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Approved building consent documents

Please note: A copy of the stamped approved documents must be available on site for all inspections.

Inspection bookings

For building inspections and enquiries phone ContactUs on: 03 347 2800.

For current inspection timeframes see Selwyn District Council - Building.

Note: where restricted building work is involved, you must provide the relevant LBP numbers for the work to be inspected at the time of booking the inspections.

Please ensure all work for inspection is ready the day before.
Incomplete work requiring re-inspection will incur an additional inspection fee.

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Memorandum from licensed building practitioner: Certificate of design work

Section 45 and section 30c, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

THE BUILDING

Street address: 115 Solihull Drive	
Suburb:	
Town/City: Rolleston	Postcode:

THE OWNER(S)

Name(s): I Shephard Homes Limited	
Mailing address: Unit 10, 20 Izone Drive	
Suburb:	PO Box/Private Bag:
Town/City: Rolleston	Postcode:
Phone number: 021 461 886	Email address: admin@ishephardhomes.co.nz

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IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK

I Karen van der Mespel carried out/supervised the following design work that is restricted building work

PRIMARY STRUCTURE

Design work that is restricted building work	Description of restricted building work	Carried out or supervised	Reference to plans and specifications
Tick ✓	If appropriate, provide details of the restricted building work	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Foundations and subfloor framing ✓	Foundation design	✓ Carried out ○ Supervised	Architectural plans sheet A.00-A.21 Specification
Walls ✓	Design of wall framing	✓ Carried out ○ Supervised	Architectural plans sheet A.00 - A.21 Specification
Roof ✓	Design of roof framing	✓ Carried out ○ Supervised	Architectural plans sheet A.00 - A.21 Specification
Columns and beams ✓	Design of columns & beams	✓ Carried out ○ Supervised	Architectural plans sheet A.00 - A.21 Specification
Bracing ✓	Design of bracing	✓ Carried out ○ Supervised	Architectural plans sheet A.00 - A.21 Specification
Other ○		○ Carried out ○ Supervised	

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EXTERNAL MOISTURE MANAGEMENT SYSTEMS			
Design work that is restricted building work	**Description of restricted building work**	**Carried out or supervised**	**Reference to plans and specifications**
Tick ✓	If appropriate, provide details of the restricted building work	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Damp proofing ✓	Design of damp proofing	✓ Carried out ○ Supervised	Architectural plans Sheet A.00 - A.21 Specification
Roof cladding or roof cladding system ✓	Design of roof cladding	✓ Carried out ○ Supervised	Architectural plans Sheet A.00 - A.21 Specification
Ventilation system (for example, subfloor or cavity) ✓	Design of natural & mechanical ventilation systems	✓ Carried out ○ Supervised	Architectural plans Sheet A.00 - A.21 Specification
Wall cladding or wall cladding system ✓	Design of wall claddings	✓ Carried out ○ Supervised	Architectural plans Sheet A.00 - A.21 Specification
Waterproofing ✓	Design of waterproofing	✓ Carried out ○ Supervised	Architectural plans Sheet A.00 - A.21 Specification
Other ○		○ Carried out ○ Supervised	

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FIRE SAFETY SYSTEMS			
Design work that is restricted building work	**Description of restricted building work**	**Carried out or supervised**	**Reference to plans and specifications**
Tick ✓ if appropriate	If appropriate, provide details of the restricted building work	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Emergency warning systems ◯ Evacuation and fire-service operation systems Suppression or control systems Other		◯ Carried out ◯ Supervised	

Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.

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WAIVERS AND MODIFICATIONS

Waivers or modifications of the Building Code are required. ◯ Yes ☑ No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
List relevant clause numbers of building code	Specify nature of waiver or modification of building code required

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ISSUED BY

Name and contact details of the licensed building practitioner who is licensed to carry out or supervise design work that is restricted building work.

Name: Karen van der Mespel	LBP or Registration number: BP133926
The practitioner is a: ☑ Design LBP ○ Registered architect ○ Chartered professional engineer	
Mailing address (if different from below):	
Street address/Registered office: 100 Lake Terrace East	
Suburb:	Town/City: Mount Gambier SA
PO Box/Private Bag:	Postcode: 5290
Phone number:	Mobile: +61 433 467 730
After hours:	Fax:
Email address: karenvandermespel@gmail.com	Website:

DECLARATION

I Karen van der Mespel certify that the design work that is restricted building work identified on this form:

- Complies with the building code, or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form

Signature: K Mespel

Date: 26.02.26

Flood Assessment Certificate
FC250547

Issued pursuant to NH-SCHED1 of the Partially Operative Selwyn District Plan.

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Property Address:	Goulds Road, Rolleston. Arbor Green Stages 4 & 5 only.
Legal Description:	Lots 34-61, 292-309, 312-346, 456-490, 669-681, 728-740, 758-761, 763-768, 775-778, 861-869 DP 624732
Date of Issue:	20th January 2026
This certificate is valid until:	20th January 2028

The sites are not located on land within a high hazard area.

The sites are likely to be subject to inundation in a 200-year Average Recurrence Interval (ARI) flood event.

