

MATERIAL SPECIFICATIONS

**Project: BROWN HOUSE
15 SCOTSWOOD STREET
WIAKAIA**

SOUTHLAND DISTRICT COUNCIL
Appln. No. 295250.1
Approved [Signature]
Date 25/1/06

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- Risk Matrix Calculations
- Smoke Alarm Compliance
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- 3604 Plate & Lintel Fixing
- NZBC E2 (Profiled Metal Claddings)

The NZ Building Act/Regulations 2004 and the provisions of the NZ Building Code must be complied with in regard to any inconsistencies in the issued consent documents.

**WEBB
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9.1.8.5 Wall framing behind cavities

Where *stud* spacings are greater than 450 mm, an intermediate means of restraining the *building wrap* and insulation from bulging into the *drained cavity* shall be installed. Acceptable means of achieving this are by using:

- a) 75 mm galvanized mesh,
- b) Polypropylene tape at 300 mm centres,
- c) Galvanized wire at 300 mm centres fixed to *dwangs* over the *building wrap*, or
- d) Vertical *cavity battens* at 300 mm centres.

Wire or mesh shall be galvanized in accordance with AS/NZS 4534.

Dwangs shall be at a minimum of 800 mm centres, except when rigid sheathing is fixed to the *framing* prior to fixing *cavity battens*.

9.1.9 Penetrations

9.1.9.1 Penetrations through cavities

Window penetrations through cavities shall meet the requirements of Paragraph 9.2 to Paragraph 9.9.

9.1.9.2 Other cavity penetrations

Where penetrations of the wall *cladding* are wider than the *cavity batten* spacing, allowance shall be made for air flow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the vertical *cavity batten* and the *flashing* to the opening.

9.1.9.3 Pipes and service penetrations

Pipes and service penetrations shall be made *weathertight* by using *flashings* and, where necessary, sealant complying with:

- b) low modulus Type II Class A of Federal Specification TT-S-00230C.

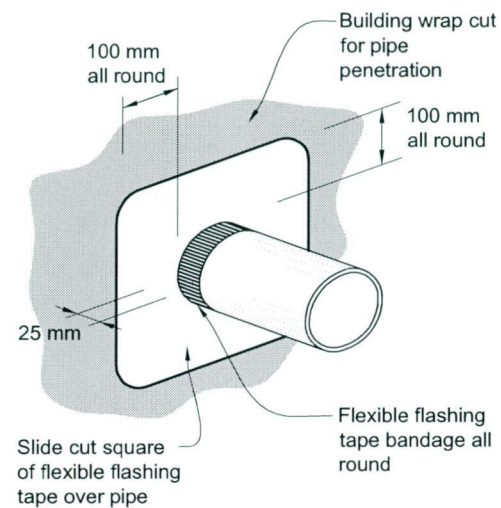
Details specific to particular *claddings* are given in Paragraph 9.2 to Paragraph 9.9.

Acceptable methods of *flashing* pipes and a meterbox are shown in Figure 68 and Figure 69.

COMMENT:

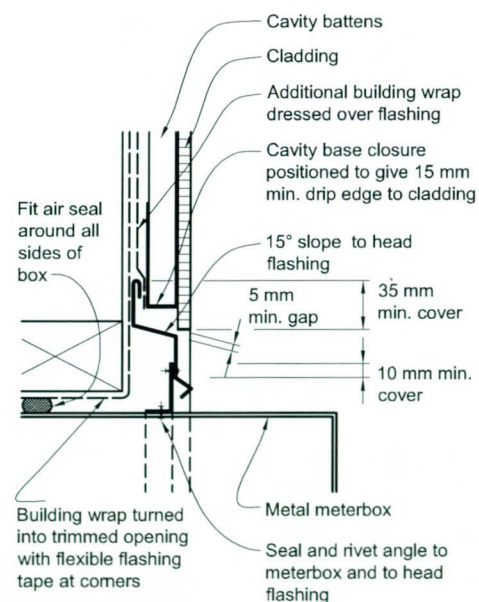
Where possible, meterboxes should be located in sheltered areas of the *building*, such as a porch, or be installed behind a weatherproof glazed panel.

Figure 68: General pipe penetration
Paragraph 9.1.9.3, Figure 126



Amend 2
Jul 2005

Figure 69: General meterbox
Paragraphs 9.1.9.3, 9.6.8.5 and 9.6.9.6



NOTE:

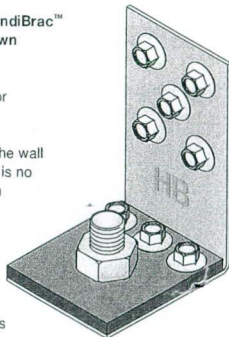
- (1) Fix angle and seal to all sides of box.
At sides and base, *claddings* shall overlap angle by 10 mm minimum. Continuously seal *cladding* against angle.
- (2) Suitable for other similar penetrations.

GIB® HandiBrac™

Panel Hold-Down Bracket

Developed in conjunction with MiTek™, the GIB® HandiBrac™ has been designed and tested for use as a hold-down bracket in GIB® BL and UP bracing elements.

- The GIB® HandiBrac™ registered design provides for quick and easy installation
- The GIB® HandiBrac™ provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to check in the framing as recommended with conventional straps
- The GIB® HandiBrac™ is suitable for both new and retrofit construction
- The design also allows for installation and inspection at any stage prior to fitting internal linings



Components

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

Components per paired pack include:

- 2 x GIB® HandiBrac™ Brackets
- 2 x Washers
- 16 x Tek Screws (8mm AF)

NB: Bolt purchased separately

GIB® Bracing Elements

The GIB® HandiBrac™ is a proprietary product that has been tested in, and is suitable only for the following GIB® Bracing systems; GIB Braceline® bracing elements (BL1, BL1a, BLP, BLG) and GIB Ultraline® PLUS Lining Systems bracing elements (UP1, UP1a, UPP, UP2) all have panel hold-down connections at each end of the bracing element.



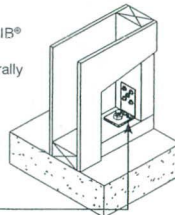
Panel Hold-down Details

Concrete Floor - Internal Wall

Bottom plate is fixed using M12 galvanised bolt set not less than 75mm into concrete and projecting sufficiently to allow for the washer and fully-threaded nut above the timber.

Locate the GIB® HandiBrac™ bracket centrally on the stud

GIB® HandiBrac™ bracket

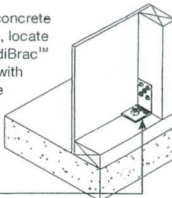


Concrete Floor - External Wall

Bottom plate is fixed using M12 galvanised bolt set not less than 75mm into concrete and projecting sufficiently to allow for the washer and fully-threaded nut above the timber.

To maximise concrete edge distance, locate the GIB® HandiBrac™ bracket flush with the inside face of the stud

GIB® HandiBrac™ bracket

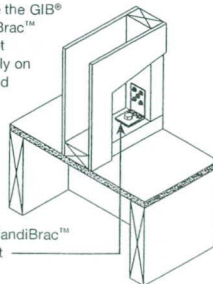


Timber Floor - Internal Wall

Bottom Plate is fixed using a 12mm diameter minimum 150mm long galvanised coach screw.

Locate the GIB® HandiBrac™ bracket centrally on the stud

GIB® HandiBrac™ bracket

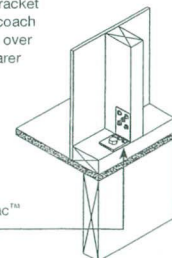


Timber Floor - External Wall

Bottom Plate is fixed using a 12mm diameter minimum 150mm long galvanised coach screw.

Locate the GIB® HandiBrac™ bracket such that the coach bolt is centred over the joist or bearer below

GIB® HandiBrac™ bracket



GIB® BRACING PANEL HOLD-DOWN FIXINGS

Panel hold-down fixings are required at both ends of the following bracing elements.

- GIB® Bracing Systems 2006; Bracing elements BL1, BL1a, BLP, BLG
- GIB UltraLine® PLUS Lining System 2006; Bracing elements UP1, UP1a, UPP, UP2.
- The washer is an integral part of the GIB® HandiBrac™ design and is supplied as part of the pack. It does not need to be acquired separately.

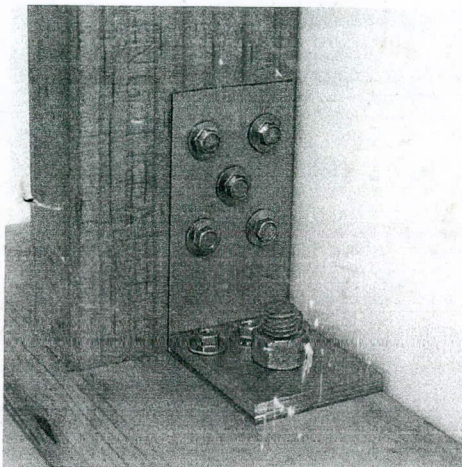
Fixing to timber framed floors

Bolt fixing to a timber framed floor is with a 150 mm long by 12 mm diameter galvanised coach screw installed in accordance with NZS 3603:1993, Clause 4.5.

Fixing to concrete slabs

The bottom plate at both ends of the bracing element is fixed using an M12 galvanised bolt set not less than 75 mm into concrete and projecting sufficiently to allow a fully threaded nut above the washer. Alternatively, a proprietary fixing with equivalent capacity may be used.

GIB® HandiBrac™ Panel Hold-Down Bracket



- Panel hold-down bracket for use in GIB® BL and UP bracing systems
- Quick and easy to fit
- May be fitted at any stage before lining
- Framing face is clear to allow flush lining
- Easily inspected

GIB® HandiBrac™ is manufactured and distributed by:

MiTek New Zealand Ltd

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Introduction to Acceptable Solution E2/AS1 External Moisture



Table 1 from E2/AS1: Definitions of risk

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

NOTES:

- 1 Eaves width measured from external face of wall cladding to outer edge of overhang, including gutters and fascias.
- 2 Balustrades and parapets count as 0 mm eaves.

Risk score

Table 2 'Building envelope risk matrix' sets out the risk matrix that shall be used to define the risk score. A risk score is calculated for each elevation of the building.

Claddings are then selected from Table 3 'Suitable wall claddings' according to the risk scores, or the highest risk score may be used for all walls.

Table 2 from E2/AS1: Building envelope risk matrix

Risk factor	Risk severity								subtotals for each risk factor
	low	score	medium	score	high	score	very high	score	
Wind zone (per NZS 3604)	0		0	✓	1		2		0
Number of storeys	0		1	✓	2		4		1
Roof/wall intersection design	0	✓	1		3		5		0
Eaves width	0		1		2	✓	5		2
Envelope complexity	0	✓	1		3		6		0
Deck design	0		2	✓	4		6		2
Total risk score:									5

(Enter the appropriate risk severity score for each risk factor in the score columns. Transfer these figures across to the right-hand column. Finally, add up the figures in the right-hand column to get the total risk score.)

Table 3 from E2/AS1: Suitable wall claddings

Suitable wall claddings ⁽¹⁾		
Risk score	Direct fixed to framing	Over 20 mm minimum drained cavity
0 – 6	a) Timber weatherboards – all types b) Fibre cement weatherboards c) Vertical profiled metal ⁽³⁾ – corrugated and symmetrical trapezoidal only d) Fibre cement sheet ⁽⁴⁾ e) Plywood sheet f) EIFS	a) Masonry veneer ⁽²⁾ b) Stucco c) Horizontal profiled metal ⁽³⁾ – corrugated and trapezoidal only
7 – 12	a) Bevel-back weatherboards b) Vertical board and batten c) Vertical profiled metal ⁽³⁾ – corrugated only	a) Masonry veneer ⁽²⁾ b) Stucco c) Horizontal profiled metal d) Rusticated weatherboards e) Fibre cement weatherboards f) Fibre cement sheet g) Plywood sheet h) EIFS
13 – 20	a) Vertical profiled metal ⁽³⁾ – corrugated only	a) to h) as above i) Bevel-back weatherboards
Over 20	a) Redesign the building to achieve a lower score, or b) Specific design: <ul style="list-style-type: none"> • The design may need changing to reduce the risk. • The territorial authority or building certifier will require more comprehensive details and documentation providing evidence of weathertightness. • The territorial authority, building certifier, designer or owner may require more inspections. • A third party audit of design by a weathertightness expert may be required. 	

Notes:

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

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

3 Refer to Figure 38 of E2/AS1 for profiles.

4 Except stucco over a fibre cement backing.

IMPORTANT NOTICE

Smoke alarms are to be installed in dwellings as noted below.

Smoke alarms are to be installed within the dwelling.

They are required in all escape routes on all levels, in all sleeping rooms or within three metres of every sleeping room door and the alarm must be audible on the other side of the closed doors.

Smoke alarms must have a test facility plus a hush facility having a minimum duration of 60 seconds.

Smoke alarms to comply with UL 217, ULC S531, AS 3786 or BS 5446 Part 1.

The above requirement is for smoke alarms to be installed when building work is undertaken e.g. if this building consent is for a solid fuel burner you will need to install smoke alarms that comply with the above before Council can grant a Code Compliance Certificate.

Design Steps 4 and 5 – Bracing Units Achieved (Wind and Earthquake)

The next step is to place selected wall bracing systems on the bracing lines. A range of GIB® bracing systems have been tested and the specifications and Bracing Unit ratings are listed below. GIB® Standard plasterboard systems often represent the majority of the wall bracing elements. GIB Braceline®, GIB Noiseline® or GIB Toughline® systems are used for narrow walls or when high Bracing Unit ratings are required. GIB Ultraline® Bracing Unit ratings generally fall between GIB® Standard plasterboard and GIB Braceline®.

Wall Heights Other Than 2.4m

The published Bracing Unit ratings are based on a 2.4 metre height. For other heights, the ratings must be multiplied by a factor $f = 2.4$ divided by actual wall height. The Bracing Unit ratings for walls higher than 2.4 metres will reduce, and the Bracing Unit rating for lower walls will increase. Factor f must not be greater than 1.3.

TABLE 1: Bracing Unit ratings for 10mm & 13mm GIB® Standard, 10mm and 13mm GIB Ultraline®, 10mm GIB Aqualine®, 10mm GIB Fyrelane®.

Type	Minimum length (m)	Lining Requirement	Additional Requirement	Bracing Units per metre (wind)	Bracing Units per metre (Earthquake)
10mm GIB® Standard plasterboard bracing systems (these ratings also apply to 10mm GIB Aqualine®, and 10mm GIB Fyreline®)					
GIB1a	1.8 and less than 2.4	10mm GIB® Standard plasterboard one face, fixed horizontal or vertical	diagonal brace	55	50
GIB1b	2.4 and greater			75	50
GIB2a	1.8 and less than 2.4	10mm GIB® Standard plasterboard both faces, fixed horizontal or vertical	diagonal brace	75	60
GIB2b	2.4 and greater			80	70
GIB3	1.2	10mm GIB® Standard plasterboard both faces, fixed horizontal or vertical	N/A	65	60
13mm GIB® Standard plasterboard bracing systems (these ratings also apply to 13mm Gib® Ultraline®)					
GIB10	1.8	13mm GIB® Standard plasterboard or 13mm GIB Ultraline® one face, fixed horizontal or vertical	N/A	65	60
GIB11	1.2	13mm GIB® Standard plasterboard or 13mm GIB Ultraline® both faces, fixed horizontal or vertical	N/A	65	65
10mm and 13mm GIB Ultraline® bracing systems					
UL1	1.2	GIB Ultraline® one face, fixed horizontal or vertical	6kN connections	70	60
UL2	1.2	GIB Ultraline® both faces, fixed horizontal or vertical	6kN connections	100	85

Design Steps 4 and 5 – Bracing Units Achieved (Wind and Earthquake)

TABLE 2: Bracing Unit ratings for 10mm GIB Braceline®, 10mm GIB Noiseline® and 10mm or 13mm GIB Toughline®.

Type	Minimum length (m)	Lining Requirement	Additional Requirement	Bracing Units per metre (wind)	Bracing Units per metre (Earthquake)
10mm GIB Braceline® bracing systems (these ratings also apply to 10mm or 13mm GIB Toughline® and 10mm GIB Noiseline®)					
BR1a	1.8 and less than 2.4	GIB Braceline® one face, fixed horizontal or vertical	diagonal brace	70	60
BR1b	2.4 and greater			90	75
BR2a	1.8 and less than 2.4	GIB Braceline® one face, fixed vertical	N/A	75	60
BR2b	2.4 and greater			85	60
BR3a	1.8 and less than 2.4	GIB Braceline® one face, fixed horizontal	N/A	60	45
BR3b	2.4 and greater			95	65
BR4	0.9 and less than 1.2	GIB Braceline® one face, fixed vertical or horizontal*.	6kN connections	100	85
BR5	1.2	GIB Braceline® one face, fixed vertical or horizontal*.	6kN connections	115	85
BR6	1.2	GIB Braceline® one face, 10mm GIB® Standard on the other, fixed vertical or horizontal*.	12kN connections	150	110
BR7	0.9	GIB Braceline® one face, 7.5mm plywood on the other, fixed vertical or horizontal*.	6kN connections	145	145
BR8	0.9	GIB Braceline® one face, 4.75mm hardboard on the other, fixed vertical or horizontal*.	6kN connections	120	95
BR9	0.6	GIB Braceline® one face, fixed vertical or horizontal*.	6kN connections	110	95

Notes: 1) Where linings are specified on both faces (Systems GIB2, GIB3, GIB11, UL2, BR6, BR7, BR8) each face must be fastened as a braced element. Refer page 12 for fastening systems relating to Plywood and Hardboard.
The standard 10mm GIB® Plasterboard on the reverse face of BR6 is fastened as per system GIB1.

2) See notes on Hold-Down Strap Placement, Page 12.

*3) For horizontal fixing of linings in Systems BR4, BR5, BR6, BR7, BR8, BR9, see page 18.

Construction Details

Framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604. Winstone Wallboards recommends the use of kiln-dried machine stress graded framing (KD MSG). To achieve the published bracing performance the minimum actual framing dimensions are 90 x 35mm for external walls and 70 x 35mm for internal walls. System BR9 always requires a minimum of 90 x 35mm framing.

Wall bracing tests on GIB® Systems were undertaken without nogs. Nogs are not considered to add to the bracing performance of the wall.

Fastening GIB® Plasterboard Linings

- 10mm and 13mm GIB® Standard, 10mm and 13mm GIB Ultraliner® and 13mm GIB Toughline® may all be fastened using 32mm x 6g GIB® Grabber™ drywall screws or 30 x 2.8mm GIB® Nails.
- GIB® Braceline®, 10mm GIB Toughline® and 10mm GIB Noiseline® must be fastened with 32mm GIB® Grabber™ Braceline screws, or 30mm GIB Braceline® nails and washers.

GIB® linings for designated bracing elements are fastened at 150mm centres around the perimeter of the bracing element. **The first fastener is always placed 50mm away from the sheet corner. See detail page 16.**

Fastening in the field of the bracing element is conventional and the screw and glue method is recommended. (See Fastener Layout details, pages 14, 15).

When fixing part sheets of GIB® plasterboard, a minimum width of 300mm is recommended for bracing elements.

Full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs (or over the studs where horizontal fixing is permissible) and fastened at 200mm centres. Alternatively, the sheet end butt joints may be back-blocked.

Plywood (BR7) and Hardboard (BR8)

'Plywood' specified in BR7 is a grade C-D 7.5mm construction plywood manufactured to AS/NZS 2269:1994, fixed with 30 x 2.8mm GIB® Nails at 150mm centres around the perimeter of the bracing element and at 300mm centres to intermediate framing.

'Hardboard' specified in BR8 is 4.75mm standard or oil tempered hardboard manufactured by Fletcher Wood Panels Ltd., fixed with 30 x 2.8mm GIB® Nails at 150mm centres around the perimeter of the bracing element and at 300mm centres to intermediate framing.

Fire Resistance Ratings

10mm GIB® Braceline®, 10mm GIB® Aqualine®, 10mm GIB® Noiseline®, 10mm and 13mm GIB® Ultraliner® and 10mm GIB® Toughline® may be substituted for 10mm GIB® Fyreliner® in fire rated constructions. The fastener length for the fire rated system applies. The field of the braced element must also be fastened in accordance with the fire rated specification (adhesive not permitted).

Jointing and Stopping

All sheet joints must be paper tape reinforced and stopped in accordance with the publication entitled, "GIB Living Solutions® Site Guide".

Fastening the Bracing Element to Timber Floors

Fastening of the bottom plate of a GIB® wall bracing element to a timber framed floor must be in accordance with NZS3604 with pairs of 100 x 3.75mm nails at 600mm centres. In addition 6 or 12kN connections must be installed when specified for the particular bracing element type.

Fastening the Bracing Element to Concrete Slabs

Fastening of the bottom plate of a GIB® wall bracing element to concrete floors must be in accordance with NZS3604 for external walls, which includes a 12mm bolt (complete with a 50 x 50 x 3mm square washer) or a proprietary fixing with equivalent performance within 150mm (90mm for BR6) from both ends of the wall bracing elements.

On internal bracing lines, the bottom plate of GIB® Bracing elements may be fixed using 3.8mm shot fired fasteners fitted with 16mm discs, spaced at 150mm and 300mm from the end studs and thereafter at 600mm centres. This method only applies to Systems GIB1, 2, 3, 10, 11 and BR1, 2, 3.

Hold-Down Strap Placement (Refer Illustrations Pages 17 and 18)

Where 6kN connections are specified in the 'Additional Requirements' column, they are required only if the bracing element terminates within 1.2 metres from a door or window opening (see illustration, page 18).

Where 12kN connections are specified they must be installed at both ends of the bracing element in all cases.

Openings in Bracing Elements

Openings are allowed within the middle third of a wall bracing element's length and height. Neither opening dimension shall be more than one third of the element height. Wall linings are fixed to opening trimmers at 150mm centres. Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element.

