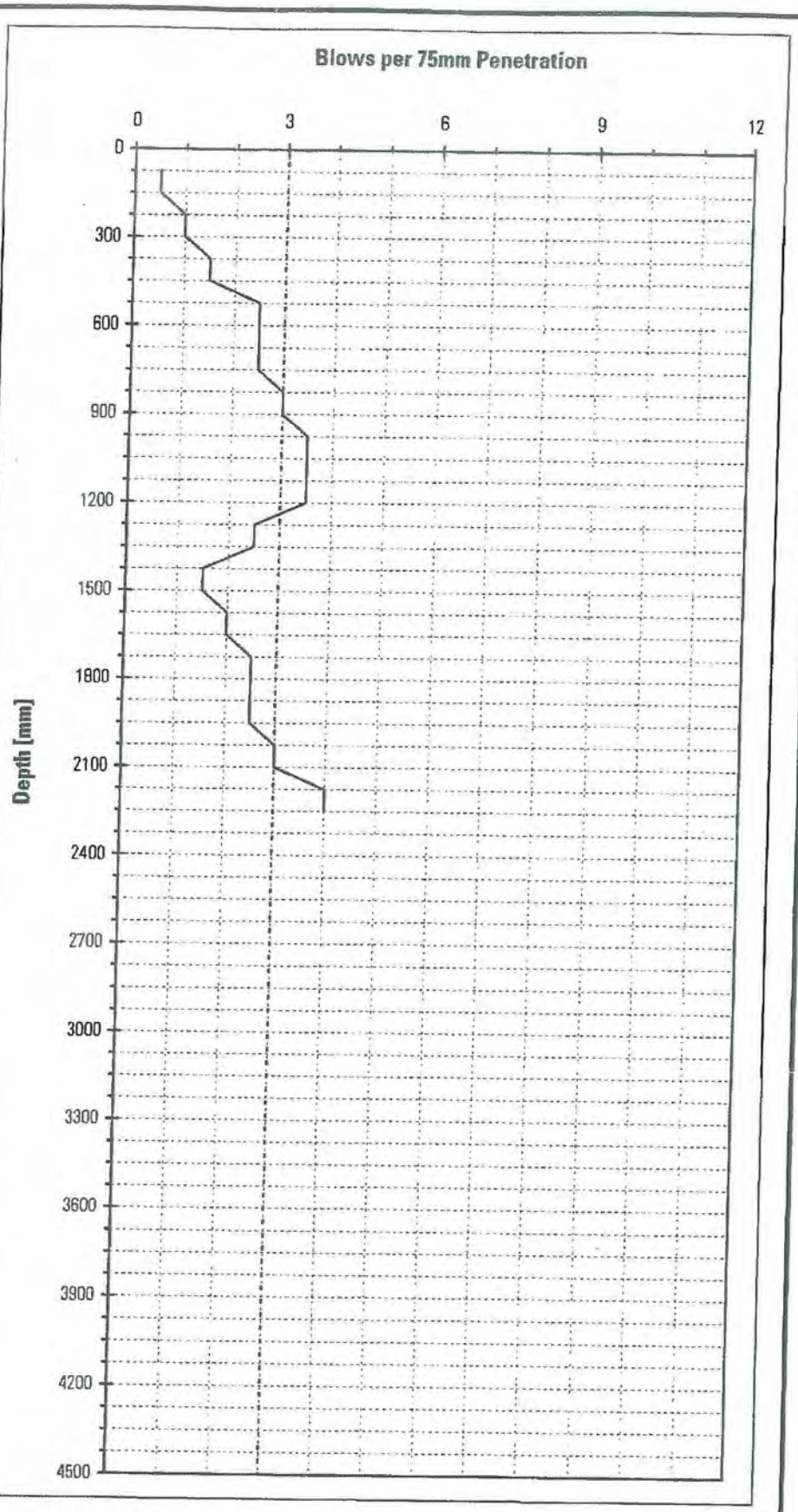
Refer attached site plan.

RL:

Notes:

1.

Depth (mm)	Blows (no.)	Depth (mm)	Blows (no.)
75	0.5	2325	
150	0.5	2400	
225	1	2475	
300	1	2550	
375	1.5	2625	
450	1.5	2700	
525	2.5	2775	
600	2.5	2850	
675	2.5	2925	
750	2.5	3000	
825	3	3075	
900	3	3150	
975	3.5	3225	
1050	3.5	3300	
1125	3.5	3375	
1200	3.5	3450	
1275	2.5	3525	
1350	2.5	3600	
1425	1.5	3675	
1500	1.5	3750	
1575	2	3825	
1650	2	3900	
1725	2.5	3975	
1800	2.5	4050	
1875	2.5	4125	
1950	2.5	4200	
2025	3	4275	
2100	3	4350	
2175	4	4425	
2250	4	4500	



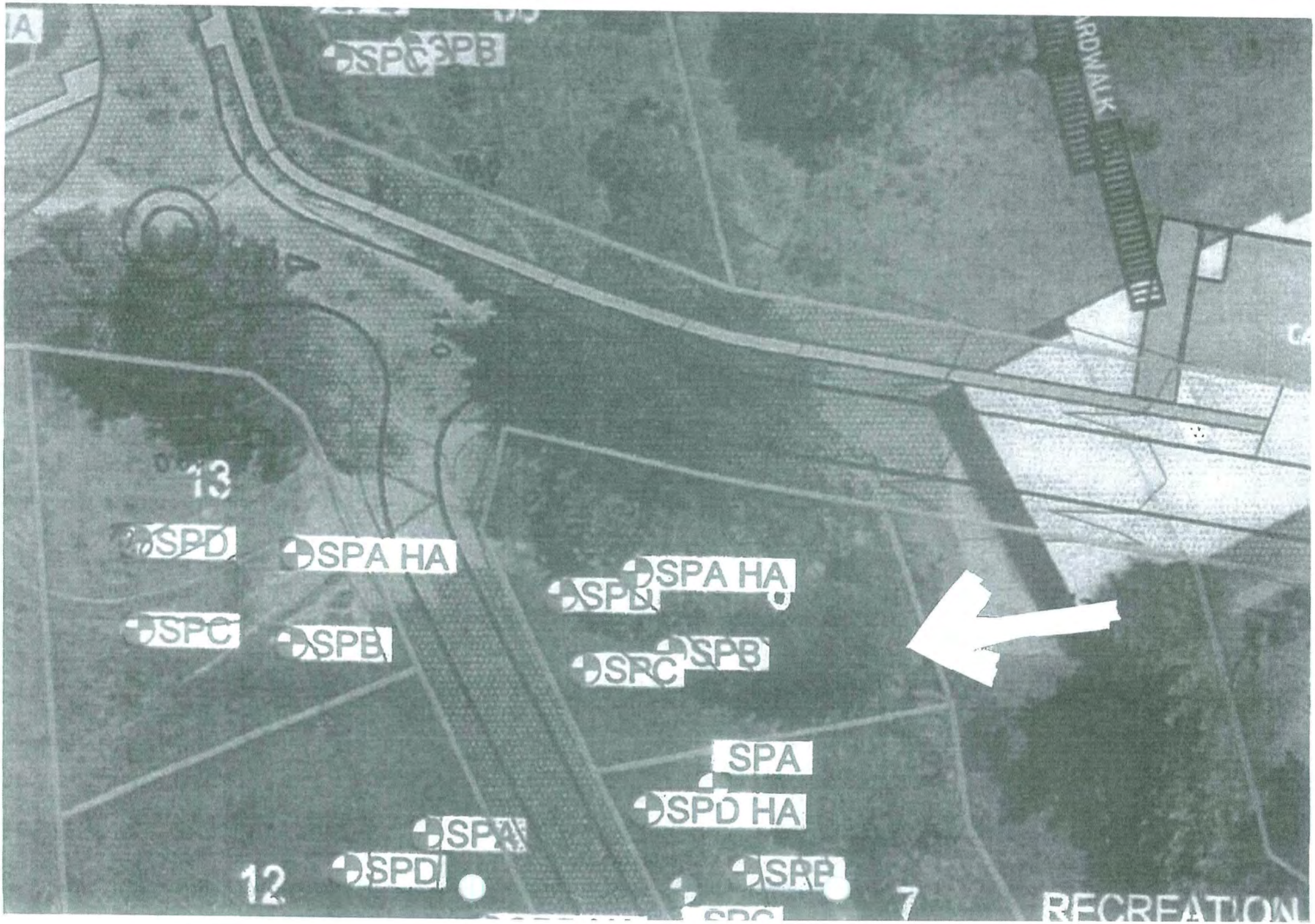
PROBE DESCRIPTION:
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Client: Ferndale Management Trust		SCALA PROBE	
Location: "Ferndale" Ngarara Road, Waikanae		No: SP D	Lot: 6	A4
Tester: SS/JT	Date: 17-Jun-08	Job Number: 153C 35	Rev: 1


SPC
SPB
BOARDWALK
13
SPD
SPA HA
SPA HA
SPD
SPC
SPB
SPC
SPB
SPA
SPD HA
SPA
SPD
12
SRB
7
RECREATION

Rafter Span - LPI 70-T I-Beam

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		I-BEAM DEPTH	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	225	6.3	6.0	5.6	5.7	5.5	5.1	5.2	5.0	4.7
		240	6.6	6.2	5.8	6.0	5.7	5.3	5.5	5.3	4.9
		300	7.4	7.1	6.6	6.8	6.5	6.0	6.3	6.0	5.6
		356	8.1	7.8	7.2	7.4	7.1	6.6	6.9	6.6	6.1
	TILED ROOF AND CEILING (90KG/M2)	225	5.0	4.8	4.5	4.4	4.2	3.9	4.0	3.8	3.6
		240	5.3	5.1	4.8	4.6	4.4	4.2	4.2	4.0	3.8
		300	6.2	5.9	5.4	5.5	5.3	4.9	5.0	4.8	4.5
		356	6.8	6.4	6.0	6.1	5.8	5.4	5.7	5.4	5.0

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

		I-BEAM DEPTH	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	225	6.3	6.0	5.6	5.7	5.5	5.1	5.2	5.0	4.7
		240	6.6	6.2	5.8	6.0	5.7	5.3	5.5	5.3	4.9
		300	7.4	7.1	6.6	6.8	6.5	6.0	6.3	6.0	5.6
		356	8.1	7.8	7.2	7.4	7.1	6.6	6.9	6.6	6.1
	TILED ROOF AND CEILING (90KG/M2)	225	5.0	4.8	4.5	4.4	4.2	3.9	4.0	3.8	3.6
		240	5.3	5.1	4.8	4.6	4.4	4.2	4.2	4.0	3.8
		300	6.2	5.9	5.4	5.5	5.3	4.9	5.0	4.8	4.5
		356	6.8	6.4	6.0	6.1	5.8	5.4	5.7	5.4	5.0

Rafter Span - Hyne LGL 44mm

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LGL SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	200 x 44	5.5	5.2	4.9	4.9	4.6	4.3	4.4	4.3	4.0
		240 x 44	6.4	6.1	5.6	5.9	5.6	5.2	5.4	5.2	4.9
		300 x 44	7.4	7.0	6.5	6.8	6.5	6.0	6.4	6.1	5.6
		360 x 44	8.4	8.0	7.4	7.7	7.4	6.8	7.3	6.9	6.4
	TILED ROOF AND CEILING (90KG/M2)	200 x 44	4.3	4.1	3.8	3.8	3.6	3.4	3.4	3.3	3.1
		240 x 44	5.2	5.0	4.7	4.6	4.4	4.1	4.2	4.0	3.8
		300 x 44	6.2	5.9	5.5	5.6	5.4	5.0	5.1	4.9	4.6
		360 x 44	7.1	6.8	6.3	6.5	6.2	5.7	6.1	5.8	5.3

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LGL SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	200 x 44	5.5	5.2	4.9	4.9	4.6	4.3	4.4	4.3	4.0
		240 x 44	6.4	6.1	5.6	5.9	5.6	5.2	5.4	5.2	4.9
		300 x 44	7.4	7.0	6.5	6.8	6.5	6.0	6.4	6.1	5.6
		360 x 44	8.4	8.0	7.4	7.7	7.4	6.8	7.3	6.9	6.4
	TILED ROOF AND CEILING (90KG/M2)	200 x 44	4.3	4.1	3.8	3.8	3.6	3.4	3.4	3.3	3.1
		240 x 44	5.2	5.0	4.7	4.6	4.4	4.1	4.2	4.0	3.8
		300 x 44	6.2	5.9	5.5	5.6	5.4	5.0	5.1	4.9	4.6
		360 x 44	7.1	6.8	6.3	6.5	6.2	5.7	6.1	5.8	5.3

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

00030

RECEIVED
29 JUN 2015
BY:

MiTek New Zealand Limite

Correspondence from : **AUCKLAND**
40 Neales Road, East Tamaki 2013
PO Box 58-014, Botany 2163
Phone: 09 274 7109
Fax: 09 274 7100

CHRISTCHURCH
14 Pilkington Way, Wigram 8042
PO Box 8387, Riccarton 8440
Phone: 03 348 8691
Fax: 03 348 0314

www.miteknz.co.nz

RODUCER STATEMENT for MiTek 20/20® TRUSS DESIGN - Version 4.6

SUED BY: **MiTek New Zealand Limited**

): **Placemakers National Estimating Unit (NEU)**

I RESPECT OF: **MiTek® Truss Designs**

is producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate r the job reference **00108031** and may be used by a Building Consent Authority to assist in determining compliance with the ew Zealand Building Code.

ie MiTek 20/20® truss design program has been developed by MiTek New Zealand Limited for the design of MiTek® timber roof, or and attic trusses in New Zealand. The truss designs computed by MiTek 20/20 ® are prepared using sound and widely cepted engineering principles, and in accordance with compliance documents of the New Zealand Building Code and Verification ethod B1/VM1; and internationally accepted standard ANSI/TPI 1 - 2002 as an alternative solution, to satisfy the requirements of auses B1 and B2 of the New Zealand Building Code.

n behalf of MiTek New Zealand Limited, and subject to:

i) All proprietary products meeting their performance specification requirements
ii) The provision of adequate roof bracing and overall building stability
iii) Correct selection and placement of GANG-NAIL connector plates
iv) Correct input of Truss Design Data as shown in the Fabricator Design Statement for this job
v) The design being undertaken by the accredited fabricator under the terms of the software licence
vi) Timber is graded to the requirements of NZS 3603:1993
vii) Minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003

believe on reasonable grounds that the trusses, if constructed in accordance with the MiTek 20/20® truss design and shop awings, will comply with the relevant provisions of the New Zealand Building Code.

iTek New Zealand Limited holds a current policy of Professional Indemnity Insurance no less than $500,000.

n behalf of MiTek New Zealand Limited, **Date: Thursday, 9 June 2016**

Ling Ng, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)
ECHNICAL SERVICES MANAGER, MiTek New Zealand Limited

MITEK FABRICATOR DESIGN STATEMENT

is statement is issued by MiTek accredited fabricator **Placemakers National Estimating Unit (NEU)**, being licensed to use the MiTek 20/20® software, to the client listed above and may used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

Tek 20/20® TRUSS DESIGN DATA

e MiTek 20/20® computer design for this job is based on the following design parameters entered into the program. The Fabricator shall ensure that these job details are current and evant to the project for the design of the MiTek ® trusses.

b Details
Roof Truss

Timber Group:	NEU-H1.2a	Pitch:	3.000 deg	Nominal Overhang:	0 mm
Roof		**Ceiling**		**Wind**	
Material:	Galv Iron .5mm	Material:	Gib Board 13mm	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	600 mm centres		
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN		

Importance Level : 2

Design Working Life : 50 years

e minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003. The timber for these MiTek® trusses shall graded to the requirements of NZS 3603:1993. Proprietary fixings and timber connectors shall be selected in accordance with NZS3604:2011 Section 4 - Durability.

Tek® Truss List

gend: * = detail only, ? = input only. ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

uss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
02	1	7988	25.000	900 GB	T04A	2	3951	3.000	900
03	2	4898	3.000	900					
1	7	6600	25.000	900					
1	12	7893	25.000	900					
1A	2	7893	25.000	900					
2	1	7988	25.000	900					
3	4	4898	3.000	900					
4	8	4091	3.000	900					

tal quantity : 39

e computer design input has been carried out by:

ned: ..... Date: ...Thursday, 9 June 2016....

me of Detailer: Zac Adler Qualifications and Title:

behalf of: Placemakers National Estimating Unit (NEU)

TRUSS FIXING SELECTION REPORT - Characteristic Loads

ings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data)

Tek® Truss List

gend: * = detail only, ? = input only, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully

uss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
02	1	7988	A	3.450	3.147	Cross	1	Pair of Wire Dog Staples
			O	0.646	0.541	Cross	1	Pair of Wire Dog Staples
			AB	5.165	4.709	Cross	1	CT200 pair
03	2	4898	J	2.066	1.724	Cross	2	Pair of Wire Dog Staples
			B	0.560	1.063	Cross	2	Pair of Wire Dog Staples
			G	3.737	3.699	Cross	2	CT200 pair
1	7	6600	A	3.685	3.254	Cross	7	CT200 pair
			K	3.863	3.213	Butt	7	JH 47x90
1	12	7893	A	4.332	3.940	Cross	12	CT200 pair
			E	4.324	3.943	Cross	12	CT200 pair
1A	2	7893	A	4.158	3.844	Cross	2	CT200 pair
			E	3.471	3.472	Cross	2	CT200 pair
			J	1.027	0.568	Cross	2	Pair of Wire Dog Staples
2	1	7988	A	4.375	3.992	Cross	1	CT200 pair
			E	4.375	3.992	Cross	1	CT200 pair
3	4	4898	B	2.685	2.488	Cross	4	Pair of Wire Dog Staples
			L	2.725	2.377	Cross	4	Pair of Wire Dog Staples
4	8	4091	B	2.804	2.111	Cross	8	Pair of Wire Dog Staples
			F	2.280	1.966	Cross	8	Pair of Wire Dog Staples
4A	2	3951	B	2.776	2.034	Cross	2	Pair of Wire Dog Staples
			H	2.215	1.891	Butt	2	JH 47x90

ing List

y	Selected Fixing
	Pair of Wire Dog Staples CT200 pair JH 47x90

te:

Fixings have been selected based on loading only. Please check that selected fixings are practical for each situation and that appropriate nailing can be applied on site.
Fixings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data) with down and uplift characteristic loads of at least the values shown for ch joint.

Job No: 16-00108031 Client: David Reid Homes Site: 2 Kanuka Cl, Waikanae
Job Name: New Residence Building Consent No:

DESIGN STATEMENT
MiTek Beam Program v1.10 June 2011

Certification of MiTek Beam Program v1.10 June 2011

The MiTek Beam Program v1.10 June 2011 has been developed by MiTek New Zealand Ltd for the design of these beams: Timber, Glulam, GANGLAM and GANG-NAIL FLITCH BEAMS. The beam designs calculated by this program are prepared using sound and widely accepted engineering principles, and in accordance with Compliance Documents of the New Zealand Building Code and Verification Method B1/VM1 to satisfy the requirements of Clause B1 of the Building Code. We believe on reasonable grounds that these beams for the proposed building, if constructed in accordance with the drawings, specifications and other documents provided will comply with the relevant provisions of the NZ Building Code. This is subject to all proprietary products meeting their performance specification requirements; the provision of adequate bracing and fixings; and the correct input of design data carried out by suitably trained personnel. This document may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

Summary of MiTek Beam Program v1.10 June 2011 Data and Output

Roof
Weight: light + ceiling
Dead Load: 0.45 kPa
Live Load: 0.25 kPa

Wind
Area/Speed: high (44.0 m/s)

Snow
Area: 0 kPa

Wall
Type: NA

Floor
Live Load: NA

Beam List

Opening Label	Beam Material	Beam Size	Beam Length	Design Status	Opening Label	Beam Material	Beam Size	Beam Length	Design Status
W1	GN Flitch Beam	FB25M	4800	OKAY					
W2	MSG8/VSG8	2/140x45	1500	OKAY					
W3	MSG8/VSG8	2/90x45	1000	OKAY					
W4	MSG8/VSG8	2/290x45	3200	OKAY					
W5	MSG8/VSG8	2/290x45	3200	OKAY					
W5B	MSG8/VSG8	2/90x45	1000	OKAY					
W7	MSG8/VSG8	2/240x45	2400	OKAY					
W8	MSG8/VSG8	2/90x45	1000	OKAY					
W9	MSG8/VSG8	2/140x45	2000	OKAY					
W10	MSG8/VSG8	2/240x45	2600	OKAY					
W11/W13	MSG8/VSG8	2/90x45	600	OKAY					
W14/W15	MSG8/VSG8	2/140x45	1800	OKAY					
W16	MSG8/VSG8	2/90x45	950	OKAY					
W17	MSG8/VSG8	2/90x45	900	OKAY					
D2/D5/D7	MSG8/VSG8	2/90x45	810	OKAY					

GANGLAM plating details indicated with RD (regular duty plating), HD (heavy duty plating) and SHD (super heavy duty plating)

The design input has been carried out by:

Signed:.....

Date: 8/06/2016

Name of Computer Operator:

Qualifications and Title:

Company:

MiTek Beam v1.10 June 2011

Date: Wednesday, 8 June 2016
Job Number 16-00108031
Job Name New Residence
Client David Reid Homes
Calculated By

Roof Weight light + ceiling
Wind Zone high (44.0 m/s)
Snow Load 0 kPa

Beam Details

Beam Label	W1	W2	W3	W4	W5	W6B	W7	W8	W9	W10
Beam Span (mm)	4800	1500	1000	3200	3200	1000	2400	1000	2000	2600
Roof Span "S" (mm)	7890	7890	900	4890	3140	900	6600	7980	900	4090
Overhang (mm)	45						45	45		450
Wall Type										
Wall Height (mm)										
Floor Live load	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Floor Span "F" (mm)										

MiTek Bearing Reactions

Not in use in this version

Point Load 1										
Girder Span (mm)					3140					
Setback (mm)					3950					
Location (mm)					2340					
Point Load 2										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 3										
Girder Span (mm)										
Setback (mm)										
Location (mm)										

Beam Status	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY
Beam Material	GN Fitch Beam	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8
Beam Size	FB25M	2/140x45	2/90x45	2/290x45	2/290x45	2/90x45	2/240x45	2/90x45	2/140x45	2/240x45
Beam Deflection	7.07mm	1.7mm	0.14mm	2.45mm	2.71mm	0.14mm	1.87mm	1.29mm	0.61mm	1.92mm
Beam Length	4800	1500	1000	3200	3200	1000	2400	1000	2000	2600

MiTek Beam v1.10 June 2011

Date: Wednesday, 8 June 2016
Job Number 16-00108031
Job Name New Residence
Client David Reid Homes
Calculated By

Roof Weight light + ceiling
Wind Zone high (44.0 m/s)
Snow Load 0 kPa

Beam Details

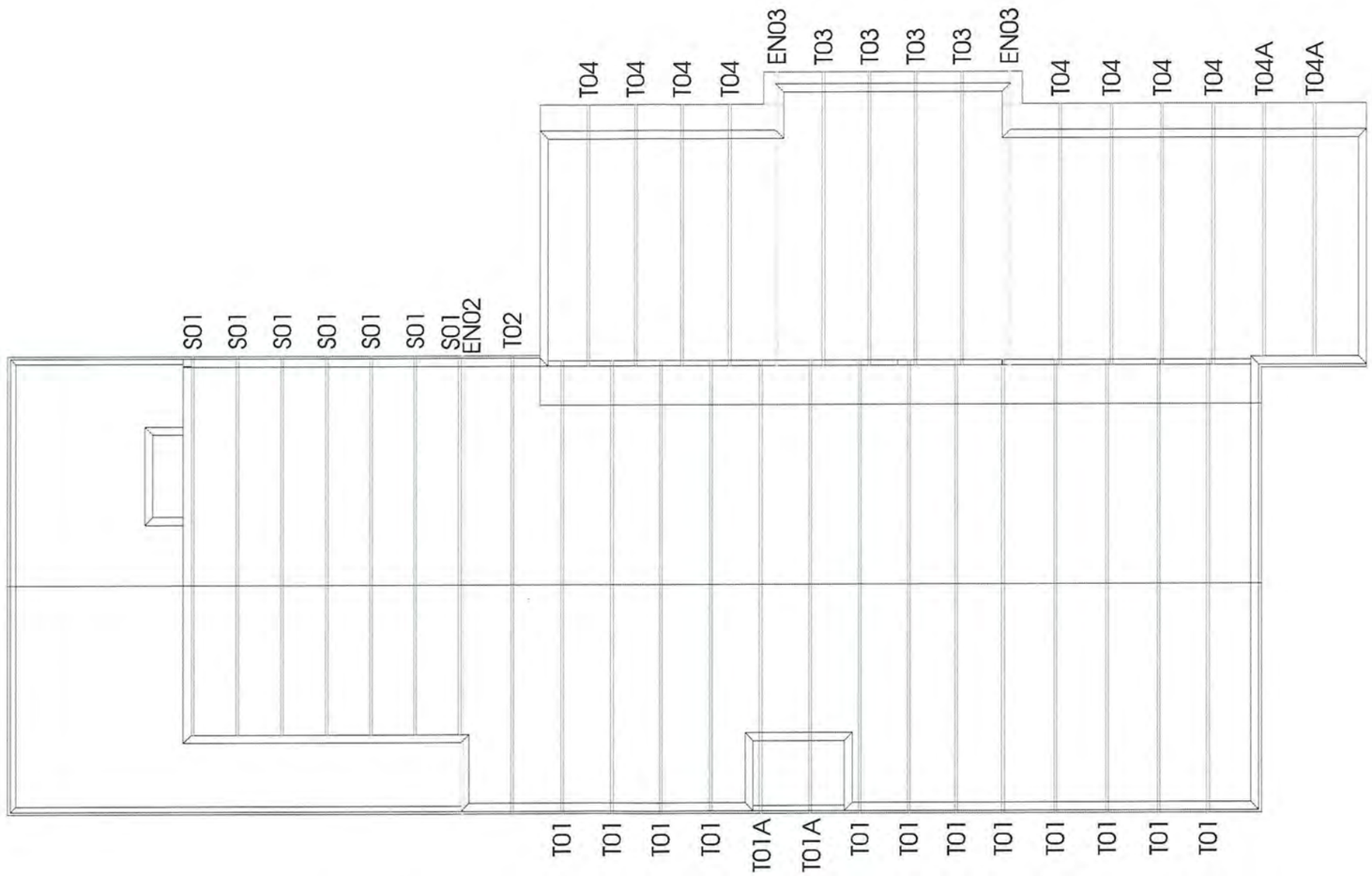
Beam Label	W11/W13	W14/W15	W16	W17	D2/D5/D7					
Beam Span (mm)	600	1800	950	900	810					
Roof Span "S" (mm)	4900	4090	900	900	11890					
Overhang (mm)	200	450	50	50						
Wall Type										
Wall Height (mm)										
Floor Live load	NA	NA	NA	NA	NA					
Floor Span "F" (mm)										

MiTek Bearing Reactions

Not in use in this version

Point Load 1										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 2										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 3										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Beam Status	OKAY	OKAY	OKAY	OKAY	OKAY					
Beam Material	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8					
Beam Size	2/90x45	2/140x45	2/90x45	2/90x45	2/90x45					
Beam Deflection	0.11mm	2.23mm	0.13mm	0.1mm	0.82mm					
Beam Length	600	1800	950	900	810					

Layout is null and void if trusses not supplied by PlaceMakers



PlaceMakers® Know how. Can do.

Site Address :
New Residence
2 Kanuka Cl
Waikanae

Sheet Title :
For Building Consent
Buildable Truss Layout

Date : 8 Jun,2016 | Drawn : Zac Adler
Scale : 1: 100 | System : MiTek 20/20

Job Details:
Roof Pitch : 3.000 Deg
Roof Material : Galv Iron .5mm
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s

PrimeCad v4.6.6.334

MiTek™

Job Title : 16-00108031
Sheet : 1
Revision Number :

Lintel Fixing Details

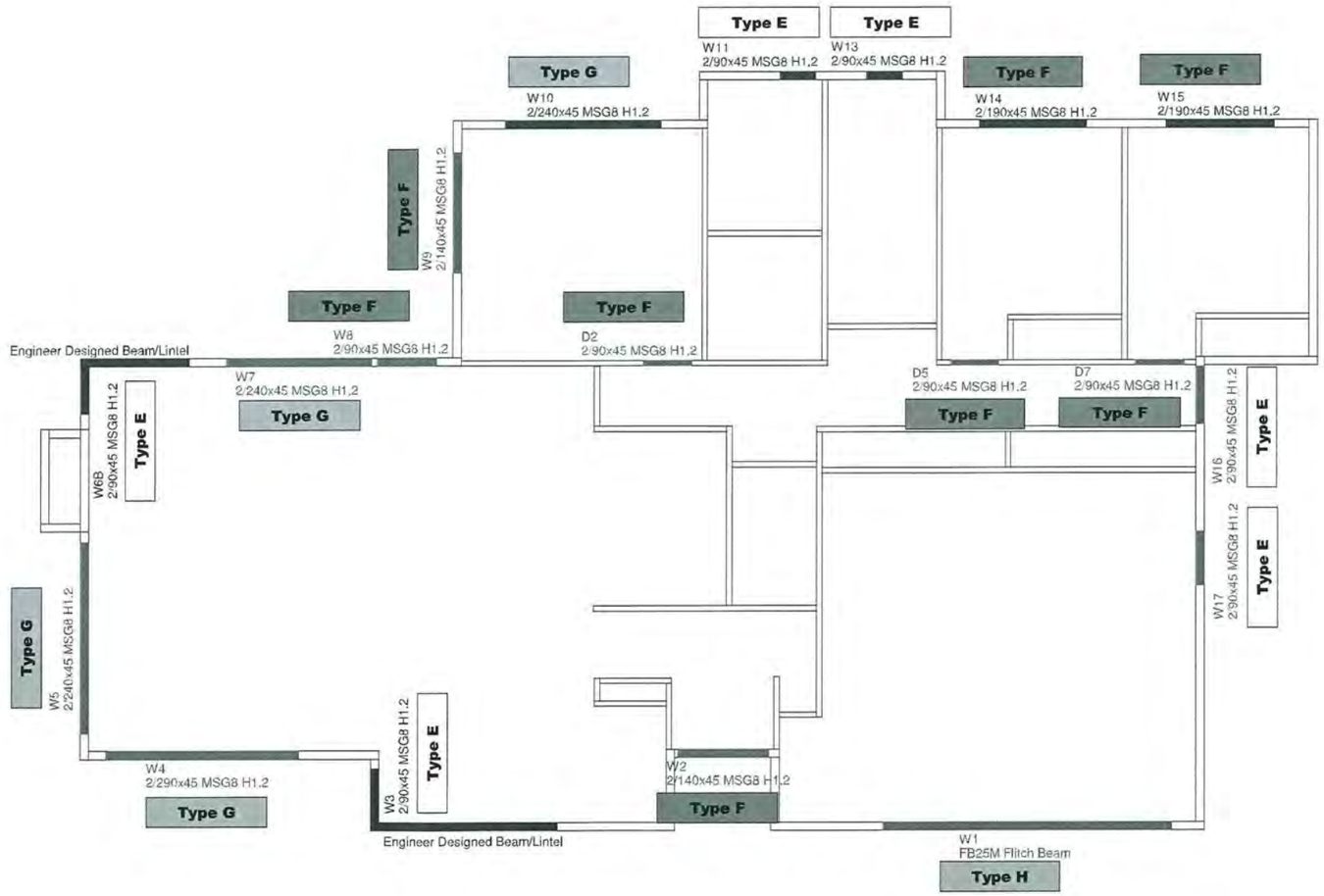
TYPE E
1.4kN

TYPE F
4.0kN

TYPE G
7.5kN

TYPE H
13.5kN

Layout is null and void if trusses not supplied by PlaceMakers



NOTES:

Refer to:
Lintel Fixing Schedule 10/2011
pages 68 & 69, Structrual Fixings
On-site Guide for Buildng Code
Compliance 2012 Edition

(Alternative to NZS 3604:2011
Table 8.14 & Figure 8.12)

PrimeCad v4.6.6.334

PlaceMakers®
Know how. Can do.

Site Address :
New Residence
2 Kanuka Cl
Waikanae

Sheet Title :
For Building Consent
Lintel Fixing

Date : 8 Jun,2016 | Drawn : Zac Adler
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 3.000 Deg	Truss Centres	: 900 mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	: kPa
Wind Zone	: High	Wind Speed	: 44.0 m/s
Roof Snow Load	: 0.000 kPa		

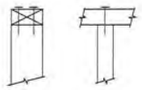
MiTek™

Job Title : 16-00108031
Sheet : 2
Revision Number :

Stud to top plate fixing details

Type A is minimum fixing required unless specified otherwise

FIXING TYPE A
0.7kN



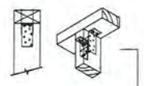
2/90x3.33 plain steel wire nails driven vertically into stud.

FIXING TYPE B
4.7kN

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.

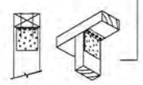
AND

Plus 2x LUMBERLOK CPC40



OR

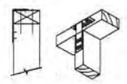
Plus LUMBERLOK 6 kN Stud Anchor (CPC80)



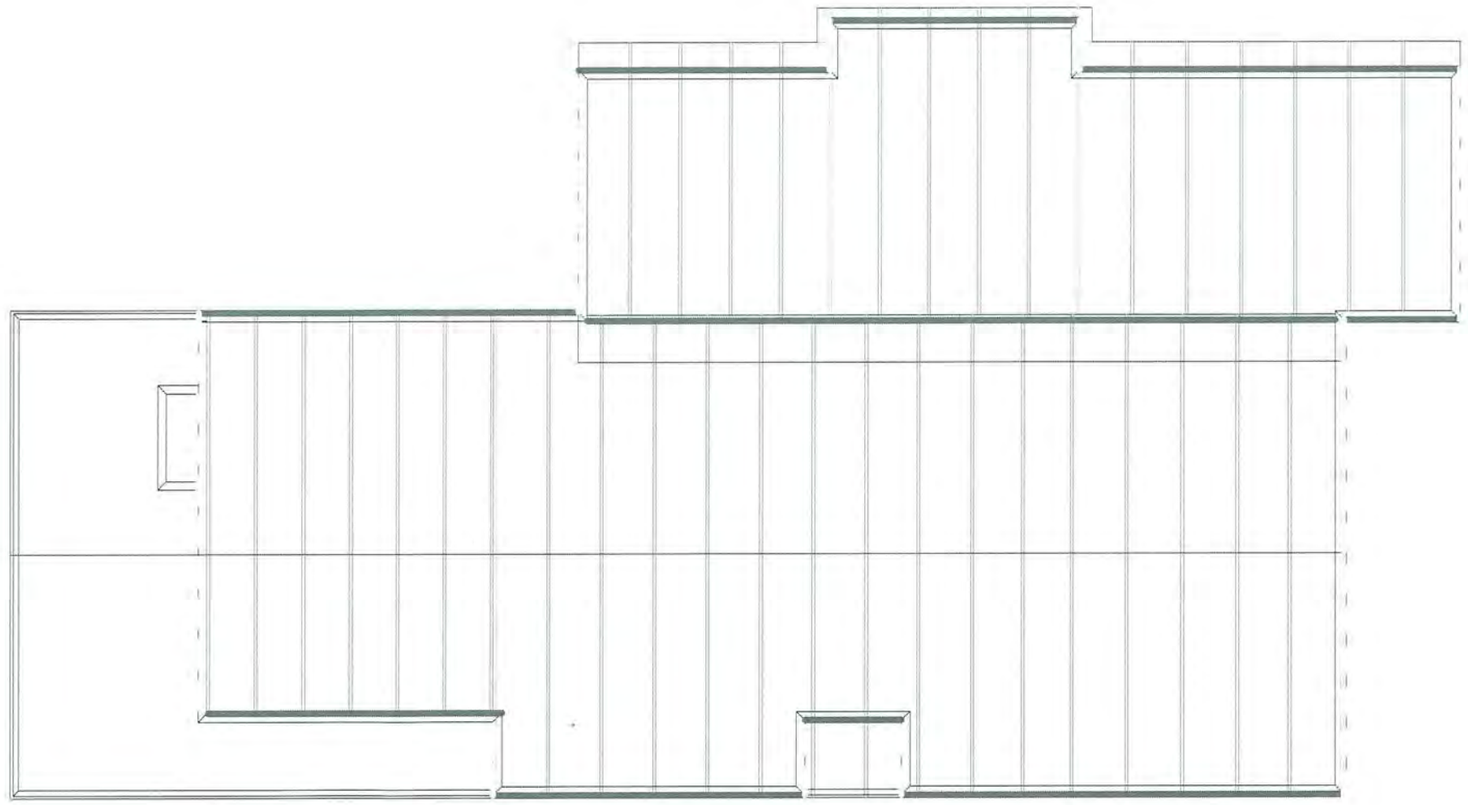
Recommended for internal wall options to avoid lining issues.

OR

Plus LUMBERLOK Stud Strap (One face only)



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NOTES:

Refer to:
LUMBERLOK Wall Fixing Chart - Stud to Top Plate Fixing Schedule 09/2011

(Alternative to NZS3604:2011 Table 8.18)

PlaceMakers® Know how. Can do.

Site Address :
New Residence
2 Kanuka Cl
Waikanae

Sheet Title :
For Building Consent
Stud To Top Plate Fixing

Date : 8 Jun,2016 | Drawn : Zac Adler
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 3.000 Deg	Truss Centres	: 900 mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	: kPa
Wind Zone	: High	Wind Speed	: 44.0 m/s
Roof Snow Load	: 0.000 kPa		

PrimeCad v4.6.6.334

MiTek™

Job Title : 16-00108031
Sheet : 3
Revision Number :

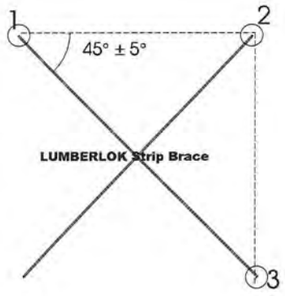
Truss Fixings

- X - LUMBERLOK JH47x90 Joist Hanger
- Z - LUMBERLOK JH47x120 Joist Hanger
- P - LUMBERLOK JH47x190 Joist Hanger
- E - LUMBERLOK JH95x165 Joist Hanger
- O - Pair of LUMBERLOK CT200 Ceiling Ties
- H - LUMBERLOK CT400 Cyclone Tie
- B - LUMBERLOK CT600 Cyclone Tie
- M - Pair of LUMBERLOK Multi Grips
- NP - LUMBERLOK Nailon Plate
- N - LUMBERLOK N21 Diagonal Cleat
- W - Pair of LUMBERLOK CPC40 Cleats
- K - LUMBERLOK TTP 16kN Truss to Top Plate set
- G - LUMBERLOK TTP 9kN Truss to Top Plate set

Roof Bracing

Refer to:
LUMBERLOK Roof Bracing Specifications brochure 08/2006 for end fixing details.

The brace must be located such that it forms an angle of 45° ± 5° to the wall

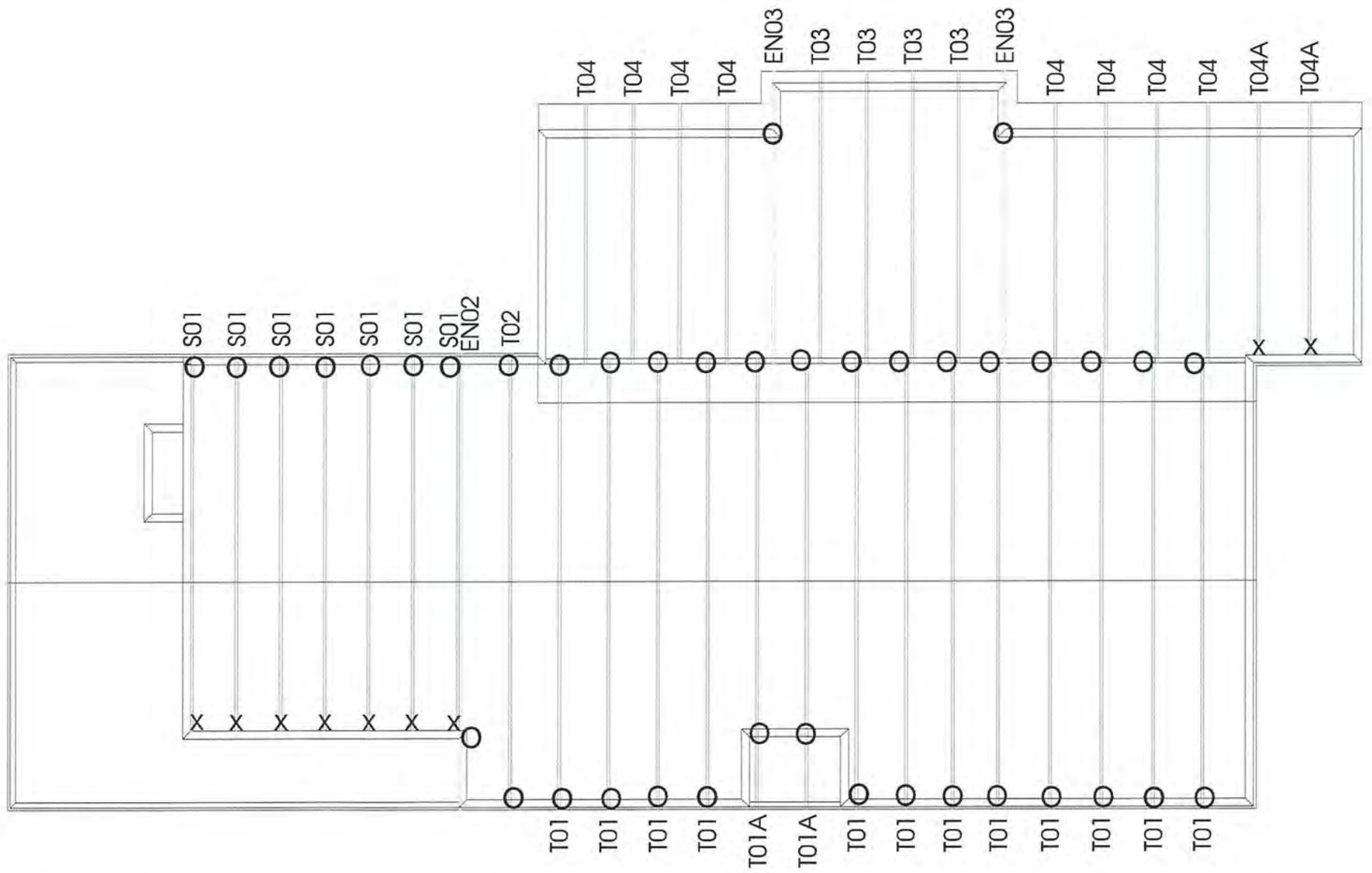


NOTES:

All other areas must have at the minimum 2/ 90x3.15mm skew nails + 2 wire dogs for truss to top plate connections.

Refer to:
LUMBERLOK Timber Connectors Characteristic Loadings Data brochure 03/4

Layout is null and void if trusses not supplied by PlaceMakers



PlaceMakers® Know how. Can do.

Site Address :
New Residence
2 Kanuka Cl
Waikanae

Sheet Title :
For Building Consent
Truss Fixings & Roof Bracing

Date : 8 Jun,2016 | Drawn : Zac Adler
Scale : 1: 100 | System : MiTek 20/20

Job Details:
Roof Pitch : 3.000 Deg
Roof Material : Galv Iron .5mm
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s

PrimeCad v4.6.6.334

MiTek™

Job Title :
16-00108031
Sheet :
4
Revision Number :

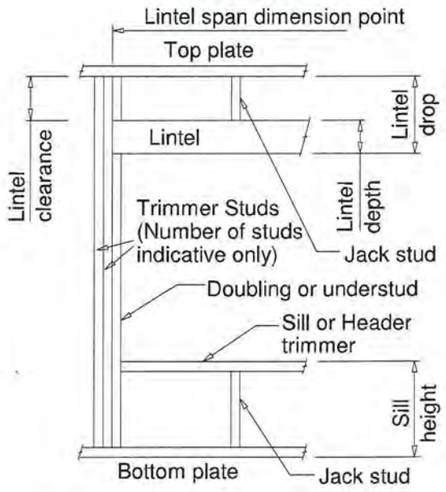
LUMBERLOK®

LINTEL FIXING SCHEDULE
ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12
NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20 kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011

DEFINITIONS



Lintel Supporting Girder Trusses:

Roof Tributary Area	Light Roof Wind Zone				Heavy Roof Wind Zone			
	L	M	H	VH	L	M	H	VH
8.6 m²	G	G	H		G	G	H	
11.6 m²	G	H	H		G	G	H	
12.1 m²	G	H	H		G	H	H	
15.3 m²	H	H	-		G	H	H	
19.1 m²	H	-	-		G	H	-	
20.9 m²	H	-	-		H	H	-	
21.8 m²	H	-	-		H	-	-	
34.3 m²	-	-	-		H	-	-	

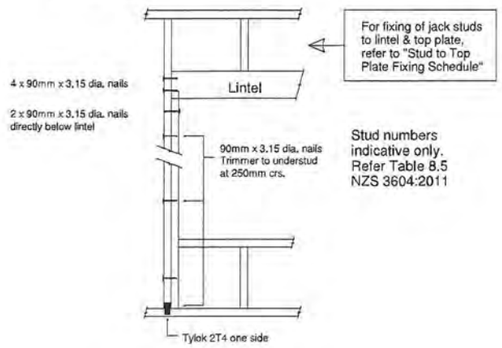
Notes:
1) Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by Lintel)
2) Assumed girder truss is at mid-span or middle third span of lintel
3) Use similar fixings for both ends of lintel
4) All other cases require specific engineering design.

SELECTION CHART FOR LINTEL FIXING

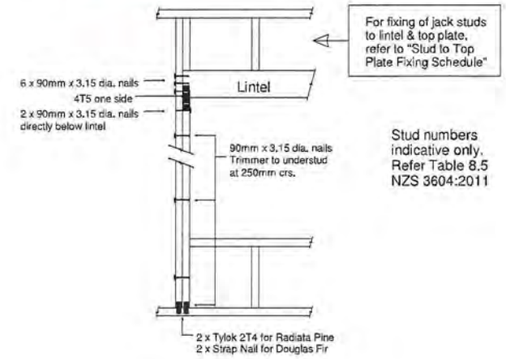
Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
0.7	2.0	E	E	E	E	F	E	E	E	E	E
	3.0	E	E	E	F	F	E	E	E	E	F
	4.0	E	E	F	F	F	E	E	E	F	F
	5.0	E	F	F	F	G	E	E	F	F	F
	6.0	E	F	F	G	G	E	E	F	F	G
0.9	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	E	F	F	F	E	E	F	F	F
	5.0	E	F	F	F	G	E	E	F	F	F
	6.0	E	F	F	G	G	E	E	F	F	G
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F			E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	-
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	-
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-

LINTEL FIXING OPTIONS

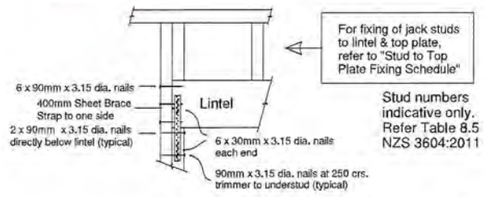
TYPE E
1.4kN

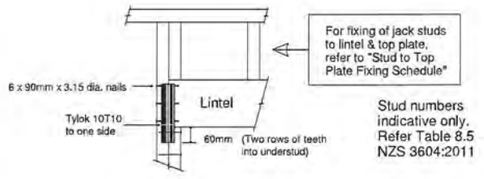


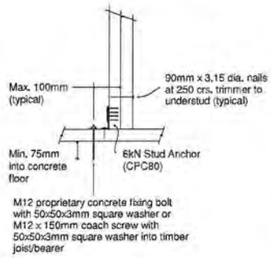
TYPE F
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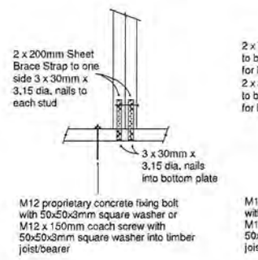


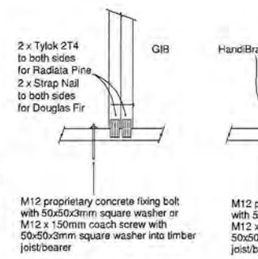
TYPE G
7.5kN

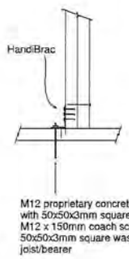


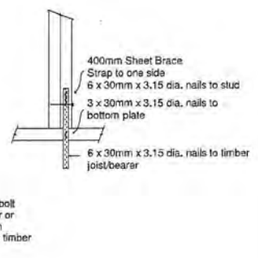




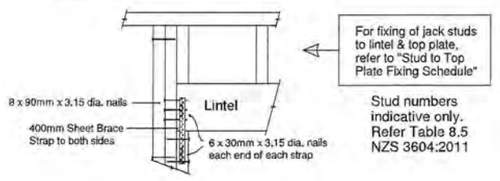


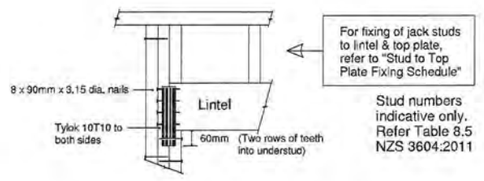


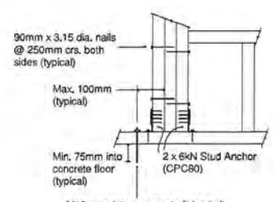


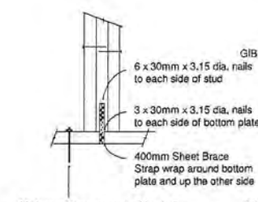


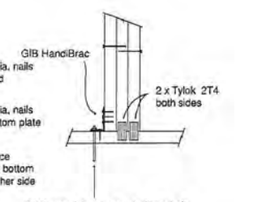
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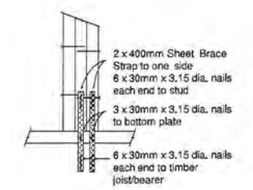












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00031

RECEIVED
29 JUN 2015
BY:

RISK MATRIX CALCULATION

(to E2/AS1 Building Envelope Risk Matrix)

for

NEW HOUSE

David Reid Homes

2 Kanuka Close (Lot 6 Ferndale)

Waikanae

Job Number: 10029

ADarchitecture
Applied Design

Risk Matrix Calculation

to E2/AS1 Building Envelope Risk Matrix

ADarchitecture
Applied Design

Wind Zone	Risk Factors												Total Risk Score
HIGH	Wind Zone		Number of Storeys		Roof/Wall Intersection		Eaves Width		Envelope Complexity		Deck Design		
Building Faces (Refer Risk-Key)	Severity	Score	Severity	Score	Severity	Score	Severity	Score	Severity	Score	Severity	Score	
1,3	H	1	L	0	H	3	VH	5	M	1	L	0	**10**
2,4,7,16,18	H	1	L	0	L	0	H	2	L	0	L	0	**3**
5	H	1	L	0	VH	5	VH	5	L	0	L	0	**11**
6,14,15,17	H	1	L	0	L	0	L	0	L	0	L	0	**1**
8,11,23	H	1	L	0	VH	5	VH	5	M	1	L	0	**12**
9,10,12,13	H	1	L	0	L	0	L	0	M	1	L	0	**2**
19	H	1	L	0	H	3	VH	5	L	0	L	0	**9**
20	H	1	L	0	L	0	VH	5	M	1	L	0	**7**
21	H	1	L	0	H	3	H	2	L	0	L	0	**6**
22	H	1	L	0	L	0	VH	5	L	0	L	0	**6**

Risk Severity Key:	
Low Risk	L
Medium Risk	M
High Risk	H
Very High Risk	VH

8/06/2016

Actual Wall Claddings

as specified in project

ADarchitecture
Applied Design

Building Face (Refer Risk-Key)	Score	Cavity	Actual claddings
1,3	10	Yes	Cladding 1
2,4,7,16,18	3	Yes	Cladding 1
5	11	Yes	Cladding 1
6,14,15,17	1	Yes	Cladding 1
8,11,23	12	Yes	Cladding 1
9,10,12,13	2	Yes	Cladding 1
19	9	Yes	Cladding 1
20	7	Yes	Cladding 1
21	6	Yes	Cladding 1
22	6	Yes	Cladding 1

Cladding Key	
Cadding 1	Plywood Sheet
Cadding 2	
Cadding 3	
Cadding 4	
Cadding 5	
Cadding 6	
Cadding 7	
Cadding 8	
Cadding 9	
Cadding 10	

Suitable Wall Claddings

to E2/AS1 Building Envelope Risk Matrix

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Risk Score	Suitable Wall Claddings as per E2/AS1 - Table 3	
	Direct fixed to framing	**Over nominal 20mm drained cavity**
		Claddings on parapets, enclosed balustrades, and in Extra High wind zones shall be installed over drained cavity (5)(6)
0 – 6	a) Timber weatherboards – all types b) Fibre cement weatherboards c) Vertical profiled metal (3) – corrugated and symmetrical trapezoidal d) Fibre cement sheet (4) (Jointed finish) e) Plywood sheet	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal (3) – corrugated and trapezoidal only d) Fibre cement sheet (Flush-finished) e) EIFS
7 – 12	a) Bevel-back timber weatherboards b) Vertical timber board and batten c) Vertical profiled metal (3)(6) – corrugated only	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal – corrugated and trapezoidal only d) Rusticated weatherboards e) Fibre cement weatherboards f) Fibre cement sheet (Flush and jointed finish) g) Plywood sheet h) EIFS
13 – 20	a) Vertical profiled metal (3)(6) – corrugated only	a) Masonry veneer (2) b) Stucco c) Horizontal profiled metal – corrugated and trapezoidal only d) Rusticated weatherboards e) Fibre cement weatherboards f) Fibre cement sheet (Flush and jointed finish) g) Plywood sheet h) EIFS i) Bevel-back weatherboards
Over 20	a) Redesign the building to achieve a lower score, or b) Specific design – The design may need changing to reduce the risk – The building consent authority may require more comprehensive details and documentation providing evidence of weathertightness – The building consent authority, designer or owner may require more inspections – A third party audit of the design may be required.	

NOTES:

(1) The wall claddings in this table are limited to those covered in this Acceptable Solution.

(2) Traditional masonry veneer as per SNZ HB 4236, with minimum 40 mm cavity.

(3) Refer Figure 38 for profiles.

(4) Except stucco over a fibre cement backing.

(5) Claddings in Extra High wind zones require rigid underlays - Refer to Paragraph 9.1.7.2

(6) Direct fix vertical corrugated steel is included as cavity construction

Definitions of Risk Levels

to E2/AS1 Building Envelope Risk Matrix

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Definitions of risk levels as per E2/AS1 - Table 1			
Risk Factor	**Score (5)**	**Risk Severity**	**Comments**
A: Wind zone	0	Low risk	Low wind zone as described by NZS 3604
	0	Medium risk	Medium wind zone as described by NZS 3604
	1	High risk	High wind zone as described by NZS 3604
	2	Very high risk	Very high wind zone as described by NZS 3604
	2	Extra high risk	Extra high wind zone as described by NZS 3604 (4)
B: Number of storeys	0	Low risk	One storey
	1	Medium risk	Two storeys in part
	2	High risk	Two storeys
	4	Very high risk	More than two storeys
C: Roof/wall intersection	0	Low risk	Roof-to-wall intersection fully protected (e.g. hip and design gable roof with eaves)
	1	Medium risk	Roof-to-wall intersection partly exposed (e.g. hip and gable roof with no eaves)
	3	High risk	Roof-to-wall intersection fully exposed (e.g. parapets, enclosed balustrades or eaves at greater than 90° to vertical with soffit lining)
	5	Very high risk	Roof elements finishing within the boundaries formed by the exterior walls (e.g. lower ends of aprons, chimneys, dormers etc)
D: Eaves width (1)(2)	0	Low risk	Greater than 600 mm for single storey
	1	Medium risk	451 – 600 mm for single storey, or over 600 mm for two storey
	2	High risk	101 – 450 mm for single storey, or 451 – 600 mm for two storey, or greater than 600 mm above two storey
	5	Very high risk	0 – 100 mm for single storey, or 0 – 450 mm for two storey, or less than 600 mm above two storey
E: Envelope complexity	0	Low risk	Simple rectangular, L, T or boomerang shape, with single cladding type
	1	Medium risk	Moderately complex, angular or curved shapes (e.g. Y or arrowhead) with no more than two cladding types
	3	High risk	Complex, angular or curved shapes (e.g. Y or arrowhead) with multiple cladding types
	6	Very high risk	As for High risk, but with junctions not covered in C or F of this table (e.g. box windows, pergolas, multi-storey re-entrant shapes etc)
F: Deck design (3)	0	Low risk	None, timber slat deck or porch at ground floor level
	2	Medium risk	Fully covered in plan by roof, or timber slat deck attached at first or second floor level
	4	High risk	Enclosed deck exposed in plan or cantilevered at first floor level
	6	Very high risk	Enclosed deck exposed in plan or cantilevered at second floor level or above

NOTES:

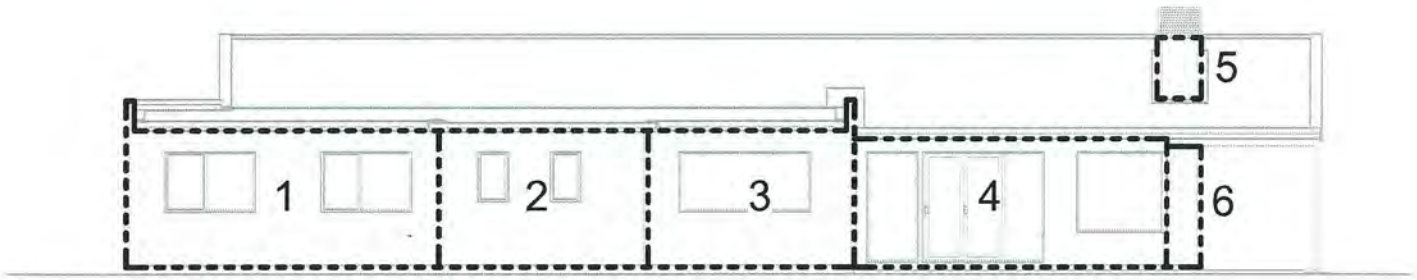
(1) Eaves width measured horizontally from external face of wall cladding to outer edge of overhang, including gutters and fascias.

(2) Balustrades and parapets count as 0 mm eaves.

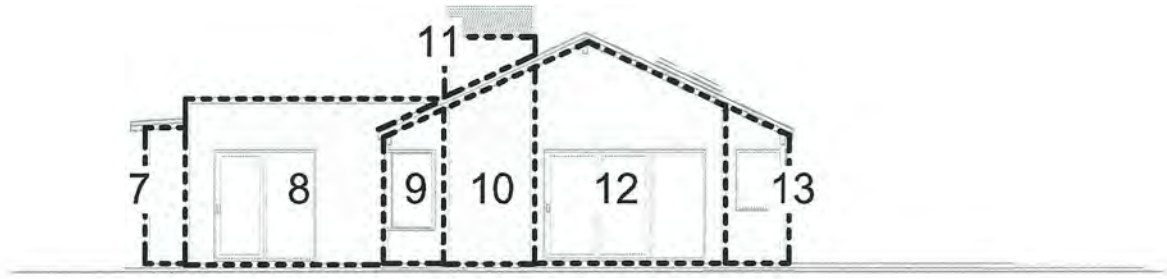
(3) The term deck includes balconies, as described in the Definitions.

(4) For buildings in Extra High wind zones, refer to Table 3 for rigid underlay and drained cavity requirements.

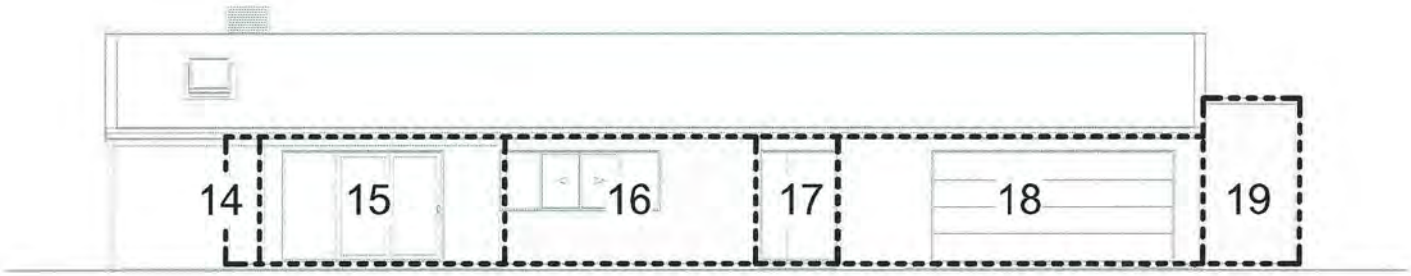
(5) Refer also to Table 2



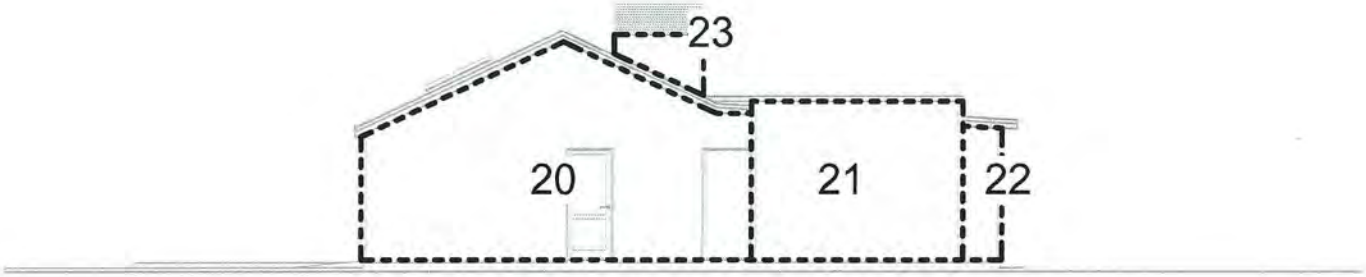
RISK ELEVATION 1



RISK ELEVATION 2



RISK ELEVATION 3



RISK ELEVATION 4

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Proposed House
for
David Reid Homes
2 Kanuka Close
Waikanae

RISK KEY

BUILDING CONSENT

Job	Date	Sheet	Rev
10029	JUN2016	R	

00032

RECEIVED
29 JUN 2016
BY: SM

H1 ENERGY ANALYSIS

(Calculation Method)

for

NEW HOUSE

David Reid Homes

2 Kanuka Close (Lot 5 Ferndale)

Waikanae

Job Number: 10029

ADarchitecture
Applied Design

HEAT LOSS EQUATION
REFERENCE BUILDING

ADarchitecture
Applied Design

Wall construction type:	Non-Solid
Climate Zone:	Zone 2
Glazing percentage:	28%

Non-Solid	**R-values as per NZS 4218 - Table 5**		
Component	**Area (m²)**	**R-value (m² °C/W)**	**Heat Loss (W/°C)**
Roof (incl. Skylights)	161.30	2.90	55.6
Wall	120.51	1.90	63.4
Floor	161.30	1.30	124.1
Glazing (30%)	51.65	0.26	198.6
Glazing (>30%)		0.40	
		Total	**441.8**

This document has been generated in accordance with NZS 4218:2009

HEAT LOSS EQUATION
PROPOSED DESIGN

ADarchitecture
Applied Design

Component	Area (m²)	R-value (m² °C/W)	Heat Loss (W/°C)
Roof 1	161.30	4.31	37.4
Wall 1	97.30	3.14	31.0
Wall 2	27.44	1.98	13.9
Floor 1	161.30	1.97	81.9
Wdw 1	47.42	0.26	182.4
		Total	**346.5**

NOTE: Refer to component descriptions for type details.

COMPONENT DESCRIPTIONS
PROPOSED DESIGN

ADarchitecture
Applied Design

ROOFS							Total
Type	Cladding	Type	Construction	Frame	Spacing	Insul.	R-value
Roof 1	Profiled Metal	Truss	Rafters and battens	90mm	900mm	R4.0	**4.31**

WALLS							Total
Type	Cladding	Type	Construction	Frame	Stds/dwngs	Insul.	R-value
Wall 1	Shadowclad	Cavity	Timber framed	140mm	400/800mm	R4.0	**3.14**
Wall 2	Internal	No Cavity	Timber framed	90mm	400/800mm	R2.4	**1.98**

FLOORS							Total
Type	Flooring	Type	Construction	Frame	Ratio / crs	Insul.	R-value
loor 1	Concrete	Slab on ground	Ribraft	140mm	2.66		**1.97**

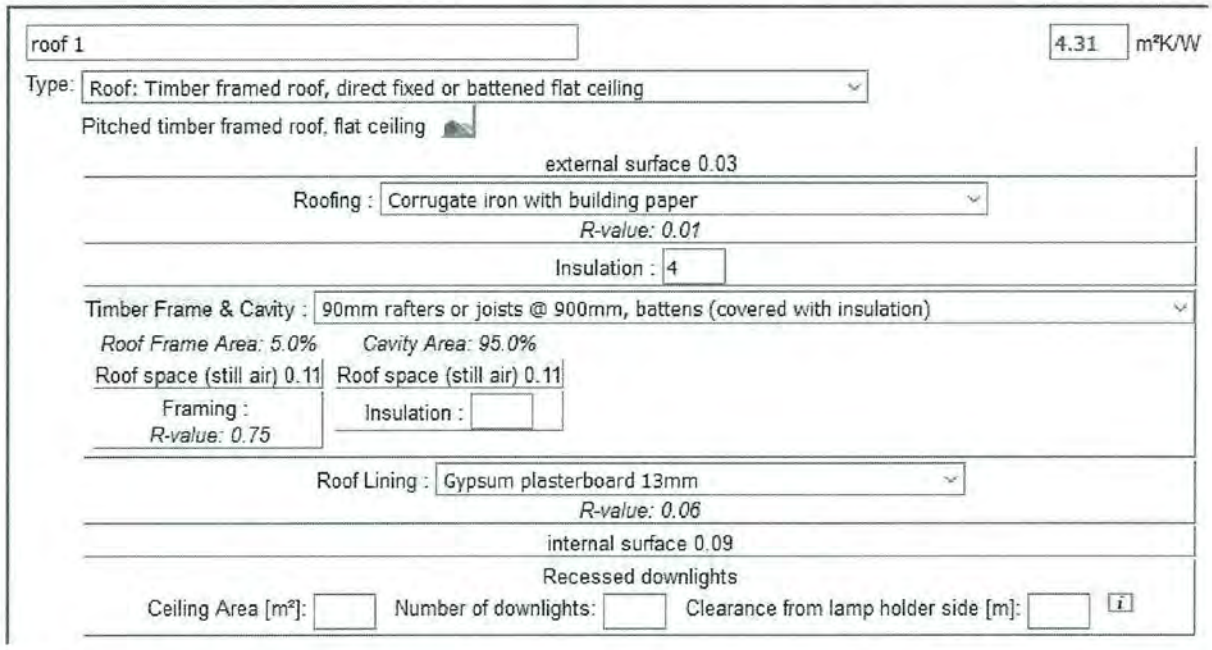
WINDOWS					Total
Type	Framing	Type	Construction	Glazing	R-value
Wdw 1	Aluminium	Vertical	Double glazed	Clear	**0.26**

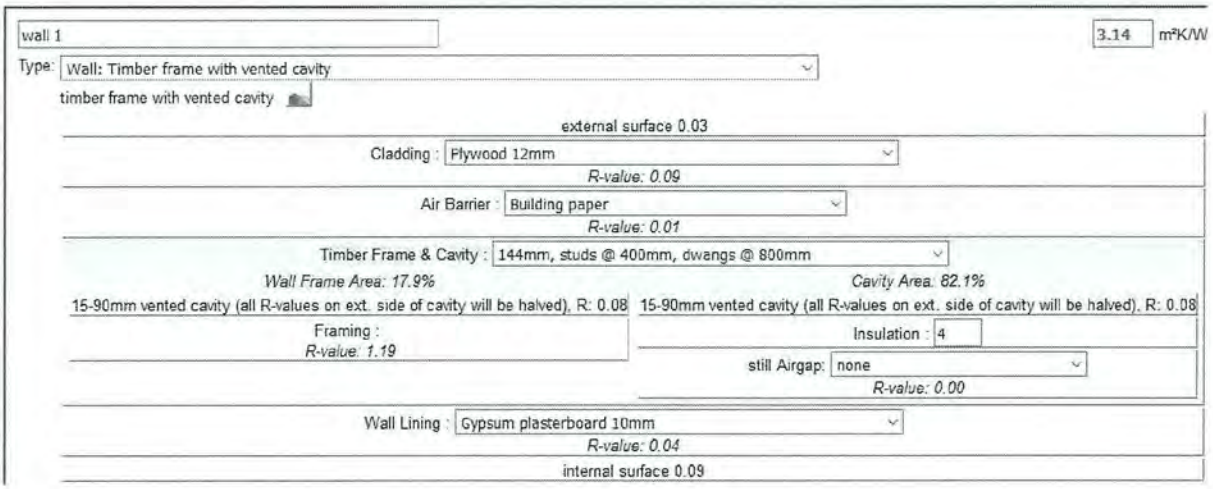
SKYLIGHTS					Total
Type	Framing	Type	Construction	Glazing	R-value

ADarchitecture Ltd

Job 10029: David Reid Homes, 2 Kanuka Close (Lot 6 Ferndale)

R-Value Calculations from designnavigator.co.nz





wall 2 | 1.98 m²K/W

Type: Wall: Timber frame (direct fixed cladding)

timber frame (direct fixed cladding)

external surface 0.03

Cladding : Gypsum plasterboard 10mm into still air (garage, etc.)

R-value: 0.10

Air Barrier : none

R-value: 0.00

Timber Frame & Cavity : 90mm, studs @ 400mm, dwangs @ 800mm

Wall Frame Area: 17.9%

Framing :

R-value: 0.75

Cavity Area: 82.1%

Insulation : 2.4

still Airgap: none

R-value: 0.00

Wall Lining : Gypsum plasterboard 10mm

R-value: 0.04

internal surface 0.09

BC 160475

00053

29 JUN 2016
BY: SM

INDICATIVE SOAKPIT DESIGN FOR STORMWATER RUNOFF DISPOSAL

DESIGN TO E1/VM1 (NZ BUILDING CODE) FOR STORMWATER INTO SOAKPIT AT LOCATION A

Estimated Dimensions of Soakpit

W =	2.0 m	L =	6.5 m
A_{sp} =	13.0 m^2		(area of base of soakpit)
C =	0.9		(run-off coefficient (from Table 1))
I_{24} =	120 mm/24hrs		(AEP 10% - 1 in 10 year storm event)
I =	31.2 mm/hr		(1 hour storm event)
			NB: 1 hour storm not necessarily worst case

Estimated Catchment Area

4 FERNDALE

2 KANUKA

$A_{Dwelling}$ =	286.0 m^2	(from A.D Architectures Roof Plan (sheet 13)) 239m2.
$A_{Driveway}$ =	m^2	
A_{total} =	286.0 m^2	= 84%

S_r =	130.0 mm/hr	(factor of safety of 3 applied to raw soakage)
R_c = 10 x C x I x A =	8.03 m^3	(total rainfall)
$V_{soak} = A_{sp} \times S_r / 1000$ =	1.69 m^3	(base soakage)
$V_{stor} = R_c - V_{soak}$ =	6.34 m^3	(design storage)

Dimensions of Chambers

Ø =	1050 mm	D = 1.2 m	(depth of chamber)
A_{chamb} =	0.87 m^2		(footprint of chamber)
V_{chamb} =	1.04 m^3		(storage of chamber)
V_{hole} =	13.95 m^3		(rubble volume of required hole - based on void ratio of 0.38)
$D_{hole} = V_{hole}/(A_{sp} - A_{chamb})$ =	1.15 m		(required hole depth)

Indicative Soakpit Dimensions

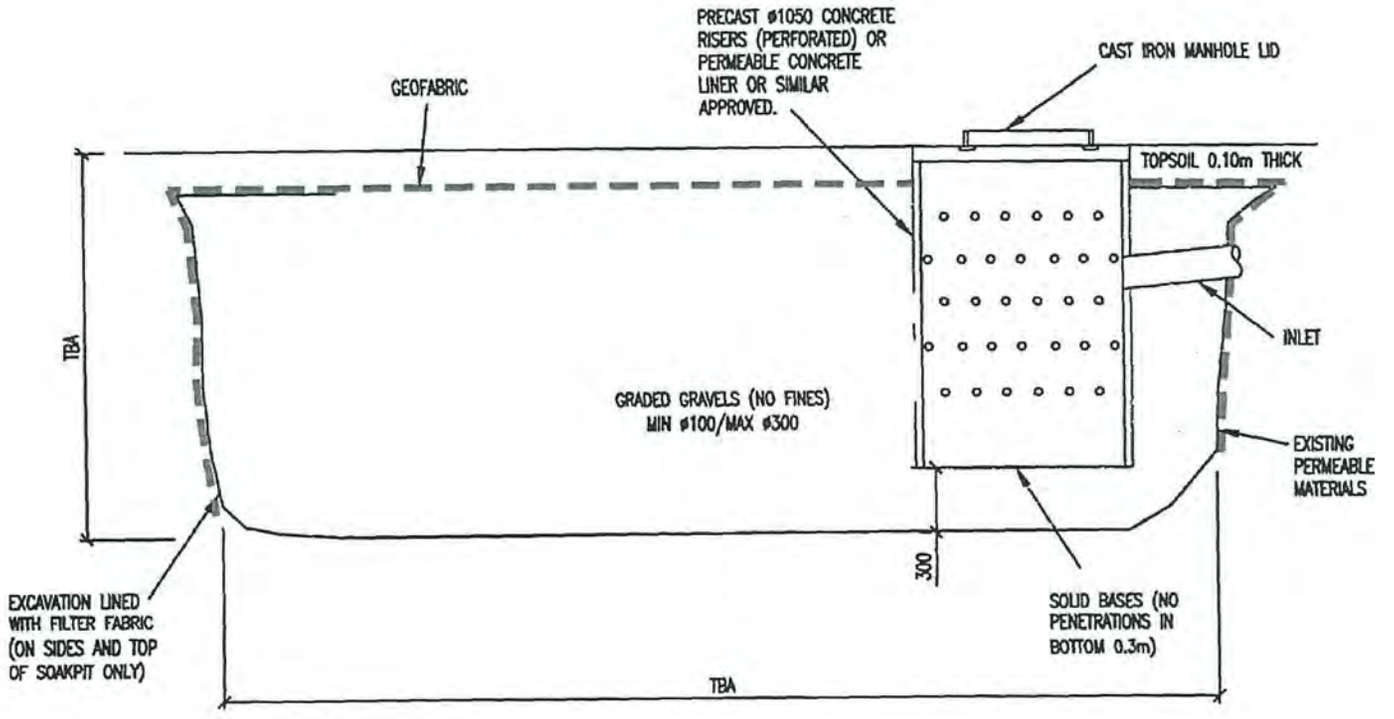
W =	**2.00 m**	
L =	**6.50 m**	= 14.95 m3
D (min) =	**1.25 m**	(assumes 100mm topsoil)

OF

W = 2.0m
L = 5.5m
D = 1.15m
= 12.65 m3

2 KANUKA CLOSE

BC 160475



SOAKPIT DETAIL

NOT TO SCALE

No.	AMENDMENT	NAME	DATE

THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.