Minimum finished floor level shall be as follows:

Stage 4:

Lot Number	Recommended FFLs (m NZVD2016)	Lot Number	Recommended FFLs (m NZVD2016)	Lot Number	Recommended FFLs (m NZVD2016)
36	40.60	**306**	40.30	**333**	40.32
37	40.67	**307**	40.25	**334**	40.30
42	40.82	**308**	40.21	**335**	40.18
43	40.80	**309**	40.15	**336**	40.04
44	40.78	**312**	40.11	**337**	39.70
45	40.75	**313**	39.98	**338**	39.64
46	40.74	**314**	40.02	**339**	39.73
47	40.71	**315**	40.20	**340**	39.85
48	40.69	**316**	40.30	**341**	39.95
49	40.67	**317**	40.35	**342**	40.03
50	41.02	**318**	40.41	**343**	40.10
292	40.06	**319**	40.45	**344**	40.19
293	40.11	**320**	40.48	**345**	40.22
294	40.16	**321**	40.59	**346**	40.29
295	40.20	**322**	40.70	**728**	40.73
296	40.24	**323**	40.63	**732**	40.46
297	40.29	**324**	40.56	**733**	40.24
298	40.33	**325**	40.48	**734**	39.90
299	40.37	**326**	40.41	**39**	41.09
300	40.41	**327**	40.31	**40**	41.21
301	40.53	**328**	40.21	**41**	41.14
302	40.50	**329**	40.54	**34**	40.86
303	40.45	**330**	40.62	**35**	40.86
304	40.41	**331**	40.51	**38**	40.92
305	40.37	**332**	40.39		

Stage 5:

Lot Number	Recommended FFLs (m NZVD2016)	Lot Number	Recommended FFLs (m NZVD2016)	Lot Number	Recommended FFLs (m NZVD2016)
51	40.21	**476**	39.91	**862**	40.63
52	40.29	**477**	39.95	**863**	40.59
53	40.31	**478**	39.99	**864**	40.55
54	40.74	**479**	40.03	**865**	40.51
55	40.60	**480**	40.35	**868**	40.47
56	40.65	**481**	40.40	**867**	40.41
57	41.31	**482**	40.40	**729**	40.34
58	40.62	**483**	40.42	**730**	41.22
59	40.51	**484**	40.44	**731**	40.58
60	40.41	**485**	40.49	**735**	40.00
61	40.33	**486**	40.57	**736**	39.68
456	39.59	**487**	40.61	**737**	39.85
457	40.03	**488**	40.62	**738**	40.07
458	39.58	**489**	40.64	**739**	40.53
459	39.67	**490**	40.68	**740**	40.65
460	40.15	**669**	40.69	**758**	39.61
461	40.06	**670**	40.64	**759**	39.60
462	39.99	**671**	41.09	**760**	39.58
463	39.99	**672**	41.19	**761**	39.58
464	40.06	**673**	41.28	**763**	41.42
465	40.30	**674**	41.43	**764**	41.31
466	40.37	**675**	41.47	**765**	41.17
467	40.43	**676**	41.56	**766**	41.02
468	40.50	**677**	41.69	**767**	40.90
469	40.55	**678**	41.79	**768**	40.83
470	40.55	**679**	41.90	**775**	40.05
471	39.59	**680**	42.02	**776**	40.00
472	39.81	**681**	42.10	**777**	39.91
473	39.97	**868**	39.75	**778**	39.61
474	39.74	**869**	39.96		
475	39.80	**861**	40.65		

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Disclaimers:

1. Whether the site is likely to be subject to inundation in a 200-year ARI flood event, and the minimum finished floor level have been determined with reference to:

   (a) The most up to date models and maps held by Selwyn District Council or Canterbury Regional Council;
   (b) Any relevant field information; and
   (c) Any site specific flood assessment prepared by a suitably qualified and experienced person, including a site specific Flood Hazard Assessment prepared by Canterbury Regional Council.

2. This certificate is based on the best information available to Selwyn District Council at the time the certificate was issued. This information is subject to change and may be updated at any time, including during the valid period of this certificate. Selwyn District Council accepts no liability for changes in this information.

3. This certificate relies on flood modelling. Flood modelling is a tool that predicts what might happen in a flood event of a given magnitude. A flood model uses hypothetical scenarios and makes assumptions about how a flood event might unfold however there are many more variables that can influence how a site is affected in an actual flood event. The minimum finished floor level does not infer that no damage will occur to a structure built above the minimum finished floor level in a flood event.

4. The Building Act 2004 also manages flood risk. The minimum floor level certified under the Partially Operative District Plan may be different to the floor level required by the Building Act 2004, which must be met in order to obtain a building consent.

5. Any activity or construction carried out on a site where a Flood Assessment Certificate is issued is carried out at your own risk, and Council recommend that you carefully consider the impact of any flooding risk associated with this site.

Advice notes:

a) For a new residential unit or principal building or the alteration of, or addition to any residential unit or principal building to be a permitted activity under the Selwyn District Plan as a whole, all other relevant rules must be complied with.

b) If the certified level is for a particular location on the site, the certified level is the minimum floor level for the proposed building location shown on the attached plan. If you wish to build elsewhere on the site the minimum floor level may be different, and you will need to request another certificate for the new location.

c) For the purposes of this certificate, ground level means:

   a. The actual finished surface level of the ground after the most recent subdivision that created at least one additional allotment was completed (when the record of title is created);

   b. If the ground level cannot be identified under paragraph (a), the existing surface level of the ground;

   c. If, in any case under paragraph (a) or (b), a retaining wall or retaining structure is located on the boundary, the level of the exterior surface of the retaining wall or retaining structure where it intersects the boundary.

d) You must reference this certificate when applying for a building consent or the building consent will not be accepted.

Signed for and on behalf of the Selwyn District Council:



Emma Larsen

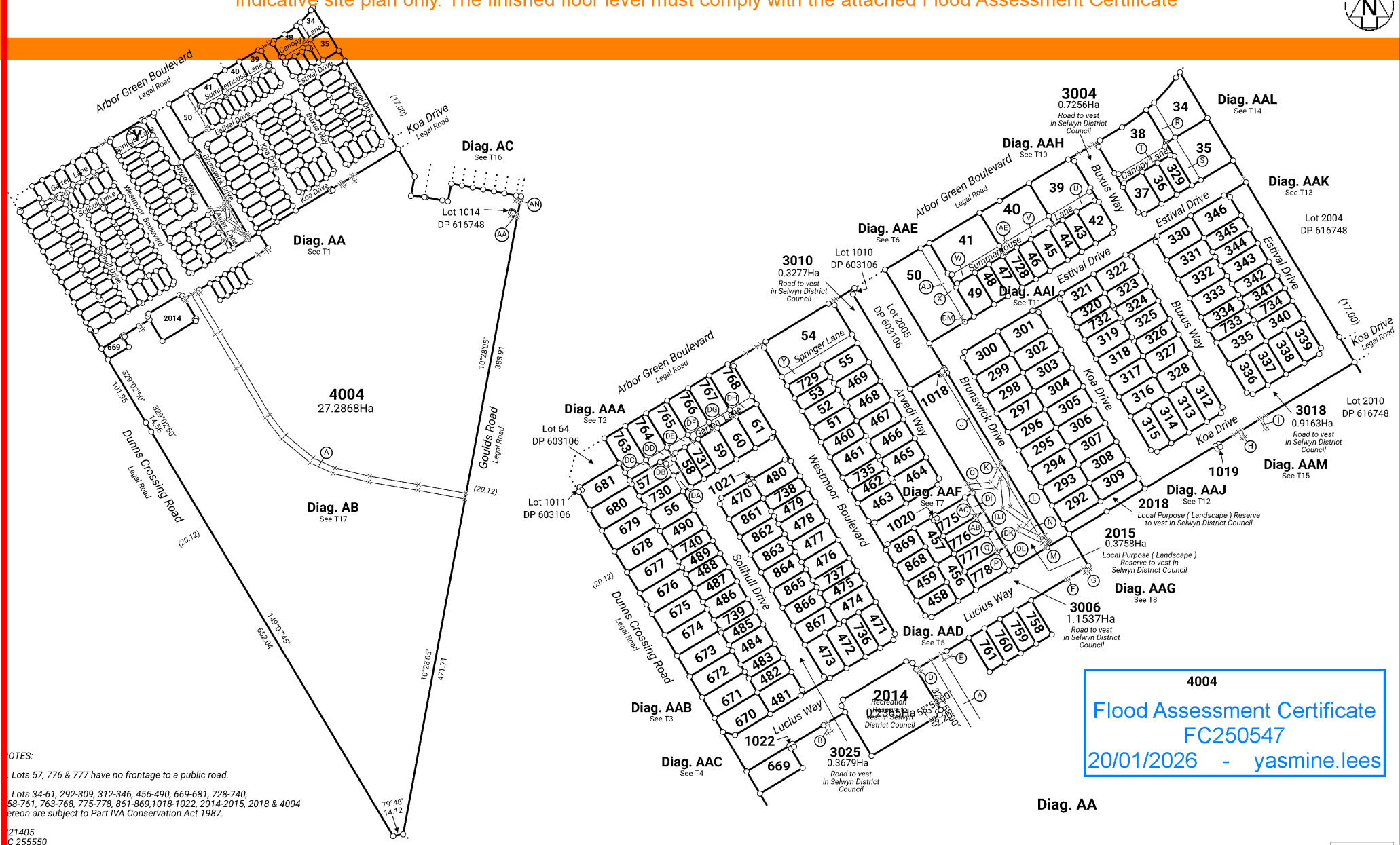
Head of Resource Consents

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Diag. A

Indicative site plan only. The finished floor level must comply with the attached Flood Assessment Certificate



NOTES:

1. Lots 57, 776 & 777 have no frontage to a public road.

2. Lots 34-61, 292-309, 312-346, 456-490, 669-681, 728-740, 758-761, 763-768, 775-778, 861-869,1018-1022, 2014-2015, 2018 & 4004 hereon are subject to Part IVA Conservation Act 1987.

21405
C 255550

4004

Flood Assessment Certificate
FC250547
20/01/2026 - yasmine.lees

Diag. AA

T 1/17

Land District: Canterbury Digitally Generated Plan Generated on: 05/12/2025 2:43pm Page 10 of 26	Lots 34-61, 292-309, 312-346, 456-490, 669-681, 728-740, 758-761, 763-768, 775-778, 861-869, 1018-1022, 2014-2015, 2018, 3004, 3006, 3010, 3018, 3025 & 4004 being subdivision of Lot 4003 DP 616748	Surveyor: Kevin Martin Hayes Firm: Davie Lovell-Smith Ltd	Title Plan LT 624732 DRAFT

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

Davie, Lovell-Smith Ltd
116 Wrights Road, Addington
PO Box 679, Christchurch 8140
New Zealand
Telephone (03) 379-0793,
E-mail: office@dls.co.nz

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19th November 2025

Hughes Developments
jake@hughesdevelopments.co.nz

Attention: Jake Hughes

FOUNDATION SOILS INVESTIGATION – Lot 61, Stage 5, Arbor Green, Rolleston

In accordance with your instructions, we have carried out foundation soil testing in terms of NZS 3604:2011 S3 on the site at Lot 61, Stage 5, Arbor Green, Rolleston.

For a foundation of a building to be designed using NZS 3604:2011, the building site must comply with the following conditions:

1. The ground needs to be classified as *good ground* and have an ultimate bearing capacity of at least 300KPa.
2. For a building being built on a hill, the foundation shall be 0.6m behind the ground line and the horizontal distance from the top to the bottom shall not exceed 3m. The slope beyond the bank shall not exceed 5° for a distance of 10m.
3. Fill, including hard fill, placed over undisturbed ground or certified fill, shall not exceed 0.6m in depth above natural ground level, if within 3m of a foundation.

For the soil supporting the footing to be assumed *good ground*, the following conditions must be met:

a) Reasonable inquiry, through project information memorandum (PIM) and site observation show no evidence of buried services and none is revealed by excavation for footings;
b) Reasonable inquiry, of PIM and site observations shows no indication or record of land slips or surface creep having occurred in the immediate locality;
c) Reasonable inquiry shows no evidence of earth fill on the building site and no fill material is revealed by the excavation for footings. This shall not apply where a certificate of suitability of earth fill for residential development has been issued in accordance with NZS 4431 for the building site, and any special limitations noted on that certificate are complied with; and
d) Excavation for footings does not reveal buried organic topsoil, soft peat, very soft clay, soft clay or expansive clay

And any of the following:

e) Where indicated by specific site investigation, using the test method for soil bearing capacity described in NZS3604:2011 s3.3, or,
f) Where inspection of existing structures on this or neighbouring sites and reasonable enquiry, including territorial authority records, local history of the site, and published geological data such as structural geology where appropriate, shows no evidence of erosion (including coastal erosion, bank erosion and sheet erosion) surface creep, land slippage or other falling debris (including soil, rock, snow and ice), uncertified fill, fill over original water course, or subsidence having occurred in the immediate locality, or,
g) When geotechnical completion reports in accordance with NZS 4404 identify subsoil class and areas that provide *good ground*.