Angle Braces

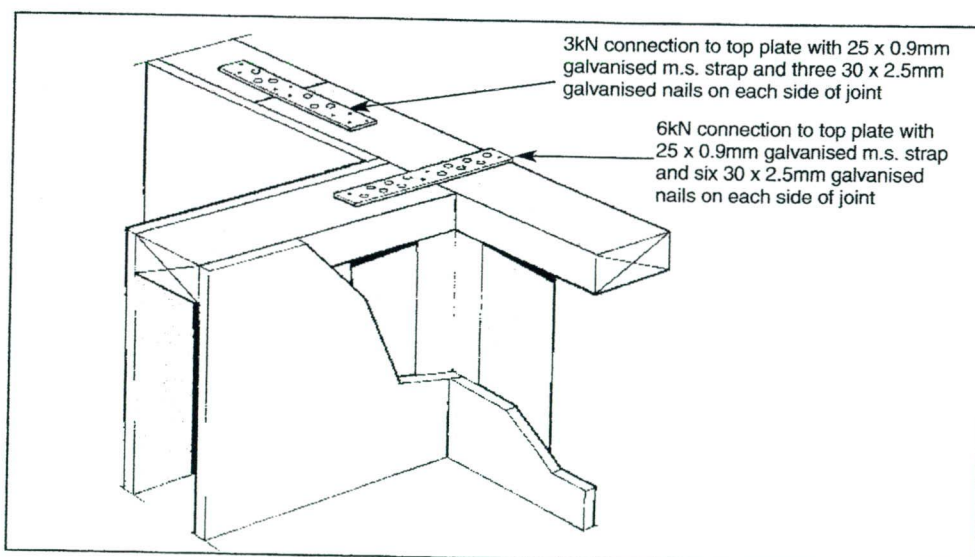
Angle braces serve to keep frames square during transport and construction. They also act as part of the temporary bracing of a building under construction. Angle braces contribute only a fraction to the bracing of a completed structure. The performance of a completed building depends mainly on the wall linings and their fixings.

Where specified, metal angle braces must be placed at an angle no steeper than 55 degrees, and within the designated length of the bracing element. For elements longer than 3.6 metres, pairs of angle braces (in opposite directions) are required. Fixing of angle braces is with three 30 x 2.8mm GIB® nails to top and bottom plates, and two 30 x 2.8mm nails to intermediate framing.

Top Plate Connections

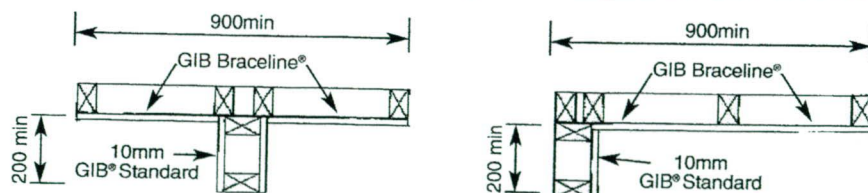
The top plate of a wall that contains one or more wall bracing elements shall be jointed according to the rating of the highest-rated individual wall bracing element as follows:

- (a) Rating not exceeding 100 bracing units: A 3kN connection as shown or by an alternative fixing of 3kN capacity in tension or compression along the plate;
- (b) Rating exceeding 100 bracing units: A 6kN connection as shown or by an alternative fixing of 6kN capacity tension or compression along the plate.



Guidelines for Intersecting Walls (all GIB® Bracing Sheet Types)

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Bracing element sheets shall be fixed and jointed as given on pages 14 and 15. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions (illustrated below) shall be fixed and jointed as specified for intermediate sheet joints. **The bracing element length must be no less than 900mm.**



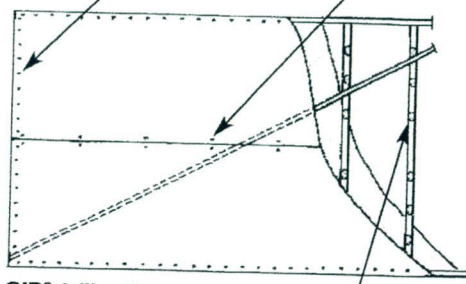
Where Wall Bracing Elements are interrupted by T or L junctions (as illustrated in the 900mm example above) they should be considered as follows:

The bracing element has been cut to accommodate the junction. Nevertheless, in respect of calculating Bracing Units, the Bracing Element is deemed to be continuous for the whole length (900mm in this particular case).

Fastener Layouts

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails where sheets cross studs

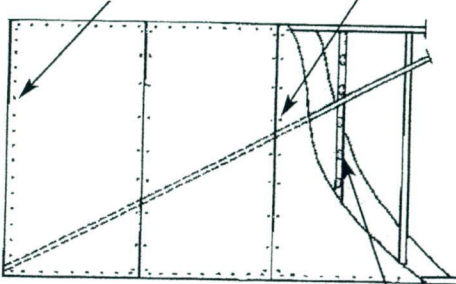


**GIB® 1 (lined one side)
GIB® 2 (lined both sides)
(Horizontal Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails at 300mm centres

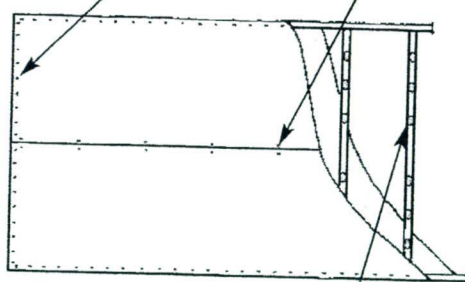


**GIB® 1 (lined one side)
GIB® 2 (lined both sides)
(Vertical Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails where sheets cross studs

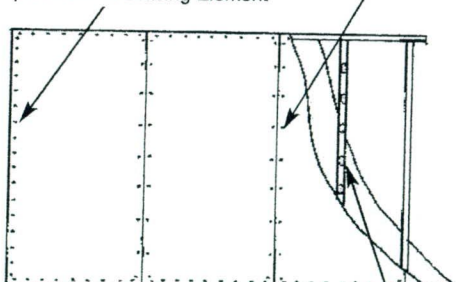


**GIB® 3 (lined both sides)
GIB® 10 (lined one side)
GIB® 11 (lined both sides)
(Horizontal Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails at 300mm centres

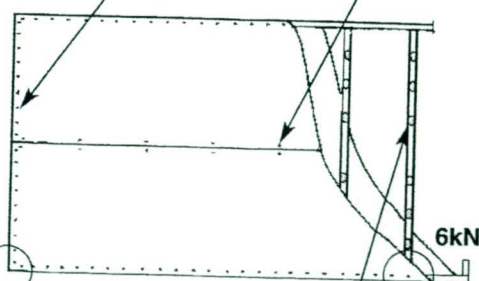


**GIB® 3 (lined both sides)
GIB® 10 (lined one side)
GIB® 11 (lined both sides)
(Vertical Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails where sheets cross studs

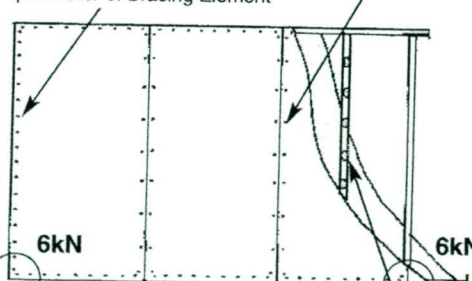


**UL1 (lined one side)
UL2 (lined both sides)
(Horizontal Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber™ screws or 30mm GIB® Nails at 150mm centres to perimeter of Bracing Element

Single 32mm screws or GIB® Nails at 300mm centres



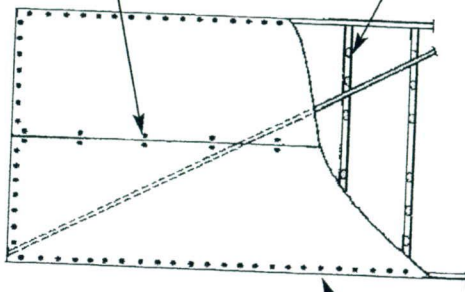
**UL1 (lined one side)
UL2 (lined both sides)
(Vertical Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

Fastener Layouts – continued

32mm single screws or GIB® Nails where sheets cross studs

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

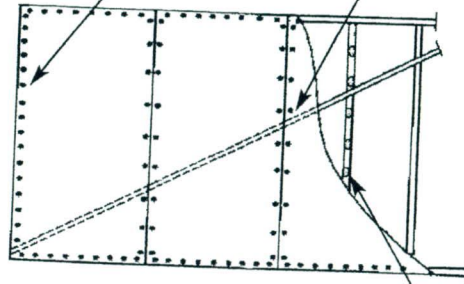


**BR1 (lined one side)
(Horizontal Fixing)**

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element

Single 32mm screws or GIB® Nails at 300mm centres

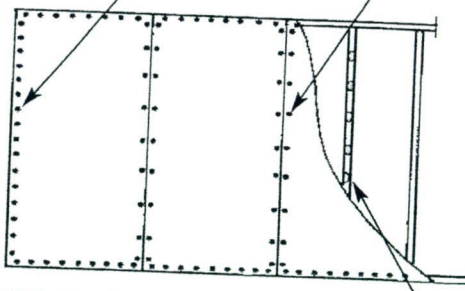


**BR1 (lined one side)
(Vertical Fixing)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element

Single 32mm screws or GIB® Nails at 300mm centres

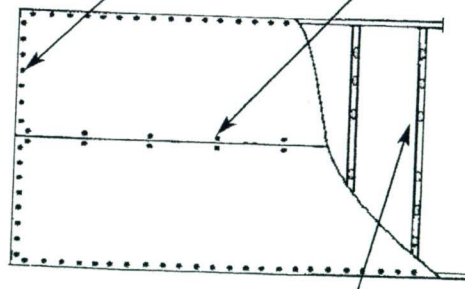


**BR2 (lined one side)
(Vertical Fixing Only)**

Daub of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element

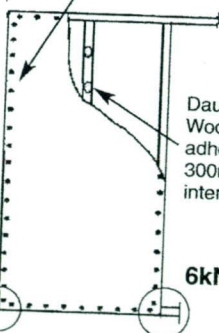
Single 32mm screws or GIB® Nails where sheets cross studs



**BR3 (lined one side)
(Horizontal Fixing Only)**

Daub of GIBFix® Wood Bond adhesive only at 300mm centres to intermediate studs

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element



**BR4 (lined one side)
BR5 (lined one side)**

Daubs of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs

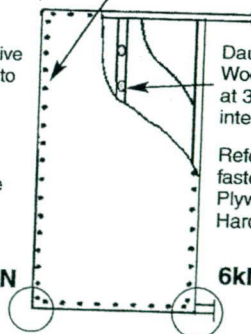
32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element



BR6 (lined both sides)

Daubs of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs
The 10mm GIB® standard plasterboard on the reverse face of BR6 is fastened as per system GIB1.

32mm GIB Braceline® screws or 30mm GIB Braceline® clouts and washers at 150mm centres to perimeter of braced element



**BR7 (lined both sides)
BR8 (lined both sides)**

Daubs of GIBFix® Wood Bond adhesive at 300mm centres to intermediate studs
Refer page 12 re fastener details for Plywood (BR7) Hardboard (BR8)

Note: If the length of the braced element using systems BR4, BR5, BR6, BR7 and BR8 exceeds 1.2m, then the sheet edges within the element are secured with single screws or nails at 300mm centres.

Table 8.1 – Ratings of 2.4 m high reinforced concrete or reinforced concrete masonry wall bracing elements (see 8.3.2.1)

If ratio $\frac{\text{wall length}}{\text{average wall height}}$ is:	Rating in bracing units per metre of wall
▶ Less than 0.5	(BUs/m) 0
▶ More than 0.5 but less than 1.5	42
▶ More than 1.5 but less than 3.0	100
▶ More than 3.0 but less than 4.5	200
▶ More than 4.5	300

NOTE –

- (1) Bracing units for walls relate to the ratio of wall length to the average wall height.
- (2) Walls to be greater than 1.5 m in length.

C8.3.2.1

The bracing ratings recognize that the strength contribution of a masonry or concrete wall is limited by the strength of its connections to other structural elements, such as floor or ceiling diaphragms.

Wall bracing elements of reinforced concrete, or reinforced concrete masonry, which are uniformly distributed throughout a building, may be used to contribute to the horizontal bracing of a building, to the ratings permitted in table 8.1.

C8.3.3

Dragon ties help stop walls from spreading.

8.3.2 Reinforced concrete and reinforced concrete masonry

8.3.2.1

Wall bracing elements of reinforced concrete or reinforced concrete masonry shall have the ratings given in table 8.1.

8.3.2.2

Concrete masonry bracing elements shall have a length not less than 1.5 m.

8.3.2.3

The construction of reinforced concrete masonry walls shall comply with NZS 4229.

8.3.2.4

Fixing of timber framing to concrete or concrete masonry walls shall be as required for foundation walls.

8.3.2.5

The bracing provisions permitted for isolated concrete masonry brace elements in this section shall not be used as an alternative to those required in NZS 4229, for reinforced concrete masonry buildings.

8.3.3 Dragon ties

8.3.3.1 General

Dragon ties may be used with a braced wall system to permit the construction of spaces up to 7.5 m x 7.5 m, without the need for a ceiling diaphragm (see figure 8.1).

8.3.3.2

When diagonal dragon ties are used, the distance to the nearest bracing line shall be a maximum of 5.0 m from the junction of the dragon tie with the top plate, in accordance with the following:

- (a) The distance from the external corner to the first bracing line shall not exceed 7.5 m;
- (b) Every external wall with a dragon tie attached to the top plate shall have a bracing capacity of at least 100 bracing units.

8.3.3.3

Dragon ties shall only be located at external corners and shall be used in pairs, one at each end of the wall.

Each *dragon tie* shall:

- (a) Consist of a continuous length of 100 mm x 40 mm timber;
- (b) Be connected to the *top plates* of the *external wall* and the adjoining *external wall* at right angles, and to intermediate roof and ceiling members;
- (c) Be fixed at an angle between 40° and 50° to both *external walls*, not more than 2.5 m from the corner.

8.3.3.4

Dragon ties shall be fixed as follows:

- (a) Either directly to the *top plates* or, to *blocking* pieces which are no deeper than 100 mm and are at least 75 mm wide; and
- (b) At the *external wall* being considered, the *dragon ties* shall also be fixed within 100 mm of the *top plate* to a joist, truss or rafter; and
- (c) At the adjoining walls which are at right angles, the *blocking* piece shall span between, and be fixed to, adjacent joists, trusses or rafters (see figure 8.1).

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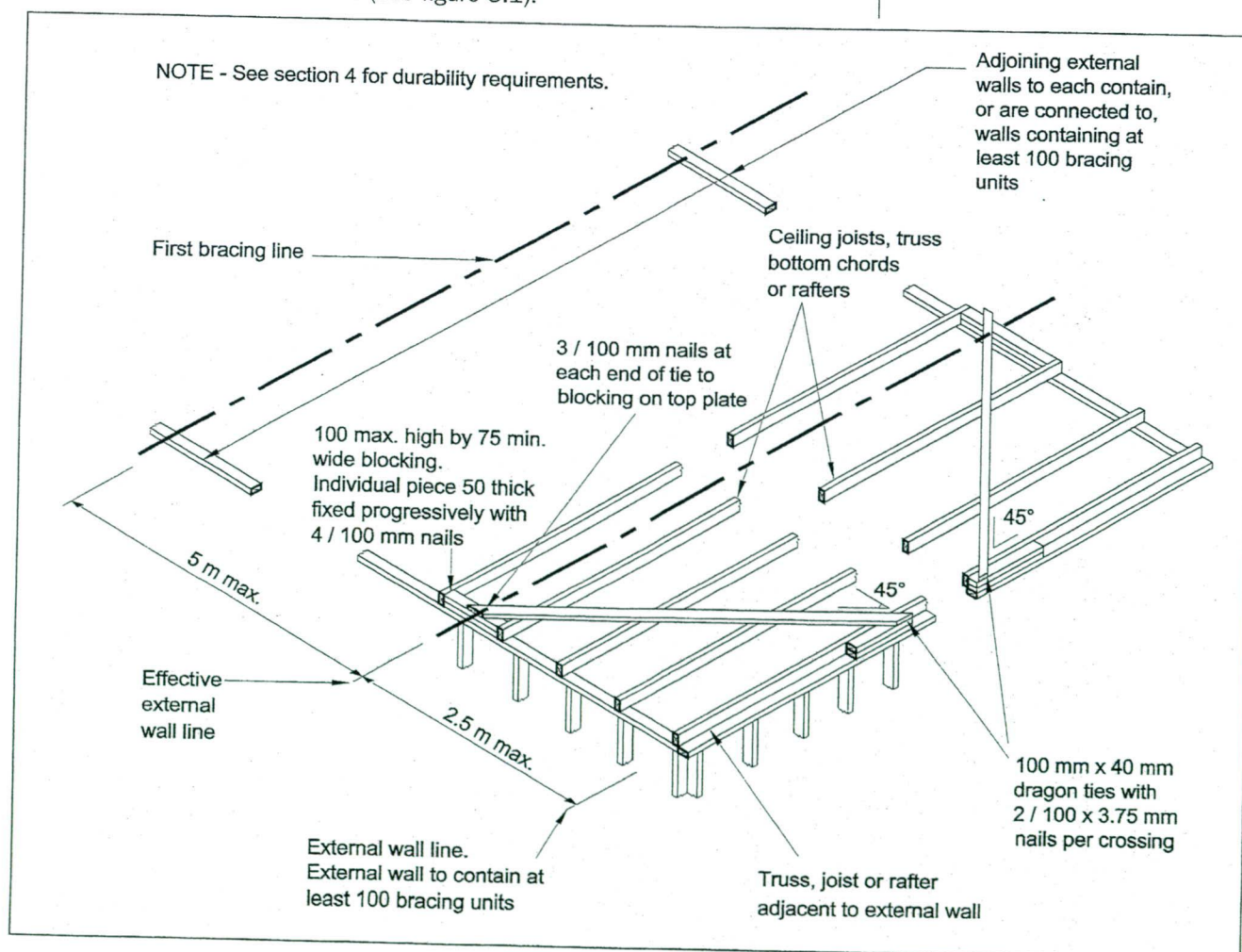


Figure 8.1 – Dragon ties (see 8.3.3.1)

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handbook
April 2002



**FLETCHER CHALLENGE
FORESTS**

Bracing

Bracing performance

Structural Origin™ Plywood is manufactured to AS/NZ Standard 2269:1994 Plywood - Structural.

If the building is constructed in accordance with NZS 3604:1999 then the bracing ratings will be as shown in Table 12. The bracing ratings are based on wall heights of 2.4m. For heights other than 2.4m, the bracing ratings are multiplied by 2.4 and divided by the height of the wall in metres. For walls higher than 2700mm (the maximum of Origin™ Plywood sheets), it is recommended that only one horizontal joint is made and that this is made over minimum 90 x 45mm nogging with nailing of both sheet edges to this at 150mm centres. Walls that measure less than 1.8m in height should be assumed to be 1.8m in height.

The minimum grade plywood required for bracing applications is 7mm DD.

Bracing is usually untreated but treated Origin™ Plywood can be used where required by a particular application.

Higher grades and thicker Origin™ Plywood must be used when required for cladding systems where aesthetic appeal is incorporated into the design.

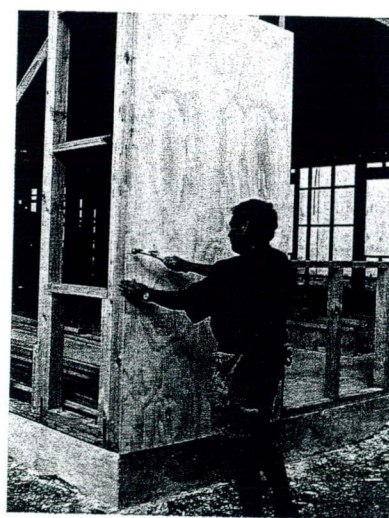


Table 12

Bracing Ratings per metre of element length for Structural Plywood Wall Bracing Systems

BRANZ P21 Rating*		Type	Bracing Element	BRANZ EM3 Rating*	
Wind	Earthquake			Wind	Earthquake
90	80	SP2	7mm Structural Plywood on one face. Length 0.6 - 0.9m.	C 120 T 125	80 80
100	110	SP1	7mm Structural Plywood on one face. Length 0.9 - 1.8m.	C 140 T 140	90 100
130	100	BR7	7mm Structural Plywood on one face with Gib® Braceline on the other. Length 0.9 - 2.4m.	C 175 T 155	130 95
120	105	SP12	7mm Structural Plywood on one face. Length 1.8 - 3.6m.	C 160 T 155	100 100

Notes: C = Concrete floor, T = Timber floor.

*The P21 ratings should be used until an amendment to NZS 3604 ratifies the EM3 ratings.

Origin™ Plywood lining (12mm) can be used in place of Gib® Braceline.

Gib® Braceline will not stand exposure to the weather.

BRANZ Appraisal

Structural Origin™ Plywood conforms to BRANZ Appraisal Certificate No.224 (2001) : Structural Plywood Wall Bracing Systems. When installed and used in accordance with the Certificate, Origin™ Plywood meets the relevant provisions of the New Zealand Building Code clauses:

- B1 Structure
- B2 Durability
- F2 Hazardous Building Materials.

Framing

All sheet edges must be fixed on timber framing. It is recommended that kiln dried mechanically graded

framing such as Origin™ Timeframe is used for framing.

Use extra studs near openings. Nogging or plates must be used at top and bottom edges of panels. Excessively warped timber should be rejected. Minor bows in the studs should be placed in the same direction to give a consistent nailing surface.

It is important to apply Origin™ Plywood to framing with moisture content of 12-16% at the time of construction and that it remains dry (<18% m.c.) during its service life. Wet framing is likely to distort the plywood during the natural drying process.

It is recommended that plywood be allowed to "condition" to ambient humidity prior to fixing over framing, especially framing that has been wet during construction.

Where cladding or lining materials are going to be fixed over the plywood bracing, the timber framing may be rebated to accommodate the plywood. 12mm Origin™ Plywood cladding is ideal for the exterior of houses, with studs at 600mm centres.

When using square edge sheets over framing, add 1 to 2mm to stud spacings to allow for slight sheet swelling.

Table 13

Recommended maximum stud spacings

Plywood Thickness (mm)	Frame spacing when sheets are fixed in residential or office buildings (mm)	
	Along framing*	Across framing**
7	240	480
9	400	600
12	600	900
15	750	1050
17	900	1200
21	1200	1200

* Along framing is when sheets are applied vertically to studs.

** Across framing is when applied horizontally to studs.

Table 14

Origin™ Plywood 7mm bracing for dry internal applications

Application	Plywood Treatment	Fixings
Plywood bracing on internal wall	Untreated	Galvanised fixings
Plywood bracing on inside face of external wall	Untreated	Galvanised fixings
Plywood bracing behind brick veneer cavity	Untreated and covered with building paper	Galvanised fixings
Plywood bracing on the dry side of the cavity behind stucco plaster on a non-rigid backing	H3 and covered with building paper	Stainless steel or the silicon bronze fixings
Plywood bracing also acting as wind barrier behind any cladding	H3 and covered with building paper	Stainless steel or silicon bronze fixings
Plywood bracing behind claddings where NZS 3604 does not require a wind barrier	Untreated and covered by building paper	Galvanised fixings

Note that drainage cavities must not be open to the subfloor or roof spaces.