BASE OF EXCAVATION TO BE INSPECTED BY ENGINEER OR KCDC

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Hutt Valley, Wellington, Kapiti Coast

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CLIENT
DAVID REID HOMES

JOB
SOAKPIT CONCEPT DETAIL

SCALE
NTS

	NAME	DATE
FIELDWORK		
DESIGNED	AMH	12/11
DRAWN	AMH	12/11
CHECKED		

DRAWING NUMBER
20725 SP

SHEET OF SHEETS

GREYWATER IRRIGATION CALCULATION SHEET

This sheet will help determine whether there is sufficient area available to reuse greywater for irrigation. Remember that greywater should be diverted to sewer and only used for garden irrigation when needed.

Greywater irrigation will not be suitable for your proposed dwelling, if it is in an area where:

- soils are too slow draining,
- are too steep,
- have high water tables less than a meter below the surface, or is within 20m of a drain, wetland, pond, river or other water body

If greywater is unsuitable, you will need to install a minimum of 10,000 litre of rainwater storage.

The following will help establish if your site is suitable for greywater irrigation.

Greywater Diversion Device:

Model:	watermate
Irrigation method	

1. Is the area being irrigated at least 20m away from a waterbody?	☑ Yes / No☐

2. Area available for irrigation.	346.8 m^2

Calculate the area you have available for outdoor irrigation allowing for set back distances below:

Set Back Features	**Setback Distance (metres)**
Property boundaries, pedestrian paths, and driveways.	0.5
Footings of buildings.	1.5
Retaining wall footing.	1.0
In ground swimming pool surrounds.	1.0
In ground potable water tank.	6.0
Bores intended for human consumption	50.0

3. Greywater Volume

Calculate how much water your home could generate. As the number of people will vary over the life of the house, use the following calculation to estimate greywater volume.

40 Litre	+	60 Litres	=	100 Litres	x	6	x	7 Days	=	4200 Litres	
Laundry Usage		Bathroom usage		Total Daily usage		Occupancy (depends on number of bedrooms see table below)		Days per week		The amount of grey water produced each week	

Bedroom numbers in home	Occupancy for design purposes and calculation
1	2
2	4
3	6
4	8
5	10
6	12

Litres produced each week		÷	Soil irrigation rate*		=	area needed for irrigation	
4200	litres/week		35	mm/day		120	m^2

Match the soil on your site to the soil irrigation rates below.

Soil Category	Soil Texture	Irrigation rate * for greywater	Indicative drainage class
1	Gravel and sands – structure-less	35 mm/week	Rapid draining
2	Coarse to medium sand	35 mm/week	Free draining
3	Medium-fine and loamy sand (dune sands)	35 mm/week	Good drainage
4	Sandy loam, loam and silt loam	20 mm/week	Moderately well drained
5	Sandy clay loam, clay loams, silt clay loam, peaty loam	20 mm/week	Moderate to slow drainage
6	Sandy clay, non-swelling clay and silty clay, peat	15 mm/week	Slowly draining
7	Swelling clay, grey clay, hardpan	15 mm/day	Poorly or non-drained

4. Does area available = area needed?	☑ Yes / No ☐

If the **area available** is greater than the **area needed**, the proposed application area is sufficient to cope with the volume of greywater that is likely to be generated and approval may be granted if all other conditions are met.

Enter the area available on the compliance sheet and mark out on the site plan or plumbing and drainage plan the area to be irrigated with greywater.

5. There isn't enough area for greywater irrigation

If the **area available** is less than the **area needed**, the proposed application area is insufficient to cope with the volume of greywater that is likely to be generated.

If you want greywater irrigation but the area available does not appear to be sufficient, you can:

- select a system that limits greywater to be suitable to your site conditions
- apply for an alternative solution that will only use greywater from the bathroom or laundry
- use a suitably qualified person to design a greywater system suited to your site (please attach their report with the compliance sheet)


Te Heke Place
11
Ferndale Drive
14
1
10
Kanuka Close
3
4

save money save water

WaterMate

A REFRESHING APPROACH TO GARDEN IRRIGATION

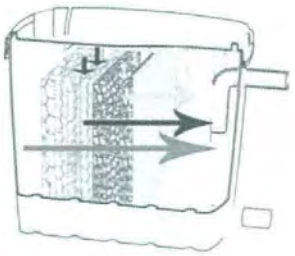
Turn your grey into Green

Greywater diversion device

With washable and replaceable filters



Cross-flow depth filtration and multichamber plug flow concept





How it works:

Step 1. When the valve is open, greywater flows directly to the mains sewage or septic tank.

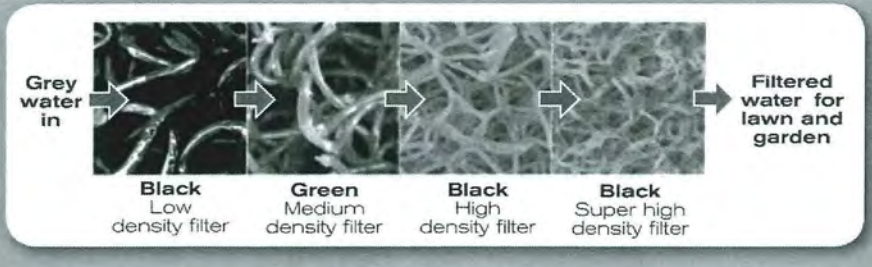
Step 2. When the valve is closed, greywater from the house is diverted to the inlet of the filter.

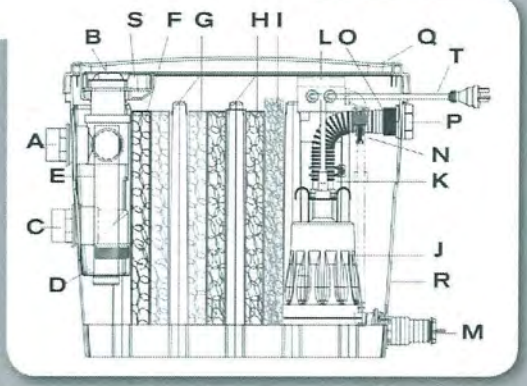
Step 3. The greywater flows through the 1st filter web that retains major and medium particles such as hair, lint, paper detergent clogs and other impurities (The filter web: Matala Black - Low density, Matala Green - Medium density).

Step 4. The greywater flows through the 2nd filter web that retains medium and small particles (The filter web: Matala Green - Medium density, Matala Blue - High density)

Step 5. The greywater flows through the 3rd filter web that retains small and minor particles (The filter web: Matala Blue - High density, Matala Gray - Super high density)

Step 6. Filtered greywater is pumped to the irrigation.





A. Inlet (2")
B. Diverting valve
C. Outlet to sewer (2")
D. Basket
E. Overflow stand pipe
F. Matala FSM190 Black
G. Matala FSM290 Green
H. Matala FSM365 Blue
I. Matala FSM460 Grey
J. Water pump
K. Pump outlet
L. Electronic pump controller
M. Drain/Cleanout point with 1" plug
N. Kink-free hose and hose clamp
O. Outlet Connector
P. Outlet
Q. Tank Cover
R. Tank
S. Inlet cover
T. Electrical pump lead

Technology proven in more than 40 countries

For more information and stockist details visit
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WaterMate
A REFRESHING APPROACH TO GARDEN IRRIGATION

Features & benefits

- 30 litres (6.8 gallons) of Matala filter media provides 10m² (108ft²) of specific surface area and 90% void space
- Cross-Flow depth filtration: each filter web has a 3-dimensional structure, able to trap a high volume of impurities without plugging
- Multi-chamber plug flow concept: If the first filter web gets clogged the filtration is done by the 2nd and 3rd filter web. If the 2nd web gets clogged, the filtration is done by the 3rd filter web
- Solid removal: up to 75% for pump operated unit, 90% for gravity unit
- Submersible pump with integrated Electronic Pump Controller (EPC)
- The pump is protected from dry run, clogging and damage with built in overflow safety
- Easy to clean
- System can be installed above ground, half-submerged in ground, or underground
- Water mark approved.

How much water can we reuse?

Use	Residential Water Usage (Single Household)	Reuse
	Litres/person/day	
Showers	90	☑
Washing Machine	22	☑
Toilet	38	☒
Washbasins/Kitchen	30	☒
Total	180	

Shower waste 90 litres
Washing machine 22 litres

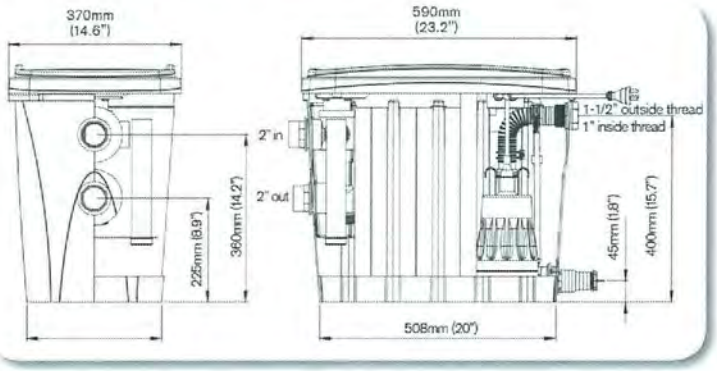
Potential water reuse 112 litres/person/day
40,880 litres/person/year

Proportion of in-house usage available for re-use

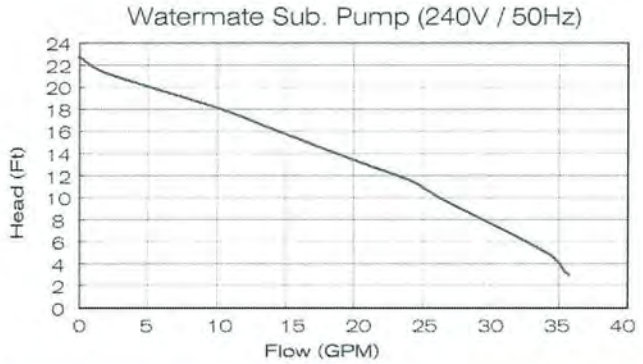


Data source: On-Site NewZ Table A-4

WaterMate dimensions



WaterMate pump performance curve

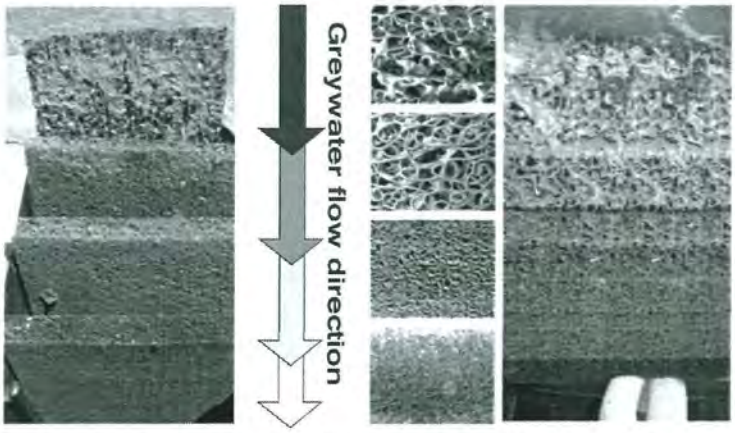


WaterMate pump specifications

Output			Rated		Maximum		Dimension	Weight
HP	W	mm	Head (m)	Flow (l/m)	Head (m)	Flow (l/m)	LxWxH (mm)	Kg
1/4	200	25-32	5	53	7	136	155x155x240	4.2

Unit tested in a caravan park, Australia

Matala greywater diverter checked after filtering 40,000L (10,567 gallons) incoming greywater: public shower rooms and laundry.



The pictures prove the high filtration efficiency achieved with progressive density Matala filter sheets. The filter can take up a huge volume of hair, lint, sand, soap, residues etc.

Ramset™
BOTTOM PLATE FIXING SOLUTIONS 2013

| Meets NZS 3604:2011 Requirements| 90 x 45 Bottom Plate |

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Bottom Plate Durability

Fixing Requirements				Installation		
Bottom Plate Location	Bottom Plate Fixing Requirement	Concrete Strength (min.)	Floor Edge Type	Max Spacing	Fastener	Min Edge Distance (FROM OUTERFACE)
External Wall	NZS3604:2011	17.5 MPa	Concrete	900 mm	12120BPAG*1 OR T12140GH*1	55 mm
			Masonry Block	600 mm		
	Proprietary Bracing Systems (15 kN)	17.5 MPa	Concrete	900 mm	AS12150GH + RPBA	
			Masonry Block	600 mm		
Internal Wall	NZS3604:2011	17.5 MPa	N/A	900 mm	12120BPAG*1 OR T12140GH*1	N/A
				600 mm	8x75 Drive Pin & Washer	N/A
	Proprietary Bracing Systems (15 kN)	17.5 MPa	N/A	900 mm	12120BPAG*1 + RPBA OR T12140GH*1 + RPBA	N/A


HD875 DRIVE PIN


AS12150GH ANCHOR


12120BPAG ANCHOR

Ramset Bracing Anchor (RPBA)

Advantages

- Ease and speed of installation
- No checking of timber frame to ensure flush fitting of board
- The RPBA is a one piece anchor for either side of stud
- Slotted hole on bottom of bracket provides some flexibility in bolt & bracket position
- Installed prior to fixing of gypsum wallboard
- Easy inspection

The Ramset Bracing Anchor is sold as a set of 2.

Each set includes the following components;

- 2 Each Ramset Bracing Anchor
- 14 Each Tek screws

Fixings into timber or concrete floor to be purchased separately



CBI 5113

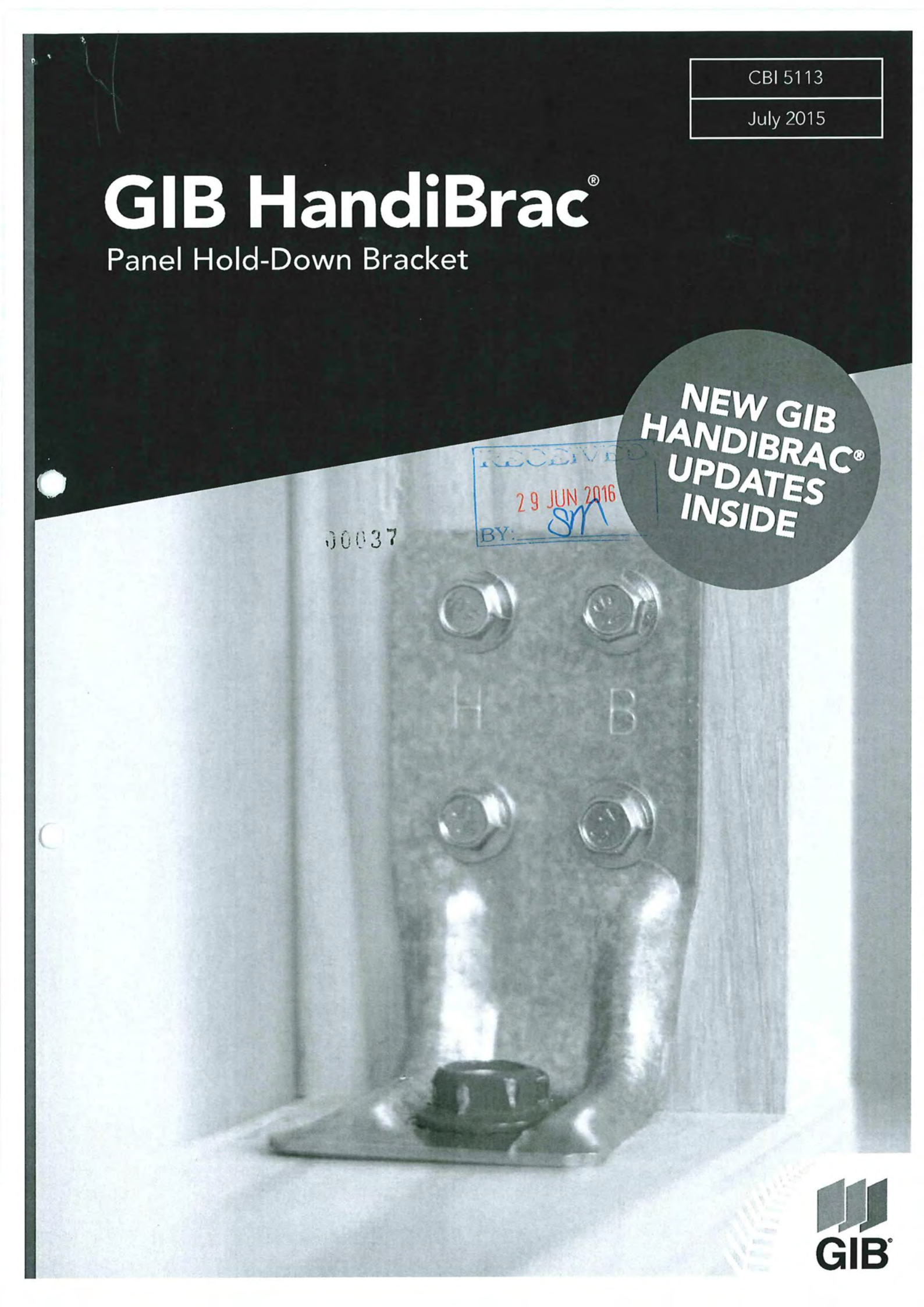
July 2015

GIB HandiBrac®

Panel Hold-Down Bracket

NEW GIB HANDIBRAC® UPDATES INSIDE

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GIB®



GIB HandiBrac®

Panel Hold-Down Bracket

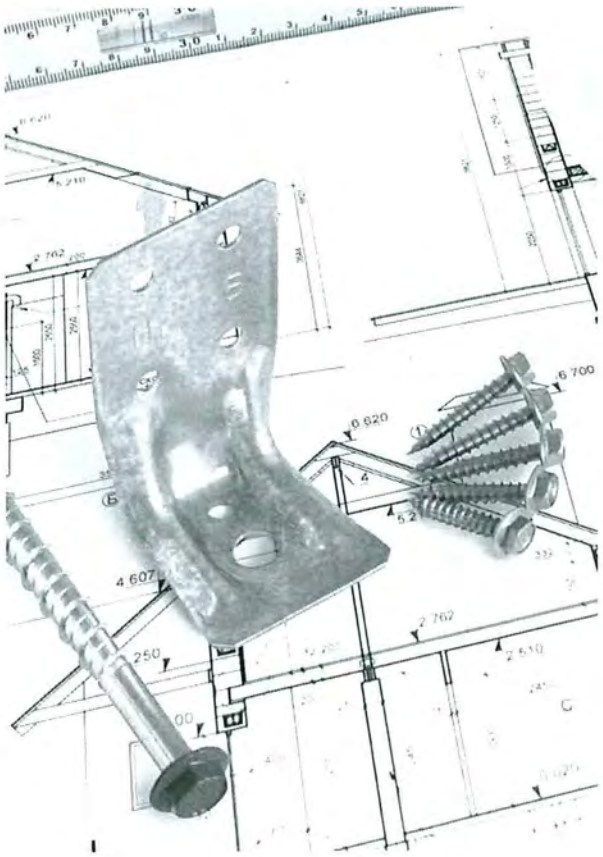
Developed in conjunction with MiTek™, the GIB HandiBrac® has been designed and tested by Winstone Wallboards for use in GIB EzyBrace® elements that require hold-downs. The GIB HandiBrac® is a substitute for bottom plate hold-down straps.

- Quick and easy to fit
- May be fitted at any stage before lining
- Framing face is clear to allow flush lining
- Easily inspected

The GIB HandiBrac® with BOWMAC® blue head screw bolt is suitable for timber and concrete floors constructed in accordance with NZS 3604:2011

The GIB HandiBrac® provides quick and easy installation. The registered design provides a flush surface for the wall linings because it is fitted inside the framing.

There is therefore no need to check in the framing as is recommended with conventional straps. Because the GIB HandiBrac® conveniently allows for installation and inspection at any stage prior to fitting internal linings, it is suitable for both new and retrofit construction.



GIB HANDIBRAC® OVERVIEW

COMPONENTS

GIB HandiBrac® is available in boxes of 10, each containing 5 pairs.

Components per paired pack include:

- 2 x GIB HandiBrac® Brackets
- 10 x Tek Screws
- 2 x BOWMAC® screw bolts included within specific GIB HandiBrac® pack

GIB® BRACING ELEMENTS

The GIB HandiBrac® is a proprietary product that has been tested and is suitable for use with specified GIB Ezy Brace® systems.

FIXING TO TIMBER FRAMED FLOORS

BOWMAC® screw bolt to achieve a characteristic uplift strength of 12kN.

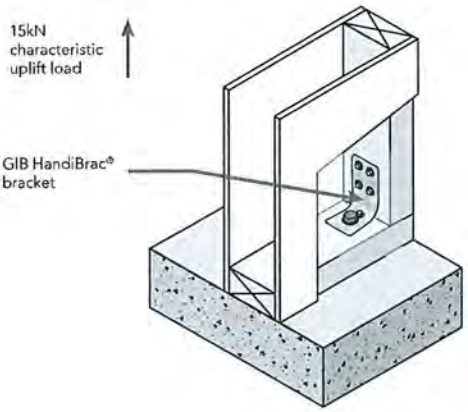
FIXING TO CONCRETE SLABS

BOWMAC® screw bolt to achieve a characteristic uplift strength of 15kN

PANEL HOLD-DOWN DETAILS

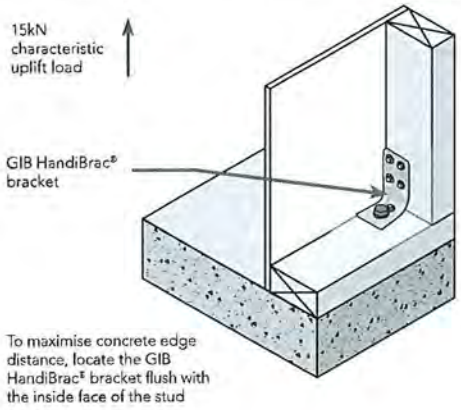
CONCRETE FLOOR – INTERNAL WALL

The bottom plate at both ends of the bracing element is fixed using a BOWMAC® screw bolt. For BOWMAC® screw bolt installation see instructions on next page



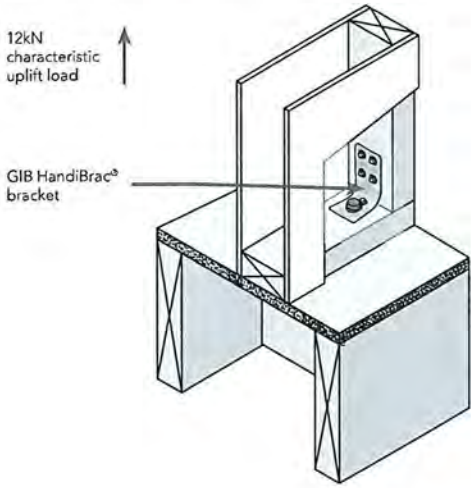
CONCRETE FLOOR – EXTERNAL WALL

The bottom plate at both ends of the bracing element is fixed using a BOWMAC® screw bolt. For BOWMAC® screw bolt installation see instructions on next page.



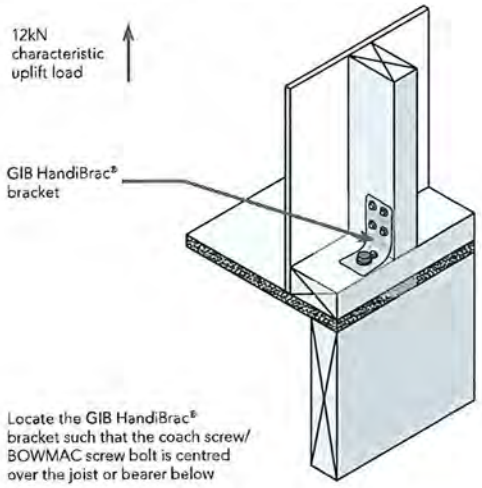
TIMBER FLOOR – INTERNAL WALL

Bottom Plate is fixed using a BOWMAC® screw bolt. For BOWMAC® screw bolt installation see instructions on next page.



TIMBER FLOOR – EXTERNAL WALL

Bottom Plate is fixed using a BOWMAC® screw bolt. For BOWMAC® screw bolt installation see instructions on next page.

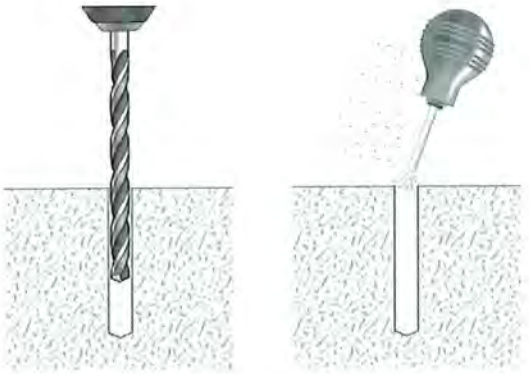


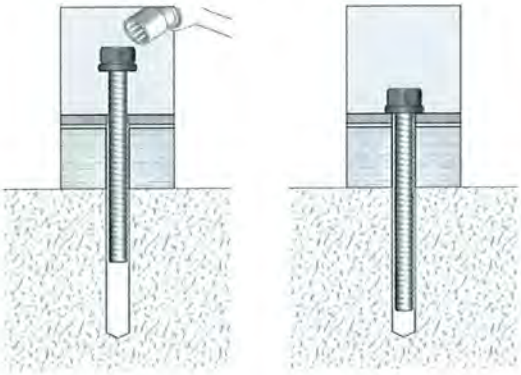
INSTALLATION OF GIB HANDIBRAC® BRACKET

1. Install the screw located in the bracket base
2. Install the BOWMAC® screw bolt as per instructions below
3. Install remaining four screws into the face of the timber stud

Installation Tips

- Use quality hexagonal socket with a ratchet spanner
- During installation debris or dust created by the thread cutting action may cause some resistance to be experienced. This is easily overcome by unscrewing the BOWMAC® screw bolt for one turn or more and then continuing to fix to the full embedment.





PREPARATION

- Use a 10mm diameter masonry bit for a solid concrete substrate and an 8mm diameter bit for fixing to a timber sub-floor.
- Drill a hole into the base material to depth 8 mm deeper than the required embedment and clean out the hole of dust and debris prior to installation of BOWMAC® screw bolt.

FIXING THE BRACKET

- Insert the bolt through the GIB HandiBrac® plate and bracket and into the hole.
- Begin tightening the bolt by applying forward pressure when engaging the first thread.
- Additional forward pressure may be required for installation in high strength, dense base materials.
- Continue tightening the anchor until the head is firmly seated against the GIB HandiBrac® base.
- In extremely dense material, use of an impact wrench is recommended.
- Be sure the bolt is at the required embedment depth.
- The installation is now complete.

GIB HANDIBRAC®

TRADEMARKS

The name GIB®, GIB HandiBrac® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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NZ Registered Design Application #420161

MANUFACTURER

GIB HandiBrac® is manufactured and distributed by MiTek New Zealand Ltd.

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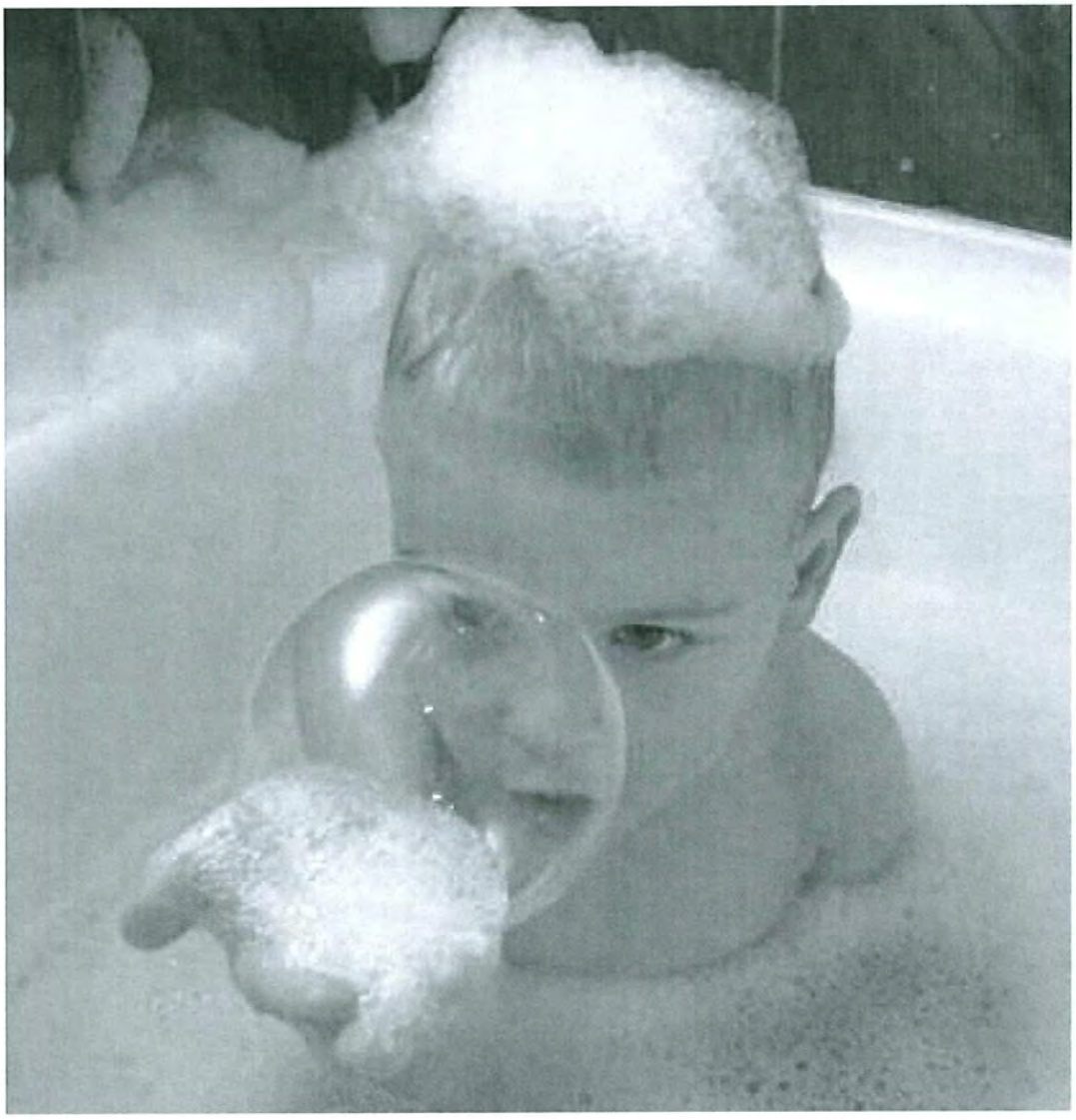
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CBI 5113

March 2007

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GIB Aqualine®
Wet Area Systems



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GIB®

Introduction

MARCH 2007

THIS PUBLICATION

This publication is not intended as the definitive guide on wet area construction and wet area systems, but rather as a helpful guide to best practice around areas where there is intermittent water exposure and splash zones within residential and non-residential buildings – in particular, areas covered by the New Zealand Building Code (NZBC), Clause E3 Internal Moisture.

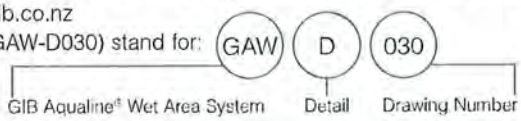
The information herein is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZBC and the end user.

Wet areas in the home often require relatively frequent and expensive renovation or repair, often because of the ingress of water to the structure of the building.

It is important to introduce materials and systems which have been specially designed to cope with the conditions that are common in wet areas, and to ensure they are installed correctly, using best practice, and are compatible to form a complete wet area system.

The code numbers shown with each "typical detail", e.g. GAW-D030, match the code numbers for drawings available as downloads on the GIB® website at www.gib.co.nz

The reference numbers (e.g. GAW-D030) stand for:



WHAT IS A WET AREA?

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Wet areas fall into two categories; these are well explained and documented in the NZBC, Clause E3.

1. Water splash areas – These are areas subject to intermittent splash of liquid water around sanitary fittings and appliances such as baths, vanities, laundry tubs, sinks, etc. These areas are required to have an impervious, easily cleaned surface.
2. Shower enclosures – These are areas subject to more frequent, larger quantities of water, and include shower enclosures and shower over bath areas. The NZBC E3/AS1 requires these areas to be impervious, and specifically excludes any paint and wallpaper finishes. Where ceramic tile or stone finishes are applied, E3/AS1 requires that they "shall be laid on a continuous impervious substrate or membrane".

The requirements of these wet areas are described on page 6 of this publication and in full in Clause E3 of the NZBC. Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management, which will require separate consideration. Ongoing maintenance of wet areas is also important to maximise the life of the wet area.

GIB AQUALINE®

Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or moisture.

The NZBC does not call for water resistant linings in wet areas but it is highly desirable to incorporate lining materials which will maintain their integrity longer when exposed more frequently to water or steam and particularly to one-off events such as leakages or flooding of a room.

GIB Aqualine® is ideal in such situations because it features a water resistant wax polymer impregnated core.

Unlike other commonly used substrates, the GIB Aqualine® core not only resists penetration of water through the lining into the framing behind, but also resists water "wicking" up the core, a common cause of long-term damage where a water resistant lining has not been used.

GIB Aqualine® will maintain its integrity for extended periods, particularly where wicking over large areas can destroy the integrity of the interface between the lining and paint or wallpaper surfaces or between the lining and the tile adhesive.

The illustrations below graphically show the difference between GIB Aqualine® and standard plasterboard after a two-hour soak test in red dye.



Introduction/Design Considerations

GIB AQUALINE® *continued*

Where to Use GIB Aqualine®

Though not required by NZBC, it is highly desirable to include GIB Aqualine® in all areas at risk of water or moisture damage, in order to prolong the life expectancy of that space.

They include:

	WALLS	CEILINGS
BATHROOMS	✓	✓
SHOWERS	✓	✓
LAUNDRY	✓	✓
KITCHEN	✓	
TOILET	✓	

Benefits

- Water resistant and durable to help protect against water damage
- Proven substrate for paint, wallpaper, tiles, sheet vinyl and rigid sheet shower linings with installations in over 300,000 bathrooms in New Zealand
- Suitable for both residential and non-residential applications
- Dimensionally stable, will not buckle or warp, hence an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains fibreglass and other additives for strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB® Noise Control Systems (see Compliance with the NZBC, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details
- Green face paper for ease of recognition.

Sheet Dimensions and Weights

SHEET DIMENSIONS (ALL SHEETS 1200mm WIDE AND TE/TE)		MAXIMUM WEIGHT/m²
Thickness (mm)	**Length (mm)**	
10	2400, 2700, 3000, 3600	7.8kg
13	2400, 2700, 3000, 3600	10.2kg

Handling and Storage

- GIB Aqualine® must be stored under cover, stacked flat and clear of the floor with sufficient support to avoid sagging
- GIB Aqualine® must be handled as a finishing material.

APPRAISAL

The document entitled *GIB Aqualine® Wet Area Systems* 2007 has been appraised by BRANZ, Appraisal Certificate, No. 427 (2007).

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

Structure – Clause B1

The design and material specification for steel and timber framing used in GIB Aqualine® systems must be in accordance with the performance requirements of NZBC Clause B1 (Structure). See Bracing in Wet Areas on page 5.

Durability – Clause B2

When installed and maintained in accordance with this literature, GIB Aqualine® tiled or vinyl covered systems have a serviceable life of at least 15 years. They comply with the requirements of NZBC Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers, showers over baths and splash-backs.

When used as a general wet area lining and maintained under normal dry internal conditions, GIB Aqualine® systems have a serviceable life of at least 50 years and comply with NZBC Clause B2 (Durability) for use within toilets, kitchens, bathrooms and laundries not directly exposed to liquid water.

Spread of Fire – Clause C3

GIB® Fire Rated Systems provide passive fire protection in accordance with the requirements of NZBC Clause C3 (Spread of Fire). When GIB Aqualine® is substituted into fire rated systems in place of the equivalent thickness GIB Fyreline®, the Fire Resistance Rating (FRR) of that system will be maintained.

Design Considerations

MARCH 2007

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC) *continued*

Internal Moisture – Clause E3

When installed in accordance with this literature, tiled or vinyl covered GIB Aqualine® systems may be used in areas directly exposed to liquid water, such as showers, to provide an impervious and easily cleaned wall surface. These systems comply with the requirements of NZBC Clause E3 (Internal Moisture).

Hazardous Building Materials – Clause F2

At no stage during handling, installation, or serviceable life does GIB Aqualine® constitute a health hazard. It therefore meets the provisions of NZBC Clause F2 (Hazardous Building Materials). Dust resulting from the sanding of stopping compounds may be a respiratory irritant and the use of a suitable facemask is recommended.

Ventilation – Clause G4

NZBC Clause G4 (Ventilation) requires buildings to have a means of collecting or otherwise removing steam generated from laundering, utensil washing, bathing or showering. To prolong the life of interior linings and surface finishes and to minimise the risk of moisture related problems such as condensation and mould growth, adequate heating and mechanical ventilation must be provided in kitchens, bathrooms and laundries.

Airborne and Impact Sound – Clause G6

GIB® Noise Control Systems can be used to provide ratings for Sound Transmission Class (STC) and Impact Insulation Class (IIC) in accordance with the requirements of NZBC Clause G6 (Airborne and Impact Sound). When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyreline®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline 0800 100 442.

LIMITATIONS

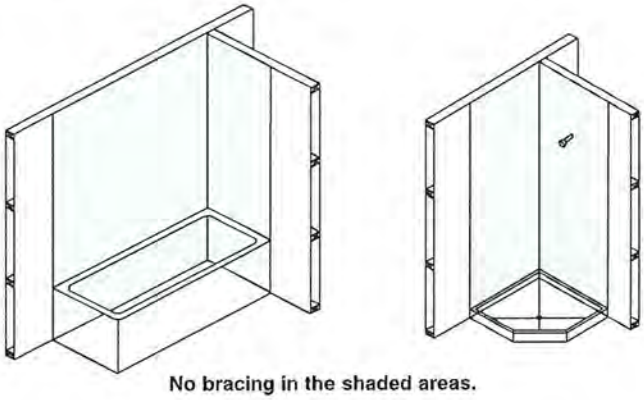
- GIB Aqualine® must not be used for bracing purposes in shower cubicles or above baths (see Bracing in Wet Areas below)
- Do not use GIB Aqualine® where it may be exposed for extended periods to humidities of 90% RH and above. Such areas include group shower or steam rooms as well as moisture and chlorine rich environments such as indoor swimming pools
- GIB Aqualine® must not be directly applied to solid plaster (gypsum or cement), wood based sheet linings or similar materials, masonry or concrete. GIB Aqualine® may only be applied to these materials where timber strapping or steel furring channels are installed
- GIB Aqualine® must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details.

BRACING IN WET AREAS

Bracing elements are required to have a durability of 50 years. GIB® bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members.

Otherwise, GIB® Bracing Systems can be used in water-splash areas as defined by NZBC Clause E3/AS1, provided these are maintained impervious for the life of the building.

GIB Aqualine® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. GIB Aqualine® can be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB Braceline® Nails or GIB Braceline® screws at 100mm centres, using the GIB Braceline® corner fixing pattern.



No bracing in the shaded areas.

Design Considerations

MARCH 2007

NEW ZEALAND BUILDING CODE

E3.3.4 requires impervious and easily cleaned surfaces to all surfaces adjacent to sanitary fixtures or laundering facilities.

E3.3.5 requires that surfaces of building elements likely to be splashed or contaminated in the course of the intended use of the building must also be impervious and easily cleaned.

E3.3.6 requires that surfaces of building elements likely to be splashed must be constructed in a way that prevents water from penetrating behind linings or into concealed spaces (e.g. wall cavities).

Walls in wet areas therefore need to be addressed according to whether they fall within the scope of one of the following descriptions:

1. Wall surface likely to be splashed
2. Shower walls. Although not a requirement of NZBC it is highly recommended that the wall surfaces within 150mm of the top edge of a bath, and the vertical faces immediately under the edge of a bath, are treated in the same way as for a shower wall.

WALL SURFACES IN AREAS LIKELY TO BE SPLASHED

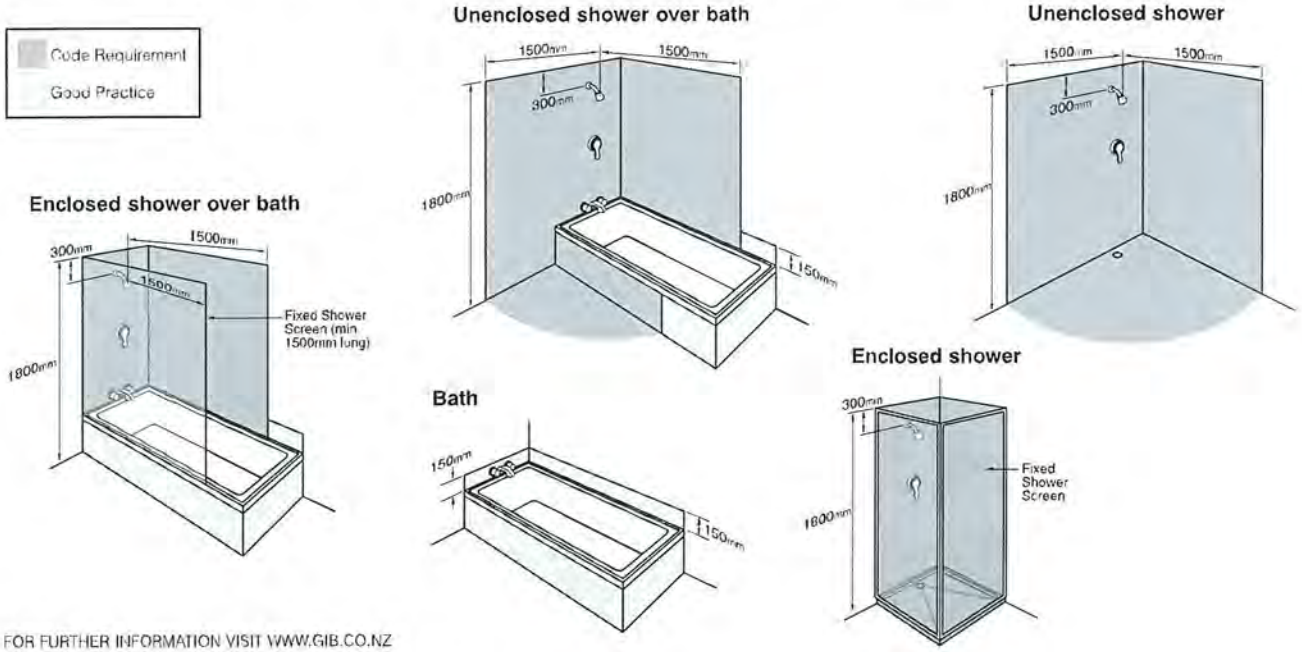
Suitable linings include:

a. Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints
b. Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment of use
c. Cement based solid plaster or concrete having a steel trowel or polished finish (semi-gloss or gloss paint must be used if a paint finish is required)
d. Cork tile or sheet sealed with waterproof applied coatings
e. Monolithic applied coatings having a polished, non-absorbent finish (e.g. terrazzo)
f. Sheet linings finished with vinyl coated wallpaper, or semi-gloss or gloss coating
g. Water resistant sheet linings finished with decorative high pressure laminate or factory applied polyurethane or resin
h. Modular or multiple lining units which are themselves *impervious* and easily cleaned, and are installed with *impervious* joints
i. Timber or timber-based products such as particleboard sealed with waterproof applied coatings.

NB: Floor surfaces and floor/wall junctions are required by E3 to be impervious.

SURFACES IN SHOWERS AND AROUND BATHS

Suitable linings include all of the above, but **NOT including items (d) and (f) from the above list.**
Note that a waterproof membrane complying with AS/NZS 4858: 2004 **MUST** be applied to all lining materials used under ceramic tiles in these areas.
The waterproof membrane must extend to a 1500mm horizontal radius from a shower rose unless the shower is contained within a fixed enclosure. A shower curtain does not constitute a fixed enclosure.
Particleboard manufacturers recommend that in wet areas, panels should be protected with a suitable wet area membrane or an integrally waterproof sheet material. Some local authorities call for this treatment on all timber based floors. Local requirements should be checked before proceeding.
Dark grey shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membranes prior to tiling. Light grey shaded areas represent good practice.



Design Considerations

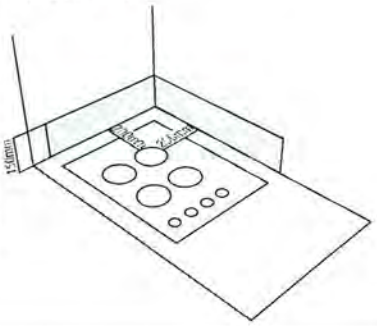
MARCH 2007

WALL SURFACES SURROUNDING COOKTOPS

The protection of combustible surfaces surrounding gas cooking appliances is covered by NZS 5261. Consult the current version of this standard to ensure compliance.

However, as a guide the following options are acceptable for wall surfaces within 200mm of the periphery of a gas element to a height of 150mm above the element for the full dimension (width and depth) of the cooktop surface area:

- 5mm ceramic tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the requirements of Clause 2.6.2.6 of NZS5261.



Because of the moisture generated by cooking, it is highly recommended that GIB Aqualine® is used in kitchen areas.

GIB® plasterboard products must not be exposed to temperatures in excess of 52°C for sustained periods. Check with the appliance manufacturer that this requirement will be met. However, it would be unusual for surfaces outside 200mm to exceed 52°C for sustained periods.

PENETRATIONS AND SEALANTS

As leaks and water ingress typically occur at junctions between building elements and at penetrations, it is essential that particular attention is given to these details at the time of installation. Lack of attention to detail can result in water damage that could remain undetected for a long time.

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Sealants should be of a mould inhibiting type and be neutral cure. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Gun a bead of silicone sealant to the full depth of the GIB Aqualine® in the following locations:
  - Around all tap/pipe bodies
  - The gap between the bath rim and the bottom edge of the GIB Aqualine®
  - Between the upstand of preformed shower bases and the bottom edge of the lining
  - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the GIB Aqualine® wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable then refer to the publication *Penetrations in GIB® Fire Rated Systems*. Always use tested and approved proprietary solutions.

WATERPROOF MEMBRANES

- A waterproof membrane must be applied to **all** lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane over the lining and the jointed areas shown shaded on page 6
- Only in-situ waterproofing materials which are manufactured to AS/NZS 4858:2004 "Wet Area Membranes" are recommended and applied to manufacturer's recommendations. Typically, these types of membranes are not suitable for paint and wallpaper finishes
- Waterproof membranes must be fully cured and dry prior to application of tiling adhesives
- Embed reinforcing mats in the membrane at all internal corners of the shower (including floor/wall junctions)
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this technical literature are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane.

TILING

GIB Aqualine® is suitable as a substrate for tiling up to the following weights:

- 10mm GIB Aqualine® up to 20kg/m²
- 13mm GIB Aqualine® up to 32kg/m².

Note: Most ceramic and porcelain tiles weigh less than 20kg/m².

For further information on tiling consult the BRANZ *Good Practice Guide – Tiling*.

Design Considerations

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FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine® is a suitable substrate for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures for the GIB Aqualine® substrate shall be as per page 10 or 11, except that the lining gap at the floor should be reduced to 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles (32 x 32 x 0.55mm) behind internal GIB Aqualine® corners is recommended for sheet vinyl applications in showers or shower over bath situations (see illustration page 14)
- The GIB Aqualine® lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph through even a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended for the wall finish in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of the flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl.

RIGID SHEET SHOWER LININGS

- The manufacturers/suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- **Do not preseal or paint** areas which are to be covered by the rigid shower linings
- The wall surface must be free of dust before installation of the lining
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service
- Care must be taken to ensure that rooms are adequately ventilated and the adhesive is fully cured before the shower is used
- Consult the manufacturer/supplier of the shower lining for full installation details.

RENOVATIONS

Bathrooms, kitchens and laundries are the most renovated rooms in the house, partly due to fashion considerations and partly because of damage sustained by ingress of water and moisture within those spaces.

In most cases when renovating these rooms it is often easier and more cost-effective to remove the existing linings and replace them with GIB Aqualine®. This allows for a completely new start in the room and offers sound substrates for new surfaces such as tiling and painting, where otherwise flaking paint or damaged plasterboard may compromise good and sound finish or practice.

At the very least re-lining will:

- Allow for inspection of framing where damage may have occurred and provide the opportunity to repair such damage
- Allow plumbing and electrics to be checked and altered or replaced where required
- Provide the opportunity to install thermal and acoustic insulation and water resistant linings where appropriate
- Make the job easier.

MAINTENANCE

Lack of maintenance is frequently the cause of premature and often very expensive failure of components and building elements within wet areas.

It is important to regularly inspect and repair any potential problem before it becomes a major problem and expensive to reinstate.

Good maintenance should include:

- Ongoing ventilation. At the very least, good passive ventilation (e.g. window vents); but good active ventilation (e.g. extraction fans) of an appropriate size for the room is recommended
- Impervious coatings and surfaces should be checked for wear and damage and maintained and recoated before ingress of water to the substrate occurs
- Regular cleaning with appropriate cleaners so that build-up of matter, such as mould, is well controlled
- Sealants at junctions and penetrations should be checked for adhesion on a regular basis and replaced where adhesion failure to substrates occurs
- Where pipe leaks have become evident, however small, they should be repaired promptly and any area around such leaks dried out completely before any other repairs are carried out.

Non-residential and Apartments

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High-rise and commercial wet areas can generally be divided into four separate categories:

HIGH-RISE APARTMENTS AND INTERTENANCY

Wet areas in apartment complexes are generally covered by Clause E3 of the NZBC and will have the same requirements as shown for residential applications. However, apartment buildings will also involve intertenancy walls requiring noise control and fire resistance.

Generally, noise control and fire resistance are the first consideration and then the water resistance is added to those systems.

For noise control, GIB Aqualine® can substitute for the equivalent thickness GIB® Standard plasterboard or GIB Fyreline®.

For fire resistance, GIB Aqualine® can substitute for GIB Fyreline® of equivalent thickness.

In all cases the prescribed noise control or fire resistance system specifications must be followed completely as presented in the GIB® publications *GIB® Noise Control Systems* and *GIB® Fire Rated Systems*.

Refer to typical details on page 25.

The NZBC for intertenancy calls for special consideration to be given to preventing water from travelling from one tenancy to another. This calls for a waterproof membrane to all wet area floors with upstands to walls and the inclusion of floor wastes.

It is important to avoid penetrations such as taps, shower roses, etc. in intertenancy walls as this will compromise fire and noise ratings.

OFFICE, WORKPLACE AND SCHOOLS

These wet areas are generally no different in requirements to those shown in this publication or those of high-rise apartments, and are treated in the same manner.

As there is often a higher impact requirement in commercial applications, 13mm GIB Aqualine® is the minimum thickness recommended.

These areas are often finished in sheet vinyl or ceramic tiles and GIB Aqualine® is an ideal substrate, particularly in the case of sheet vinyl where a high quality finish is required to minimise telegraphing of imperfections in the substrate.

HEALTHCARE AND HOSPITALS

This industry will generally have special requirements for wet areas. GIB Aqualine® will generally satisfy specific design needs in healthcare facilities and in particular is an ideal substrate for the preferred finish of sheet vinyl.

PUBLIC AMENITIES AND SPORTS CLUBS

Public amenities and sports clubs often have a high demand for impact resistance, therefore 13mm GIB Aqualine® should be used, and suitable impact resistant wall coverings considered, such as heavy duty sheet vinyl or ceramic tiles over waterproof membrane to 1200mm high.

Also full consideration should be given to the usage of the amenity and whether high pressure or chemical cleaners will be used or if the amenity may be subject to vandalism.

Because of extreme humidity and presence of chemicals, GIB Aqualine® is not suitable for enclosed swimming pool areas.

Contact the GIB® Helpline on 0800 100 442 for further assistance.

Non-tiled Walls – Timber Framing

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If bracing, noise control or fire rating considerations exist, consult the relevant GIB® technical publication, e.g. *GIB® Fire Rated Systems, GIB® Noise Control Systems, GIB® Bracing Systems*, for the appropriate information.

Wall Framing

Framing dimensions must comply with the requirements of NZS 3604:1999.

- The moisture content of timber framing shall be 18% or less at the time of lining
- Studs shall be spaced at 600mm centres maximum for both 10mm and 13mm GIB® plasterboard
- Nogs to be evenly spaced with a maximum spacing of 1350mm. Alternatively, nogs may be staggered 150mm maximum either side of a horizontal joint line
- Nogs are not required behind horizontal joints except in shower situations or specific fire or noise control systems.

Fasteners

- 10mm GIB Aqualine® – minimum 25mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails
- 13mm GIB Aqualine® – minimum 32mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails.

Fastener Centres

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element.

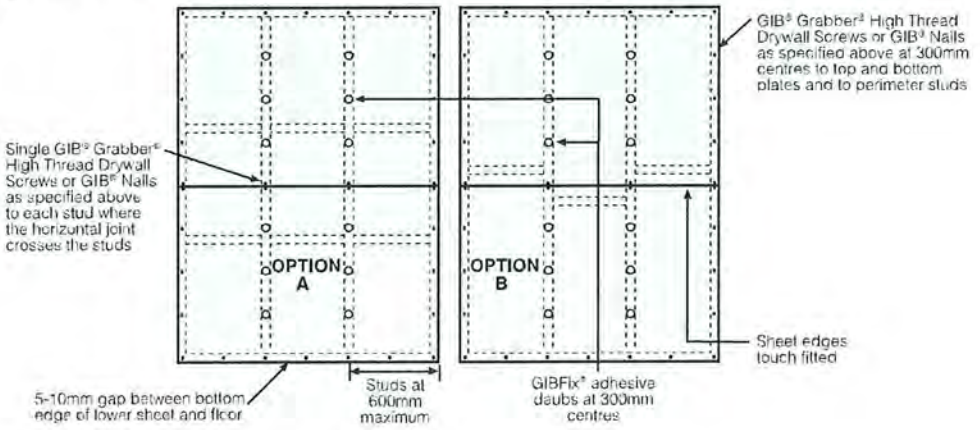
Lining

- Install the sheets leaving a 5-10mm gap at the floor line to allow for movement of the framing members and to allow for cleaning dirt and rubbish before sealing
- Sheets to be touch fitted.

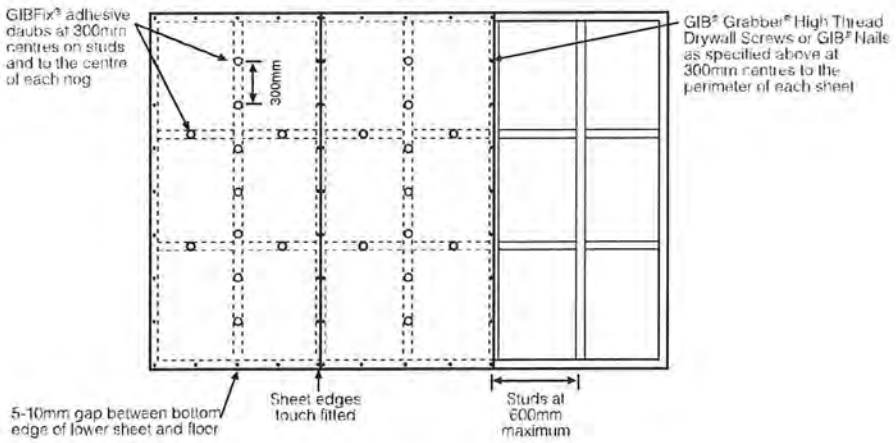
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*; GIB® AquaMix is recommended for the first two coats.

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



Non-tiled Walls – Steel Framing

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The minimum sheet thickness for fixing on light gauge steel framing is 13mm GIB® plasterboard.
Steel framing for residential construction is by specific design.
If noise control or fire rating considerations exist, consult the relevant GIB® technical publication (e.g. *GIB® Fire Rated Systems or GIB® Noise Control Systems)* for the appropriate information.

Wall Framing

- Steel stud dimensions to be minimum 63 x 34 x 0.55mm nominal with a 6mm return
- Steel channel dimensions to be minimum 63 x 30 x 0.55mm nominal
- Studs shall be spaced at 600mm centres maximum
- Ensure that the studs are placed with the open side facing in the same direction (see *GIB® Site Guide*).

Fasteners

- 25mm x 6g GIB® Grabber® Self Tapping Drywall Screws.

Fastener Centres

- 300mm centres to top and bottom channels and to end studs
- Single screws to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® All-Bond adhesive OR screws at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed.

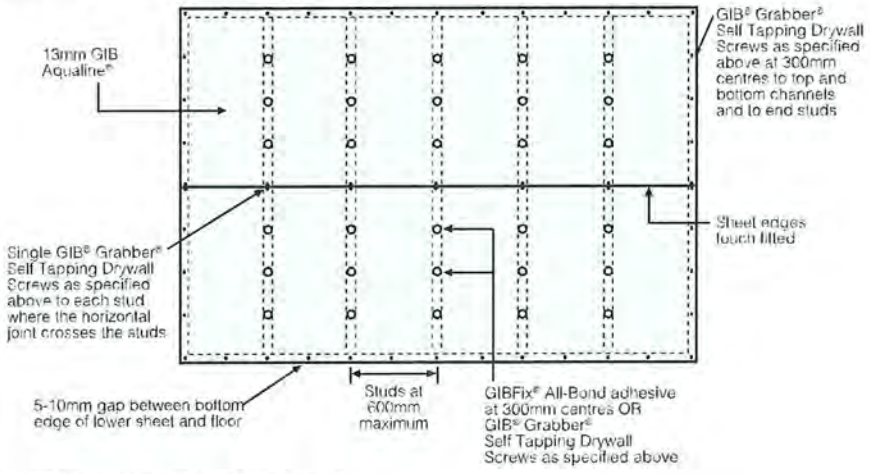
Lining

- Lay the sheets, leaving a 5-10mm gap at the floor line.
  Note: If friction fitted steel studs have been used, sheets must be fitted hard to the floor. Ensure floor is cured and dry
- Sheets to be touch fitted.

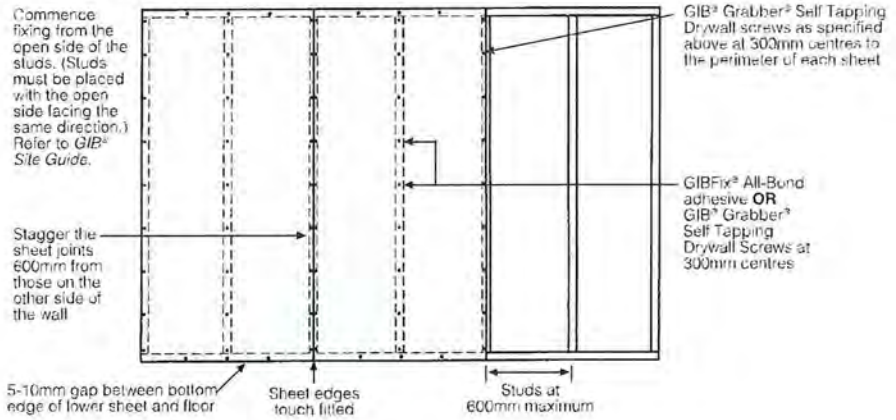
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*. GIB® AquaMix is recommended for the first two coats.

Fastening and Jointing the Linings – Horizontal Fixing



Fastening and Jointing the Linings – Vertical Fixing



Tiled Walls

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Important: See page 6 and 7 for waterproof membrane requirements.

Wall Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard.

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle. Each side of the angle shall be fastened to the framing with 30mm galvanised clouts at 300mm centres
- Steel stud systems do not generally require nogs except as below:
  - Adjacent to each pipe penetration and behind sink and tub flashings
  - Between all studs above bath flanges and preformed shower bases
- For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require either vertical fixing of the GIB Aqualine® or the installation of some additional nogs.

Fasteners

- For 10mm GIB Aqualine® use minimum 25mm x 6g GIB® Grabber® Drywall Screws
- For 13mm GIB Aqualine® use minimum 32mm x 6g GIB® Grabber® Drywall Screws.

Fastener Centres

- GIB® Grabber® Drywall Screws at 100mm centres to perimeter of wall and to all intermediate studs
- Adhesive is not to be used in place of mechanical fastenings.

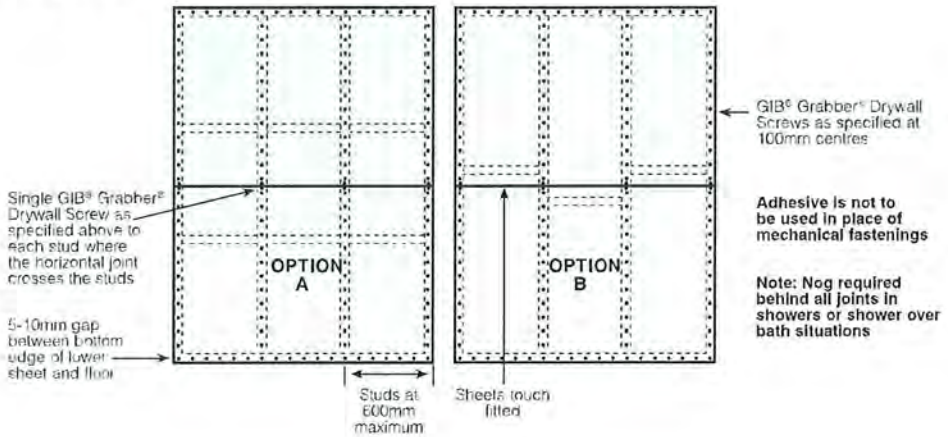
Lining

- 10mm or 13mm GIB Aqualine® is suitable for use on timber framing and for tile weights up to 20kg/m²
- 13mm GIB Aqualine® must be used for tile weights between 20 and 32kg/m² and when light steel framing has been used
- GIB Aqualine® may be fixed vertically or horizontally
- Provide a 5-10mm gap at the wall/floor junction
- Provide a 5-10mm gap between the bottom edge of the GIB Aqualine® and any bath rim or preformed shower base to allow for placement of sealant
- GIB Aqualine® sheets shall be touch fitted
- Where the framing or fastener centres required for tiled areas are closer than those specified for GIB® Fire Rated and GIB® Noise Control Systems, the tiling specification shall prevail. Where relevant, check that fastener lengths comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems.

Jointing

- Jointing shall be carried out in accordance with instructions in the *GIB® Site Guide*
- Water resistant GIB® AquaMix is recommended for the first two coats
- No top coat is required.

Fastening the Linings – Horizontal Fixing in Tiled Areas



Note:

GIB Aqualine® is suitable for tiling to full height of walls, but if a wall is to be partially tiled (i.e. half high), only the area of wall under the tiles needs to be fixed as above. The remainder of the wall may be fixed as for non-tiled area (see page 10 & 11).

Ceilings

MARCH 2007

Ceiling Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard.
If bracing, noise control, fire rating considerations exist consult the relevant GIB® publication for appropriate information.

Fasteners

- Steel battens – 25mm x 6g GIB® Grabber® Self Tapping Drywall screws
- Timber battens or Joists – 32mm x 6g GIB® Grabber High Thread Drywall screws.

Adhesives

- Steel battens – GIBFix® All-Bond
- Timber battens – GIBFix® Wood Bond (not suitable for LOSP treated timber).

Fasteners Centres

- Single screws to the edges and centre of the sheets across each batten
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw or nail pops.

Lining

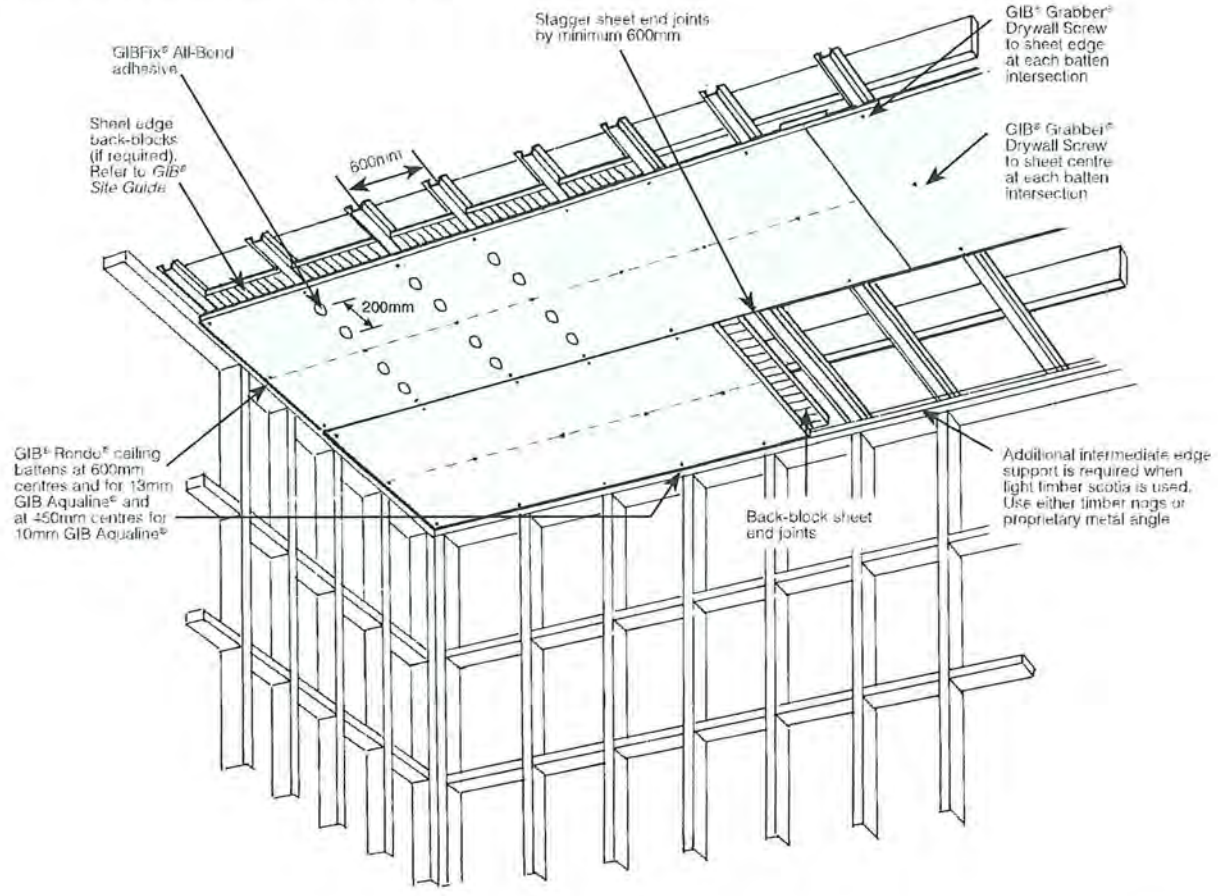
- The lining shall be fixed at right angles to the battens or joists
- Commence fixing from the centre of the sheets outwards
- Sheets to be touch fitted
- Use long length sheets to minimise sheet end butt joints
- Back-block sheet end butt joints
- See GIB® Site Guide for sheet edge backblocking requirements.

Batten Spacings

- 13mm GIB Aqualine® plasterboard – 600mm centres max
- 10mm GIB Aqualine® plasterboard – 450mm centres max.

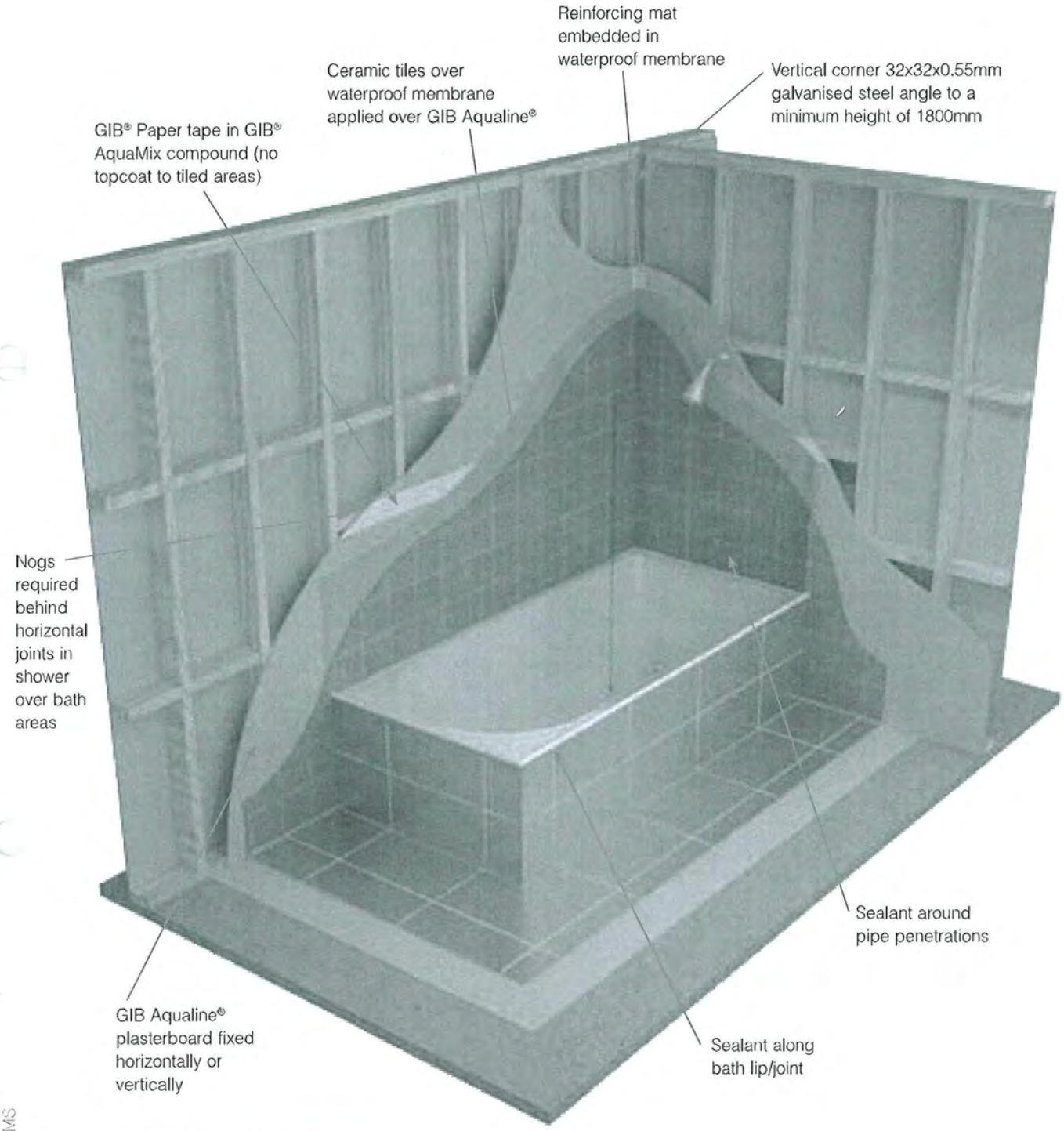
Jointing

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the *GIB® Site Guide*. Water resistant GIB® AquaMix is recommended for the first two coats.
- Do not fix tiles to GIB® plasterboard ceilings.