With reference to items a-g, the subject building site has been assessed as follows:

a. We have not found any record of land slips or surface creep having occurred on this site
b. We have not found any evidence of uncertified filling on this site.

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In addition to this and in accordance with item (e) above, a specific site investigation was carried out.

Specific Site Investigation Requirements:

In terms of condition 1 above, the test method for soil bearing capacity is described in NZS3604:2011 s3.3.

Section 3.3.4 requires the tip of the penetrometer to be driven to at least 2m or until rock is met.

The ultimate bearing capacity requirements are described in s3.3.7. The soil below the underside of the foundations shall be assumed to have an ultimate bearing capacity of not less than 300 kPa when conditions are met, in particular

3.3.7.1 (b) *Scala Penetrometer tests conducted in accordance with 3.3.2(a), where the number of blows per 100mm depth of penetration below the underside of the proposed footing at each test site exceeds:*

(i) *Five down to a depth equal to twice the width of the widest footing below the underside of the proposed footing;*

(ii) *Three at greater depths;*

(iii) *Providing the set below is relatively uniform, the number of blows per 100mm may be obtained by averaging the number of blows for depths not exceeding 300mm;*

The width of footing details are described in NZS3604:2011 Section 7.5, in particular

7.5.2.3 *The combined foundation and edge details shall be constructed as shown in figures 7.13 and 7.14 (and figures 7.15 and 7.16 for foundations supporting a masonry veneer).*

The widest footing described in these figures 7.13, 7.14, 7.15 and 7.16 is 240mm. Twice this widest footing width would therefore be 480mm, we have used 500mm in our calculations.

Specific Site Investigation Methodology:

Four test sites were selected. At each test site, penetrometer testing was performed to a depth of two metres or until refusal was met. A bore log was also taken to a depth of refusal at one site. Enclosed are the results of the penetrometer tests, bore log and map of the location of each test site.

Investigation Results:

The test results were relativity consistent. All tests managed to achieve a bearing capacity of 300kPa for most of the 100mm deep sections tested between the surface and conclusion of the tests.

At test site 1 a bearing capacity of 300kPa was achieved at 200mm which was maintained for the duration of the test.

At test site 2 a bearing capacity of 300kPa was achieved at 300mm which was maintained for the duration of the test.

At test site 3 a bearing capacity of 300kPa was achieved at 300mm which was maintained for the duration of the test.

At test site 4 a bearing capacity of 300kPa was achieved at 300mm which was maintained for the duration of the test.

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One Hand Auger bore log was undertaken at test site 2. The Strata found is described as follows.

Test Site 2

- Topsoil 0-300mm
- Sandy silt, Brown 300mm-700mm
- Refusal 700mm

Based on the above site-specific testing we consider that the soils across the proposed site at **Lot 61, Stage 5, Arbor Green, Rolleston do meet the definition of *good ground*** under NZS 3604:2011.

This site is considered TC1.

Recommendations:

According to NZS 3604:2011, **this site is considered good ground**, and is suitable for NZS 3604:2011 foundations.

Excavations should be carried out to the depth of the underside of the foundation basecourse or until all topsoil is removed, whichever is greater. Before a building is erected, all rubbish, noxious, and organic matter must be removed from the building footprint. If any buried organic topsoil, soft peat, very soft clay, soft clay or expansive clay is revealed during excavation under the footings, this is to be removed and replaced with compacted gravels. A visual inspection of the excavated subgrade will be required before slab installation.

Limitations:

Please note that these tests do not preclude any party from their obligation to carry out further site testing in terms of the requirements of NZS 3604:2011 “Timber Framed Buildings” in relation to other proposed site works.

Please note that this report does not address liquefaction. This has been assessed as part of a geotechnical report, which is in Council records.