Building paper

Building paper must meet the requirements for a non-rigid cladding underlay given in Table 11 of NZS 3604:1999. It must pass the AS/NZS 4201.4:1994 resistance to water penetration test and in addition have a durability of 50 years. Building paper is a requirement over untreated and treated plywood bracing to meet the durability requirements of BRANZ Appraisal Certificate, No. 224 (2001). Install building paper in accordance with manufacturers instructions.

Fasteners

The bracing ratings given in Table 12 apply when the structural plywood is fixed to timber frames using either:

- 30 x 2.5mm galvanised clouts
- 40 x 2.5mm galvanised clouts
- 40 x 2.8mm Grade 316 stainless steel annular grooved nails
- 40 x 2.8mm silicon bronze annular grooved nails

For treated plywood, use the silicon bronze or stainless steel options.

bracing

Fixing plywood

Refer to Figures 3-6; bracing details.

Fix nails at 150mm centres around the perimeter of each plywood panel and 300mm centres to intermediate studs and noggs. Nails should be no closer than 10mm from panel edges.

Nail popping is rarely a problem with plywood. The risk of nail popping and sheet distortion can be further minimised by using kiln dried mechanically graded pine such as Origin™ Timeframe.

It is recommended that during installation a 2mm expansion gap is provided between each sheet of square-edge plywood. Exceptions to this are T&G and ship-lap edge profiles; these should be butt-jointed over dry framing.

Plywood must be installed and maintained at a minimum 100mm above concrete or cobblestones and 150mm above grass or gardens.

It is recommended that the bottom edge of exterior plywood be sealed with an appropriate paint system to guard against moisture uptake and swelling. Ensure that the sealer and finish paint system are compatible.

Bending performance

To achieve the bending performance shown in Table 16 below, it is a requirement that fastenings be placed at 150mm centres on all frames and that the fastener sizes described on page 18 be applied.

Stucco plaster finishes

Origin™ Plywood comes in a wide range of thicknesses, allowing it to fully support stucco finishes; refer table 15.

Thicker plywood provides extra stiffness and stability, helping to reduce problems such as cracking and buckling of the plaster as it dries.

Stainless steel (type 316) nails must be used with H3 treated plywood under stucco plaster finishes.

It is very important that Origin™ Plywood square-edge sheets be fixed with a 3mm gap between sheets where stucco plaster is to be applied; refer figure 18.

In accordance with NZS 4251, a breather type building paper must be fixed between the plywood and the plaster. Apply the plaster according to instructions of the plaster manufacturer.

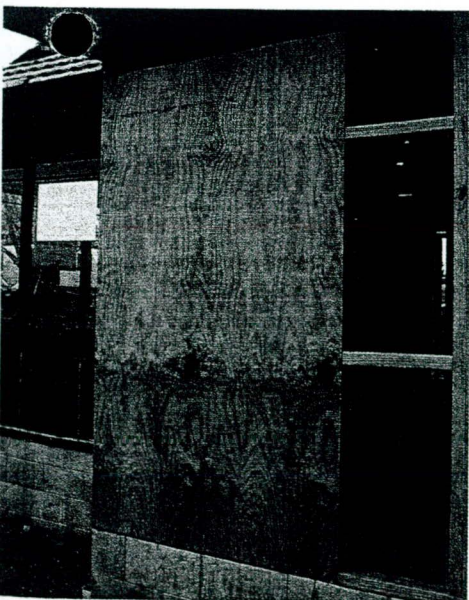


Table 15

Recommended maximum framing spacings for plywood under stucco plaster

Thickness (mm)	Spacings when sheets are fixed (mm)	
	Along framing*	Across framing**
9	n.a.	400
12	400	600
15	600	900
17	750	1000
21	900	1200

* Along framing is when sheets are applied vertically to studs.

** Across framing is when applied horizontally to studs.

Table 16

Origin™ Plywood structural bending performance

Thickness (mm)	7	9	12	15	17	21
Curve radius along face (m)	1.6	2.0	4.5	5.0	6.0	8.0
Curve radius across face (m)	0.6	1.7	2.2	3.0	4.5	6.0

bracing details

Exploded Detail 1

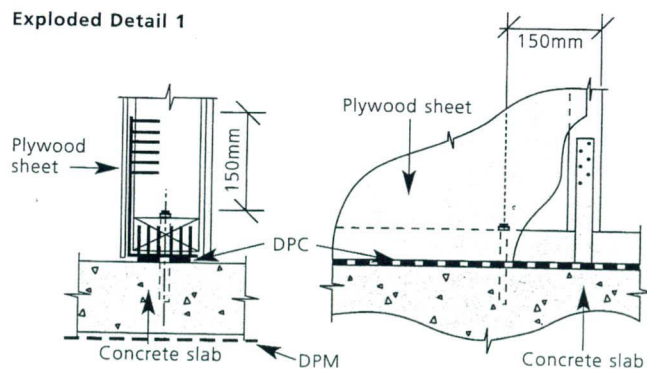


Figure 3.

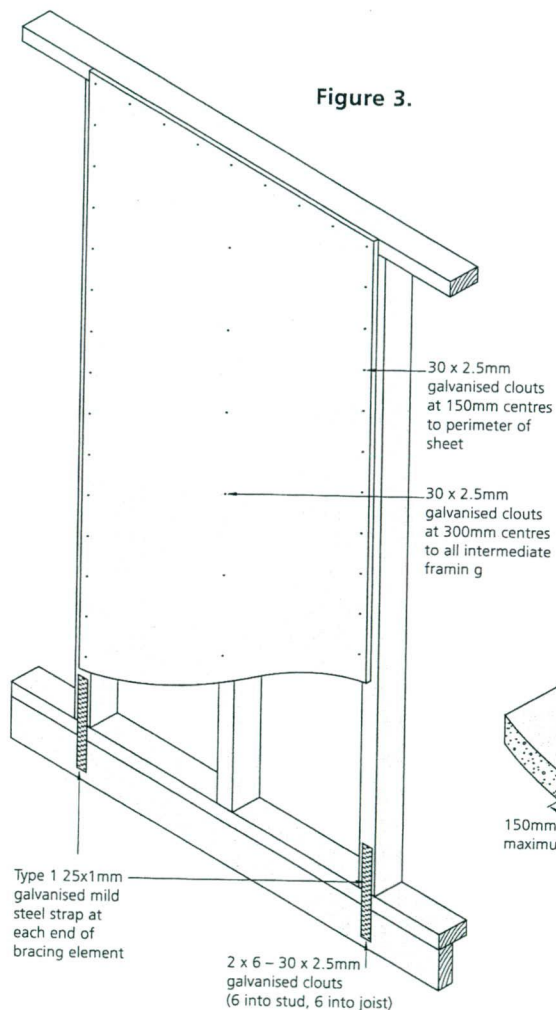
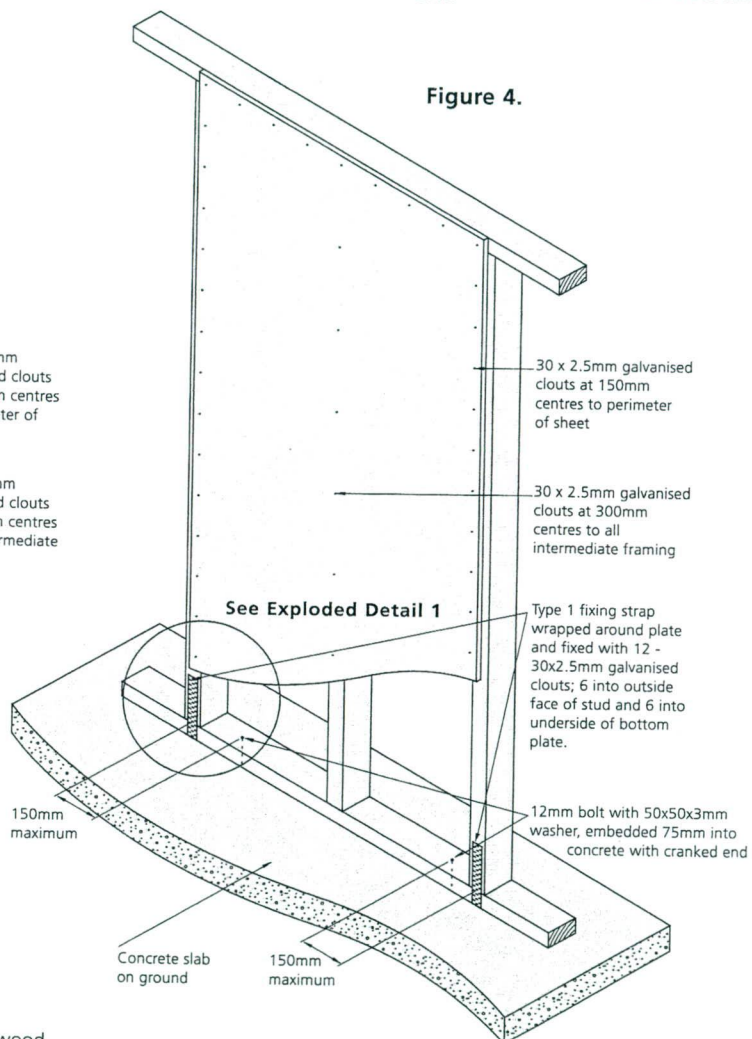


Figure 4.



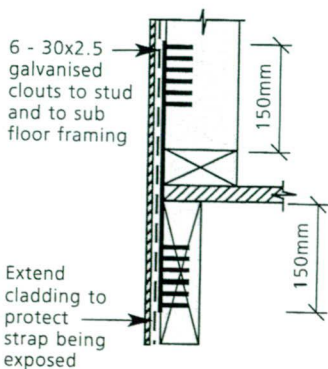
Notes: Figures represent fixing of 7mm untreated plywood.

Where the galvanised straps protrude into the subfloor space, additional corrosion protection is required, refer BRANZ Appraisal Certificate No. 224 (2001) for details.

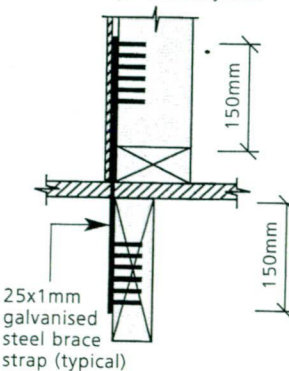
With H3 treated plywood stainless steel straps must be used and either 40x2.8mm grade 316 stainless steel annular grooved nails or 40x2.8mm silicon bronze annular grooved nails must be used in lieu of the 30x2.5mm galvanised clouts shown.

End stud fixing details

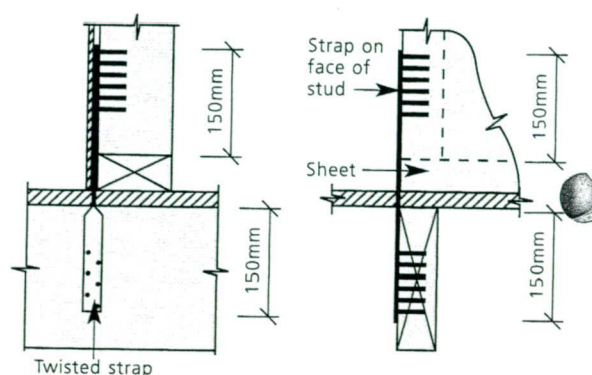
Exterior cladding over plywood sheet



Internal detail over continuous floor - wall parallel to joists



Internal detail over continuous floor - wall across joists



bracing details

Figure 5.

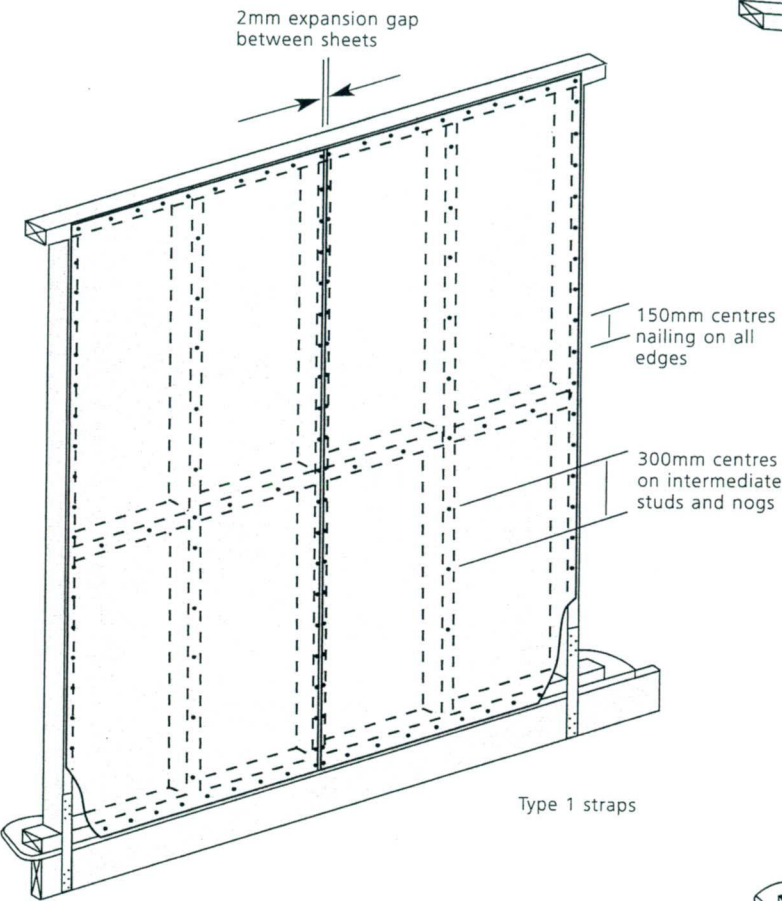


Figure 6.

Bracing wall higher than plywood sheet length

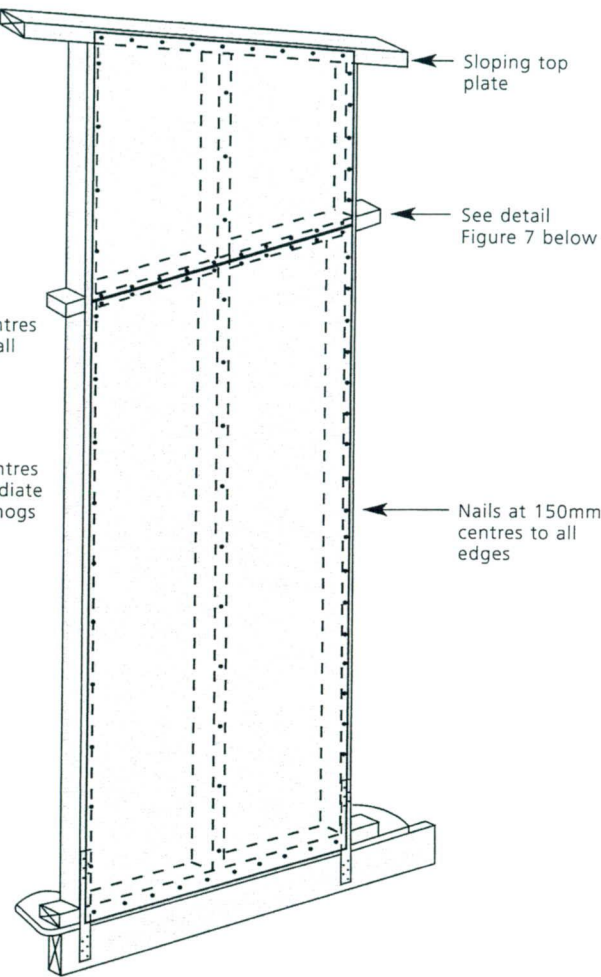
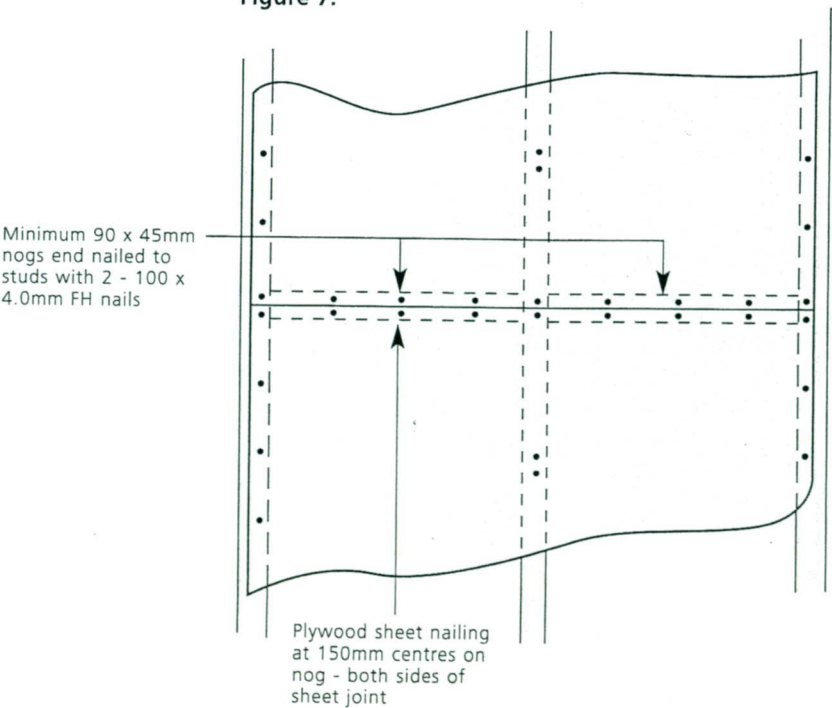


Figure 7.



Notes: Refer to page 18 for nailing options.

bracing details

Figure 8.
Sheet brace under brick veneer

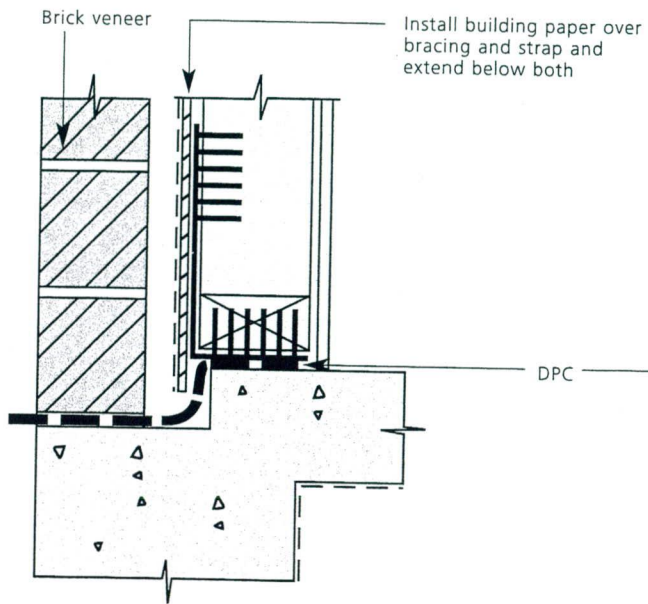


Figure 9.
Sheet brace under cladding

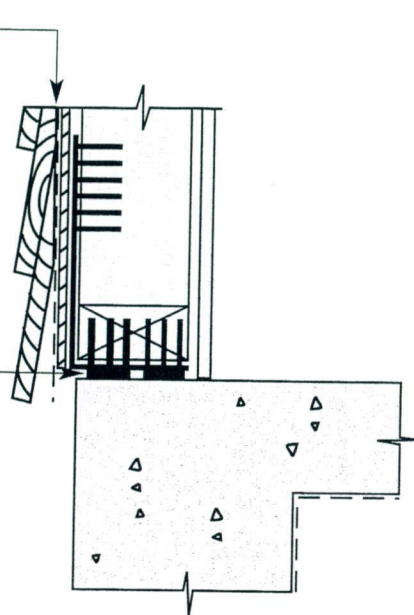


Figure 10.
Plywood sheet as internal lining

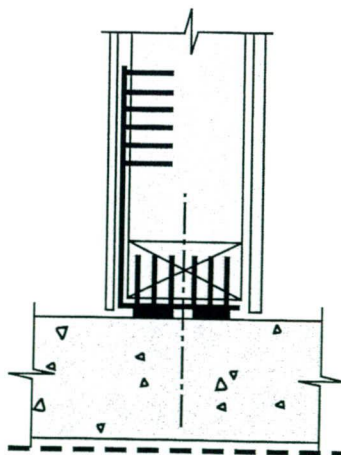
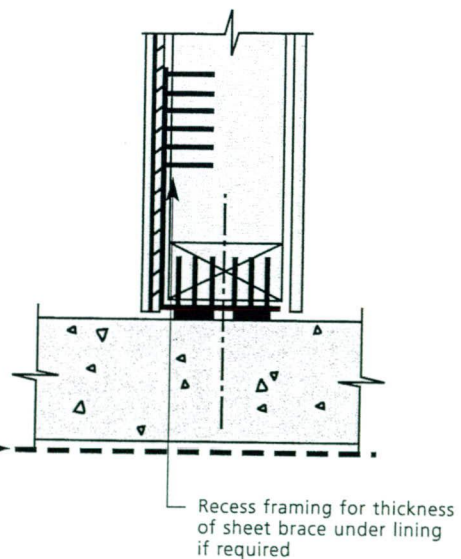


Figure 11.
Plywood sheet under internal lining



Note: Plywood under stucco or a non-rigid backing - similar to brick veneer except plywood must be H3 treated.

Table 8.19 – Nailing schedule for hand driven and power driven nails (see 8.8.6)

Joint	Hand driven nails		Power driven nails	
	Length (mm) x diameter (mm) and type	Number and location	Length (mm) x diameter (mm) and type	Number and location
Bottom plate to floor framing at:				
(a) External walls and internal wall bracing elements	100 x 3.75	2 at 600 mm centres	90 x 3.15	3 at 600 mm centres
(b) Internal walls (may be nailed to floor decking)	100 x 3.75	1 at 600 mm centres	90 x 3.15	1 at 600 mm centres
(c) Trimmer not exceeding 4.2 m long	100 x 3.75	4 (end nailed)	90 x 3.15	6 (end nailed)
Dwang to stud	75 x 3.15 or 100 x 3.75	2 (skewed) 2 (end nailed)	75 x 3.06 90 x 3.15	2 (skewed) 2 (end nailed)
Fishplate to straightened stud	60 x 2.8	4 each side of cut	60 x 2.8	4 (each side of cut)
Half joint in top plate	75 x 3.15	3	75 x 3.06	4
Lintel to trimming stud	75 x 3.15 or 100 x 3.75	4 (skewed) 2 (end nailed)	90 x 3.15	3 (end nailed)
Ribbon board to stud	100 x 3.75	2	90 x 3.15	3
Sill or header trimmer to trimming stud for:				
(a) Trimmer not exceeding 2.4 m long	100 x 3.75	2 (end nailed)	90 x 3.15	3 (end nailed)
(b) Trimmer not exceeding 3.6 m long	100 x 3.75	3 (end nailed)	90 x 3.15	5 (end nailed)
(c) Trimmers not exceeding 4.2 m long	100 x 3.75	4 (end nailed)	90 x 3.15	6 (end nailed)
Solid plaster batten to stud	60 x 2.8 (galv.)	500 mm centres	60 x 2.8 (galv.)	500 mm centres
Stud to plate	100 x 3.75 or 75 x 3.15	2 (end nailed) 4 (skewed)	75 x 3.06 90 x 3.15	4 (skew nailed) 3 (end nailed)
Top plate 150 mm x 40 mm to 100 mm x 50 mm and top plate to lintel	100 x 3.75	2 at 500 mm centres	90 x 3.3 90 x 3.15	3 at 500 mm 3 at 500 mm centres
Trimming studs at openings, blocking and studs at wall intersections	100 x 3.75	600 mm centres	90 x 3.3 90 x 3.15	600 mm centres
Trimming stud to doubled stud immediately under lintel	100 x 3.75	2	90 x 3.15	2
Waling to stud	60 x 2.8	2	60 x 2.8	2

NOTE –

- (1) Nail lengths and diameters are the minimum required.
- (2) Refer to 4.4 for required protective coatings for metal fasteners.