Shower Over Bath – Tiled Walls

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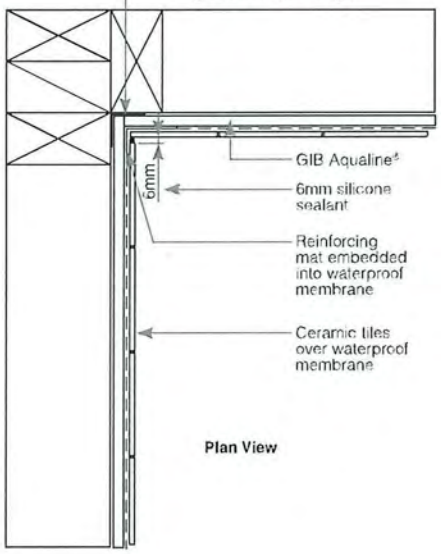
Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

For typical details, see the following pages.

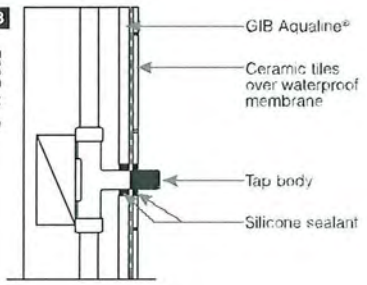
Shower Over Bath – Tiled Walls

MARCH 2007

A GAW-D001

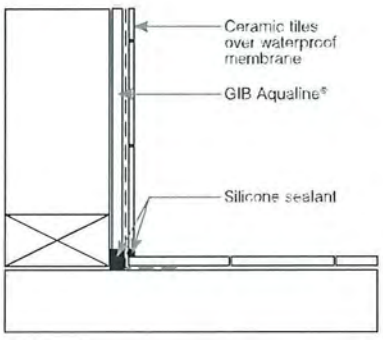


B GAW-D002

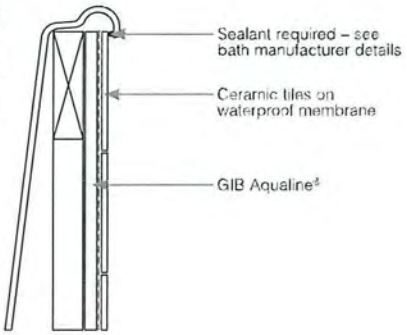


Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

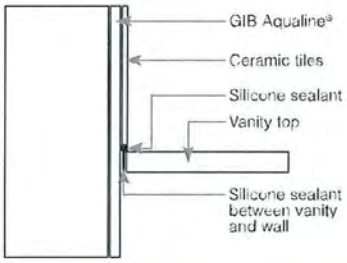
C GAW-D003



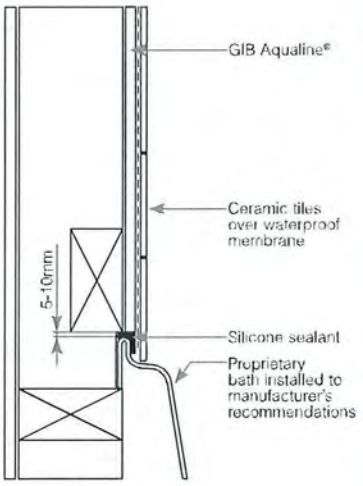
D GAW-D004

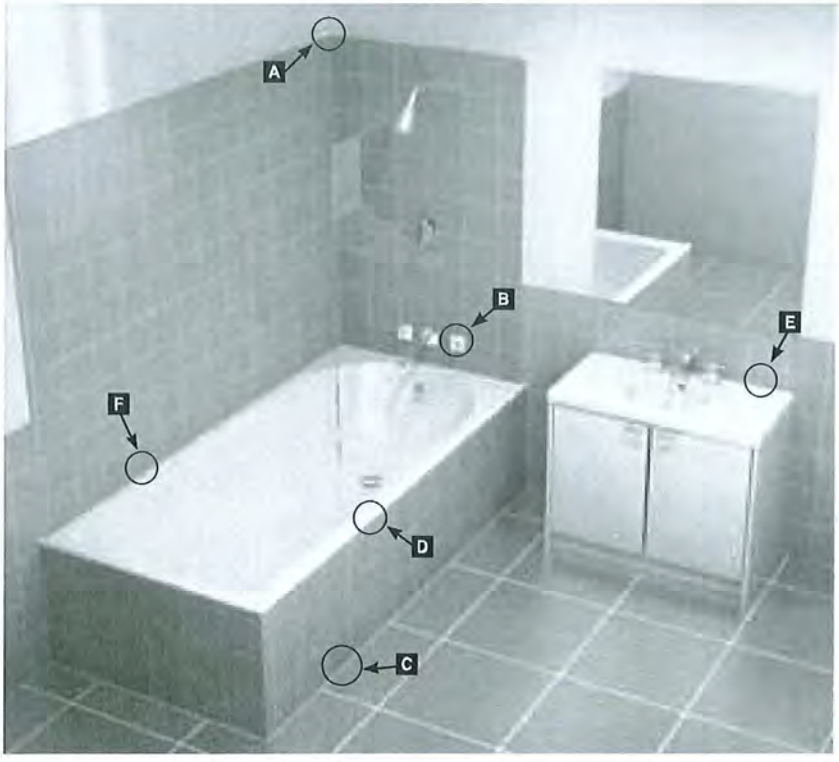


E GAW-D005



F GAW-D006

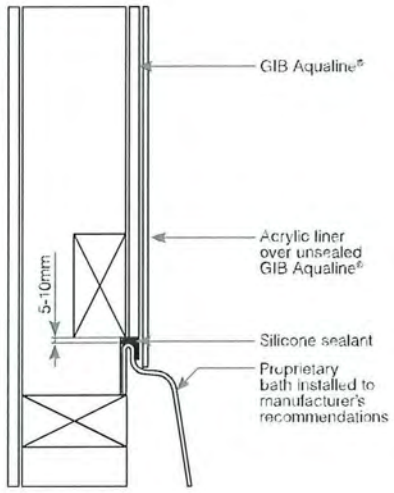




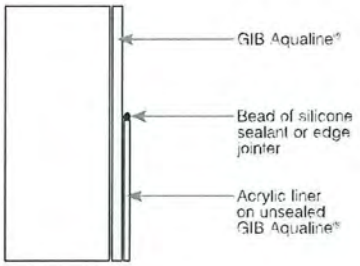
Shower Over Bath – Acrylic Liner

MARCH 2007

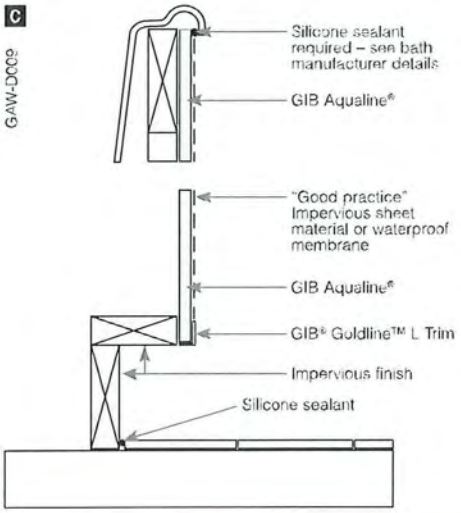
A GAW-D007



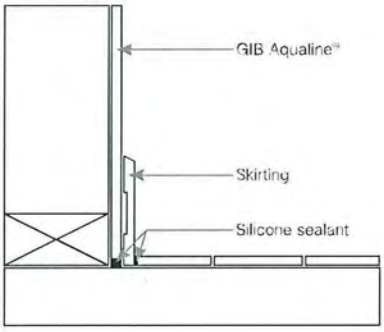
B GAW-D008



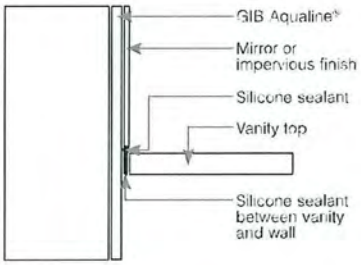
C GAW-D009

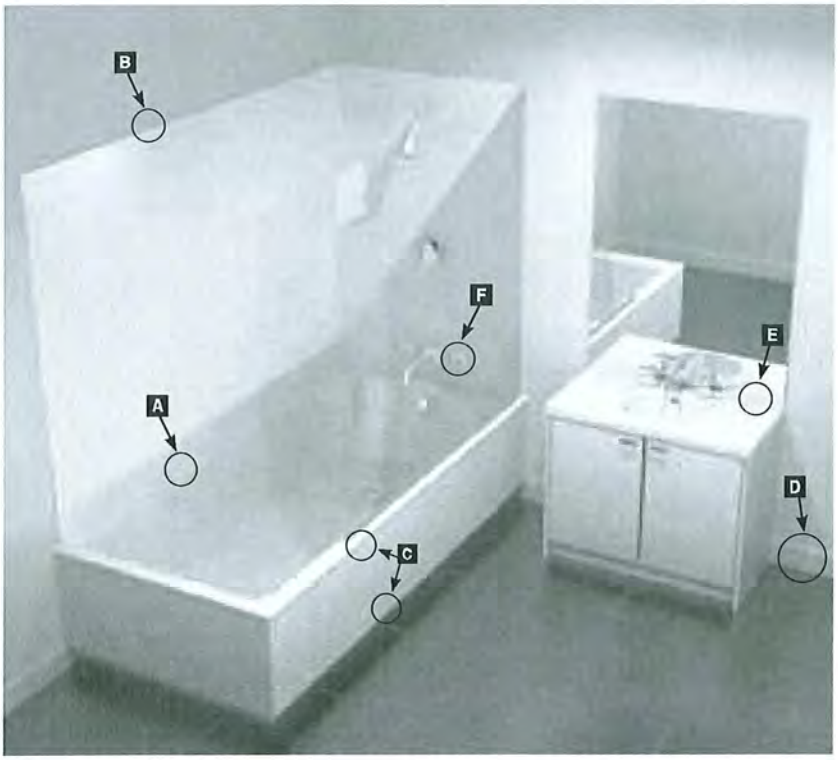


D GAW-D010

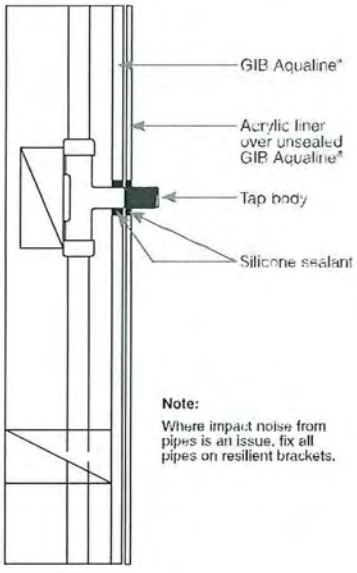


E GAW-D011





F GAW-D012



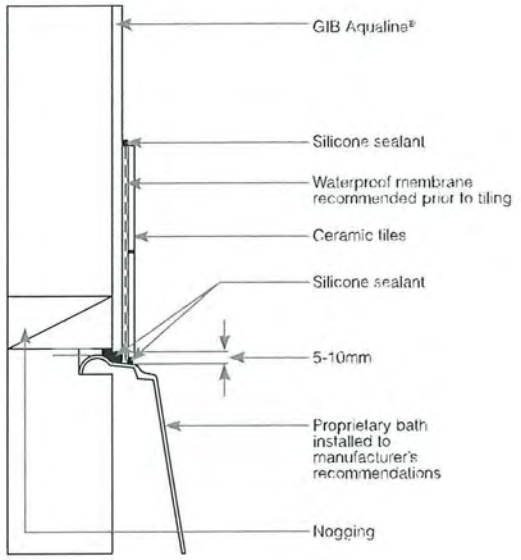
Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

Bath – Tiled Upstand

MARCH 2007

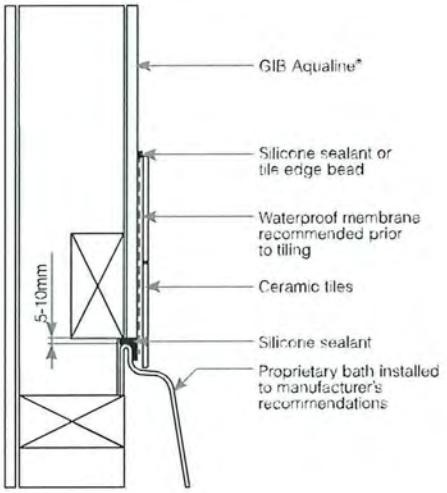
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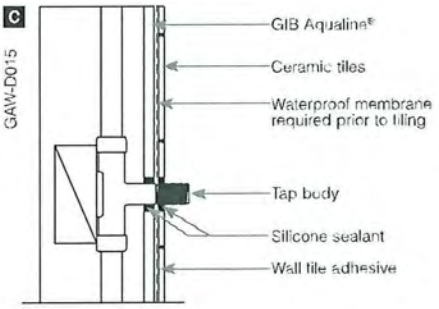
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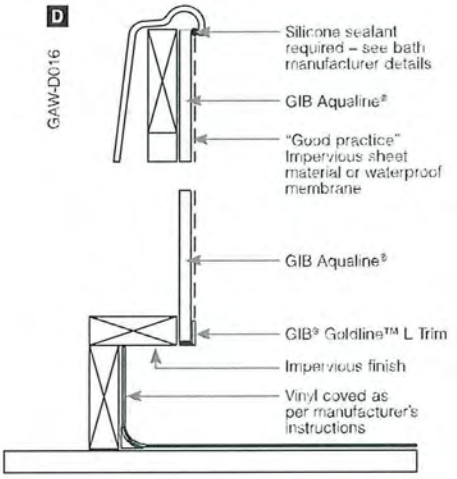
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Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

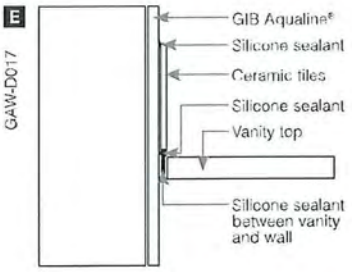
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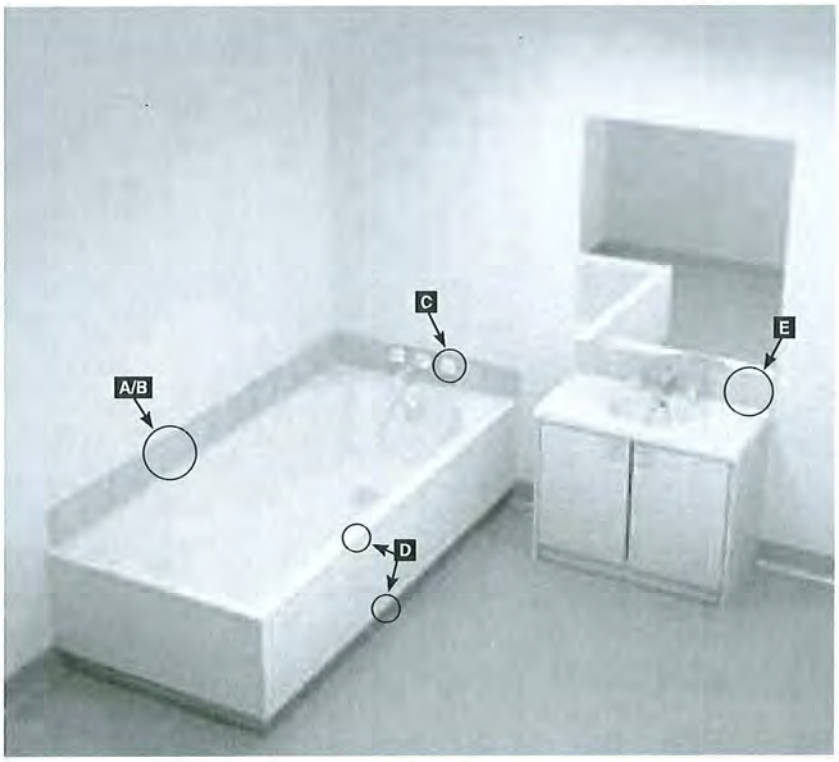
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E

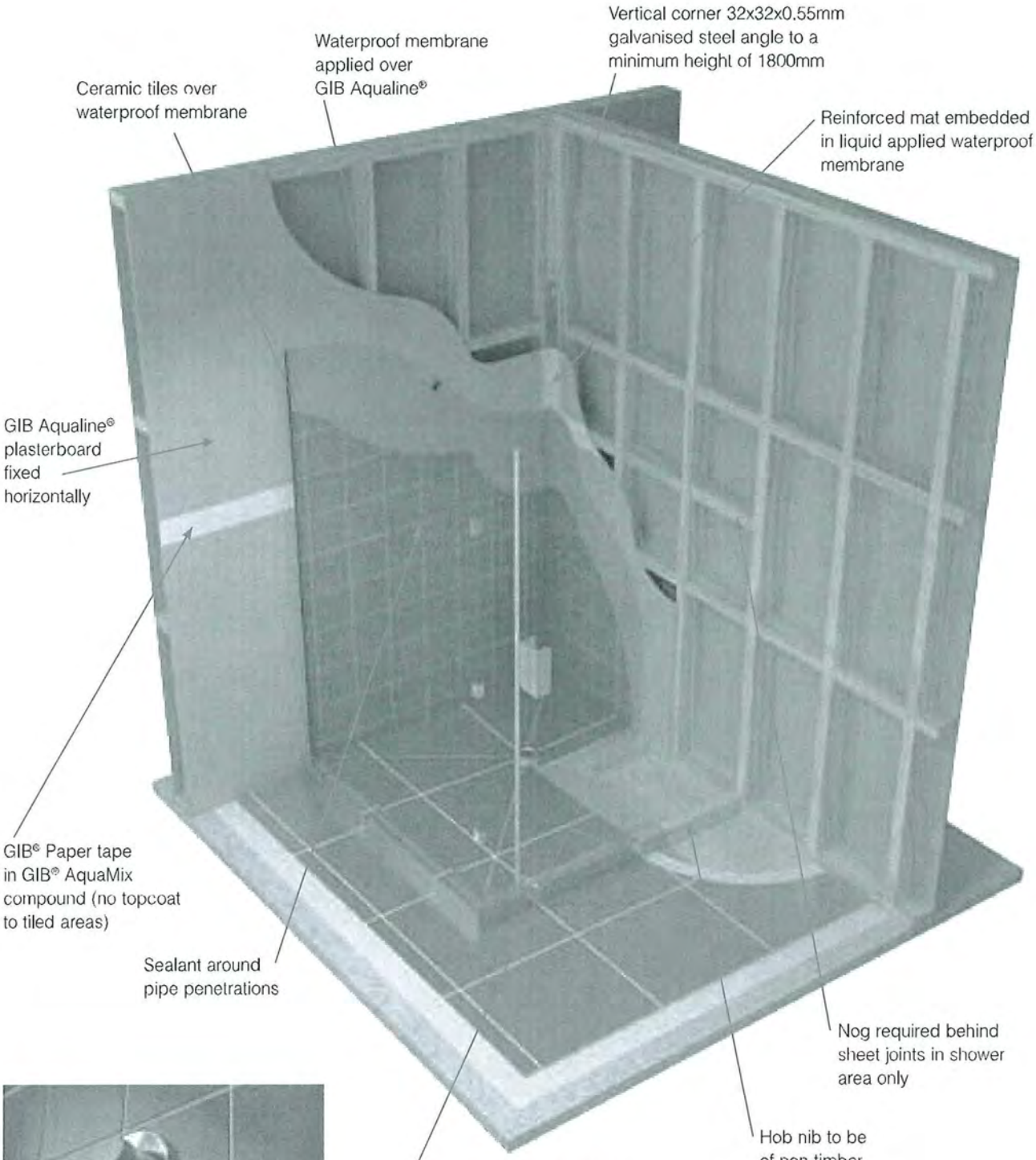
GAW-D017





Shower – Tiled Walls and Base

MARCH 2007





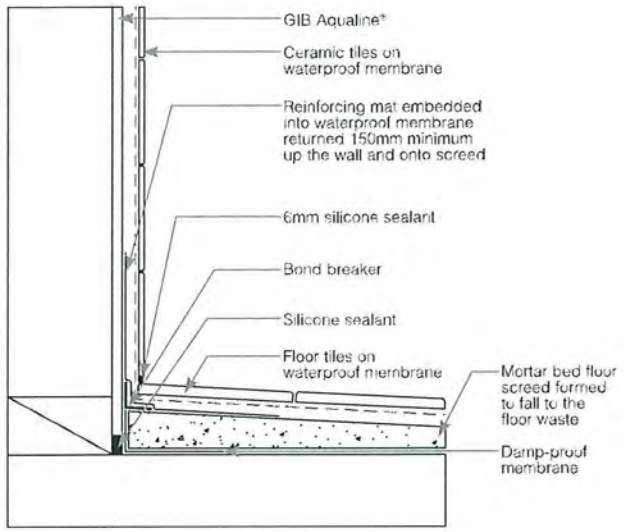
Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

For typical details, see the following pages.

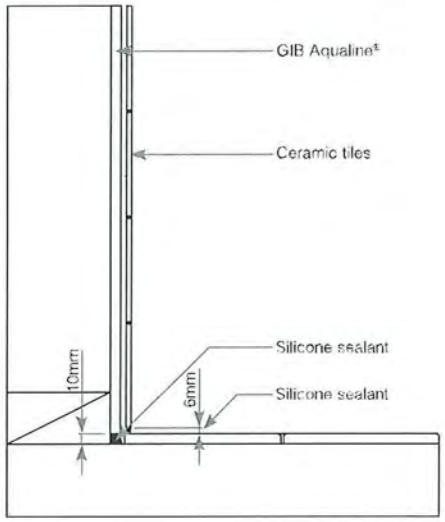
Shower – Tiled Walls and Base

MARCH 2007

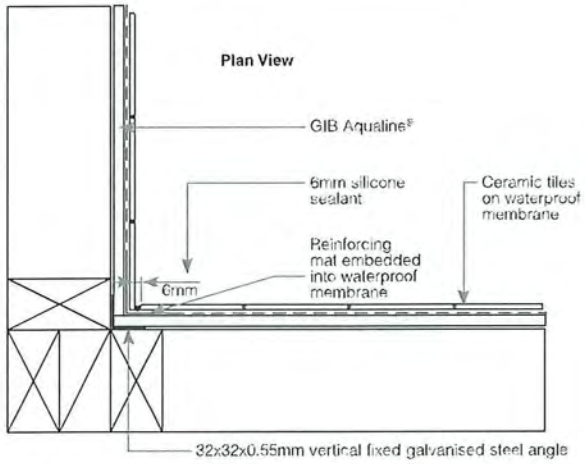
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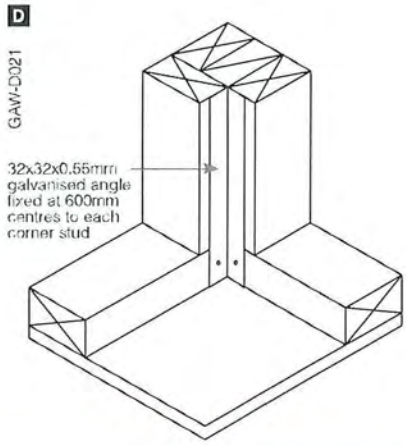
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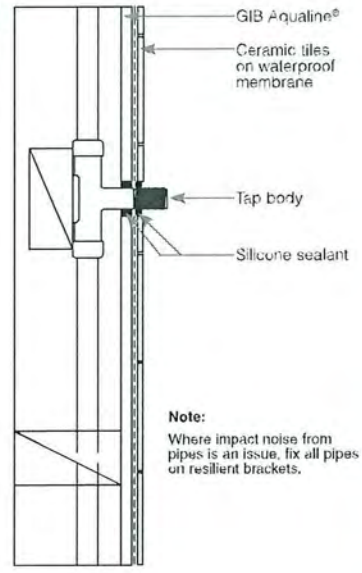
C GAW-D020



D GAW-D021



E GAW-D022



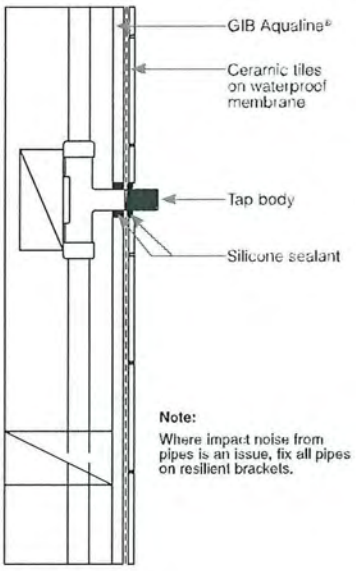
Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.



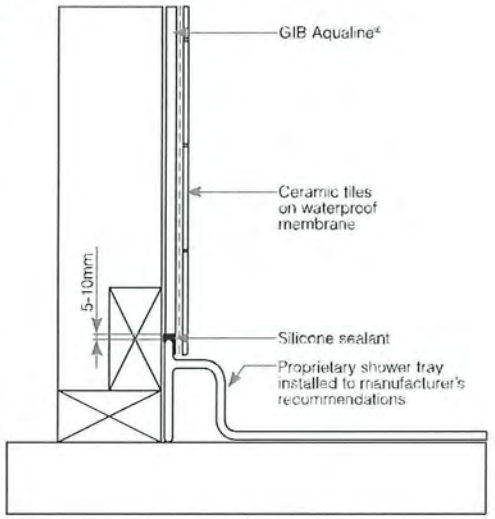
Shower – Tiled Walls and Acrylic Base

MARCH 2007

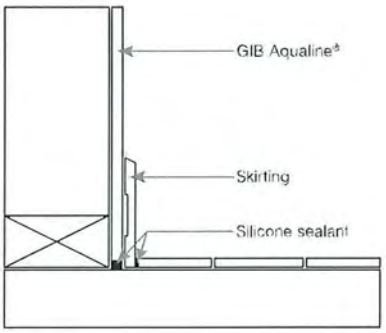
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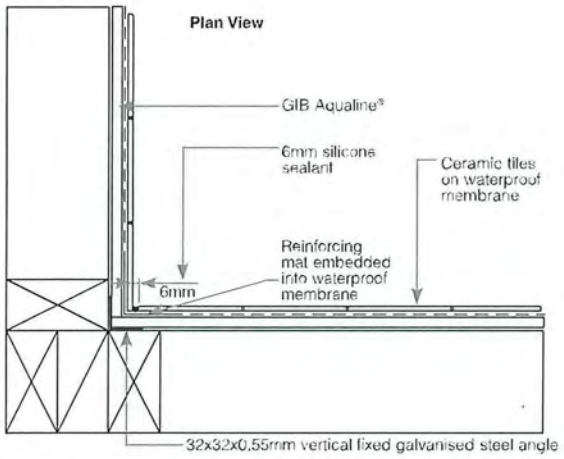
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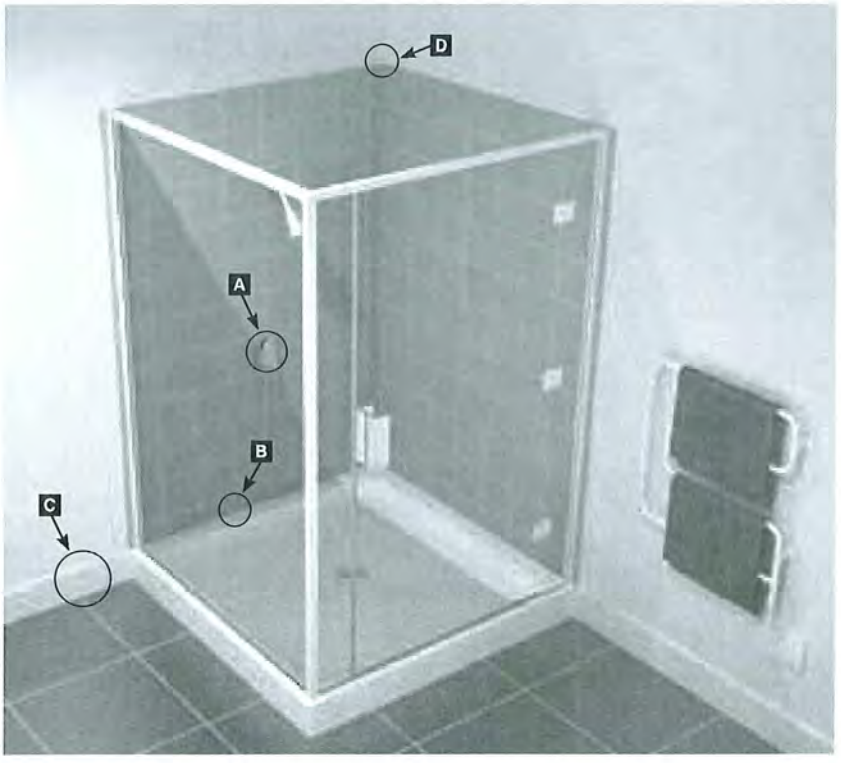


C GAW-D025



D GAW-D026

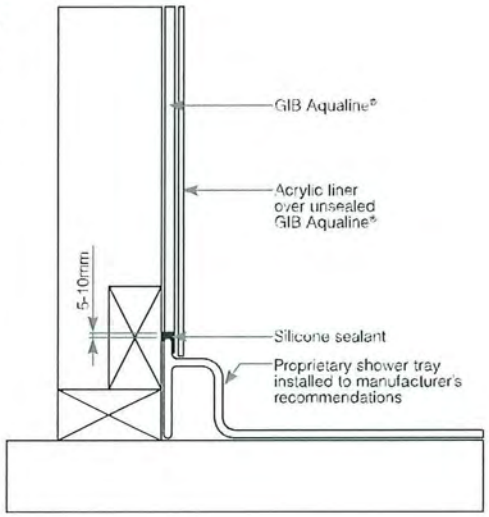




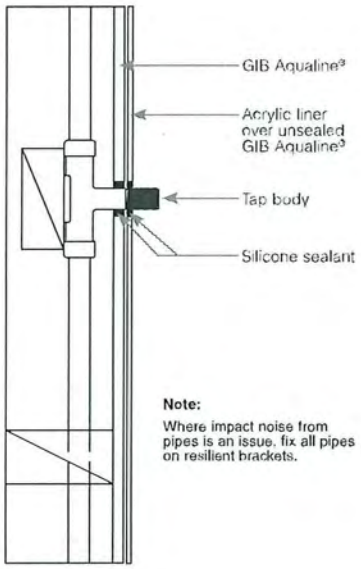
Shower – Acrylic Liner and Base

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A GAW-D027

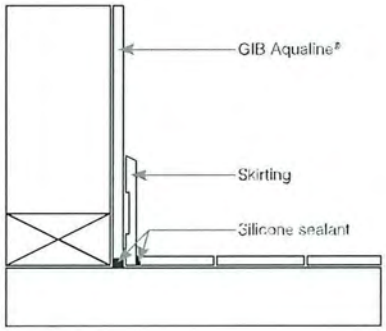


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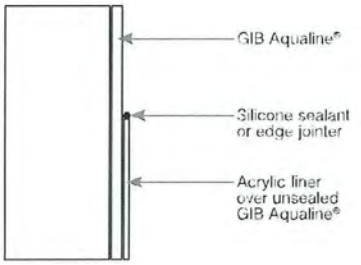


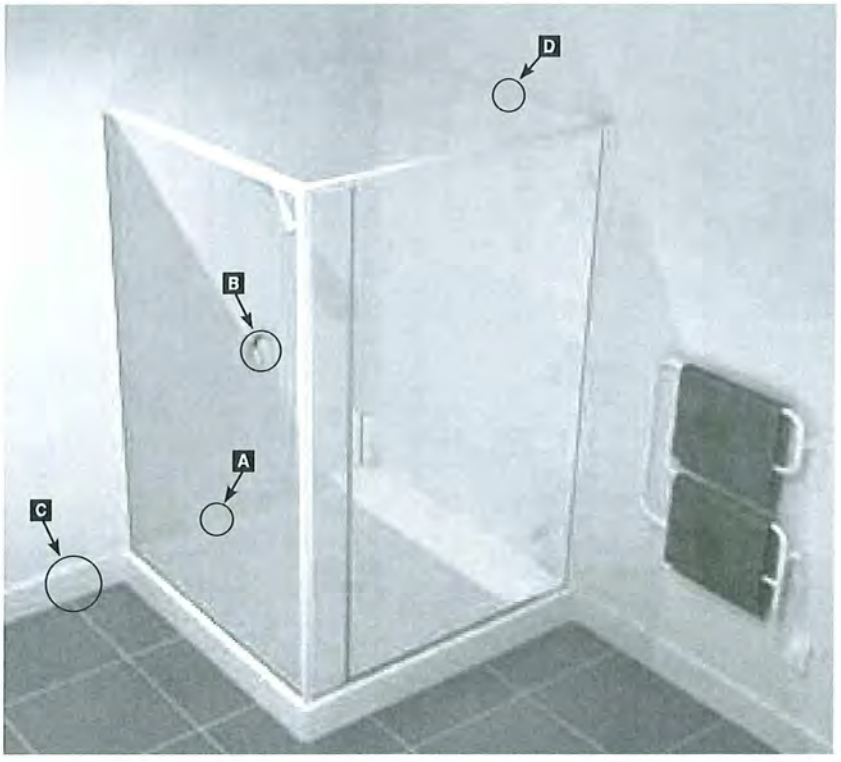
Note:
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C GAW-D029



D GAW-D030



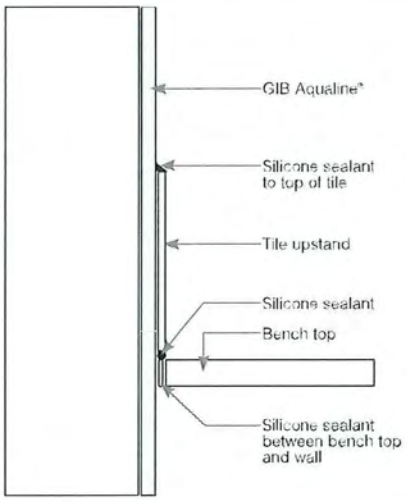


Kitchen and Laundry

MARCH 2007

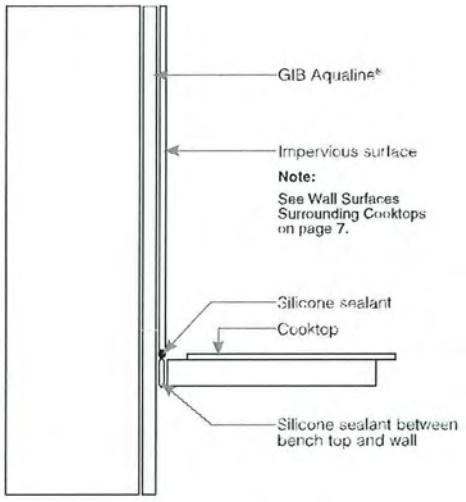
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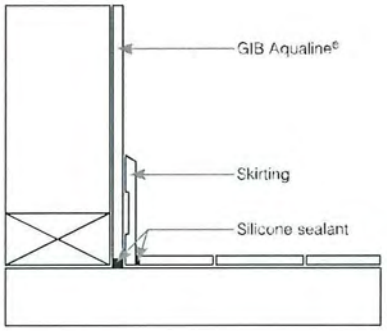
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GAW-D032



C

GAW-D033





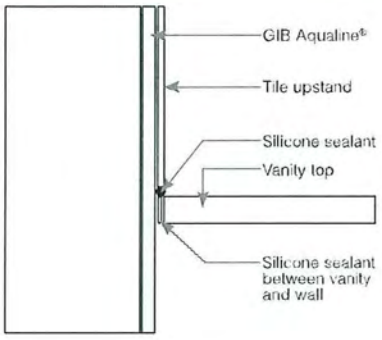


Office, Workplace or School Bathroom

MARCH 2007

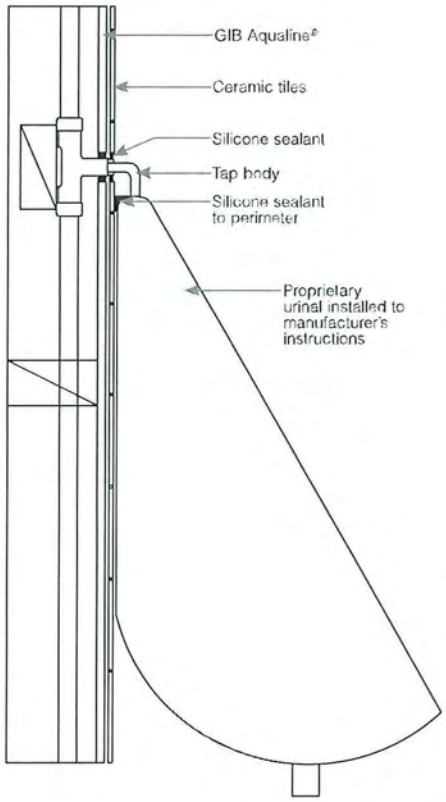
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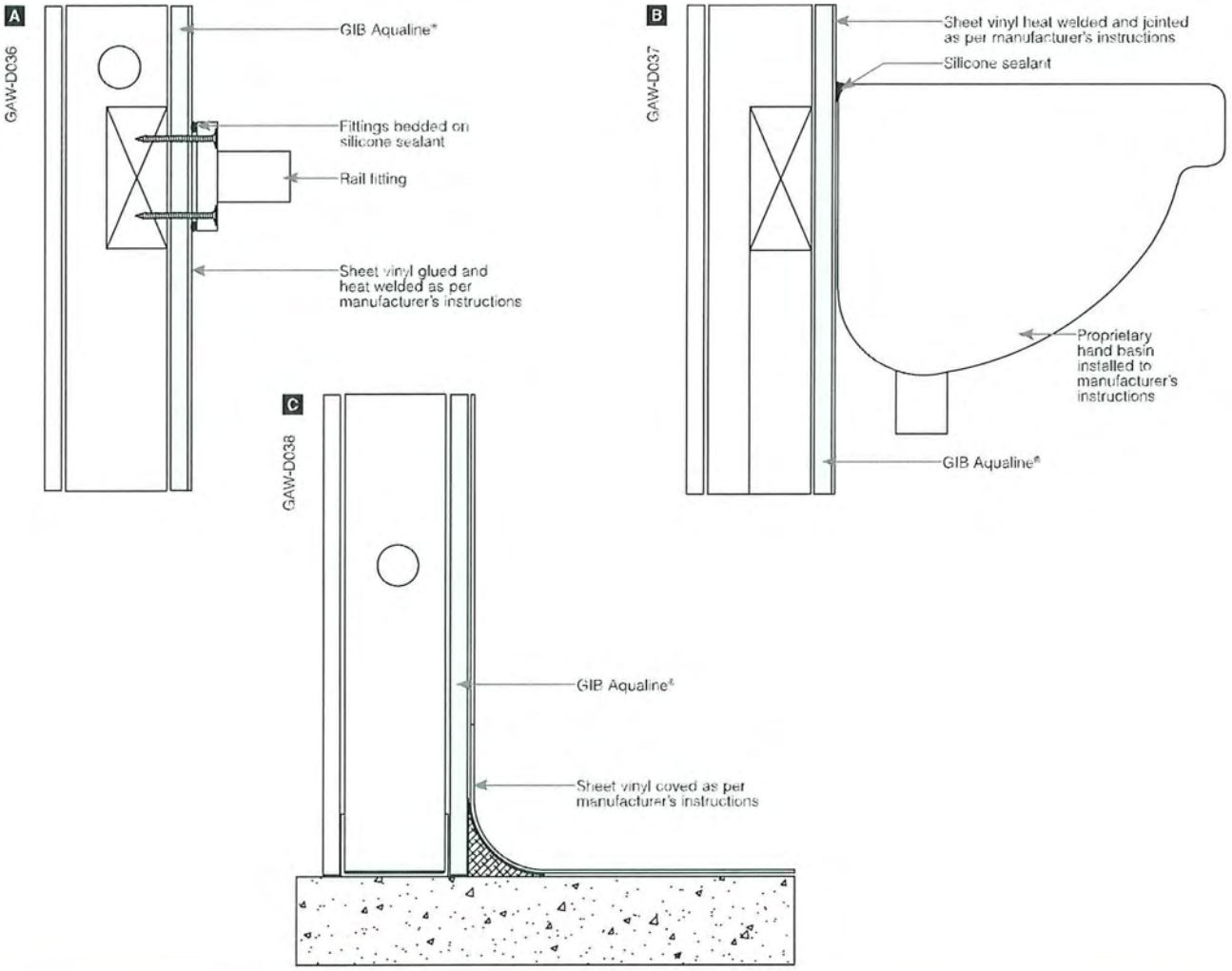
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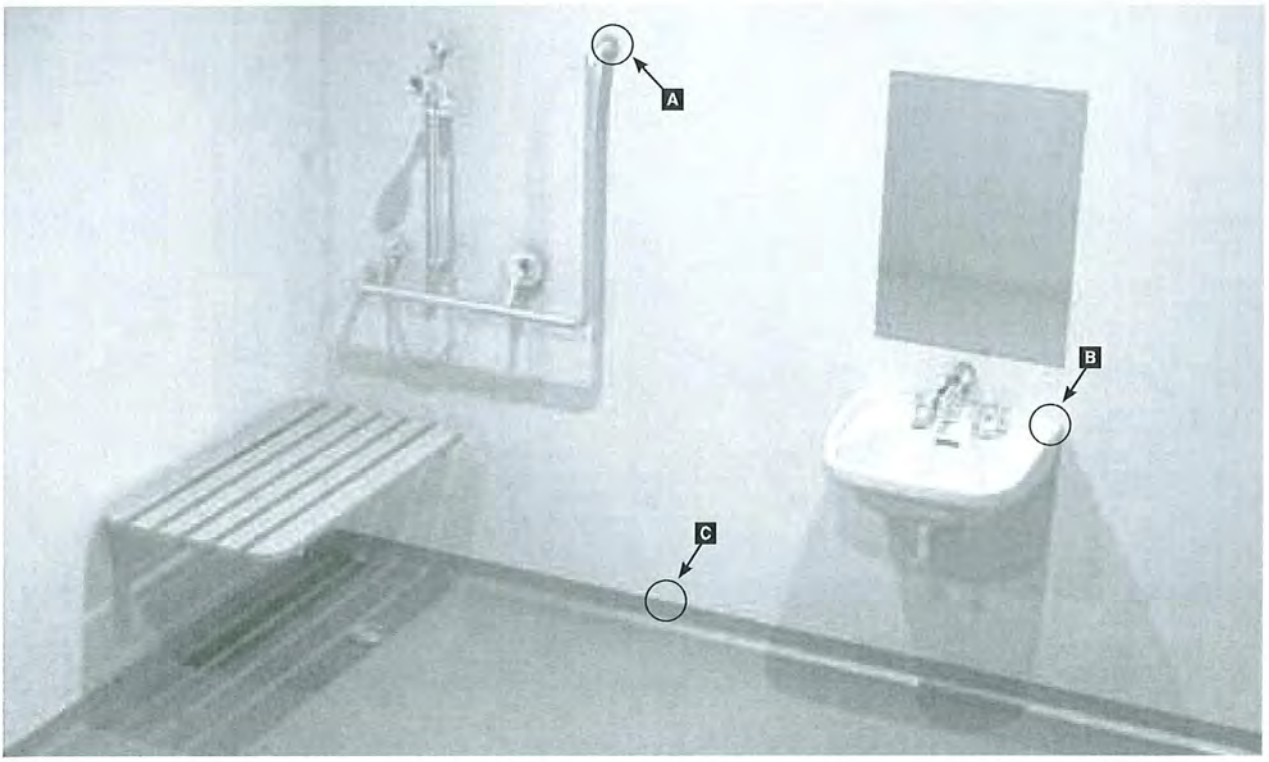




Healthcare and Hospital Bathroom

MARCH 2007

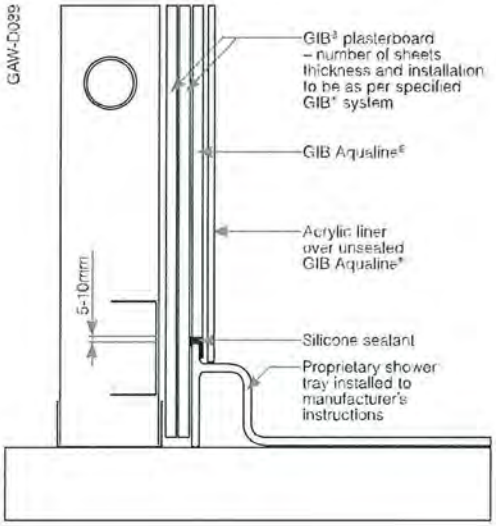




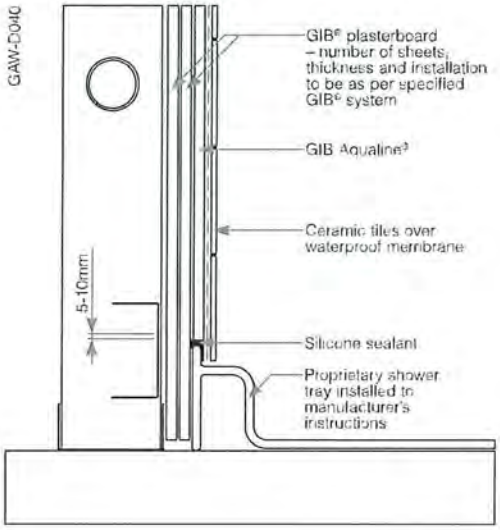
Fire Rated and Noise Control

MARCH 2007

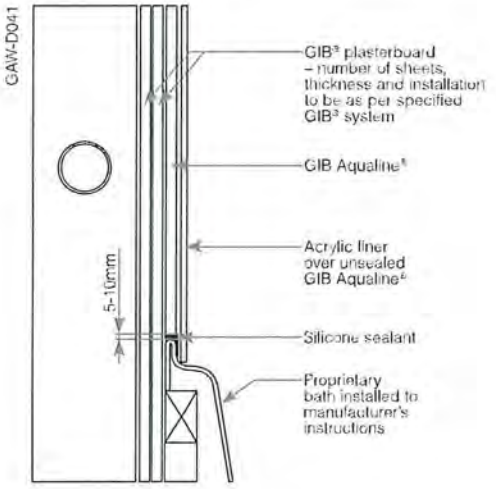
Shower – Acrylic Liner



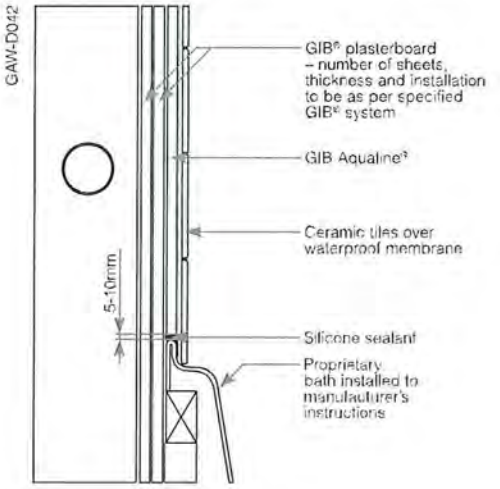
Shower – Tiled Walls



Shower Over Bath – Acrylic Liner



Shower Over Bath – Tiled Walls



GIB Aqualine® Fire Resistance and Noise Control Performance

When GIB Aqualine® is substituted into GIB® Fire Rated systems in place of the equivalent thickness GIB Fyreline®, the Fire Resistance Rating (FRR) of that system will be maintained.

When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyreline®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline on 0800 100 442.

Specification and Installation Checklist

MARCH 2007

Contract ID	
Site Address	
Client Name	
Designer	
Builder	
Plasterboard Installer	
Plasterboard Supplier	
Tiler	
Shower Installer	

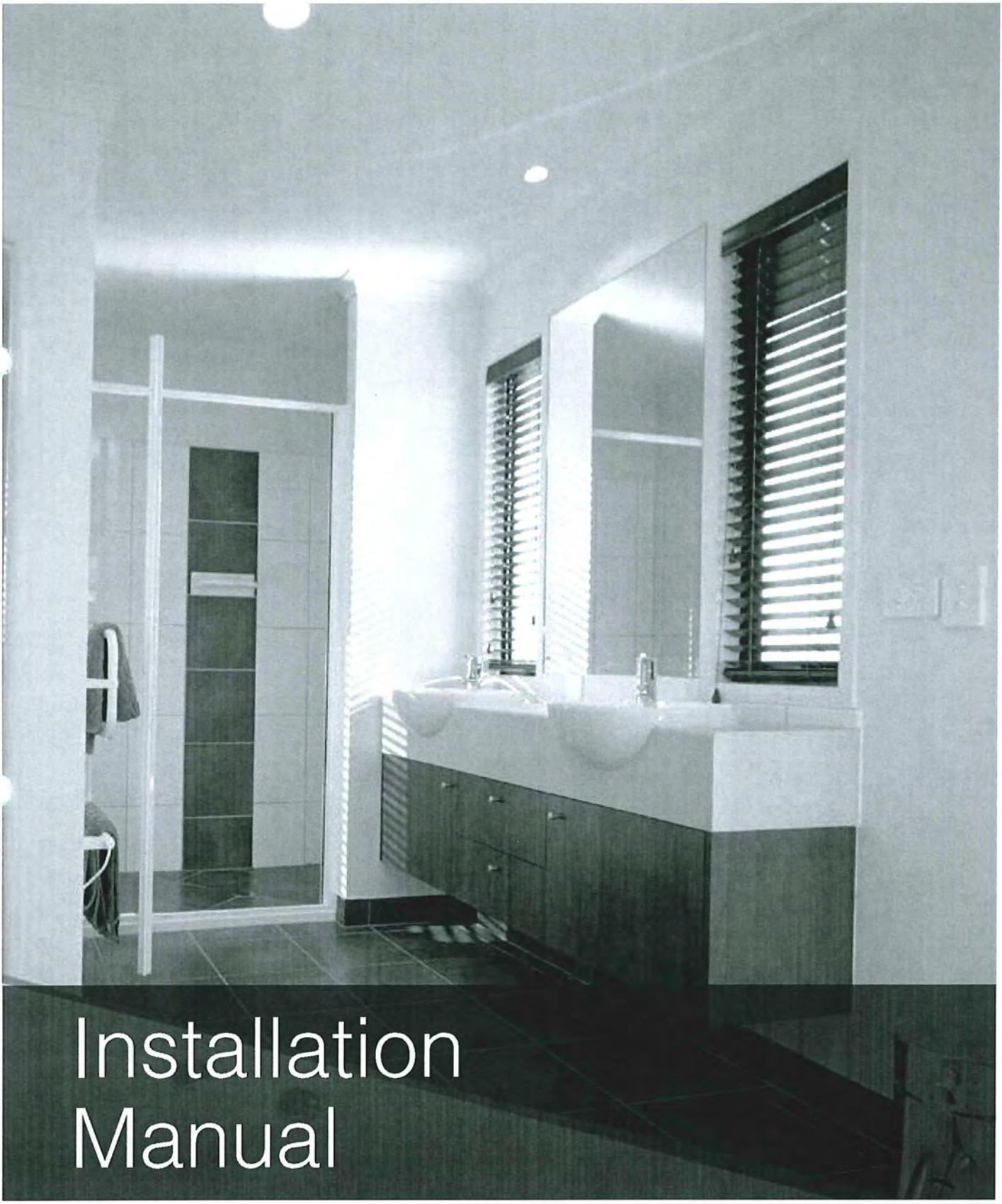
DESIGNER	YES	NO	CHECKED BY	DATE
GIB Aqualine® specified for wet areas and appropriate details included on plans?				
Are tiled areas clearly shown on plans?				
Is area requiring waterproof membrane clearly shown on plan?				
Is the waterproof membrane required to be installed by a licensed applicator? If so, is this noted on the documentation?				
No bracing behind shower or bath?				
BUILDER	**YES**	**NO**	**CHECKED BY**	**DATE**
Galvanised steel angle installed to the internal corners of tiled shower?				
All sheet joints in showers to be made on solid timber. This may require some additional dwangs for horizontal board installation.				
PLASTERBOARD INSTALLER	**YES**	**NO**	**CHECKED BY**	**DATE**
10mm GIB Aqualine® for tiles up to 20kg per m^2?				
13mm GIB Aqualine® for tiles up to 32kg per m^2?				
GIB Aqualine® mechanically fastened at 100mm centres when tiles are to be installed?				
All junctions between GIB Aqualine® and walls, floors, baths, showers and other elements are correctly sealed with appropriate sealant?				
Pipe penetrations sealed?				
PLASTERBOARD STOPPER	**YES**	**NO**	**CHECKED BY**	**DATE**
Air drying compound (e.g. GIB ProMix® or GIB Plus 4®) not to be used on areas to be tiled.				
Recommended that GIB® AquaMix is used in wet areas.				
TILER	**YES**	**NO**	**CHECKED BY**	**DATE**
Waterproof membrane applied to shower areas prior to tiling?				
SHOWER INSTALLER	**YES**	**NO**	**CHECKED BY**	**DATE**
GIB Aqualine® walls must not be sealed or painted under where acrylic linings are to be installed.				
Ensure GIB Aqualine® is free from dust before installation of acrylic liners.				
Sealant applied to top edge of acrylic shower linings?				
BUILDER/PLUMBER	**YES**	**NO**	**CHECKED BY**	**DATE**
Sealant applied under penetration face covers?				

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a smarter way™

Villaboard®

LINING



Installation Manual

SEPTEMBER 2014 | NEW ZEALAND

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WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
Fax 0800 808 988
literaturefeedback@jameshardie.co.nz

1 Introduction

James Hardie Villaboard® Lining is a premium sanded fibre cement sheet with recessed edges for flush jointing, or square edge sheet for butt jointing. Villaboard Lining is an ideal lining for bathrooms, laundries, kitchens and other high traffic areas.

The main features of Villaboard Lining are:

- Durable internal lining suitable for wet areas.
- Creates suitable surface for tiles, paint or wallpaper.
- Long edges recessed for easy flush-jointing.
- Reliable impact resistant lining. Ideal for wall lining in commercial applications where walls are prone to damage.
- Suitable for use in fire and acoustically rated systems.

This manual covers the use of Villaboard Lining in internal wall and ceiling applications. Further information relating to Villaboard Lining is also available in the following James Hardie manuals:



- Eaves and Soffit Linings Installation Manual.
- Fire and Acoustic Design Manual.
- Bracing Design Manual.

The specifier or other responsible party for the project must ensure the information and details in this guide are appropriate for the intended application and specific design and detailing is undertaken for areas which fall outside the scope of this documentation.

Note: James Hardie Villaboard Lining is not suitable for exterior wall applications.

Make sure your information is up to date
When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

1.1 BRACING

Villaboard Lining can be used to achieve structural bracing. For further information refer to Bracing Design Manual.

For dry area internal applications the standard hot dipped galvanised nails can be used.

For wet area internal application stainless steel nails must be used.

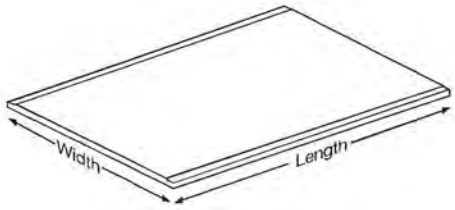
1.2 STRUCTURAL CEILING DIAPHRAGM

Villaboard Lining can be used as structural ceiling diaphragms in accordance with NZS 3604. For further information refer to Bracing Design Manual.

1.3 HEAT SHIELD

9mm Villaboard Lining can be used as a heat shield. For further information refer to Heat Shield - Villaboard Lining 9mm Accel™ Technical Supplement.

Table 1

Villaboard Lining sheet sizes				
Product	**Length**	**Width**		
Smooth fibre cement internal lining for tiled and untiled applications		1200mm		
		4 recessed edges	2 recessed edges (long)	Square edges
	6mm thickness			
	2400	✓	✓	✓
	2700		✓	
	3000		✓	✓
	9mm thickness			
	2400	✓	✓	✓
	2700		✓	
	3000		✓	✓

Villaboard Lining 6mm has no chamfer on square edge sheet.
Villaboard Lining 9mm has small chamfer on square edge sheet.

Table 2

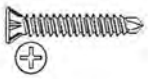
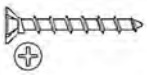
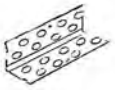
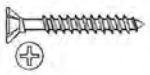
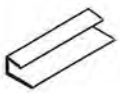
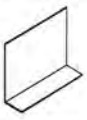
Product / accessories / tools					
Components supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**HardieBlade™ Saw Blade** Ø185mm poly crystalline diamond blade, for fast, clean cutting of James Hardie fibre cement.	**300660**		**James Hardie Base Coat** Base compound for flush finished jointing.	4kg - **304490** 15kg - **304491**
	**FibreZip® Screw** For fastening to 0.55mm -1.0mm BMT steel frames. ® denotes a registered mark of Buildex	Box 1000 - **303840**		**James Hardie Top Coat** Topping compound for flush finished jointing.	3kg - **304492** 15kg - **304493**
	**Villadrive Screw 6g x 30mm** For fastening to timber frames	5kg - **300993** 100/jar - **300992** Collated/1000 - **300994**		**uPVC Perforated Corner Mould** 30mm x 30mm. For finishing internal and external corners.	3000mm - **300669**
	**HardieDrive™ Screw S/S 316** 30mm x 7g For fastening to timber frames	100/jar - **300928**		**HardieJointer™ 6mm**	3000mm - **300734** 2400mm - **300730**
	**Control Jointer 2700**	**300978**		**HardieJointer™ 9mm (2 piece)**	3000mm - **300736**
	**HardieFlex™ Cap Mould 6mm** Capping edge of Villaboard Lining	2400mm - **300539** 3000mm - **300540**			

Table 3

Components not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with Villaboard Lining. James Hardie does not supply these products and does not provide a warranty for their use. Please contact the component manufacturer for information on their warranties and further information on their products.

Accessories	Description	Accessories	Description
	**Galvanised/Stainless Steel HardieFlex™ nails** 40 x 2.8mm fibre cement nails		**Second Coat Trowel 200mm** For installing second coats on set joints.
	**Backing Rod** Backing to sealant in movement joints.		**Finishing Coat Trowel** For installing top coats on set joints.
	**Perforated Paper Tape** Joint reinforcing tape. e.g. GIB® paper tape, Strataflex tape or similar.		**Corner Tool** For setting of internal corners.
	**Level/Straight Edge** For checking straightness of frame.		**Hawk** To assist in the application of compounds especially with the use of trowels.
	**Hand Guillotine** Guillotine for cutting fibre cement.		**Hand Sander** For sanding set joints.
	**Broadknife 150mm** For setting of joints on Villaboard Lining.		**Notched Trowel** For applying tile adhesive to face of Villaboard Lining.
	**Collated Screw Gun** For speedy installation of Villaboard Lining.		**Electric Shear/Fibreshear** For cutting of James Hardie fibre Cement.
	**Hole Saw** For clean cut circular holes.		**Paper Faced Corner Mould** 'Goldline' mouldings
	**Bondbreaker Tape** Sellotape 5850 Super Mask 18mm		**Waterproofing Admixture** Multiplast Resin by Plaster Systems. Used in diluted form over sheet edges to control moisture suction.
	**Score and Snap Knife** Scoring tool for easy cutting.		**Lumberlock** Studsaver
	**Wet Wall Cavity** Wet Wall Caddy Wall penetrating sealing device eg Aquatite Wetwall cavity protectors		**Support Angle** To support tiles Is fixed over the lining to main frame

2 Safe working practices

WARNING — DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

James Hardie products contain sand, a source of respirable crystalline silica which is considered by some international authorities to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. During installation or handling: (1) work in outdoor areas with ample ventilation; (2) minimise dust when cutting by using either 'score and snap' knife, fibre cement shears or, where not feasible, use a HardieBlade™ Saw Blade and dust-reducing circular saw attached to a HEPA vacuum; (3) warn others in the immediate area to avoid breathing dust; (4) wear a properly-fitted, approved dust mask or respirator (e.g. P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures. During clean-up, use HEPA vacuums or wet cleanup methods — never dry sweep. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

James Hardie recommended safe working practices
CUTTING OUTDOORS
1. Position cutting station so wind will blow dust away from the user or others in working area. 2. Use one of the following methods based on the required cutting rate: **BEST** • Score and snap • Hand guillotine • Fibreshear **BETTER** • Dust reducing circular saw equipped with HardieBlade™ Saw Blade and HEPA vacuum extraction. **GOOD** • Dust reducing circular saw with HardieBlade™ Saw Blade.
CUTTING INDOORS
• Cut only using score and snap, hand guillotine or fibreshears (manual, electric or pneumatic). • Position cutting station in a well-ventilated area.
SANDING/REBATING/DRILLING/OTHER MACHINING
When sanding, rebating, drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.
IMPORTANT NOTES
1. For maximum protection (lowest respirable dust production), James Hardie recommends always using "Best" — level cutting methods where feasible. 2. NEVER use a power saw indoors. 3. NEVER use a circular saw blade that does not carry the HardieBlade™ logo. 4. NEVER dry sweep — Use wet suppression or HEPA vacuum. 5. NEVER use grinders. 6. ALWAYS follow tool manufacturers' safety recommendations.
P1 or P2 respirators should be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.co.nz to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

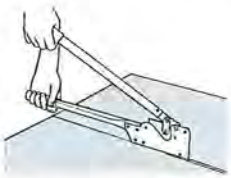
Working instructions
Refer to recommended Safe Working Practices before starting any cutting or machining of product.

Score and snap
Score and snap is a fast and efficient method of cutting James Hardie building products using special tungsten tipped score and snap knife.



Preferably score on the face side of the product. Score against a straight edge and repeat the action to obtain adequate depth for clean break — normally one third of sheet thickness. Snap upwards to achieve break. Smooth any rough edges with a rasp.

Hand guillotine
Make guillotine cut on the off-cut side of line to allow for the thickness of the blade.



Fibreshear heavy duty
An electrically powered, fast, clean and effortless way of cutting James Hardie building products, especially around curves such as archways. Make fibreshear cut on the 'off-cut' side of the line to allow for the thickness of the shear.



HardieBlade™ Saw Blade
The HardieBlade™ Saw Blade used with a dust-reducing saw connected to a HEPA vacuum allows for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector which can be connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



Hole-forming
For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet.
- Pre-drill a pilot hole.
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.



For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.
- Tap carefully to avoid damage to sheets, ensuring the sheet edges are properly supported.

Storage and handling
To avoid damage, all James Hardie building products should be stored with edges and corners of the sheets protected from chipping.

James Hardie building products must be installed in a dry state and protected from rain during transport and storage. The product must be laid flat under cover on a smooth level surface clear of the ground to avoid exposure to water, moisture, etc.

Quality
James Hardie conducts stringent quality checks to ensure any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

3 Framing / substrate

3.1 GENERAL

Villaboard Lining can be fixed to either timber framing, light gauge domestic type steel framing and battens fixed over masonry. The framing and substrate used must comply with the relevant building regulations and standards and the requirements of this manual.

For untiled walls the studs spacing must not exceed 600mm centres and noggings 1200 centres maximum.

For tiled wall applications studs spacing must be closed to 400mm for a 6mm Villaboard Lining, and between 400mm to 600mm centres for a 9mm Villaboard Lining. Refer Table 10 for further information.

At sheet joint the studs must be minimum 45mm wide.

Notes

1. Stud spacings restrict the thickness of tiles used to finish Villaboard Lining. For more information refer to the Finishes and Maintenance section on page 25.
2. In internal and external corners use a PVC perforated corner mould or paper faced rigid moulding.
3. Ensure a 6mm building tolerance gap is provided at the floor and ceiling junctions with the Villaboard Lining.

3.2 TIMBER

Timber framing must at a minimum comply with the requirements of NZS 3604 'Timber Framed Buildings'.

The timber framing treatment and moisture contents must comply with the requirements of NZS 3602.

3.3 STEEL

The minimum size for steel stud framing should be 64mm deep x 35mm wide and 0.55mm base metal thickness (BMT) minimum.

Steel framing shall comply with the minimum stiffness requirements of NZS 3604. Refer to NASH 3405 document for further guidance on steel framing or contact steel framing supplier for information.

Steel sections shall be suitably galvanised zinc coated to comply with the durability requirements of NZBC. Refer to framing manufacturer for further information. Studs must not be less than 35mm wide at joints.

For tiled applications it is recommended to use a 0.75mm thick steel framing to achieve the required rigidity/stiffness.

3.4 MASONRY SUBSTRATE

Always ensure the substrate is given adequate time to dry out before the installation of Villaboard Lining. The wall surface must be clean, dry and free of any material that will affect the straightness of the battens. Refer to page 13 for further information.

3.5 SKILLION ROOF DESIGN

When installing Villaboard Linings direct to skillion roof framing, refer to Eaves and Soffit Linings Installation Manual.

3.6 FRAME TOLERANCES

Ensure the frame is square and work from a central datum line. Frames must be straight and true to provide a flush face to receive the sheeting.

Figure 1: Frame straightness



A suggested maximum tolerance of between 3mm and 4mm in any 3000mm length of frame will give best results. Villaboard Lining will not straighten excessively warped or distorted frames and any warping may still be visible after the internal lining is installed.

3.7 MASONRY WALL

Cut Villaboard Lining approximately 12mm less than floor to ceiling height to allow for building tolerances. Ensure a 6mm building tolerance gap is provided at the floor and ceiling junctions with the Villaboard Lining. Refer to page 14 for specific substrate requirements.

4 Sheet layout

3.8 CURVED WALLS

Villaboard Lining may be bent to accommodate curved walls. The minimum bending radii are shown below.

Table 4

Curved wall minimum bending radii		
	Along Length (mm)	**Across Width (mm)**
Villaboard Lining 6mm	1800 (1200)	2400
Villaboard Lining 9mm	3000 (1800)	4000

Notes

1. The bending radii given above require no special pre-wetting of the sheet and may be used on internal or external curves.
2. With extra care, the sheet can be bent to the radius shown in the brackets.

To maintain the smoothness of the curve, studs must be closed to spacings as shown below.

Table 5

Curved lining — stud spacing	
Range of Radii (mm)	**Stud Spacing (mm)**
1200 to 3000	300
Above 3000	*400

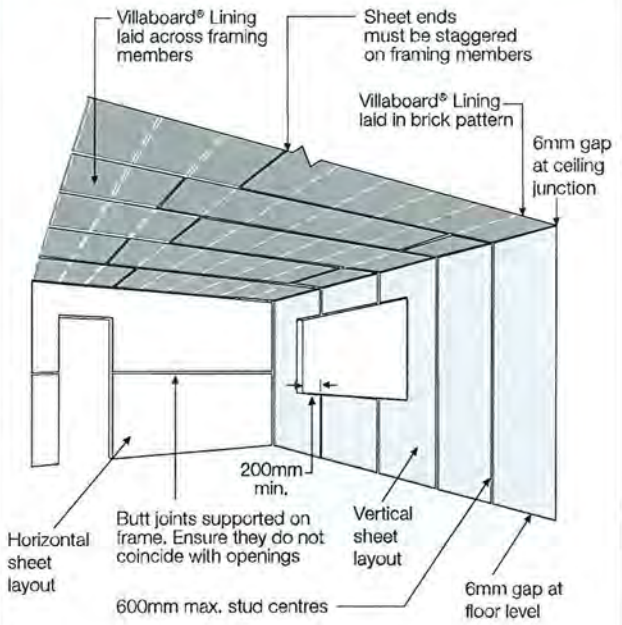
*or at one third of the sheet width, whichever is the lesser.

Install Villaboard Lining across the framing either vertically or horizontally.

Sheet joints must coincide with the centre line of the framing member.

At door and window openings fix sheets around the opening in a way that the sheet joints do not coincide with the edges of openings. The sheet joint must be 200mm minimum away from the opening edge. See Figure 2.

Figure 2: Sheet layout



Notes

1. The sheets should be installed vertically on the inner face of external walls where the exterior cladding is installed on cavity battens. For cavity construction method the nogs are generally fixed at 800mm centres max.
2. Sheets with two long edges recessed are most suitable for vertical installation.
3. When the space above the window/door is less than 250mm then a control joint must be provided on either side of opening. Refer to Figure 18.
4. 3-4mm packers can be fixed on the framing where required to suit the window reveals or in wet areas.
5. All sheet edges must be supported by the framing.
6. Joints can be staggered.

5 Installation

5.1 GENERAL

Place 6mm packers along the floor as temporary support for sheets. This will allow for any frame movement/shrinkage. Put sheets in place as shown.

Ensuring the sheet is level, fix starting from the centre of sheet and working outwards to avoid any drumminess.

Figure 3: First sheet



Provide 1-2mm gap between Villaboard Lining sheets at vertical, horizontal, internal or external corner joints.

Fix the remaining sheets in a similar sequence.

Notes

1. For fastener selection and spacings see pages 10 -13.
2. Do not fix sheets to the bottom chord of roof trusses. Instead, fix to ceiling battens or furring channels.

Figure 4: Fixing remaining sheets



5.2 FASTENERS

Fasteners must have the appropriate level of durability required for the intended project.

Fasteners must be fully compatible with all other material that they are in contact with to ensure the durability and integrity of the assembly.

On timber frame use Villadrive collated screws for quick installation of Villaboard Linings. Alternatively the Villaboard Lining can also be fixed with HardieDrive stainless steel screws or 40 x 2.8mm HardieFlex nails.

For fixing Villaboard Lining to 0.55 – 1.0mm BMT steel framing, use 30mm Buildex FibreZip Class 3 collated screws. These screws must not be used in sea spray zones.

Nails must be finished flush (Figure 5). Screws can be driven 0.5mm below the sheet surface to achieve the required finish level (Figure 5). In steel framing the fasteners should be driven as close as possible to the stud corners to avoid deflection of the stud flange, see Figure 6.

Refer to Section 6 – Step 7, for finishing of fasteners.

Figure 5: Fastener depth

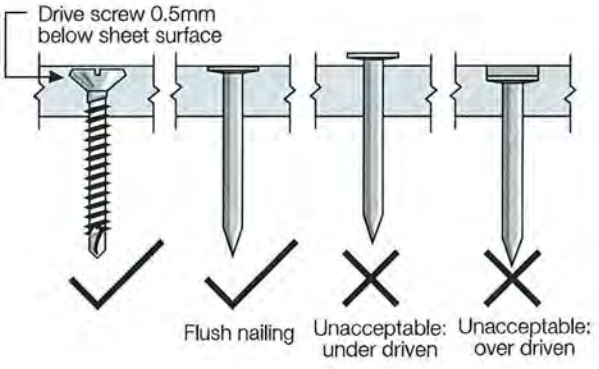
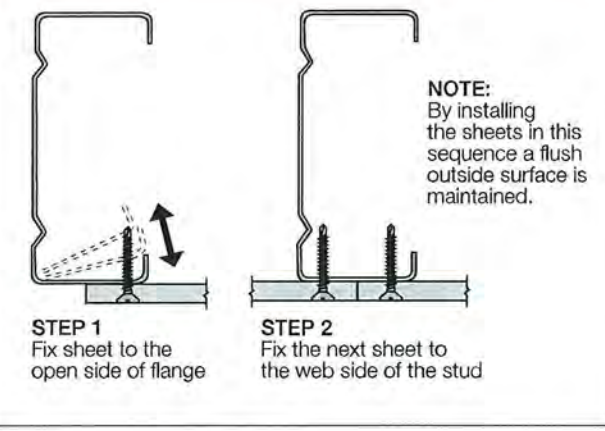


Figure 6: Screw fastening



5.3 FIXING TO FRAMED WALLS

Untiled walls

Where Villaboard Lining is to be left untiled, the sheets can be fixed with fasteners or a combination of fasteners and adhesive, see Figures 7 and 8 respectively.