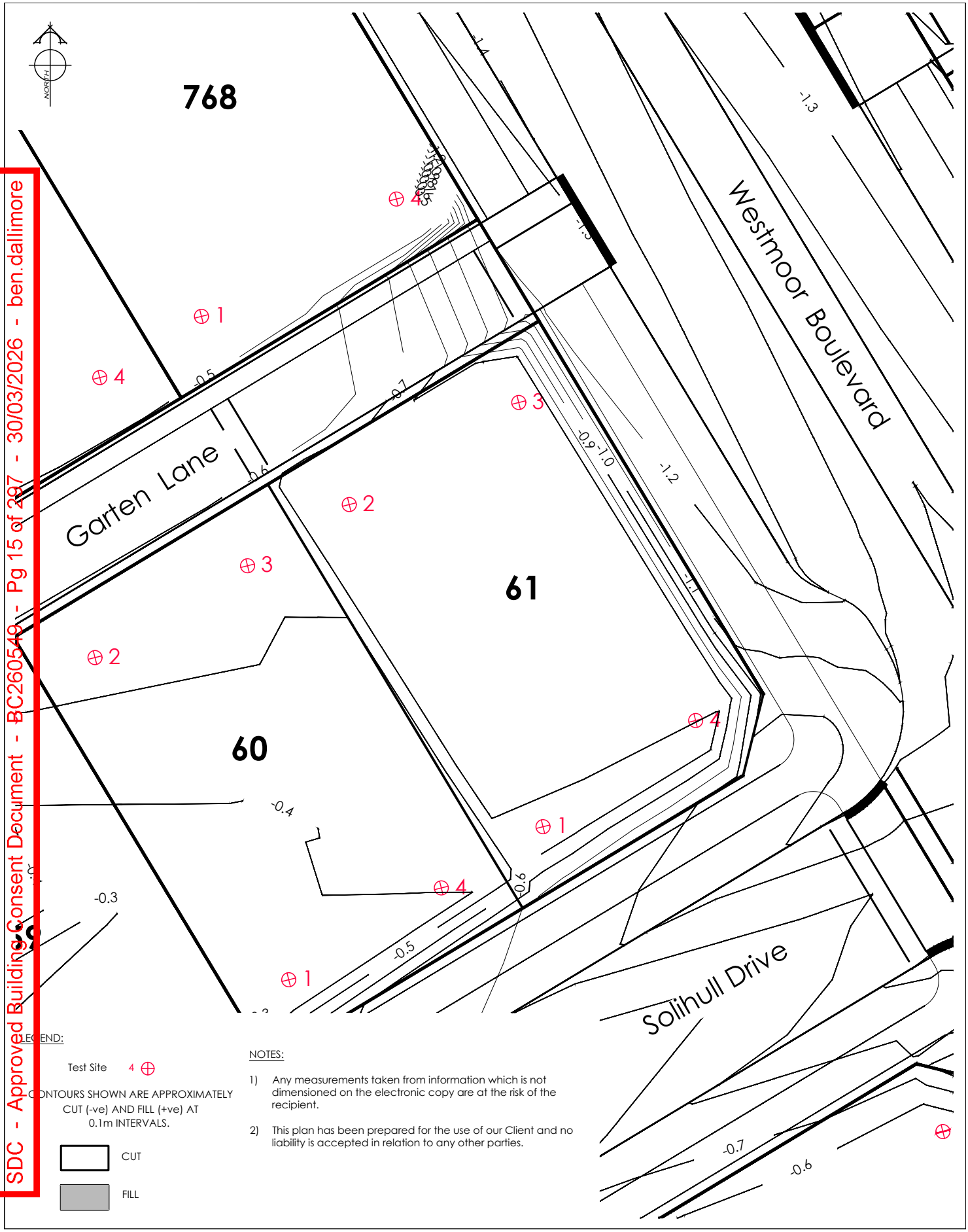
Should you need further information on this matter do not hesitate to contact us.

Yours faithfully
DAVIE LOVELL-SMITH LIMITED

Jamie Verstappen
Chartered Professional Engineer

ENCL: Site plan and test locations
Penetrometer and Bore log test results

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LEGEND:

Test Site 4 ⊕

CONTOURS SHOWN ARE APPROXIMATELY CUT (-ve) AND FILL (+ve) AT 0.1m INTERVALS.

CUT

FILL

NOTES:

1) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.

2) This plan has been prepared for the use of our Client and no liability is accepted in relation to any other parties.

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road
PO Box 679 Christchurch
8140,
New Zealand
Tele 0-3-3790 793
E-mail: office@dls.co.nz

Arbr Green Stage 5

Earthfill Design

Lot 61

Scale: 1:250@A4
Date: October 2025

Drawing No: E21510

J:\21510\E21510_SITE PLANS A4 WEST.DWG

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

Scala Penetrometer Log

Job No: 21510

Project: Foundation Testing - Arbor Green

SPT No: 1

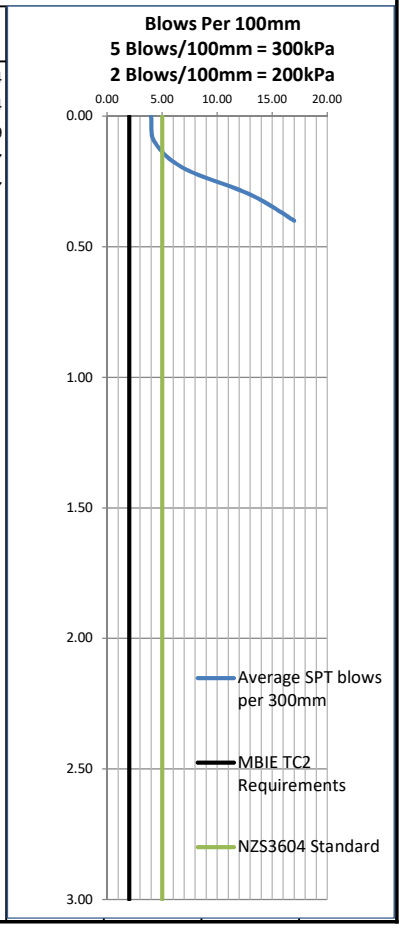
Stage 5 **Lot 61**

Date: 19/11/2025

Location: Arbor Green, Stage 5 , Lot 61

Logged By: Sam Medlicott

Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)
		0.00 - 0.10	4	4.00	7.94
		0.01 - 0.20	4	4.33	7.94
		0.20 - 0.30	5	7.00	10.19
		0.30 - 0.40	12	13.00	27.17
		0.40 - 0.50	22	17.00	53.57
		0.50 - 0.60			
		0.60 - 0.70			
		0.70 - 0.80			
		0.80 - 0.90			
		0.90 - 1.00			
		1.00 - 1.10			
		1.10 - 1.20			
		1.20 - 1.30			
		1.30 - 1.40			
		1.40 - 1.50			
		1.50 - 1.60			
		1.60 - 1.70			
		1.70 - 1.80			
		1.80 - 1.90			
		1.90 - 2.00			
		2.00 - 2.10			
		2.10 - 2.20			
		2.20 - 2.30			
		2.30 - 2.40			
		2.40 - 2.50			
		2.50 - 2.60			
		2.60 - 2.70			
		2.70 - 2.80			
		2.80 - 2.90			
		2.90 - 3.00			



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DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