Compliance Document for New Zealand Building Code Clause E2 External Moisture

Prepared by the Department of Building and Housing

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ISBN 0-477-01606-5

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Amend 2
Jul 2005**9.6 Profiled Metal Wall Cladding**

Horizontal profiled metal wall *cladding* shall be fixed over a *drained cavity* as described in Paragraph 9.1.8.

Vertical profiled metal wall *cladding* shall be *direct fixed to framing* over a *roof underlay*.

Refer to Table 3: Suitable wall claddings.

9.6.1 Limitations

This Acceptable Solution is limited to corrugated or *trapezoidal* metal wall *cladding* with the profiles, as shown in Figure 38, running:

- a) Horizontally, and fixed over a *drained cavity*, or
- b) Except for asymmetrical *trapezoidal* profile, vertically, and *direct fixed to framing*.

Amend 2
Jul 2005**9.6.2 General**Amend 2
Jul 2005**COMMENT:**

It is recommend that installation of profiled metal wall *cladding* be by trained installers, approved by the manufacturer or the NZ agent (in the case of imported *cladding*).

Amend 2
Jul 2005**9.6.3 Materials****9.6.3.1 Choice of metal**

The metal *cladding* shall be selected according to the exposure conditions as defined in:

- a) NZS 3604 Clause 4.2, or
- b) AS/NZS 2728.

Amend 2
Jul 2005

The metal *cladding*, *flashings* and fixings shall be selected from Table 20 according to the *durability* required for the specific application.

COMMENT:

The exposure zone in which a *building* is located can affect the *durability* of metal *cladding*.

AS/NZS 2728 lists atmospheric classes derived from ISO 9223 for Australia and New Zealand.

Exposure zones are defined in Clause 4.2 of NZS 3604, based on the likely exposure to wind-driven sea-salt or geothermal gases.

9.6.3.2 Steel

Materials for the manufacture of profiled steel *cladding* shall:

- a) Have a *base metal thickness (BMT)* of 0.4 mm minimum,
- b) Be grade G550 minimum for 0.4 mm BMT steel and G300 minimum for 0.55 mm BMT steel
- c) Have a minimum protective metal coating of:
 - i) aluminium-zinc AZ150 to AS 1397, or
 - ii) zinc Z450 to AS 1397, or
 - iii) zinc ZM275 with a factory-applied finish,
- d) Where required for additional *durability*, a factory-applied finish shall comply with AS/NZS 2728.

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Jul 2005**COMMENT:**

While galvanized steel wall *cladding* may be left unpainted in some environments, this may shorten its life, especially in areas where it is not washed naturally by the rain.

9.6.3.3 Aluminium

Aluminium for the manufacture of profiled aluminium wall *cladding* shall comply with AS/NZS 1734, and be:

- a) A *base metal thickness (BMT)* of a minimum of 0.7 mm,
- b) Minimum 5000 series.

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For pre-painted aluminium, a factory-applied finish complying with AS/NZS 2728 shall be applied.

9.6.4 Maintenance**COMMENT:**

A deterioration in the appearance of the coating of the metal does not necessarily relate to a deterioration in the *weathertightness* of the roof *cladding*.

Maintenance of profiled metal wall *cladding* shall be carried out as necessary to achieve the expected *durability* of the material – refer Paragraph 2.5. The extent and nature of the necessary maintenance is dependent on the:

- a) Type of *cladding* used,
- b) Position of the *cladding* on the *building*,
- c) Geographical location of the *building*, and
- d) Specific site conditions.

COMMENT:

Washing by rain removes most accumulated atmospheric contaminants, but sheltered areas are protected from the direct effects of rain and require more regular manual washing.

However, high pressure water should not be used, due to the risk of driving water past *flashings*.

9.6.5 Profiles

Profiles covered in this Acceptable Solution are:

- a) Corrugated – curved with a minimum crest height of 17.5 ± 1 mm, and
- b) *Trapezoidal* – symmetrical with a minimum crest height of 19 mm.

For details of these profiles, refer to Figure 38.

9.6.6 Fixings

The *cladding* shall be screw-fixed through the troughs and battens, where applicable, into the *framing*. Fixings shall:

- a) Be minimum 12-gauge hexagonal head, self-drilling wood screws,
- b) Penetrate the *framing* by a minimum of 25 mm,
- c) Be hot-dipped galvanized, complying with AS 3566: Part 2, to at least Class 4,
- d) Be selected from Table 20 to minimise corrosion,
- e) Include neoprene (having a carbon black content of 15% or less by weight) or EPDM sealing washers as shown in Figure 39, and
- f) Be used on the *cladding* at side laps and every second trough or, for *trapezoidal* where the rib centres exceed 150 mm, at side laps and every trough:
 - i) to *framing*, and
 - ii) at all external and internal corners.

9.6.7 Flashings

Flashings used with metal wall *cladding* shall be in accordance with Paragraph 4.0, and with the following requirements:

- a) *Hooks* and *hems* shall be as shown in Figure 5,
- b) Have joins formed with laps and sealant as shown in Figure 6,

- c) Where shown, sealant shall be neutral cure, complying with:

- i) Type F, Class 20LM or 25LM of ISO 11600, or
- ii) low modulus Type II Class A of Federal Specification TT-S-00230C,

- d) *Under-flashings* shall be fixed to *framing* at 600 mm maximum centres.

- e) *Flashings* shall be fixed together at junctions at 50 mm maximum centres or to cladding at 900 mm centres with:

- i) for galvanized steel, 4 mm diameter monel metal or stainless steel rivets, where compatible as per Table 21, or
- ii) for aluminium-zinc coated steel, 4 mm diameter aluminium rivets, or
- iii) for aluminium, 4 mm diameter aluminium rivets.

9.6.8 Vertical profile – direct fixed**9.6.8.1 Installation**

For *direct fixed* vertical profile, the *building wrap* shall be in accordance with the properties listed for *roof underlay* in Table 23.

COMMENT:

In *direct fixed* metal *cladding*, the wrap will be in contact with the back of the vertical profiled metal *cladding*.

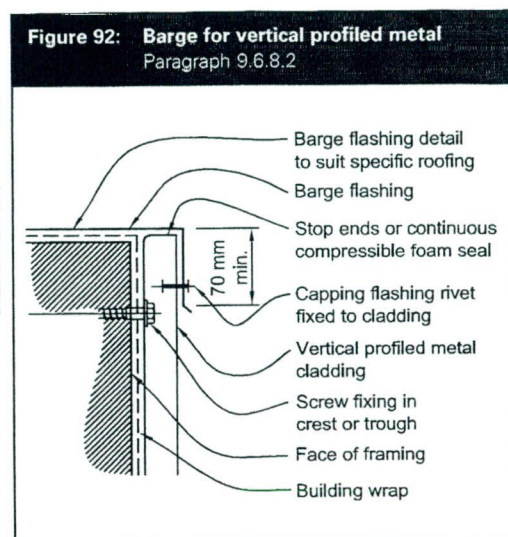
In the same way as for roof situations, underlay is needed to separate treated timber from the back of the metal to minimise the risk of *electrolytic corrosion*.

9.6.8.2 Barges

Barge *flashings* shall be as shown in Figure 92.

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**9.6.8.4 Corners**

Direct fixed vertical profiled metal wall *cladding* shall be over-flashed at external and internal corners as shown in Figure 94. The cover of the *flashings* shall:

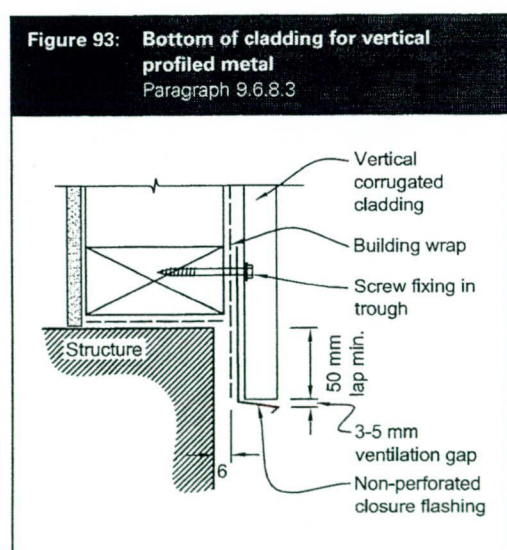
- Be dimensioned to suit the metal wall *cladding* profile,
- Cover at least two crests, and
- Terminate leaving a gap from the wall *cladding* in the following trough. The gap shall be a maximum of 5 mm.

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9.6.8.3 Bottom of cladding

The bottom edge of the *cladding* shall overlap the foundation wall as described in Paragraph 9.1.3 and as shown in Figure 93.

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9.6.9 Horizontal profiled metal on cavity**9.6.9.1 Installation**

A *building wrap*, as specified in Table 23, shall be installed over the outside face of the *framing*.

9.6.9.2 Cavity battens

If the *cavity batten* contains copper (e.g. CCA, copper azole or ACQ), appropriate separation between the back of the *cladding* and the *cavity batten* shall be provided.

Examples of suitable separation are:

- An additional layer of paper-based underlay, complying with Table 23, over *cavity battens*,
- Strips of paper-based *building wrap* complying with Table 23 on the face of *cavity battens*,

- Pre-priming *cavity battens*.

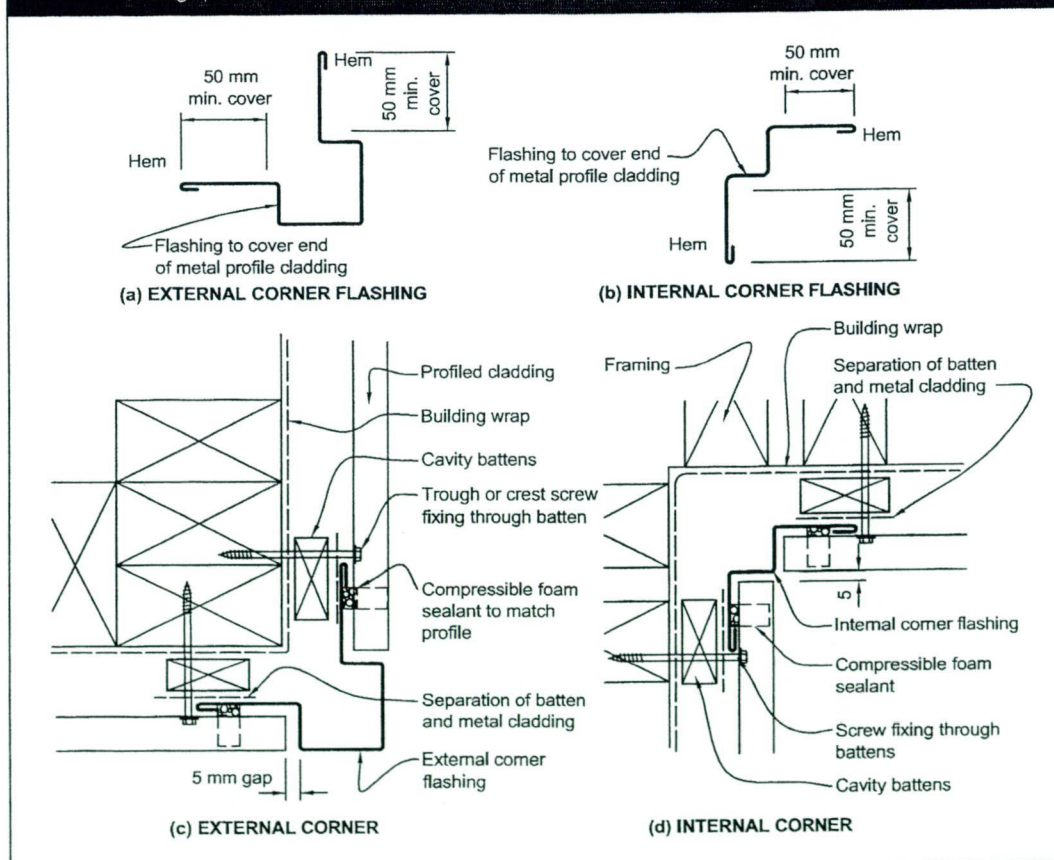
9.6.9.3 Corners

Corners shall be weatherproofed by using the *flashings* and details shown in Figure 96.

Horizontal profiled metal wall *cladding* shall be under-flashed using *butt flashings* which shall:

- Be formed in one shaped piece as shown in Figure 96,
- Allow metal *cladding* to butt, with a separation of 5 mm, against sides of the exposed *flashing* corner, and
- Use profiled compressible foam to seal between the *flashing* underlap and underside of *cladding*.

Figure 96: Corner flashings for horizontal profiled metal
Paragraphs 9.6.9.3 and 9.6.9.3 a)

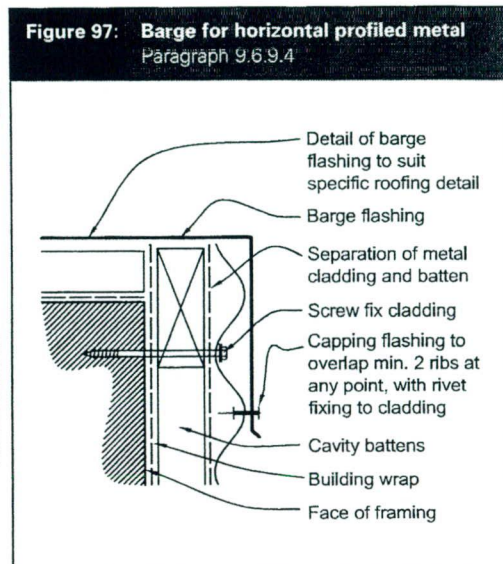


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9.6.9.4 Barges

Barge *flashings* shall be as shown in Figure 97.

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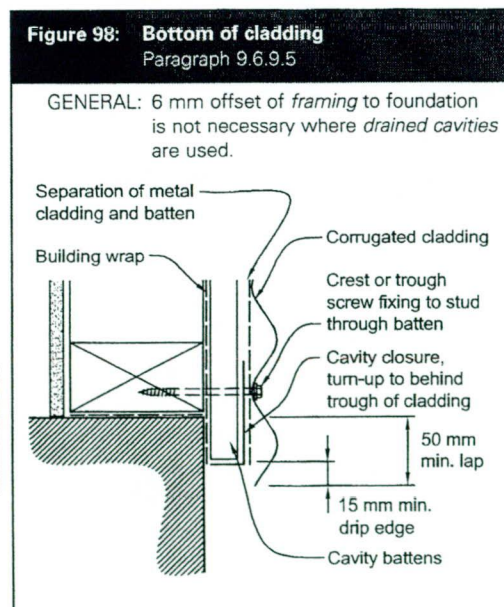


Amend 2
Jul 2005

9.6.9.5 Bottom of cladding

The bottom edge of the *cladding* shall overlap the foundation wall as described in Paragraph 9.1.3 and as shown in Figure 98.

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9.6.9.6 Horizontal profile: penetrations

All services penetrations through *claddings* shall be flashed and sealed. Pipe penetrations are shown in Figure 53.

The heads of larger penetrations shall be flashed in a similar fashion to Figure 69, with head *flashings* adjusted to suit profile and other *flashings* as per window details in relevant paragraphs.

9.6.9.7 Horizontal profile: windows

Windows and doors shall be installed in accordance with Paragraph 9.1.10, and as shown in Figure 99 and Figure 100.

9.6.9.8 Parapets and balustrades

Parapets shall be in accordance with Paragraph 6.0.

Enclosed balustrades shall comply with Paragraph 7.4, and be as shown in Figure 101 and Figure 102.

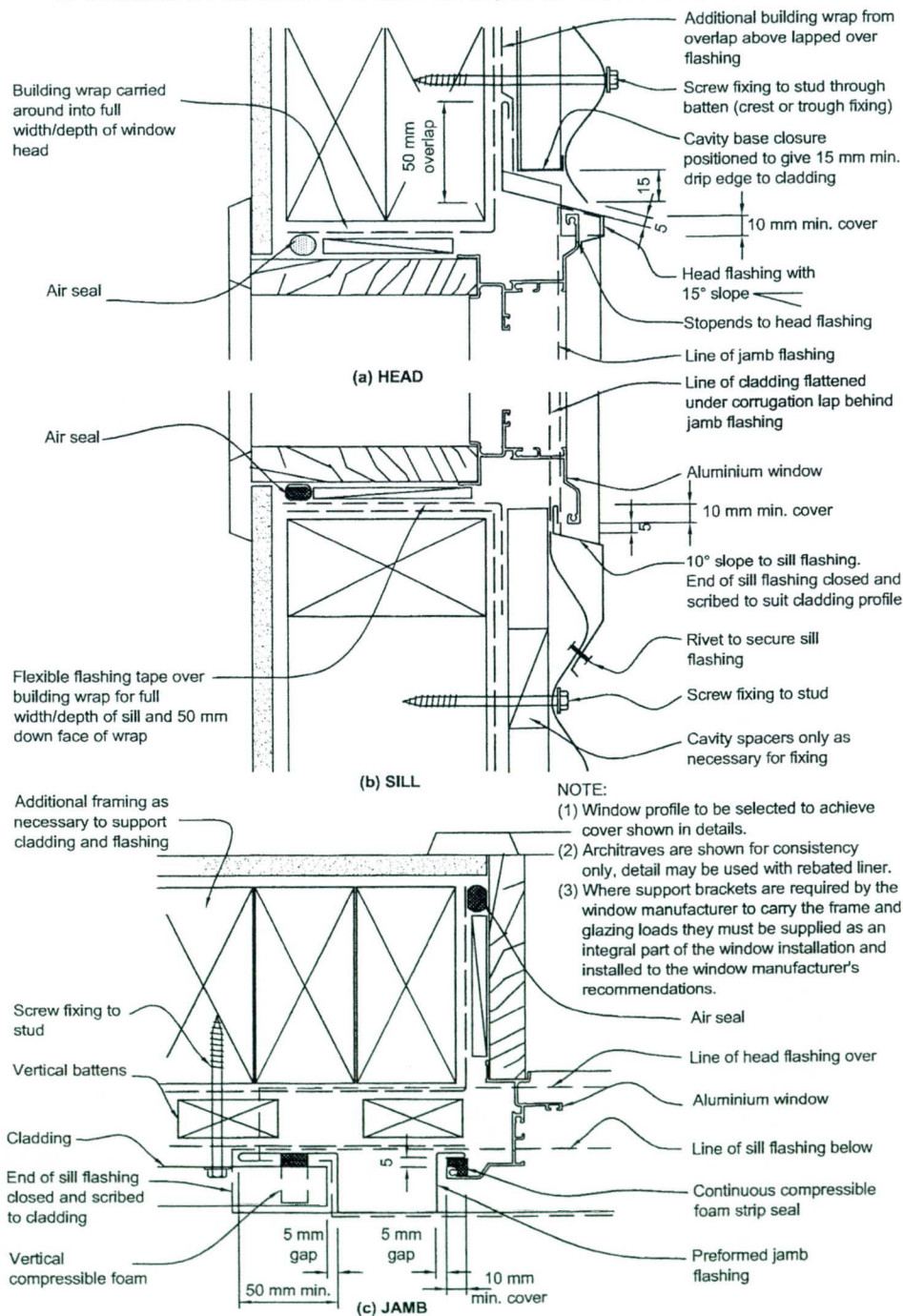
COMMENT:

Side fixings of *handrails* or other attachments to *enclosed balustrades* or *parapets* will require *specific design* to demonstrate *weather-tightness*, together with specific structural design for *stanchion* fixings.

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Figure 99: Windows for horizontal profile
Paragraph 9.6.9.7, Figure 100

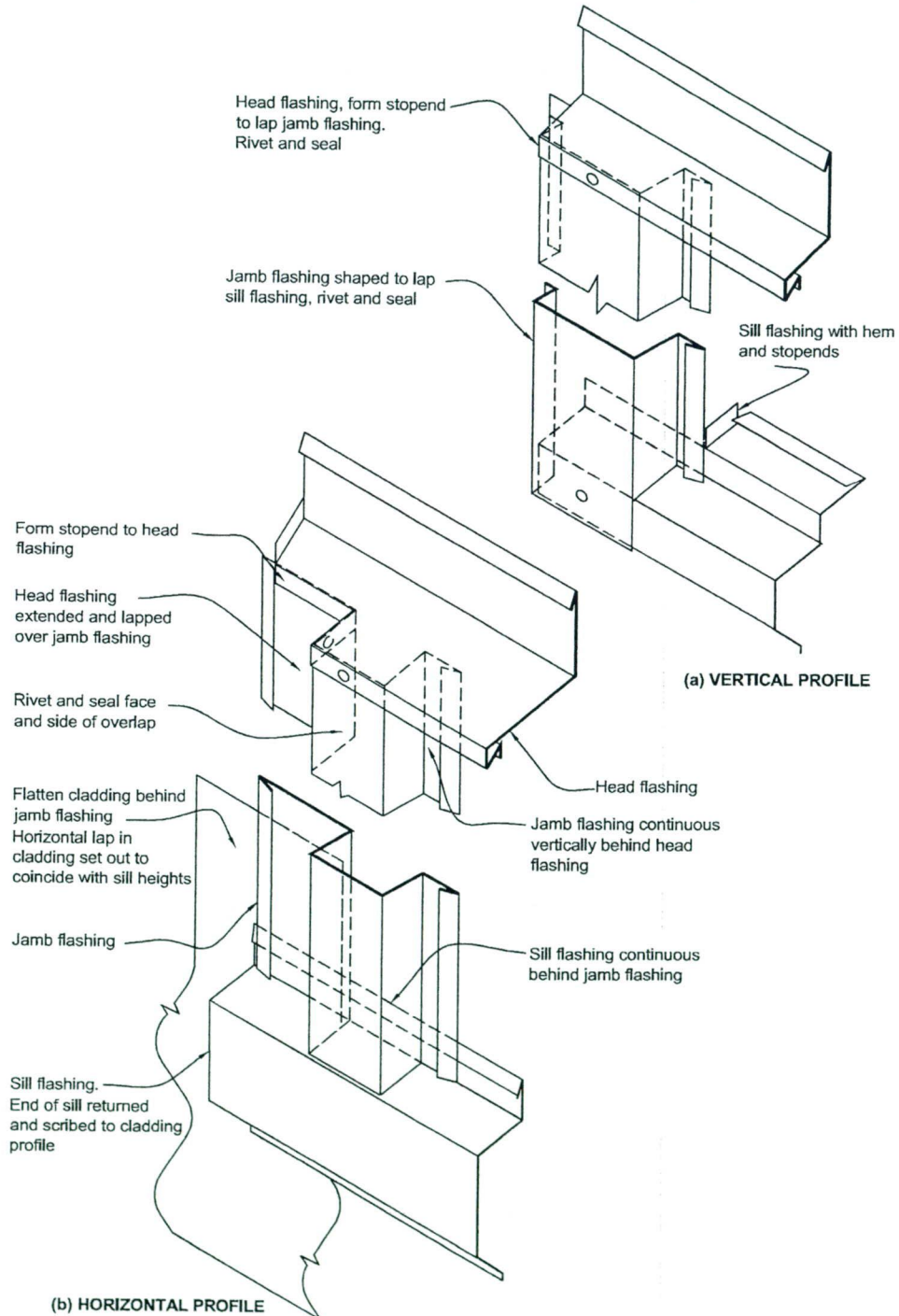
- GENERAL: (a) Refer Figure 72 for wrapping of framed opening prior to window installation.
(b) Refer Figure 100 for sketch of flashings.
(c) Sliding and bi-fold windows will require specific design.
(d) A minimum of 8 mm effective cover at sills shall be permitted where necessary to allow for tolerances.