Figure 7: Fastening to wall frames

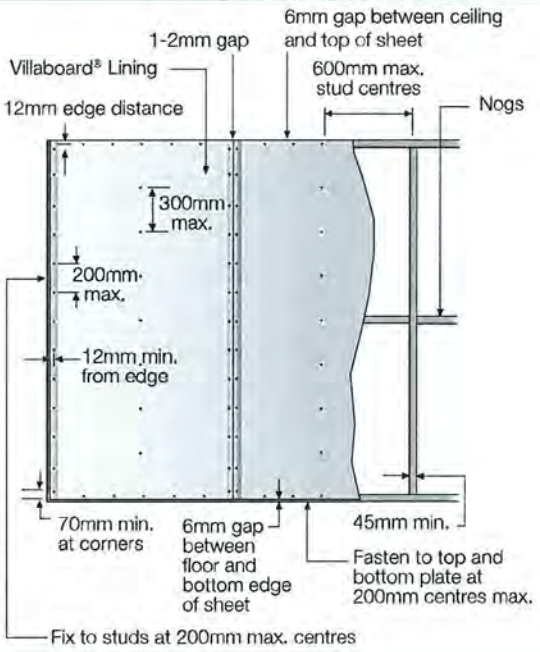
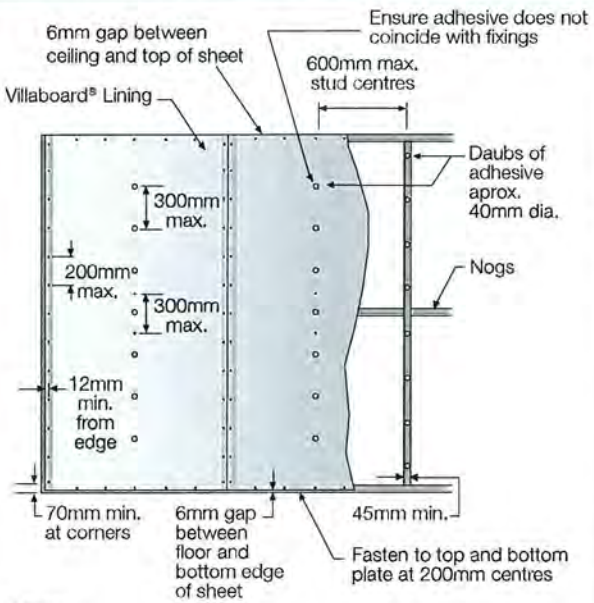


Figure 8: Fastener / adhesive fixing to wall frames



NOTE:
Fasteners required at vertical and horizontal sheet edges and adhesive infield of sheet only.

Notes

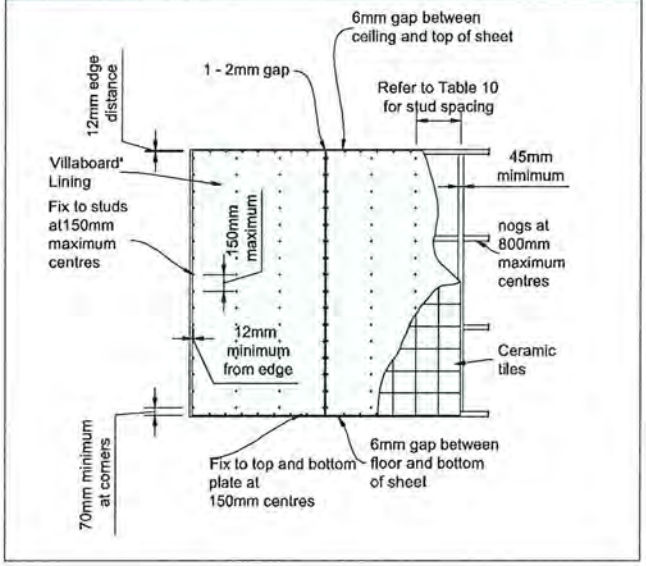
1. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
2. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.

Tiled walls

Where Villaboard Lining is to be finished with tiles, the sheets must be fixed with fasteners only as shown in Figure 9.

For tiled wall applications studs spacing must be closed to 400mm for a 6mm Villaboard Lining, and between 400mm to 600mm centres for a 9mm Villaboard Lining. Refer Table 10 for further information.

Figure 9: Fastening to wall frames for tiling



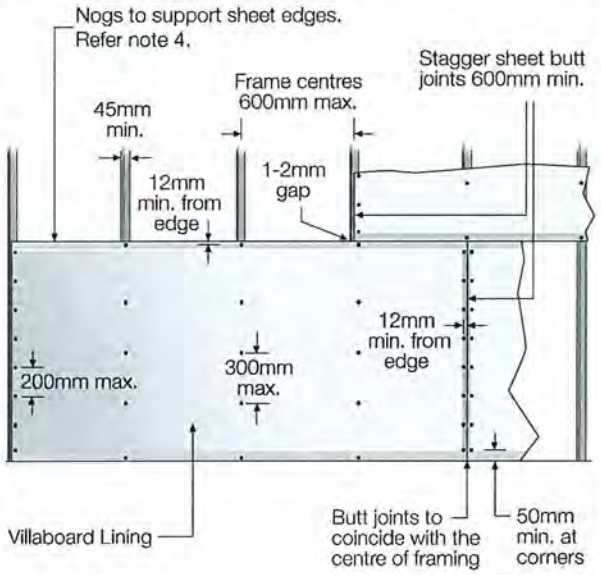
Notes

1. It is good practice to install Villaboard Lining horizontally for tiled applications.
2. When tiling in wet areas, apply water proofing membranes before tiling on walls. Ensure water proofing membranes manufacturers recommendations are followed.
3. The recessed edges are required to be stopped with James Hardie Base Coat as per Section 6. The top coat is not required behind the tiles. The square sheet joint can be sealed with a flexible sealant before the installation of tiles. Refer Figure 16.
4. When installed horizontally full perimeter sheet support and fixing is required. The vertical sheet joints can be staggered.
5. Fixings not to be staggered at the joint. Refer Figure 9.

5.4 FIXING TO FRAMED CEILINGS

For ceiling applications either the fastener or fastener/adhesive method can be used. Refer to Figures 10 and 11 respectively.

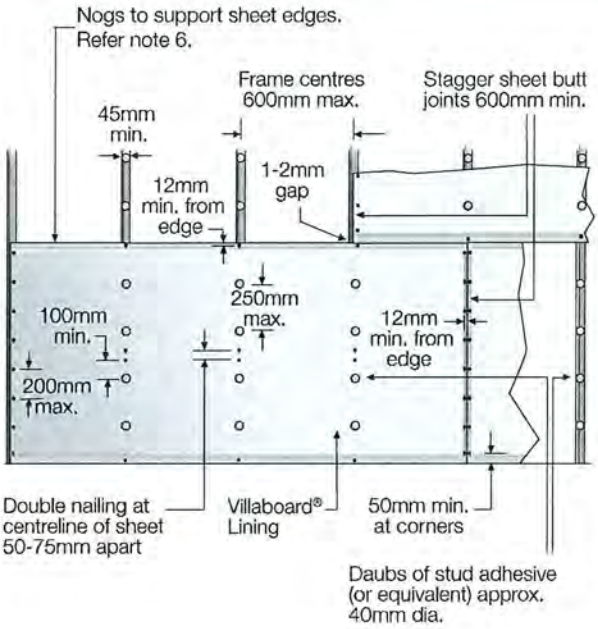
Figure 10: Fastening to ceiling frames



Notes

1. Do not install tiles in ceiling applications.
2. Do not fix sheets to the bottom chord of trusses. Batten these out first with timber battens or steel ceiling battens.
3. It is recommended that flush stopping of joints is suitable when using recessed edge Villaboard Lining.
4. When nogs not installed for perimeter support, unsupported sheet edges across the framing must be supported by back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centered between the framing.
5. For external soffit applications refer to James Hardie Eaves and Soffit Linings Installation Manual.

Figure 11: Fastener / adhesive fixing to ceiling frames



Notes

1. Do not install tiles in ceiling applications.
2. Do not use adhesive only. Ensure sheet perimeter is fastened as shown.
3. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
4. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.
5. It is recommended that flush stopping of joints is suitable when using recessed edge Villaboard Lining.
6. When nogs not installed for perimeter support, unsupported sheet edges across the framing must be supported by back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centered between the framing.
7. For external soffit applications refer to James Hardie Eaves and Soffit Linings Installation Manual.

5.5 FIXING TO MASONRY/CONCRETE WALL

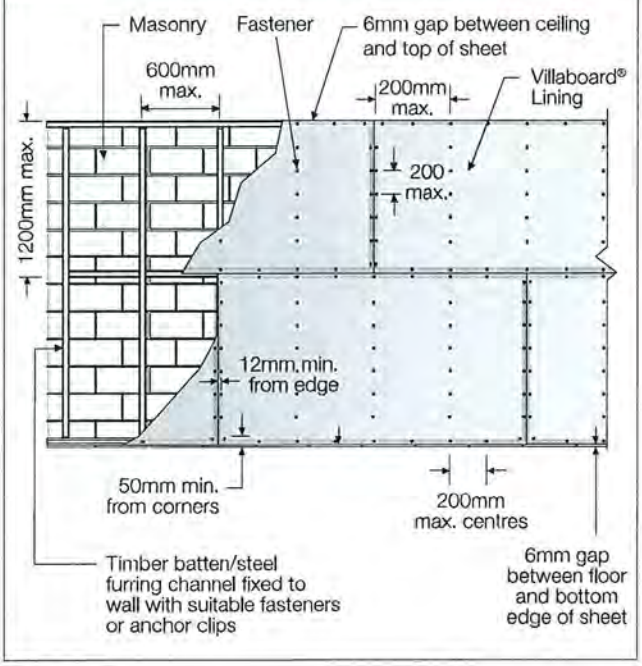
Villaboard Lining can be installed over masonry, concrete and Aerated Autoclaved Cement (AAC) substrates by following the requirements as explained below.

5.6 BATTEN/FURRING CHANNEL METHOD

Note: This method is suitable for tiled or untiled applications.

1. Where substrate may be uneven and misaligned – this method allows correction of irregular surfaces; allows packing out to accommodate large surface variations.
2. Timber battens are either fixed directly to the walls, or alternatively, metal furring channel anchor clips can be used. These are attached to the wall prior to fitting the metal furring channels.
3. Where services are run over walls, deeper furring channels may be used.
4. Use suitable masonry fasteners to structurally fix timber/steel battens or recessed furring channels as shown in Figure 12.
5. Pack behind battens as required to achieve a flat surface.
6. Villaboard Lining edges must be supported on the wall.

Figure 12: Batten/furring channel — horizontal layout



Notes

1. Timber battens or proprietary steel battens or furring channel sections may be used. Where space is a major consideration, use recessed furring channels which have the least section depth.
2. The spacing and fixing of anchor clips must be in accordance with the manufacturer's recommendations.
3. The sheets can also be fixed vertically using this method.
4. The depth of timber battens must be suitable for the length of fasteners used.

6 Joints

6.1 GENERAL

Villaboard Lining joints are set with proprietary jointing compounds reinforced with perforated paper tape. Both recessed edge, square edge and butt joints are finished by using the jointing products outlined in this manual.

The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanships applied. However, James Hardie considers that the recommendations provided in Table 6 describe best practice to reduce the risk of joint cracking or other problems.

There are various factors that can affect the performance of jointing compounds on edge recessed fibre cement substrates. These factors include the framing, movement, installation quality, vibrations, moisture, humidity, temperature, etc. To achieve satisfactory joint performance these factors need to be carefully considered and understood by the installer and designer when positioning joints.

James Hardie Base Coat has been specifically developed for use with Villaboard Lining and offers superior joint strength when compared with the gypsum jointing compound alternatives.

All site cut and site recessed sheet edges must be sealed with Dulux Acraprime 501/1 or Dulux Primacryl or similar.

In addition, provision for movement needs to be made by the installation of control joints. See Figure 18.

Table 6

Jointing recommendations

		Application	Base Compound	Topping Compound
Dry area walls	Recessed Edge	Untiled	James Hardie Base Coat with perforated paper tape	James Hardie Top Coat, Plaster Systems compound or Gypsum topping compound
		Tiled	James Hardie Base Coat with perforated paper tape	N/A
	Butt Edge	Untiled	Silicone Joint	N/A
		Tiled	Silicone Joint	N/A
Wet area walls	Recessed Edge	Untiled	James Hardie Base Coat with perforated paper tape	James Hardie Top Coat
		Tiled or Shower Lining	James Hardie Base Coat with perforated paper tape	N/A
	Butt Edge	Tiled or Shower Lining	James Hardie Base Coat with perforated paper tape	N/A
			Silicone Joint	N/A

Figure 13: Vertical flush joint setout

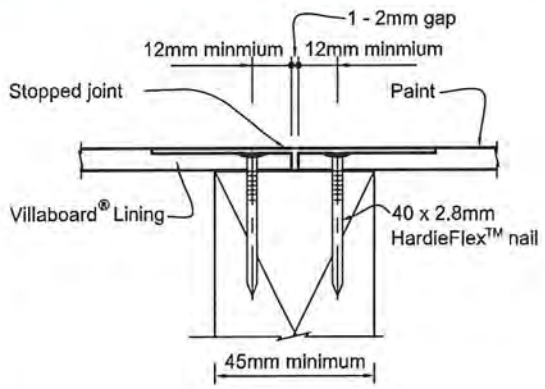
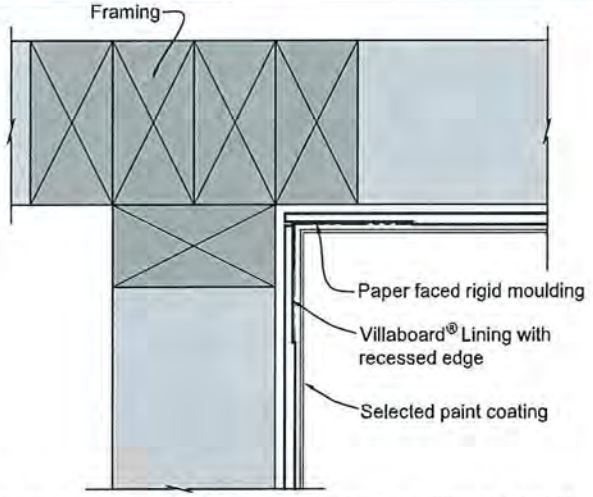
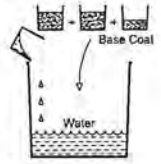


Figure 14: Wall to wall junction



Note: When Villaboard® Lining is to be tiled the corners behind the Villaboard Lining must be tied together with a Lumberlok® Stud Saver steel corner angle. Refer to Figure 21 for this angle's location.

6.2 JAMES HARDIE BASE COAT MIXING INSTRUCTIONS



Step 1

First, add 1 part of clean water into bucket.

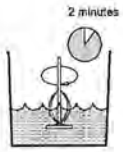
Then add 2½ parts

James Hardie Base

Coat powder

Allow to soak for 1 minute.



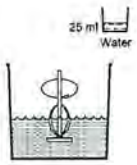


Step 2

Mix for 1½ – 2 minutes using paint mixer or equivalent (approximately 2500-3000rpm).

James Hardie Base Coat is NOT like the plaster based compounds. Initial mixing will indicate a dry mix and further mixing **WITHOUT** further addition of water will deliver the ideal workable paste.

Warning: Inadequate or over mixing can lead to poor workability and can cause performance issues. **Do Not Hand Mix.**



Step 3

The mix at this stage should be consistently smooth.

Based on the environmental conditions i.e. temperature, humidity and wind etc you may add maximum of 25ml of water per 1Kg of base coat powder in the mix at this stage to adjust workability. Mix it well.

(Note: Adding excess water than the recommendation may delay the drying of base coat and may cause joint cracking due to excessive shrinkage.)

The mix should be glossy and smooth. There should be no lumps in the mix.

Important Notes:

1. Do not apply James Hardie Base Coat in temperatures above 40° C or below 5° C.
2. Allow the compounds to dry before applying the next coat. The drying time will vary between 12 to 24 hours depending upon the weather conditions.
3. Site cut and site recessed sheet edges must be sealed with an acrylic sealer e.g. Dulux Acraprime 501/1, Dulux Primercryl or similar product.
4. In corners, use James Hardie uPVC internal/external corner mould primed with Dulux Primerlock or similar. A 'GIB® Goldline™ Platinum' corner mould can also be used.
5. Use only perforated paper tapes in straight joints.
6. It is recommended that one (1) base coat bag is mixed in three (3) portions.
7. Before stopping the sheet edges, Multiplast Resin or a similar product in diluted form must be applied to the sheet edges. Mix the resin as per the manufacturer's recommendations.

Product Life:

James Hardie Base Coat has a shelf life of 12 months in unopened bags when stored in a cool dry place.

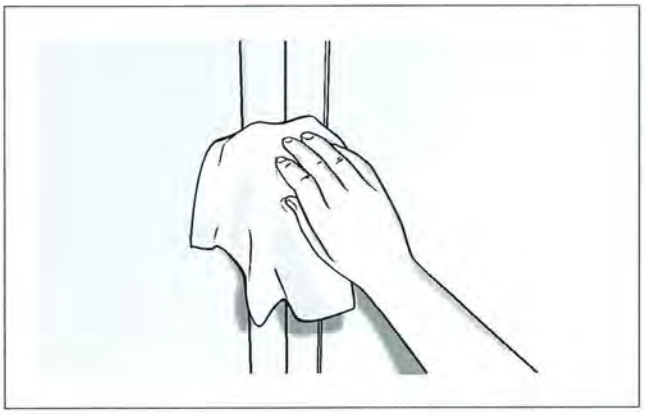
James Hardie Base Coat has a bag life of 1 month if opened bags are resealed and stored in a cool dry place.

6.2.1 Compound coverage

1kg of Base Coat will provide approximately 5 lm of standard joints. 1kg of Top Coat will provide approximately 5.6 lm of standard joints.

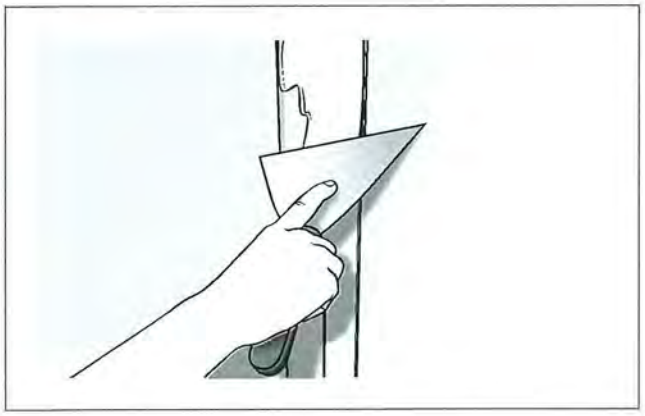
6.3 SET RECESSED EDGE JOINTS

Step 1 — Preparation
Ensure that the recesses are clean and free of dust and contaminants. Sheet edges must be sealed prior to stopping with Multiplast Resin water proofing admixture or other similar products. If working conditions are hot and dry, dampen the area around the joint prior to working.

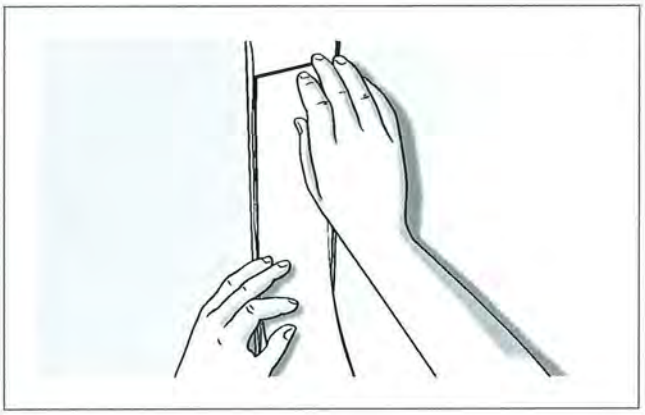


Note: The jointing method shown on page 16 and 17 provides a level 4 finish. For more information about this and other finishes refer to Table 9.

Step 2 — First coat
Apply James Hardie Base Coat to fill the recess with a 150mm broad knife.

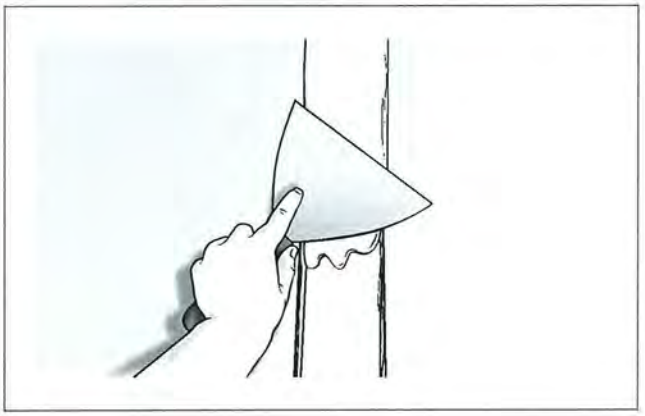


Step 3 — Embed tape
Firmly embed the perforated paper tape centrally into the joint using a 50mm broad knife. Ensure that there are no voids under the tape and remove excess compound.



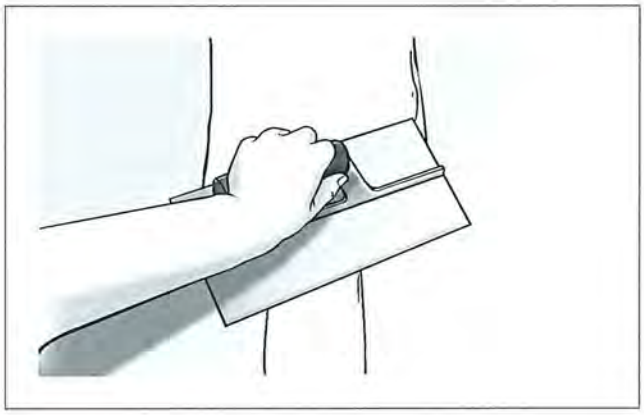


Step 4 — Thin layer
Immediately fill joint covering tape with a layer of James Hardie Base Coat applied with a 150mm broadknife.

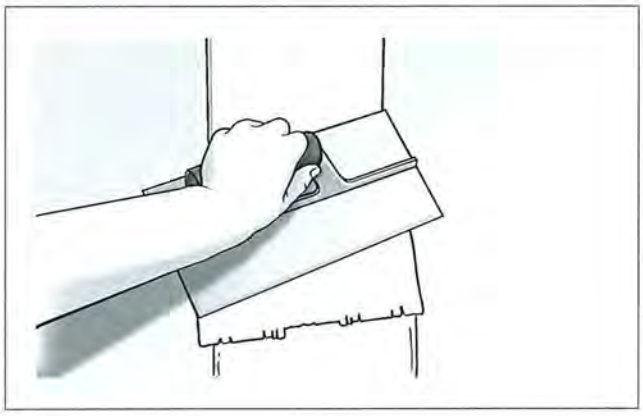


Note: Steps 5, 6 and 7 are only required for paint and wall paper finishes up to a level 4 finish. Refer Table 9 for level 5 finish.

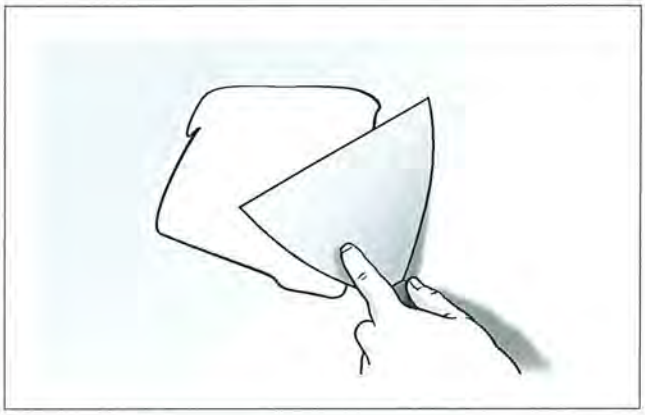
Step 5 — Second coat (untiled walls only)
When the first coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Base Coat. Apply this coat approximately 180mm wide, laid down over the recess and feather the edges.



Step 6 — Finishing coat (untiled walls only)
Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of James Hardie Top Coat 280mm wide centrally over the joint and feather out the edges. Allow to dry fully before sanding.



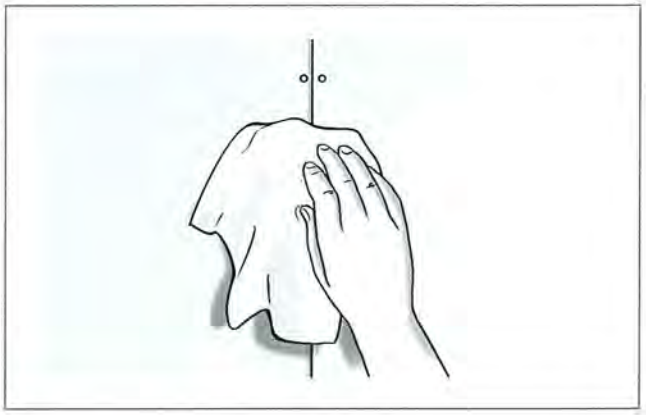
Step 7 — Fastener heads (untiled walls only)
Apply a finishing coat of James Hardie Base Coat to fastener heads, feathering out the edges. Allow to fully dry before sanding.



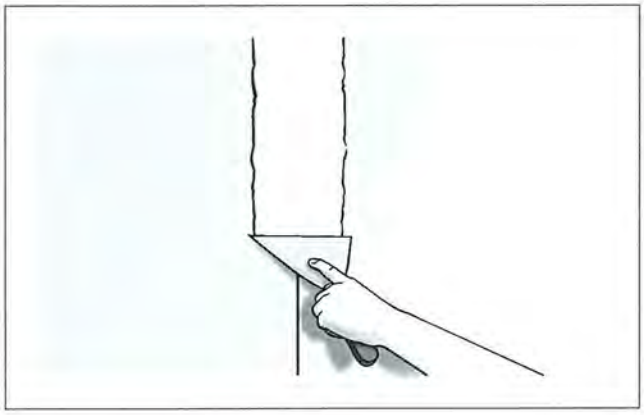
6.4 SET SQUARE EDGE JOINTS

As an alternative to setting the recessed edge joints, square edge Villaboard Lining can also be jointed and stopped on stud as shown below. This detail will achieve a level 3 finish.

Step 1 — Preparation
When jointing un-recessed sheet joint, ensure that sheet edges are clean and free of dust and contaminants. Sheet edges must be sealed prior to stopping with Multiplast Resin water proofing admixture or other similar products. If working conditions are hot and dry, dampen the area around the joint prior to working.



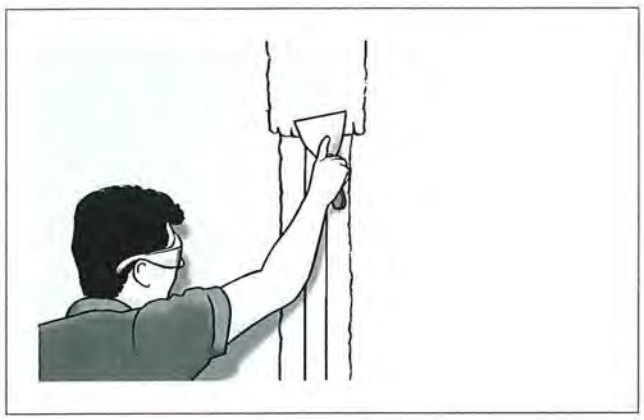
Step 2 — First coat
Apply James Hardie Base Coat centrally over butt joint to 200mm wide with a 150mm broadknife.



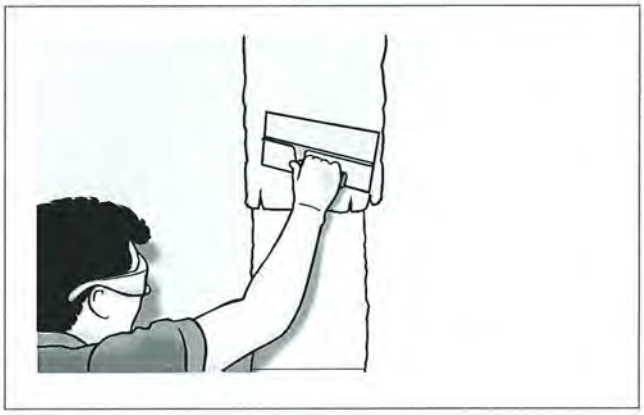
Step 3 — Embed tape
Firmly embed the perforated paper tape centrally using a 50mm broadknife. Ensure that there are no voids under the tape and remove excess compound.



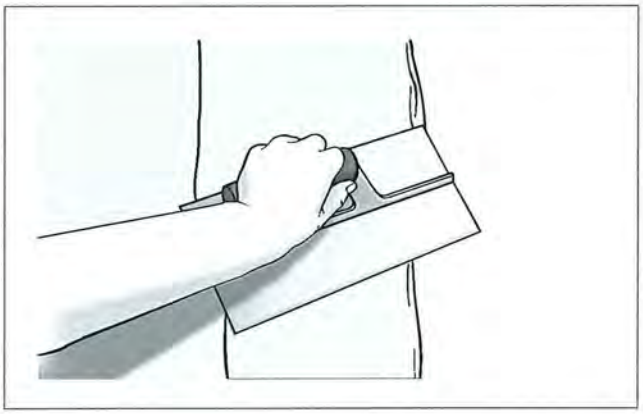
Step 4 — Thin layer
Immediately cover tape with a thin layer of James Hardie Base Coat applied with a 150mm broadknife.



Step 5 — Second coat (untiled walls only)
When the first coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Base Coat. Apply this coat approximately 300mm wide.



Step 6 — Finishing coat (untiled walls only)
Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of James Hardie Top Coat 500mm wide centrally over the joint and feather out the edges. Allow to fully dry before sanding.



6.5 BUTT JOINT

Figure 15: Butt joint detail (dry area)

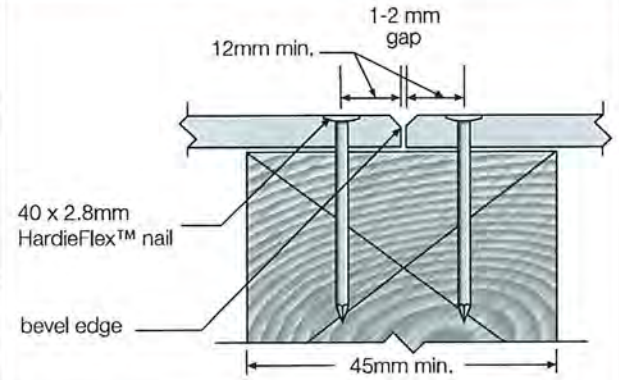
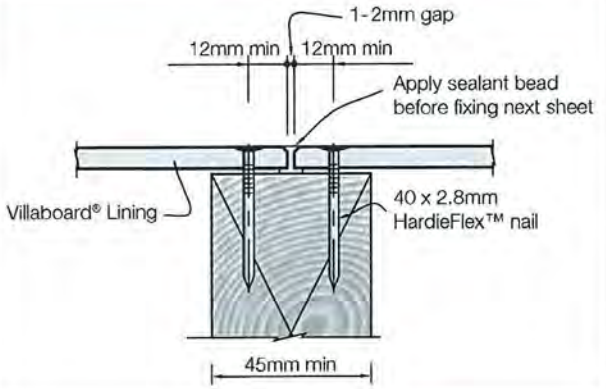
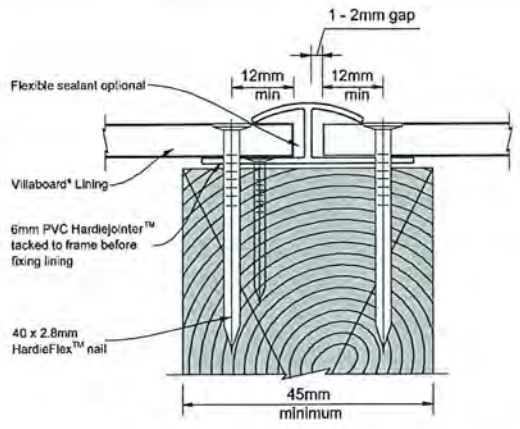


Figure 16: Butt joint detail
(tiled over in dry and wet areas)



6.6 PVC JOINT

Figure 17: Butt joint detail



Note.
1. Use of flexible silicone sealants as per their manufacturers instructions.
2. The 6mm Hardiejointer™ is available from James Hardie stockists.

6.7 INTERNAL CORNERS

The internal corners can be formed as per one of the following two methods;

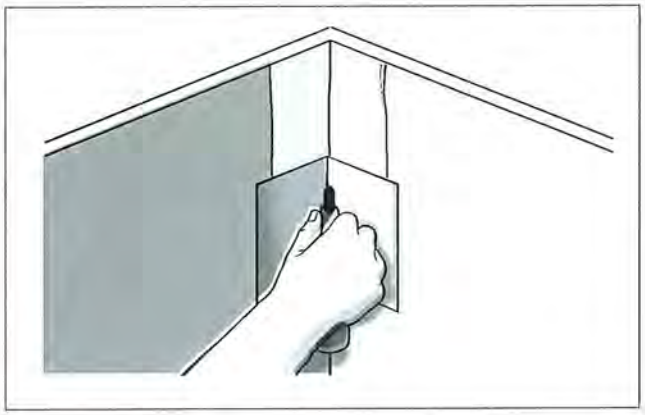
Method A:

1. Apply James Hardie Base Coat to both sides of the corner using a 70mm broad knife. Fold the perforated paper tape to form a corner and embed it into the corner using 50mm wide corner trowel.
2. Cover the paper tape with James Hardie Base Coat using a 100mm corner trowel. Allow the base coat to dry. This will normally take up to 24 hours depending upon the temperatures and humidity conditions.
3. Once the base coat has dried then apply a thin finishing coat over it with a corner trowel and smooth it out. Allow the compounds to fully dry before sanding.

Note: Step 3 is only required for untiled walls.

Method B:

Embed and fix a paper faced rigid spine corner mould (Goldline) in the corner and then stop over it using a James Hardie Base Coat. Follow steps 2 and 3 mentioned above to finish the corner joint.

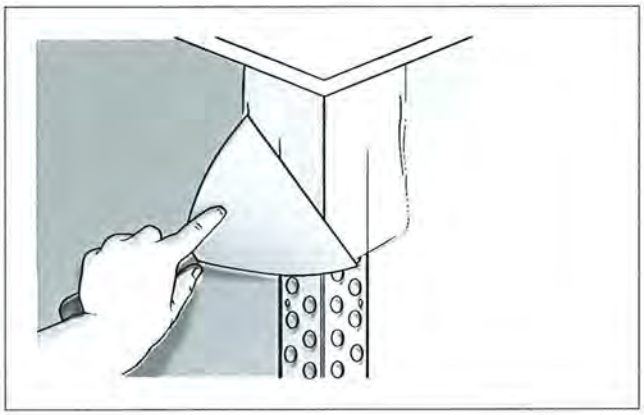


6.8 EXTERNAL CORNERS

Setting of external corners is required for untiled applications only as follows:

- Fit a perforated corner angle supplied by James Hardie or a paper faced rigid spine corner mould (Goldline) over the external corner and ensure straightness before fixing with HardieFlex nails at 300mm centres.
- Apply James Hardie Base Coat to both sides of the corner angle to a width of 150mm using a broad knife. Allow to dry before applying a second coat.
- Using a straight trowel, build up the edges to 250mm from the corner. Allow to dry.

- When dry, use the straight trowel to apply a thin finishing coat, 300mm wide, to both sides of the corner angle, feathering out the edges.
- Allow to fully dry before sanding.



6.9 CONTROL JOINTS

Control joints are required in long runs of Villaboard Lining walls or ceilings in either direction. These joints are designed to take up the structural movement between the sheets and the building frame. They may also be required in ceilings where they change direction or continue into passage ways. Control joints should also be provided at frame junctions / joints such as wall intersections.

See Table 8 for maximum control joint spacings and Figure 18 for a typical detail.

Table 8

Maximum spacing for control joints (m)			
	Steel framing		**Timber Framing**
	0.55 – 0.75mm BMT	greater than 0.75 – 1.6mm BMT	
General	9.0	6.0	7.2
Tiles walls	4.8		4.2*

*The maximum wall area should be restricted to 10m² between control joints

Figure 18: Control joint

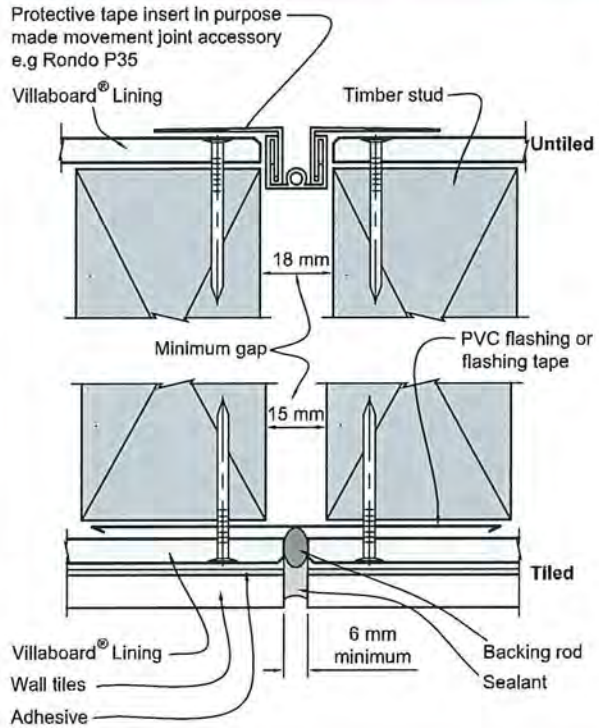
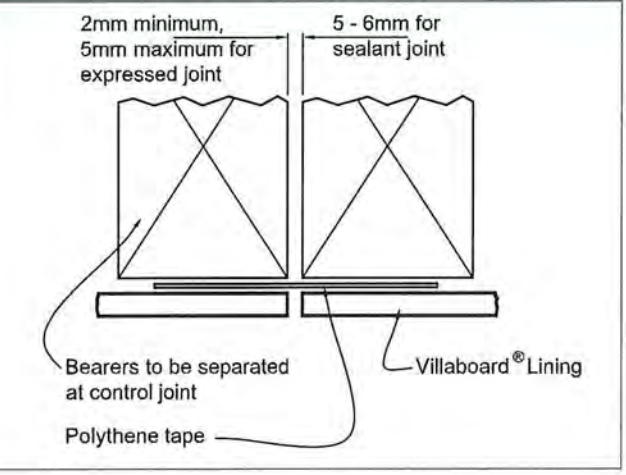


Figure 19: Control joint



Note: Alternatively a PVC control jointer supplied by James Hardie can also be used to form a control joint.

7 Wet area application

7.1 BATHROOM AREAS

Villaboard Lining is most suitable for use in wet area applications. Villaboard Lining must be covered with a water proofing membrane in a shower application before the installation of tiles.

Note: Paints are not suitable for wet area applications (splash zone) and must not be relied upon to achieve water tightness.

7.2 INTERNAL SWIMMING POOL APPLICATION

To fix Villaboard Lining in internal swimming pool areas;

- The sheets must be back and edge sealed before installation.
- All sheet joints to be stopped.
- Only stainless steel fasteners must be used.
- Full perimeter fixing required.

In addition, it is recommended that H3.1 treated timber framing and ceiling battens are used to enhance the durability considering the high condensation levels.

Figure 20: Sealing around splash zones (showers)

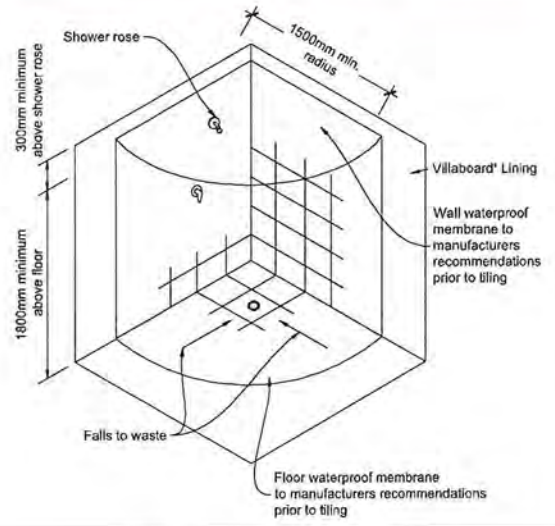
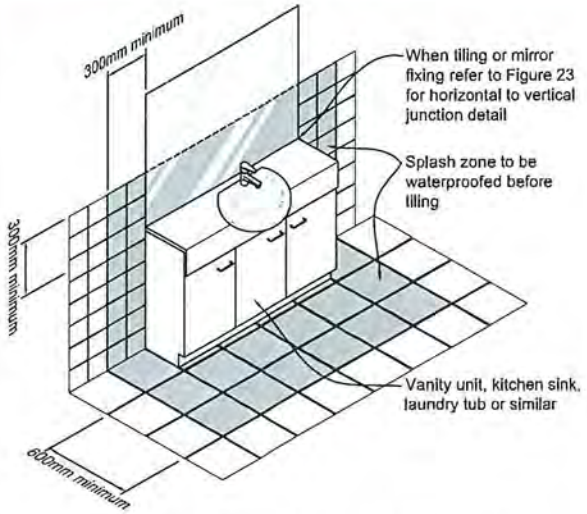


Figure 21: Sealing around splash zones (vanities)



Note: The extent of floor or wall waterproofing depends on the extent of water to be splashed over these areas. Recommended area to be waterproofed outside of bath, shower or vanity is a minimum of 300mm on walls and 600mm on floors.

Figure 22: Wall to wall wet area tiled wall internal corner

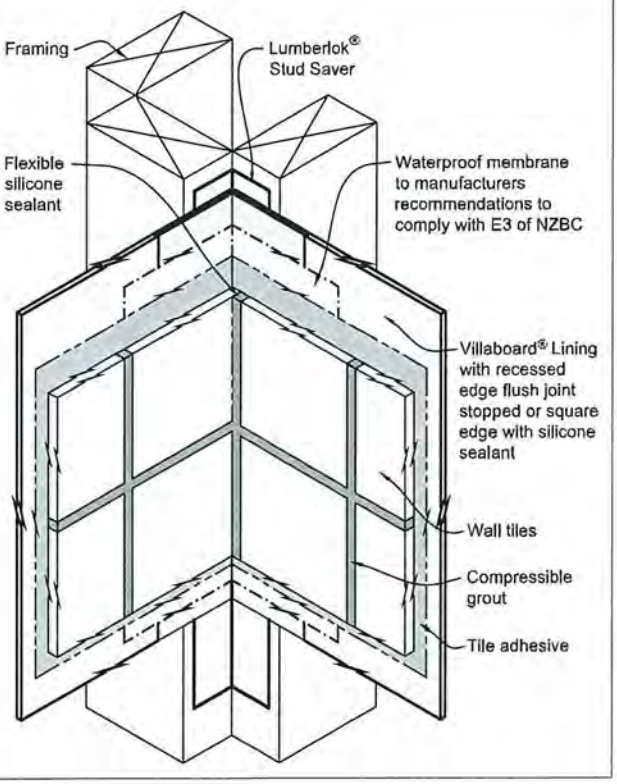
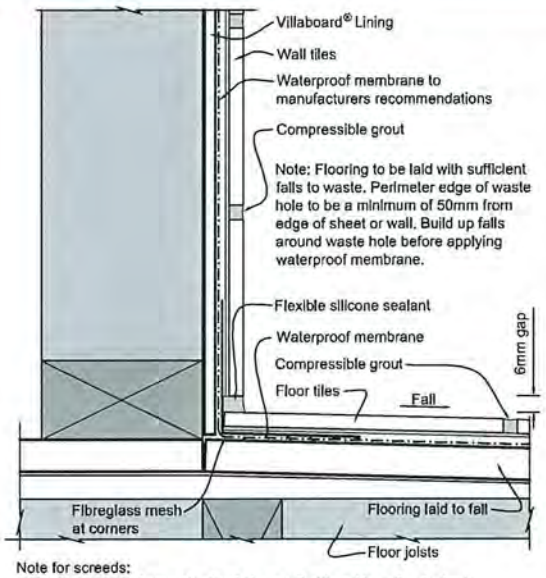


Figure 23: Wall to floor junction



Note for screeds:

1. The thickness of screeds should be applied to achieve the desired slope in accordance with the manufacturers recommendations.
2. Clean down the surface of the sheet flooring thoroughly. Apply a coat of bonding chemical to improve the bonding of the mortar bed to the floor.
3. To prevent cracking of the floor tiles, the mortar bed must be reinforced over all joints in floor sheets with 150mm wide galvanised mesh placed centrally over joints and in the centre of bedding.
4. Control joints in the flooring must be continued through the tiles.
5. Epoxy mortar screeds may also be used.

Note: Refer to Clause 8.5 for further information

Figure 24: Wall to acrylic bath/shower

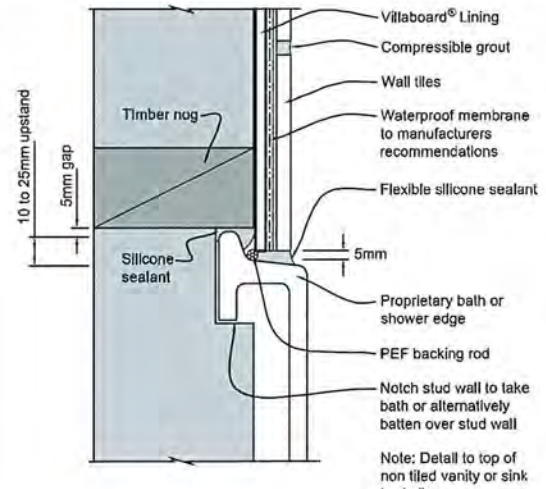
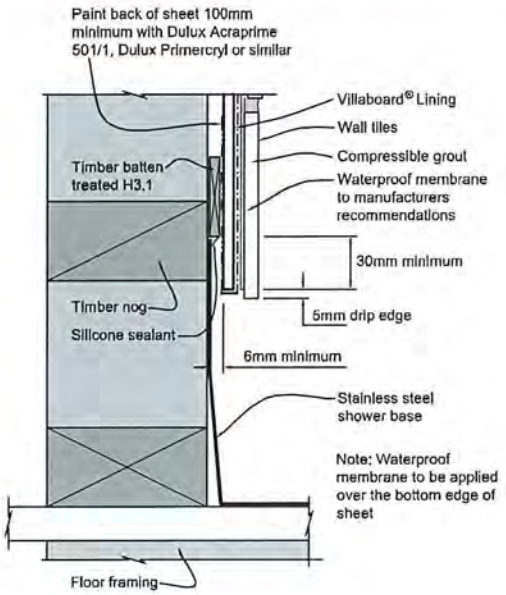


Figure 25: Wall to stainless steel shower

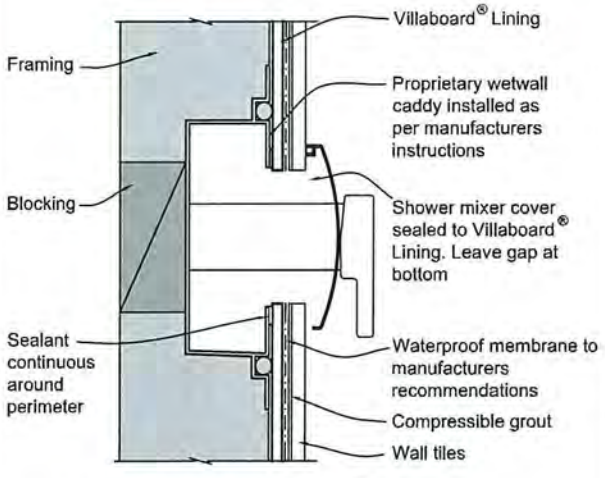


7.3 WATERPROOFING MEMBRANE

A waterproofing membrane must be applied to Villaboard Lining when used in wet area or water splash area applications. A reinforcing fibre glass/band must be used in corners and walls to floor junctions. Always follow the recommendations of waterproofing membrane manufacturers. BRANZ appraised water proofing membranes are recommended for use in this application.

7.4 WET AREA PENETRATION

Figure 26: Wet wall caddy



Note: Seal cut edges of Villaboard® Lining

8 Finishes and maintenance

8.1 GENERAL

Villaboard Lining is finished with either paint, tiles or wallpaper as per application requirements. The application and maintenance of these finishes must be in accordance with the manufacturer's specifications.

Notes

1. For wet areas, the waterproofing requirements of all relevant codes, standards and regulations must be met.
2. Refer to the manufacturers' specifications on application, compatibility and suitability of waterproofing membranes.

8.2 GLANCING LIGHT

In some instances, due to glancing light, set joints may be noticeable in Villaboard Lining walls, especially where paint finishes have a high gloss level. Work closely with your builder or designer to minimise this.

Artificial lighting needs to be considered in relation to walls and ceilings (e.g. down-lights in ceilings above set joints in walls). Ceilings and wall joints should run in the direction of the light source (at right angles to windows).

Where glancing light is an issue its effect can be lessened by:

- The use of curtains or blinds.
- Artificial light shading devices.
- The use of light coloured, matt finish paints.

8.3 LEVEL OF FINISHES

Different levels of finishes are typically specified for different applications. Higher levels of finishes are used to address the glancing light issues with painted Villaboard Lining referred to above. A description of the various levels of finishes and the jointing/coating requirements can be found in Table 9.

Table 9

Levels of finishes			
Level of Finish	**Definition***	**Typical Jointing/Setting**	**Finish**
0	This level of finish may be useful in temporary construction.	No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/nailing sheets in place.	For use in areas where finishing and stopping is not considered necessary.
1	For use in plenum areas above ceilings, in areas where the work would generally be concealed, or in building service corridors and other areas not normally open to public view.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape.	Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.
2	For use in warehouse, storage or other areas where surface appearance is not of primary concern.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	Minor tool marks and ridges are generally acceptable.
3	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall paper coverings are to be applied as the final decoration. This level of finish is not generally suitable where smooth painted surfaces or light to medium wall coverings are specified.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	This level of finish must be sufficiently smooth to accept heavy vinyl, tiles or textured coatings without blemishes.
4	This is generally the accepted level of finish for domestic construction. It is used where light textures or wall coverings and smooth textured finishes and satin/flat/low sheen paints are illuminated by non-critical lighting.	Refer to flush jointing recommendations on page 16–17, steps 1–7 recessed edge joints. All joints and corner joints will have tape embedded in James Hardie Base Coat applied over all joints, angles, fastener heads and accessories. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	For use where light-texture coatings or wallpaper or other lightweight wall coverings are to be applied. For painted finishes in non-critical lighting areas flat and low-sheen textured paints are to be applied. Gloss and semi-gloss paints are not generally suitable over this level of finish as any minor blemish will show under critical light. The weight, texture and sheen level or wall coverings applied over this level of finish must be carefully evaluated. Joints and fasteners must be adequately concealed if the wall-covering material is lightweight, contains limited pattern, has a gloss finish, or any combination of these features is present. Unbacked vinyl wall coverings are not suitable over this level of finish.
5	This level of finish is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheet paints.	Refer to page 16 steps 1–4 for jointing. Final James Hardie Base Coat application should be feathered out to approximately 200mm + each side of the joint. Then a full skim coat of James Hardie Top Coat must be applied over entire sheet surface in order to achieve a uniform finish. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	This level of finish is for use where gloss, semi-gloss, low-sheen or non-textured paints are specified or where critical lighting conditions occur.

*Reference: AS/NZS 2589.1: 'Gypsum lining in residential and light commercial construction — Application and finishing. Part 1: Gypsum plasterboard'

8.4 PAINT FINISHES

Prior to the application of paint finishes, remove any residual sanding dust and ensure the surface is suitable for paint application.

Always follow the paint manufacturer's recommendations for paint suitability, mixing and application.

Note: Use of a 'sealer coat' or 'preparation undercoat' is recommended.

8.5 TILED APPLICATIONS

Before ommencing tiling it is suggested that you refer to BRANZ 'Good Tiling Practice' guide to fully understand the substrate preparation/installation before tiling, also refer Table 10 for Villaboard Sheet thickness, stud spacing and tile thickness.

Refer to Clause 5.3 Tiled Walls for fixing Villaboard Lining to Framed walls.

Control joints must be provided to accommodate thermal/ framing movement and stresses which will generate during the life of the building. Control joints must be carried out through the tiles to the exterior face. Refer Figure 18.

James Hardie only recommends the use of flexible tile adhesive for tile applications. Refer to adhesive manufacturer for suitability and application information. The size of tiles used over Villaboard Lining are restricted based on thickness of sheet. Refer Table 10 below.

Square edge sheets can be used for tiled applications. The sheet joint can either be stopped as per Figure 13 or it can be filled with a sealant as per Figure 16.

Note

1. Do not tile ceilings.
2. Tiling must not exceed 3m in height.
3. Provide control joints as per Table 8.
4. The Villaboard Lining joints can be staggered.

Table 10

Villaboard Thickness (mm)	Tile Thickness (mm)	Sizes		Stud Spacing
		Maximum Tile Weight per m2 (Kg)	**Tile Size Max**	
6	≤ 8mm	Up to 15	300 x 300mm	400mm centres maximum
9	> 8mm	15 - 30	300 x 600mm/ 400 x 400mm	600mm centres maximum
9	> 8mm	31 - 60	300 x 600mm/ 400 x 400mm/ 300 x 900mm	400mm centres maximum

Support angles are required to transfer the weight of tiles to the framing.

A support angle must be fixed at the base of the wall into the bottom plate. When tiling the full height of the wall, it is recommended that an intermediate support angle fixed into framing is also used to support the weight of tiles. The overall mass of tiles and the support required must be considered and the c/c distance between the support angles should be reduced for tiles thicker than 18mm. Refer Table 11 for recommended spacing of angle supports.

Table 11

Guidance for consideration	
Tile Weight per m2 (Kg)	**Vertical Spacing of Support Angles (Metres, Max.)**
20 - 30	1.6
31 - 42	1.2
43 - 60	0.8

8.6 MAINTENANCE

James Hardie recommends that the cleaning and maintenance of all finishes be undertaken regularly as per the recommendations of the manufacturer. Joints must also be maintained and be free of dirt and grime. Special attention must be given to water proofing membranes and tile adhesives. These must be suitable for the intended application and compatible with other materials they are used in conjunction with.

9 Product information

9.1 GENERAL

Villaboard Lining is a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre and water.

Villaboard Lining is manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets').

Villaboard Lining is classified Category 3, Type B in accordance with AS/NZS 2908.2.

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

9.2 PRODUCT MASS

Based on equilibrium moisture content the approximate mass of Villaboard Lining is:

- 6mm thick — 8.3kg/m2
- 9mm thick — 12.4kg/m2

9.3 DURABILITY
Resistance to Moisture/Rotting

Villaboard Lining has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with AS/NZS 2908.2:

- Water permeability (Clause 8.2.2)
- Warm water (Clause 8.2.4)
- Heat rain (Clause 6.5)
- Soak dry (Clause 8.2.5)

9.4 FIRE PROPERTIES

Maximum service temperature for the Villaboard Lining is 60°C.

Villaboard Lining sheet has been tested for heat release rate as per AS/NZS 3837 and the product has a Heat Release Rate below 50 kw/m^2.

Villaboard Lining has a 'Group Number' classification of 1-S as per the requirements of clause C of the NZBC.

Product Warranty

Villaboard®
LINING

September 2014

James Hardie New Zealand ("James Hardie") warrants for a period of 15 years from the date of purchase that the Villaboard® Lining (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;

b) this warranty is not transferable;

c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;

d) the project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code (NZBC), regulations and standards;

e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);

g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;

h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested the performance of the Villaboard® Lining when installed in accordance with the Villaboard® Lining installation manual, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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James Hardie
a smarter way™



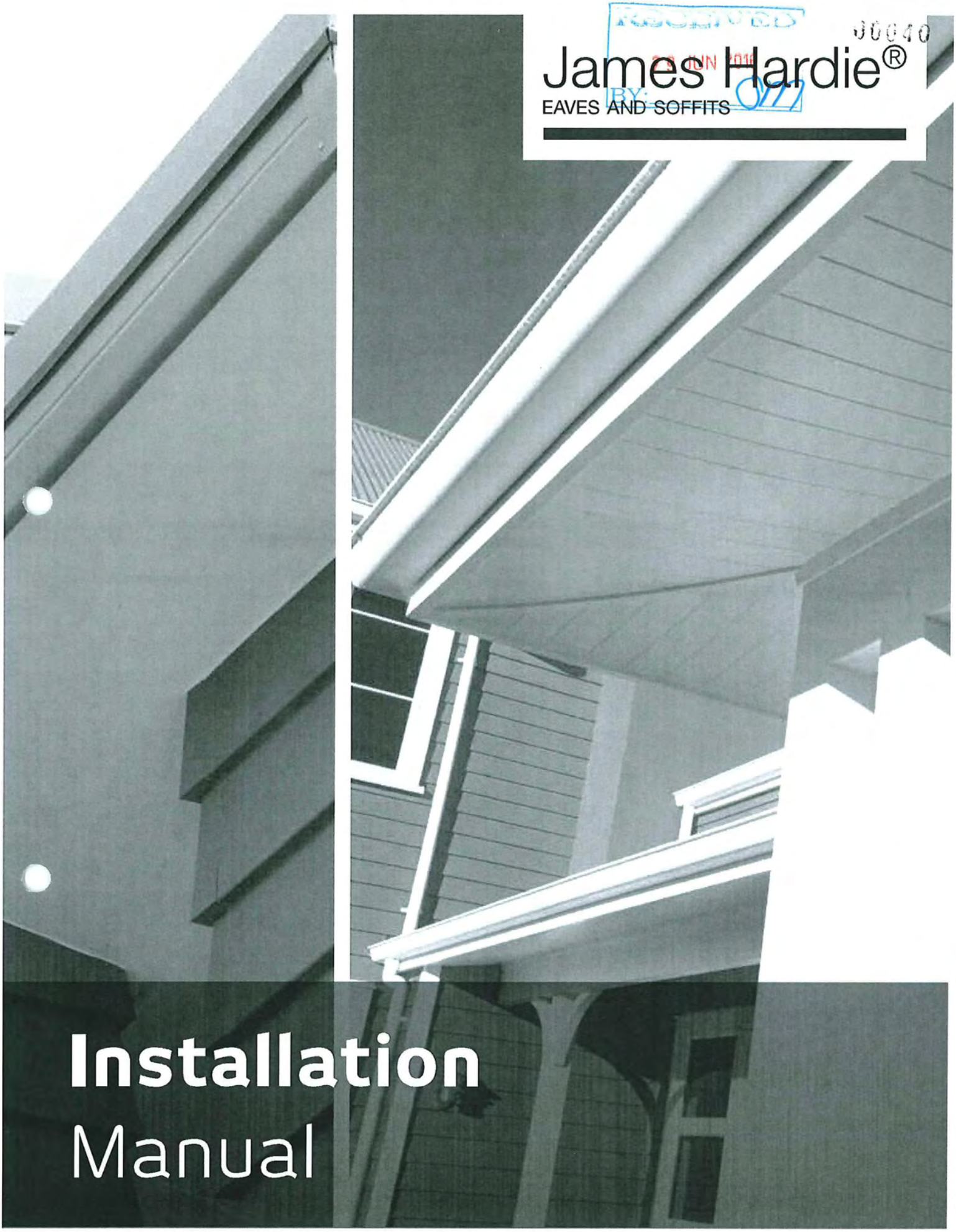
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James Hardie®

EAVES AND SOFFITS



Installation Manual

FEBRUARY 2013 | NEW ZEALAND

James Hardie
a smarter way™

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WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
Fax 0800 808 988
literaturefeedback@jameshardie.co.nz

1 Introduction

James Hardie have a wide range of soffit linings and pre-finished soffit linings that enable you to create the look you want.

Cool, wide soffits and verandahs have, over the years, been a feature which specifiers have used to provide shade from the hot summer sun and to give UV protection to exterior paintwork and interior fabrics.

Today's high energy costs demand that all avenues be explored to develop cost-efficient ways for keeping our homes cool. One of these methods — tried and proven — is the use of wide soffits, verandahs and covered outdoor living areas. James Hardie products are resistant to fire and damage from moisture and rotting when installed and maintained as directed.

James Hardie Eclipsa Eaves Lining, HardieGroove Soffit Lining, Silkline Soffit Lining, HardieFlex Eaves Lining, Hardiesoffit Lining and Villaboard Soffit Lining are not suitable for use as a cladding.



Eclipsa™
EAVES LINING

Eclipsa™ Eaves Lining is a 4.5mm thick, pre-finished acrylic eave providing innovative style and enduring performance.

- Easy to install, saving both time and money.
- A slipsheet minimises surface marks on paint during transportation and installation.



HardieGroove™
SOFFIT LINING

HardieGroove™ Soffit Lining has the charm of traditional tongue and groove timber panelling, but has all the qualities of a modern James Hardie fibre cement product. It's perfect for enhancing design lines on modern buildings or renovating old villas and bungalows.

- HardieGroove Soffit Lining comes with a half groove length ways along the edge of the sheet to achieve concealed joints.



Silkline®
SOFFIT LINING

Pre-finished Silkline® Soffit Linings are 4.5mm in thickness and comes as a complete, easy-to-install soffit lining with jointers, cappings, Fastfix fasteners and a simple two-piece scotia to complete a good-looking soffit.

- Silkline Soffit Lining is the ideal lining for soffits, eaves, verandahs, carports and porches or wherever a decorative easy-clean ceiling lining is required, e.g. spa pools, kitchens and garages.
- When low maintenance building materials are your choice, Silkline Soffit Linings will last and meet these needs. In addition, they have a 10 year coating warranty to give you extra peace of mind.



Villaboard®
SOFFIT LINING

Villaboard® Soffit Linings are 6mm and 9mm in thickness to suit both residential and commercial applications. The recessed edges are suitable for flush jointing to give a smooth flush finish. Ideal for larger sized soffits.

- The sheets are fully sanded to give a smoother face surface.
- Two long sheet edges are supplied with a recessed finish and site-cut edges can be readily ground on site. Other combinations are also available. Refer Table 3, page 5.
- Square-edge sheets are also available. These sheets can be used for the alternative expressed, sealant-filled or uPVC joint finish.



Hardiesoffit™
LINING

Hardiesoffit™ Linings are 4.5mm thick and are specifically manufactured for the narrow soffit around the perimeter of the house or building. Standard widths of 450mm, 600mm and 750mm are available.

- Hardiesoffit Linings have an unsanded finish suitable for semi-gloss acrylics or lightly textured semi-gloss or high-gloss coatings. Smooth high-gloss coatings must be avoided as some surface undulations may be visible in critical light.
- Hardiesoffit Linings can be nail-fixed to timber or mechanically fixed to a steel frame.
- Hardiesoffit Linings can be uPVC jointed or the joints can be left expressed.



HardieFlex™
EAVES LINING

HardieFlex™ Eaves Lining are 4.5mm in thickness and are available in wider widths for use in wider soffits, ceilings and verandahs. They are complementary to the Hardiesoffit Lining and are fixed and jointed in a similar way.

- HardieFlex Eaves Lining has an unsanded finish suitable for semi-gloss acrylics or lightly textured coatings. Smooth high-gloss coatings must be avoided as some surface undulations may be visible in critical light.
- HardieFlex Sheet 6mm, can also be used in eaves application for extra rigidity on larger spanning eaves.
- When higher impact or wind resistance is required, 6mm thick HardieFlex Sheet is used.



This manual covers the use of Eclipsa Eaves Lining, Silkline Soffit Lining, Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining in external eave and soffit applications. Further technical literature relating to these products and internal linings are available from James Hardie in the following manuals:

- Villaboard Lining Installation Manual.
- HardieGroove Lining Installation Manual.
- Fire and Acoustic Design Manual.

The specifier or other responsible party for the project must ensure the information and details in this manual are appropriate for the intended application and specific design and detailing is undertaken for areas which fall outside the scope of this document.

MAKE SURE YOUR INFORMATION IS UP TO DATE

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

Table 1

Eclipsa Eaves Lining Sheet Sizes

Pre-finished square-cut edge sheet for use with jointers



Length	Mass (kg/m²)	Width (mm)	
		600	1200
4.5mm thickness	5.9		
2400		✔	✔

Table 2

Silkline Soffit Lining Sheet Sizes

Pre-finished square-cut edge sheet for use with jointers.

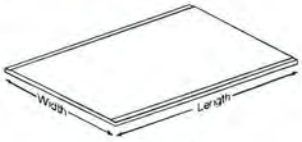


Length	Mass (kg/m²)	Width (mm)	
		600	1200
4.5mm thickness	5.9		
2400		✔	✔

Table 3

Villaboard Soffit Lining Sheet Sizes

Smooth recessed edge for flush jointing. Square-cut edge also available for use with jointers.



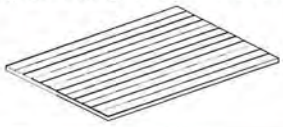
6mm Villaboard Lining has no chamfer on square edge sheet.
9mm Villaboard Lining has small chamfer on square edge sheet.

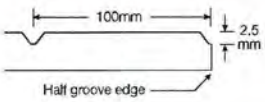
Length	Mass (kg/m²)	Width (mm)		
		1200		
		4 rec/ edges	2 rec/ edges (long)	Square edges
6mm thickness	8.3			
2400		✔	✔	✔
2700			✔	
3000			✔	✔
9mm thickness	12.4			
2400		✔	✔	✔
2700			✔	
3000			✔	✔

Table 4

HardieGroove Soffit Lining Sheet Sizes

Half groove length ways to achieve concealed joints.





Length	Mass (kg/m²)	Width (mm)
		1200
7.5mm thickness	10.44	
2400		✔
2700		✔

Table 5

Hardiesoffit Lining Sheet Sizes

Square-cut edge sheet for use with jointers.

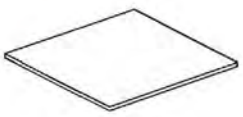


Length	Mass (kg/m²)	Width (mm)		
		450	600	750
4.5mm thickness	5.9			
2400		✔	✔	✔

Table 6

HardieFlex Eaves Lining Sheet Sizes

Square-cut edge sheet for use with jointers.



Length	Mass (kg/m²)	Width (mm)			
		1800	2400	2700	3000
4.5mm thickness	5.9				
900			✔		
1200		✔	✔	✔	✔
6mm thickness	7.8				
1200			✔	✔	✔

Table 7

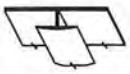
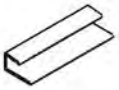
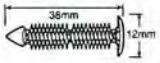
Eclipsa Eaves Lining And Silkline Soffit Lining – Accessories / Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Hardiejointer™ 5mm** 2400 long 750 long 600 long 450 long	 300729 300921 300920 300919		**Silkline PVC 2-way Jointer** 2400 long, uPVC / White	300915
	**Silkline Scotia Mould (base and cap)** 2400 long, uPVC / White	300916		**HardieFlex Capping Mould 5mm** 2400 long, uPVC / White	300538
	**Fastfix Fasteners** 38 x 12mm, Nylon / White	300632		**Inseal 3259** 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767
	**Eclipsa Eaves Lining and Silkline Soffit Lining Touch-up Paint** 15ml	Free Ask James Hardie on 0800 808 868			

Table 8

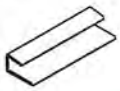
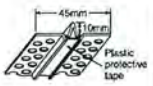
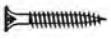
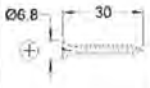
Villaboard® Soffit Lining — Accessories / Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Silkline Scotia Mould (base and cap)** 2400 long, uPVC / White	300916		**Inseal 3259** 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767
	**Hardiejointer 6mm** uPVC / Bone colour 2400 long 3000 long	 300730 300734		**9mm Hardiejointer** uPVC / Bone colour 3000mm long	300736
	**HardieFlex Capping Mould 6mm** 2400 long 3000 long uPVC / Bone colour	 300539 300540		**Control Joint** 2700 long, uPVC / White	300978
	**Corner Angle** 3000 long uPVC	300669		**James Hardie Top Coat** Topping compound for flush finished jointing.	3kg Pail 304492 15kg Pail 304493
	**James Hardie Base Coat** Base compound for flush finished jointing.	4kg Pail 304490 15kg Bag 304491		**HardieBlade Saw Blade** Ø185mm poly crystalline diamond blade, for fast, clean cutting of James Hardie fibre cement.	300660
	**HardieDrive Screw s/s 316** 30mm x 7g 100 per jar For fastening to timber frames.	300928		**Villadrive Screw 6g x 30mm** For fastening to timber frames. 100/jar 5kg Collated/1000	 300992 300993 300994
	**FibreZip® Screws** Self drilling rib head screw Box 1000	303840			

Table 9

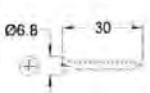
HardieGroove Soffit Lining — Accessories / Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Silkline Scotia Mould (base and cap)** 2400 long, uPVC / white	300916		**Inseal 3259** 1.5mm thick 50mm wide x 50m long, black compressible foam	300767
	**HardieBlade Saw Blade** Ø185mm poly crystalline diamond blade, for fast, clean cutting of James Hardie fibre cement.	300660		**James Hardie Top Coat** Topping compound for flush finished jointing.	3kg Pail 304492 15kg Pail 304493
	**HardieDrive Screw s/s 316** 30mm x 7g. 100 per jar For fastening to timber frames.	300928		**Villadrive Screw 6g x 30mm** For fastening to timber frames. 100/jar 5kg Collated/ 1000	 300992 300993 300994

Table 10

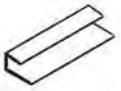
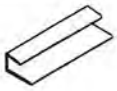
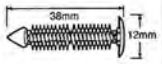
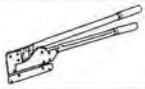
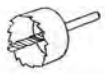
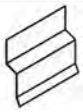
HardieFlex™ Eaves Lining And Hardiesoffit™ Lining – Accessories / Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Silkline PVC 2-way Jointer** 2400 long, uPVC / White	300915		**Hardiejointer 5mm** uPVC / White 2400 long 750 long 600 long 450 long	 300729 300921 300920 300919
	**6mm Hardiejointer** uPVC/Bone colour 2400 long 3000 long	 300730 300734		**HardieFlex 5mm Capping Mould** 2400 long, uPVC / White	300538
	**6mm Capping Mould** uPVC/Bone colour 2400 long 3000 long	 300539 300540		**Scotia Mould (base and cap)** 2400 long, uPVC / White	300916
	**Fastfix Fasteners** 38 x 12mm, Nylon / White	300632		**Inseal 3259** 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767

Table 11

Components Not Supplied by James Hardie

James Hardie recommends the following products for use in conjunction with its eaves and soffit linings. James Hardie does not supply these products. Please contact component manufacturer for information on their warranties and further information on their products.

Accessories	Description	Accessories	Description
	**HardieFlex Nail** 40 x 2.8mm galvanised or stainless steel nails.		**Second Coat Trowel 200mm** For installing second coats on set joints on Villaboard Lining.
	Rondo P35 Control joint used in movement joints.		**Finishing Coat Trowel** For installing top coats on set joints on Villaboard Lining.
	**Perforated Paper Tape** Joint reinforcing tape.		**Corner Tool** For setting of internal corners on Villaboard Lining.
	**Level/straight Edge** For checking straightness of frame.		**Hawk** To assist in the application of finishing compounds especially with the use of trowels.
	**Hand Guillotine** Guillotine for cutting fibre cement.		**Hand Sander** For sanding set joints on Villaboard Lining.
	**Collated Screw Gun**		**Notched Trowel** For applying tile adhesive to face of Villaboard Lining.
	**Hole Saw**		**Broadknife 150mm** For setting of joints on Villaboard Lining.
	**Electric shear/Fibreshear** For cutting Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining, HardieFlex Eaves Lining.		**Flashing to Table 20 'E2/AS1'** Flashing fabricator
	**Flashing Tape** Proprietary tape to adhere to building wrap. Tyvek, Protecto wrap or similar		**Flexible Joint Sealant** Tube Sikaflex MS or similar
	**Masking Tape** 3M Scotch™ Blue painters tape 2090 or Sellotape 5855 Long Life		**Paperback Corners** 'Goldline' corner moulds
	**Polyurethane Tape**		**Adhesive Sealant** Sikaflex-11FC by Sika Seal N Flex-1 by Bostik
	**Acrylic Paint** Dulux X10 or similar brand		**Waterproofing Admixture** Multiplast Resin by Plaster Systems. Used in diluted form over Villaboard Lining sheet edges to control moisture suction before flush stopping.

2 Safe working practices

WARNING - DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

James Hardie products contain respirable crystalline silica which is considered by some international authorities to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. During installation or handling: (1) work in outdoor areas with ample ventilation; (2) minimise dust when cutting by using either 'Score and Snap' knife, fibre cement shears or, where not feasible, use a HardieBlade™ Saw Blade and dust-reducing circular saw attached to a HEPA vacuum; (3) warn others in the immediate area to avoid breathing dust; (4) wear a properly-fitted, approved dust mask or respirator (e.g. P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures. During clean-up, use HEPA vacuums or wet cleanup methods – never dry sweep. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

James Hardie recommended safe working practices

CUTTING OUTDOORS

1. Position cutting station so that wind will blow dust away from user or others in working area.
2. Use one of the following methods based on the required cutting rate:

BEST
- Score and snap
- Hand guillotine
- Fibreshear

BETTER
- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and HEPA vacuum extraction.

GOOD
- Dust reducing circular saw equipped with HardieBlade™ Saw Blade

CUTTING INDOORS

- Cut only using score and snap, hand guillotine or fibreshears (manual, electric or pneumatic).
- Position cutting station in well-ventilated area

SANDING/REBATING/DRILLING/OTHER MACHINING

When sanding/rebating/drilling/machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.

IMPORTANT NOTES:

1. For maximum protection (lowest respirable dust production), James Hardie recommends always using "Best" – level cutting methods where feasible
2. NEVER use a power saw indoors
3. NEVER use a circular saw blade that does not carry the HardieBlade™ logo
4. NEVER dry sweep – Use wet suppression or HEPA Vacuum
5. NEVER use grinders
6. Always follow tool manufacturer's safety recommendations

P1 or P2 respirators can be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.co.nz to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

3 Framing

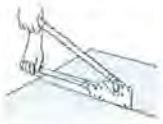
Working instructions
Refer to recommended Safe Working Practices before starting any cutting or machining of product.