Scala Penetrometer Log

Job No: 21510

Project: Foundation Testing - Arbor Green

SPT No: 2

Stage 5 **Lot 61**

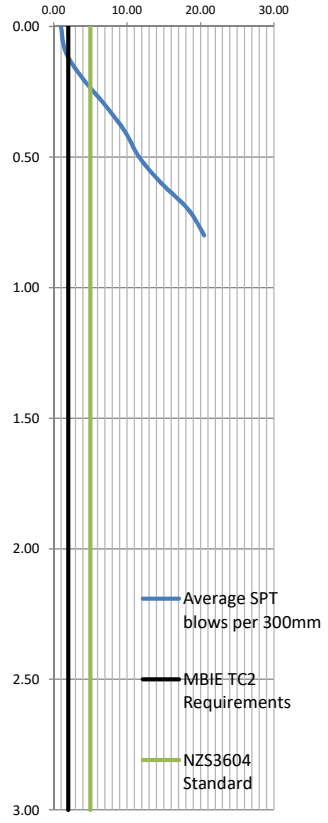
Date: 19/11/2025

Location: Arbor Green, Stage 5 , Lot 61

Logged By: Sam Medlicott

Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)
Topsoil		0.00 - 0.10	1	1.00	1.68
		0.01 - 0.20	1	1.67	1.68
		0.20 - 0.30	3	4.00	5.75
Sandy silt, Brown		0.30 - 0.40	8	7.00	17.25
		0.40 - 0.50	10	9.67	22.15
		0.50 - 0.60	11	11.67	24.65
		0.60 - 0.70	14	14.67	32.29
Refusal		0.70 - 0.80	19	18.33	45.46
		0.80 - 0.90	22	20.50	53.57
		0.90 - 1.00			
		1.00 - 1.10			
		1.10 - 1.20			
		1.20 - 1.30			
		1.30 - 1.40			
		1.40 - 1.50			
		1.50 - 1.60			
		1.60 - 1.70			
		1.70 - 1.80			
		1.80 - 1.90			
		1.90 - 2.00			
		2.00 - 2.10			
		2.10 - 2.20			
		2.20 - 2.30			
		2.30 - 2.40			
		2.40 - 2.50			
		2.50 - 2.60			
		2.60 - 2.70			
		2.70 - 2.80			
		2.80 - 2.90			
		2.90 - 3.00			

Blows Per 100mm
5 Blows/100mm = 300kPa
2 Blows/100mm = 200kPa



SDC - Approved Building Consent Document - BC260549 - Pg 17 of 297 - 30/03/2026 - ben.dallimore

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

Scala Penetrometer Log

Job No: 21510

Project: Foundation Testing - Arbor Green

SPT No: 3

Stage 5 **Lot 61**

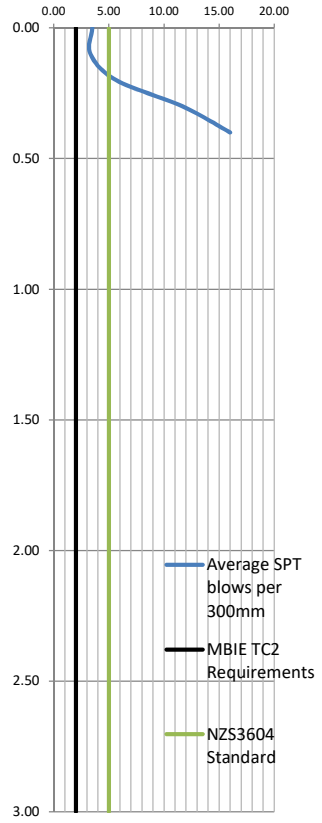
Date: 19/11/2025

Location: Arbor Green, Stage 5 , Lot 61

Logged By: Sam Medlicott

Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)
		0.00 - 0.10	3	3.50	5.75
		0.01 - 0.20	4	3.33	7.94
		0.20 - 0.30	3	5.67	5.75
		0.30 - 0.40	10	11.67	22.15
		0.40 - 0.50	22	16.00	53.57
		0.50 - 0.60			
		0.60 - 0.70			
		0.70 - 0.80			
		0.80 - 0.90			
		0.90 - 1.00			
		1.00 - 1.10			
		1.10 - 1.20			
		1.20 - 1.30			
		1.30 - 1.40			
		1.40 - 1.50			
		1.50 - 1.60			
		1.60 - 1.70			
		1.70 - 1.80			
		1.80 - 1.90			
		1.90 - 2.00			
		2.00 - 2.10			
		2.10 - 2.20			
		2.20 - 2.30			
		2.30 - 2.40			
		2.40 - 2.50			
		2.50 - 2.60			
		2.60 - 2.70			
		2.70 - 2.80			
		2.80 - 2.90			
		2.90 - 3.00			

Blows Per 100mm
5 Blows/100mm = 300kPa
2 Blows/100mm = 200kPa



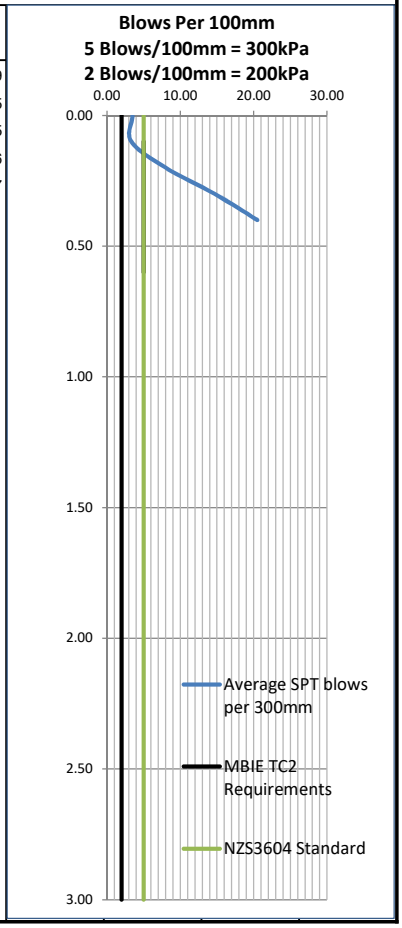
SDC - Approved Building Consent Document - BC260549 - Pg 18 of 297 - 30/03/2026 - ben.dallimore