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Figure 100: Window flashings for profiled metal
 Paragraphs 9.6.8.6 and 9.6.9.7, Figures 95 and 99

NOTE: (1) Detail (a) *Direct fixed vertical profile*: refer Figure 95 for window.
 (2) Detail (b) *Horizontal profile on cavity*: refer Figure 99 for window.
 (3) *Building wrap omitted for clarity.*



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 Jul 2005

MAHON PLUMBING & DRAINLAYING



Member of Certified
Plumbers Association of
New Zealand

P O Box 1551
Invercargill

Mobile: 0274 332277

A/hrs : 03 127 0069

Fax: 03 217 0064

Email: mahon.plumbing@clear.net.nz

SOUTHLAND DISTRICT COUNCIL
Appln. No. 2952501
Approved *[Signature]*
Date 25/1/06

ON-SITE WASTE WATER MANAGEMENT DESIGN

for

P. BROWN
15 Scotswood Street
Waikaia

The NZ Building Act/Regulations and the provisions of the NZ Building Code must be complied with in regard to any inconsistencies in the issued consent documents.

BASIS OF REPORT INFORMATION

PROPERTY OWNER	P Brown
PROPERTY LOCATION	15 Scotswood Street Waikaia
SIZE OF SITE	908m ²
SITE EVALUATOR	Dave Mahon Mahon Plumbing Ltd
DATE OF EVALUATION	12/11/05
RELEVANT STANDARD	AS/NZS 1547:2000
DOMESTIC WATER SUPPLY	5000 gallon tank Roof collection
NUMBER OF BEDROOMS	Two
NEW BUILDING	Yes
SIZE OF BUILDING	Refer to attached plans
REPLACEMENT OF EXISTING SEPTIC SYSTEM	N/A
RAINFALL	900mm – 1200mm per annum
PREVAILING WINDS	South; southwest; west; northwest
SOIL TYPE	Category Four
SOIL LOG	250 topsoil 250 brownish yellow soil clay mix 500 clay
NUMBER OF TEST HOLES	Two
TEST HOLE DEPTHS	1.000
DEPTH TO GROUND WATER TABLE	None located
DISTANCE FROM BOUNDARYS	1.5 metres from east 4.000 metres from street boundary
DISTANCE TO EXISTING BORES	None located within 50 metres
DISTANCE TO WATER COURSES	None located within 50 metres
SITE DESCRIPTION	Flat
SITE GROUND COVER	Grass with some ornamental trees

DIRECTION OF SLOPES	N/A
DESIGN DAILY FLOW LITRES/DAY	720 – 2 bedrooms – 4 people
DESIGN LOADING RATE (DLR)	10mm/day
SEPTIC TANK TYPE	Oasis Z54 Deluxe
SEPTIC TANK CAPACITY	Refer to attached specifications
TRENCH LENGTHS	$L = \frac{Q}{DLR \times W}$ $18 = \frac{720}{10 \times 4.000}$
TRENCH SPACINGS	N/A
METHOD OF LOADING	Pump dosing
CONSTRUCTION DETAILS	As per attached drawings
MAINTENANCE GUIDELINES	As attached

EXCAVATION AND CONSTRUCTION OF TRENCHES:

The base of the bed is to be level and clean before the placement of any gravels. Care must be taken to avoid smooth surfaces to the base and side walls of the trenches. If this occurs the base and side wall should be scarified and this will enable better acceptance of effluent to the soil. 20-40 aggregate gravel with no fines is to then be placed in the trenches ensuring an even consistent depth of 300mm. Care must be taken to ensure there is no contamination of the gravel by the excavated material. The discharge pipework is to then be layed. Once this has been achieved, further backfilling of the trenches with gravel can continue to finish with the soffit of the pipework. Drafil filter cloth (type polypropelene non woven and spun bonded weight – 100 GSM) is to be layed over the pipework and gravel. Care must be taken to ensure the filter cloth completely covers the gravel to avoid contamination by backfill. Then backfilling of the trenches can be continued with soil, preferably with no clay contamination and mounded to 100mm above natural ground level. This will help avoid slumping and infiltration of ground water.

After a settling period the mounds may be sown in grass or landscaped with small shrubs and plants. The area of the trenches must be kept free from vehicular traffic and livestock. If necessary, the area may require fencing off to achieve this.

DISTRIBUTUON:

Effluent is pumped from the Oasis Z54 Deluxe by a submersible pump through a 32mm \varnothing PVC pressure pipe to a manifold comprising a 32mm tee junction centrally located between the two 25mm \varnothing discharge lines. Immediately after the tee 25mm PVC ball valves are to be fitted to allow for even flow to each trench.

The 25mm \varnothing PVC shall be drilled at 1000mm centres with a 3mm hole. A 25mm screwed cap is to be fitted at the end of these discharge lines to enable testing and adjustment and to enable equal flow to each line. These caps are to terminate 100mm above the finished ground level.

The 25mm \varnothing discharge lines are to be encased in 100 \varnothing Nova Coil drain pipe to protect discharge holds from clogging by fine particles. This also helps even distribution. These pipes must be layed level in 20-40mm clean aggregated gravel with no fines (as shown on the drawings attached).

Filter cloth is to be layed over the gravel before backfilling with soil. Care must be taken to completely cover this gravel. Backfilling of soil to trenches is to be mounded up approximately 100mm above natural ground to help prevent slumping and also impendence of stormwater to trench.

A high level float switch and alarm is to be fitted to alert the homeowner of pump malfunction.

The system is to be filled with clean water and tested to ensure the proper function of the discharge pump and even distribution to the trenches.

Functions of alarms ie. pump failure.

INSTALLATION:

By a licenced registered drainlayer in accordance with the plans and specifications supplied, NZ Building Codes and appropriate Standards relevant to this project.

MAINTENANCE:

As per the attached documents.

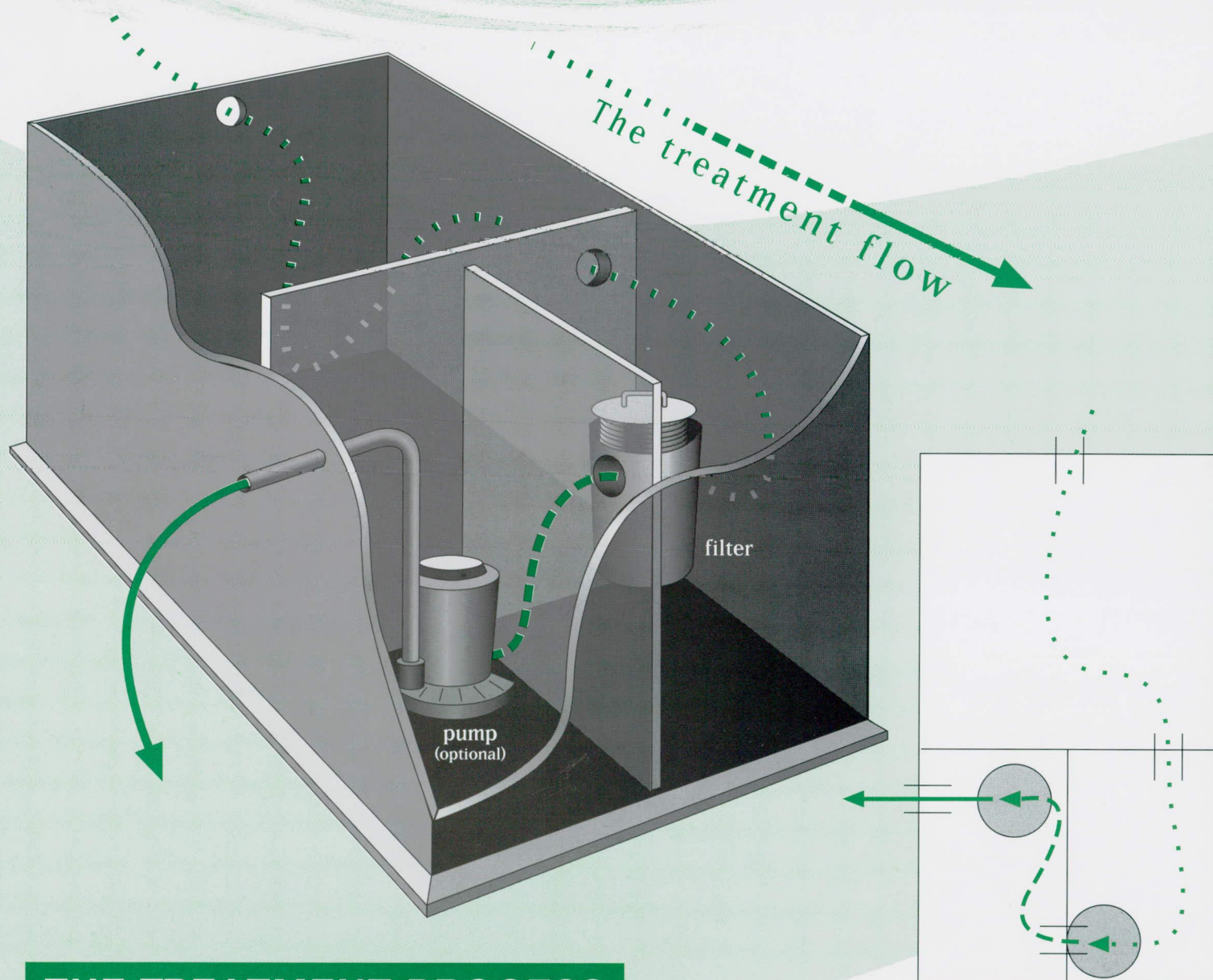


Oasis Clearwater
SYSTEMS Ltd.

CLEARWATER Z54 DELUXE

SEPTIC TANKS AND
TREATMENT SYSTEMS

FOR DOMESTIC AND COMMERCIAL APPLICATIONS



THE TREATMENT PROCESS

- The Clearwater Z54 method for treating sewage and sullage is based on the tried and tested principle of separating solids from liquids as a first stage to the process.
- Initially the wastewater enters a primary setting chamber where heavy solids undergo anaerobic digestion, the liquid overflow from this primary section passes into the second treatment chamber.
- The main treatment chamber allows further anaerobic breakdown to occur. The resulting liquid then flows upwards through the heart of the system, the Zabel filter and into the pump chamber.
- The pump is controlled by a float switch allowing final dosing of the treated sewage to occur directly in the disposal system.

BECAUSE LIFE DEPENDS ON CLEAN WATER

CONSIDER THESE POINTS

- Improves effluent quality
- One chamber - one hole - one connection
- Prevents clogged drainage systems
- Protects the environment
- The simplest and least expensive system to operate
- Fewer working parts, low maintenance
- Easy to maintain
- Approved by local councils
- Durable pre-cast concrete, no plastic or fiberglass to crack or rot

APPLICATIONS

- For residential homes
- For holiday homes
- For commercial applications
- For grease trap applications

TECHNICAL SPECIFICATIONS

- Primary Pre treatment chamber (usable) - 3,500 litres
- Secondary Pre treatment chamber (usable) - 1,180 litres
- Pump well - 700 litres
- Total operating capacity - 5,440 litres
- Total holding capacity - 7,500 litres
- Control panel (optional) including audio alarm and hi level float

TANK DIMENSIONS

- Overall length - 3 metres
- Overall width - 2 metres
- Overall height - 1.55 metres
- Weight - 4.5 tonnes
- Invert level (less extension turrets) - 300mm

CONSTRUCTION DETAILS

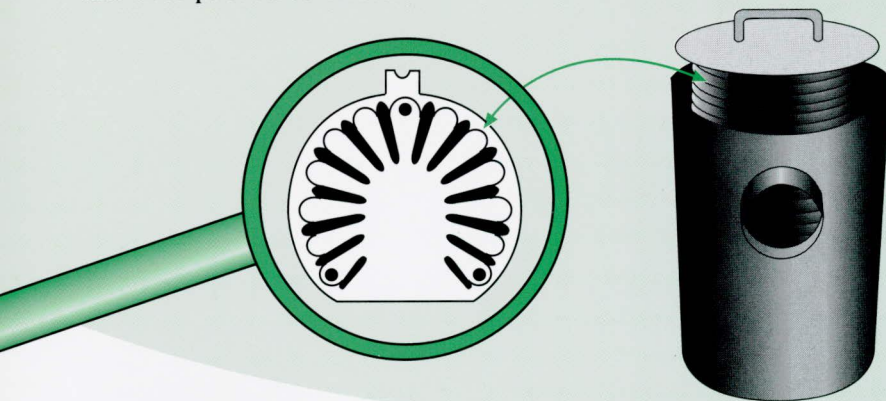
Manufactured in ultra strong durable 35 mpa concrete

CERTIFICATIONS

Manufactured to AS/NZS 1547:2000

THE HEART OF THE SYSTEM

The Zabel filter contains 26 patented disc dam filter plates. These plates dam the amount of solids reaching the field drain by 67% more than other methods. No other method of filtration has ever proved so effective.



ZABEL FILTER PERFORMANCE DETAILS

- Filters more than 90% of all suspended solids.
- Treats waste water by lowering BOD₅ by more than 50%.
- Slows internal velocity and holds nutrients and solids from the tank exit through anaerobic organisms causing the particles to disintegrate, lose their buoyancy and fall to the bottom of the tank.



Oasis Clearwater
SYSTEMS Ltd.

ENVIRONMENTAL & PUMPING ENGINEERS -
PRECAST CONCRETE PRODUCTION

AUTHORISED LOCAL DISTRIBUTOR:



P.O.Box 16-276 Hornby, Christchurch
Ph: 03-344 0262 Fax: 03-344 0267
Mobile: 025-356 789 or 0274-324 624

MAINTENANCE GUIDELINES

The following sections advise on operation and maintenance to be specifically directed to the home owner/occupier and user of an on-site domestic-wastewater system.

Advice to a home owner/occupier on use of the system

For the on-site wastewater system to work well, there are some good habits to encourage and some bad habits to avoid:

- (a) In order to reduce sludge building up in the tank
 - (i) scrape all dishes to remove fats, grease, etc. before washing;
 - (ii) keep all possible solids out of the system;
 - (iii) don't use a garbage grinder unless the system has been specifically designed to carry the extra load;
 - (iv) don't put sanitary napkins and other hygiene products into the system.
- (b) In order to keep the bacteria working in the tank and in the land application area:
 - (i) use biodegradable soaps;
 - (ii) use a low-phosphorus detergent;
 - (iii) use a low-sodium detergent in dispersive soil areas;
 - (iv) use detergents in the recommended quantities;
 - (v) don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants;
 - (vi) don't put chemicals or paint down the drain.
- (c) Conservation of water will reduce the volume of effluent requiring disposal to the land application area, make it last longer and improve its performance. Conservation measures include:
 - (i) installation of water-conservation fittings;
 - (ii) taking showers instead of baths;
 - (iii) only washing clothes when there is a full load;
 - (iv) only using the dishwasher when there is a full load.
- (d) Avoid overloading the system by spacing out water use as evenly as possible.

Comment. Do not do all the washing on one day. Do not run the washing machine and dishwasher at the same time.

Advice on maintenance

- (a) The primary wastewater-treatment unit (septic tank) will need to:
 - (i) be desludged regularly i.e. every three to five years or when scum and sludge occupy 2/3 of the volume of the tank (or first stage of a two-stage system);
 - (ii) be protected from vehicles;
 - (iii) have any grease trap cleaned out regularly;
 - (iv) keep the vent and/or access cover of the septic tank exposed;
 - (v) have any outlet filter inspected and cleaned.
- (b) The land-application area needs protection as follows:
 - (i) spray or irrigation areas are not play areas for children and access should be restricted;
 - (ii) any evapo-transpiration areas should be designed to deter

- pedestrian traffic;
 - (iii) no vehicles or stock should be allowed on trenches or beds;
 - (iv) deep rooting trees or shrubs should not be grown over absorption trenches or pipes;
 - (v) keep the surface water diversion drains upslope of and around the land-application area should be kept clean to reduce absorption or rainwater into trenches or beds;
 - (vi) the baffles or valves in the distribution system should be periodically (monthly or seasonally) changed to direct effluent into alternative trenches or beds, as required by the design.
- (c) Evapo-transpiration and irrigation areas should have their grass mowed and plants maintained to ensure that these areas take up nutrients with maximum efficiency.
- (d) Signs for spray irrigation areas should ensure that appropriate warning signs are always visible to persons undertaking any activity near a spray irrigation area.
- (e) Check equipments and:
 - (i) follow the manufacturer's instructions for maintaining and cleaning pumps, siphons and septic tank filters;
 - (ii) clean disc filters or filter screens on irrigation-dosing equipment periodically by rinsing back into the primary wastewater-treatment unit;
 - (iii) flush drip irrigation lines periodically to scour out any accumulated sediment.

Advice on operating problems

Problems can occur with systems which have not been maintained and where absorption areas have become blocked or clogged. The warning signs are obvious:

- (a) Absorption field is wet or soggy with wastewater ponding on the surface of the ground.
- (b) There is a smell of "sewage" near the septic tank or absorption area.
- (c) The drains and toilets run slowly.
- (d) The grease trap is full or blocked.

Advice on the consequences of failure

A failed septic tank and land-application system is a serious health and environmental hazard and can lead to:

- (a) Spread of infectious diseases.
- (b) Breeding of mosquitoes and attraction of flies and rodents.
- (c) Nuisance and unpleasantness.
- (d) Pollution and infection of waterways, beaches, streams and shellfish beds.
- (e) Contamination of bores, wells and groundwater.
- (f) Alteration of the local ecology.

Advice on home owner/occupier responsibilities

Home owners and occupiers are legally responsible to keep their on-site wastewater system in good working order. If any of the warning signs in previously mentioned are evident, the home owner or occupier must contact the nearest local government office without delay.

Table 10.10 – Capacity of fixings for purlins or battens (see 10.2.1.16.1 and 10.2.1.16.5)

Fixing description	Fixing capacity
	(kN)
1/100 x 3.75 nail or 1/90 x 3.15 power driven nail	0.4
2/100 x 3.75 skewed nails or 2/90 x 3.15 power driven nails	0.7
2/100 x 3.75 skewed nails + 1 wire dog or 2/100 x 3.75 skewed nails + 1/14 g Type 17 screw to AS 3566*	2.7
2/100 x 3.75 skewed nails + 2 wire dogs or 2/100 x 3.75 skewed nails + 2/14 g Type 17 screws to AS 3566*	4.7

* If screw fixed, screws shall be sufficiently long so as to penetrate rafter by at least 50 mm.

Amd 1
Dec '00

NOTE –

- (1) Purlins on flat may be substituted for the following sizes:

On flat On edge

75 x 50 65 x 50

100 x 50 75 x 50

- (2) Alternative fixings with required uplift capacity determined in accordance with 2.4.6 may be used.

- (3) Where purlins are fixed over sarking or ceiling sheet lining material refer to 10.2.1.16.5(b).