Score and Snap
Score and Snap is a fast and efficient method of cutting the product using special tungsten tipped Score and Snap knife.



Preferably score on the face side of the product. Score against a straight edge and repeat the action to obtain adequate depth for clean break – normally 1/3 of sheet thickness. Snap upwards to achieve break. Smooth any rough edges with a rasp.

Hand Guillotine
Make guillotine cut on the off-cut side of line to allow for the thickness of the blade.



Fibreshear Heavy Duty
An electrically powered, fast, clean and effortless way of cutting James Hardie building products, especially around curves such as archways. Make Fibreshear cut on the "off-cut" side of the line to allow for the thickness of the shear.



HardieBlade™ Saw Blade
The HardieBlade Saw Blade used with a dust-reducing and HEPA vacuum extraction allows for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



Hole-Forming
For smooth clean cut circular holes:
Mark the centre of the hole on the sheet. Pre-drill a pilot hole. Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:
Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face. Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.



Storage and Handling
All James Hardie building products should be stored to avoid damage, with edges and corners of the sheets protected from chipping. James Hardie building products must be installed in a dry state and be protected from rain during transport and storage. The product must be laid flat under cover on a smooth level surface clear of the ground to avoid exposure to water or moisture, etc.

Quality
James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

3.1 TIMBER FRAME

Timber framing must be in accordance with NZS 3604 Timber Frame Buildings.

Specific design to NZS 3603 and AS/NZS 1170 can also be undertaken providing that:

- the framing centres do not exceed those given in this specification
- the framing member widths conform to this specification.

Also refer to the Approved Document for NZBC Clause B2 'Durability' and NZS 3602 (Timber and Wood-Based Products for use in Buildings) regarding timber treatment requirements and allowable moisture contents in timber for various components of the building. Also refer to the framing manufacturer's literature for further guidance on the use of treated timber.

3.2 STEEL FRAME

The figures in this brochure are drawn for timber framing. However, steel framing and furring channels can also be used.

All metal framing centres are to be the same as specified for timber frame in this manual.

Steel framing members must be fabricated from light-gauge sheet steel 0.55mm thick minimum to 1.6mm maximum. If heavier sections are used difficulties may be experienced in fixing the self-drilling, self-tapping fasteners. Refer to specific details for the minimum flange width requirements.

Sheets must not be fixed directly to drawn steel or hot-rolled steel sections. These must first be battened out with ex 50mm-thick (40mm minimum) timber battens or light-gauge metal furring channels.

Screw-fix 6mm or thicker sheets only.

Screw fixings can be finished flush or sunk a maximum of 0.5mm below the sheet surface ready for filling.

NOTE: The fasteners must not be over driven as will reduce the holding capacity of the sheet.

3.3 FRAMING SET-OUT

For the framing set-out of 450mm and 600mm-wide soffit refer to Figure 1.

For the framing set-out of 750mm-wide soffits refer to Figure 2.

For the framing set-out of 900mm and 1200mm-wide soffit refer to Figure 3.

Pre-finished steel fascia/gutters

When pre-finished steel fascia/gutters are used the soffit edge must be supported 4mm min. into fascia recess, similar to Figure 27.

Ribbon board to be continuous for product fixing.

NOTE: Because of the limited fascia groove available with some metal fascias a supporting ribbon board will be required with fixings at 300mm centres maximum. Pre-finished soffits can distort due to surface tension when adequate edge support is not provided.

4 Installation

Table 12

Eaves Lining Framing Centres		
Eaves And Soffit Width (Mm)	**Wind Zone**	**Max. Soffit Bearer Centres (Mm)**
Up to 450	L, M	1200
	H, VH	900
451 - 600	L, M	1200
	H, VH	600
601 - 1200	L, M, H, VH, EH*	600

*HardieFlex Sheet 6mm or Villaboard Lining 6mm must be used in ' Wind Zone with soffit bearers maximum 600mm centres.

3.4 BATTEN REQUIREMENTS

Battens are required when sheets are fixed over:

- Gypsum board exceeding 20mm in thickness
- Softboard, polystyrene or similar
- Concrete, masonry block or brick.

Timber battening is to be a minimum of 35mm deep x 40mm wide to achieve adequate sheet nail penetration.

Steel battens must be minimum 0.55mm thick, 23mm deep and have a bearing surface of 38mm min. Battens must be galvanised to meet the durability requirements of the New Zealand Building Code (NZBC) and fixed to manufacturer's specifications. All battening centres and sheet fixing is to be strictly in accordance with the framing and fixing required by this manual. Care must be taken to ensure the battens are packed and aligned to give a true even face for the sheets to be fixed. Check the face of the battens with a long straight-edge before fixing sheets.

3.5 SKILLION ROOF DESIGN

When installing soffit linings direct to skillion roof framing ensure that sufficient ventilation has been provided within the roof space. The temperatures within these smaller roof spaces can reach extreme levels in certain conditions and this can cause cracking in flush stopped joints due to excessive movement in framing. The framing in skillion soffits and ceiling also need engineering design consideration. General design guide is to provide control joints at 4.8m x 3.6m in either direction when fixing to this type of framing.

For narrow strip soffits provide control joints at 4.8m centres.

This installation manual covers the use of James Hardie Eaves and Soffits for buildings within the scope of NZS 3604. For all other buildings specific engineering design is required.

Figure 1: Eaves and soffits 450mm, 600mm wide

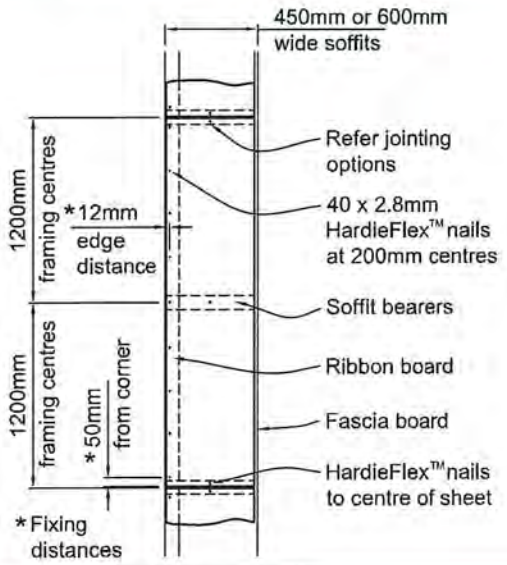
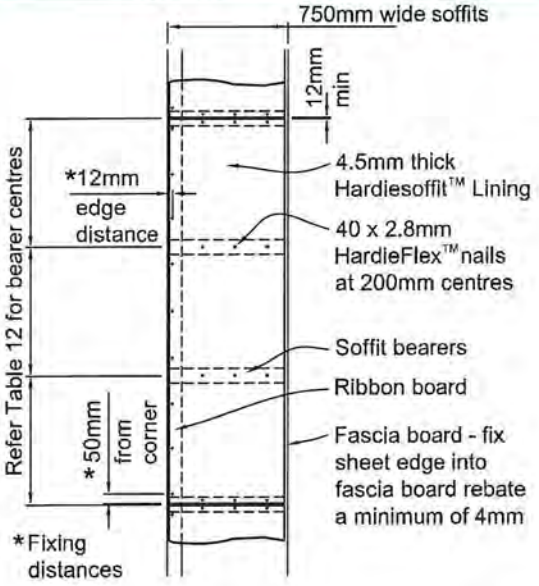


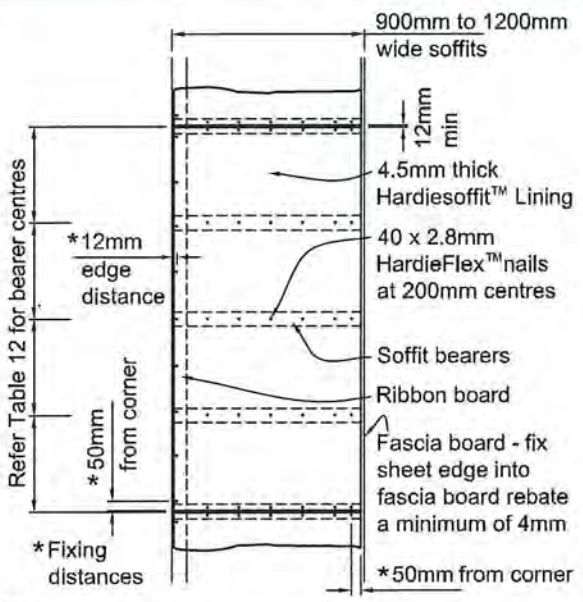
Figure 2: Eaves and soffits 750mm wide



Notes

1. HardieFlex™ nails are the usual fixing method for Hardiesoffit™ Lining. The Fastfix method can also be used as an alternative.
2. When Fastfix fastenings are used refer to Table 7 and Figure 25 and 27.

Figure 3: Eaves and soffits 900mm–1200mm wide



Notes
1. HardieFlex® nails are the usual fixing method for Hardiesoffit® Lining. The Fastfix method can also be used as an alternative.
2. When Fastfix fastenings are used refer to Table 7 and Figure 25 and 27.

4.1 GENERAL

Refer to Table 12 and Figure 1, 2 and 3 regarding nail fixing centres, for framing and types of fasteners.

The eaves/soffits must be sealed against claddings to minimise moisture ingress behind the claddings. The roof must have been installed before installing the soffits linings. Where the soffits are sloping upwards away from the wall, a mechanical flashing must be provided in the soffit to wall junction. The flashing is fixed under soffit lining and laps over the face of cladding by 35mm min. Refer to Figure 18.

4.1.1 DRIP EDGE

All soffit linings must either be installed with a grooved fascia, refer Figure 13, or with exterior cladding which forms a drip edge below the soffit lining by 15mm min. Soffit linings are generally fitted into the recess formed in fascia board to form the drip edge.

4.1.2 STRUCTURAL CEILING DIAPHRAGMS

HardieFlex Eaves Lining and Villaboard Soffit Lining are suitable for use in structural ceiling diaphragms as per NZS 3604.
Refer to the James Hardie Bracing Design Manual.

4.1.3 CURVED APPLICATIONS

HardieFlex Eaves Lining and Villaboard Soffit Lining can be used for curved applications.

The minimum bending radii are shown below.

Table 13

Curved Wall Minimum Bending Radii		
	Along length (mm)	**Across width (mm)**
9mm Villaboard Lining	3000	4000
6mm Villaboard Lining	1800	2400
HardieFlex Eaves Lining	1800	2400
Hardiesoffit Lining	1800	2400

NOTE: The bending radii given above require no special pre-wetting of the sheet. Mechanical fix at 200mm centres maximum.

To maintain the smoothness of the curve, ceiling battens are generally required at spacings as shown below.

Table 14

Curved Lining – Soffit Batten Spacing	
Range of Radii (mm)	**Soffit batten spacing (mm)**
1800	200
Above 1801 to 3000	300
Above 3001	400

4.1.4 FASTFIX FASTENERS

Fastfix fasteners (38mm long) can be used as an alternative fixing for prefinished soffit and ceiling systems in conjunction with adhesives. Drill a 6mm-diameter hole through the sheet and framing to insert the Fastfix fastener. In timber the hole must be 40mm deep.

4.1.5 MASKING TAPE

The recommended masking tape for use with Silkline Soffit Lining and Eclipsa Eaves Lining is 3M Scotch Blue painters tape 2090 or Sellotape 5855 longlife. This tape can only be left on the Silkline Soffit Lining or Eclipsa Eaves Lining for maximum 7 days, otherwise tape removal may cause paint loss.

4.1.6 FIRE RATED SOFFITS

A fire rating of 30 or 60 minutes can be achieved in a soffit when using 6mm or 9mm Villaboard Soffit Lining or 6mm or 7.5mm HardieFlex Sheet when James Hardie FRR wall systems are used. For full details refer to the James Hardie Fire and Acoustic Design Manual or Ask James Hardie on 0800 808 868.

4.2 FASTENER DURABILITY

Fasteners used in external applications must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing's material to be used in relation to the exposure conditions and are summarised in Table 15.

Table 15

Exposure conditions and nail selection prescribed by NZS 3604		
Zone / Nail Material		
Zone D*	Zone C outside sea spray zone and Zone B and geothermal hot spots	Bracing — All zones
Grade 316 Stainless	Hot-dipped galvanised or 316 stainless	Grade 316 Stainless

*(Zone C areas where local knowledge dictates that increased durability is required, appropriate selection shall be made)

When using screws to fix into steel framing a minimum class-3 coated screw must be used.

4.3 HARDIESOFFIT LINING

For framing and fixing schedules refer to Section 3.

All sheet edges are to be supported by framing or a fascia board. Fixings are to be at 200mm centres to all framing (refer Figures 1 and 2).

Hardiesoffit Lining up to a max. width of 600mm can be jointed up to a maximum 150mm off the ceiling/soffit batten when using uPVC jointers.

NOTES

1. Use of 6mm thick sheets will minimise the deflection and enhance the impact resistance.
2. Sheets can be jointed as per Section 4.
3. Do not screw fix 4.5mm thick sheets.

4.4 HARDIEFLEX EAVES LINING

For framing and fixing schedules refer to Section 3.

All sheet edges are to be supported by framing or a fascia board. Fixings are to be at 200mm centres to all framing (refer Figures1 and 2).

NOTES

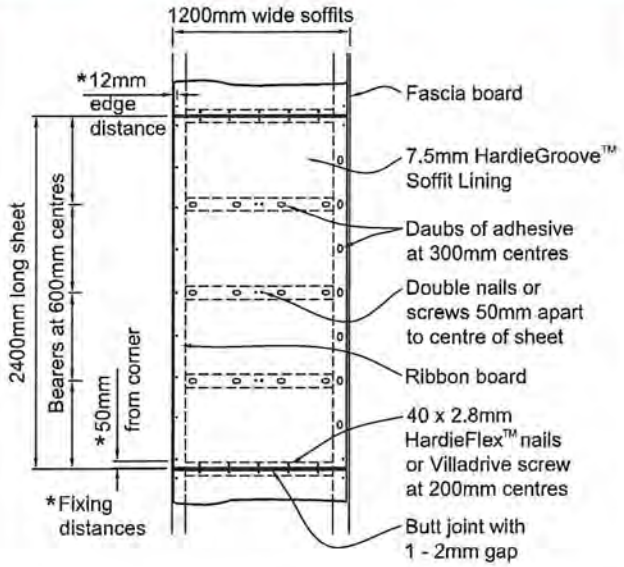
1. Use of 6mm thick sheets will minimise the deflection and enhance the impact resistance.
2. Sheets can be jointed as per Section 4.
3. Do not screw fix 4.5mm thick sheets.

4.5 HARDIEGROOVE SOFFIT LINING FIXING METHOD

For framing and fixing schedules refer to Section 3.
The recommended fixing methods are combined nail and adhesive or screw and adhesive. However, screw or nail fixing only is an option. (Refer Figure 4).

To achieve a concealed joint, butt the long edges together (half-grooved). (Refer Figure 5).

Figure 4: Nail or screw and adhesive fixing



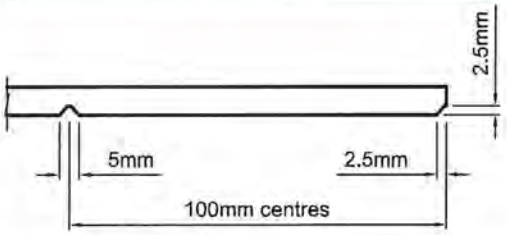
NOTES

1. Do not place nails or screws within 100mm of the adhesive daubs.
2. Suitable fixings are HardieDrive stainless steel 30mm x 7g wood screws, HardieFlex galvanised nails 40 x 2.8mm and 316 stainless steel nails 40 x 2.8mm.
3. Use only stainless steel fixings in sea spray zones.
4. When butt jointing short ends of HardieGroove Lining in ceiling/soffit applications, the short edges must be cut square and have chamfer formed.

Nails must be finished flush with the sheet surface. Screw heads can be finished 1-2mm below the sheet surface and stopped.

In steel framing the fasteners should be driven as close as possible to the stud corners to avoid deflection of the stud flange.

Figure 5: Sheet edge and groove detail



Note: Sheets are grooved along the length of the sheet.

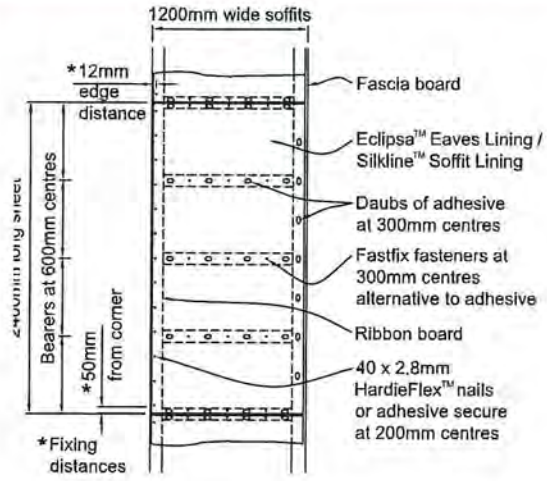
4.5.1 FINISHING

Once the sheets are in place, fill over all driven fixings with James Hardie Base Coat to the required level of finish.

4.6 ECLIPSA EAVES LINING AND SILKLINE SOFFIT LINING

- Eclipsa Eaves Lining/Silkline Soffit Lining are to be supported by bearers and fasteners at the maximum spacings specified for the 4.5mm sheets in Section 3, Table 12 and Figures 22, 25 and 26 of this manual
- To fix larger soffit, ceiling or verandah applications provide a perimeter frame to all sheet edges and intermediate nogging at the centres shown in Table 12.
- Fix the Eclipsa Eaves Lining/Silkline Soffit Lining into the fascia board groove then nail into the ribbon board at 300mm centres with 40 x 2.8mm HardieFlex nails. Ensure nails will be hidden by the scotia mould or timber scotia (refer Figure 27 and Figure 28).
- Use a 6mm-diameter masonry bit to drill holes and fix Fastfix fasteners (refer Figures 6 and 25).
- Eclipsa Eaves Lining/Silkline Soffit Lining up to a maximum 600mm width can be jointed up to a maximum 150mm off the ceiling/soffit batten when using uPVC jointers.

Figure 6: Fastfix fastener and adhesive fixing



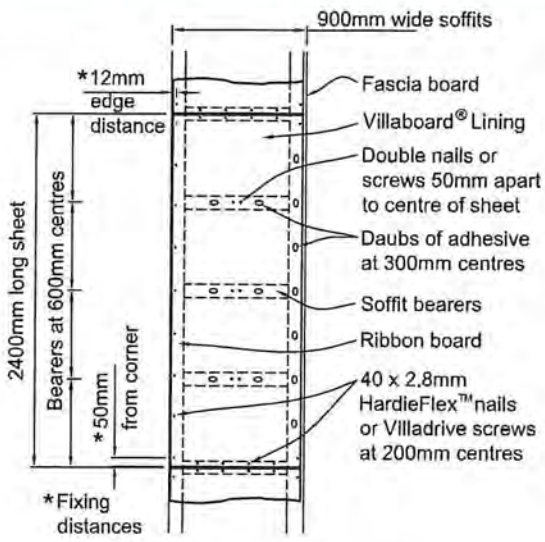
4.7 VILLABOARD SOFFIT LINING (SMALL SOFFITS)

Villaboard Lining 6mm-thick is used when a smooth sanded sheet is required to achieve a painted flush finish.

Refer to the framing fixing schedule Section 3 Table 12, Figures 1, 2 and 3, and finishing schedules on page 21.

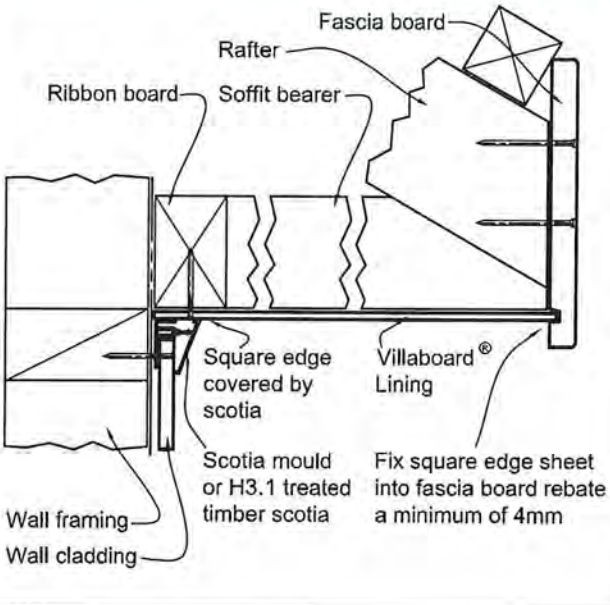
Refer to the flush jointing procedures, pages 21-24.

Figure 7: Nail/screw and adhesive fixed soffit



• Alternately sheets can be fixed with nails/screws only at 200mm c/c at sheet edges and 250mm c/c at intermediate framing.

Figure 8: Soffit cross section



4.7.1 CONTROL JOINTS

Control joints are required in long runs of Villaboard Lining soffits/ ceilings to accommodate structural movement. Control joints must also be provided where the soffits change in direction, change in level, where there is a construction joint in framing or where the soffits continue into passage ways etc. See Table 16 for maximum control joint spacing and Figure 9 for a typical control joint detail.

4.7.2 JOINTING OPTIONS

Villaboard Soffit Lining is suitable for:

- Flush-jointed narrow strip soffits around a building
- Flush-jointed ceilings over verandahs, porches and entryways to residential and small-scale commercial buildings
- Expressed, uPVC-jointed and sealant-filled joint ceilings where a smooth surface finish is required
- All edges to be supported by the framing.

Table 16

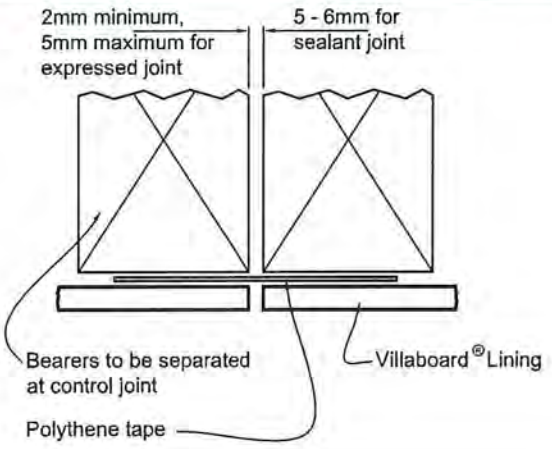
Maximum spacing for control joints (m)		
	STEEL FRAMING	TIMBER FRAMING
General	4.8	7.2

When these ceilings are wider than one sheet width the sheets can be fixed to the framing provided the control joints are placed to limit the bay size to 7.2m x 4.8m maximum.

4.7.3 NARROW-STRIP FLUSH-JOINTED SOFFITS AND CEILINGS

In these applications sheets must be jointed on the framing as shown in Figures 1, 2, 15 and 16. Control joints, as shown in Figure 9, must be located at a distance as specified in Table 16 above. Sheets must not be fixed to the bottom cord of roof trusses.

Figure 9: Control joint



NOTE

Refer Section 3.5 for skillion roof design.

4.7.4 VILLABOARD SOFFIT AND CEILING LINING (large areas)

For standard commercial soffits and ceilings, framing must be at 600mm maximum centres and 6mm thick Villaboard Soffit Lining can be used. For high-impact areas, heavy-use commercial areas, and high-wind areas, framing at 600mm maximum centres and 9mm thick Villaboard Soffit Lining should be used. Sheets must not be fixed to the bottom cord of roof trusses. Timber or steel ceiling battens must be fixed to the underside of the roof truss. Sheets must be laid in an offset pattern so that adjacent end joints do not coincide. Timber ceiling battens must comply with the requirements of NZS 3604 or the specific engineering design. Steel ceiling battens must be a minimum of 37mm wide x 23mm deep x 0.55mm thick and have a bearing surface of 37mm minimum. Battens must be galvanised steel (275 g/m2 zinc coating), have a suitable coating to meet the durability requirements and be fixed to the manufacturer's specifications. Refer to the flush-jointing and finishing procedures on pages 21-24.

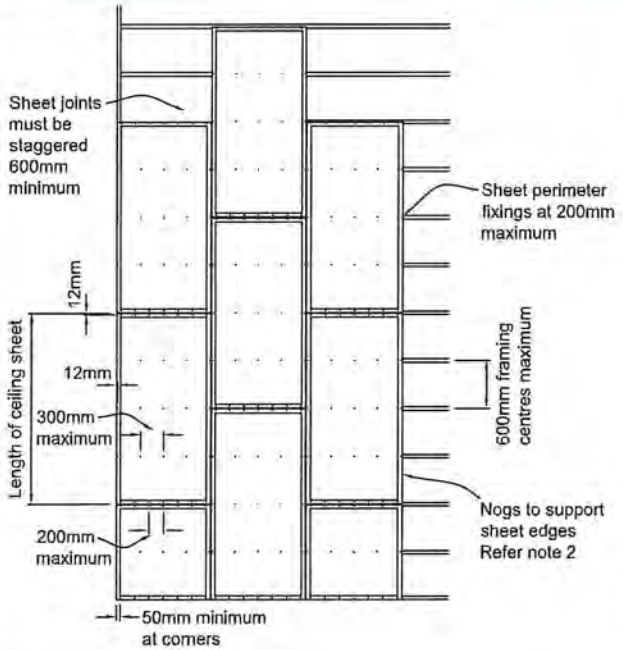
For specific engineering design projects consideration must be given to framing deflections expected due to loadings and appropriate selection of sheet jointing method must be made.

For skillion roof design refer to Clause 3.5 for further design consideration.

NOTE

1. It is recommended that flush stopping of joints is suitable when using recessed edge Villaboard Lining.
2. When nogs not installed for perimeter support, the unsupported sheet edges across the framing must be supported by back blocking using a 300 – 400mm wide Villaboard Lining strip adhered to rear face and centred between the framing.

Figure 10: Ceiling layout



4.7.5 CONTROL JOINTS

The ceilings must be divided into bays not exceeding 7.2 x 4.8m. To permit movement, control joints must be formed at the perimeter of each bay (refer Figures 11, 12, 13 and 14) and at the junction of large ceilings with narrow passage strips or where there is a change in direction (also refer Figures 12 and 13). Each bay must be independent of adjacent bays and the surrounding building structure. When the ceilings or soffits contain sloping areas then control joint centres must be reduced to coincide with the slope

change lines (refer Figure 14). Framing members (to which the sheet is fixed) must not continue across this control joint. Sheets shall be fixed across the ceiling joists or ceiling battens (refer Figures 15 and 16). Figures 12 and 13 show control joints with the battens running in the same direction as the sheet joint.

Figure 11: Control joint layout

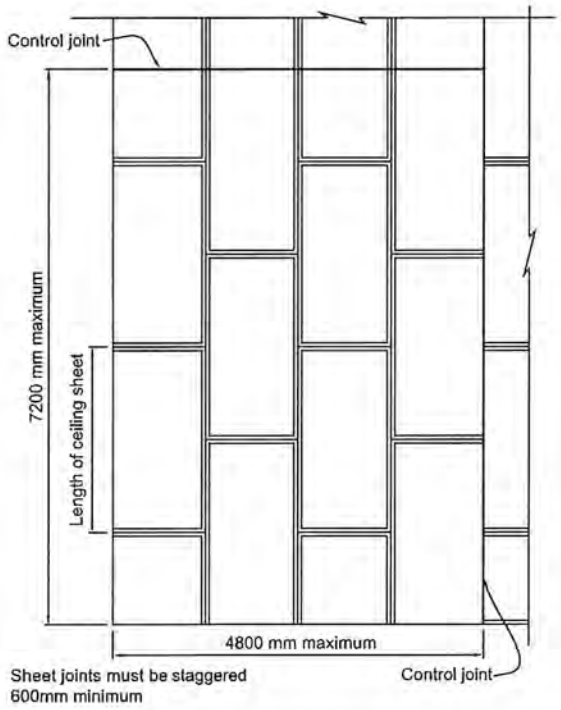


Figure 12: Steel ceiling batten control joint detail

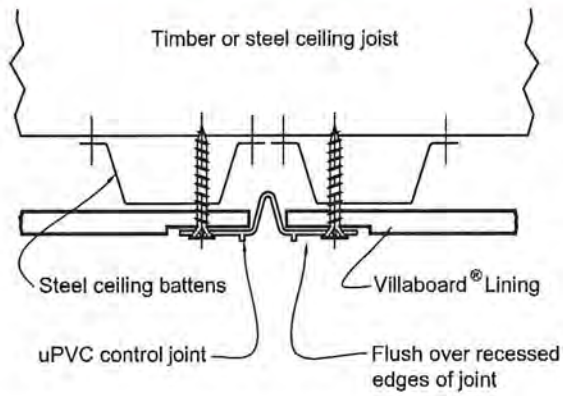


Figure 13: Timber control joint detail

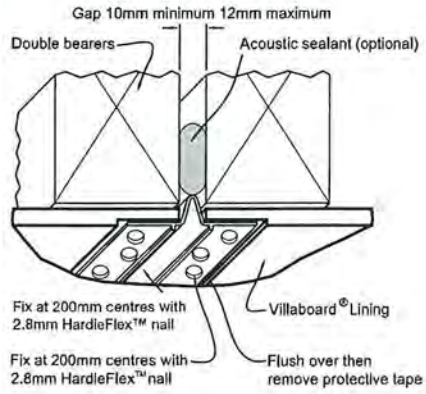
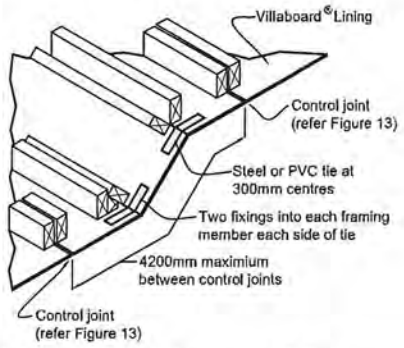


Figure 14: Directional changes to soffits and ceilings — control joint



Note: Tie fixings to be 40 x 2.8mm HardieFlex™ nails.

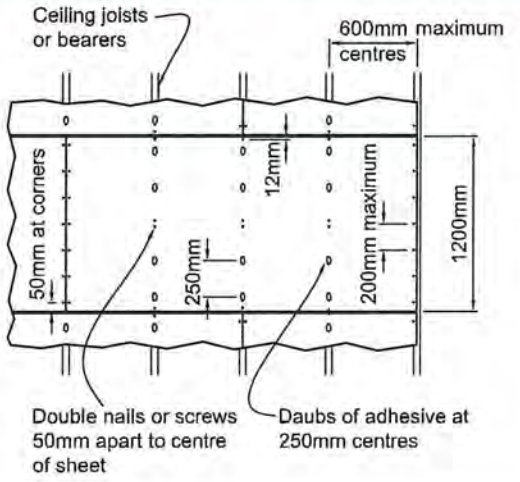
4.7.6 FIXING OPTION ONE

A smooth surface finish is obtained by minimising the visible sheet fixings. For painted finishes the combined nail or screw and adhesive method gives this superior finish (refer Figure 19).

Fix at 200mm centres down each sheet end with edge fixings in each joist or batten. Double-fix in the centre of each joist or batten (refer Figure 19). Do not place nails or screws within 100mm of adhesive daubs. Daubs of wallboard adhesive 25mm diameter and 15mm thick must be applied to the intermediate joists or battens at 250mm centres (refer Figure 19).

When nogs are not installed for perimeter support, the unsupported edges between ceiling joists or battens must be supported with back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centred between framing.

Figure 15: Nail or screw and adhesive fixing



NOTES

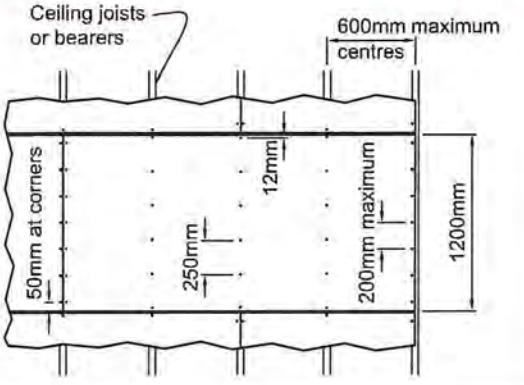
1. All surfaces to receive adhesive must be clean, free of dust, oil etc.
2. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.

4.7.7 FIXING OPTION TWO

For an alternative nail or screw-fixing method, fasteners are to be driven along the sheet perimeter at 200mm centres and along intermediate ceiling battens at 250mm centres (refer Figure 16).

When nogs are not installed for perimeter support, the unsupported edges between ceiling joists or battens must be supported with back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centred between framing.

Figure 16: Nail or screw



4.7.8 COLUMN OR WALL ABUTMENTS

Soffit sheeting must be free to move independently from the building element it abuts with. This is critical for flush-jointed sheeting, otherwise cracking at the joint may occur.

4.7.9 BULKHEAD IN SOFFITS

The bulkhead made in soffits is generally used to carry the services through them and they can be lined with Villaboard Soffit Lining. The box framing provided must be rigid enough to carry its weight and/or services. It must provide support to all sheet edges and joints. The external/internal corner of a bulkhead can either be stopped using a James Hardie PVC corner mould or a 'proprietary paper faced rigid spine'* corner mould.

**Paper faced rigid spine corner mould is generally available in the market.*

4.7.10 SQUARE-EDGE VILLABOARD LINING CEILINGS AND SOFFITS

Square-edge Villaboard Lining is used for butt-joint; expressed-joint or uPVC-jointed ceilings.

4.8 TITAN FACADE PANEL

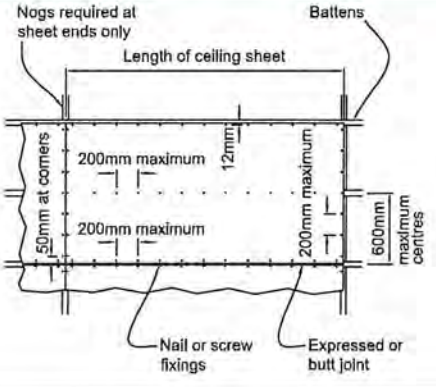
May be used as soffit with expressed joint when istalled as per Figure 23 and fixings as per Villaboard Soffit Lining.

4.9 INTERNAL SWIMMING POOL APPLICATION

For fixing Villaboard Lining and HardieGroove Lining in internal swimming pool areas;

- The sheets must be back and edge sealed before installation.
- When fixing Villaboard Lining to the ceiling under a skillion roof, roof ventilation must be considered to minimise thermal movement and sheet joint cracking.
- All Villaboard Lining recessed sheet joints must be stopped. Alternatively, when using square edge Villaboard Lining, the sheet joint must be butted over an Inseal 3259 tape with an appropriate flexible sealant in the 1mm joint.
- All HardieGroove Lining joints must have continuous bead of sealant applied to edge of sheet before butting together. Only stainless steel fasteners must be used.
- Full perimeter fixing required.
- In addition, it is recommended that H3.1 treated timber ceiling battens are used to resist decay due to higher condensation levels present in this area.

Figure 17: Sheets laid along ceiling joints (expressed or butt joints)



4.10 SPECIAL DETAILS

Figure 18: Sloping soffit and wall junction

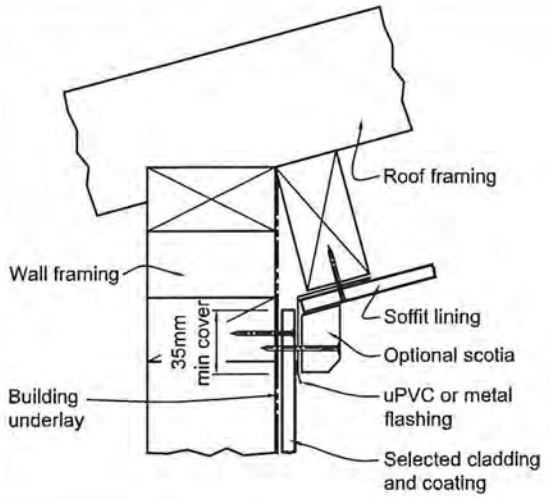


Figure 19: Gable elevation

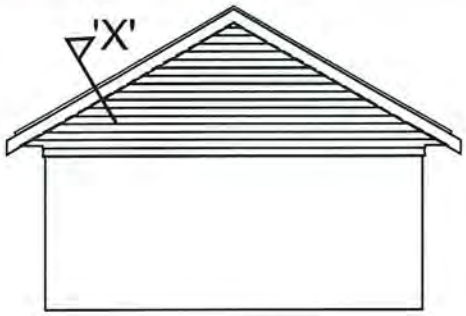
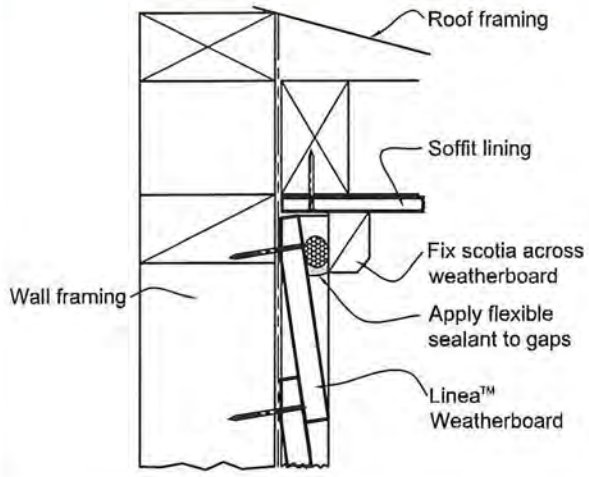


Figure 20: Sloping soffit to weatherboard cladding junction (Section 'X')



- All soffit lining sheet edges must be supported by framing and/or a fascia board.

HARDIEFLEX EAVES LINING

- Refer to Figure 22 for uPVC Hardiejointer detail
- Refer to Figure 23 for express joint detail
- Refer to Figure 24 for butt joint detail
- Refer to Figure 26 for two-way uPVC jointer

HARDIEGROOVE SOFFIT LINING

- Sheets have half groove along the long edges for butt jointing
- Sheets to have chamfer formed on site along the short edge for butt jointing

HARDIESOFFIT LINING

- Refer to Figure 22 for uPVC Hardiejointer detail
- Refer to Figure 23 for express joint detail
- Refer to Figure 26 for two-way uPVC jointer

ECLIPSA EAVES LINING

- Refer to Figure 22 for uPVC Hardiejointer detail
- Refer to Figure 25 for Fastfix Fasteners fixing detail. Use a 6mm diameter masonry drill bit to drill a hole and fix fasteners
- Refer to Figure 26 for Two-way uPVC Jointer

SILKLINE SOFFIT LINING

- Refer to Figure 22 for uPVC Hardiejointer detail
- Refer to Figure 25 for Fastfix Fasteners fixing detail. Use a 6mm diameter masonry drill bit to drill a hole and fix fasteners
- Refer to Figure 9 for two-way uPVC jointer

VILLABOARD SOFFIT LINING

- Refer to Figure 21 for flush joint details. Refer to Section 5.5 for flush jointing
- Refer to Figure 22 for uPVC Hardiejointer detail
- Refer to Figure 23 for express joint detail
- Refer to Figure 24 for butt joint detail

Figure 21: Vertical flush joint setout

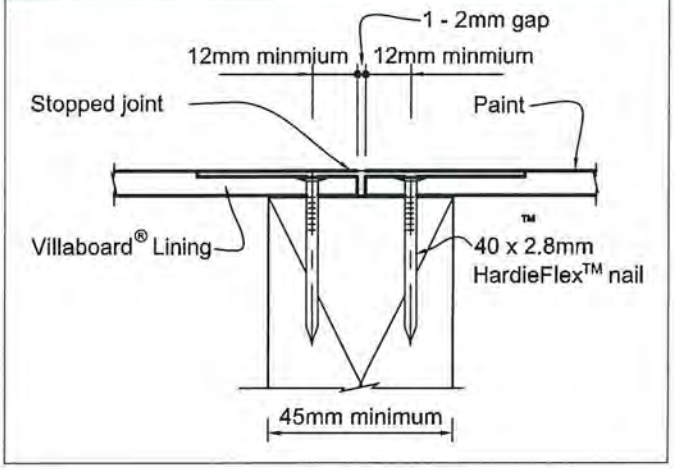


Figure 22: uPVC Hardiejointer detail

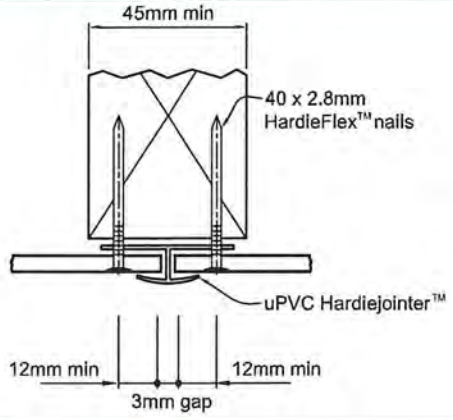


Figure 23: Expressed joint detail

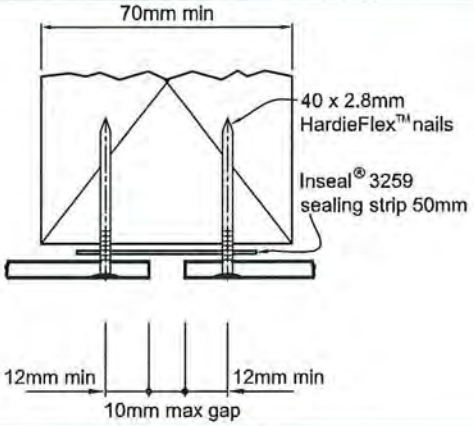


Figure 24: Butt joint detail

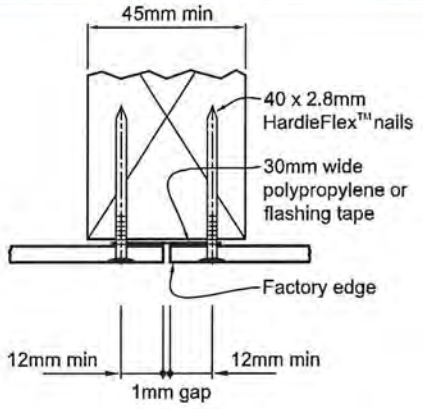


Figure 25: Fastfix fastener fixing detail

Note: Use a 6mm diameter masonry drill bit for drilling holes in sheet for fixing Fastfix fasteners.

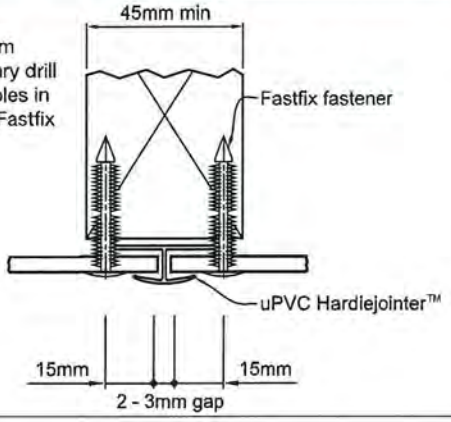


Figure 26: Two-way uPVC jointer

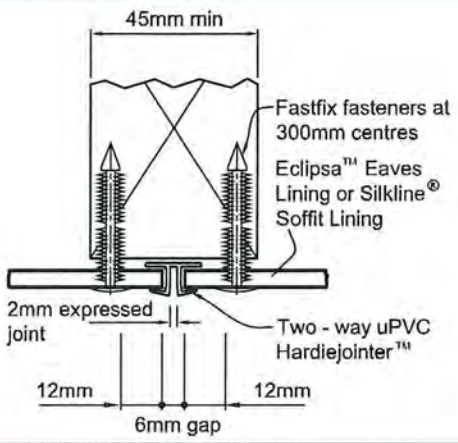


Figure 27: Cladding detail with scotia mould

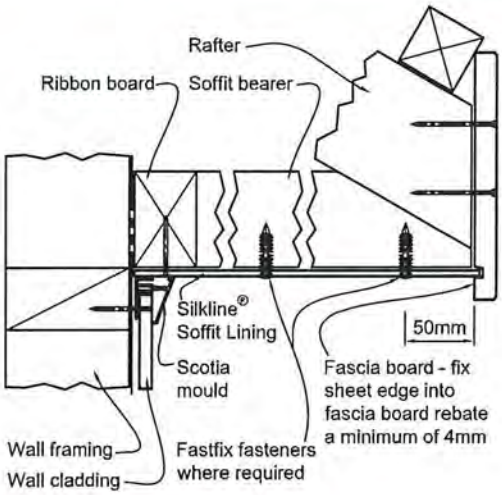
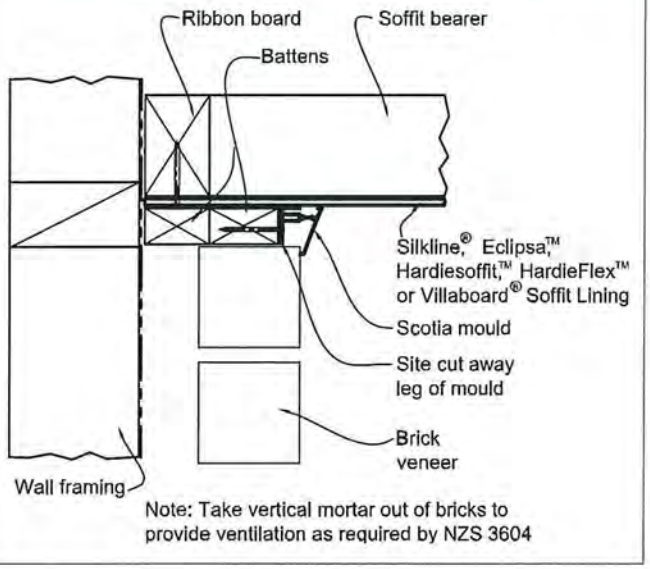


Figure 28: Brick veneer detail with scotia mould



Note: Take vertical mortar out of bricks to provide ventilation as required by NZS 3604

6 JOINTING AND FINISHING

FOR VILLABOARD LINING

6.1 GENERAL

Villaboard Soffit Lining is finished with paint complying with parts 7, 8, 9 and 10 of AS 3730. The application and maintenance must be in accordance with the manufacturer's specifications.

NOTE: Before flush stopping sheet edges must be sealed with Multiplast resin, water proofing admixture or other similar products.

6.2 GLANCING LIGHT

In some instances, due to glancing light, set joints may be noticeable in Villaboard Lining walls, especially where paint finishes have a high gloss level. Work closely with your builder or designer to minimise this.

Artificial lighting needs to be considered in relation to soffits.

Where glancing light is an issue its effect can be lessened by:

- Artificial light shading devices.
- The use of light coloured, matt finish paints.

6.3 LEVEL OF FINISHES

Different levels of finishes are typically specified for different applications. Higher levels of finishes are used to address the glancing light issues with painted Villaboard Soffit Lining referred to above. A description of the various levels of finishes and the jointing/coating requirements can be found in Table 17.

Table 17

Levels of Finishes			
Level of finish	**Definition***	**Typical jointing/setting**	**Finish**
0	This level of finish may be useful in temporary construction.	No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/nailing sheets in place.	For use in areas where finishing and stopping is not considered necessary.
1	For use in plenum areas above ceilings, in areas where the work would generally be concealed, or in building service corridors and other areas not normally open to public view.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape.	Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.
2	For use in warehouse, storage or other areas where surface appearance is not of primary concern.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	Minor tool marks and ridges are generally acceptable.
3	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall paper coverings are to be applied as the final decoration. This level of finish is not generally suitable where smooth painted surfaces or light to medium wall coverings are specified.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	This level of finish must be sufficiently smooth to accept heavy vinyl, tiles or textured coatings without blemishes.
4	This is generally the accepted level of finish for domestic construction. It is used where light textures or wall coverings and smooth textured finishes and satin/flat/low sheen paints are illuminated by non-critical lighting.	Refer to flush jointing recommendations on page 22. All joints and corner joints will have tape embedded in James Hardie Base Coat applied over all joints, angles, fastener heads and accessories. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	For use where light-texture coatings or wallpaper or other lightweight wall coverings are to be applied. For painted finishes in non-critical lighting areas flat and low-sheen textured paints are to be applied. Gloss and semi-gloss paints are not generally suitable over this level of finish as any minor blemish will show under critical light. The weight, texture and sheen level or wall coverings applied over this level of finish must be carefully evaluated. Joints and fasteners must be adequately concealed if the wall-covering material is lightweight, contains limited pattern, has a gloss finish, or any combination of these features is present. Unbacked vinyl wall coverings are not suitable over this level of finish.
5	This level of finish is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheet paints.	Refer to page 23 steps 1–4 for jointing. Final James Hardie Base Coat application should be feathered out to approximately 200mm + each side of the joint. Then a full skim coat of James Hardie Top Coat must be applied over entire sheet surface in order to achieve a uniform finish. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	This level of finish is for use where gloss, semi-gloss, low-sheen or non-textured paints are specified or where critical lighting conditions occur.

*Reference: AS/NZS 2589.1: 'Gypsum lining in residential and light commercial construction — Application and finishing. Part 1: Gypsum plasterboard'

6.4 PAINT FINISHES

Prior to application of paint finishes, remove any residual sanding dust and ensure the surface is suitable for paint application.

Always follow the paint manufacturer's recommendations for paint suitability, mixing and application.

NOTES

1. Use of a 'sealer coat' or 'preparation undercoat' is recommended.
2. Do not tile ceilings.

6.5 VILLABOARD SOFFIT LINING JOINTING AND STOPPING

aboard Soffit Lining joints are set with James Hardie jointing compounds reinforced with perforated paper tape. Recessed edge sheet joints require joint setting by using the jointing products outlined. The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanship applied. However, James Hardie considers that the recommendations provided in Table 17 describe best practice to reduce the risk of joint cracking or other problems. There are various factors that can affect the performance of jointing compounds on edge recessed fibre cement substrates. These factors include the framing, movement, installation quality, vibrations, moisture, humidity, temperature, etc. To achieve satisfactory joint performance these factors need to be carefully considered and understood by the installer and designer when positioning joints and selecting jointing compounds. Furthermore, it is important that the jointing compound used has the physical attributes required to perform considering these factors. James Hardie compounds have been specifically developed for use with Villaboard Soffit Lining.

addition, provision for movement needs to be made by the installation of control joints. See page 16.

COMPOUND COVERAGE

1kg of Base Coat will provide approximately 5 lm of standard joints.

1kg of Top Coat will provide approximately 5.6 lm of standard joints.

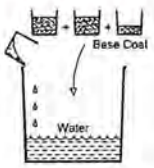
NOTE

Follow the mixing instructions carefully when mixing James Hardie Base Coat and Top Coat.

MIXING INSTRUCTIONS

Table 18

James Hardie Base Coat Mixing Instructions



Step 1

First, add 1 part of clean water into bucket.

Then add 2½ parts James Hardie Base Coat powder

Allow to soak for 1 minute.



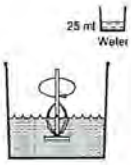


Step 2

Mix for 1½ – 2 minutes using paint mixer or equivalent. (approximately 2500-3000rpm)

James Hardie Base Coat is NOT like the plaster based compounds. Initial mixing will indicate a dry mix and further mixing **WITHOUT** further addition of water will deliver the ideal workable paste.

Warning: Inadequate or over mixing can lead to poor workability and can cause performance issues. **Do not hand mix.**



Step 3

The mix at this stage should be consistently smooth.

Based on the environmental conditions (i.e. temperature and humidity) you may add maximum of 25ml of water per 1Kg of base coat powder in the mix at this stage to adjust workability. Mix it well.

(Note: Adding excess water than the recommendation may delay the drying of base coat and may cause joint cracking due to excessive shrinkage.)

Mix should be glossy and smooth. There should be no lumps in the mix.

Important Notes:

1. Do not apply James Hardie Base Coat in temperatures above 40° C or below 5° C.
2. Allow the compounds to dry before applying the next coat. The drying time will vary between 12 to 24 hours depending upon the weather conditions.
3. Site cut and site recessed sheet edges must be sealed with an acrylic sealer e.g. Dulux Acraprime 501/1, Dulux Primercryl or similar product.
4. In corners, use James Hardie uPVC internal/external corner mould primed with Dulux Primerlock or similar. A 'GIB® Goldline™ Platinum' corner mould can also be used.
5. Use only perforated paper tapes in straight joints.
6. It is recommended that one (1) base coat bag is mixed in three (3) portions.
7. Before stopping the sheet edges, Multiplast Resin or a similar product in diluted form must be applied over the sheet edges. Mix the resin as per the manufacturers recommendations.

Product Life:

James Hardie Base Coat has a shelf life of 12 months in unopened bags when stored in a cool dry place.

James Hardie Base Coat has a bag life of 1 month if opened bags are resealed and stored in a cool dry place.

6.6 SET JOINTS

Step 1 — Preparation

Ensure that the recesses are clean and free of dust and contaminants. Sheet edges must be sealed with Multiplast resin, water proofing admixture or other similar products. If working conditions are hot and dry, dampen the area around the joint prior to working.

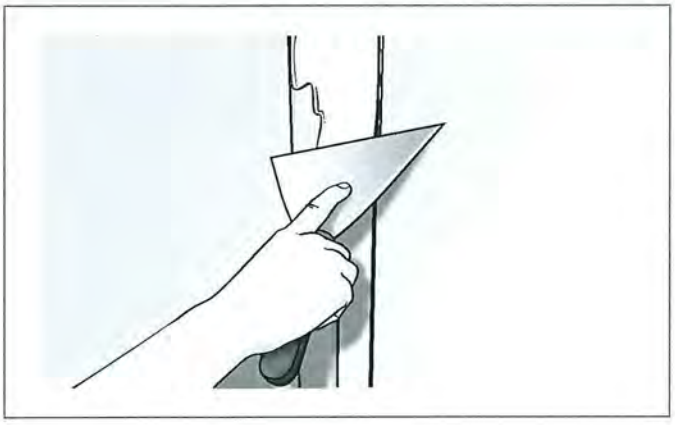


NOTE

The jointing method shown below provides a Level 4 finish. For more information about this and other finishes refer to page 21.

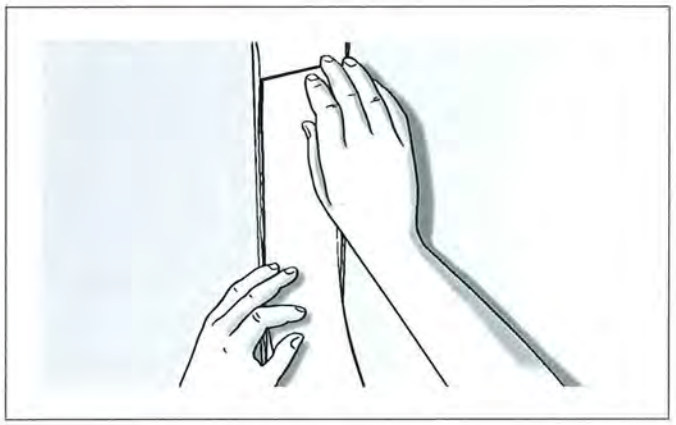
Step 2 — First Coat

Apply James Hardie Base Coat to fill the recess with a 150mm broad knife.



Step 3 — Embed Tape

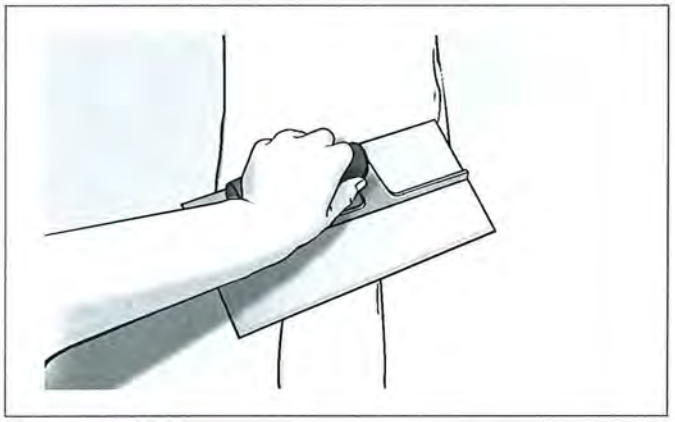
Firmly embed the perforated paper tape centrally into the joint using a 50mm broad knife. Ensure that there are no voids under the tape and remove excess compounds.





Step 4 — Thin Layer

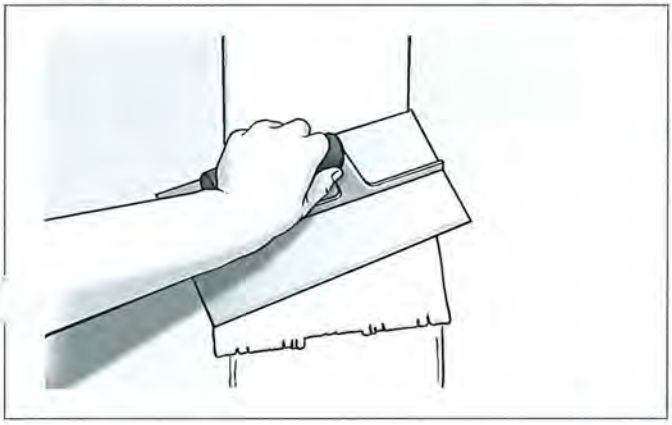
Immediately cover tape with a thin layer of James Hardie Base Coat applied with a 150mm broadknife.



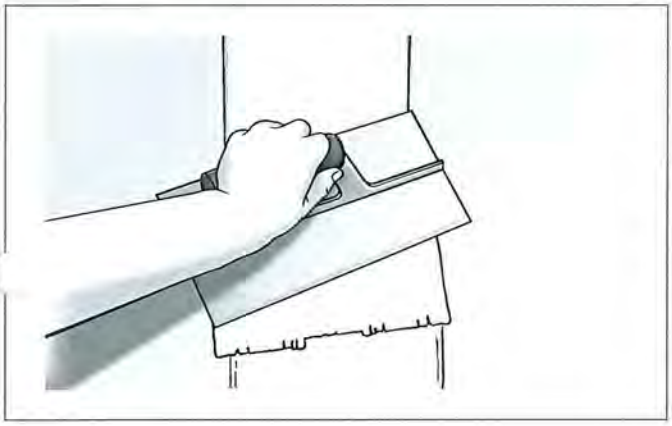
NOTE

Steps 5, 6 and 7 are only required for paint and wall paper finish.

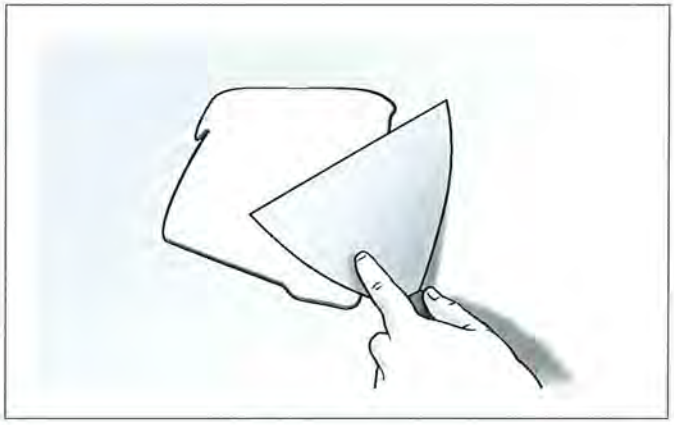
Step 5 — Second Coat
When the first coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Base Coat. Apply this coat approximately 180mm wide, laid down over the recess and feather the edges.



Step 6 — Finishing Coat
Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of James Hardie Top Coat 280mm wide centrally over the joint and feather out the edges. Allow to dry fully before sanding. Sand with a 180 grit sand paper to achieve a smooth finish for painting.



Step 7 — Fastener Heads
Apply a finishing coat of James Hardie Base Coat to fastener heads, feathering out the edges. Allow to fully dry before sanding.



6.7 PAINTING

Hardiesoffit Lining, HardieFlex Eaves Lining, Villaboard Soffit Lining and HardieGroove Soffit Lining sheets are to have a minimum of two coats of acrylic paint applied after fixing in order to meet the requirements of the NZBC. All sheets must be coated within 3 months of installation.

Use quality 100% acrylic paints. Economy paints are not recommended because generally they are less well bound, less moisture resistant and more prone to mould growth.

In all cases the manufacturer's specification for the selected paint must be followed. Note that some paints require an undercoat before applying finish coats.

Damp, shady situations, proximity to bush, agricultural paddocks or seaspray environments may induce an extra tendency to mould growth. Use mould-inhibiting and alkaline-resistant undercoats and consult the paint manufacturer for details of maximum mould-resistant paints.

Before painting, remove any surface grime or other contaminants and ensure the Hardiesoffit Lining, HardieFlex Eaves Lining, Villaboard Soffit Lining and HardieGroove Soffit Lining is dry. Paint must not be applied when the air temperature is below 10°C.

When using uPVC moulds avoid dark colours (paints must have light reflection of 40% or more) as excessive movement may cause buckling of the uPVC when exposed to direct sunlight.

Enamel-based paints can be used, utilising a three-coat system.

For full details apply to the selected paint manufacturer before commencing the work.

7 Product information

7.1 GENERAL

Eclipsa Eaves Lining, Silkline Soffit Lining, Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining are a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre and water.

Eclipsa Eaves Lining, Silkline Soffit Lining, Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining is manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets').

James Hardie New Zealand is an ISO 9001 'Telarc' certified manufacturer. Eclipsa Eaves Lining, Silkline Soffit Lining, Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining are classified Type A, Category 3 in accordance with AS/NZS 2908.2 'Cellulose-Cement Products'.

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

7.2 DURABILITY

Resistance to moisture/rotting

Eclipsa Eaves Lining, Silkline Soffit Lining, Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with AS/NZS 2908.2:

- Water permeability (Clause 8.2.2)
- Warm water (Clause 8.2.4)
- Heat rain (Clause 6.5)
- Soak dry (Clause 8.2.5)

7.3 FINISHES

Villaboard Soffit Lining, HardieGroove Soffit Lining, Hardiesoffit Lining and HardieFlex Eaves Lining must be paint finished within 90 days of their installation. Refer to the paint manufacturer for paint suitability, mixing and application.

8 Maintenance

It is the responsibility of the specifier to determine normal maintenance requirements for eaves and soffits to comply with NZBC Acceptable Solution B2/AS1. The extent and nature of maintenance will depend on the geographical location and exposure of the building. As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months*,
- Pre-painted soffits, such as Silkline Soffit Lining and Eclipsa Soffit Lining, when used in harsh costal environments, the soffit must be washed down using a hose and soft brush minimum once every four months in addition to the other maintenance requirements,
- Re-applying exterior protective finishes**,
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants,
- Cleaning out gutters, blocked pipes and overflows as required,
- Pruning back vegetation close to or touching the building.

* Do not use a water blaster to wash down the soffits.

**Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.

Product Warranties

James Hardie®
EAVES AND SOFFITS

February 2013

All James Hardie eaves and soffit linings come with a 15 year product warranty. Pre-finished products such as Eclipsa Eaves Lining and Silkline Soffit Lining come with a 10 year coating warranty and 15 year warranty on the base sheet. All accessories supplied by James Hardie are warranted for a period of 15 years. For full warranty details visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) in each products warranty under "Conditions of Warranty". James Hardie has tested the performance of the Eclipsa™ Eaves Lining, HardieGroove™ Soffit Lining, Silkline® Soffit Lining, Villaboard® Soffit Lining, Hardiesoffit™ Lining and HardieFlex™ Eaves when installed in accordance with the Eclipsa™ Eaves Lining, HardieGroove™ Soffit Lining, Silkline® Soffit Lining, Villaboard® Soffit Lining, Hardiesoffit™ Lining and HardieFlex™ Eaves Lining installation manual, in accordance with the standards and verification methods required by the New Zealand Building Code (NZBC) and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

Product Warranty

HardieGroove™
LINING

February 2015

James Hardie New Zealand ("James Hardie") warrants for a period of 15 years from the date of purchase that the HardieGroove™ Eaves Lining (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;

b) this warranty is not transferable;

c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;

d) the project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards;

e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);

g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;

h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested the performance of the HardieGroove™ Eaves Lining when installed in accordance with the Eaves and Soffit Linings Installation Manual, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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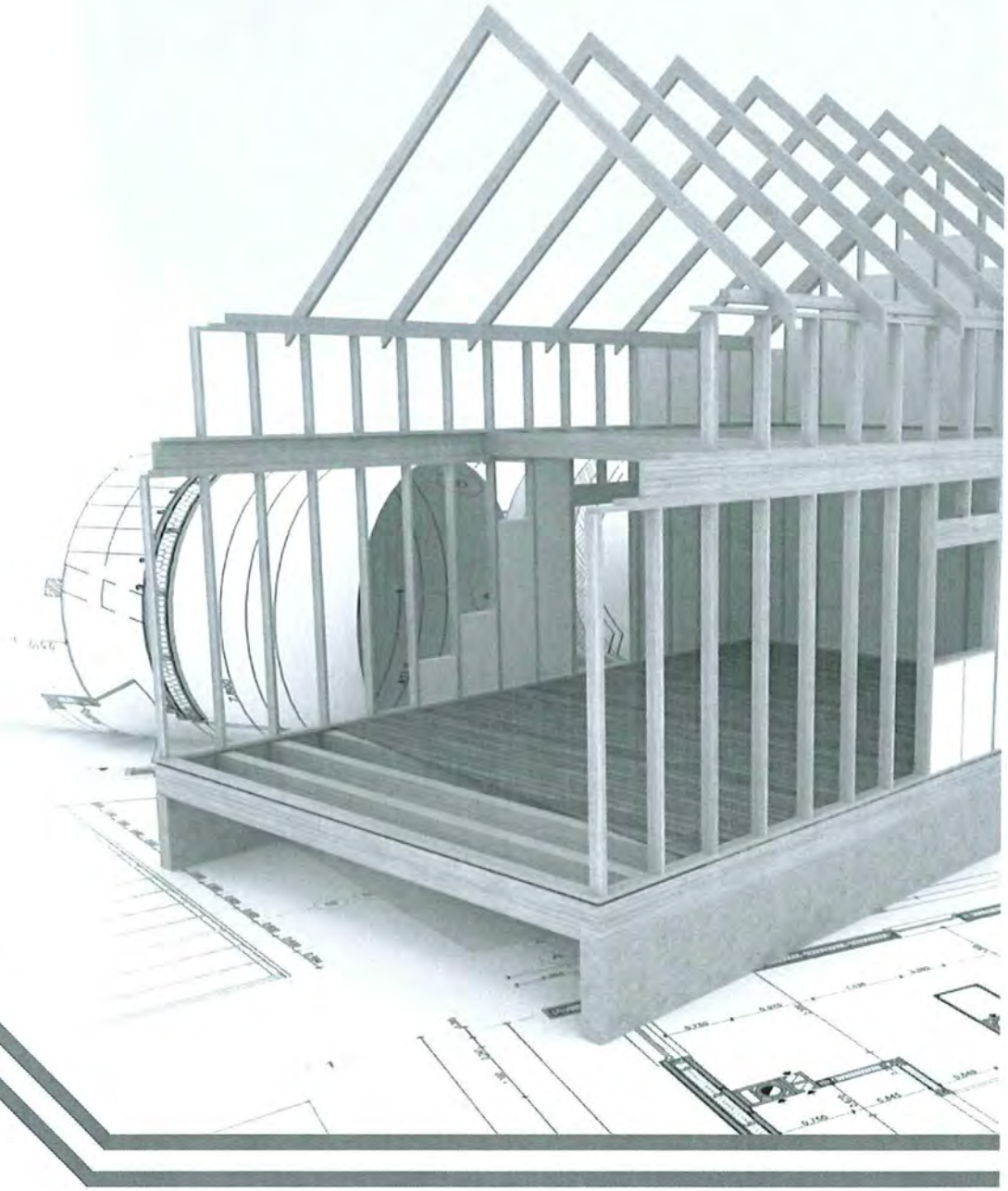
IBUILT™

Building Systems

April 2014

Design and Installation Guide





HYNE TIMBER

LP SOLIDSTART
ENGINEERED WOOD PRODUCTS

IBUILT LVL

NZWOOD
NEW ZEALAND WOOD PRODUCTS LIMITED

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Scope of this Document

The span tables and construction details contained in this document have been developed primarily for domestic/residential applications in accordance with the principles and intent of NZS3604:2011 'Timber Framed Buildings'; NZS3603:1993 'Timber Structures Standard'; AS1720.1:2010 'Timber Structures – Design Methods'. Loading data is taken from AS/NZS1170:2002 'Structural Design Actions' to satisfy the requirements of Section B1 of the New Zealand Building Code.

All technical information and span tables in this guide are in accordance with the product specific design properties. This data may be used for specific engineering design in applications outside the scope of this document. Please refer to New Zealand Wood Products Ltd for the 'Engineering Data'.

The information in this design guide has been checked and verified, however, it should only be used by designers who are suitably qualified.

NZWOOD accepts no liability or responsibility if the information contained in this document is incorrectly interpreted, inappropriately applied, or used in a manner other than explicitly set out in this design guide.

Note: Other manufacturers' products may have different properties and therefore cannot be substituted or designed using information contained in this document.

Compliance with the New Zealand Building Code (NZBC)

This design guide offers information for designing and installing NZWOOD's I-Built engineered timber products as floor and roof framing systems in both residential and commercial buildings. Additional design guidance can also be achieved by downloading the Hyne Design (HD) software available from the NZWOOD website.

The use of this guide is intended for suitably qualified designers to be able to select engineered beam or framing sizes and to provide installation details for floor and roof construction in the NZ building industry.

Products

The full I-Built Engineered Timber and Ply range is product certified by the Engineered Wood Products Association of Australasia (EWPAA). All NZWOOD's products are manufactured in accordance with AS/NZS 4357.0:2005 and AS/NZS 2269.

LP® SolidStart™ I-Beams are an engineered 'I-Beam' supplied by Louisiana Pacific®. The top and bottom flanges are Laminated Veneer Lumber (LVL) made from strong and naturally durable Douglas Fir timber. Engineered I-Beams are intended to be used as structural floor or roof members and are manufactured in line with the requirements of AS/NZS 4357:2005 Structural Laminated Veneer Lumber. The webs are made from strong OSB (Orientated Strand Board).

Hyne Timber produce a range of Glued-laminated timber products (Glulam). Glulam is produced by finger jointing and gluing shorter and small cross section timber together to make a larger cross section final product.

All Hyne Glued-laminated products are produced at the Maryborough Glulam plant in Brisbane and are manufactured in accordance with AS/NZS 1328.1:1998. The site operates an AS4707-2006 Chain of Custody compliant management system that covers all laminated products produced at the site as well as holding ISO9001:2006 accreditation for its manufacturing systems.

I-Built LVL (Laminated Veneer Lumber) is an engineered wood composite made from 3-4mm thick rotary peeled veneers that have been laid up with parallel grain orientation. One of the main features of LVL is to disperse or remove strength-reducing characteristics of natural wood, i.e. knots and splits. LVL is engineered, highly predictable, dimensionally stable and resists warping and twisting. Veneer sheets are graded ultrasonically and are orientated with in the product to maximise the potential of the stiffer and stronger veneer grades. LVL is manufactured using a phenolic adhesive in a continuous assembly. All I-Built LVL is produced in NZ mills that have been certified by the EWPAA.

Design

NZWOOD's engineered timber products that are used to calculate the span tables in this design guide were determined in accordance with NZS 3603:1993 Timber Structures Standard which is an Acceptable Solution to the New Zealand Building Code Clause 1 Structure.

Guidance has also been taken from AS 1684.1:1999, Residential timber-framed construction in the preparation of this guide and complies with NZS 3604:2011 Timber Framed Buildings which is an Acceptable Solution to NZBC Clause 1 Structure.

The requirements set out in the New Zealand Building Code will be achieved when floor joists and rafter framing components are installed in accordance with this design guide.

This design guide has been prepared and designed within the requirements of the following standards:

- AS/NZS 1170:2002 Structural Design Actions
- AS 1720.1:2010 Timber Structures, Part 1: Design methods.

Durability

NZWOOD's LP I-Beam, Hyne Timber LGL and LVL members' service life is in excess of 50 years when in dry well protected areas where moisture levels are maintained below the requirements specified in NZS 3602:2003. Buildings must remain weather tight and structural framing members must be protected from internal and external moisture exposure. Designers must ensure products specified are fit for purpose and building owners should ensure products remain protected.

Engineered I-Beams, LGL and LVL framing is not suitable in weather exposed applications. Light wetting during construction periods will not affect the performance of framing members, components must be left to dry before applying framing loads.

Note: Damaged, warped or delaminating engineered timber products should not be installed into a building. Please contact NZWOOD if there are any concerns with faulty products prior to installation.

Treatment

The I-Built engineered product range is available both untreated and H3.1 LOSP treated for use for weather-protected applications noted in NZS 3602:2003. LVL with an H1.2 glueline treatment can also be supplied on request. Please enquire with NZWOOD products for availability.

All I-Built engineered products must be installed fully protected from the weather.