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

Scala Penetrometer Log

Job No: 21510
Project: Foundation Testing - Arbor Green
SPT No: 4
Stage 5 **Lot 61**
Date: 19/11/2025
Location: Arbor Green, Stage 5 , Lot 61
Logged By: Sam Medlicott

Description of Soils	Graphic	Depth (m)	SPT blows	Average SPT blows per 300mm	CBR (%)
		0.00 - 0.10	5	3.50	10.19
		0.01 - 0.20	2	3.33	3.65
		0.20 - 0.30	3	8.00	5.75
		0.30 - 0.40	19	14.67	45.46
		0.40 - 0.50	22	20.50	53.57
		0.50 - 0.60			
		0.60 - 0.70			
		0.70 - 0.80			
		0.80 - 0.90			
		0.90 - 1.00			
		1.00 - 1.10			
		1.10 - 1.20			
		1.20 - 1.30			
		1.30 - 1.40			
		1.40 - 1.50			
		1.50 - 1.60			
		1.60 - 1.70			
		1.70 - 1.80			
		1.80 - 1.90			
		1.90 - 2.00			
		2.00 - 2.10			
		2.10 - 2.20			
		2.20 - 2.30			
		2.30 - 2.40			
		2.40 - 2.50			
		2.50 - 2.60			
		2.60 - 2.70			
		2.70 - 2.80			
		2.80 - 2.90			
		2.90 - 3.00			



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SDC - Approved Building Consent Document - BC260549 - Pg 20 of 297 - 30/03/2026 - ben.dallimore

AGREEMENT LETTER

NOMINATED FABRICATOR = AKARANA TIMBERS CHRISTCHURCH (Ph: 03 347 8845)

DATE:	**5 February 2026**	CONSENT NO:	**BC**

CLIENT: **I. Shephard Homes Ltd**
JOB NAME: **Lot 61 Arbor Green**
SITE ADDRESS: **115 Solihull Drive, Rolleston**
JOB REF: **2600037**

Attn: Territorial Authority

We have manufactured the frames and trusses for the above project.
The following has been provided to both the building owner and your office:

(1) A full 'as-built' layout and Producer Statement
(2) Specific truss/truss fixings done as per NZS3604:2011, Clause 10.2.2.6.1
(3) Specific top plate to stud fixings that comply with NZS3604:2011, Table 8.18
(4) Specific lintel fixings outside NZS3604:2011

On advice from the building project owner, the structure has been designed under the following parameters

Roofing material:	**Gavl .5mm Longrun Iron**	Wind zone:	**High**
Soffit:	**70mm**	Ground Snow load:	**0.900kPa (O/G snow load)**
Spacing:	**900mm**	Roof Snow load:	**0.630kPa (basic roof load)**
Roof pitch:	**18.5 / 36**		

Treatment Definition:

Roof Trusses:	**90x45mm SG KD (H1.2)**
External Walls	**90x45mm SG8 KD (H1.2) (Stud centers as per NZ3604:2011)**
Internal Walls	**90x45mm SG8 KD (H1.2) (Stud centers as per NZ3604:2011)**

It should be noted that the details provided have been designed to comply with the Building Code and relevant standards. Any increase above these standards is only at the preference and request of the building owner.

MiTek New Zealand Limited

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

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

www.miteknz.co.nz

PRODUCER STATEMENT for MiTek 20/20® TRUSS DESIGN - Version 4.7

SDC Approved Building Consent Document - BC260549 - Rev 1 of 2/7 - 3/03/2026 - ben.ballimore

ISSUED BY: **MiTek New Zealand Limited**

TO: **Akarana Timbers Christchurch**

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

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **2600037** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

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

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

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

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

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

On behalf of MiTek New Zealand Limited, **Date: Thursday, 5 February 2026**



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

Job: 2600037 Client: I. Shephard Homes Ltd Site: Lot 61 Arbor Green
Phone: 115 Solihull Drive
Description: Rolleston
Building Consent No.: Phone:

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **Akarana Timbers Christchurch**, being licensed to use the MiTek 20/20® software, to the client listed above and may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

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MiTek 20/20® TRUSS DESIGN DATA

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

Job Details Importance Level : 2 Design Working Life : 50 years

Roof Truss

Timber Group:	SGx45 H1.2	Pitch:	18.500 deg	Nominal Overhang:	70 mm
Roof		**Ceiling**		**Wind**	
Material:	Galv Iron .5mm	Material:	Gib Board 13mm	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	600 mm centres	**Snow**	
Live Load:	Qur = 0.250 kPa	Live Load:	Qc = 1.400 kN	Location:	Rolleston (N4) at 100 m
	Qc = 1.100 kN			Open Ground Load:	0.900 kPa
				Basic Roof Load:	0.523 kPa

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

MiTek® Truss List

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

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
EN01	1D	4980	36.000	900	T01A	1	4980	36.000	900
EN01A	1D	4980	36.000	900	T02	1	3180	18.500	900
EN02	1D	3180	18.500	900	T03	8	10850	18.500	900
EN03	1D	10850	18.500	900	T03A	3	10850	18.500	900
*R01	2	5120	36.000	900	T04	1	10850	18.500	900
*R02	1	5150	18.500	900	V01	1	6780	18.500	900
*R03	1	8415	18.500	900	V02	1	2871	18.500	900
T01	11	4980	36.000	900					