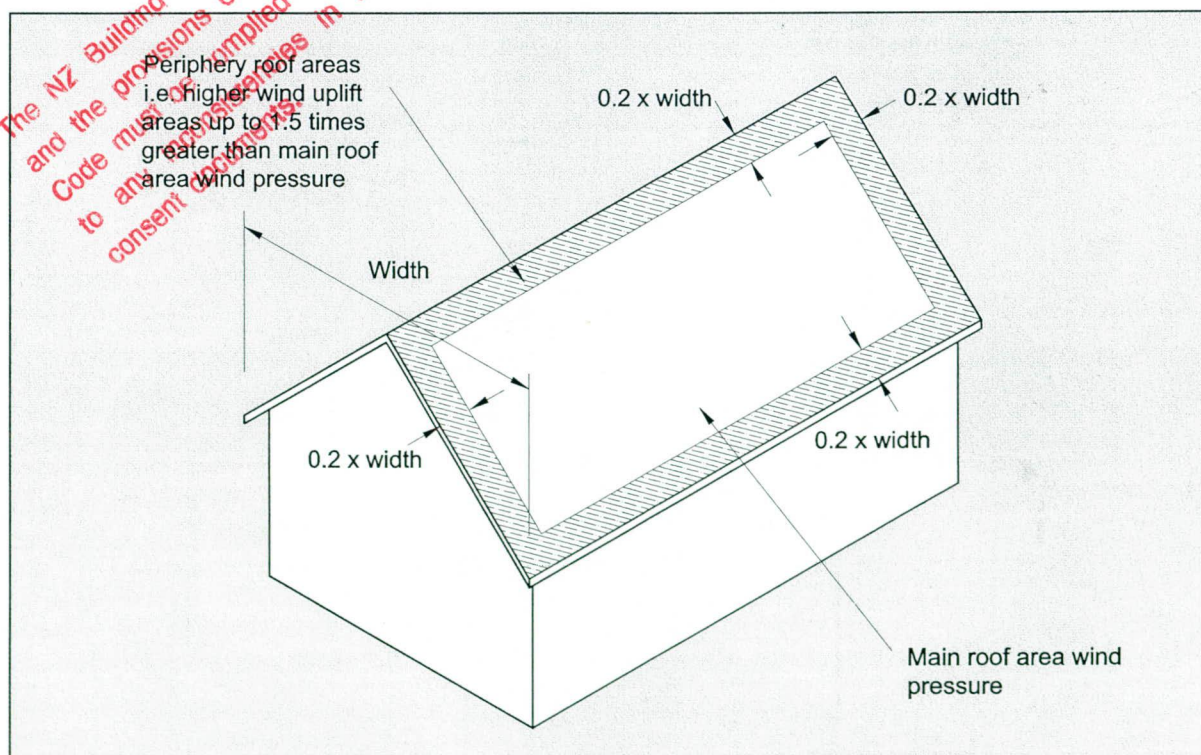
Amd 1
Dec '00**Figure 10.16 – Gable roof showing higher wind uplift areas requiring extra purlin and batten fixings** (see table 10.9)Amd 1
Dec '00

Table 10.9 – Purlins or battens (see 10.2.1.16.1)

(a) **Light roof cladding** (see figures 10.16 and 10.17)

Purlin or batten size	Maximum span	Maximum spacing and fixing loads in the following wind zones											
		Low			Medium			High			Very high		
		Spacing	Fixing capacity		Spacing	Fixing capacity		Spacing	Fixing capacity		Spacing	Fixing capacity	
			M ⁽¹⁾	P ⁽¹⁾		M ⁽¹⁾	P ⁽¹⁾		M ⁽¹⁾	P ⁽¹⁾		M ⁽¹⁾	P ⁽¹⁾
(mm x mm)	(mm)	(mm)	(kN)	(kN)	(mm)	(kN)	(kN)	(mm)	(kN)	(kN)	(mm)	(kN)	(kN)
50 x 40	900	400	0.3	0.4	400	0.4	0.5	400	0.5	0.8	400	0.7	1.0
50 x 50	1200	400	0.4	0.5	400	0.5	0.7	400	0.7	1.0	400	0.9	1.3
75 x 50	900	900	0.6	0.9	900	0.8	1.2	900	1.1	1.7	900	1.5	2.2
75 x 50	900	1200	0.8	1.2	1200	1.1	1.6	1200	1.5	2.3	1200	2.0	2.9
75 x 50	900	1800	1.2	1.8	1800	1.6	2.4	1800	2.3	3.4	1400	2.3	3.4
75 x 50	1200	1200	1.1	1.6	1200	1.4	2.1	1200	2.0	3.0	1100	2.4	3.6
75 x 50	1200	1400	1.3	1.9	1400	1.7	2.5	1000	1.7	2.5	800	1.7	2.5
100 x 50	1200	1800	1.6	2.4	1800	2.1	3.2	1400	2.3	3.5	1100	2.4	3.6

NOTE –

- (1) M = Main roof; P = Periphery (see figures 10.16 and 10.17).
- (2) Fixings with the capacity required by the table shall be selected from table 10.10.
- (3) Purlin and batten sizes are on the flat.

(b) **Heavy roof cladding**

Purlin or batten size	Maximum purlin span	Spacing	Fixing loads (all wind areas all roof areas)
(mm x mm)	(mm)	(mm)	(kN)
50 x 25	480	400	0.4
50 x 40	600	400	0.4
50 x 50	900	400	0.4

NOTE –

- (1) Fixings with the capacity required by the table shall be selected from table 10.10.
- (2) Purlin and batten sizes are on the flat.

The NZ Building Act/Regulations 2004 and the provisions of the NZ Building Code must be complied with in regard to any inconsistencies in the issued consent documents.



SOUTHLAND DISTRICT COUNCIL

Appln. No. 2952501

Approved [Signature]

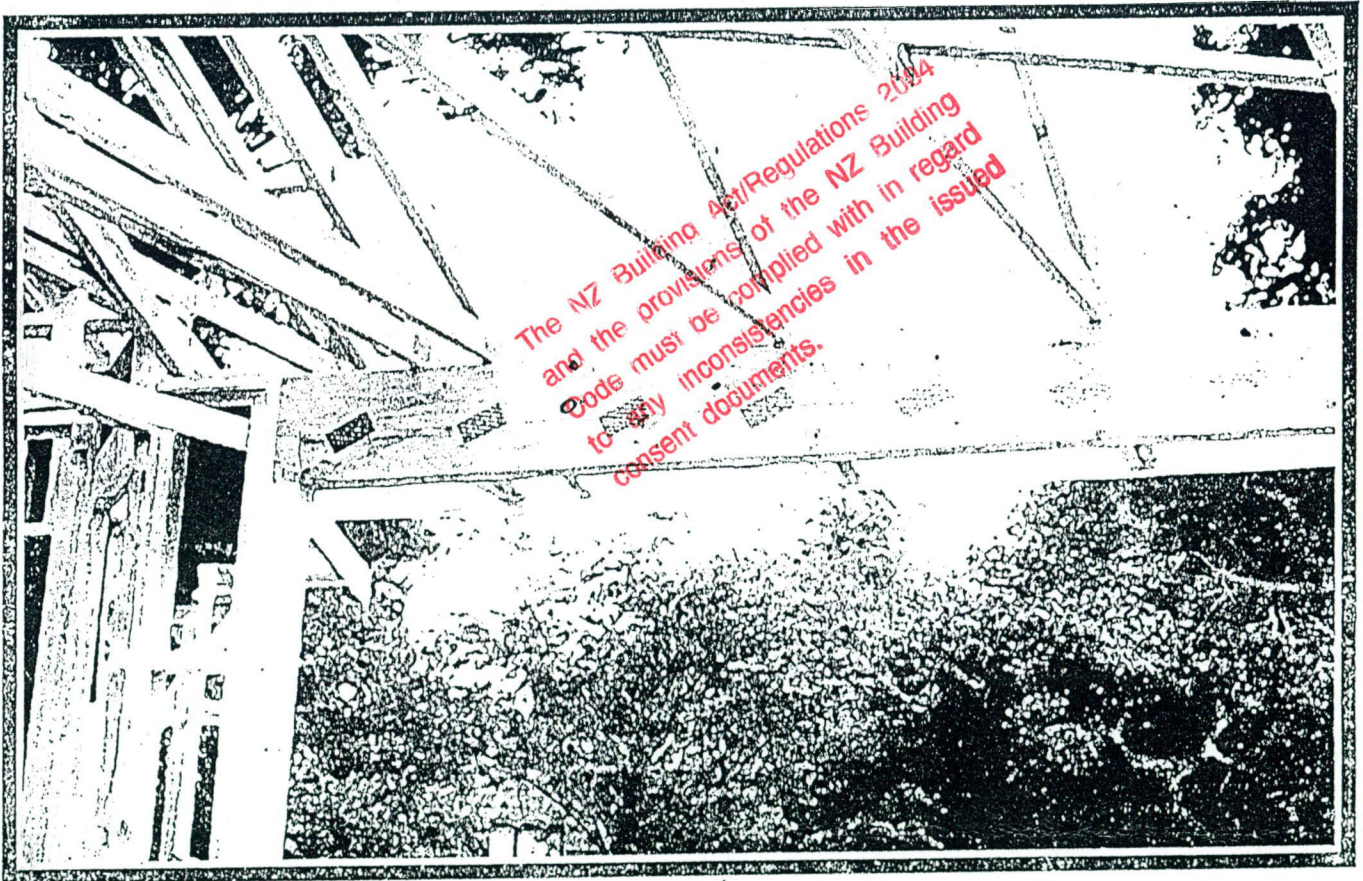
Date 25/1/06

Reference No. E - 8

MAY-99

pryda®

Claw Beam Lintels

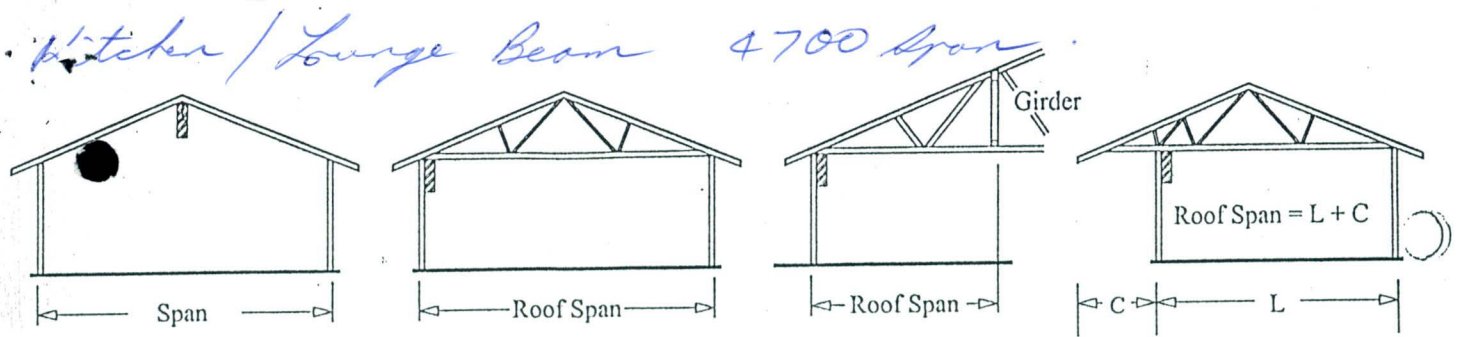


Trevor Withington
A/c - Brown
15 Scotswood St
Waikanae

Design Manual



PRESTON PRE-CUTS LTD
30 Mersey Street
P.O. Box 1433
Invercargill, Phone 83-647



All beam sizes shown to have a nominal width of 100mm

Plate size shown adjacent to beam depth to be placed at centres not exceeding the beam depth.

TABLE 1		LINTEL SIZE supporting Light Roof span of:								
Wind Zone	LINTEL SPAN	4m	5m	6m	7m	8m	9m	10m	11m	12m
LOW & MEDIUM WIND UP TO 0.5 KPA SNOW LOAD	2.15	150 -	150 -	150 -	150 -	200 -	200 -	200 -	200 -	200 -
	2.45	150 -	200 -	200 -	200 -	200 -	200 -	200 -	200 -	200 -
	2.75	200 -	200 -	200 -	200 -	200 -	200 -	250 -	250 -	250 -
	3.05	200 -	200 -	200 -	250 -	250 -	250 -	250 -	250 -	250 -
	3.35	200 -	250 -	250 -	250 -	250 -	250 -	250 -	300 4C3	300 5C3
	3.65	250 -	250 -	250 -	250 -	250 -	300 4C3	300 4C3	300 5C3	300 5C3
	3.95	250 -	250 -	250 -	300 4C3	300 4C3	300 4C3	300 5C3	300 5C3	350 5C3
	4.25	250 -	300 4C3	300 4C3	300 4C3	300 4C3	300 5C3	350 5C3	350 5C3	350 6C3
	4.55	300 4C3	300 4C3	300 4C3	350 5C3	350 5C3	350 5C3	350 5C3	400 6C3	400 6C3
	4.85	300 4C3	350 4C3	350 4C3	350 4C3	400 5C3	400 5C3	400 5C3	400 6C3	400 6C3
	5.15	350 4C3	350 4C3	400 5C3	400 5C3	400 5C3	400 5C3	450 6C3	450 6C4	450 6C3
	5.45	350 4C3	400 4C3	400 4C3	400 5C3	450 6C3	450 6C3	450 6C3	450 6C3	500 6C4
	5.75	400 4C3	400 4C3	450 5C3	450 5C3	450 6C3	500 6C3	500 6C4	500 6C4	500 6C4
	6.05	400 4C3	450 5C3	450 5C3	450 5C3	500 6C3	500 6C3	500 6C4	550 6C4	550 6C4
TABLE 2		LINTEL SIZE supporting Light Roof span of:								
Wind Zone	LINTEL SPAN	4m	5m	6m	7m	8m	9m	10m	11m	12m
HIGH & VERY HIGH WIND UP TO 1KPA SNOW LOAD	2.15	150 -	150 -	150 -	200 -	200 -	200 -	200 -	200 -	200 -
	2.45	150 -	200 -	200 -	200 -	200 -	200 -	250 -	250 -	250 -
	2.75	200 -	200 -	200 -	200 -	250 -	250 -	250 -	250 -	250 -
	3.05	200 -	200 -	250 -	250 -	250 -	250 -	250 -	300 6C3	300 6C3
	3.35	200 -	250 -	250 -	250 -	250 -	300 5C3	300 6C3	300 6C3	300 6C3
	3.65	250 -	250 -	250 -	300 5C3	300 5C3	300 6C3	300 6C3	350 6C4	350 6C4
	3.95	250 -	250 -	300 5C3	300 5C3	300 6C3	350 6C3	350 6C4	350 6C4	400 6C4
	4.25	250 -	300 4C3	300 5C3	300 5C3	350 6C3	350 6C3	400 6C4	400 6C4	400 6C4
	4.55	300 4C3	300 5C3	300 5C3	350 6C3	350 6C3	400 6C4	400 6C4	400 6C4	450 6C4
	4.85	300 4C3	350 5C3	350 5C3	350 6C3	400 6C4	400 6C4	400 6C4	450 6C4	450 6C4
	5.15	350 5C3	350 5C3	400 6C3	400 6C3	400 6C4	450 6C4	450 6C4	450 6C4	500 8C4
	5.45	350 5C3	400 5C3	400 6C3	450 6C4	450 6C4	450 6C4	450 6C4	500 8C4	500 8C4
	5.75	400 5C3	400 5C3	450 6C3	450 6C4	450 6C4	500 6C4	500 6C4	500 8C4	550 8C4
	6.05	400 5C3	450 6C3	450 6C3	500 6C4	500 6C4	500 6C4	550 8C4	550 8C4	550 8C4
TABLE 3		LINTEL SIZE supporting Heavy Roof span of:								
Wind Zone	LINTEL SPAN	4m	5m	6m	7m	8m	9m	10m	11m	12m
ALL WIND AREAS 0.5KPa SNOW LOAD	2.15	200 -	200 -	200 -	200 -	200 -	250 -	250 -	250 -	250 -
	2.45	200 -	200 -	250 -	250 -	250 -	250 -	250 -	250 -	250 -
	2.75	250 -	250 -	250 -	250 -	250 -	300 5C3	300 6C3	300 6C3	300 6C4
	3.05	250 -	250 -	300 4C3	300 5C3	300 5C3	300 6C3	300 6C3	350 6C4	350 6C4
	3.35	250 -	300 4C3	300 5C3	300 5C3	350 5C3	350 6C3	350 6C4	350 6C4	350 6C4
	3.65	300 4C3	300 5C3	350 5C3	350 5C3	350 6C3	350 6C4	400 6C4	400 6C4	400 6C4
	3.95	300 4C3	350 5C3	350 5C3	350 5C3	400 6C3	400 6C4	400 6C4	400 6C4	450 6C4
	4.25	350 4C3	350 5C3	400 6C3	400 6C3	400 6C4	450 6C4	450 6C4	450 6C4	450 6C4
	4.55	350 4C3	400 5C3	400 6C3	400 6C3	450 6C4	450 6C4	450 6C4	500 6C4	500 8C4
	4.85	400 5C3	400 5C3	450 6C3	450 6C3	450 6C4	500 6C4	500 6C4	500 6C4	550 8C4
	5.15	450 5C3	450 5C3	450 6C3	450 6C3	500 6C4	550 6C4	550 6C4	550 6C4	550 8C4
	5.45	450 5C3	500 6C3	500 6C3	500 6C4	550 6C4	550 6C4	600 8C4	600 8C4	600 8C4
	5.75	500 5C3	500 6C3	550 6C4	550 6C4	600 6C4	600 6C4	600 8C4	600 8C4	
	6.05	500 5C3	550 6C3	550 6C4	550 6C4	600 6C4				

PRESTON PRE-CUTS LTD

30 Mersey Street, Invercargill
PO Box 1433
Telephone (03) 218-3647
A/H (03) 217-9739
Fax (03) 218-9558

We confirm that:

- (a) The loadings, spacings, spans and other details used to create this Beam are correct for this project.
- (b) The timber members for this project will be manufactured in accordance with the specifications of Able Cooke (NZ) Ltd.
- (c) The Beam has been manufactured in accordance with Pryda® Claw Beam Lintels Design Manual Ref No: E-8 May 99

Signed : *PD Dawson*

Date: 27/10/05

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and the provisions of the NZ Building
Code must be complied with in regard
to any inconsistencies in the issued
consent documents.

PRODUCER STATEMENT

Job Ref: 7773

TRUSS DESIGN CRITERIA

Customer name : WITHINGTON
COUNSELL RD
RD

Site address : BROWN HOUSE
15 SCOTSWOOD ST

DESIGN CRITERIA

Roofing - Corrugated Iron
Ceiling - Gib Board (9.5mm)
Top chord purlins - 900 mm
Bottom chord restraints - 1800 mm
Standard truss spacing - 900 mm
Standard roof pitch - 25.00 deg

Design wind speed - 50 m/s (ultimate)
Classification - N4

Internal pressure coefficient up - 0.2
Snow Load (U.L.S.) - 600 Pa

The truss designs for this job have been determined using computer software provided by the Technical Division within Pryda Truss Systems. These designs are in accordance with sound and widely accepted engineering principles and comply with the following New Zealand Standards:-

NZ4203 : 1992 General Structural Design and Design Loadings for Buildings
NZ3603 : 1993 Timber Design
AS1649 : 1974 Determination of Basic Working Loads for
Metal Fasteners for Timber

These trusses shall be installed, connected and braced in accordance with the recommendations given in :-

AS4440:2004 Installation of nailplated timber trusses.

We confirm that the trusses for this project have been manufactured in accordance with the fabrication specifications provided by Pryda Truss Systems.

Name : Brent Dawson

Position: Detailer

Signed : B Dawson

Date : 10 / 1 / 06

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and the provisions of the NZ Building
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to any inconsistencies in the issued
consent documents.

1025R0 1025R0

span 4100

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Customer: WITTINGTON

Site Addr: BROWN HOUSE

15 SCOTSWOOD ST

TRUSS DATA

Truss Type : Std
 TC pitch 1 : 25.00
 Thickness : 45
 Spacing : 900
 TC Restraint: 900
 BC Restraint: 1800
 Timber Group: MSG8

CHORDS

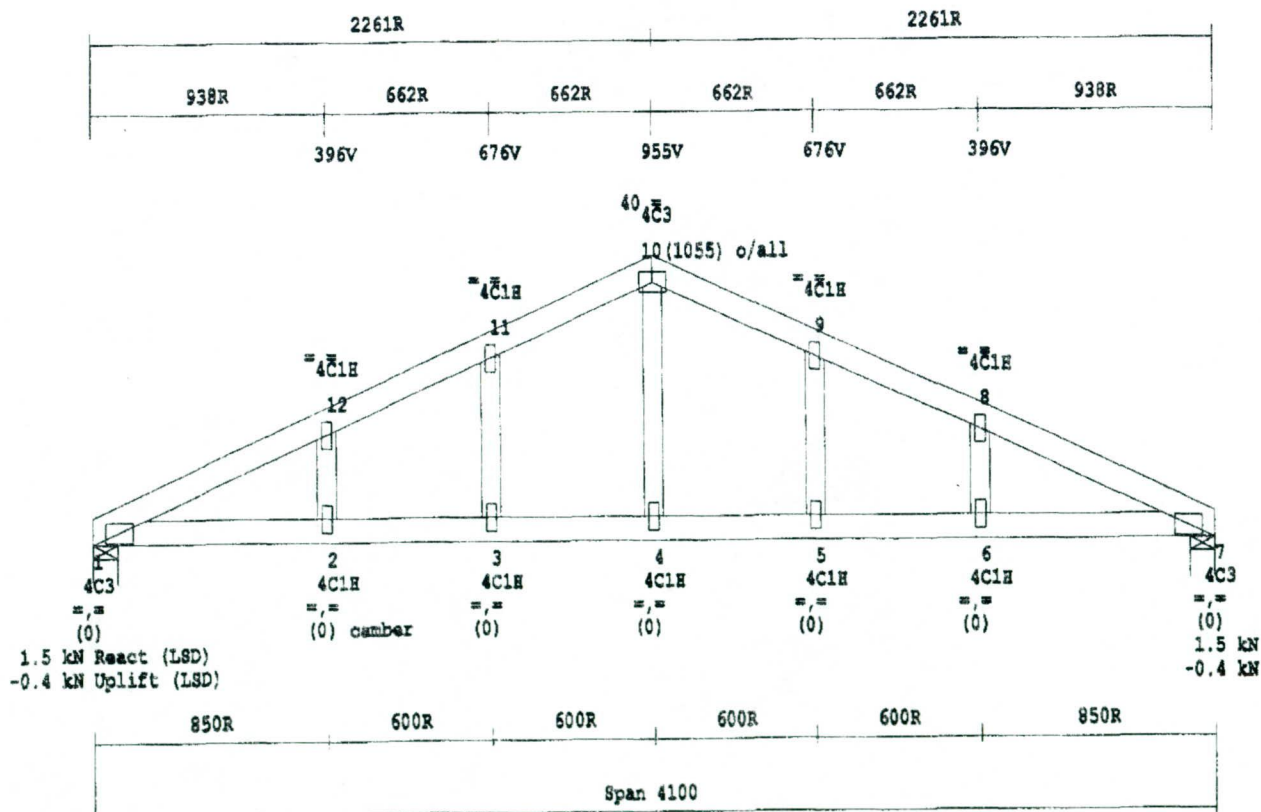
1 7 90MSG8 JD5
 7 10 90MSG8 JD5
 1 10 90MSG8 JD5

WEBS

u.o.n 70MSG8 JD5

Roofing Material : Corrugated Iron 79 Pa
 Ceiling Material : Gib Board (9.5mm) 79 Pa
 Overhang design assumes non-structural fascia.