Note:

- It is currently acceptable to install untreated engineered timber products in internal weather protected areas as defined by NZS 3602:2003.
- H1.2 LVL with glueline treatment is an acceptable solution for internal framing meeting the requirements of the New Zealand Building Code B2/AS1 for Durability.
- H3.1 LOSP treated LVL is an acceptable solution where it is being using in an H1.2 application.

FSC & PEFC Chain of Custody Certification

NZWOOD has Forest Stewardship Council® (FSC) and Programme for the Endorsement of Forest Certification (PEFC) chain of custody certification. The certification proves that the timber NZWOOD sells meets environmentally and socially responsible timber criteria. FSC and PEFC Chain of custody systems are governed by standards that require specific documentation and procedures for handling certified wood products with the basic aim to prevent the mixing of FSC or PEFC wood with uncontrolled sources. All information relating to the path taken by products from the forest including each stage of processing, transformation, manufacturing and distribution is tracked.

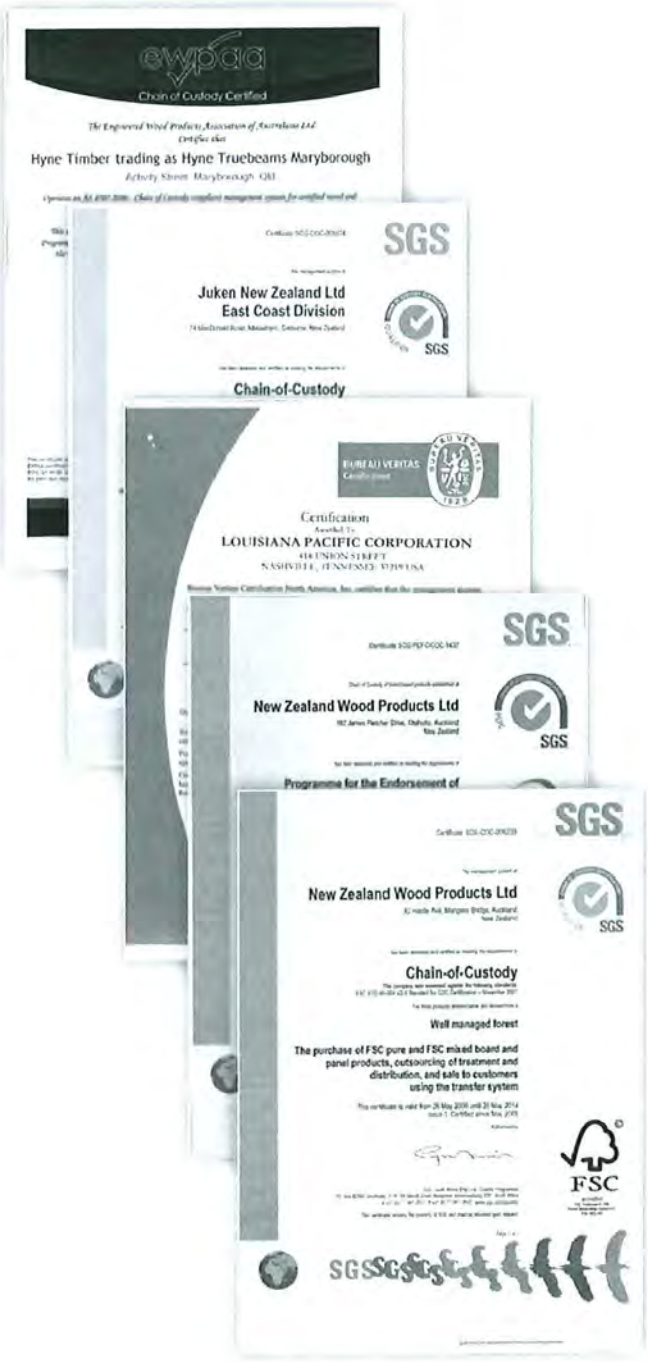
FSC Chain of Custody Certification

FSC chain of custody certified products provide assurances that the wood originates from well managed or responsibly managed forests. NZWOOD provide a range of plywood, scaffolding and LVL products that are FSC Certified with a FSC Mix 70% claim. Our main supplier for these products is Juken New Zealand Ltd.

PEFC Chain of Custody Certification

PEFC differs from FSC at the forest management level, but the chains of custody are similar. The certification includes requirements for traceability and handling of PEFC certified timber. A product carrying the PEFC label means it has originated from a forest certified by a PEFC endorsed scheme and has been handled by PEFC certified organisations. NZWOOD provide a range of I-Beams and engineered timber products that are PEFC certified. Our supplier of I-Beams is Louisiana Pacific Corporation and our supplier for engineered beams is Hyne Pty Australia.

If you require further information regarding our FSC and PEFC certification please contact us at NZWOOD.



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Producer Statement

Issued: February 2013

HYNE produce a range of Glued-laminated products (Glulam). Glulam products are produced by finger jointing and gluing shorter and small cross section timber together to make a larger cross section final product.
All HYNE Glued-laminated products are produced at the Maryborough Glulam plant and are manufactured in accordance with AS/NZS 1328.1-1998. The site operates an AS4707-2006 Chain of Custody compliant management system that covers all laminated products produced at the site as well as holding ISO9001-2006 accreditation for its manufacturing systems.

HYNE BEAM 17 products are high grade glued-laminated timber beams formed from Australian pine.

- All components are assembled using only durable, exterior grade adhesives that comply with Service Class 3 as per AS/NZS 4364-2010.
- The beams are specified as cambered (C) to 600 m radius.
- HYNE BEAM 17 is available in two grades in accordance with AS/NZS1328.1-1998. STR – Structural Grade/Appearance C and SEL –Select Grade/Appearance A.
- HYNE BEAM is available treated to H3.1
- Third party certified through the Glue Laminated Timber Association of Australia (GLTAA).

HYNE BEAM 18 products are high grade glued-laminated timber beams formed from Australian hardwoods.

- All components are assembled using only durable, exterior grade adhesives that comply with Service Class 3 as per AS/NZS 4364-2010.
- The beams are specified as cambered (C) to 600 m radius.
- HYNEBEAM 18 is manufactured from Durability Class 4 timber species and is only suitable for internal applications
- HYNEBEAM 18 is available in two grades in accordance with AS/NZS1328.1-1998. STR – Structural Grade/Appearance C and SEL –Select Grade/Appearance A.

HYNE BEAM 21 products are high grade glued-laminated timber beams formed from Australian hardwoods

- All components are assembled using only durable, exterior grade adhesives that comply with Service Class 3 as per AS/NZS 4364-2010.
- The beams are specified as cambered (C) to 600 m radius.
- HYNE BEAM 21 is manufactured from a minimum Durability Class 2 Timber species.
- HYNE BEAM 21 is available in two grades in accordance with AS/NZS1328.1-1998. STR – Structural Grade/Appearance C and SEL –Select Grade/Appearance A.
- Third party certified through the Glue Laminated Timber Association of Australia (GLTAA).

HYNE LGL44 and HYNE LGL65 are high grade glued-laminated timber beams formed from Australian pine.

- All components are assembled using only durable, exterior grade adhesives that comply with Service Class 3 as per AS/NZS 4364-2010.
- The beams are specified as straight only.
- HYNE LGL44 and HYNE LGL65 are available only in STR – Structural Grade/Appearance C as per AS/NZS1328.1-1998.
- HYNE LGL44 and HYNE LGL65 is available treated to H3.1

Producer Statement

Pryda Timber Connectors

January 2012

This Producer Statement is issued by Pryda NZ to cover the use, installation and durability of PRYDA TIMBER CONNECTORS for both structural application and durability as required by the New Zealand Building Code clauses B1 & B2 respectively.

Description

The PRYDA timber connectors are manufactured from either Z275 or Z600 galvanised coil. Some brackets are also available hot dipped galvanised or stainless steel for use in certain exposed and covered situations.

Application

PRYDA timber connectors are designed for specific connections of timber to timber mostly but also to other materials such as masonry, concrete and steel. Please contact PRYDA technical service should you require assistance relating to these connectors.

Installation

The PRYDA timber conectors should be installed without damage to the finished surfaces. Storage prior to use to be in dry moisture free conditions that would not affect the future durability of the product.

Design Capacity

As timber grades vary the design capacity is derived by the verification method as with the NZBC standards NZS3603:1993 mostly dependant on the shear values of the nails and bolts in timber. Most commonly used brackets have published characteristic strengths published in our literature.

Durability

The durability of the PRYDA timber connectors is in accordance with the acceptable solutions contained in Table 4.1 and Table 4.2 of NZS3604:2011 in order to achieve a 50 year life expectancy for the connectors where applicable. Alternative solutions and direct applications are to be found else where in this publication.

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17 March 2014

New Zealand Wood Products Ltd
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Ref 1763: Structural review of Hyne Design V7 software for New Zealand.

I have structurally reviewed the Hyne Design software version 7.3.1.2 produced by HR Design Group Ltd in accordance with sound engineering practice and with the following standards:

AS/NZS1170:2002
NZS3603:1993, including Amendment4
NZS3604:2011

The program enables the user to design rafters, beams, bearers, joists and wall frame components for domestic applications. Timber products available are Hyne 17C, 18, 21, LGL, MGP10, MGP12; LP Building Products LPI 53-T and LPI 70-T timber I beams, generic LVL11 / 13 grades and solid radiata pine grade SG8.

The review has consisted of running a range of typical scenarios through the software. No review of the internal program logic and programming code has been undertaken.

I am satisfied that with proper use by appropriately qualified personal the results from the software will enable selection of components to comply with the structural requirements of the New Zealand Building Code, subject to correct installation in accordance with the component suppliers' requirements.

Yours faithfully

David Reid
STRUCTURAL ENGINEER, IPENZ Member ID 121639.

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15 August 2012

Louisiana Pacific Corporation
No 2000 - 414 Union Street
NASHVILLE, TN, USA 37219

Ref 1505: Report on structural review of timber I beams for New Zealand market.

I have structurally reviewed the data and methodology for deriving the structural properties for Louisiana Pacific timber I beams LPI53-T, LPI70-T and LPI32. The derivation of the properties has been performed by H R Design Group Ltd, Queensland, Australia and has been done in accordance with the following standards:

- AS/NZS 4063:2010 – Characterization of Structural Timber
- ASTM D5055 - 11a Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists

Table 1: Characteristic Structural Properties of LP timber I beams

Type	LPI 53-T		width = 53mm		LPI 70-T		width = 70mm		LPI 32		width = 63.5mm	
	Mchar	EI	GwAw	Vchar	Mchar	EI	GwAw	Vchar	Mchar	EI	GwAw	Vchar
Depth	kNm	$x10^9 Nmm^2$	$x10^6 N$	kN	kNm	$x10^9 Nmm^2$	$x10^6 N$	kN	kNm	$x10^9 Nmm^2$	$x10^6 N$	kN
200	9.1	367	2.7	11.0	12.4	494	2.7	11.0	8.0	395	1.9	8.0
225	10.5	488	3.0	12.4	14.2	651	3.0	12.4	9.2	530	2.2	9.1
241	11.4	574	3.2	13.3	15.4	769	3.2	13.3	10.0	635	2.3	9.9
302	14.7	967	3.9	15.7	19.9	1286	4.0	15.7	12.9	1080	2.8	12.7
356	17.4	1412	4.6	17.7	23.6	1871	4.7	17.7	15.6	1580	3.3	14.9
406	19.9	1911	5.3	19.7	27	2528	5.3	19.7	18.1	2130	3.7	16.6

The structural properties shown in Table 1 are consistent with the requirements of the NZ Building Code, B1 Structure and may be used for the specific design of timber components utilising NZS 3603:1993 Timber Structures Standard. Connections may be designed using NZS3603:1993 J4 joint group properties.

David Reid
STRUCTURAL ENGINEER, IPENZ Member ID 121639.

David Reid - LPI Joists Certification Letter



Hyne Design

Waiting for you on our website is the feature packed Hyne Design (HD) software, distributed in NZ by New Zealand Wood Products who are the Sole Distributors of the Hyne Timber Product Range.
HD software can specify Louisiana Pacific's Solid Start timber I-Beams for an engineered floor or rafter framing system, a range of LVL11 and LVL13 products, Hyne's 17C, 18C and 21C high strength laminated beams and the Hyne 44mm LGL Edge beam. A range of common SG8 solid timber sizes are included also for additional design scope.
NZWOOD will provide technical support and design services for these products as well as providing support with the HD software package.

Need to see more? Visit New Zealand Wood Products Limited (www.nzwoodproducts.co.nz) for a free programme download with just one click of a button.



LP SolidStart

LPI 70-T I-Beam

Description	I-Beams are a unique combination of timber resources, utilising advanced technology to form a structurally efficient 'I' section. Made from Douglas Fir Top & Bottom Flange and an OSB web. Components are assembled using only durable, exterior grade adhesives. I-Beam is available untreated or treated to H3.1 (LOSP) from stock. I-Beams are supplied to H2S levels which is an insecticide treatment only.
Advantages	Dimensional stability, lightweight, long spanability, elimination of mid-span blocking in floor joists.
Applications	Floor joists, rafters.
Section sizes:	225 x 70, 240 x 70, 300 x 70, 356 x 70
Available lengths:	Up to 12m in 300mm increments.
Availability:	Readily available.
Specification example:	225 LPI 70-T I-Beam



HYNE Beam 17

Hyne Beam 17C

Description	Hyne Beam 17C products are high grade glued-laminated timber beams formed from Australian pine, into larger rectangular sections. The Hyne Beam 17C product range is manufactured in accordance with AS1328 by Hyne in Maryborough. The Hyne Beam 17C is made from slash pine feedstock. All components are assembled using only durable, exterior grade adhesives (service class 3). The beams are specified as cambered (C) to 600 m radius. Available in structural grades (STR). Hyne Beam 17C is available treated to H3.1 (LOSP).
Advantages	Dimensional stability, long spanability, aesthetically appealing, variety of shapes and curved beam options, simple high-tech connections, termite resistance and durability (when treated), easier to handle and install than steel members, third party certified through the Glue Laminated Timber Association of Australia (GLTAA) and ISO 9002.
Applications	Roof beams, bearers, columns, floor joists, rafters, lintels,portal frames.
Section sizes:	195 x 85 up to 525 x 85, 195 x 130 up to 360 x 130
Available lengths:	Up to 11.4m in 600mm increments.
Availability:	Readily available. (65mm width available on request)
Specification example:	295 x 85 Hyne Beam 17C



HYNE Beam 18

Hyne Beam 18C - for premium appearance and strength

Description	Hyne Beam 18C products are high grade glued-laminated timber beams formed from Tasmanian Oak, into larger rectangular sections. The Hyne Beam 18 product range is manufactured by Hyne in Maryborough. The Hyne Beam 18C is made from Tasmanian Oak feedstock. All components are assembled using only durable, exterior grade adhesives (service class 3). The beams are specified as cambered (C) to 600 m radius. Available in appearance / select grade (SEL). Hyne Beam 18C can only be used in internal situations.
Advantages	Dimensional stability, long spanability, aesthetically appealing, variety of shapes and curved beam options, simple high-tech connections, termite resistance and durability (when treated), easier to handle and install than steel members, third party certified through the Glue Laminated Timber Association of Australia (GLTAA) and ISO 9002.
Applications	Roof beams, bearers, floor joists, rafters, lintels, portal frames.
Section sizes:	120 x 65 – 420 x 65, 120 x 85 – 600 x 85, 120 x 130 – 600 x 130
Available lengths:	Up to 11.4m in 600mm increments.
Availability:	Special order
Specification example:	270 x 85 Hyne Beam 18C(SEL)



HYNE Beam 21

Hyne Beam 21C - for premium appearance and strength

Description	Hyne Beam 21C products are high grade glued-laminated timber beams formed from Australian Hardwoods, into larger rectangular sections. The Hyne Beam 21 product range is manufactured by Hyne in Maryborough. The Hyne Beam 21 is made from Queensland Hardwood feedstock. All components are assembled using only durable, exterior grade adhesives (service class 3). The beams are specified as cambered (C) to 600m radius. Available in appearance / select grade (SEL). Hyne Beam 21C can only be used in sheltered situations.
Advantages	Dimensional stability, long spanability, aesthetically appealing, variety of shapes and curved beam options, simple high-tech connections, termite resistance and durability (when treated), easier to handle and install than steel members, third party certified through the Glue Laminated Timber Association of Australia (GLTAA) and ISO 9002.
Applications	Roof beams, bearers, floor joists, rafters, lintels, portal frames.
Section sizes:	120 x 65 – 410 x 65, 120 x 85 – 600 x 85
Available lengths:	Up to 11.4m in 600mm increments.
Availability:	Special order.
Specification example:	270 x 85 Hyne Beam 21C(SEL)



HYNE LGL

Hyne LGL (Edgebeam)

Description	Hyne LGL (Edgebeam) is a high grade edge glued-laminated timber beam product assembled from finger jointed pine scantling, into deeper rectangular sections. The Hyne LGL product range is manufactured in accordance with AS1328 by Hyne in Maryborough. All components are assembled using only durable, exterior grade adhesives (service class 3). Available in a range of depths to ensure compatibility with Hyne-I-Beam. Hyne LGL is available treated or H3.1 (LOSP).
Advantages	Dimensional stability, lightweight, long spanability, treatable to H3.1, may be nail-laminated to provide wider sections.
Applications	Floor joists, bearers, rafters, purlins, lintels.
Section sizes:	200 x 44 up to 360 x 44
Available lengths:	Up to 11.4m in 600mm increments.
Availability:	Readily available. Check with New Zealand Wood Products Ltd for the 65mm availability.
Specification example:	300 x 44 Hyne LGL (E/B)



IBUILT RIM

I-Built Rim (RB21, RB35, RB45)

The Rimboard is used as a perimeter board.

Treated to the level of H3.1 (LOSP) to provide a protective envelope to the floor joists.

Rimboard (RB21) ties the end of the I-Beams joists together, providing lateral stability to the floor platform. Rimboard is also used as a stiffener for I-Beams in cantilevered situations.

Rimboard (RB35/RB45) is used in situations where structural fixing is required.



Pryda Hardware

Pryda is a world leader and specialist in the development and manufacture of timber connections systems.

These quality fixings are used throughout our flooring design. The use of Pryda specialised hardware enables quick and simplistic installation.



I-Built LVL 11 & 13

Description

I-Built LVL 11 and 13 is laminated veneer lumber made from rotary peeled veneers, laid up with parallel grain orientation. I-Built LVL is a highly predictable, uniform lumber product because natural defects such as knots, slope of grain and splits have been removed or dispersed throughout the product. In addition, the veneer sheets are placed in a specific sequence and location within the product to maximise the potential of the stiffer and stronger veneer grades. This can be considered as an engineered configuration of the veneers. NZWOOD LVL is dimensionally stable, resists warping and twisting and is machined to consistent uniform sizes.

LVL properties are consequently superior to those of standard stress graded timber. The average of most strength characteristics is higher and the variation is significantly lower when compared to solid wood.

The structural properties of NZWOOD LVL have been determined by testing in accordance with the requirements of AS/NZS 4357.0:2005 Structural Laminated Veneer Lumber.

Advantages	Dimensionally stable, long span ability, simple high tech connections, durable when treated, easier to handle and install than steel members.
Applications	Roof beams, bearers, floor joists, rafters, lintels and portal frames.
Section sizes:	90x45 up to 610x63
Available lengths:	Up to 12m in 300mm increments.
Availability:	Readily Available
Specification example:	300 x 45 LVL13



I-Built 90

Description

I-Built 90 is a light weight Laminated Veneer Lumber product suitable for use in frame construction, as a lintel or a beam or joist. I-Built 90 provides a cost effective, light weight solution. The 90mm beam is designed to match New Zealand framing sizes and is manufactured by Juken New Zealand Limited (an EWPPA certified mill) to meet the ANS/NZS 4357:2005 manufacturing standard for LVL. I-Built 90 is FSC certified and supplied Untreated or Treated to H3.1 (LOSP).

Treated beams are designed for limited exposure to weather. Beams should not be exposed to high moisture and must be contained within a building structure protected from the weather. The 90mm beams are treated by certified treatment plants in accordance with AS/NZS 1604.2004 to meet NZS3602-2003 and achieve both a H1.2 and H3.1 treatment class. Treat end cuts with a solvent based preservative.

I-Built 90 comes standard in 9.5 Mpa. 10.7 Mpa is also available on request.

Advantages	Dimensionally stable, long span ability, simple high tech connections, durable when treated, easier to handle and install than steel members.
Applications	Lintels, beams.
Section sizes:	150x90, 200x90, 240x90, 300x90, 360x90, 400x90
Available lengths:	Up to 9.6m in 300mm increments.
Availability:	Readily available
Specification example:	300 x 90 I-Built 90

Product Summary

PRODUCT NAME	PRODUCT TYPE	AVAILABILITY	PRODUCT CODE	SIZE LIST (MM)
LPI 70 I-BEAM	LVL Flange composite I-Beam	Available	LPI	LPI 225 x 70, LPI 240 x 70, LPI 300 x 70, LPI 356 x 70
HYNE BEAM 17C 85MM	Glued-laminated timber	Available	GL17C	195 x 85, 230 x 85, 260 x 85, 295 x 85, 330 x 85, 360 x 85, 395 x 85, 425 x 85, 460 x 85, 495 x 85, 525 x 85, 560 x 85, 590 x 85
HYNE BEAM 17C 135MM	Glued-laminated timber	Available	GL17C	130 x 130, 165 x 130, 195 x 130, 230 x 130, 260 x 130, 295 x 130, 330 x 130, 360 x 130, 395 x 130, 425 x 130, 460 x 130, 495 x 130, 525 x 130, 560 x 130, 590 x 130
HYNE BEAM 18C 65MM	Glued-laminated timber	On Request	GL18C	120 x 65, 155 x 65, 185 x 65, 215 x 65, 240 x 65, 270 x 65, 300 x 65, 330 x 65, 360 x 65, 390 x 65, 420 x 65
HYNE BEAM 18C 85MM	Glued-laminated timber	On Request	GL18C	120 x 85, 155 x 85, 185 x 85, 215 x 85, 240 x 85, 270 x 85, 300 x 85, 330 x 85, 360 x 85, 390 x 85, 420 x 85, 450 x 85, 480 x 85, 510 x 85, 540 x 85, 570 x 85, 600 x 85
HYNE BEAM 18C 130MM	Glued-laminated timber	On Request	GL18C	120 x 130, 155 x 130, 185 x 130, 215 x 130, 240 x 130, 270 x 130, 300 x 130, 330 x 130, 360 x 130, 390 x 130, 420 x 130, 450 x 130, 480 x 130, 510 x 130, 540 x 130, 570 x 130, 600 x 130
HYNE BEAM 21C 65MM	Glued-laminated timber	On Request	GL21C	120 x 65, 155 x 65, 185 x 65, 215 x 65, 240 x 65, 280 x 65, 300 x 65, 315 x 65, 350 x 65, 380 x 65, 410 x 65
HYNE BEAM 21C 85MM	Glued-laminated timber	On Request	GL21C	120 x 85, 155 x 85, 185 x 85, 215 x 85, 240 x 85, 280 x 85, 300 x 85, 315 x 85, 350 x 85, 380 x 85, 410 x 85, 445 x 85, 475 x 85, 505 x 85, 535 x 85, 570 x 85, 600 x 85
HYNE LGL 44 (EDGEBEAM)	Edge glued-laminated timber	Available	LGL	200 x 44, 240 x 44, 300 x 44, 360 x 44
HYNE LGL 65 (EDGEBEAM)	Edge glued-laminated timber	On Request	LGL	150 x 65, 200 x 65, 240 x 65, 300 x 65, 360 x 65
LVL 11 45MM	Laminated veneer lumber	Available	LVL11	90 x 45, 140 x 45, 190 x 45, 240 x 45, 300 x 45
LVL 13 45MM	Laminated veneer lumber	Available	LVL13	150 x 45, 200 x 45, 240 x 45, 300 x 45, 360 x 45
LVL 13 63MM	Laminated veneer lumber	Available	LVL13	150 x 63, 200 x 63, 240 x 63, 300 x 63, 360 x 63
I-BUILT 90	Laminated veneer lumber	Available	LVL 90mm	150 x 90, 200 x 90, 240 x 90, 300 x 90, 360 x 90, 400 x 90

Structural Properties - LVL / LGL

PRODUCT			HYNE LGL 44 (EDGEBEAM)	HYNE LGL 65	HYNE BEAM 17C	HYNE BEAM 18C	HYNE BEAM 21C	I-BUILT LVL 11	I-BUILT LVL 13	I-BUILT 90
TYPE			Glulam	Glulam	High strength Glulam	High strength Glulam	High strength Glulam	Structural LVL	High strength LVL	High strength LVL
GRADE			LGL	LGL	GL17	GL18	GL21	LVL 11	LVL 13	LVL 90
BENDING	f_b	MPa	30	33	40	45	50	38	48	35
TENSION	f_t	MPa	16	16	20	25	25	26	33	-
SHEAR	f_s	MPa	3.7	4.2	4.2	5.0	5.0	5.0	5.3	-
COMP.	f_c	MPa	30	26	33	45	50	38	38	-
MODULUS OF ELASTICITY	E	MPa	13300	13300	16700	18500	21000	11000	13200	9500
MODULUS OF RIDGITY	G	MPa	890	900	1110	1230	1400	550	660	-
DENSITY		kg/m^3	540	650	650	750	1000	570	570	520
JOINT GROUP			JD4	JD4	JD4	JD3	JD2	JD4	JD4	-
STRENGTH GROUP			SD6	SD6	SD5	SD3	SD2	SD5	SD5	-
BEARING PERP	f_p	MPa	10	10	13	19	23	10	10	-
BEARING PARALLEL	f_l	MPa	30	30	40	59	67	-	-	-
SHEAR AT JOINTS	f_{sj}	MPa	4.2	4.2	5.4	7.3	8.4	5.0	5.3	-
TENSION PERP	ft_p	MPa	0.5	0.5	0.5	0.6	0.8	-	-	-
DURABILITY CLASS			4	4	4	4	2	4	4	-

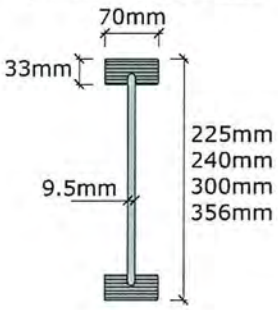
LPI 70-T Structural Properties

LPI 70-T SOLID START I-BEAM DEPTH	JOIST WEIGHT (KG/M)	BENDING RIGIDITY EIXX (KN. M2)	BENDING RIGIDITY EIYY (KN. M2)	TORSIONAL RIGIDITY GJ (KN.M2)	SHEAR RIGIDITY GWAW (MN)	BENDING MOMENT CAPACITY (KN.M)	MAX VERT SHEAR (KN)	END BEARING CAPACITY (KN)	INTERNAL BEARING CAPACITY (KN)
225	3.7	651.0	28.9	4.9	3.0	14.2	12.4	9.5	21.7
240	4.0	769.0	28.9	4.9	3.2	15.4	13.3	9.5	22.0
300	4.1	1286.0	28.9	4.9	4.0	19.9	15.7	9.5	22.9
356	4.5	1871.0	28.9	4.9	4.7	23.6	17.7	9.5	23.7

PLEASE NOTE:

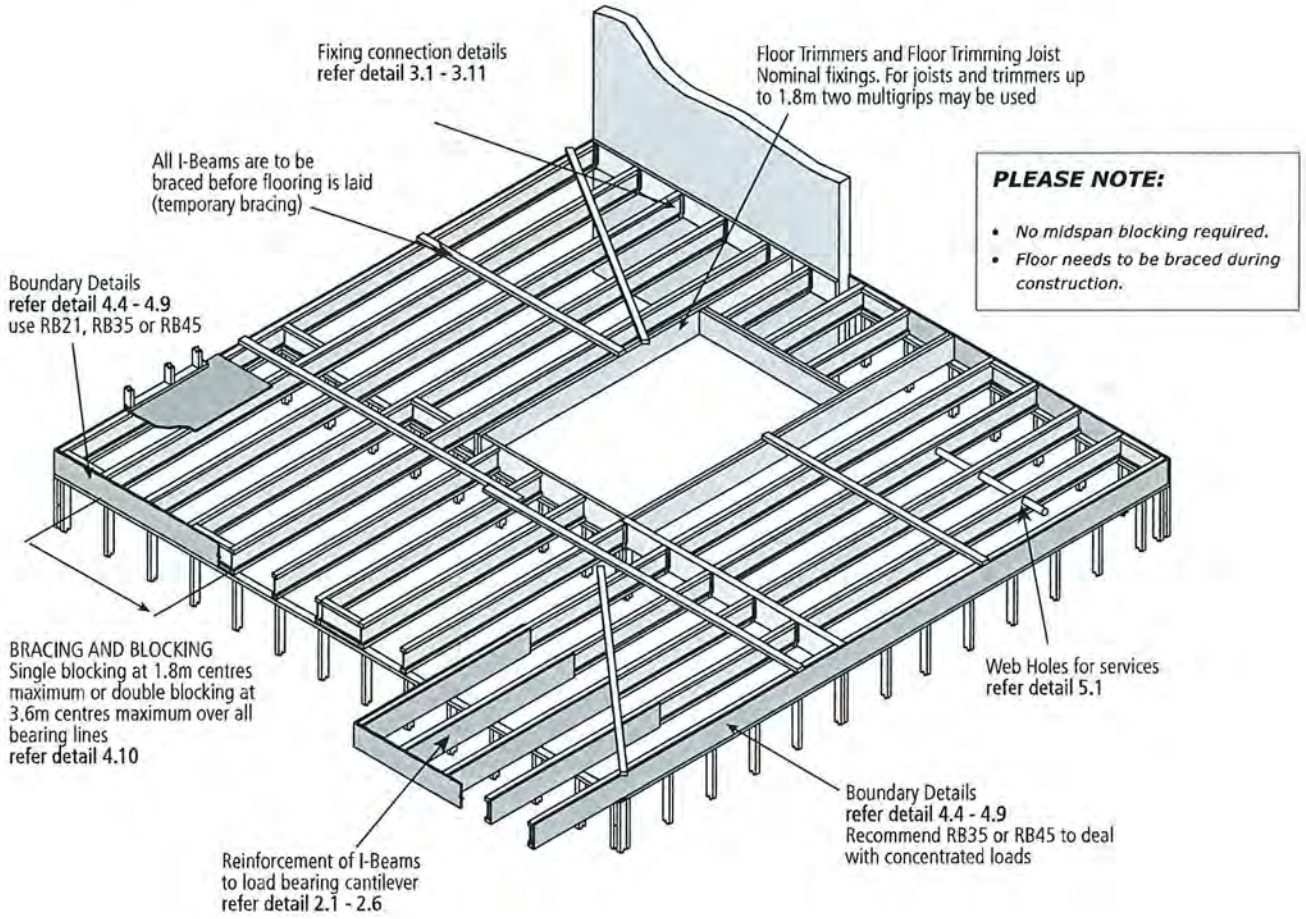
Check with NZWOOD regarding 53mm wide I-Beams & 200 high I-Beam availability

LPI™ 70-T Profile



1.1 Typical Floor Construction Plan

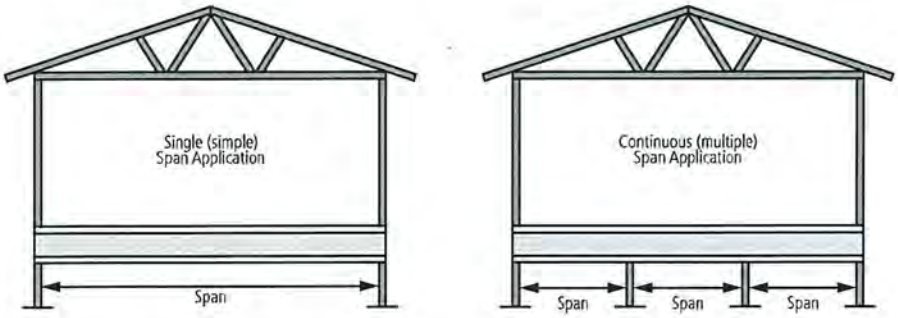
This is a typical floor construction plan. Please see detail numbers on the plan to locate specifics.



PLEASE NOTE:

- *No midspan blocking required.*
- *Floor needs to be braced during construction.*

1.2 Span Definitions Floor Joists



For an Engineered Timber Product member to be considered 'continuous' it shall span at least 2 adjacent spans such that span 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'.

PLEASE NOTE:

- *40% of the live load has been considered to be permanent load for assessing the long-term deflection limits for floors in general office, residential and institutional space. For other applications such as storage areas, where higher permanent loads may be expected, specific engineering design should be applied – refer to HD7 software.*
- *Where heavy permanent dead loads, such as water beds, or tiled floors are to be applied to the floor joist system, allowance should be made. Suitable allowances can be made by designing the floor joists at 450mm or 600mm centres but installing them at 300 or 450mm respectively.*

Floor Joist Span - LPI 70-T I-Beam

IBUILT Building Systems

Single Span

		MAX JOIST SPAN (M)					
		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	5.5	5.1	5.0	4.9	4.6
		240	5.7	5.3	5.2	5.1	4.8
		300	6.5	6.1	5.9	5.8	5.4
		356	7.2	6.7	6.5	6.3	6.0
	DEAD LOAD TILED FLOOR 95 KG/M²	225	5.1	4.8	4.6	4.6	4.3
		240	5.3	5.0	4.8	4.8	4.5
		300	6.1	5.7	5.5	5.4	5.1
		356	6.6	6.2	6.0	5.9	5.6

		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	5.4	5.1	4.9	4.8	4.6
		240	5.6	5.3	5.1	5.0	4.8
		300	6.4	6.0	5.8	5.7	5.4
		356	7.0	6.6	6.4	6.3	5.9
	DEAD LOAD TILED FLOOR 95 KG/M²	225	5.0	4.6	4.5	4.4	4.1
		240	5.2	4.8	4.7	4.6	4.3
		300	5.9	5.5	5.3	5.2	4.9
		356	6.5	6.0	5.8	5.7	5.4

		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	5.0	4.7	4.5	4.5	4.2
		240	5.3	4.9	4.7	4.6	4.4
		300	6.0	5.5	5.4	5.3	4.5
		356	6.6	6.1	5.9	5.6	4.5
	DEAD LOAD TILED FLOOR 95 KG/M²	225	4.7	4.4	4.2	4.1	3.8
		240	4.9	4.6	4.4	4.3	4.0
		300	5.6	5.2	5.0	5.0	4.0
		356	6.1	5.7	5.3	5.0	4.0

Continuous Span

		MAX JOIST SPAN (M)					
		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	6.0	5.6	5.4	5.3	5.0
		240	6.3	5.8	5.6	5.5	5.2
		300	7.1	6.6	6.4	6.3	5.9
		356	7.8	7.3	7.0	6.9	6.5
	DEAD LOAD TILED FLOOR 95 KG/M²	225	6.0	5.6	5.4	5.3	5.0
		240	6.3	5.8	5.6	5.5	5.2
		300	7.1	6.6	6.4	6.3	5.9
		356	7.8	7.3	7.0	6.9	6.5

		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	6.1	5.7	5.5	5.4	5.1
		240	6.4	5.9	5.7	5.6	5.3
		300	7.3	6.7	6.5	6.4	6.0
		356	8.0	7.4	7.2	7.0	6.6
	DEAD LOAD TILED FLOOR 95 KG/M²	225	6.1	5.7	5.5	5.4	5.1
		240	6.4	5.9	5.7	5.6	5.3
		300	7.3	6.7	6.5	6.4	6.0
		356	8.0	7.4	7.2	7.0	6.5

		I-BEAM DEPTH	300CRS	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	225	5.5	5.1	4.9	4.9	4.6
		240	5.7	5.3	5.2	5.1	4.8
		300	6.5	6.0	5.9	5.8	5.2
		356	7.2	6.6	6.4	6.3	5.2
	DEAD LOAD TILED FLOOR 95 KG/M²	225	5.5	5.1	4.9	4.9	4.5
		240	5.7	5.3	5.2	5.1	4.5
		300	6.5	6.0	5.9	5.8	4.7
		356	7.2	6.6	6.3	5.9	4.7

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Floor Joist Span - Hyne LGL 44mm

Single Span

MAX JOIST SPAN (M)						
		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	200 x 44	4.6	4.4	4.4	4.1
		245 x 44	5.3	5.2	5.1	4.8
		300 x 44	6.2	6.0	5.9	5.6
		360 x 44	7.1	6.9	6.8	6.4
	DEAD LOAD TILED FLOOR 95 KG/M²	200 x 44	4.2	4.0	4.0	3.7
		245 x 44	4.9	4.8	4.7	4.5
		300 x 44	5.7	5.6	5.5	5.2
		360 x 44	6.6	6.4	6.3	6.0

		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	200 x 44	4.5	4.3	4.3	4.0
		245 x 44	5.2	5.1	5.0	4.8
		300 x 44	6.0	5.9	5.8	5.5
		360 x 44	6.9	6.7	6.6	6.3
	DEAD LOAD TILED FLOOR 95 KG/M²	200 x 44	4.0	3.9	3.8	3.5
		245 x 44	4.8	4.7	4.6	4.3
		300 x 44	5.6	5.4	5.3	5.1
		360 x 44	6.4	6.2	6.1	5.8

		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	200 x 44	4.1	4.0	3.9	3.6
		245 x 44	4.9	4.7	4.7	4.4
		300 x 44	5.7	5.5	5.4	5.1
		360 x 44	6.5	6.3	6.2	5.9*
	DEAD LOAD TILED FLOOR 95 KG/M²	200 x 44	3.8	3.6	3.6	3.3
		245 x 44	4.6	4.5	4.4	4.1
		300 x 44	5.3	5.2	5.1	4.8
		360 x 44	6.1	5.9	5.8	5.5*

* Denotes member must have min 65mm bearingat the 2 supports

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Floor Joist Span - Hyne LGL 44mm

Continuous Span

		MAX JOIST SPAN (M)				
		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	130 x 44	3.6	3.3	3.2	3.0
		150 x 44	4.0	3.9	3.8	3.6
		170 x 44	4.4	4.3	4.2	4.0
		200 x 44	5.0	4.8	4.8	4.5
		245 x 44	5.8	5.7	5.6	5.3
		300 x 44	6.8	6.6	6.5	6.1
		360 x 44	7.8	7.6	7.4	7.0
	DEAD LOAD TILED FLOOR 95 KG/M²	130 x 44	3.6	3.5	3.4	3.2
		150 x 44	4.0	3.9	3.8	3.6
		170 x 44	4.4	4.3	4.2	4.0
		200 x 44	5.0	4.8	4.8	4.5
		245 x 44	5.8	5.7	5.6	5.3
		300 x 44	6.8	6.6	6.5	6.1
		360 x 44	7.8	7.6	7.4	7.0#

Denotes member must have min 85mm bearing at the internal support

		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	130 x 44	3.7	3.3	3.2	3.0
		150 x 44	4.1	3.9	3.8	3.6
		170 x 44	4.5	4.4	4.3	4.1
		200 x 44	5.1	4.9	4.9	4.6
		245 x 44	5.9	5.8	5.7	5.3
		300 x 44	6.9	6.7	6.6	6.2
		360 x 44	7.9	7.7	7.6	7.2#
	DEAD LOAD TILED FLOOR 95 KG/M²	130 x 44	3.6	3.4	3.3	2.9
		150 x 44	4.1	3.9	3.8	3.4
		170 x 44	4.5	4.4	4.3	3.8
		200 x 44	5.1	4.9	4.9	4.5
		245 x 44	5.9	5.8	5.7	5.3
		300 x 44	6.9	6.7	6.6	6.2#
		360 x 44	7.9*	7.7#	7.6#	7.2#

* Denotes member must have min 65mm bearing at the internal support

Denotes member must have min 85mm bearing at the internal support

		LGL SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	130 x 44	3.2	3.1	3.0	2.6
		150 x 44	3.7	3.6	3.4	3.0
		170 x 44	4.1	3.9	3.9	3.5
		200 x 44	4.6	4.5	4.4	4.1
		245 x 44	5.3	5.2	5.1	4.8#
		300 x 44	6.2	6.1*	6.0#	5.6#
		360 x 44	7.2#	6.9#	6.8#	6.1#
	DEAD LOAD TILED FLOOR 95 KG/M²	130 x 44	3.1	2.9	2.8	2.5
		150 x 44	3.6	3.4	3.2	2.9
		170 x 44	4.1	3.8	3.7	3.3
		200 x 44	4.6	4.5	4.4	3.9
		245 x 44	5.3	5.2	5.1*	4.8#
		300 x 44	6.2*	6.1#	6.0#	5.4#
		360 x 44	7.2#	6.9#	6.7#	5.4#

* Denotes member must have min 65mm bearing at the internal support

Denotes member must have min 85mm bearing at the internal support

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Floor Joist Span - I-Built LVL 11

Single Span

MAX JOIST SPAN (M)						
		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	2.9	2.8	2.7	2.6
		190 x 45	4.2	4.0	3.9	3.7
		240 x 45	5.0	4.9	4.8	4.5
		300 x 45	6.0	5.8	5.7	5.4
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	2.8	2.7	2.6	2.4
		190 x 45	3.8	3.6	3.6	3.3
		240 x 45	4.7	4.5	4.5	4.2
		300 x 45	5.5	5.4	5.3	5.0

		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	2.9	2.8	2.7	2.6
		190 x 45	4.1	3.9	3.8	3.6
		240 x 45	4.9	4.8	4.7	4.5
		300 x 45	5.8	5.6	5.6	5.3
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	2.7	2.6	2.5	2.3
		190 x 45	3.6	3.5	3.4	3.2
		240 x 45	4.5	4.4	4.3	4.0
		300 x 45	5.4	5.2	5.1	4.9

		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	2.7	2.6	2.6	2.4
		190 x 45	3.7	3.6	3.5	3.3
		240 x 45	4.6	4.5	4.4	4.1
		300 x 45	5.4	5.3	5.2	4.9
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	2.5	2.4	2.4	2.2
		190 x 45	3.4	3.3	3.2	3.0
		240 x 45	4.3	4.1	4.0	3.8
		300 x 45	5.1	5.0	4.9	4.6

Continuous Span

MAX JOIST SPAN (M)						
		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	3.7	3.4	3.3	3.1
		190 x 45	4.6	4.5	4.4	4.2
		240 x 45	5.5	5.4	5.3	5.0
		300 x 45	6.5	6.3	6.2	5.9
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	3.7	3.6	3.5	3.2
		190 x 45	4.6	4.5	4.4	4.2
		240 x 45	5.5	5.4	5.3	5.0
		300 x 45	6.5	6.3	6.2	5.9

		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	3.5	3.2	3.2	3.0
		190 x 45	4.7	4.6	4.5	4.2
		240 x 45	5.6	5.4	5.4	5.1
		300 x 45	6.6	6.4	6.3	6.0
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	3.7	3.5	3.4	3.2
		190 x 45	4.7	4.6	4.5	4.2
		240 x 45	5.6	5.4	5.4	5.1
		300 x 45	6.6	6.4	6.3	6.0

		LVL11 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	140 x 45	3.3	3.2	3.1	2.9
		190 x 45	4.2	4.1	4.1	3.8
		240 x 45	5.1	4.9	4.8	4.6
		300 x 45	6.0	5.8	5.7	5.4
	DEAD LOAD TILED FLOOR 95 KG/M²	140 x 45	3.3	3.2	3.1	2.9
		190 x 45	4.2	4.1	4.1	3.8
		240 x 45	5.1	4.9	4.8	4.6
		300 x 45	6.0	5.8	5.7	5.4

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Floor Joist Span - I-Built LVL 13

Single Span

		MAX JOIST SPAN (M)				
		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	3.3	3.1	3.1	2.9
		200 x 45	4.6	4.4	4.3	4.1
		240 x 45	5.3	5.1	5.0	4.8
		300 x 45	6.2	6.1	6.0	5.6
		360 x 45	7.2	7.0	6.8	6.5
		150 x 63	3.8	3.5	3.5	3.3
		200 x 63	5.0	4.9	4.8	4.5
		240 x 63	5.7	5.6	5.5	5.2
		300 x 63	6.8	6.6	6.5	6.1
		360 x 63	7.8	7.6	7.5	7.0
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	3.2	3.1	3.0	2.8
		200 x 45	4.2	4.1	4.0	3.7
		240 x 45	4.9	4.8	4.7	4.5
		300 x 45	5.8	5.6	5.5	5.3
		360 x 45	6.6	6.4	6.3	6.0
		150 x 63	3.9	3.7	3.7	3.4
		200 x 63	5.0	4.8	4.8	4.5
		240 x 63	5.7	5.5	5.5	5.2
		300 x 63	6.7	6.5	6.4	6.1
		360 x 63	7.6	7.4	7.3	7.0

		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	3.3	3.1	3.1	2.9
		200 x 45	4.5	4.4	4.3	4.0
		240 x 45	5.2	5.0	5.0	4.7
		300 x 45	6.1	5.9	5.8	5.5
		360 x 45	6.9	6.7	6.7	6.3
		150 x 63	3.8	3.5	3.5	3.3
		200 x 63	5.1	4.9	4.9	4.6
		240 x 63	5.8	5.7	5.6	5.3
		300 x 63	6.9	6.7	6.6	6.2
		360 x 63	7.9	7.7	7.6	7.2
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	3.1	2.9	2.9	2.7
		200 x 45	4.1	3.9	3.8	3.6
		240 x 45	4.8	4.6	4.6	4.3
		300 x 45	5.6	5.5	5.4	5.1
		360 x 45	6.4	6.2	6.1	5.8
		150 x 63	3.7	3.6	3.5	3.3
		200 x 63	4.8	4.7	4.6	4.4
		240 x 63	5.5	5.4	5.3	5.0
		300 x 63	6.5	6.3	6.2	5.9
		360 x 63	7.4	7.2	7.1	6.8

		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	3.1	3.0	2.9	2.7
		200 x 45	4.2	4.0	3.9	3.7
		240 x 45	4.8	4.7	4.6	4.4
		300 x 45	5.7	5.5	5.5	5.2
		360 x 45	6.5	6.3	6.2	5.9
		150 x 63	3.7	3.5	3.5	3.3
		200 x 63	4.6	4.5	4.4	4.1
		240 x 63	5.3	5.1	5.0	4.8
		300 x 63	6.2	6.1	6.0	5.6
		360 x 63	7.2	7.0	6.8	6.5
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	2.9	2.7	2.7	2.5
		200 x 45	3.8	3.7	3.6	3.3
		240 x 45	4.5	4.4	4.3	4.0
		300 x 45	5.3	5.2	5.1	4.9
		360 x 45	6.1	5.9	5.9	5.6
		150 x 63	3.5	3.4	3.3	3.1
		200 x 63	4.6	4.5	4.4	4.1
		240 x 63	5.3	5.1	5.0	4.8
		300 x 63	6.2	6.0	6.0	5.6
		360 x 63	7.1	6.9	6.8	6.5

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Floor Joist Span - I-Built LVL 13

Continuous Span

		MAX JOIST SPAN (M)				
		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 1.5KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	4.0	3.8	3.7	3.5
		200 x 45	5.0	4.9	4.8	4.5
		240 x 45	5.8	5.6	5.5	5.2
		300 x 45	6.8	6.6	6.5	6.2
		360 x 45	7.8	7.6	7.5	7.1
		150 x 63	4.4	4.3	4.2	4.0
		200 x 63	5.5	5.3	5.2	4.9
		240 x 63	6.3	6.1	6.0	5.7
		300 x 63	7.4	7.2	7.1	6.7
		360 x 63	8.5	8.3	8.2	7.7
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	4.0	3.9	3.9	3.6
		200 x 45	5.0	4.9	4.8	4.5
		240 x 45	5.8	5.6	5.5	5.2
		300 x 45	6.8	6.6	6.5	6.2
		360 x 45	7.8	7.6	7.5	7.1
		150 x 63	4.4	4.3	4.2	4.0
		200 x 63	5.5	5.3	5.2	4.9
		240 x 63	6.3	6.1	6.0	5.7
		300 x 63	7.4	7.2	7.1	6.7
		360 x 63	8.5	8.3	8.2	7.7

		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 2.0KPA DISTRIBUTED 1.8KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	4.1	3.8	3.7	3.5
		200 x 45	5.1	5.0	4.9	4.6
		240 x 45	5.9	5.7	5.6	5.3
		300 x 45	7.0	6.7	6.6	6.3
		360 x 45	8.0	7.7	7.6	7.2
		150 x 63	4.5	4.3	4.2	4.0
		200 x 63	5.6	5.4	5.3	5.0
		240 x 63	6.4	6.2	6.1	5.8
		300 x 63	7.6	7.3	7.2	6.8
		360 x 63	8.7	8.4	8.3	7.8
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	4.1	4.0	3.9	3.6
		200 x 45	5.1	5.0	4.9	4.6
		240 x 45	5.9	5.7	5.6	5.3
		300 x 45	7.0	6.7	6.6	6.3
		360 x 45	8.0	7.7	7.6	7.2
		150 x 63	4.5	4.3	4.3	4.0
		200 x 63	5.6	5.4	5.3	5.0
		240 x 63	6.4	6.2	6.1	5.8
		300 x 63	7.6	7.3	7.2	6.8
		360 x 63	8.7	8.4	8.3	7.8

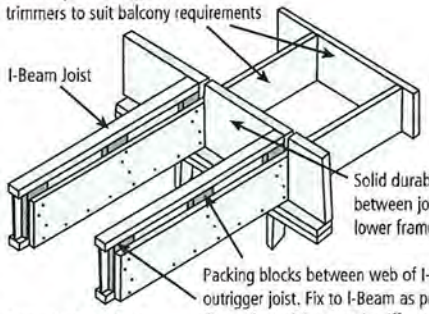
		LVL13 SIZE	400CRS	450CRS	480CRS	600CRS
LIVE LOADS: 3.0KPA DISTRIBUTED 2.7KN CONCENTRATED	DEAD LOAD TIMBER FLOOR 40 KG/M²	150 x 45	3.7	3.6	3.5	3.3
		200 x 45	4.6	4.5	4.4	4.2
		240 x 45	5.3	5.1	5.1	4.8
		300 x 45	6.3	6.1	6.0	5.7
		360 x 45	7.2	7.0	6.9	6.5
		150 x 63	4.0	3.9	3.9	3.6
		200 x 63	5.0	4.9	4.8	4.5
		240 x 63	5.8	5.6	5.5	5.2
		300 x 63	6.8	6.6	6.5	6.2
		360 x 63	7.8	7.6	7.5	7.1
	DEAD LOAD TILED FLOOR 95 KG/M²	150 x 45	3.7	3.6	3.5	3.3
		200 x 45	4.6	4.5	4.4	4.2
		240 x 45	5.3	5.1	5.1	4.8
		300 x 45	6.3	6.1	6.0	5.7
		360 x 45	7.2	7.0	6.9	6.5
		150 x 63	4.0	3.9	3.9	3.6
		200 x 63	5.0	4.9	4.8	4.5
		240 x 63	5.8	5.6	5.5	5.2
		300 x 63	6.8	6.6	6.5	6.2
		360 x 63	7.8	7.6	7.5	7.1

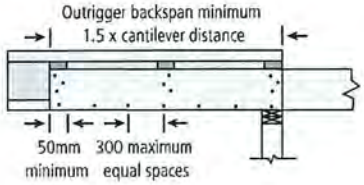
PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

2.1 Cantilever Outrigger Deck/Balcony Detail

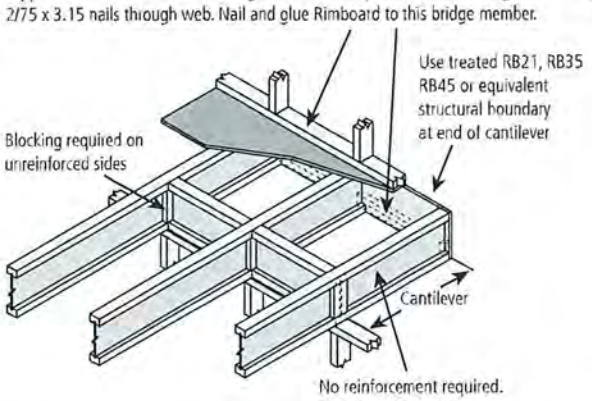
2.0 Durable joist outriggers and edge trimmers to suit balcony requirements





2.2 Cantilever Method (M1)

2.1 If bottom plate is outside the requirements of NZS 3604 Table 8.17 and requires support use min 70 x 35 MSG8 bridge member on top of the bottom flange, fixed using 2/75 x 3.15 nails through web. Nail and glue Rimboard to this bridge member.



PLEASE NOTE:

M1 - no reinforcement required.

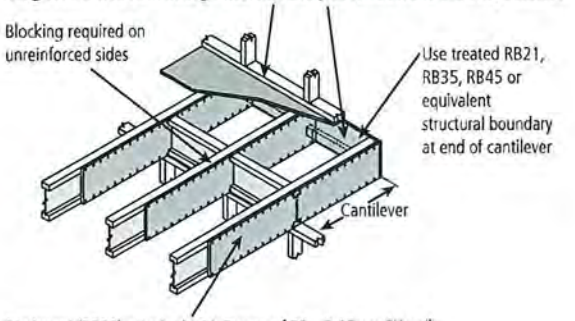
M2 - load-bearing cantilever reinforced one side.

M3 - load-bearing cantilever reinforced both sides.

Cantilever distance allowable for I-Beam sizes to be verified by reference to the I-Beam span tables or HD software.

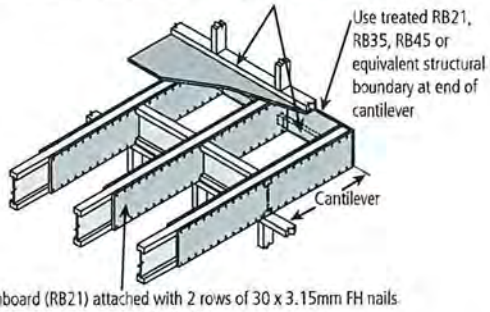
2.3 Cantilever Method 2 (M2) Detail

2.2 If bottom plate is outside the requirements of NZS 3604 Table 8.17 and requires support use min 70 x 35 MSG8 bridge member on top of the bottom flange, fixed using 2/75 x 3.15 nails through web. Nail and glue Rimboard to this bridge member



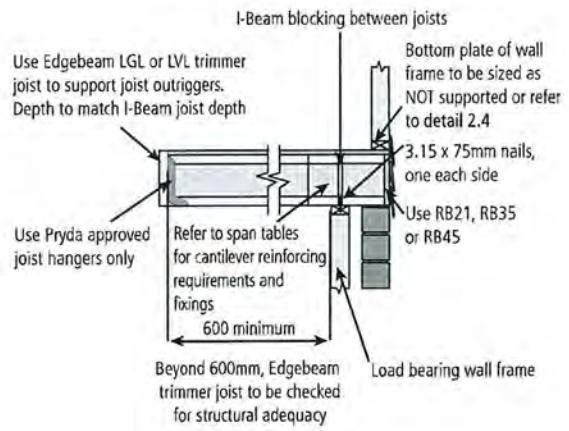
2.4 Cantilever Method 3 (M3)

2.3 If bottom plate is outside the requirements of NZS 3604 Table 8.17 and requires support use 70 x 35 MSG8 bridge member on top of the bottom flange, fixed using 2/75 x 3.15 nails through web. Nail and glue Rimboard to this bridge member.



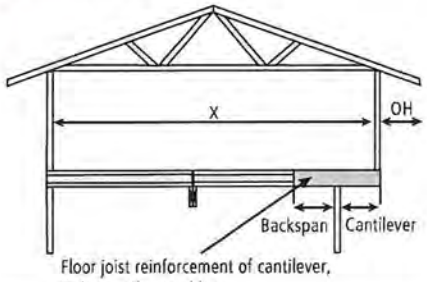
2.5 Brick Edge Cantilever

2.4



2.6 Load Bearing Cantilever Example

2.5



Minimum backspan of reinforcement equals cantilever length

$$\text{Roof load width (RLW)} = \left(\frac{X}{2} + OH\right)$$

Refers to superceded detail number

Cantilever Floor Joist Details / Fixing Details

Span Table – Load Bearing Cantilever - 1.5 kPa Floor

MAXIMUM CANTILEVER	I-BEAM SOLUTION	LIGHT WEIGHT ROOFING - (UP TO 20KG/M²)									HEAVY WEIGHT ROOFING - (UP TO 60KG/M²)								
		ROOF LOAD WIDTH, RLW (M)									ROOF LOAD WIDTH, RLW (M)								
		4.0			6.0			8.0			2.0			4.0			6.0		
FLOOR JOIST SPACINGS(MM)		300	450	600	300	450	600	300	450	600	300	450	600	300	450	600	300	450	600
450MM	LPI 225	M1	M1	M2	M1	M2	M3	M1	M2	-	M1	M1	M2	M1	M2	-	M1	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
750MM	LPI 225	M1	M1	M2	M1	M2	-	M1	M3	-	M1	M1	M2	M1	M2	-	M1	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
900MM	LPI 225	M1	M1	M3	M1	M2	-	M1	M3	-	M1	M1	M3	M1	M3	-	M2	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M3	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
1200MM	LPI 225	M1	M3	-	M2	-	-	M3	-	-	M1	M3	-	M2	-	-	-	-	-
	LPI 240	M1	M1	M3	M1	M2	-	M1	M3	-	M1	M1	M3	M1	M3	-	M2	-	-
	LPI 300	M1	M1	M1	M1	M1	M2	M1	M1	M2	M1	M1	M1	M1	M1	M2	M1	M2	M3
	LPI 356	M1	M1	M1	M1	M1	M2	M1	M1	M2	M1	M1	M1	M1	M1	M2	M1	M2	M3

Span Table – Load Bearing Cantilever 0.5 kPa Snow Load

MAXIMUM CANTILEVER	I-BEAM SOLUTION	LIGHT WEIGHT ROOFING - (UP TO 20KG/M²)									HEAVY WEIGHT ROOFING - (UP TO 60KG/M²)								
		ROOF LOAD WIDTH, RLW (M)									ROOF LOAD WIDTH, RLW (M)								
		4.0			6.0			8.0			2.0			4.0			6.0		
FLOOR JOIST SPACINGS(MM)		300	450	600	300	450	600	300	450	600	300	450	600	300	450	600	300	450	600
450MM	LPI 225	M1	M1	M2	M1	M2	M3	M1	M2	-	M1	M1	M2	M1	M2	-	M1	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
750MM	LPI 225	M1	M1	M2	M1	M2	-	M1	M3	-	M1	M1	M2	M1	M2	-	M1	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
900MM	LPI 225	M1	M1	M3	M1	M2	-	M1	M3	-	M1	M1	M3	M1	M3	-	M2	-	-
	LPI 240	M1	M1	M1	M1	M1	M2	M1	M2	M3	M1	M1	M1	M1	M1	M3	M1	M2	-
	LPI 300	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
	LPI 356	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M2
1200MM	LPI 225	M1	M3	-	M2	-	-	M3	-	-	M1	M3	-	M2	-	-	-	-	-
	LPI 240	M1	M1	M3	M1	M2	-	M1	M3	-	M1	M1	M3	M1	M3	-	M2	-	-
	LPI 300	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	M3
	LPI 356	M1	M1	M1	M1	M1	M2	M1	M1	M3	M1	M1	M1	M1	M1	M2	M1	M2	M3

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

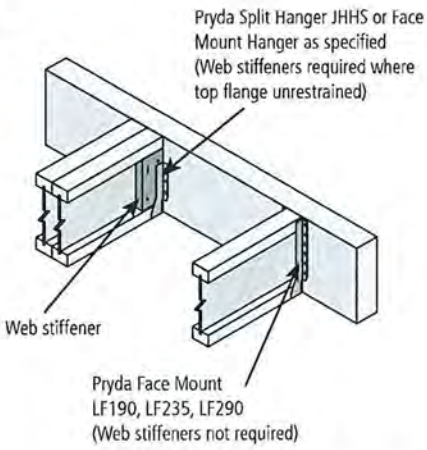
Pryda I-Beam hangers have been engineered to provide support for I-Beams, Hyne LGL and 17C beams in domestic and commercial applications. The hangers are fully compatible with I-Beams, Hyne LGL and 17C beams and are suitable for any support configuration. The product has been developed in accordance with the relevant New Zealand Building Standards and the design capacities are verified by a rigorous testing program. We recommend that installation of I-Beams, Hyne LGL and 17C beams with the Pryda I-Beam hangers is conducted in accordance with the construction guide.

PLEASE NOTE:

- *You must check the capacity of all hangers and connections for your particular application.*
- *Minimum 3mm/maximum 6mm clearance between beams. Contact between beams may cause squeaks.*
- *Ensure fasteners are selected to meet the durability requirements of NZS 3604:2011.*
- *Use the correct nails, screws and nail plates, following installation instructions.*
- *Builder also to refer to the I-Built supplementary site guide.*

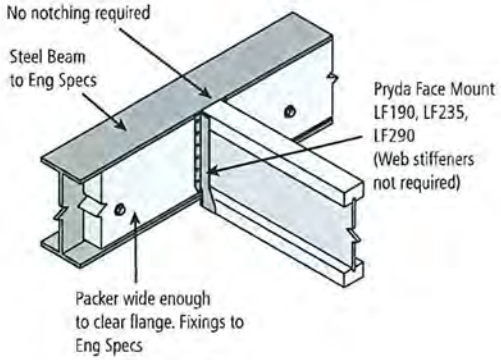
3.1 Joist Hanger Connection Types

4.0



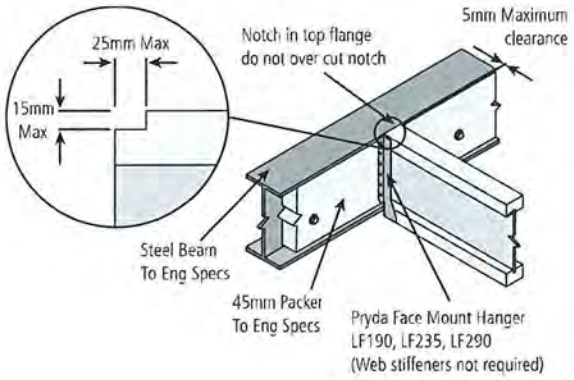
3.2 I-Beam Fixed to Steel Beam with Face Mount Hanger

4.1 Option 1



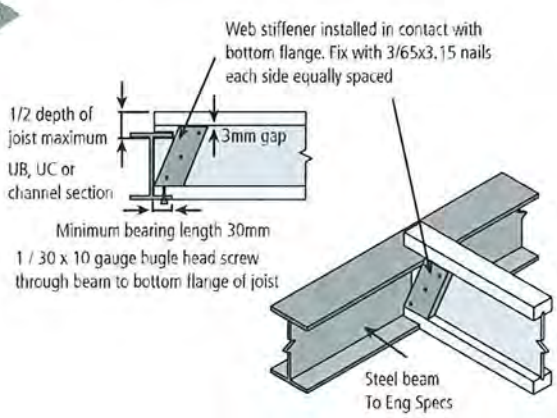
3.3 I-Beam Fixed to Steel Beam with Face Mount Hanger

4.2 Option 2



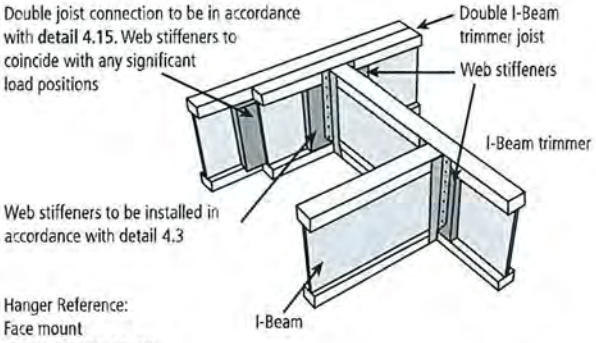
3.4 Joist Connection to Steel Beam

4.3 Option 3



3.5 Joist to Trimmer Connection

4.4

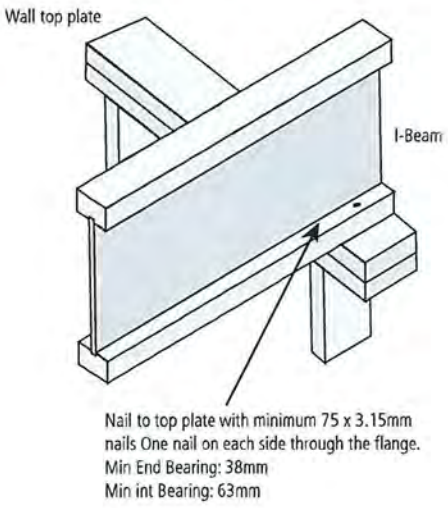


Refers to superceded detail number

3.6 End Bearing

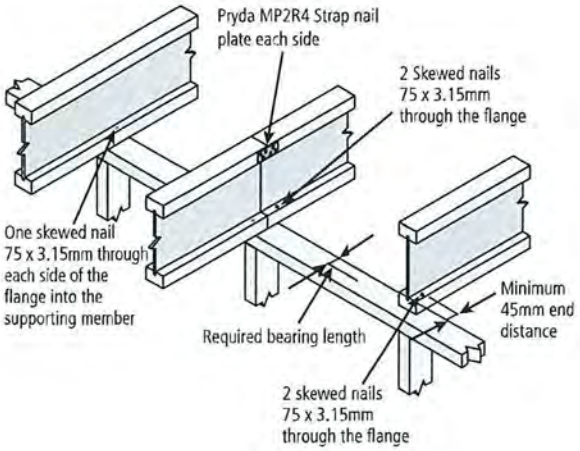
A

4.5



Detail Over the Top Plate at Mid Support

B

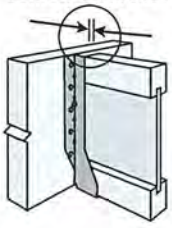


3.7 Fixing Requirements for Face Mount Hangers

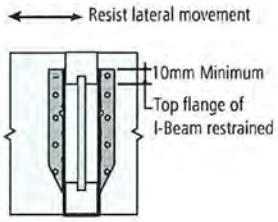
A

4.6

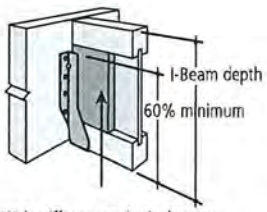
IMPORTANT
Minimum gap 3mm between beam and I-Beam



B



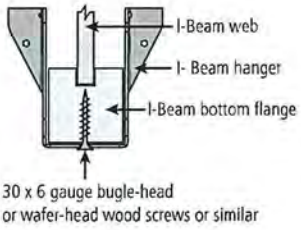
C



Web stiffener required when top flanges are unrestrained

The hanger must support a minimum of 60% of joist depth

D

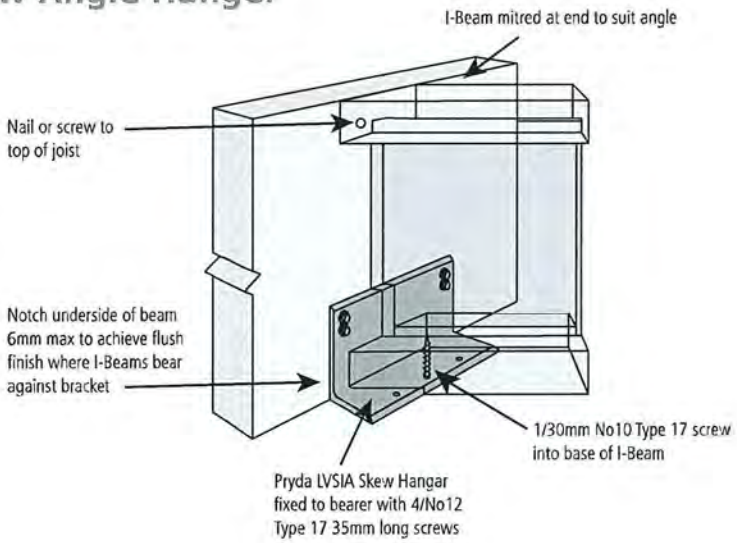


PLEASE NOTE:

Minimum 3mm/maximum 6mm clearance between beams. Contact between beams may cause squeaks.

3.8 Skew Angle Hanger

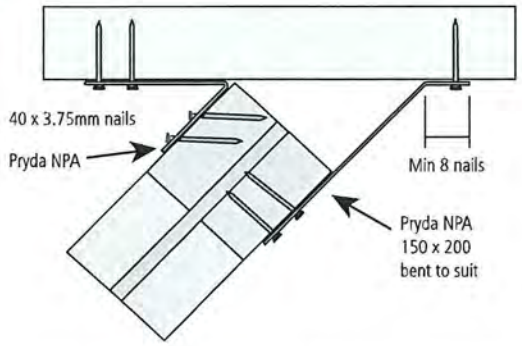
4.7



Refers to superceded detail number

3.9 45° Skew Angle Hanger Fixing

4.8

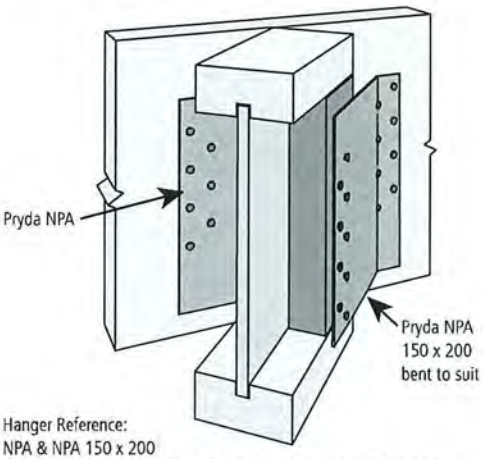


Left or right orientation based on view from the supported I-Beam

Hanger Reference:
NPA & NPA 150 x 200
Refer to New Zealand Wood Products Ltd for alternative solution

3.10 45° Skew Angle Hanger Fixing

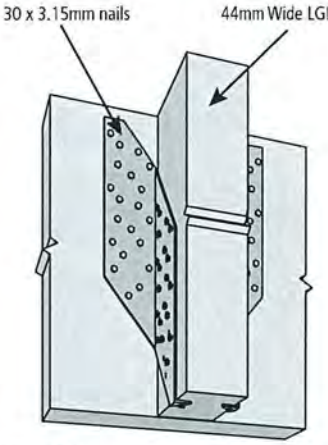
4.9



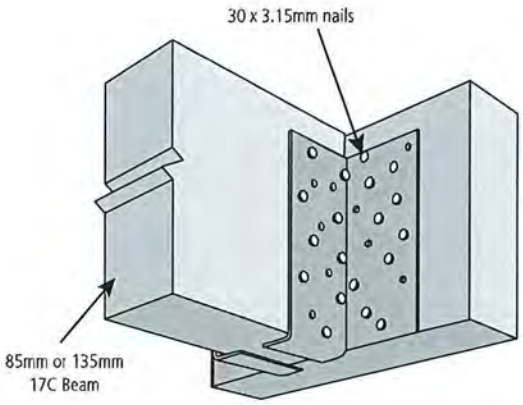
Hanger Reference:
NPA & NPA 150 x 200
Refer to New Zealand Wood Products Ltd for alternative solution

3.11 Hyne LGL & 17c Hanger Fixing

4.10



Hanger Reference:
JHHS

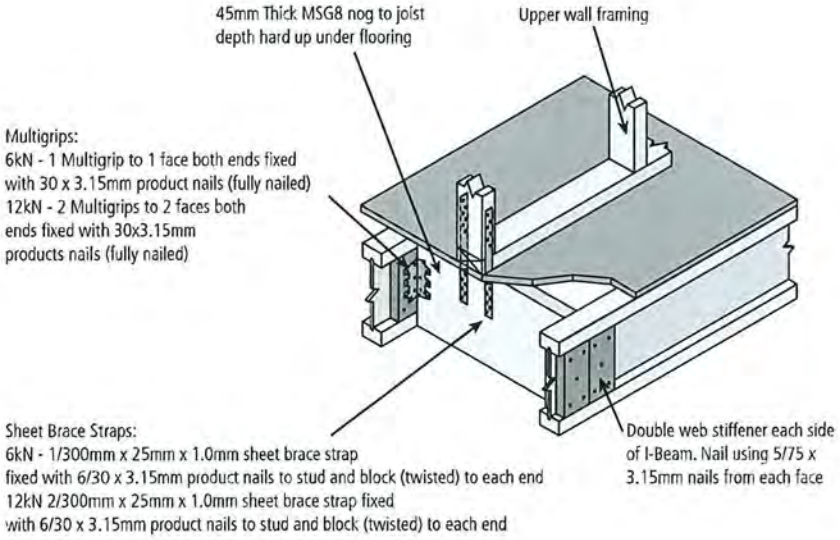


Hanger Reference:
JHSS 212
JHSS 275
JHSS 401

Internal Bracing & Web Stiffener Detail

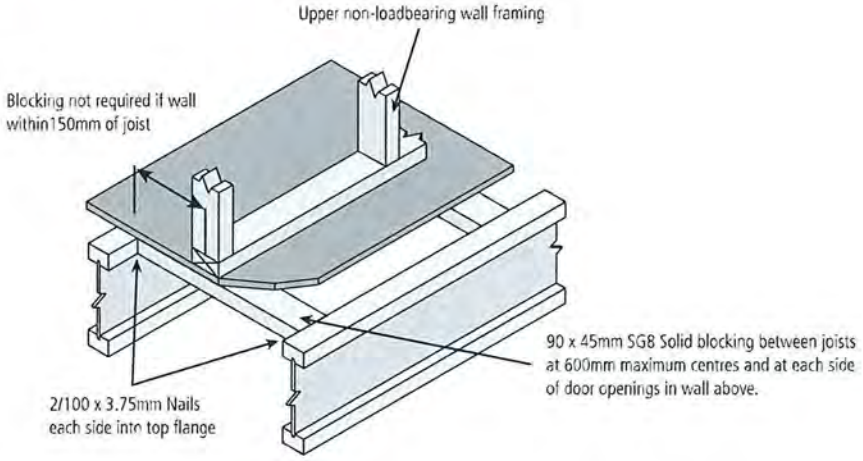
4.1 Bracing Wall Tie Down

5.0



4.2 Non-Loadbearing Wall Parallel

5.1

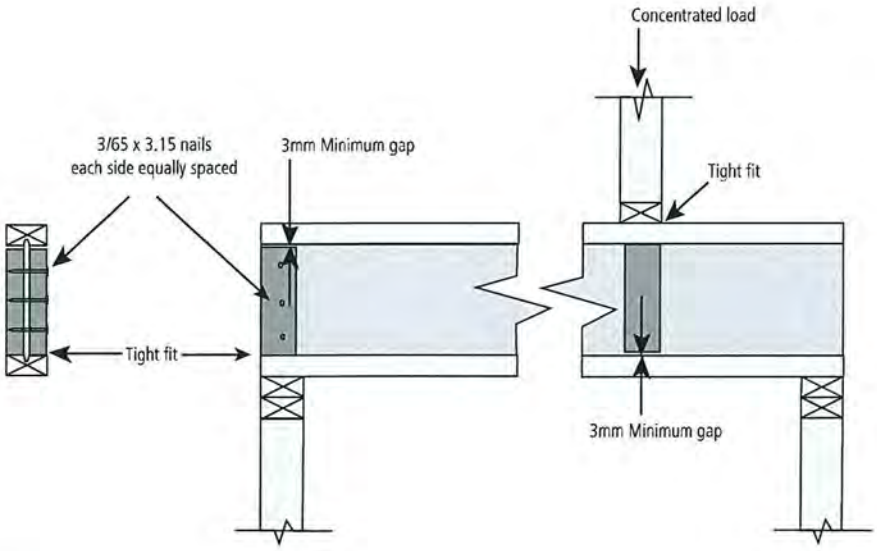


4.3 Web Stiffener Detail

5.2

PLEASE NOTE:

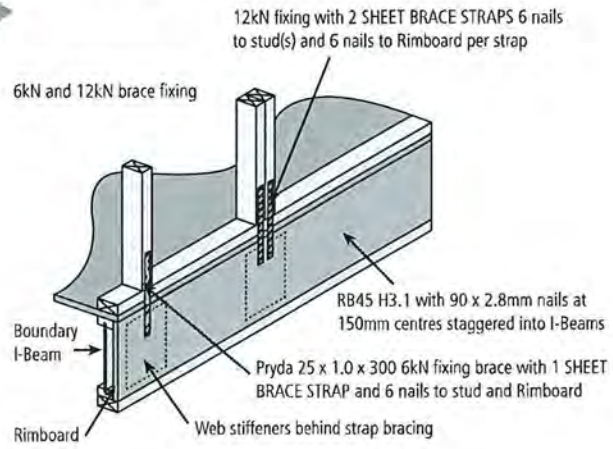
- *Web stiffeners to be used at all concentrated loads and at supports where specified.*
- *Web stiffener size 70 x 30mm.*
- *Web stiffeners are required to prevent buckling of I-Beam web. This occurs when loads are being transferred to the end of the beam.*



Refers to superceded detail number

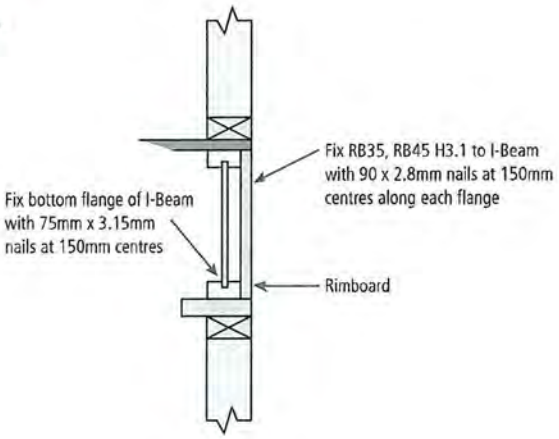
4.4 Rimboard External Wall Bracing Fixing

5.3



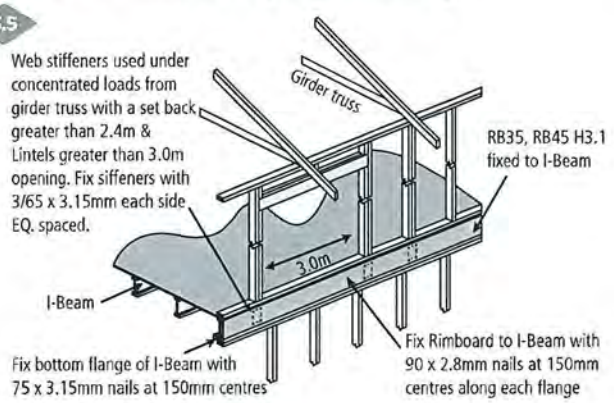
4.5 Rimboard End Joist

5.4



4.6 Load Bearing I-Beam & Rimboard/Boundary

5.5

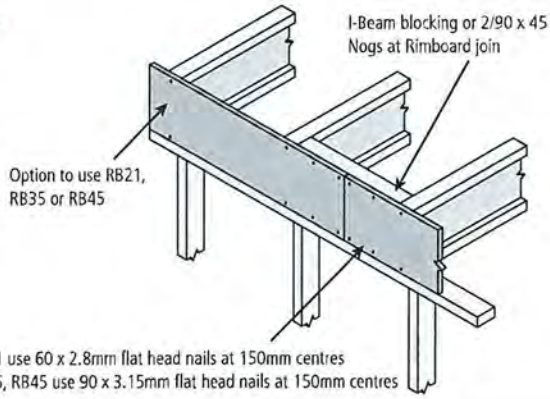


PLEASE NOTE:

- *Avoid using wide section timber.*
- *All Rimboards are treated to H3.1 (LOSP)*
- *Refer to NZS3602.2003 for treatment details.*

4.7 Rimboard Joining

5.6

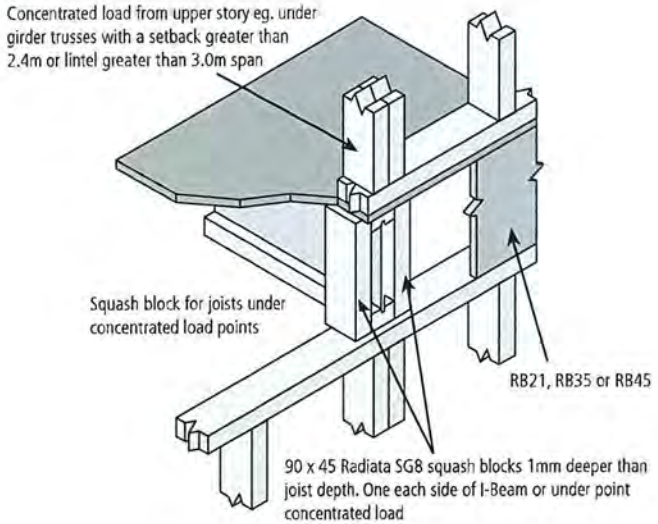


PLEASE NOTE:

- *Blunt nail ends to avoid splitting of flanges.*
- *All Rimboards are treated to H3.1 (LOSP)*
- *Refer to NZS3602.2003 for treatment details.*

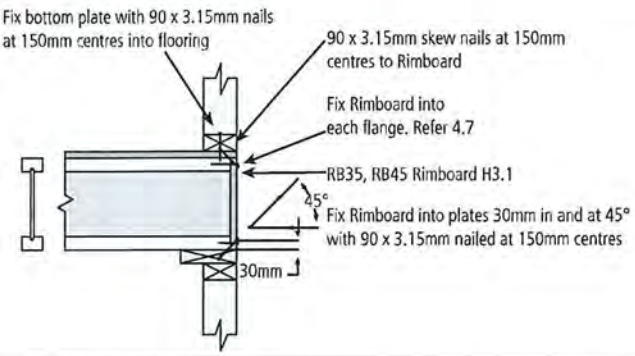
4.8 Concentrated Load at Jam Studs or Posts

5.7



4.9 Rimboard Fixing to I-Beam - Transferring Bracing Load From Wall Above

5.8



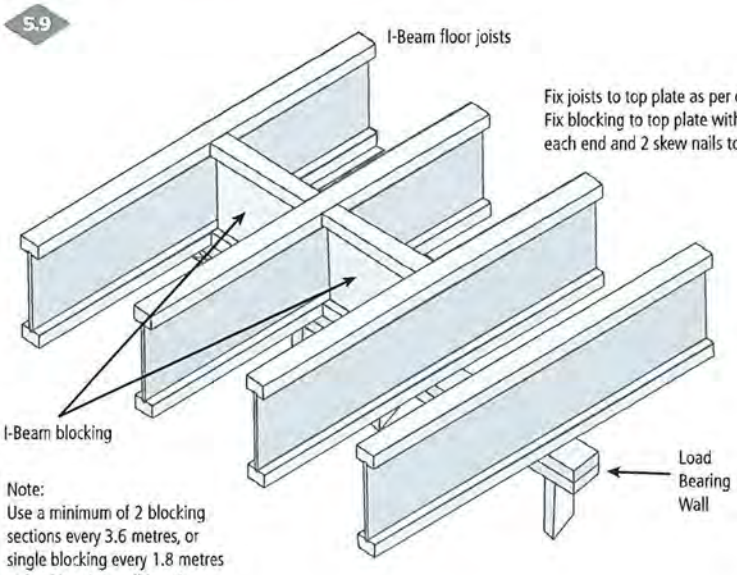
PLEASE NOTE:

- *Where 6kN and 12kN tie down bracing straps are required - these are to be fixed to manufactures specifications in addition to the fixing shown above.*
- *Other wall fixings to NZS3604 requirements.*

Refers to superceded detail number

4.10 Bracing and Blocking

5.9



PLEASE NOTE:

BRACE BLOCKING FOR WIND AND EARTHQUAKE

Bracing of the floor is required to transfer bracing forces from the upper level to the lower level.

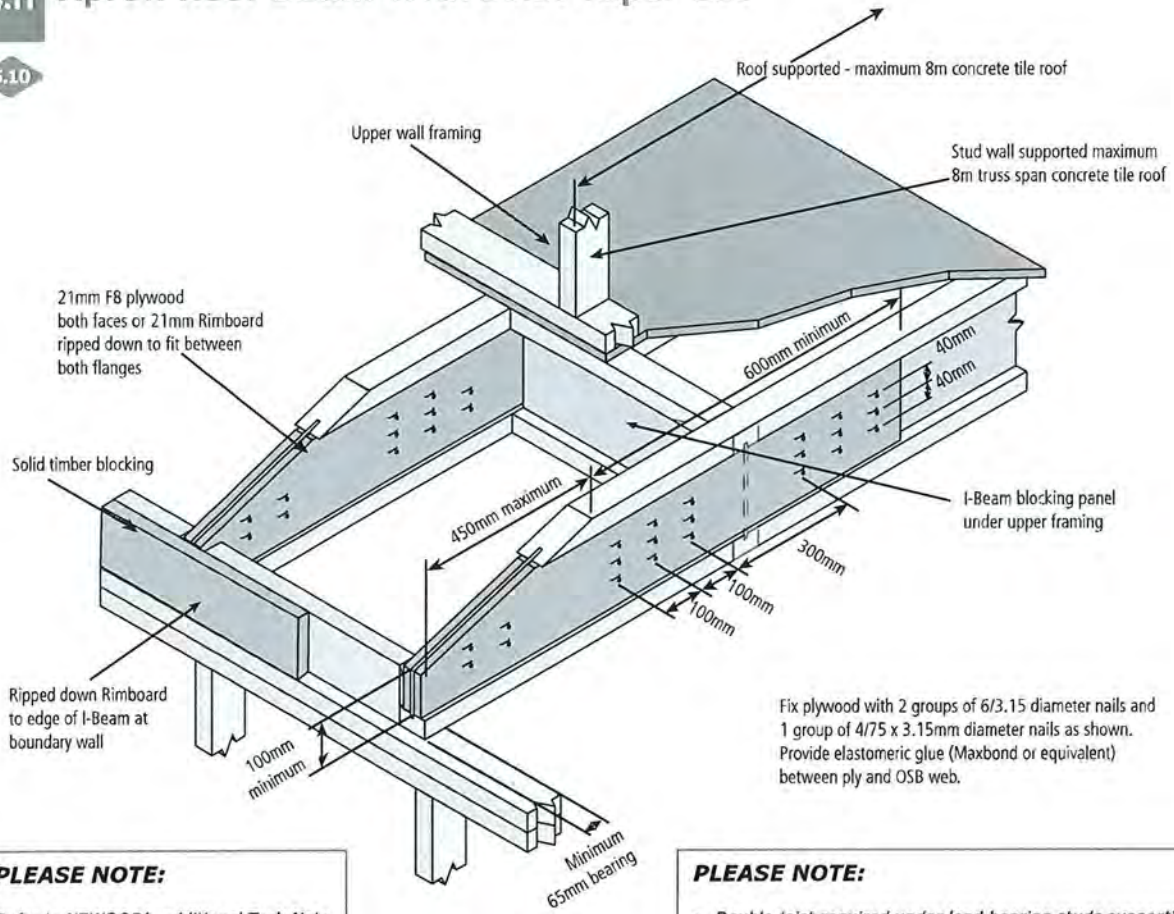
This is achieved by providing lateral restraint to the floor. Where the forces are parallel with the joist this is adequate with the longitudinal shear capacity of the joists.

For forces perpendicular to the joist, brace blocking is required. This can be achieved by two blocking panels at 3.6m centres or one blocking panel at 1.8m centres along bearing and bracing walls.

Along the external wall use the Rimboard.

4.11 Apron Roof Detail With Joist Taper Cut

5.10



Fix plywood with 2 groups of 6/3.15 diameter nails and 1 group of 4/75 x 3.15mm diameter nails as shown. Provide elastomeric glue (Maxbond or equivalent) between ply and OSB web.

PLEASE NOTE:

Refer to NZWOOD's additional Tech Note "Taper Cuts" regarding LP I-Joists maximum reaction capacities at support locations also.

PLEASE NOTE:

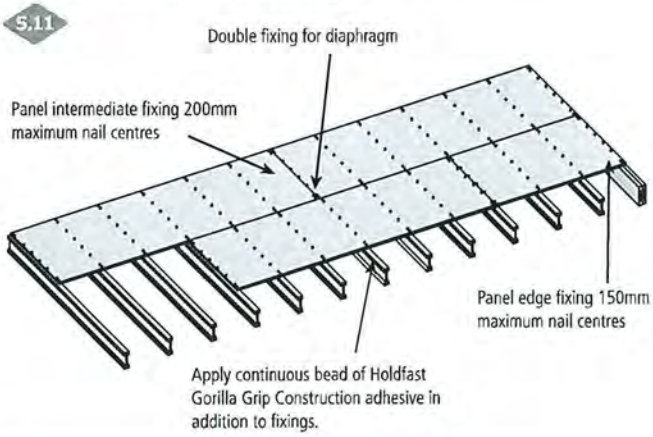
- *Double joist required under load bearing studs supporting upstairs lintels.*
- *For lintel spans greater than 900mm, Engineering design will be required.*
- *Engineered design is required for I-Beams supporting girder trusses.*
- *Rimboard will need to be ripped down on site to fit between flanges.*
- *For I-Beam size selection refer to HD software for walls loaded on joists.*

Refers to superceded detail number

J-Ply Floor Fixing – Details

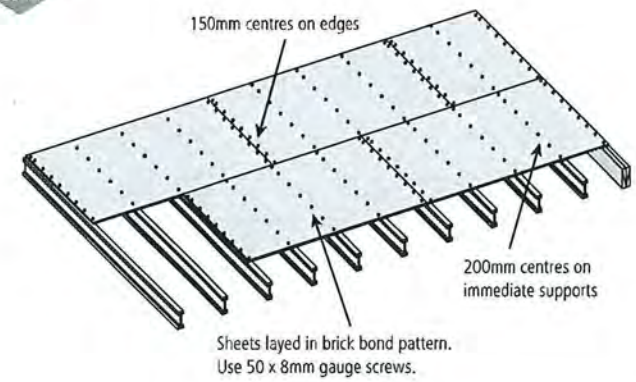
4.12 Fixing Strandfloor/Particle Board Flooring

5.11



4.13 Fixing Plywood Flooring Panels

5.12



PLEASE NOTE:

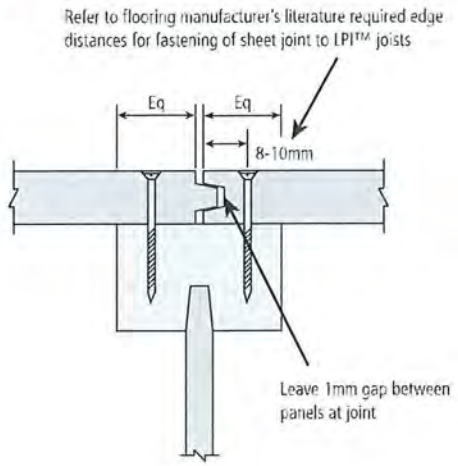
- *Timber nogs or tongue and groove joint is required at sheet edges.*
- *Lay sheets in brick - bond pattern.*

PARTICLE BOARD FIXING OPTIONS		FIXING CENTRES (MM)	
I-BEAM JOISTS	SIZE	ENDS	INTERMEDIATES
Annular grooved galvanised particle board flooring nails	60mm	150	200
Galvanised jolt head nails	60mm	150	200
Type 17 countersunk head self drilling screws	45mm x 8g	150	200

PLYWOOD FIXING OPTIONS		FIXING CENTRES (MM)	
I-BEAM JOISTS	SIZE	ENDS	INTERMEDIATES
Galvanised Flat head Nails	60mm x 2.8g	150	200
Galvanised screw self drilling or counter sunk	60mm x 2.8g	150	200

4.14 Floor Fixing Detail

5.13



PLEASE NOTE:

- *NZWOOD recommends the use of tongue and groove floor sheets.*
- *Floor sheets should be installed staggered, with all edges parallel to the joists bearing on the joist.*
- *Screw floor sheets to each joist. The use of properly applied adequate adhesive will*
- *increase floor performance.*
- *All four floor sheet corners should preferably be screwed.*
- *Leave 10mm gap between sheet edges and walls.*
- *Unless otherwise specified by flooring manufacturer, apply fasteners with 8mm*

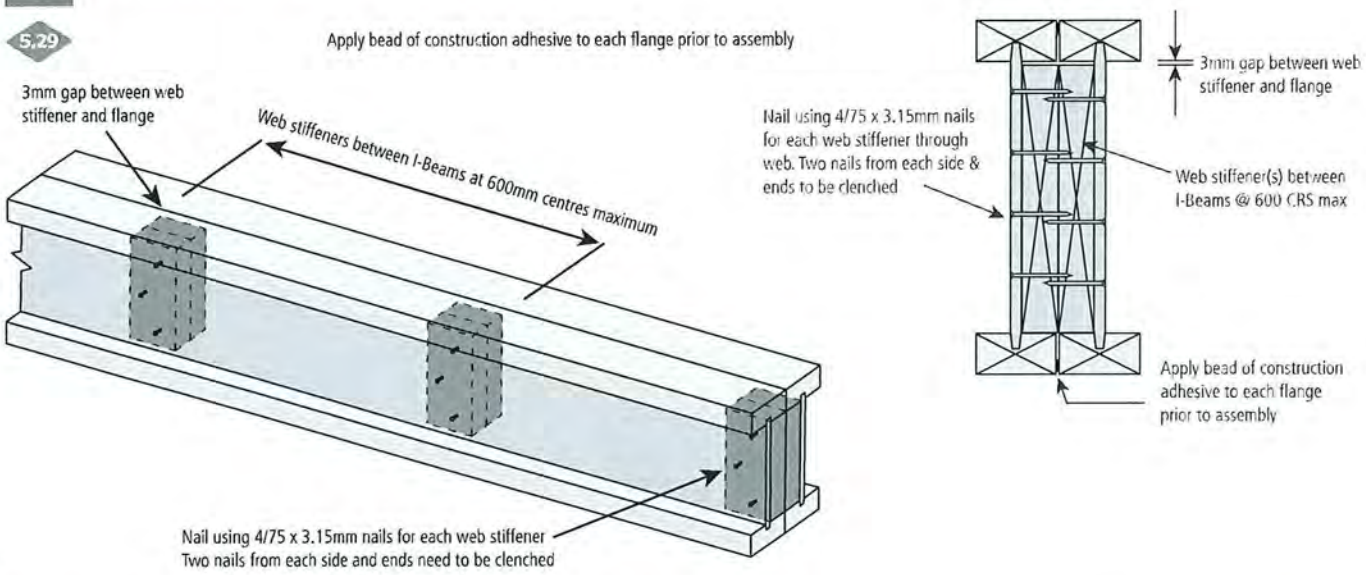
jply

strandfloor®

Refers to superceded detail number

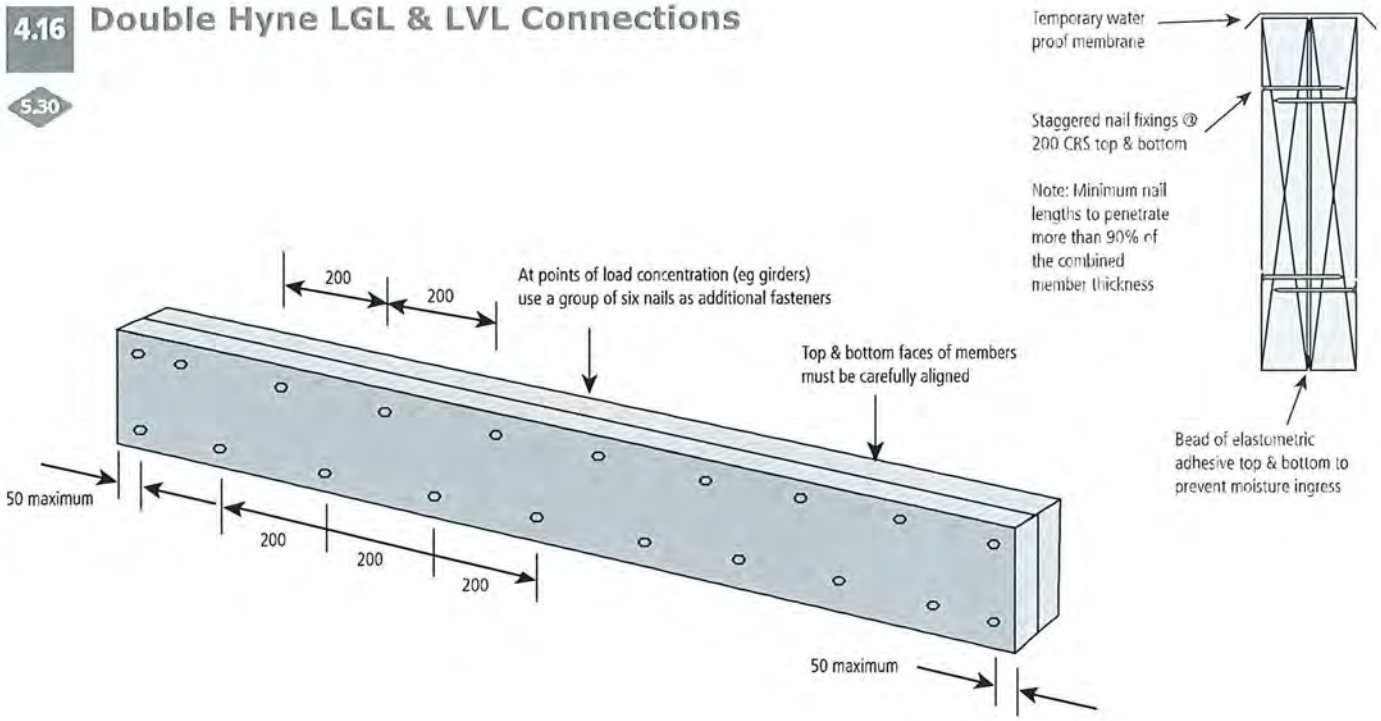
4.15 Double I-Beam Connection

5.29



4.16 Double Hyne LGL & LVL Connections

5.30



PLEASE NOTE:

- *Where the double member supports another member fixed to its face, additional nailing is required from the reverse side of the beam.*
- *Additional fasteners will also be required at points of concentrated load.*
- *Skew nailing is required to avoid prying.*
- *All nails to be alternatively skewed (30° to vertical)*
- *An additional centre row of nails is required to both sides for beams 300mm in depth.*
- *Where a double component has a concentrated load from one side only, use 6x3.15mm diameter nails in the vicinity of the load. Fixing needs to be specifically designed when the load from one side is greater than 4.8kN.*

NAILING SCHEDULE	2 X 44MM HYNE LGL	75 x 3.15mm
	2 X 35 LVL	70 x 3.15mm
	2 X 45 LVL	90 x 3.15mm
	2 X 63 LVL	120 x 3.15mm

Refers to superceded detail number

Holes in LP I-Beams

To use:

1. Select the required depth of I-Beam.
2. Determine the support condition for the nearest bearing: End support or interior support (including cantilever-end supports).
3. Select the row corresponding to the required span. For spans between those listed, use the next largest value.
4. Select the column corresponding to the required hole diameter. For diameters between those listed, use the next largest value.
5. The intersection of the Span row and Hole Diameter column gives the minimum distance from the inside face of bearing to the centre of a circular hole.
6. Double check the distance to the other support, using the appropriate support condition.

Notes:

1. **Cut holes carefully! Do not overcut holes! Do not cut or notch joist top and bottom flanges.**
2. Holes may be placed anywhere within the depth of the joist. A minimum 2mm clear distance is required between the hole and the flanges.
3. Round holes up to 38mm diameter may be placed anywhere in the web
4. Perforated "knockouts" may be neglected when locating web holes.
5. Holes larger than 38mm are not permitted in cantilevers without special engineering.
6. Multiple holes shall have a clear separation along the length of the joist of at least twice the length of the larger adjacent hole, or a minimum of 305mm centre-to-centre, whichever is greater.
7. Multiple holes may be spaced closer than specified, but the assessment of the hole must be made for a hole diameter that would enclose both smaller holes together.
8. Locating holes in joists with spans exceeding those in the tables or larger holes, greater uniform loads or non-uniform loads, and closer proximity to supports and other holes may be possible with analysis using Hyne Design (HD) 7 software. Please contact New Zealand Wood Products (NZWOOD) Limited for more information.

JOIST DEPTH (MM)	CLEAR SPAN (M)	DISTANCE (x) FROM END SUPPORT (M)						DISTANCE (x) FROM INTERIOR OR CANT END SUPPORT (M)					
		HOLE DIAMETER (MM)						HOLE DIAMETER (MM)					
		50MM	100MM	150MM	165MM	225MM	280MM	50MM	100MM	150MM	165MM	225MM	280MM
LPI™ 70-T 225	2.0M	0.30	0.30	0.30	-	-	-	0.30	0.30	0.36	-	-	-
	3.0M	0.30	0.30	0.66	-	-	-	0.30	0.36	1.09	-	-	-
	4.0M	0.30	0.51	1.27	-	-	-	0.38	1.07	1.88	-	-	-
	5.0M	0.38	1.09	1.93	-	-	-	1.04	1.80	-	-	-	-
	6.0M	0.94	1.70	2.62	-	-	-	1.78	2.59	-	-	-	-
LPI™ 70-T 240	2.0M	0.30	0.30	0.30	0.30	-	-	0.30	0.30	0.30	0.33	-	-
	3.0M	0.30	0.30	0.43	0.64	-	-	0.30	0.30	0.84	1.07	-	-
	4.0M	0.30	0.30	1.02	1.27	-	-	0.30	0.84	1.60	1.85	-	-
	5.0M	0.30	0.84	1.65	1.93	-	-	0.84	1.55	2.39	-	-	-
	6.0M	0.71	1.45	2.31	2.59	-	-	1.52	2.31	-	-	-	-
	7.0M	1.27	2.06	2.97	3.30	-	-	2.26	3.10	-	-	-	-
LPI™ 70-T 300	2.0M	0.30	0.30	0.30	0.30	0.30	-	0.30	0.30	0.30	0.30	0.41	-
	3.0M	0.30	0.30	0.30	0.30	0.71	-	0.30	0.30	0.30	0.30	1.14	-
	4.0M	0.30	0.30	0.30	0.46	1.32	-	0.30	0.30	0.81	1.02	1.93	-
	5.0M	0.30	0.30	0.84	1.04	2.01	-	0.30	0.84	1.52	1.75	-	-
	6.0M	0.30	0.74	1.42	1.65	2.67	-	0.89	1.55	2.29	2.51	-	-
	7.0M	0.64	1.30	2.03	2.29	3.38	-	1.57	2.29	3.07	3.33	-	-
	8.0M	1.19	1.88	2.67	2.92	-	-	2.31	3.05	3.89	-	-	-
LPI™ 70-T 356	2.0M	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.46
	3.0M	0.30	0.30	0.30	0.30	0.30	0.76	0.30	0.30	0.30	0.30	0.46	1.19
	4.0M	0.30	0.30	0.30	0.30	0.61	1.40	0.30	0.30	0.30	0.41	1.17	2.01
	5.0M	0.30	0.30	0.30	0.41	1.19	2.08	0.30	0.30	0.91	1.09	1.93	-
	6.0M	0.30	0.30	0.79	0.97	1.83	2.77	0.38	0.97	1.60	1.80	2.72	-
	7.0M	0.30	0.71	1.35	1.57	2.46	3.45	1.04	1.68	2.34	2.57	-	-
	8.0M	0.66	1.27	1.96	2.18	3.12	-	1.73	2.39	3.12	3.35	-	-

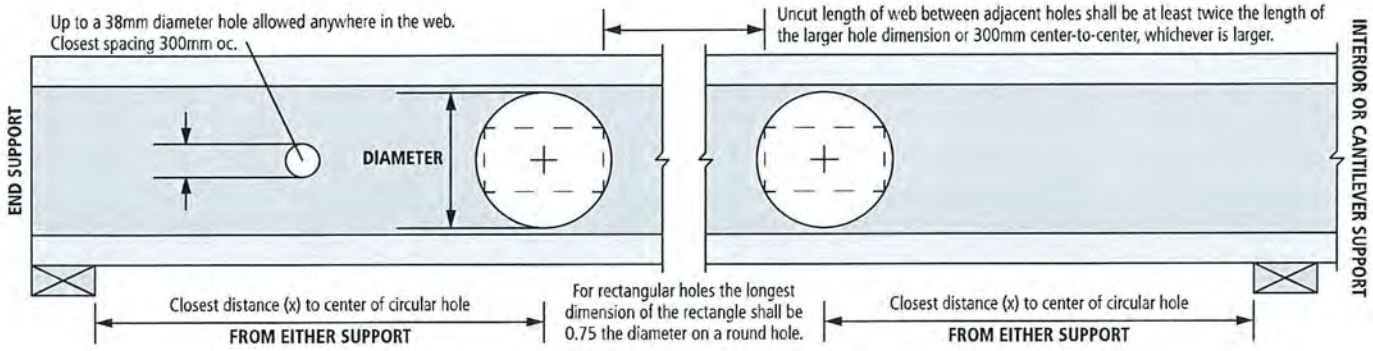
Design assumptions:

1. The hole locations listed above are valid for floor joists supporting only uniform loads that do not exceed those set out in the standard flooring span tables.
2. Hole location is measured from the inside face of bearing to the centre of a circular hole, from the closest support.
3. Clear Span has not been verified for these joists and is shown for informational purposes only. Verify that the joist selected will work for the span and loading conditions needed before checking hole location.
4. The maximum circular hole diameters for I-Beams are: 150mm Dia for 225mm deep, 165mm Dia for 240mm deep, 225mm Dia for 300mm deep and 280mm Dia for 356mm deep.
5. Holes cannot be located in the span where designated "-", without further analysis by a design professional.

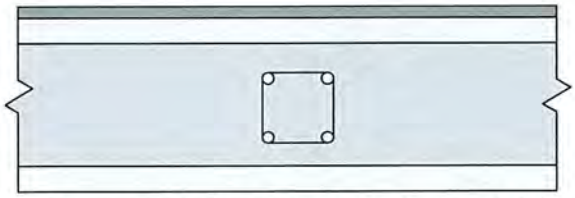
Holes in LP I-Beams

5.1 A Round Holes

6.0



B Square Holes



Note: For rectangular hole sizes the longest dimension of the rectangular shall be 0.75 the diameter of a round hole

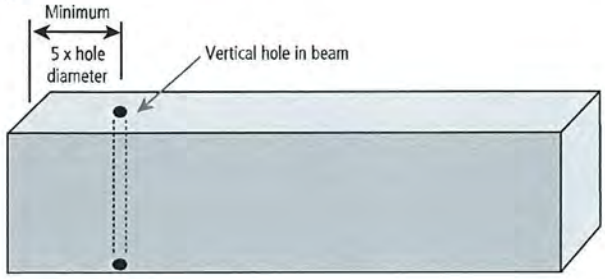
PLEASE NOTE:

- *Never drill, cut or notch the flange, or over-cut the web.*
- *The holes in the web should be cut with a sharp saw.*
- *For rectangular holes, avoid over cutting the corners as this can cause stress concentrations.*
- *Slightly rounding the corners is recommended to avoid over-cutting, for rectangular holes.*
- *Start the rectangular hole by drilling a 10mm diameter hole in each of the four corners and then making the cuts between the holes to minimise damage to the web.*

Refers to superceded detail number

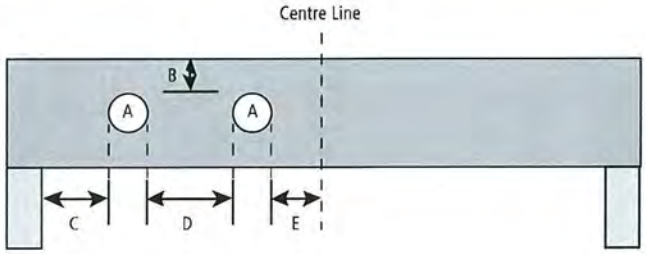
5.2 Vertical Hole Locations in 17c Beams Only

6.7



5.3 Service Hole Locations in Hyne LGL & 17c Beams

6.8



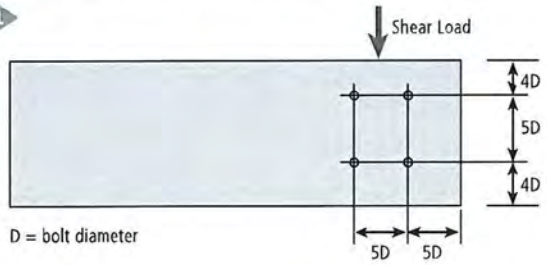
5.4 Service Holes in Hyne LGL & 17c Beams

6.10 The following table outlines the requirements for holes being drilled through Hyne LGL and 17C floor members. For 18C and 21C please phone the technical helpline on 0800 022 357.

	A	B	C	D	E	F
HYNE LGL & 17C BEAMS	MAXIMUM HOLE DIAMETER (MM)	TOP AND BOTTOM EDGE DISTANCE (MM)	MINIMUM END DISTANCE FROM SUPPORT FACE (MM)	MINIMUM HOLE SPACING	MINIMUM DISTANCE FROM CENTRE OF SPAN	MAXIMUM NUMBER OF HOLES IN SPAN
200	25	30	70	5 x Diameter	None	3 Holes / Halfspan
	40	55	290	5 x Diameter	None	3 Holes / Halfspan
	55	55	880	5 x Diameter	440	2 Holes / Halfspan
	75	55	880	1300mm	650	1 Hole / Halfspan
240	25	30	70	5 x Diameter	None	3 Holes / Halfspan
	50	70	360	5 x Diameter	None	3 Holes / Halfspan
	70	70	1050	5 x Diameter	520	2 Holes / Halfspan
	95	70	1050	1600mm	800	1 Hole / Halfspan
295 OR LARGER	25	30	70	5 x Diameter	None	3 Holes / Halfspan
	60	85	440	5 x Diameter	None	3 Holes / Halfspan
	85	85	1200	5 x Diameter	600	2 Holes / Halfspan
	115	85	1200	1800mm	900	1 Hole / Halfspan

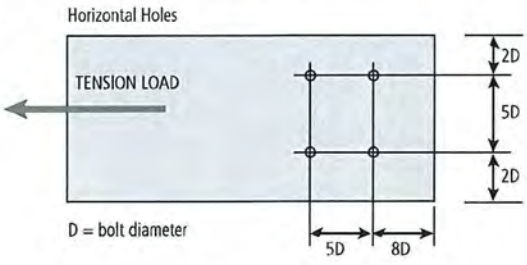
5.5 Fastening Horizontal Holes for Shear Loads

6.11



5.6 Fastening Horizontal Holes for Tension Loads

6.12



PLEASE NOTE:

Details show minimum bolt spacing & bolt edge distances

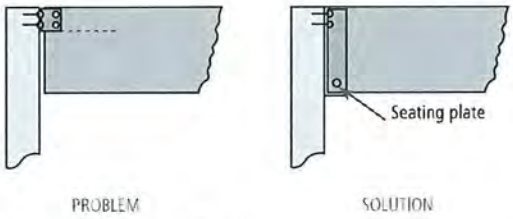
BEAM WIDTH (MM)	MAX HOLE DIA (MM)	MIN HOLE SPACING (MM)
65	15	390
85/130	22	510

Refers to superceded detail number

Overcoming Splitting / Taper Cuts - LGL, 17C & LVL

6.1 Details

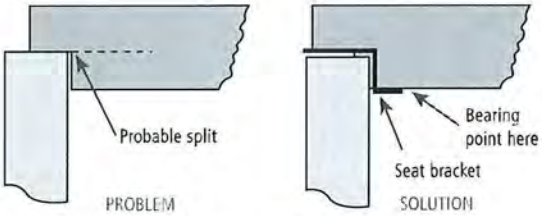
7.0



Splitting at bolted beam support.

6.2 Details

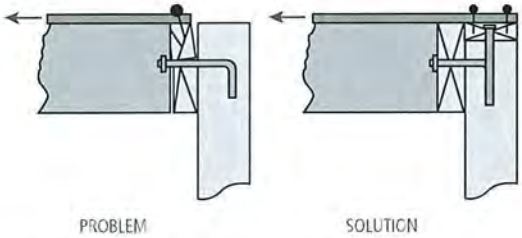
7.1



Splitting at notched beam support.

6.3 Details

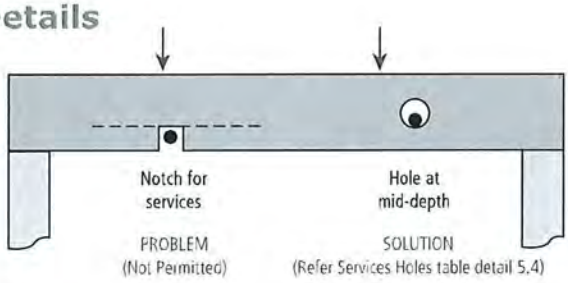
7.2



Splitting due to lateral loads in diaphragm connection.

6.4 Details

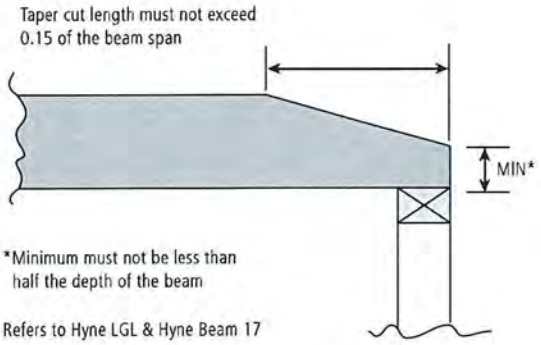
7.3



Splitting at notch in beam.

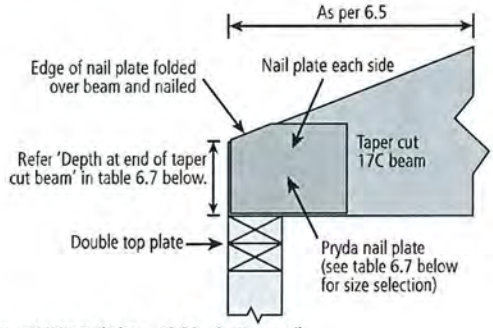
6.5 Unreinforced Tapercut

7.4



6.6 Nail Plate Reinforced Taper Cut

7.5



Pryda NPA 150/190 Nail Plate - 72/30 x 3.15mm nails
Pryda NPB 150/250 Nail Plate - 94/30 x 3.15mm nails
Taper cut length must not exceed 15% of the beam span

6.7 Nail Plate Sizes For Reinforced Taper Cuts Applies to 85mm Hyne Beam 17

7.6 Please phone the technical helpline on 0800 022 357 for beams not listed below.

	NAIL PLATES		TAPER CUT DETAILS	
HYNE 17C BEAM SIZE	DEPTH AT END OF TAPER CUT BEAM (MM)			
	130	160	190	220
330 X 85	NPA 150/190	X	X	X
360 X 85	NPA 150/190	X	X	X
395 X 85	NPB 150/250	NPB 150/250	X	X
425 X 85	NPB 150/250	NPB 150/250	NPB 150/250	X
460 X 85	NPB 150/250	NPB 150/250	NPB 150/250	X
525 X 85	NPB 150/250	NPB 150/250	NPB 150/250	NPB 150/250

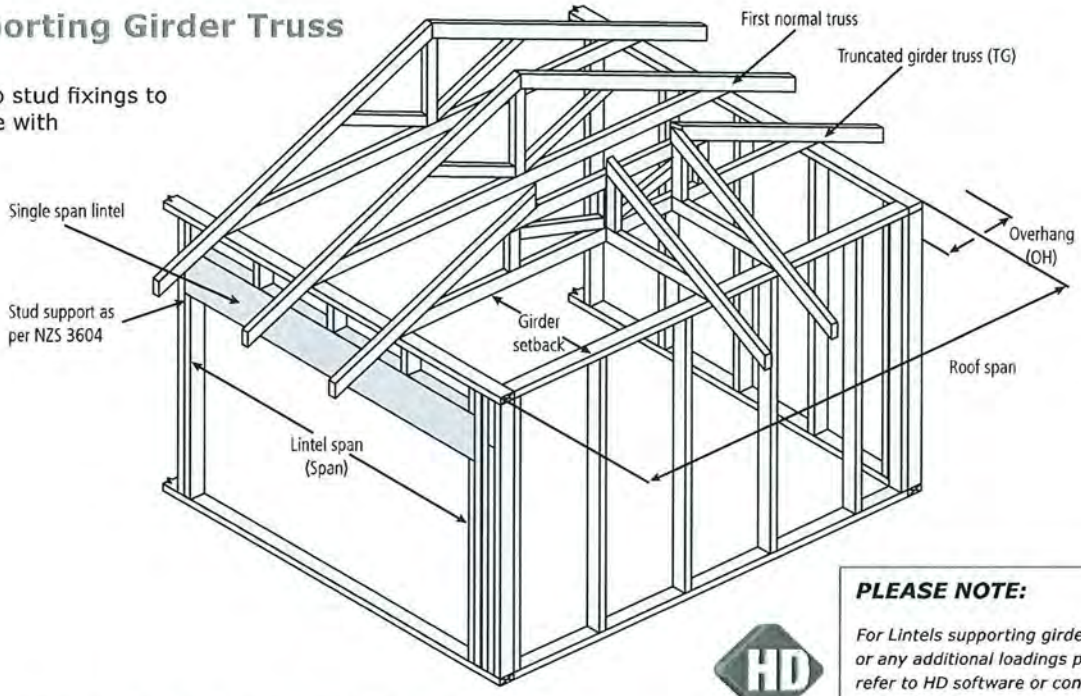
PLEASE NOTE:

Plate to be placed symmetrically about the inner face of the support, i.e. on the shear line
Maximum reaction load for 150 deep NPA is 35kN ultimate. Maximum reaction load for 150 deep NPB is 70kN ultimate
X - indicates where the beam would have more than 50% depth
INSTALLATION: Use 30 x 3.15mm Pryda Timber Connector, Galvanised Nails – GBC030315 (500G)

Refers to superceded detail number

Lintel Supporting Girder Truss

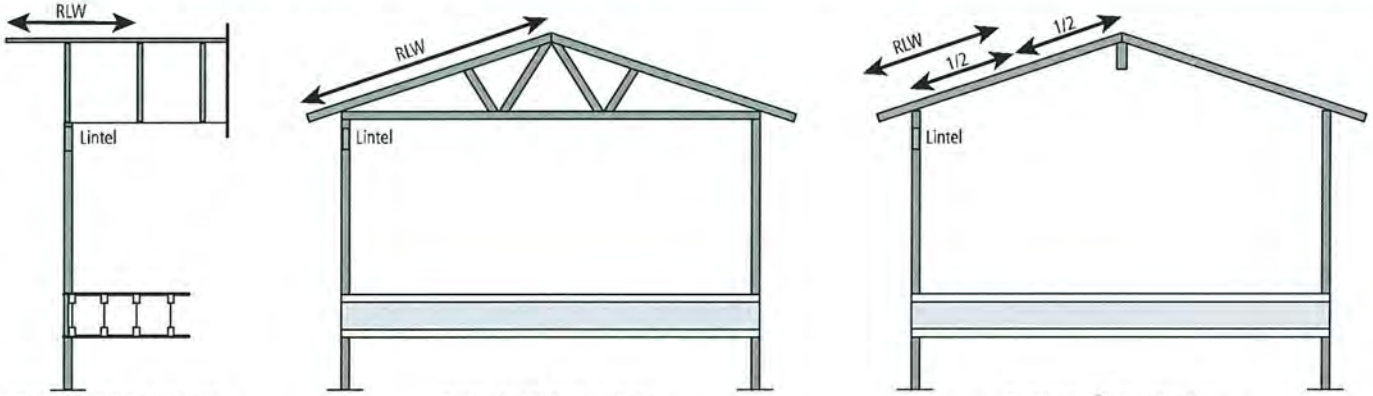
Note: All lintel to stud fixings to be in accordance with NZS3604:2011



PLEASE NOTE:

For Lintels supporting girder trusses or any additional loadings please refer to HD software or contact your technical rep.

Defining Roof Load Width



Roof load width for gable end

Roof load width for truss design

Roof load width for rafter design

Standard Lintel - I-Built 90 LVL

Span Table - Supporting roof loads only - Up to high wind zone / 30° slope

ROOFING TYPE	LINTEL SIZE	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH - RLW (M)									
		1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
METAL ROOF AND CEILING (40KG/M2)	150 x 90	3.2	3.0	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.1
	200 x 90	3.9	3.7	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.9
	240 x 90	4.5	4.3	4.1	3.9	3.8	3.6	3.5	3.5	3.4	3.3
	300 x 90	5.3	5.0	4.8	4.6	4.5	4.3	4.2	**4.1**	**4.0**	**3.9**
	360 x 90	6.1	5.8	5.5	5.3	5.1	5.0	**4.8**	**4.7**	**4.6**	**4.5**
	400 x 90	6.6	6.3	6.0	5.7	5.5	**5.4**	**5.2**	**5.1**	**5.0#**	**4.9#**
TILED ROOF AND CEILING (90KG/M2)	150 x 90	2.6	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.7	1.6
	200 x 90	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.3	2.2
	240 x 90	3.8	3.5	3.4	3.2	3.1	3.0	2.9	2.8	2.7	2.6
	300 x 90	4.5	4.2	4.0	3.8	3.7	3.6	3.5	3.4	3.3#	3.2#
	360 x 90	5.2	4.8	4.6	4.4	4.2	4.1	4.0#	**3.9#**	**3.8#**	**3.7#**
	400 x 90	5.6	5.2	5.0	4.8	4.6	4.4#	4.3#	**4.2#**	**4.1#**	**4.0#**

Denotes member muxst have minimum 2x45mm stud supports at each end

4.0 - Uplift fixings to NZS3604, Figure 8.12

4.0 - Uplift fixings requiring Specific Eng Design

PLEASE NOTE:

These span tables provide maximum member spans to 100% of the recommended capacity. It is recommended that deflection is limited to 5mm to ensure the continued performance of items such as Bifolding door joinery is maintained

Standard Lintel - I-Built 90 LVL

Span Table - Supporting roof and ceiling load only - Up to high wind zone

ROOFING TYPE	LINTEL SIZE	FLOOR LOAD WIDTH (FLW)	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH - RLF (M) 2	3	4	5	6
METAL ROOF AND CEILING (40KG/M2)	150 x 90	1	2.1	2.0	1.9	1.9	1.8
		2	1.9	1.9	1.8	1.7	1.7
		3	1.8	1.7	1.7	1.6	1.6
	200 x 90	1	2.8	2.7	2.6	2.5	2.4
		2	2.6	2.5	2.4	2.3	2.3
		3	2.4	2.3	2.3	2.2	2.1
	240 x 90	1	3.3	3.2	3.1	3.0	2.9
		2	3.1	3.0	2.9	2.8	2.7
		3	2.9	2.8	2.7#	2.7#	2.6#
	300 x 90	1	3.9	3.8	3.7	3.6	3.5
		2	3.6	3.5	3.4#	3.4#	3.3#
		3	3.4#	3.4#	3.3#	3.2#	3.2#
	360 x 90	1	4.5	4.3	4.2	4.1#	4.0#
		2	4.2#	4.1#	4.0#	3.9#	3.8#
		3	3.9#	3.9#	3.8#	3.7#	3.6#
	400 x 90	1	4.9	4.7	4.5	4.4#	4.3#
		2	4.5#	4.4#	4.3#	4.2#	4.1#
		3	4.3#	4.2#	4.1#	4.0#	3.9#
TILED ROOF AND CEILING (90KG/M2)	150 x 90	1	1.9	1.8	1.7	1.6	1.5
		2	1.8	1.7	1.6	1.5	1.4
		3	1.7	1.6	1.5	1.4	1.4
	200 x 90	1	2.5	2.4	2.2	2.1	2.0
		2	2.4	2.2	2.1	2.0	1.9
		3	2.2	2.1	2.0	1.9	1.9#
	240 x 90	1	3.0	2.8	2.7	2.5	2.4
		2	2.8	2.7	2.5	2.4#	2.3#
		3	2.7	2.5#	2.4#	2.3#	2.3#
	300 x 90	1	3.6	3.4	3.2	3.1#	3.0#
		2	3.4	3.3#	3.1#	3.0#	2.9#
		3	3.3#	3.1#	3.0#	2.9#	2.8#
	360 x 90	1	4.1	3.9	3.7#	3.6#	3.5#
		2	3.9#	3.7#	3.6#	3.5#	3.4#
		3	3.7#	3.6#	3.5#	3.4#	3.3#
	400 x 90	1	4.5	4.2#	4.0#	3.9#	3.8#
		2	4.2#	4.0#	3.9#	3.8#	3.7#
		3	4.1#	3.9#	3.8#	3.7#	3.6#

Denotes member muxst have minimum 2x45mm stud supports at each end
4.0 - Uplift fixings to NZS3604, Figure 8.12

Standard Lintel - I-Built LVL 13

Span Table - Supporting roof and ceiling load only - Up to high wind zone

ROOFING TYPE	LINTEL SIZE	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH (M) 1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
LIGHT ROOF: METAL ROOF AND CEILING (40KG/M2)	2/150 X 45	3.5	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.2
	2/200 X 45	4.3	4.0	3.8	3.6	3.5	3.4	3.3	3.2	3.1	3.0
	2/240 X 45	5.0	4.6	4.4	4.2	4.0	3.9	3.7	3.6	3.5	3.4
	2/300 X 45	5.8	5.4	5.2	4.9	4.7	4.6	4.4	4.3	4.2	4.1
	2/360 X 45	6.6	6.2	5.9	5.6	5.4	5.2	5.0	4.9	4.8	4.6
	150 X 63	3.5	3.2	3.0	2.9	2.7	2.6	2.5	2.4	2.3	2.2
	200 X 63	4.3	4.0	3.8	3.6	3.4	3.3	3.2	3.1	3.0	2.9
	240 X 63	4.9	4.6	4.3	4.1	4.0	3.8	3.7	3.6	3.5	3.4
	300 X 63	5.8	5.4	5.1	4.9	4.7	4.5	4.3	4.2	4.1	4.0
	360 X 63	6.6	6.2	5.8	5.6	5.3	5.2	5.0	4.8	4.7	4.6
HEAVY ROOF: TILED ROOF AND CEILING (90KG/M2)	2/150 X 45	2.9	2.7	2.5	2.3	2.2	2.1	2.0	1.9	1.8	1.8
	2/200 X 45	3.6	3.4	3.2	3.0	2.9	2.8	2.7	2.6	2.5	2.4
	2/240 X 45	4.2	3.9	3.7	3.5	3.4	3.2	3.1	3.1	3.0	2.9
	2/300 X 45	4.9	4.6	4.3	4.1	4.0	3.8	3.7	3.6	3.5	3.4
	2/360 X 45	5.6	5.2	5.0	4.7	4.6	4.4	4.3	4.1	4.0	3.9
	150 X 63	2.9	2.6	2.4	2.3	2.1	2.0	1.9	1.9	1.8	1.7
	200 X 63	3.6	3.3	3.1	3.0	2.9	2.7	2.6	2.5	2.4	2.3
	240 X 63	4.1	3.8	3.6	3.4	3.3	3.2	3.1	3.0	2.9	2.8
	300 X 63	4.9	4.5	4.3	4.1	3.9	3.8	3.7	3.6	3.5	3.4
	360 X 63	5.6	5.2	4.6	4.7	4.5	4.3	4.2	4.1	4.0	3.9

PLEASE NOTE:

These span tables provide maximum member spans to 100% of the recommended capacity. It is recommended that deflection is limited to 5mm to ensure the continued performance of items such as Bifolding door joinery is maintained

Standard Lintel - Hyne LGL 44mm

Span Table - Supporting roof and ceiling load only - Up to high wind zone

ROOFING TYPE	LINTEL SIZE	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH (M)									
		1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
METAL ROOF AND CEILING (40KG/M2)	2/200 X 44	4.5	4.2	4.0	3.8	3.6	3.5	3.4	3.3	3.2	3.1
	2/245 X 44	5.2	4.9	4.6	4.4	4.2	4.1	3.9	3.8	3.7	3.6
	2/300 X 44	6.1	5.7	5.4	5.1	4.9	4.7	4.6	4.4	4.3	4.2
	2/360 X 44	6.9	6.5	6.1	5.8	5.6	5.4	5.2	5.1	4.9	4.8
TILED ROOF AND CEILING (90KG/M2)	2/200 X 44	3.7	3.4	3.2	3.1	3.0	2.8	2.8	2.6	2.5	2.4
	2/245 X 44	4.3	4.0	3.8	3.6	3.5	3.5	3.3	3.1	3.1	3.0
	2/300 X 44	5.0	4.7	4.4	4.2	4.0	4.0	3.9	3.7	3.6	3.5*
	2/360 X 44	5.7	5.3	5.0	4.8	4.6	4.6	4.5	4.2*	4.1*	4.0*

* Denotes member must have a minimum 45mm bearing at the 2 supports

Standard Lintel - I-Built LVL 11

Span Table - Supporting roof and ceiling load only - Up to high wind zone

ROOFING TYPE	LINTEL SIZE	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH (M)									
		1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
LIGHT ROOF: METAL ROOF AND CEILING (40KG/M2)	2/140 X 45	3.2	3.0	2.7	2.6	2.4	2.3	2.2	2.1	2.0	2.0
	2/190 X 45	4.0	3.7	3.5	3.3	3.2	3.1	3.0	2.9	2.8	2.7
	2/240 X 45	4.7	4.4	4.2	4.0	3.8	3.7	3.6	3.5	3.4	3.3
	2/300 X 45	5.6	5.2	4.9	4.7	4.5	4.3	4.2	4.1	4.0	3.9
HEAVY ROOF: TILED ROOF AND CEILING (90KG/M2)	2/140 X 45	2.6	2.3	2.2	2.0	1.9	1.8	1.7	1.7	1.6	1.6
	2/190 X 45	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.2	2.1
	2/240 X 45	4.0	3.7	3.5	3.3	3.2	3.1	3.0	2.9	2.8	2.7
	2/300 X 45	4.7	4.4	4.1	3.9	3.8	3.7	3.5	3.4	3.4	3.3

* Denotes member must have a minimum 45mm bearing at the 2 supports

Standard Lintel - Hyne Beam 17C

Span Table - Supporting roof and ceiling load only - Up to high wind zone

ROOFING TYPE	LINTEL SIZE	MAXIMUM LINTEL SPAN (M) ROOF LOAD WIDTH (M)									
		1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
METAL ROOF AND CEILING (40KG/M2)	195 X 85	5.7	5.2	4.9	4.6	4.4	4.2	4.0	3.9	3.8	3.7
	230 X 85	6.6	6.1	5.7	5.3	5.1	4.8	4.7	4.5	4.3	4.2
	260 X 85	7.5	6.8	6.3	6.0	5.7	5.4	5.2	5.0	4.8	4.7
	295 X 85	8.4	7.7	7.2	6.7	6.4	6.1	5.8	5.6	5.4	5.2
	330 X 85	9.5	8.6	8.0	7.5	7.1	6.8	6.5	6.2	6.0	5.8
	360 X 85	10.4	9.4	8.7	8.2	7.8	7.4	7.1	6.8	6.5	6.3
	395 X 85	11.4	10.4	9.6	9.0	8.5	8.1	7.7	7.4	7.2	6.9
	425 X 85	12.4	11.3	10.4	9.7	9.2	8.7	8.3	8.0	7.7	7.4
	460 X 85	13.5	12.3	11.4	10.6	10.0	9.5	9.1	8.7	8.4	8.1
	495 X 85	14.7	13.3	12.3	11.5	10.8	10.3	9.8	9.4	9.0	8.7
TILED ROOF AND CEILING (90KG/M2)	195 X 85	4.5	4.1	3.9	3.7	3.5	3.4	3.2	3.1	3.1	3.0
	230 X 85	5.2	4.8	4.5	4.2	4.0	3.9	3.7	3.6	3.5	3.4
	260 X 85	5.8	5.3	5.0	4.7	4.5	4.3	4.1	4.0	3.9	3.8
	295 X 85	6.5	6.0	5.6	5.3	5.0	4.8	4.6	4.5	4.3	4.2
	330 X 85	7.3	6.6	6.2	5.8	5.5	5.3	5.1	4.9	4.8	4.7
	360 X 85	7.9	7.2	6.7	6.3	6.0	5.8	5.5	5.3	5.2	5.0*
	395 X 85	8.7	7.9	7.4	6.9	6.6	6.3	6.0	5.8*	5.6*	5.5*
	425 X 85	9.4	8.5	7.9	7.4	7.1	6.7	6.5*	6.3*	6.0*	5.9*
	460 X 85	10.2	9.3	8.6	8.1	7.6	7.3*	7.0*	6.7*	6.5*	6.3#
	495 X 85	11.1	10.1	9.3	8.7	8.2	7.9*	7.5*	7.3#	7.0#	6.8#

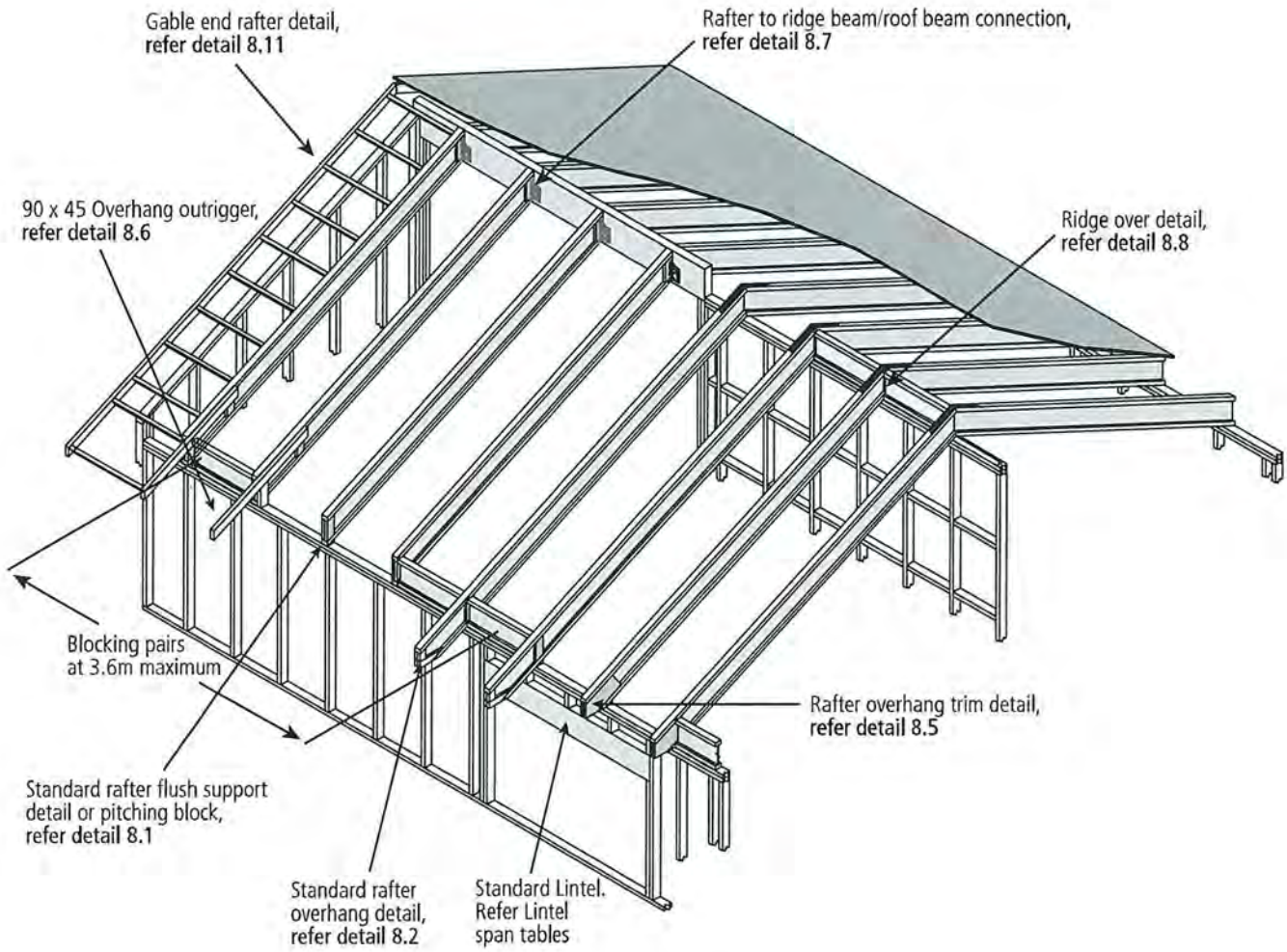
* Denotes Member must have a minimum 45mm bearing length at the 2 supports
Denotes Member must have a minimum 65mm bearing length at the 2 supports

PLEASE NOTE:

These span tables provide maximum member spans to 100% of the recommended capacity. It is recommended that deflection is limited to 5mm to ensure the continued performance of items such as Bifolding door joinery is maintained

7.1 Typical Roof Construction Plan

3.1 This is a typical roof construction plan. Please see detail numbers on the plan to locate specifics.



PLEASE NOTE:

- *If a beam is above a window or a door, then it is a lintel. If not, then it is a bearer.*
- *Point Loads on rafters i.e. water storage cylinder, air-conditioning units and other such units, where higher permanent loads may be expected, specific engineering design should be applied – refer to HD software.*
- *The Span Tables in this brochure are designed as conservative spans. To run precise spans please use the Hyne Design software.*

DESIGN CRITERIA:

- *The tables provide realistic maximum spans for the given rafter spacings. The serviceability criteria used are as specified in AS/NZS 1170.*

SNOW LOADS:

- *Snow loads have not been considered in the preparation of these tables. Reference should be made to section 15 of NZS 3604:2011 – Timber framed buildings to determine the geographical area of the site. Specific engineering design should be applied – refer to HD software or contact your technical rep.*

Rafter Span - LPI 70-T I-Beam

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		I-BEAM DEPTH	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	225	6.3	6.0	5.6	5.7	5.5	5.1	5.2	5.0	4.7
		240	6.6	6.2	5.8	6.0	5.7	5.3	5.5	5.3	4.9
		300	7.4	7.1	6.6	6.8	6.5	6.0	6.3	6.0	5.6
		356	8.1	7.8	7.2	7.4	7.1	6.6	6.9	6.6	6.1
	TILED ROOF AND CEILING (90KG/M2)	225	5.0	4.8	4.5	4.4	4.2	3.9	4.0	3.8	3.6
		240	5.3	5.1	4.8	4.6	4.4	4.2	4.2	4.0	3.8
		300	6.2	5.9	5.4	5.5	5.3	4.9	5.0	4.8	4.5
		356	6.8	6.4	6.0	6.1	5.8	5.4	5.7	5.4	5.0

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

		I-BEAM DEPTH	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	225	6.3	6.0	5.6	5.7	5.5	5.1	5.2	5.0	4.7
		240	6.6	6.2	5.8	6.0	5.7	5.3	5.5	5.3	4.9
		300	7.4	7.1	6.6	6.8	6.5	6.0	6.3	6.0	5.6
		356	8.1	7.8	7.2	7.4	7.1	6.6	6.9	6.6	6.1
	TILED ROOF AND CEILING (90KG/M2)	225	5.0	4.8	4.5	4.4	4.2	3.9	4.0	3.8	3.6
		240	5.3	5.1	4.8	4.6	4.4	4.2	4.2	4.0	3.8
		300	6.2	5.9	5.4	5.5	5.3	4.9	5.0	4.8	4.5
		356	6.8	6.4	6.0	6.1	5.8	5.4	5.7	5.4	5.0

Rafter Span - Hyne LGL 44mm

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LGL SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	200 x 44	5.5	5.2	4.9	4.9	4.6	4.3	4.4	4.3	4.0
		240 x 44	6.4	6.1	5.6	5.9	5.6	5.2	5.4	5.2	4.9
		300 x 44	7.4	7.0	6.5	6.8	6.5	6.0	6.4	6.1	5.6
		360 x 44	8.4	8.0	7.4	7.7	7.4	6.8	7.3	6.9	6.4
	TILED ROOF AND CEILING (90KG/M2)	200 x 44	4.3	4.1	3.8	3.8	3.6	3.4	3.4	3.3	3.1
		240 x 44	5.2	5.0	4.7	4.6	4.4	4.1	4.2	4.0	3.8
		300 x 44	6.2	5.9	5.5	5.6	5.4	5.0	5.1	4.9	4.6
		360 x 44	7.1	6.8	6.3	6.5	6.2	5.7	6.1	5.8	5.3

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LGL SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	200 x 44	5.5	5.2	4.9	4.9	4.6	4.3	4.4	4.3	4.0
		240 x 44	6.4	6.1	5.6	5.9	5.6	5.2	5.4	5.2	4.9
		300 x 44	7.4	7.0	6.5	6.8	6.5	6.0	6.4	6.1	5.6
		360 x 44	8.4	8.0	7.4	7.7	7.4	6.8	7.3	6.9	6.4
	TILED ROOF AND CEILING (90KG/M2)	200 x 44	4.3	4.1	3.8	3.8	3.6	3.4	3.4	3.3	3.1
		240 x 44	5.2	5.0	4.7	4.6	4.4	4.1	4.2	4.0	3.8
		300 x 44	6.2	5.9	5.5	5.6	5.4	5.0	5.1	4.9	4.6
		360 x 44	7.1	6.8	6.3	6.5	6.2	5.7	6.1	5.8	5.3

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Rafter Span - I-Built LVL 13 - 45mm

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LVL 13 SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	150 x 45	5.7	5.4	5.0	5.0	4.8	4.5	4.6	4.4	4.1
		200 x 45	7.0	6.7	6.2	6.4	6.1	5.7	6.0	5.7	5.3
		240 x 45	7.9	7.6	7.0	7.3	7.0	6.4	6.9	6.5	6.1
		300 x 45	9.3	8.8	8.2	8.6	8.2	7.6	8.1	7.7	7.1
		360 x 45	10.5	10.0	9.3	9.7	9.3	8.6	9.2	8.8	8.1
	TILED ROOF AND CEILING (90KG/M2)	150 x 45	4.4	4.2	4.0	3.9	3.7	3.5	3.5	3.4	3.2
		200 x 45	5.8	5.6	5.2	5.2	5.0	4.6	4.7	4.5	4.2
		240 x 45	6.7	6.4	5.9	6.1	5.8	5.4	5.7	5.4	5.0
		300 x 45	7.9	7.5	6.9	7.2	6.8	6.3	6.7	6.4	5.9
		360 x 45	9.0	8.5	7.9	8.2	7.8	7.2	7.7	7.3	6.8*

*Denotes member must have a minimum 45mm bearing at the 2 supports

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LVL 13 SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	150 x 45	4.2	4.0	3.7	3.7	3.5	3.3	3.4	3.2	3.0
		200 x 45	5.5	5.2	4.9	4.9	4.7	4.4	4.5	4.3	4.0
		240 x 45	6.3	6.0	5.6	5.8	5.5	5.1	5.3	5.1	4.8
		300 x 45	7.4	7.0	6.5	6.8	6.5	6.0	6.4	6.1	5.6
		360 x 45	8.4	8.0	7.4	7.7	7.4	6.8	7.3	6.9	6.4
	TILED ROOF AND CEILING (90KG/M2)	150 x 45	3.2	3.1	2.9	2.9	2.7	2.6	2.6	2.5	2.3
		200 x 45	4.3	4.1	3.9	3.8	3.6	3.4	3.5	3.3	3.1
		240 x 45	5.2	4.9	4.6	4.6	4.4	4.1	4.2	4.0	3.7
		300 x 45	6.2	5.9	5.5	5.7	5.4	5.0	5.2	5.0	4.6
		360 x 45	7.1	6.8	6.3	6.5	6.2	5.7	6.1	5.8	5.4

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

Rafter Span - I-Built LVL - 63mm

Single Span - Supporting Roof and Ceiling - Up to High Wind Zone

		LVL 13 SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	150 x 63	5.0	4.8	4.5	4.5	4.3	4.0	4.1	3.9	3.7
		200 x 63	6.4	6.1	5.6	5.9	5.6	5.2	5.5	5.2	4.9
		240 x 63	7.2	6.9	6.4	6.7	6.4	5.9	6.3	6.0	5.6
		300 x 63	8.4	8.0	7.4	7.8	7.5	6.9	7.4	7.0	6.5
		360 x 63	9.5	9.1	8.4	8.9	8.5	7.8	8.4	8.0	7.4
	TILED ROOF AND CEILING (90KG/M2)	150 x 63	4.0	3.8	3.6	3.5	3.4	3.1	3.2	3.1	2.9
		200 x 63	5.3	5.0	4.7	4.7	4.5	4.2	4.3	4.1	3.8
		240 x 63	6.1	5.9	5.4	5.6	5.3	5.0	5.1	4.9	4.6
		300 x 63	7.2	6.9	6.4	6.6	6.3	5.8	6.2	5.9	5.5
		360 x 63	8.2	7.8	7.2	7.5	7.2	6.7	7.1	6.7	6.2

Continuous Span - Supporting Roof and Ceiling - Up to High Wind Zone

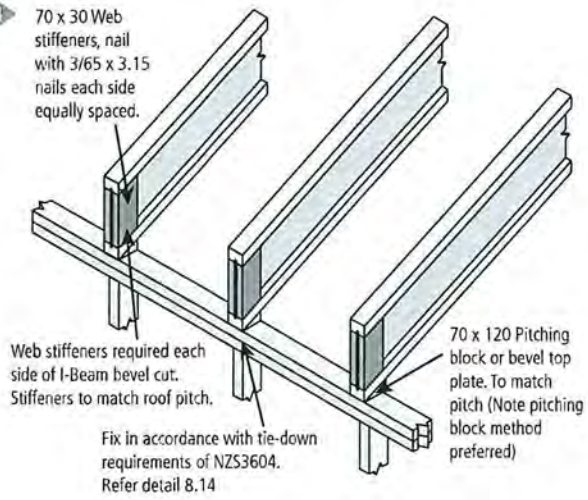
		LVL 13 SIZE	MAX RAFTER SPAN (M)								
			RAFTERS 600CRS			RAFTERS 900CRS			RAFTERS 1200CRS		
			0-15°	15-25°	25-35°	0-15°	15-25°	25-35°	0-15°	15-25°	25-35°
WIND ZONE: HIGH (44M/ SEC)	METAL ROOF AND CEILING (40KG/M2)	150 x 63	6.6	6.3	5.8	6.0	5.7	5.3	5.6	5.4	5.0
		200 x 63	8.0	7.7	7.1	7.4	7.1	6.5	7.0	6.6	6.1
		240 x 63	9.1	8.7	8.0	8.4	8.0	7.4	7.9	7.6	7.0
		300 x 63	10.6	10.1	9.4	9.8	9.4	8.7	9.3	8.9	8.2
		360 x 63	12.0	11.4	10.6	11.2	10.6	9.9	10.6	10.1	9.3
	TILED ROOF AND CEILING (90KG/M2)	150 x 63	5.4	5.2	4.8	4.8	4.6	4.3	4.4	4.2	3.9
		200 x 63	6.8	6.5	6.0	6.2	5.9	5.5	5.8	5.5	5.1
		240 x 63	7.7	7.4	6.8	7.1	6.7	6.2	6.6	6.3	5.8
		300 x 63	9.1	8.6	8.0	8.3	7.9	7.3	7.8	7.4	6.9
		360 x 63	10.3	9.8	9.1	9.5	9.0	8.4	8.9	8.5	7.9

PLEASE NOTE:

These span tables provide maximum member spans up to 100% of the recommended capacity. For a premium floor or rafter system with minimal deflection, it is recommended that spans should be restricted to 85% of the maximum allowed.