Truss Mark <GT1 > 2 Single Trusses



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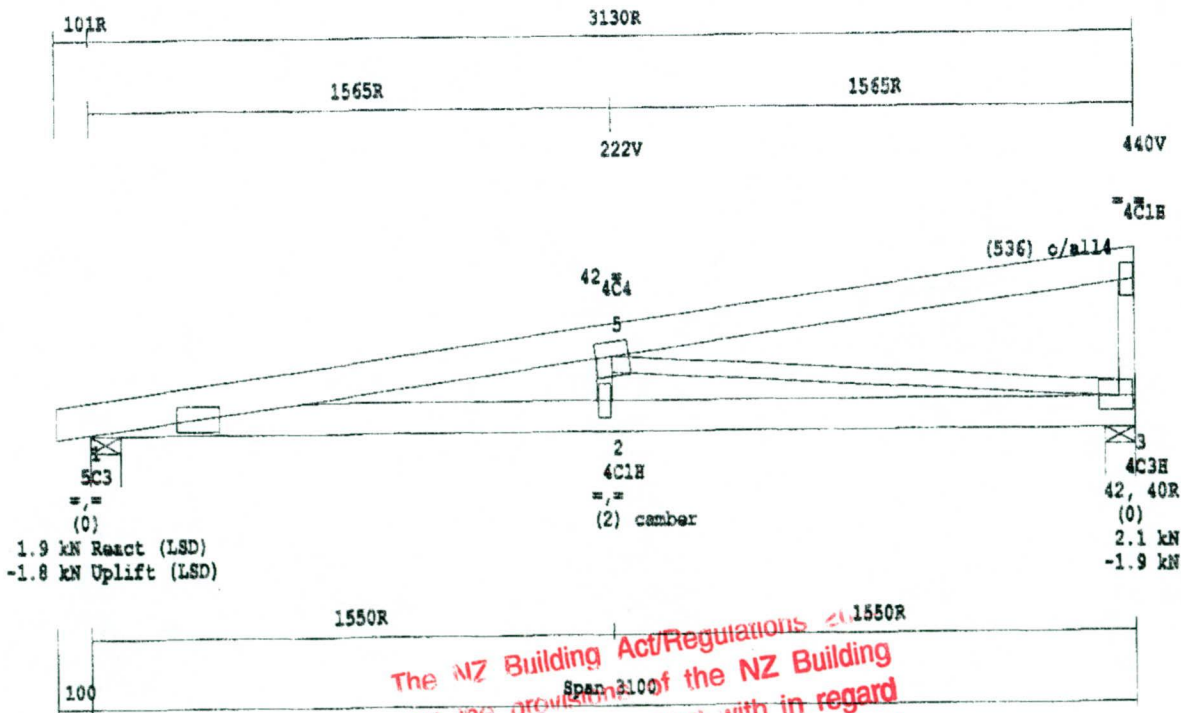
TRUSS DETAIL SHEET

9:27am 10 JAN 2006
Ver 3.5.0.10 PAGE 4
Job Ref: 7773

Customer: WITTINGTON

Site Addr: BROWN HOUSE
15 SCOTSWOOD ST

TRUSS DATA	CHORDS	WEBS
Truss Type : Mono	1 3 94No1DFC J4	1 1 47No1DFC J4
TC pitch 1 : 8.00	1 4 94No1DFC J4	
Thickness : 47		
Spacing : 900		
TC Restraint: 900		
BC Restraint: 1800		
Timber Group: DFIR-CERT		
Roofing Material : Corrugated Iron		79 Pa
Ceiling Material : Gib Board (9.5mm)		79 Pa
Overhang design assumes non-structural fascia.		
Truss Mark <MT1 > 11 Single Trusses		



The NZ Building Act/Regulations of the NZ Building Code must be complied with in regard to any inconsistencies in the issued consent documents.

TRUSS DETAIL SHEET

Job Ref: 7773

Customer: WILKINSON

Site Addr: BROWN HOUSE

15 SCOTSWOOD ST

TRUSS DATA

Truss Type : Mono
 TC pitch 1 : 8.00
 Thickness : 45
 Spacing : 900
 TC Restraint: 900
 BC Restraint: 1800
 Timber Group: MSG8

CHORDS

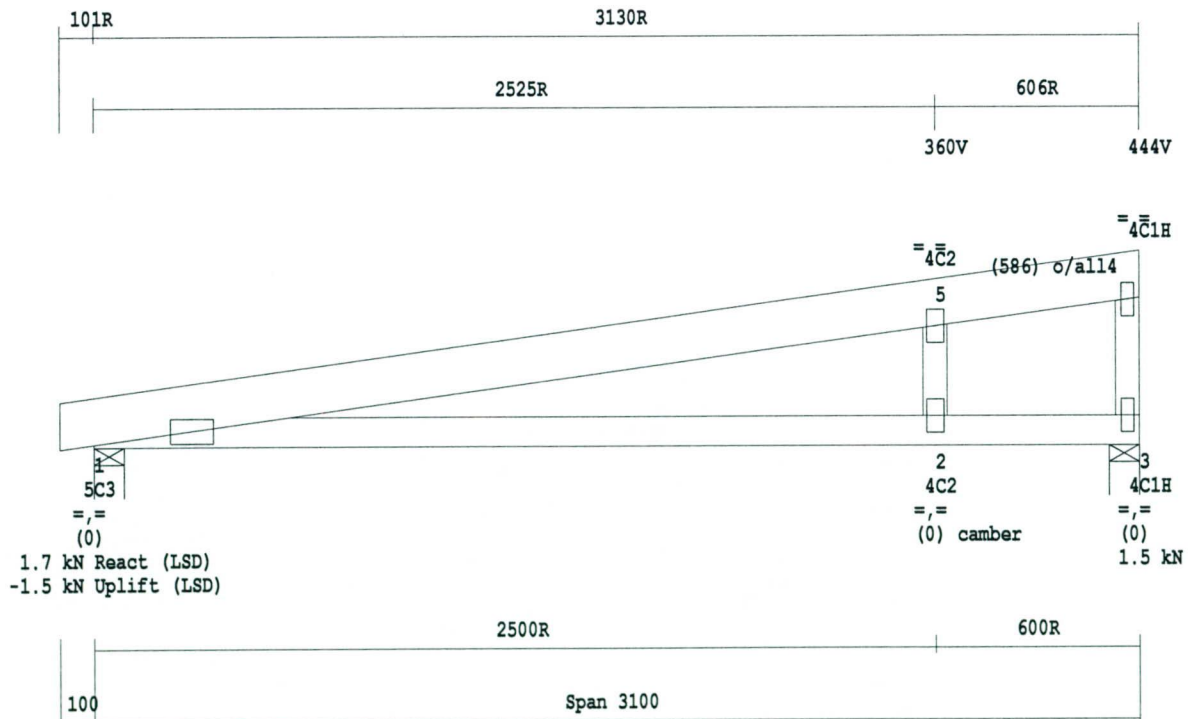
1 3 90MSG8 JD5
 1 4 140MSG8 JD5

WEBS

u.o.n 70MSG8 JD5

Roofing Material : Corrugated Iron 79 Pa
 Ceiling Material : Gib Board (9.5mm) 79 Pa
 Overhang design assumes non-structural fascia.

Truss Mark <GTm1 > 2 Single Trusses



The NZ Building Act/Regulations 2014
 and the provisions of the NZ Building
 Code must be complied with in regard
 to any inconsistencies in the issued
 consent documents.

TRUSS REACTIONS REPORT

Job Ref: 7773

Client Details
 WITHINGTON
 COUNSELL RD
 RD
 O/N :

Site Address
 BROWN HOUSE
 15 SCOTSWOOD ST

Date Reqd:

Truss Mark	Support at Joint	(1.4G) (kN)	Max.Reaction (1.2G+1.6Q2) (kN)	Uplift (0.9G+WuUpl) (kN)	Uplift fixing	Special bearing requirement
T1	1	0.8	2.1	-1.9	2/Z NAILS	
T1	5	0.8	2.1	-1.9	2/Z NAILS	
GT1	1	0.1	1.5	-0.4	2/Z NAILS	
GT1	7	0.1	1.5	-0.4	2/Z NAILS	
MT1	1	0.5	1.9	-1.8	2/Z NAILS	
MT1	3	0.6	2.1	-1.9	2/Z NAILS	
GTM1	1	0.3	1.7	-1.5	2/Z NAILS	
GTM1	3	-0.1	1.5	0.7	2/Z NAILS	

Note 1 :

All supports for bearing have been checked for 90mm JD4 and are satisfactory unless the bearing width and/or joint group have been changed, or there is a reference to Note 2.

Fixing Summary :

All trusses not listed require a minimum of 2 Skew Nails
 Z NAILS / 104 : Each side of truss

Legend :

2/Z NAILS Double Z-nails

The NZ Building Act/Regulations 2014
 and the provisions of the NZ Building
 Code must be complied with in regard
 to any inconsistencies in the issued
 consent documents.

WBL

WITHINGTON BUILDERS LTD

Trevor Withington

1793 Winton Lorneville Highway ~ Makarewa No 6 RD ~ Invercargill
Mobile 027 2892851 ~ Fax (03) 2358-054 ~ Home (03) 2358-064

23.01.06

Southland District Council
No 3272 / 15
Attention Peter Meikle

SOUTHLAND DISTRICT COUNCIL

Appln. No. 2952501

Approved

Date 25/1/06

Building Consent no BLD 2952501 New Dwelling.

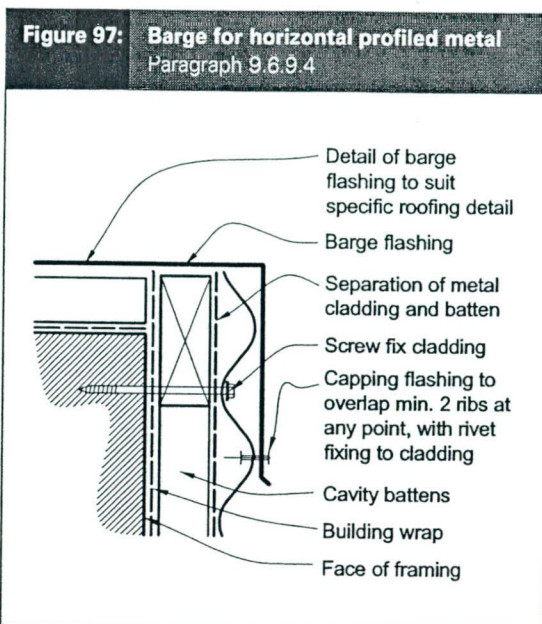
Items requiring additional information.

1. Safety glass will be fitted.
2. Enclosed from Preston Precuts Invercargill.
3. Enclosed from Preston Precuts Invercargill.
4. Door opening lintels to be increased to 200x100.
5. 150mm step between house floor and verandah.
6. Purlin Dimension 75 x 50 900/ spacings
7. Roofing underlay to be self supporting black building paper.
8. H 1-2 treated framing timber to be used.
9. Enclosed detail flashings from Calder Stewart (installers)
10. Type to be confirmed by owner at later date.
11. Enclosed design from Mahon Plumbing.

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and the provisions of the NZ Building
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9.6.9.4 Barges

Barge flashings shall be as shown in Figure 97.

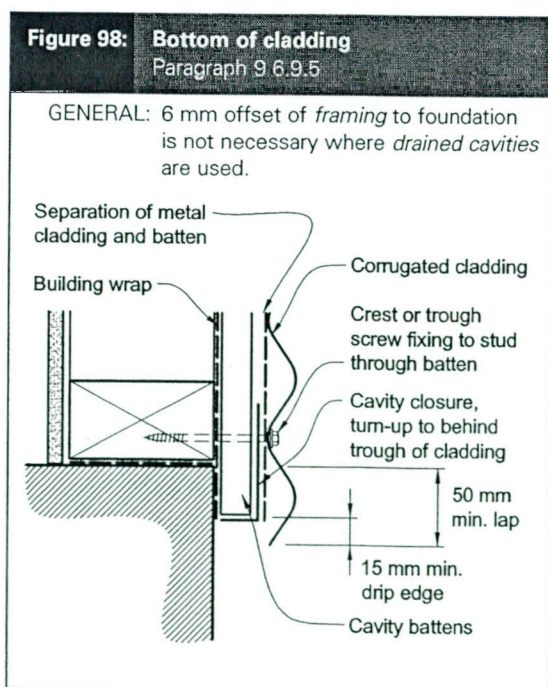


Amend 2
Jul 2005

Amend 2
Jul 2005

9.6.9.5 Bottom of cladding

The bottom edge of the *cladding* shall overlap the foundation wall as described in Paragraph 9.1.3 and as shown in Figure 98.



Amend 2
Jul 2005

9.6.9.6 Horizontal profile: penetrations

All services penetrations through *claddings* shall be flashed and sealed. Pipe penetrations are shown in Figure 53.

The heads of larger penetrations shall be flashed in a similar fashion to Figure 69, with head *flashings* adjusted to suit profile and other *flashings* as per window details in relevant paragraphs.

9.6.9.7 Horizontal profile: windows

Windows and doors shall be installed in accordance with Paragraph 9.1.10, and as shown in Figure 99 and Figure 100.

9.6.9.8 Parapets and balustrades

Parapets shall be in accordance with Paragraph 6.0.

Enclosed balustrades shall comply with Paragraph 7.4, and be as shown in Figure 101 and Figure 102.

COMMENT:

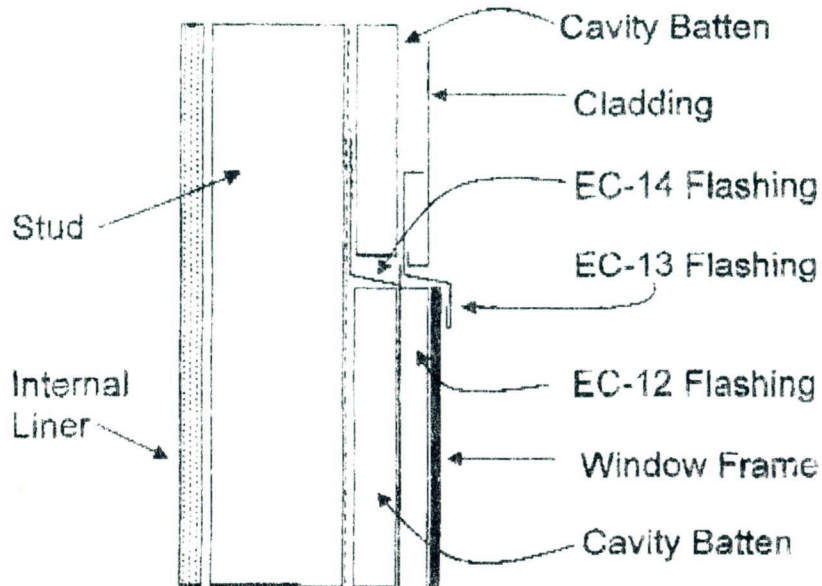
Side fixings of *handrails* or other attachments to *enclosed balustrades* or *parapets* will require *specific design* to demonstrate *weather-tightness*, together with *specific structural design* for *stanchion* fixings.

Amend 2
Jul 2005

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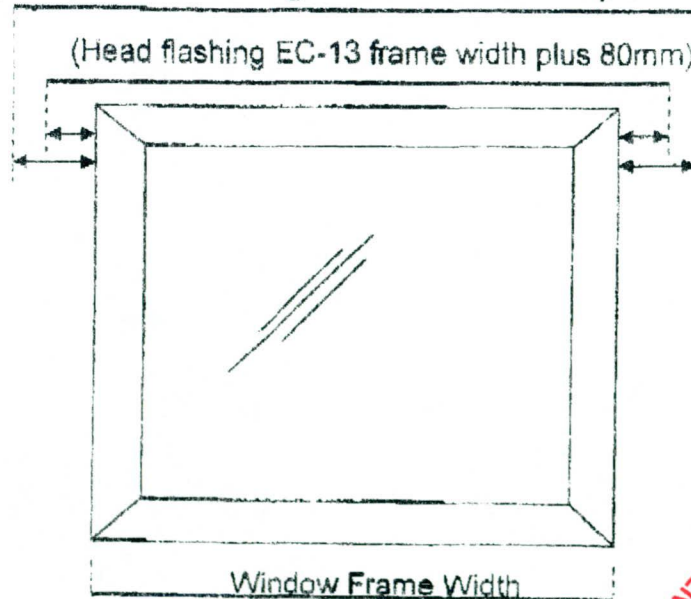
Applications onto Buildings cont.

Window Head Detail



Head Flashing Lay-out

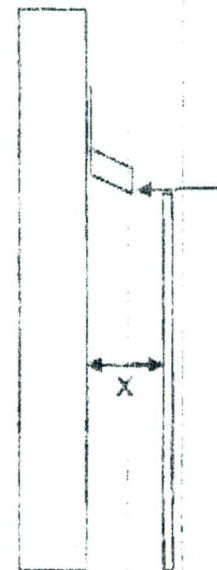
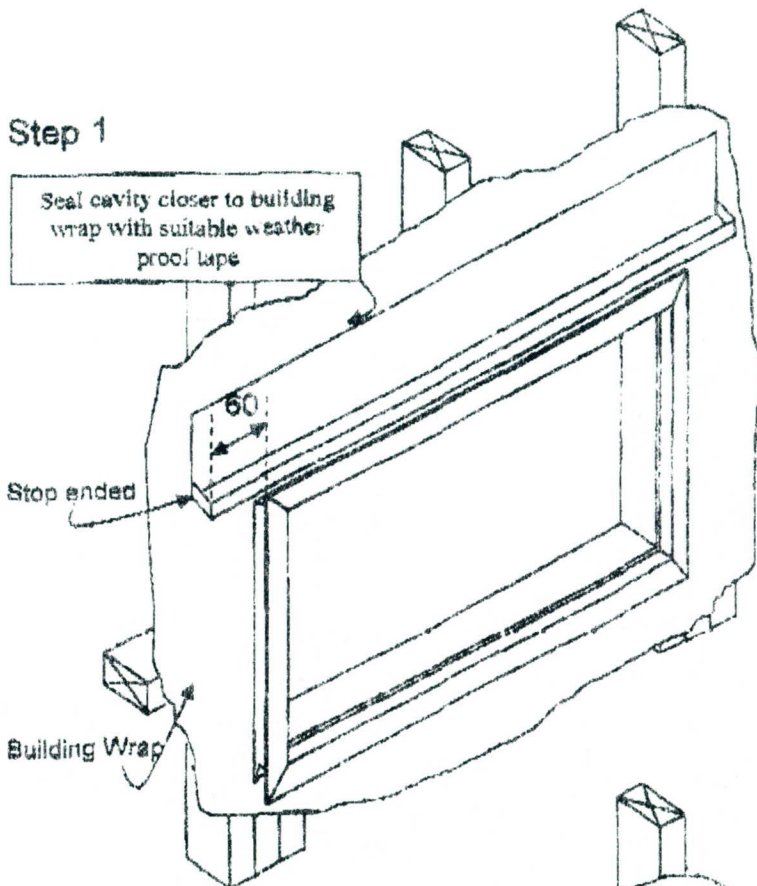
(Cavity closure flashing EC-14 = frame width plus 150mm)



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and the provisions of the NZ Building
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consent documents.

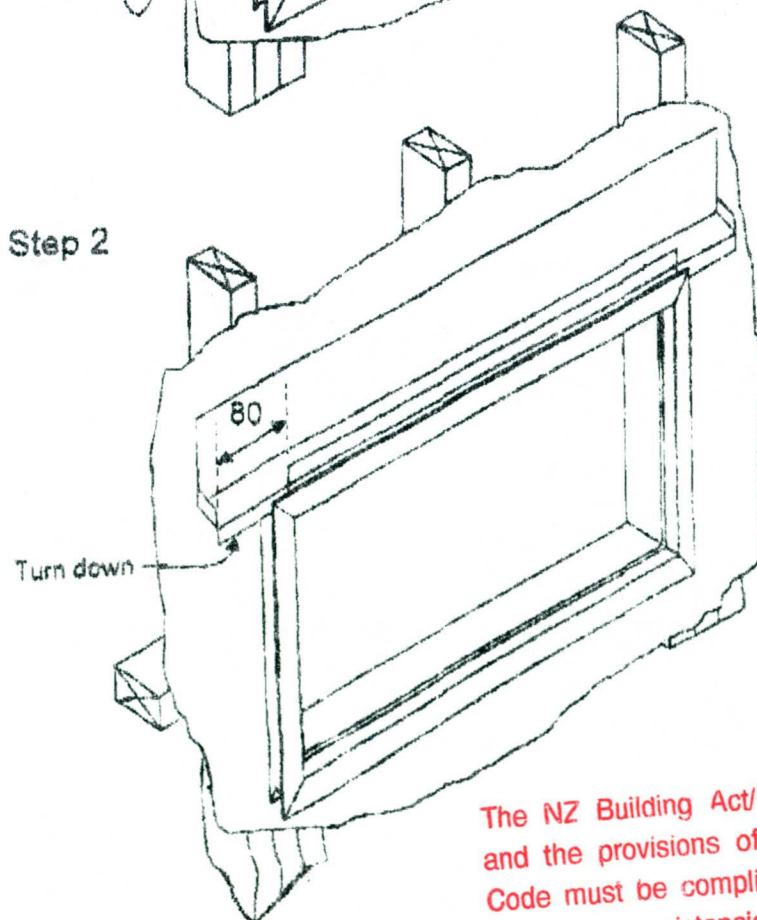
EC-14 Head Cavity Closer Detail (Install with slight fall to one end)
(Secure flashing to studs with suitable fixings)

Step 1



X = Batten width plus
Cladding width

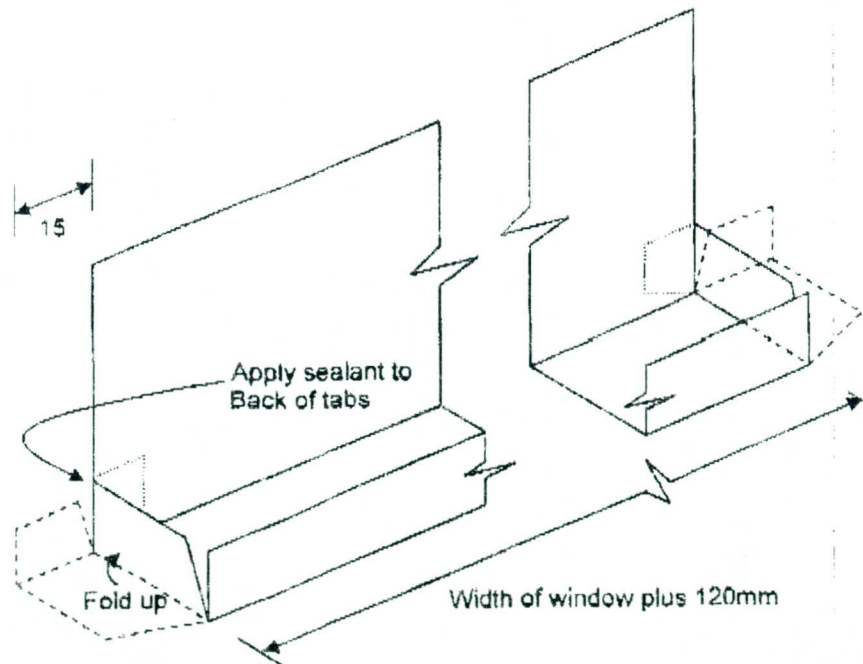
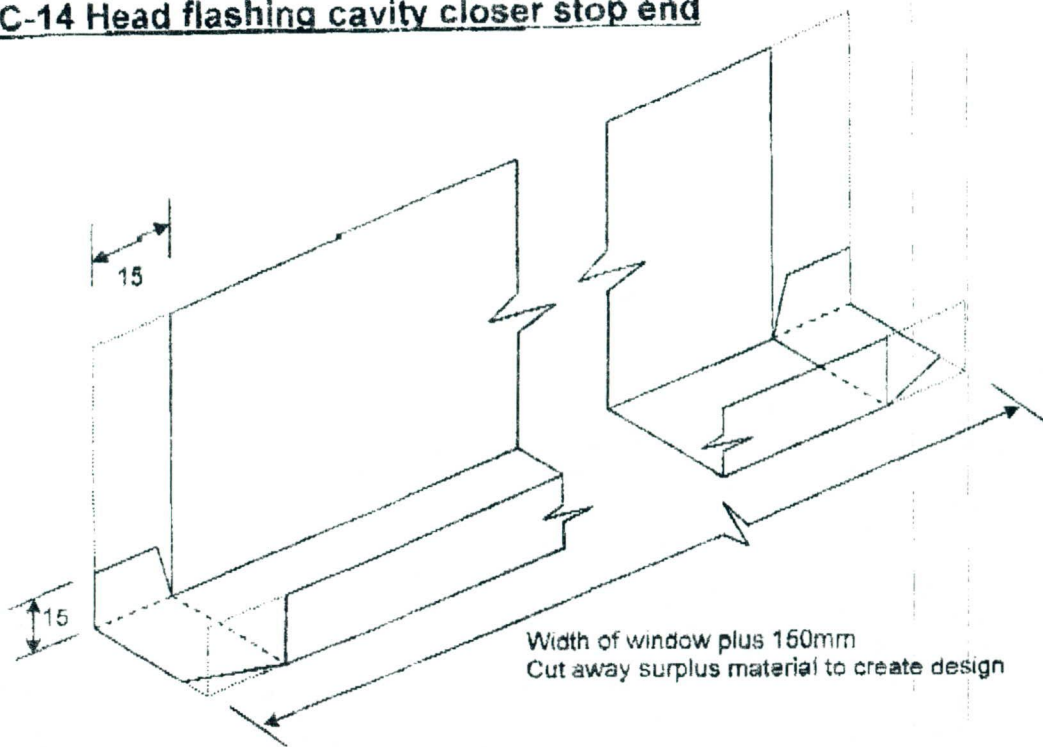
Step 2



X = Batten width plus
Cladding width

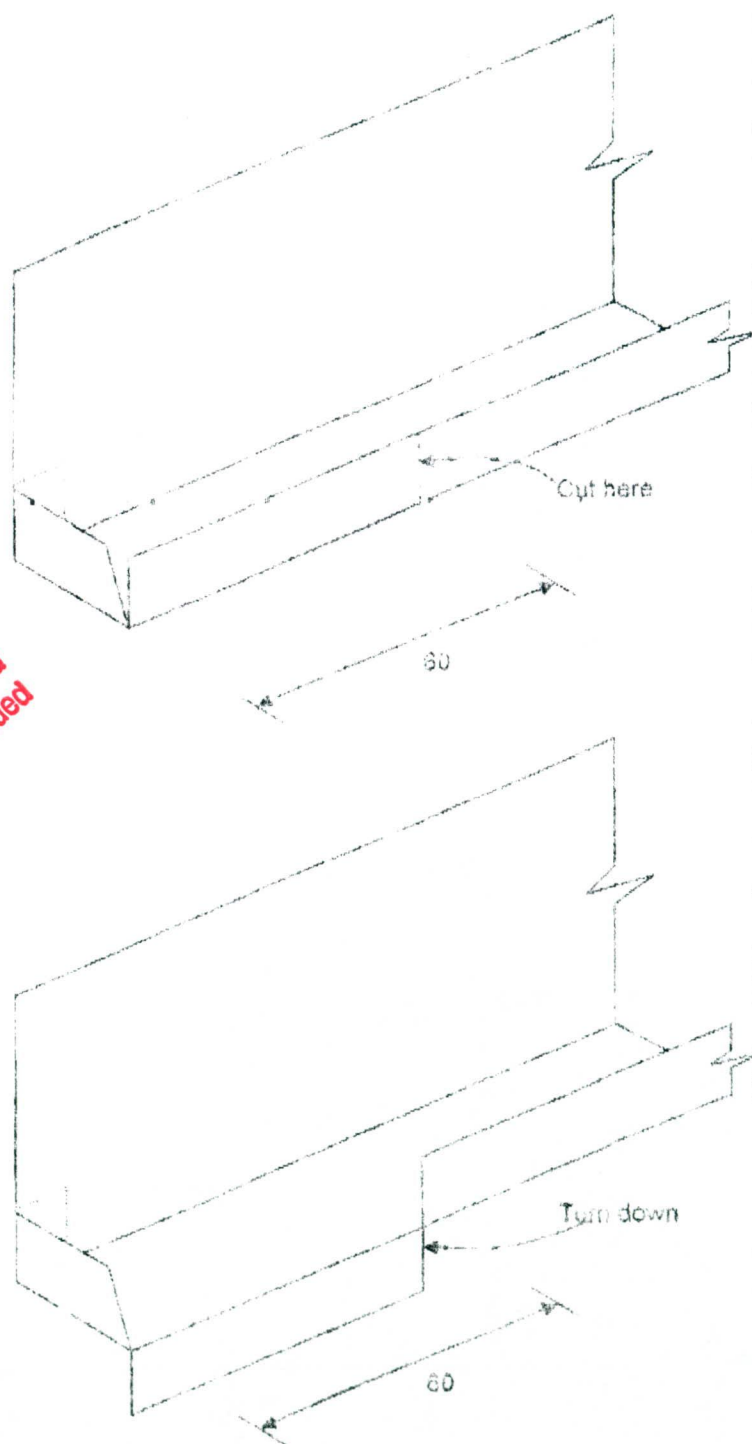
The NZ Building Act/Regulations 2004
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consent documents.

EC-14 Head flashing cavity closer stop end



Copy right
Calder Stewart Roofing

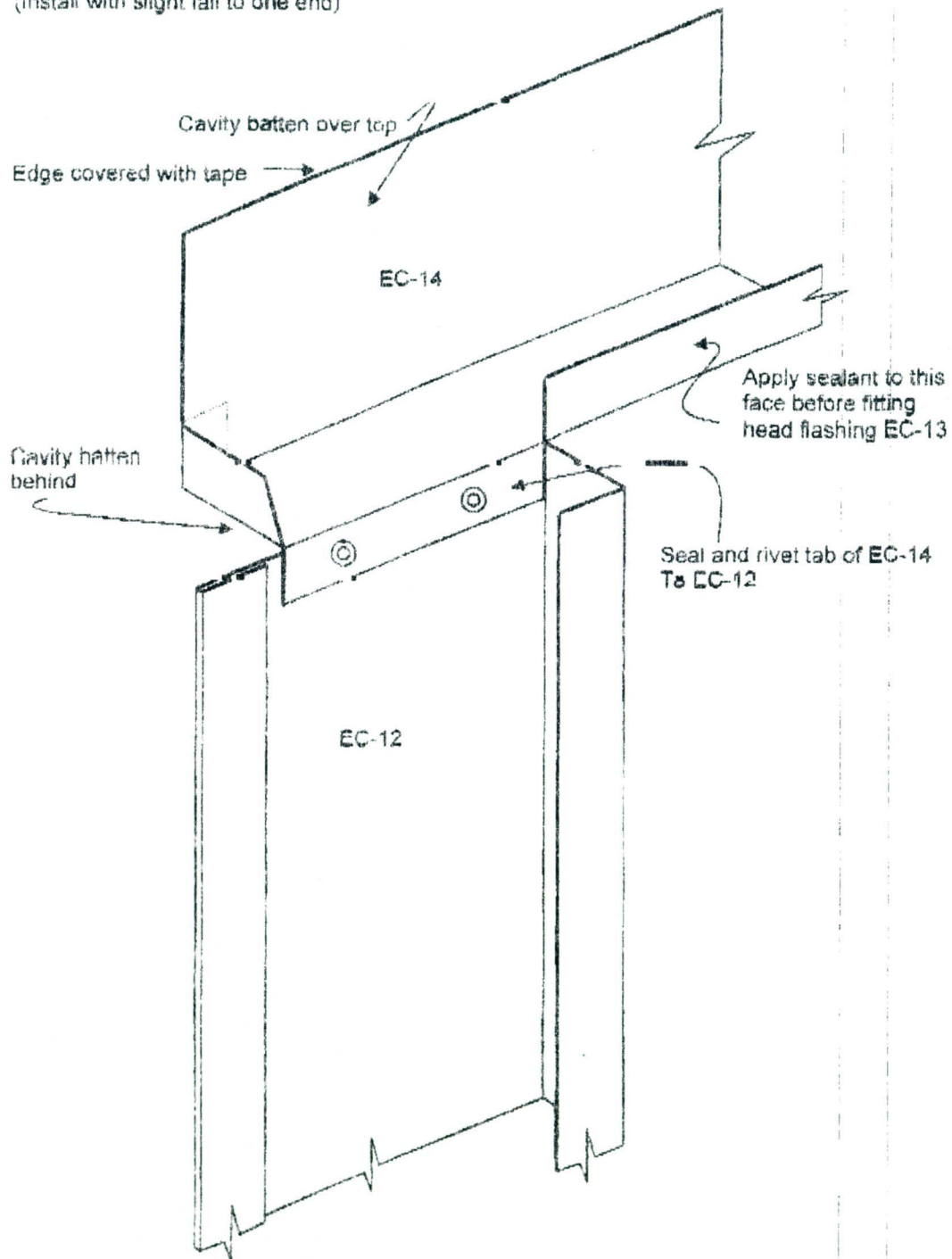
The NZ Building Act/Regulations 2004
and the provisions of the NZ Building
Code must be complied with in regard
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EC-14 Head flashing cavity closer stop end

**The NZ Building Regulations 2004
and the provisions of the NZ Building
Code must be complied with in regard
to any inconsistencies in the issued
consent documents.**

Once Cavity closer has been installed, battens can be fitted above window. Battens must not entry into the channel of the cavity closer. Cavity must be clear for air movement and any drainage that may be required.

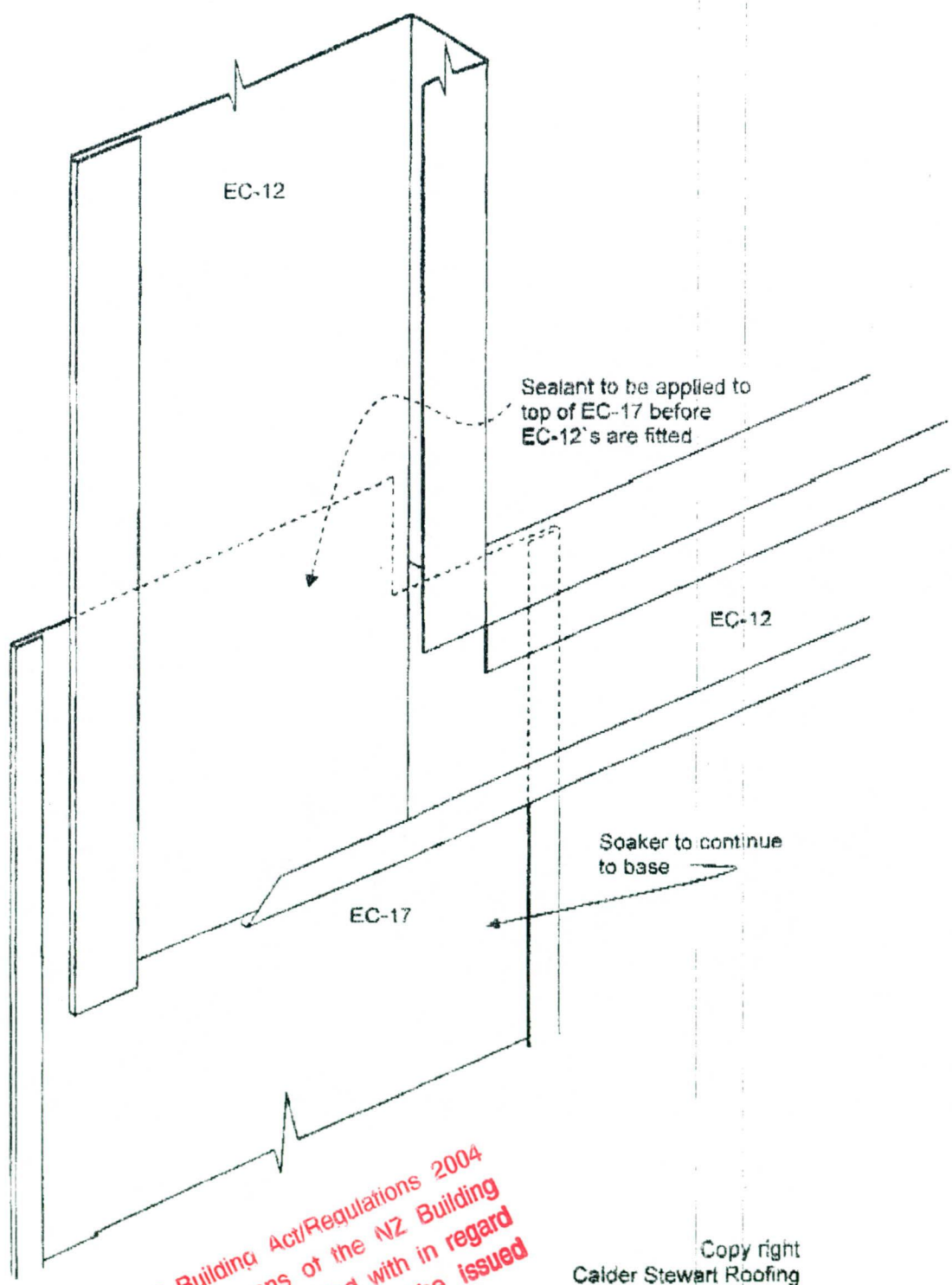
Cavity Closer – Jamb
EC-14 and EC-12 Junction Detail
(Install with slight fall to one end)



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and the provisions of the NZ Building
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to any inconsistencies in the issued
consent documents.

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Calder Stewart Roofing

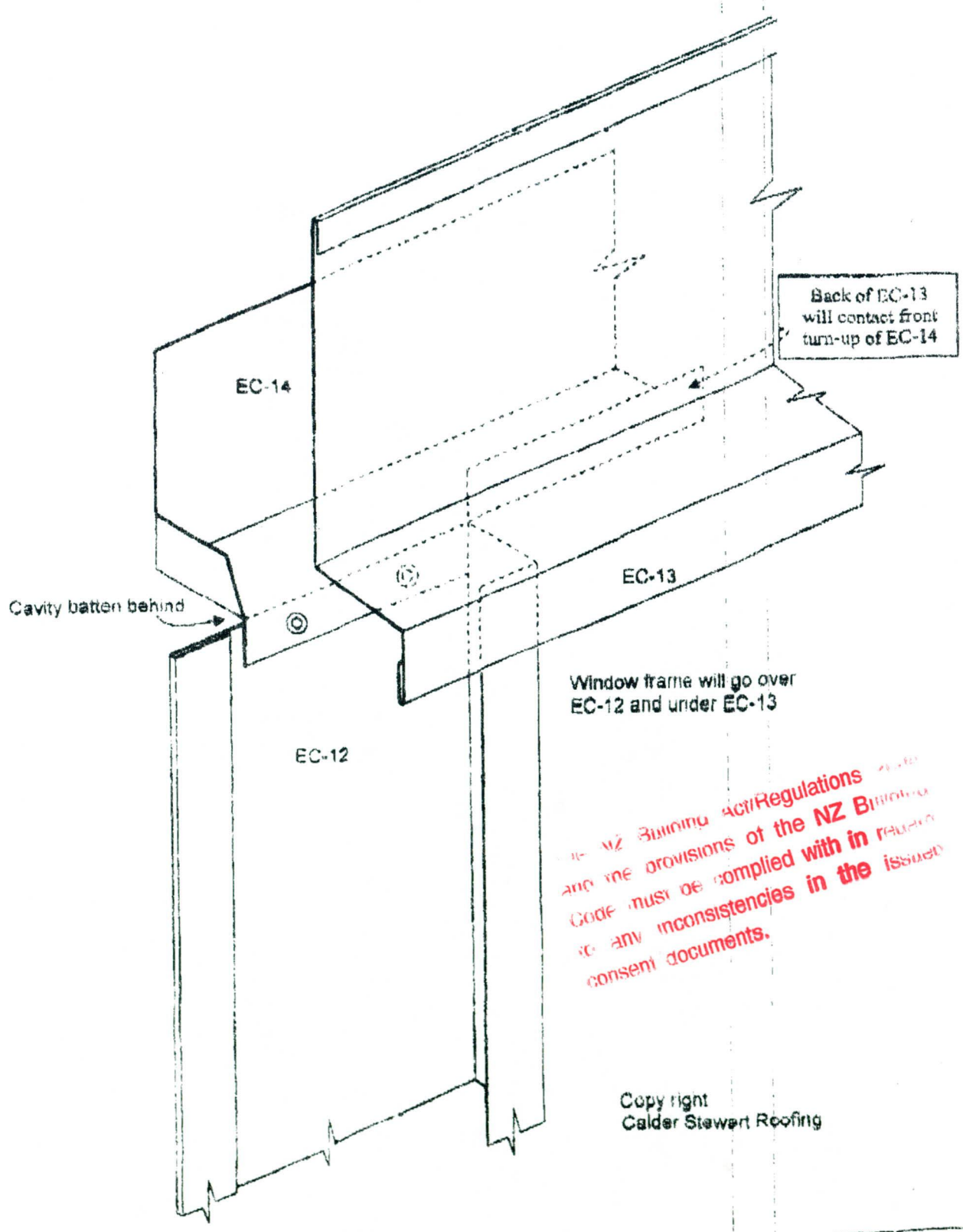
Jamb – Sill and Soaker
EC-12 and EC-17 Detail



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to any inconsistencies in the issued
consent documents.

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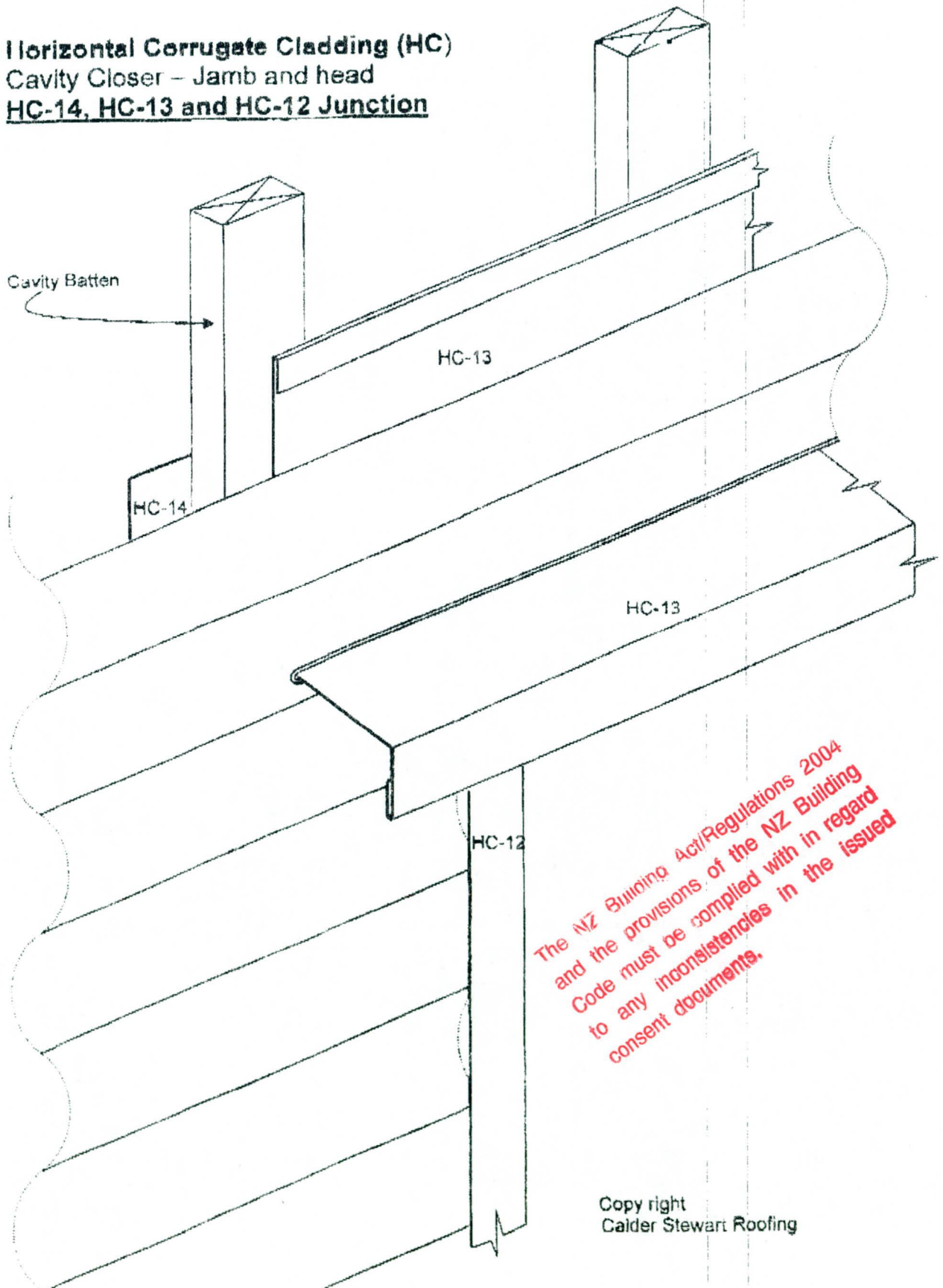
Cavity Closer – Jamb and head
EC-14, EC-13 and EC-12 Junction Detail



All NZ Building Act/Regulations and the provisions of the NZ Building Code must be complied with in relation to any inconsistencies in the issued consent documents.

Calder **Stewart**
Roofing

**Horizontal Corrugate Cladding (HC)
Cavity Closer – Jamb and head
HC-14, HC-13 and HC-12 Junction**



*The NZ Building Act/Regulations 2004
and the provisions of the NZ Building
Code must be complied with in regard
to any inconsistencies in the issued
consent documents.*

Copy right
Calder Stewart Roofing

Calder **Stewart**
Roofing

Horizontal Corrugate Cladding (HC)
Cavity Closer – Jamb and head
HC-14, HC-13, HC-12 & HC-18 Junction