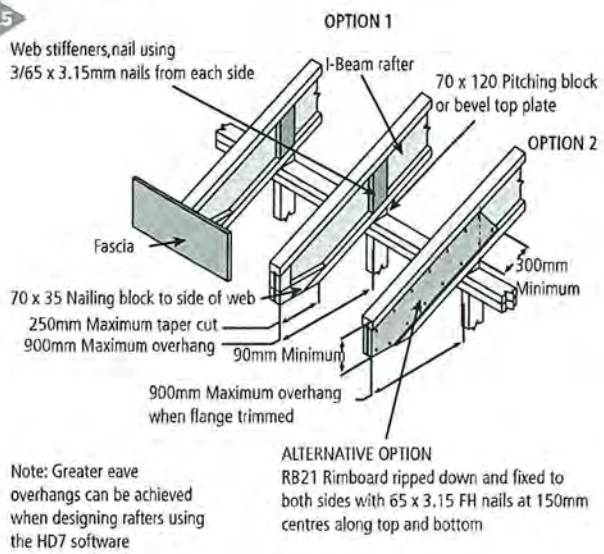
8.1 Pitching Block Detail

5.14



8.2 Standard Rafter Overhang Detail

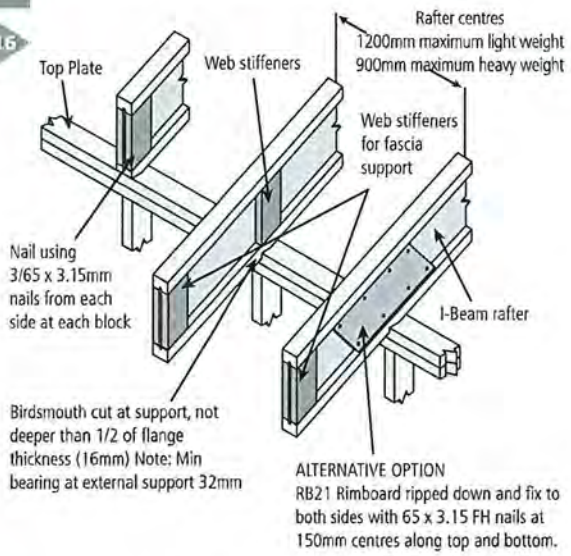
5.15



Note: Greater eave overhangs can be achieved when designing rafters using the HD7 software

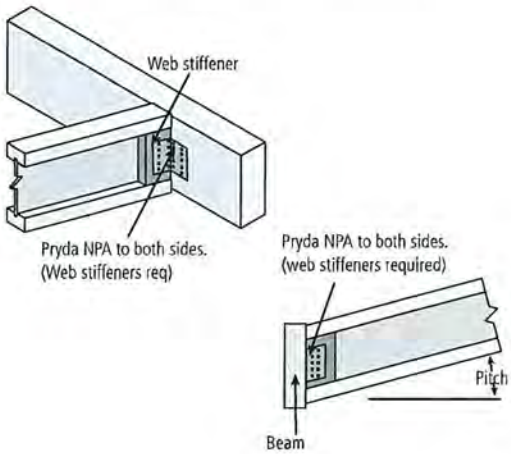
8.3 Rafter Birdsmouth Detail

5.16



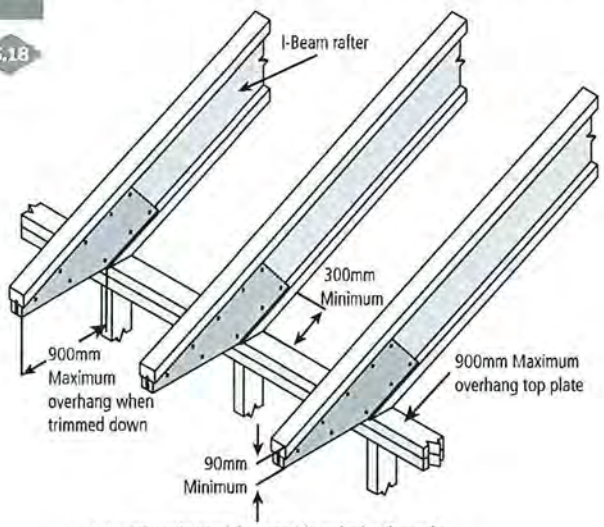
8.4 Rafter to Beam Connection

5.17



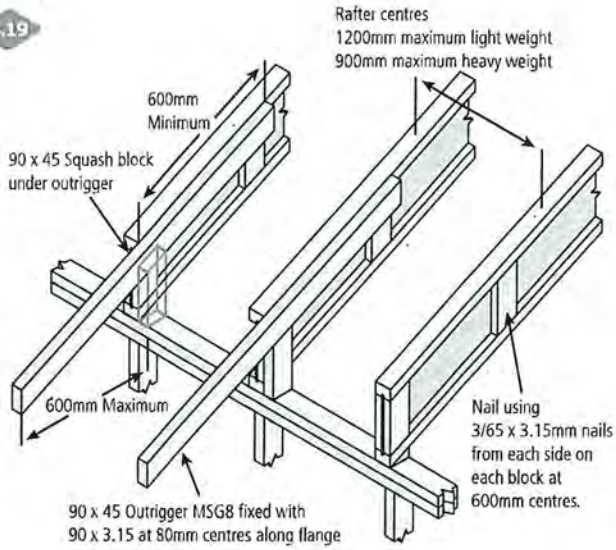
8.5 Rafter Overhang Trim Detail

5.18



8.6 90 x 45 Overhang Outrigger

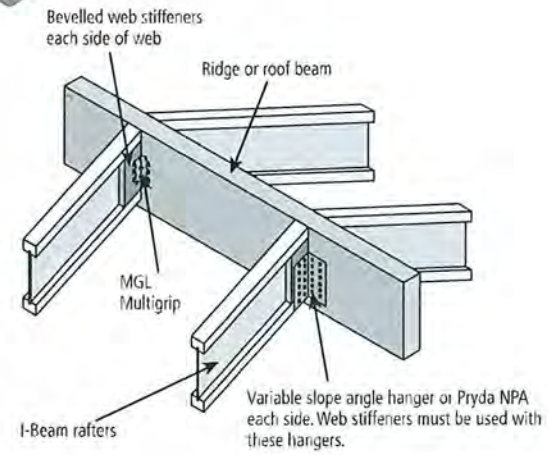
5.19



Refers to superceded detail number

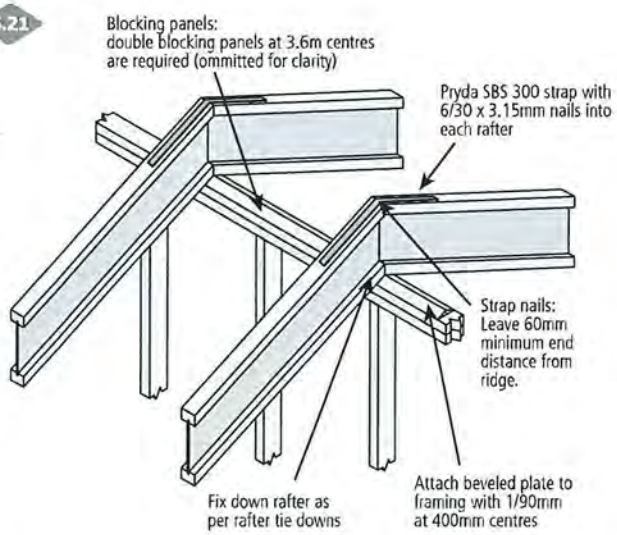
8.7 Rafter to Ridge Beam / Roof Beam Connection

5.20



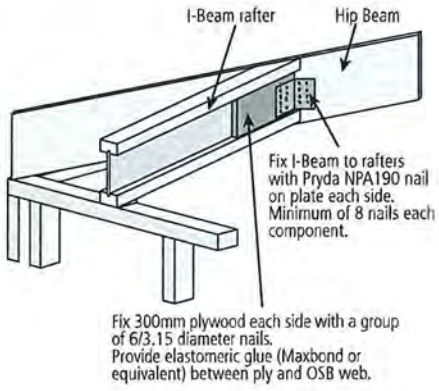
8.8 Ridge Over Detail

5.21



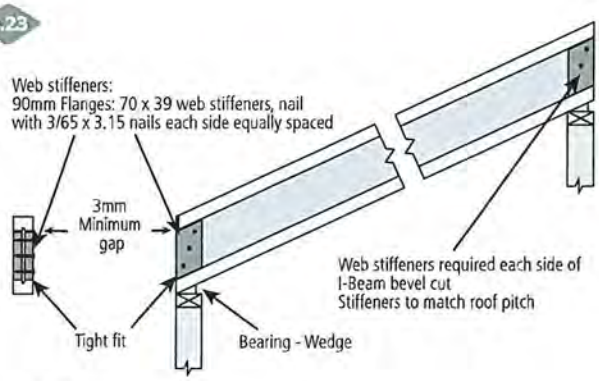
8.9 Hip Rafter Connection

5.22



8.10 Web Stiffener Detail

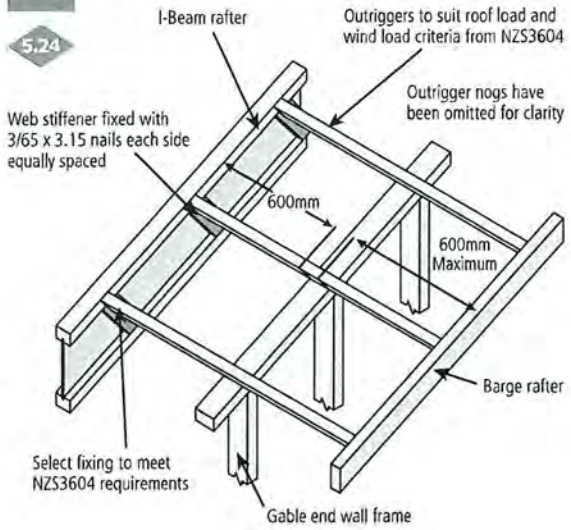
5.23



Web stiffeners:
70mm Flange I-Beam – use 70 x 29mm
Note: I-Beam web stiffeners to be used at all concentrated loads and at supports where specified

8.11 Gable End Rafter Detail

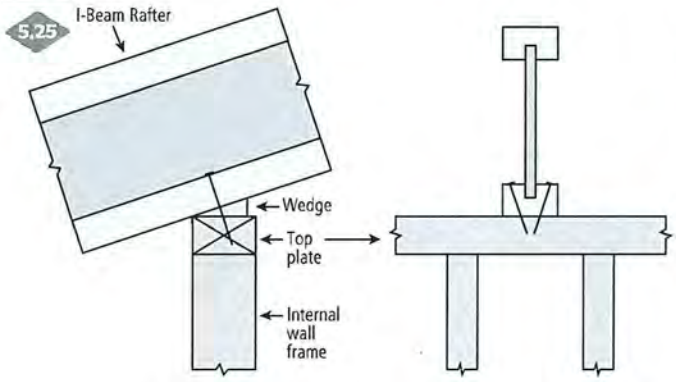
5.24



Refers to superceded detail number

8.12 Intermediate Bearing Detail

5.25

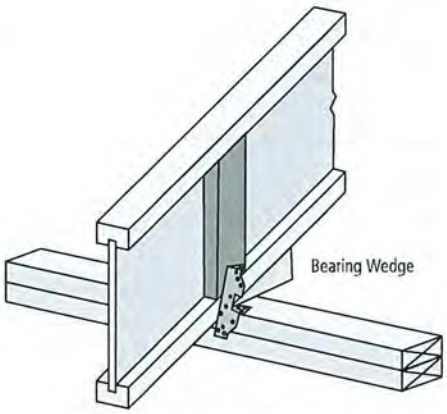


Fixing Requirements at Intermediate Bearing

FOR SLOPES < 18°	=1/75 x 3.15mm nail each side
FOR PITCHES 15-22.5°	=2/75 x 3.15mm nails each side
FOR PITCHES > 22.5°	=2/75 x 3.15 nails each side and tie down strap

8.13 Rafter Tie Down Multigrip

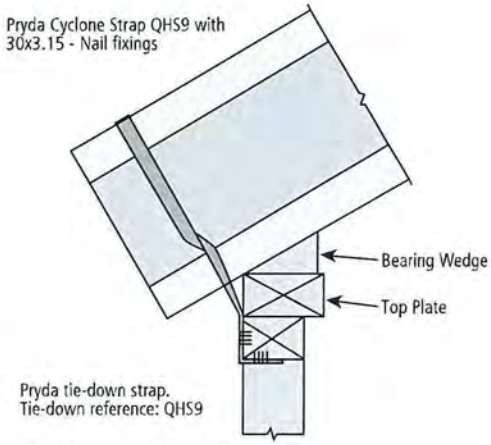
5.26



Site made wedge with Pryda Multigrip (MGL).
Use one each side. Tie-down reference: MGL.
Note: Refer NZS3604 for hold down requirements

8.14 Rafter Tie Down Cyclone Strap

5.27

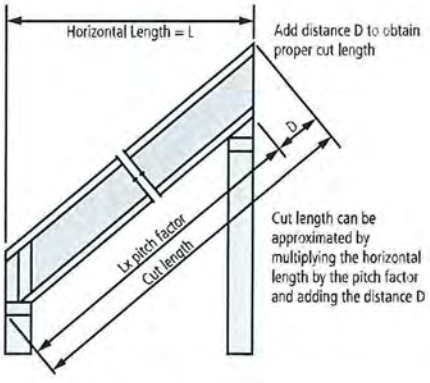


Note: Where possible bend strap legs under support for increased support

8.15 SolidStart™ I-Beam Cut Length Calculation

PITCH FACTORS	
PITCH (DEG)	PITCH FACTOR
5	1.01
10	1.02
15	1.04
20	1.07
22.5	1.09
25	1.11
30	1.16
35	1.23

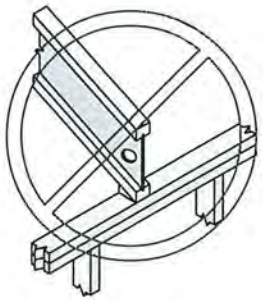
DISTANCE D (MM)				
PITCH (DEG)	RAFTER DEPTH (MM)			
	225	240	300	356
5	20	21	26	31
10	40	43	53	63
15	60	65	81	95
20	82	88	110	129
22.5	93	100	125	147
25	105	113	141	166
30	130	139	174	205
35	158	169	211	249



Refers to superceded detail number

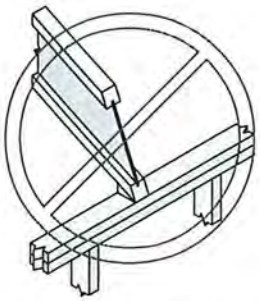
Avoid These Practices

A 8.0



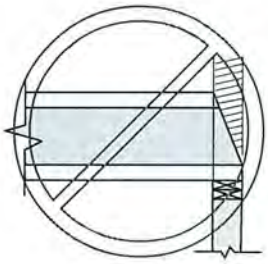
DO NOT cut holes too close to support.

B 8.1



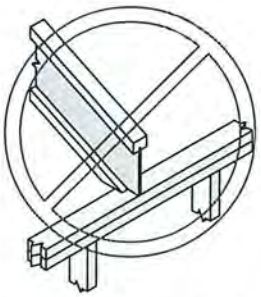
DO NOT bevel cut rafter beyond inside face of wall.

C 8.2



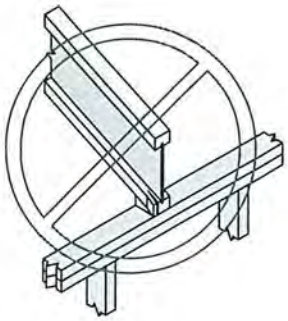
DO NOT bevel cut joist beyond inside face of wall

D 8.3



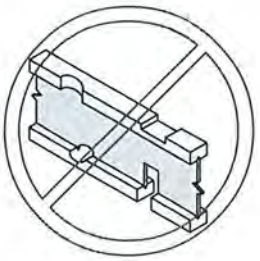
DO NOT overhang birdsmouth cut from inside face of plate.

E 8.4



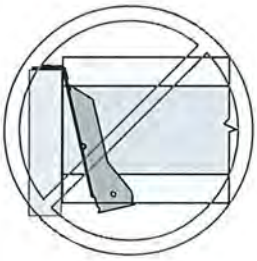
DO NOT split the flange.
Ensure the correct heel fixing is done.

F 8.5



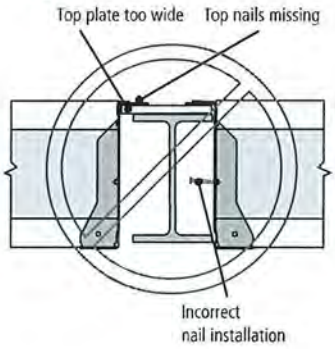
DO NOT cut, notch or drill top or bottom chords.

G 8.6



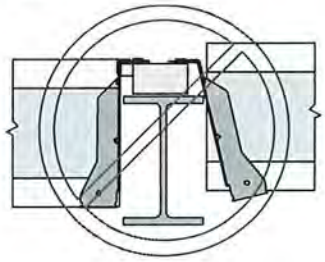
I-Beam is not seated properly into the hanger, this may cause nail pullout or shear under load.

H 8.7



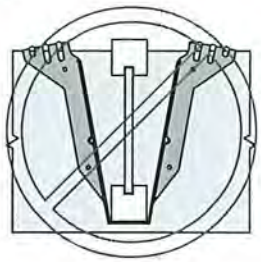
Top nailing is incorrect due to:
1. Top plate too thin or
2. Wrong length nail is used

I 8.8



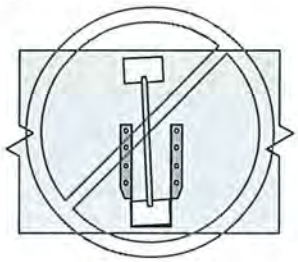
If the top plate is too narrow it may cause:
1. Hanger deformation
2. Nail pull-out or shear
3. Supporting beam deformation

J 8.9



Spreading hanger legs will push the I-Beam up which may cause uneven floors, squeaky floors and I-Beam rotation.

K 8.10



Hangers not supporting the top flange of the I-Beam will require stiffeners.

◆ *Refers to superceded detail number*

Storage, Handling and Safety

As with other high quality products, Engineered Timber Products such as I-Beams, Edge Beams and 17C beams require proper storage and handling during distribution and at the job site in order to protect the product from damage. The following information provides techniques for safe and proper handling to minimise physical and moisture damage to our Engineered Timber Products.

Storage:

- Store bundles upright on a level and well drained surface. Beams should not be stored in direct contact with the ground and should always be protected from the weather. Ensure supports of packs do not exceed 3.0m apart.
- Bundles should remain wrapped, strapped and protected from the weather until time of installation.
- Always stack and handle I-Beams in the upright position.
- Twisting of joists or applying loads to the joists when flat can damage the joist.
- Avoid walking on wrapped and unwrapped product.
- Do not stack other materials on top of I-Beams, Edge beams and 17C beams.
- Follow good forklift safety procedures when handling Engineered timber Products in the yard and at building sites:
  - Use wide forks to handle long length material
  - Storage yard should be maintained to provide flat, well drained and level driving surface.
  - Do not handle or rotate loads over people
  - Do not bound or jerk loads
  - Maintain low forklift speeds and brake smoothly to prevent accidental dumping of loads.
  - Stabilise the load if there is a possibility of the load shifting
  - Maintain load height within safe limits

Handling:

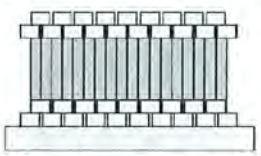
- Use care when handling bundles and individual components to prevent injury to handlers or damage by forklifts or cranes.
- Do not lift or roll I-Beams by the top flange. This activity may cause damage to the beams.
- Avoid excessive bowing during all phases of handling and installation.
- Joists should remain vertical during handling
- Damaged Beams should not be used. Do not try to repair a damaged beam on site.
- Refer table for size/weight when handling. Please take these into account when handling timber

Safety Warning:

- Never walk on wrapped or unwrapped bundles.
- Do not walk on the joists until they are full installed or correctly braced, joists are unstable until braced laterally.
- During installation, a minimum of 100 x 50 temporary bracing at 2.4m CRS max is required.
- Only remove the bracing as the sheathing is being attached.
- Never overload joists with loads that exceed design limits.
- Stack building materials over walls or main beams only.
- Do not use I-Beams as ramps, planks or walkways.
- Brace each joist as it is erected.
- All hangers, rimboards and blocking at the end supports of the joists must be installed and nail properly.

THE ABOVE ARE GENERAL RECOMMENDATIONS AND IN SOME CASES ADDITIONAL PRECAUTIONS MAY BE REQUIRED

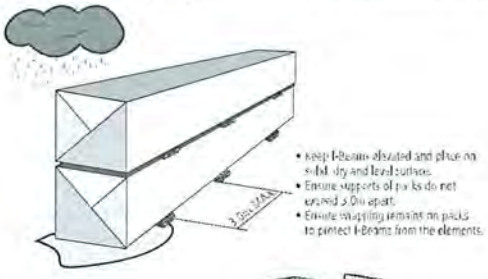
TRANSPORTING I-BEAMS AND LGL BEAMS			
BEAM TYPE	BEAM DEPTH (MM)	BEAM WIDTH (MM)	BEAM MASS (KG/M)
I-BEAM			
225 LPI 70-T	225	70	3.97
240 LPI 70-T	240	70	4.07
300 LPI 70-T	300	70	4.48
356 LPI 70-T	356	70	4.84
EDGE BEAM			
200X44	200	44	4.7
245X44	245	44	5.6
300X44	300	44	7
17C LGL			
295X85	295	85	16.3
330X85	330	85	18.2
360X85	360	85	19.9
425X85	425	85	23.5
460X85	460	85	25.4



I-Beams in the upright position.



DO NOT stack or handle I-Beams flat.



- Keep I-Beams situated and place on solid, dry and level surface.
- Ensure supports of packs do not exceed 3.0m apart.
- Ensure wrapping remains on packs to protect I-Beams from the elements.



- Where large quantities of beams are delivered on site appropriate lifting device should be used to remove packs from trucks.
- DO NOT use steel bars to push packs off trucks.



- Remove packs from truck with forklift or similar.
- DO NOT use steel bars to lever or push packs off truck.



DO NOT lift or roll I-Beams by the top flange.



DO NOT lift I-Beams whilst they are lying flat. Excessive flopping may cause damage.



Never overload joists with loads that exceed design loads. DO NOT walk on the joists until they are fully installed or braced.

Chemical Treatment of I-Beams, LGL Edgebeams, 17C, LVL, Rimboard & Plywood

All Engineered Timber Solutions' products are available in the following treatment options: I-Beams LOSP H3.1 and untreated; Edgebeams LOSP H3.1 and untreated; 17C LOSP H3.1 and untreated; Rimboard CCA H3.2. For treated timber, please read the following information carefully before handling the product.

LIGHT ORGANIC SOLVENT PRESERVATIVES (LOSP):

Light Organic Solvent-borne Preservatives (LOSP's): Are preservatives that contain combinations of fungicides and insecticides for timber used in internal and external situations. All of these preservatives components are incorporated in a solvent carrier such as white spirit.

Copper Chrome and Arsenic (CCA) Treatment: Copper Chrome and Arsenic preservative contains copper and arsenic to protect against fungal decay and wood boring insects and chromium to fix the preservative to the cell structure in the wood.

The following information is designed to inform builders, pre-nailers and merchants of the correct procedures for handling and storing treated timber.

HANDLING PRODUCTS TREATED WITH LOSP AND CCA

Some people may experience temporary skin irritation, headaches or light headedness when handling LOSP or CCA treated timber. These undesirable effects are more likely if the timber is not solvent dry.

The following precautions should be taken when handling LOSP/CCA treated timber.

- Where possible packs should be opened a day or 2 before use to allow any residual vapours in the inner boards to evaporate.
- LOSP/CCA treated timber should be stored in a well-ventilated under cover area with any protective wrapping removed.
- Wear gloves and long sleeves for protection against splinters and cuts during handling. If the timber is still damp from treatment, either do not handle or solvent resistant gloves are recommended.
- Wear protective glasses and a filter mask when sawing, sanding or machining treated timber.
- If LOSP/CCA preservative or treated sawdust accumulates on clothes, wash separately before reuse.
- Always wash hands and any exposed areas after handling LOSP/CCA treated timber, especially before eating.
- If undesirable effects occur cease handing or using the material and review your personal protection measures.
- Do not transport LOSP/CCA treated timber in an enclosed environment.

STORAGE

- Always ensure LOSP/CCA treated timber is stored in a well-ventilated space
- Merchants, builders and pre-nailers should remove wrapping off delivered material as soon as convenient to assist in the dissipation of solvent fumes.
- Stored LOSP/CCA treated timber should not be kept in a confined area. Store only in areas that have double ventilated openings or an extraction system.

DISPOSAL

- Dispose of all sawdust and off cuts after construction.
- For normal domestic and trade users, dispose of waste through normal waste collection and disposal services, refer to waste collection guides.
- LOSP/CCA treated timber must not be burned in open fires, stoves, fireplaces or any confined spaces as toxic fumes may be released.

TREATMENT OF CUTS, HOLES AND NOTCHES

NZWOOD recommends that all cuts, holes and notches are coated with generous amounts of preservatives:

H3.1 LOSP – Koppers Arch Enseal clear/green or similar preservative.

H3.2 CCA – A suitable copper or Zinc napthenate based primer.

IDENTIFYING TREATED TIMBER ON SITE

Untreated timber will have no marking on it. Treated timber will have the following markings:

I-Beam



LGL Edgebeam



17C



Rimboard



PLEASE NOTE:

All treated and untreated I-Beams, Edgebeams, 17Cs and Rimboard are not suitable for weather exposed situations.

IBUILT™

Building Systems







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www.nzwoodproducts.co.nz

You are welcome to contact us for further information about the range of Engineered Timber Products, our Rimboard and Pryda fittings

HYNE TIMBER

LP SOLIDSTART
ENGINEERED WOOD PRODUCTS

IBUILT LVL

NZWOOD
NEW ZEALAND WOOD PRODUCTS LIMITED

00642

shadowclad®

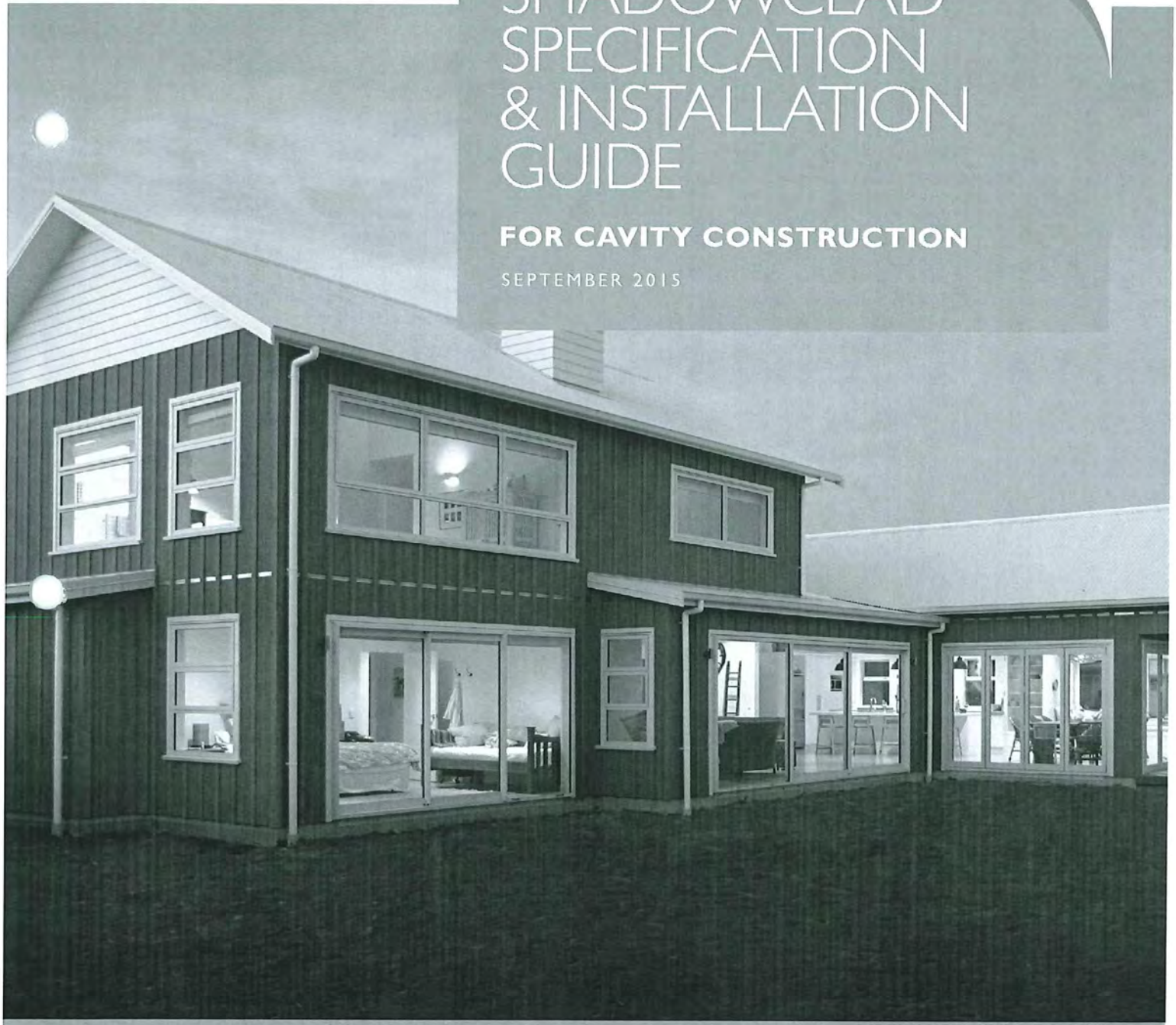
Natural GROOVE | Natural TEXTURE | Ultra GROOVE | Ultra TEXTURE | FLASHINGS

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BY:

SHADOWCLAD® SPECIFICATION & INSTALLATION GUIDE

FOR CAVITY CONSTRUCTION

SEPTEMBER 2015



CarterHoltHarvey Woodproducts New Zealand

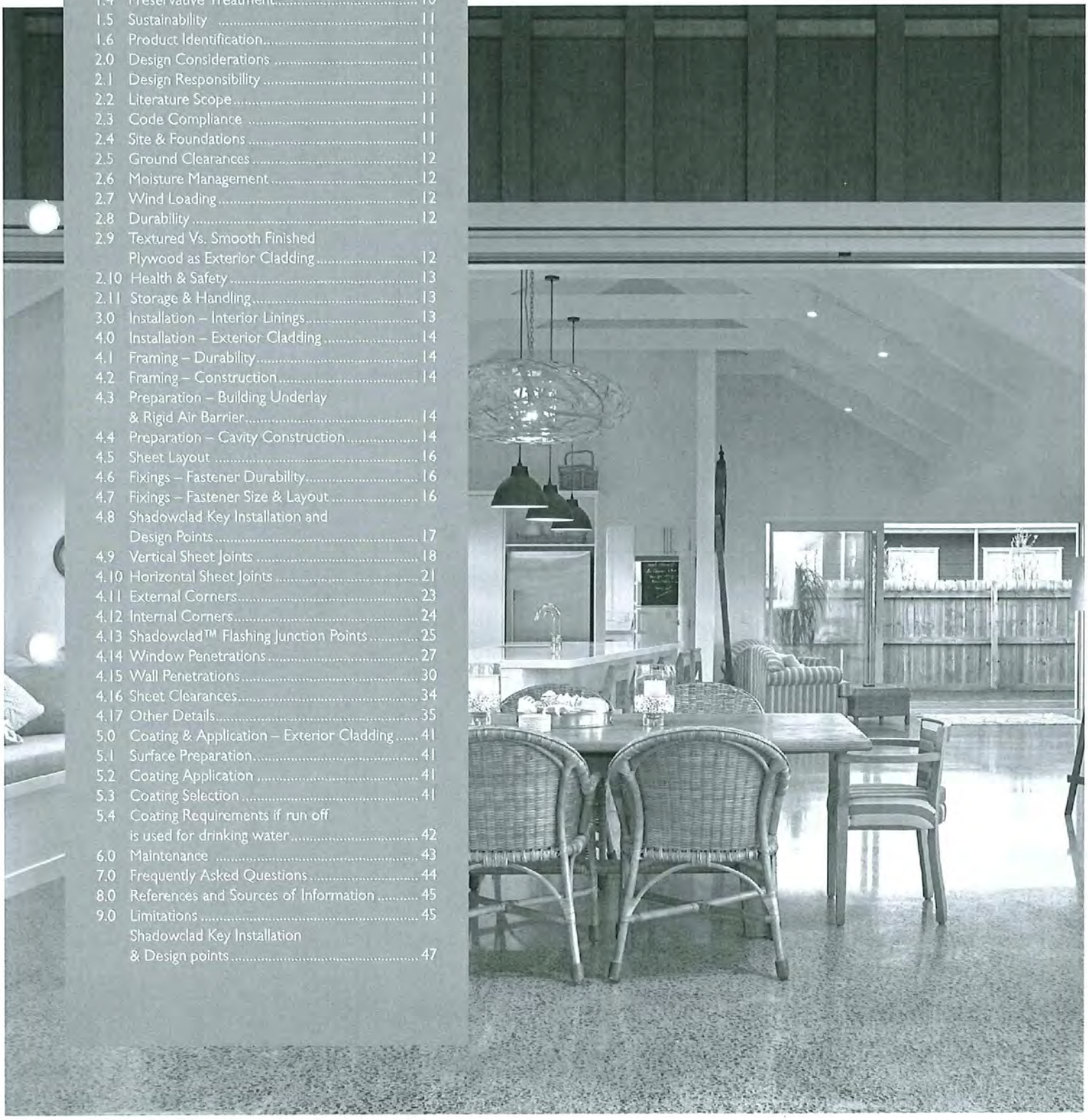
Information contained within is specific to Shadowclad® structural plywood products and must not be used with any other plywood products, no matter how similar they may appear.

shadowclad®

CAVITY CONSTRUCTION

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CarterHoltHarvey
Woodproducts New Zealand



1.0 SHADOWCLAD® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey® Woodproducts, Shadowclad panels are suitable for use as an exterior wall cladding when using H3 treated panels or as an internal wall or ceiling lining when using untreated panels.

Shadowclad is manufactured under a third party audited quality control programme to monitor compliance with AS/NZS 2269 Plywood Structural. All Shadowclad products carry Engineered Wood Products Association of Australasia (EWPAA) Joint Accreditation System – Australia and New Zealand (EWPAA/JAS-ANZ) certification.

Shadowclad has been BRANZ appraised as a cladding material for cavity wall construction. To view the appraisal visit www.chhwoodproducts.co.nz.

For information relating to Ecoply® structural plywood and applications other than exterior cladding, refer to the current Ecoply Specification & Installation Guide. For specific information on plywood as a rigid air barrier, and/or bracing, refer to the current Ecoply Barrier Specification and Installation Guide. These are both available to be downloaded from www.chhwoodproducts.co.nz.

The Shadowclad BRANZ Appraisal No. 764 (2011) does not cover:

- Shadowclad® used as an interior lining
- Handiply® Utilityclad™ plywood products
- Shadowclad® in direct fix cladding applications

Shadowclad products must be competently installed in accordance with good building practices and sound design principles to satisfy the requirements of the Building Act 2004, the New Zealand Building Code (NZBC), and applicable New Zealand Standards. This is the responsibility of building owners and the design professionals and builders that they engage. This document contains information, limitations, and cautions regarding the properties, handling, installation, usage, and the maintenance of Shadowclad products. However, to the maximum extent permitted by law, Carter Holt Harvey assumes no legal liability to you in relation to this information.

1.1 TECHNICAL INFORMATION AND CAD DETAILS

When specifying or installing any Shadowclad product visit www.chhwoodproducts.co.nz or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

Having trouble installing Shadowclad visit www.chhwoodproducts.co.nz to view the installation of common Shadowclad junctions.

The information contained in this document is current as at September 2015. It is your responsibility to ensure you have the most up to date information available.

The information contained in this publication relates specifically to Shadowclad structural plywood products manufactured by Carter Holt Harvey Woodproducts and must not be used with any other plywood manufacturer's products no matter how similar they may appear.

Alternative plywood products can differ in a number of ways which may not be immediately obvious and substituting them for Shadowclad structural plywood products is not appropriate, and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the NZBC.

1.2 PRODUCT DESCRIPTION AND RANGE

Shadowclad structural plywood panels are manufactured from radiata pine wood veneers. The veneers are placed at right angles to each other for maximum strength and stability then bonded together with synthetic phenolic (PF) resin to form a strong and permanent Type A bond.

Shadowclad is available in panel sizes 2440 / 2745 x 1216mm (to provide 1200mm cover) and features a unique textured (bandsawn) appearance which also helps to diffuse UV rays for increased aesthetic performance when exposed to weather.

Shadowclad is available as a Textured or Grooved profile and in either Natural or Ultra finishes.

Shadowclad Natural

Shadowclad Natural is an uncoated panel suitable for use with penetrating stains, film forming stains and paint systems. If Shadowclad is left uncoated or is clear coated in exterior applications the long term aesthetics of the board will be significantly reduced. While the product will meet the B2 and E2 durability and weathertightness requirements for cladding, a high visual appearance will not be achieved in the long term.

Shadowclad Ultra

Shadowclad Ultra features a factory applied exterior grade performance coating suitable for use with most paint and film forming stain systems. Using a unique powder coating process on the panel face and edges means Ultra panels can be immediately top coated on site, eliminating (in most cases) the need for expensive and time consuming wet primers.

CHH Woodproducts recommends the use of Shadowclad Ultra where suitable paint or film forming stains are being used.

Shadowclad Ultra features:

- High 60-80 microns film build, can be up to 2-3 times thicker than traditional wet primers
- Continuous powder coated surface forms an effective moisture barrier for a drier more consistent painting surface
- Saves time and money as traditional wet primers are not normally required
- Panel surface, edges and bottom 150mm of sheet factory coated for increased panel durability
- Once installed Shadowclad Ultra can be exposed to weather for up to 3 months prior to application of finishing coats
- Low volatile organic compound (VOC) primer coating

Shadowclad Ultra is available H3 treated for use as an exterior cladding. It is available H3.1 LOSP treated for residential and commercial applications or H3.2 CCA if required. H3.2 CCA treatment is only available in the Ultra finish and is not available with Natural finish products.

Shadowclad Ultra is not suitable for use with penetrating stains. The selection, application and maintenance of coatings is the responsibility of the building owners and the professionals that they engage. For advice on specific coating systems and their suitability for use with Shadowclad Ultra, always refer to the coating manufacturer.

Table 1 Surface finishes

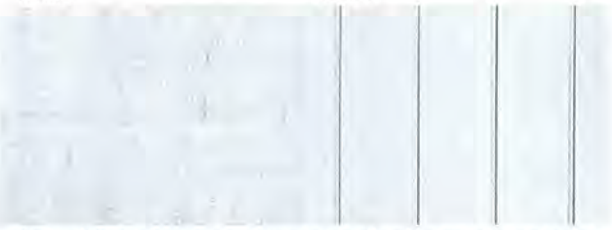
Natural		Ultra	
Texture	Groove	Texture	Groove
			
Shadowclad Natural is an uncoated panel suitable for staining and painting. Untreated panels can be clear coated for internal, dry applications.		Shadowclad Ultra features a performance coated surface ready for top coating saving time and money when using paints and film forming stains. It is suitable for use in exterior applications only.	

Table 2 Shadowclad Product Range

	Texture	Groove
Finish	Natural or Ultra	Natural or Ultra
Sheet Length	2440 & 2745mm	2440 & 2745mm
Width (overall)	1216mm	1216mm
Width (effective)	1200mm	1200mm
Cover / Width Tolerance	+/ –1mm	+/ –1mm
Nominal Thickness	12mm	12mm
Weight (kg/m²)	6.6	6.6
R-value (m².C/W)	0.104	0.104
Groove Profile	N/A	9mm wide, 5mm deep at 150mm centres
Edge Profile	Shiplap with weather groove	Shiplap with weather groove
Treatment Available	• H3.1 LOSP (Azole) • H3.2 CCA (Ultra finish only) • Untreated – internal dry applications (Natural finish only)	• H3.1 LOSP (Azole) • H3.2 CCA (Ultra finish only) • Untreated – internal dry applications (Natural finish only)

Shadowclad™ Exterior Flashing Range

Manufactured from extruded aluminium or folded from 0.5 mm thick G304 stainless steel, the Shadowclad™ flashings range is purpose designed to complement Shadowclad panels used in exterior applications.

Independently tested for weathertightness and compliant with Table 20 of E2/AS1, Shadowclad™ flashings achieve 50 year durability in all NZS 3604 exposure zones including zone D (sea spray).

The range includes internal and external angles, horizontal and inter-storey 'Z' flashings and a cavity base closure.

Aluminium horizontally installed flashings come in 3600mm lengths and vertically installed angles are available in 3000mm & 6000mm lengths - refer Table 3. Stainless Steel flashings are available in 3000mm lengths - refer Table 4.

The information, details and performance statements provided in this guide are based on Shadowclad plywood panels and Shadowclad™ flashings being used together as a system. CHH Woodproducts does not recommend that Shadowclad plywood panels be installed with non-CHH Woodproducts flashings. Flashings not supplied by CHH Woodproducts must, as a minimum, comply with E2/ AS1 specifications and be compatible for use with H3.1 LOSP or H3.2 CCA treated plywood. It is the Designer's responsibility to ensure that any non-CHH Woodproducts flashings are fit for purpose and compatible with Shadowclad products and any other building materials or components of the exterior wall.

Aluminium Flashing Finishes

Shadowclad™ aluminium flashings are available in either natural anodised finish (silver colour) for immediate installation or mill finished allowing customers to powder coat flashings to any desired colour finish.

Refer to your local powder coating supplier for more information.

Exterior Flashings & H3.2 CCA Treated Shadowclad®

Exposure Zone B & C

H3.2 CCA treated Shadowclad in exposure zones B and C (where flashings are exposed to weather) must use mill finished flashings which must be powder coated to the desired colour or use stainless steel flashings.

H3.2 CCA treatment contains copper. As such, some form of isolation between aluminium flashings and H3.2 CCA treated panels such as powder coating of the flashings is required. Refer to Table 21 "Compatibility of Materials in Contact" in E2/AS1 for more information.

Exposure Zone D (Sea Spray)

In exposure zone D (sea spray) flashings exposed to weather must be stainless steel for H3.2 CCA treated Shadowclad.

H3.2 CCA Treated Shadowclad

Uncoated aluminium flashings are not permitted to be in direct contact in any zone with H3.2 CCA treated Shadowclad under any circumstances.

For further information relating to H3.2 CCA treated Shadowclad contact CHH Woodproducts on 0800 326 759

Table 3 **Aluminium** **Shadowclad™ Flashings Range**

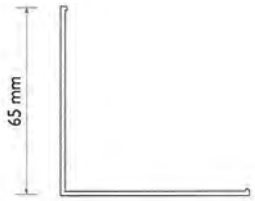
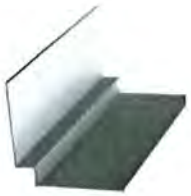
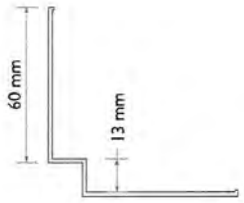
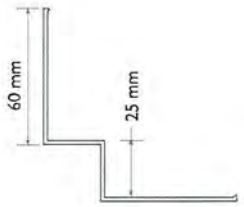
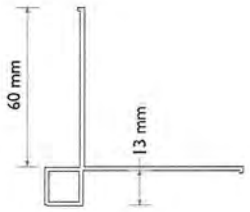
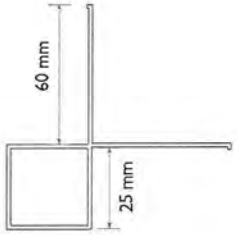
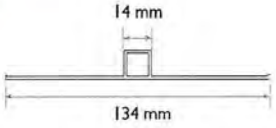
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle			Back flashing for internal corners	Natural Anodised	3000 6000
Internal 'W' Angle			'W' back flashing for internal corners providing a flush finish with panels (13mm x 13mm)	Natural Anodised Mill	3000 6000
Large Internal 'W' Angle			'W' back flashing for internal corners (25mm x 25mm) **Design Tip:** Use a Large 'W' where a flush junction between the Horizontal 'Z' flashing and corner flashing is desired	Natural Anodised Mill	3000 6000
External Box Angle			Box corner for external corners providing a flush finish with panels	Natural Anodised Mill	3000 6000
Large External Box Angle			Box corner for external corners (25mm x 25mm) **Design Tip:** Use Large External Box where a flush junction between the Horizontal 'Z' flashing and corner flashing is desired	Natural Anodised Mill	3000 6000
Vertical Top Hat			Vertical sheet joint flashing	Natural Anodised Mill	3000 6000

Table 3 **Aluminium** **Shadowclad™ Flashings Range**

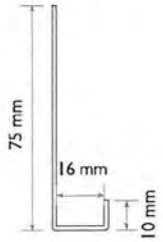
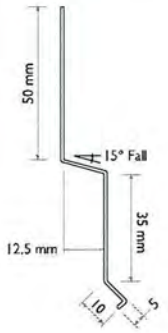
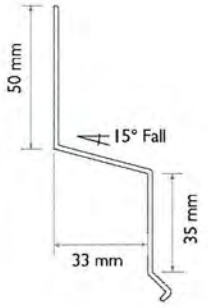
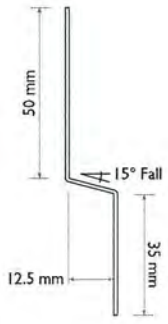
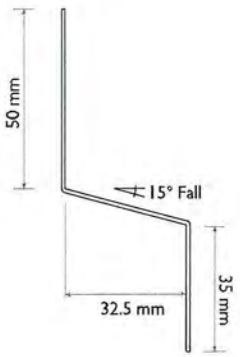
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Cavity Base Closure			Restricts vermin from accessing the cavity space	Natural Anodised	3600
Horizontal 'Z' Flashing			Horizontal Z flashing for horizontal joints between panels	Natural Anodised Mill	3600
Inter-Storey 'Z' Flashing			Horizontal Z flashing for horizontal joints between panels when limiting continuous cavities to a height of two storeys or 7 meters	Natural Anodised Mill	3600
Horizontal 'Z' Back Flashing			Back flashing for junction of butt jointed horizontal 'Z' flashing.	Mill	300
Inter-storey 'Z' Back Flashing			Back flashing for junction of butt joint 'Z' Flashing inter-storey.	Mill	300

Table 4 **Stainless Steel** **Shadowclad™ Flashings Range**

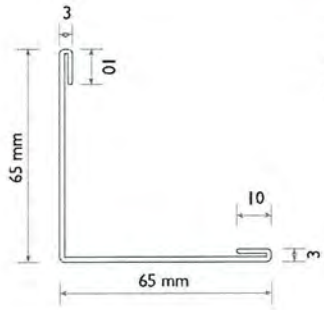
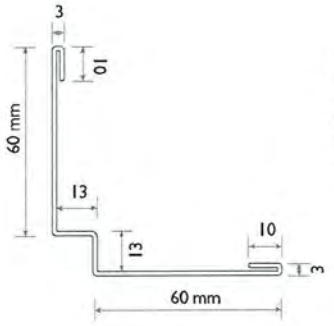
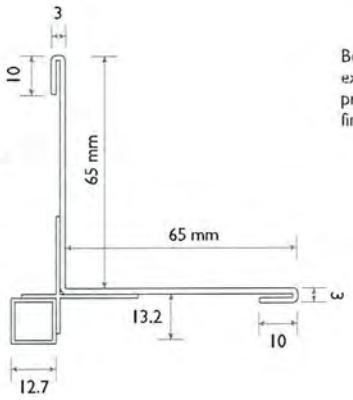
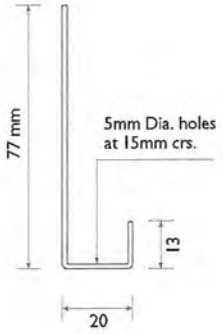
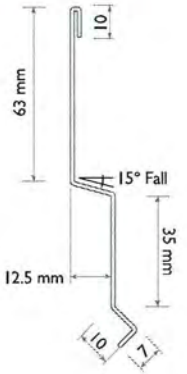
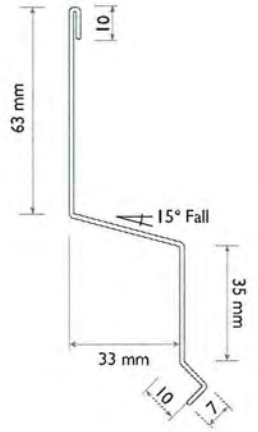
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle	 	Back flashing for internal corners	Stainless Steel	3000
Internal 'W' Angle	 	'W' back flashing for internal corners providing a flush finish with panels (13mm x 13mm)	Stainless Steel	3000
External Box Angle	 	Box corner for external corners providing a flush finish with panels	Stainless Steel	3000
Cavity Base Closure	 	Restricts vermin from accessing the cavity space	Stainless Steel	3000

Table 4 **Stainless Steel** **Shadowclad™ Flashings Range**

Flashing	Line Drawing	Description	Finish Available	Length (mm)
Horizontal 'Z' Flashing			Horizontal Z flashing for horizontal joints between panels	Stainless Steel	3000
Inter-Storey 'Z' Flashing			Horizontal Z flashing for horizontal joints between panels when limiting continuous cavities to a height of two storeys or 7 meters	Stainless Steel	3000

1.3 BUILDING MATERIALS FOR USE WITH SHADOWCLAD (EXTERIOR CLADDING)

Table 5 Materials available from CHH Woodproducts

	Description	Treatment	Size/Length
Frame Flashing Tape[1]	For a secure and permanent seal of all Ecoply Barrier openings (Use in conjunction with Sill Tape)	-	150mm / 200mm x 30m
Sealing Tape[1]	For a secure and permanent seal of all Ecoply Barrier vertical joints	-	60mm x 30m
Sill Tape[1]	One piece stretchable sill tape for window and door sills. 2 rolls per box.	-	150mm / 200mm x 20m
Ecoply® Barrier[1]	Rigid Air Barrier System	H3.2 CCA	2440mm / 2745mm x 1200mm
Cavity Batten	45 x 20mm (nominal)	H3.1 LOSP	Random
Flashings	Aluminium and stainless steel flashings range	Refer Tables 3 & 4	Refer Tables 3 & 4

1 Please refer to the Ecoply Barrier Specification and Installation Guide for more information.

Building Materials Supplied by Other Manufacturers

- Fasteners (i.e. nails or screws) in accordance with Table 8: Fastener Lengths for Shadowclad fixing
- Building underlay compliant with Table 23 of E2/AS1
- Window/door head flashings supplied by window joinery company
- Paint in accordance with paint manufacturer's recommendations (refer to 5.3 Coating Selection for more details).

1.4 PRESERVATIVE TREATMENT

Shadowclad is available either H3 treated for use as an exterior cladding or untreated (Natural finish products only) for interior wall and ceiling linings. H3 treated Shadowclad is treated in accordance with AS/NZS 1604.3 with the standard treatment for Shadowclad panels being H3.1 LOSP (Azole). H3.2 CCA treatment is available for Shadowclad Ultra panels if required.

Shadowclad is envelope preservative treated. Where sheets are cut, cuts must be coated with a brush on timber preservative. Holdfast® Metalex® Concentrated Timber Preservative Clear (Holdfast® Metalex® Clear) is recommended. Failure to do so will affect the long term durability of the panel.

H3.1 LOSP Treatment

H3.1 LOSP treatment is the standard treatment for Shadowclad panels as it does not discolour the panel surface and does not use water in the treatment process allowing panels to remain at uniform dimensions.

When coating H3.1 LOSP treated plywood some residual solvent may be present on the sheet surface from the treatment process. Sheets feeling greasy to touch should be placed in a well ventilated area and allowed to flash off to ensure proper adhesion of paints and stains to the sheet surface.

Mechanical fasteners are required to fix H3.1 LOSP treated Shadowclad to framing. Do not glue Shadowclad to frames.

H3.2 CCA Treatment

H3.2 CCA uses water during the treatment process and may leave panel surfaces with a slight green colour. For this reason H3.2 CCA treatment is available only in the Shadowclad Ultra finish.

Table 6 Preservative treatment options

	Untreated	H3.1 LOSP (Azole)	H3.2 CCA
Preservative carrier	N/A	Light organic oil (white spirits)	Water
Colour	Natural	Natural	Green
Fungicide	Heat treated dry wood	Propiconazole and Tebuconazole	Copper
Insecticide	Heat treated dry wood	Permethrin	Arsenate
Other chemicals	N/A	Butyl Oxitol (co-solvent to assist active stability)	Chrome (to fix preservative in water)
Mouldicide	N/A	IPBC	Copper (limited efficiency)
Notes	Plywood for dry interior use, supplied ex mill at <15% moisture content	Solvent does not affect dimensions. Solvent smell disappears when exposed to air flow	Dried after treatment to average 18% moisture content
Applications (Refer NZ3602)	Interior dry protected	Exterior (service performance subject to detailing & coatings used)	Exterior (service performance subject to detailing & coatings used)

1.5 SUSTAINABILITY

Shadowclad is manufactured from radiata pine. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture. The crop is managed on a sustainable basis to yield millable trees.

New Zealand plantations are managed in compliance with the New Zealand Forest Accord.

Shadowclad is manufactured in New Zealand at CHH Woodproducts Tokoroa plywood mill.

Shadowclad is available Forestry Stewardship Council (FSC) (SCS-COC-001316) certified upon request.

1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, every sheet of Shadowclad plywood has the following information marked on the back:

- Brand name: eg.SHADOWCLAD
- Intended application: eg. STRUCTURAL
- Glue bond: eg. A BOND
- Formaldehyde emission class: eg. E0
- Australasian Standard: eg. AS/NZS 2269:2012
- Treatment Standard (if applicable) eg. AS/NZS 1604.3:2012
- Date and time of manufacture: eg. 01/12/15 12:34:56
- The Engineered Wood Products Association of Australasia (EWPAA) brand and mill number: e.g. 911 (Tokoroa mill)

Treated example:

SHADOWCLAD STRUCTURAL A BOND
E0 AS/NZS 2269.0:2012
AS/NZS 1604.3:2012 400 64 H3 E LOSP
RETREAT CUTS PAT 01/12/15 12:23:45
911

Untreated example:

SHADOWCLAD STRUCTURAL A BOND
E0 AS/NZS 2269.0:2012
UNTREATED – FOR INTERNAL USE
ONLY PAT 01/12/15 12:23:45
911

2.0 DESIGN CONSIDERATIONS

2.1 DESIGN RESPONSIBILITY

Design responsibility lies with the building owner and the professionals that they engage. The specifier for the project must ensure that the details in the specification for their individual projects are appropriate for the intended application. The specifier must also ensure that additional detailing is provided for specific design or any areas that fall outside the scope and specifications of this literature. It is the specifier's responsibility to ensure that non-CHH products are fit for purpose, and compatible with Shadowclad products.

Good detailing which avoids moisture or dust accumulation on the sheet surface can help increase durability and aesthetics. Roof overhangs contribute to performance as they offer shade and will protect walls from rain and dust. Trims should be bevelled to shed moisture and flashings should be detailed with gaps that do not trap water at the panel edges.

2.2 LITERATURE SCOPE

Shadowclad can be used for those structures which fall within the scope of Acceptable Solution E2/AS1- External Moisture. Shadowclad is recommended for a drained and ventilated cavity, where the cladding is fixed onto timber battens fixed over the timber frame and building underlay.

Shadowclad is not recommended where a risk score >20 in accordance with E2/AS1 is established.

2.3 CODE COMPLIANCE

Shadowclad on a cavity wall system is tested in accordance with E2/VM1 and AS/NZS 4284 "Testing of Building Facades" for compliance with the NZBC Clause E2 - External Moisture.

2.4 SITE & FOUNDATIONS

The site on which the building is situated must comply with the Acceptable Solution E1/AS1 of the Approved Document for the NZBC Clause E1 - Surface Water.

2.5 GROUND CLEARANCES

The bottom edge of each Shadowclad sheet must be a minimum of 50mm above decks and verandahs, 100mm above paved ground and a minimum of 175mm above unprotected ground.

Shadowclad must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604 and E2 - External Moisture. Maximum distance from the bottom of the sheet to the fixing shall not exceed 75mm.

For garage door openings, refer Paragraph 9 "Openings to garages" in Acceptable Solution E2/AS1.

2.6 MOISTURE MANAGEMENT

It is the responsibility of the specifier to identify moisture related risks associated with any particular building design and site exposure.

Wall construction design must effectively manage moisture, accounting for both the interior and exterior environments of the building. This is particularly important in buildings that have a higher risk of wind driven rain penetration or that are artificially heated or cooled.

Where a deck is attached to the building and the Shadowclad extends below the deck to cover the framing, keep decking clear of the Shadowclad surface and detail to avoid moisture entrapment.

All wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate Shadowclad™ flashings for waterproofing. Materials, components and the installation used to manage moisture in framed wall construction must, at a minimum, comply with the requirements of the NZBC.

2.7 WIND LOADING

Shadowclad is suitable for use in all wind zones up to and including extra high (55 m/s) as defined by NZS 3604 and specific design wind pressures up to design differential ultimate limit state (ULS) of 2.5 kPa.

2.8 DURABILITY

The durability level applicable to Shadowclad is dependent upon the application and coating applied. Detailing, treatment and installation methods need careful consideration to satisfy the requirements of the NZBC.

Internal Linings – 50 year Durability

Untreated Shadowclad used in dry, interior situations will meet the requirements for 50 year minimum durability if coated or uncoated.

Exterior Cladding – 15 year Durability

CHH Woodproducts does not recommend Shadowclad is left uncoated when used as an exterior cladding.

The NZBC Clause B2 requires claddings to achieve a minimum structural durability level of 15 years.

Shadowclad coated with stains or paints (regardless of colour choice) will meet this requirement. If using dark colours (colours with an LRV of less than 50%) homeowners should expect an increased level of coating maintenance over the life of the cladding than would normally be expected where lighter colours are used.

Using dark colours with an LRV of less than 50% and failure to adequately maintain the surface coating of the cladding increases the risk of aesthetic related issues such as face checking.

Additional Notes:
For further advice on coatings refer to section 5.0: Coating and Application – Exterior Cladding.

2.9 TEXTURED VS. SMOOTH FINISHED PLYWOOD AS EXTERIOR CLADDING

Structurally, some smooth faced plywood products may meet the requirements of E2/AS1 however in CHH Woodproducts opinion smooth faced plywood does not retain a high visual appearance when directly exposed to weathering.

Where a high visual appearance is desired (such as exterior cladding) CHH Woodproducts recommends the use of Shadowclad rather than smooth faced plywood.

Shadowclad features a textured (bandsawn) face which reduces the visibility of natural face checking which can occur in any wood based product which has been exposed to weather for a prolonged period.

Face checks are not considered a manufacturing fault as they are part of a natural process and are merely an indication that it is time to re-apply the surface coating on the product.

2.10 HEALTH & SAFETY

Shadowclad should be installed and used as per the Material Safety Data Sheet (MSDS) which can be downloaded from www.chhwoodproducts.co.nz.

Always wear safety glasses or non-fogging goggles when cutting Shadowclad panels and flashings.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

2.11 STORAGE & HANDLING

Shadowclad panels:

- Keep Shadowclad panels dry
- Store under cover
- Handle and stack with care to avoid damage
- Stack flat; clear of ground, on at least three evenly spaced bearers
- Store in well-ventilated areas away from sources of heat, flames or sparks

Shadowclad™ flashings:

- Keep dry. Should a shipment of Shadowclad™ flashings arrive in a wet condition, they should be immediately dried before storing
- When storing flashings avoid contact with other metals which may cause scratches or marks. The use of shelving or racks faced with dry wood is recommended
- Keep away from caustics, nitrates and acids

3.0 INSTALLATION – INTERIOR LININGS

The use of untreated Shadowclad is acceptable under NZS 3604, NZBC for internal wall and ceiling linings where NZS 3602 allows the use of untreated plywood.

For detailed installation advice for plywood used as an internal lining refer to the Internal Linings Technical Bulletin, which is available to be downloaded from www.chhwoodproducts.co.nz.

4.0 INSTALLATION – EXTERIOR CLADDING

4.1 FRAMING – DURABILITY

Refer to NZBC Acceptable Solution B2/AS1 "Durability". External timber framing must be treated to a minimum H1.2 treatment. For timber treatment and allowable moisture content, refer to NZS 3602 as well as framing manufacturer's literature (e.g. Laserframe®). The current Laserframe Product Guide can be downloaded from www.chhwoodproducts.co.nz.

4.2 FRAMING – CONSTRUCTION

Use kiln dried framing such as Laserframe in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. The current Laserframe Product Guide can be downloaded from www.chhwoodproducts.co.nz.

Timber frame sizes and set out must comply with NZS 3604 (or specifically designed to NZS 3603) and with stud and nog centres and timber width required by this specification.

All Shadowclad sheet edges must be fully supported by framing.

- Studs must not exceed 600mm centres
- Nogs must be provided at a maximum of 800mm centres
- An extra stud is required at internal corners for ventilated cavities
- Refer to NZS 3602 for moisture content requirements as a guide, frame and cavity batten moisture content should be no greater than 20%
- Framing must be kept as dry as possible at all times
- Single spans of Shadowclad should not exceed 600mm (e.g. Below windows or balustrades)

4.3 PREPARATION – BUILDING UNDERLAY & RIGID AIR BARRIER

The use of building underlay compliant with Table 23 of E2/AS1 or an alternative solution rigid air barrier must be provided over framing prior to the installation of exterior cladding

- Barriers to air flow are required
- Rigid air barriers are required in extra high wind zones and above.
- Rigid air barriers are also required in high wind zones and above for Ministry of Education school properties.

For more information on rigid air barriers refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from www.chhwoodproducts.co.nz

4.4 PREPARATION – CAVITY CONSTRUCTION

Cavity Construction

A Shadowclad cavity base closure must be installed at the bottom of all walls and above window heads, this provides vermin proofing to ventilation openings. The holes in the cavity base closure must be kept clear to enable ongoing drainage and ventilation of the cavity.

Cavity Battens

Cavity battens provide an air space between the frame and the sheet and are considered a "packer" when installed in accordance with Acceptable Solution E2/AS1.

The battens must be fixed over the building underlay or a rigid air barrier.

All timber battens must: be nominal 20mm thick (between limits of 18mm and 25mm in thickness); at least the same width as the stud; and minimum H3.1 LOSP treated in accordance with NZS 3640.

Polystyrene battens MUST NOT be used with H3.1 LOSP treated Shadowclad panels, as they may melt in contact with solvents.

Battens must be fixed over the building underlay/rigid air barrier to all studs, as follows.

If studs are at 600mm centres:

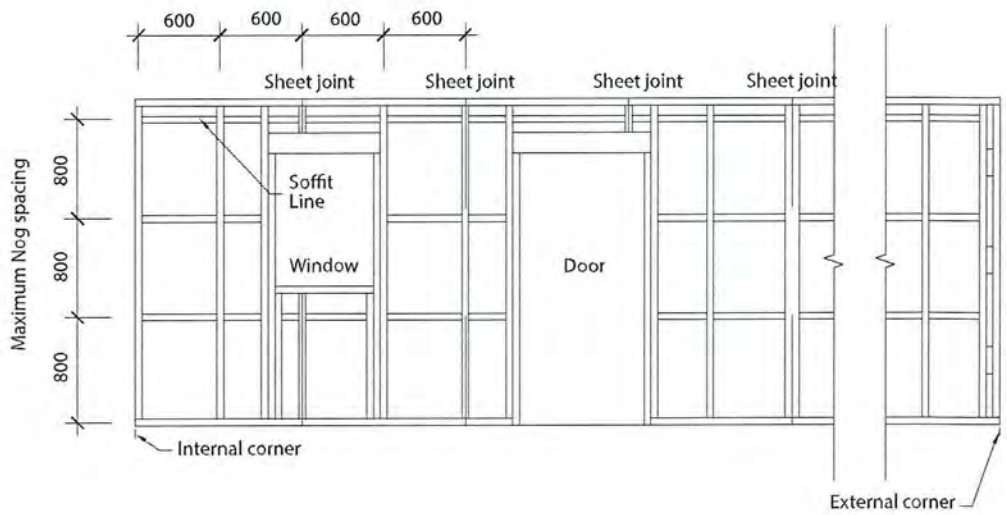
- Battens must be fixed vertically at 300mm centres (i.e. a batten on studs and one in between the two studs fixed to top and bottom plates and nogs)
- Battens fixed between studs are to restrain the building underlay and insulation from bulging into the drained cavity
- The Shadowclad must not be fixed to these cavity battens where there is no framing behind them

If studs are at 400mm centres battens may be fixed on studs only.

Horizontal battens must be used at the top of the wall to block the top of the cavity from venting into the roof space.

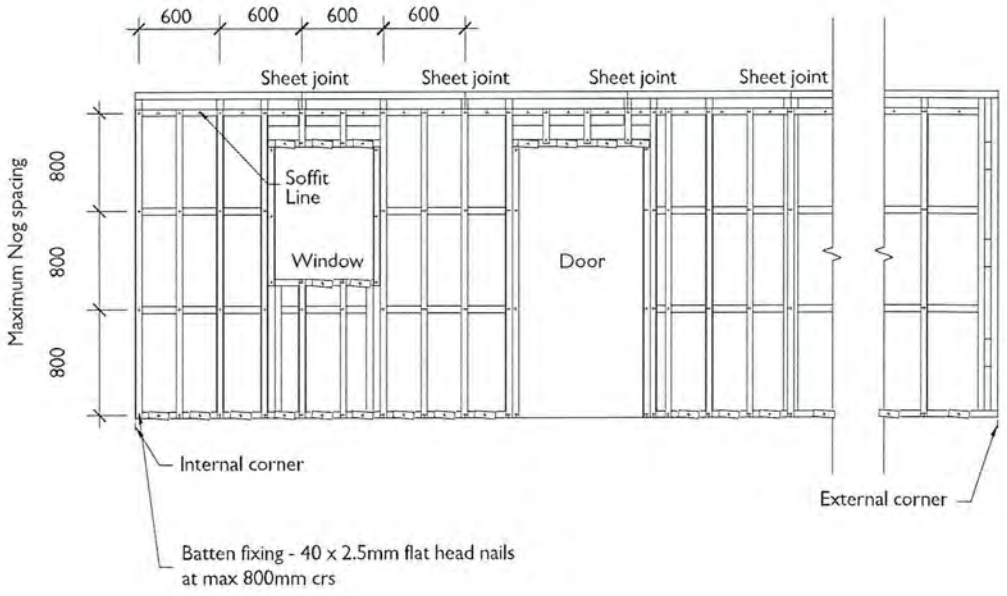
Cavity spacers (i.e. short pieces of cavity batten) may be used to support the bottom sheet edge (or provide intermediate support where required eg above window openings) but must allow water drainage to the outside. The cavity spacers must be fixed at a 5° minimum slope with a 50mm minimum air gap at either side.

SC001: Typical Framing Setout (without Battens)



Note: Single spans of Shadowclad® must not exceed 600 mm (e.g. Below windows or on balustrades)

SC002: Typical Framing Setout (with Battens)



4.5 SHEET LAYOUT

A sheet layout should form part of architectural drawings and be used from the basis of stud/framing layout

- Sheet edges must be supported by the framing
- Sheets are designed to be vertically fixed. **Do not fix sheets horizontally**
- When laying up on to framing, start at framing corners and work across the wall
- All treated Shadowclad panels are envelope preservative treated. Where sheets are cut, edges **must** be coated with a brush on timber preservative such as Holdfast® Metalex® Clear
- Cut edges must be placed at the top of the sheet to avoid rain drips soaking in to cut end grains
- Priming the bottom edges and the back (rear) of the sheets to a height of 150mm is required
  - Shadowclad Ultra sheets are coated on the rear to a height of 150mm (min.) to meet this requirement

4.6 FIXINGS – FASTENER DURABILITY

Table 7 Fastener Durability for Shadowclad®

Finish	Treatment	Exposure Zone (refer to section 4 of NZS 3604)	Material Required
Shadowclad Natural/Ultra	H3.1 LOSP	Zones B & C	Minimum hot dipped galvanised or better
		Zone D (sea spray)	Stainless Steel
Shadowclad Ultra	H3.2 CCA	All Zones	Stainless Steel

4.7 FIXINGS – FASTENER SIZE & LAYOUT

Table 8 Fastener Lengths for Shadowclad®

	Minimum Fastener Length and size (Cavity Fix)
Nails in Timber	60 x 2.8mm
Screws in Timber	8 g x 65mm

Shadowclad must be nailed or screwed to timber as per below:

- Use flat head (full round head) nails or rose head nails with timber framing. Rose head nails should be considered where a more decorative fastener is desired.
- Standard fixing pattern: fasten sheet edges at 150mm centres and within the panel on all supports at 300mm centres
- Do not fix to battens that are not installed over studs as the nails will puncture the building wrap
- Fasten no closer than 7mm to sheet edges except on edge with top lap (weather groove lap), **do not nail through top lap.**
- Fasten shiplap joints independently to ensure natural sheet expansion is not restricted
- When using a rigid air barrier the Shadowclad fastener lengths should be increased by the thickness of the panel to ensure required fastener pull out loadings are achieved
- Drive nails & screws flush
- Do not nail through the grooves in Shadowclad Groove panels

Power Driven Fastening

- Best practice is to hand drive nails as better control of nail depth is achieved
- Paslode Impulse Nailers may be used to fire power driven nails. Refer to Paslode for suitable fasteners as per the minimum lengths stated in table 8
- Do not overdrive nails into the sheet

4.8 SHADOWCLAD KEY INSTALLATION AND DESIGN POINTS

The following tasks are provided to installers to point out key installation and design factors when used as an exterior cladding. These do no detract from the requirements to read and understand this literature as a whole.

Task	Tick when checked
Prior to Specification and Installation	
Read the Shadowclad Specification and Installation Guide in its entirety	☐
Framing Plan	
Framing setout drawings to suit Shadowclad fixing and installation guidelines	☐
Sheet Cuts	
Coat all sheet cuts with a preservative timber treatment such as Holdfast® Metalex® Clear	☐
After applying Holdfast® Metalex® Clear, apply the surface coating (e.g. paint or stain) to cut edges	☐
Place uncut edge to bottom	☐
Fastener Material Type	
Galvanised fasteners or better used (Stainless steel annular groove nails required in sea spray zones and with H3.2 CCA treated Shadowclad Ultra)	☐
Sheet Fastener Pattern	
Around sheet edge – maximum 150mm centre spacing	☐
Within sheet body – maximum 300mm centre spacing	☐
Horizontal Sheet Joints	
Minimum 9mm separation gap between sheets above all Horizontal Z flashings	☐
Prime the bottom of the sheet edge and 150mm up the back (rear) of the sheets	☐
50 mm strip of neutral cure silicon sealant or stop ends at all Z flashing terminations excluding terminations at Shadowclad™ metal corner flashings	☐
Back flashings or 150 mm overlap to all flashing butt joints	☐
Expansion Gaps Between Sheets (Vertical Sheet Joints)	
Texture Profile Sheets - 2mm gap between vertical edges of sheets	☐
Groove Profile Sheets - 9mm gap (i.e. full groove space) between vertical edges of sheets	☐
Note: Expansion gaps required between vertical edges of sheets to accommodate natural expansion and contraction of sheets	
Ground Clearances	
Paved/ Sealed Ground - minimum 100mm distance from the ground to sheet bottom	☐
Broken Ground - minimum 175mm distance from the ground to sheet bottom	☐
Prime the bottom of the sheet 150mm up the back (rear) of the sheet	☐

Refer to the current Shadowclad Specification and Installation Guide for full installation specifications and suggested details