Total quantity : 35

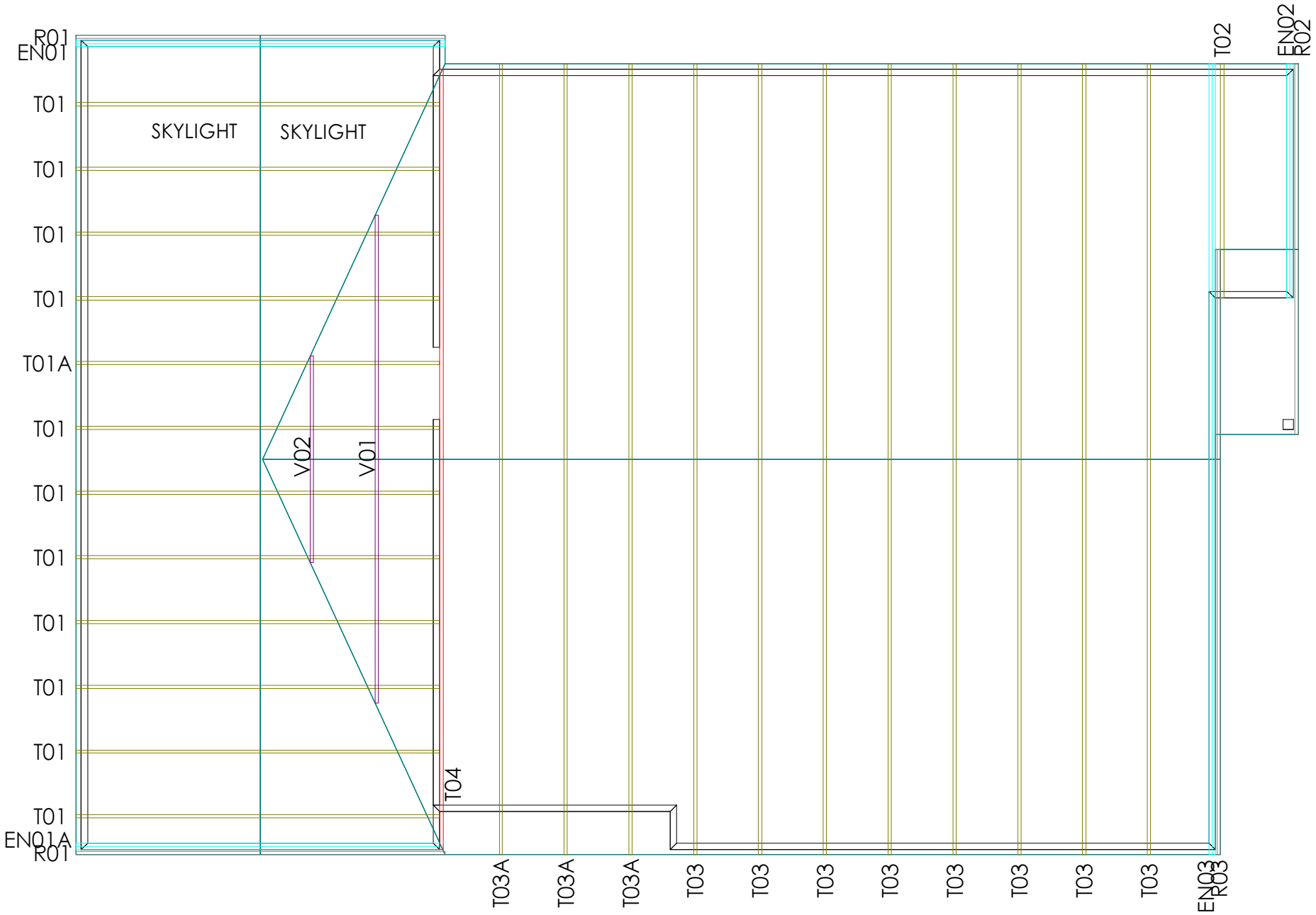
The computer design input has been carried out by:

Signed: ..... Date: ...Thursday, 5 February 2026....

Name of Detailer: ..... Qualifications and Title:

On behalf of: Akarana Timbers Christchurch
18 Hynds Drive, I-Zone Industrial Park, Rolleston 7675, New Zealand
Phone: Ph 03 3478845

SDC - Approved Building Consent Document - BC260549 - Pg 23 of 297 - 30/03/2026 - ben.dallimore



Akarana timbers
Ph: 03 3477 818

Site Address :
Lot 61 Arbor Green
115 Solihull Drive
Rolleston

Sheet Title :
Buildable Design
Buildable Layouts

Date : 5 Feb,2026 | Drawn : Standard
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 18.5 / 36 deg	Truss Centres	: 900mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.523kPa	Overhang	: 70mm

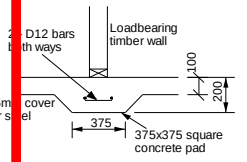
PrimeCad v4.7.346

MiTek™

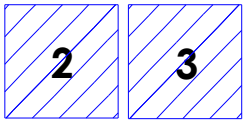
Job Title : 2600037
Sheet : 1
Revision Number :

SDC - Approved Building Consent Document - BC2600549 - Pg 24 of 297 - 30/03/2026 - ben.dallimore

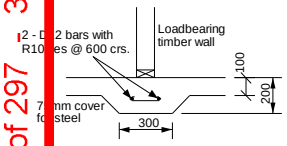
Slab Thickening Details



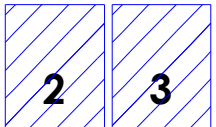
TYPE FP1 - 375x375mm Pad



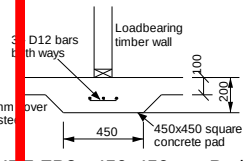
Number of Understuds



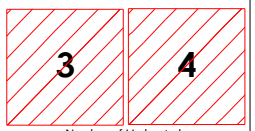
TYPE FS1 - 300mm Strip footing



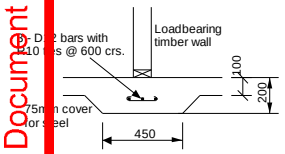
Number of Understuds



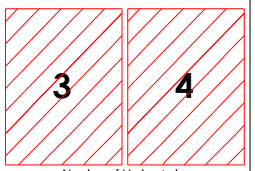
TYPE FP2 - 450x450mm Pad



Number of Understuds



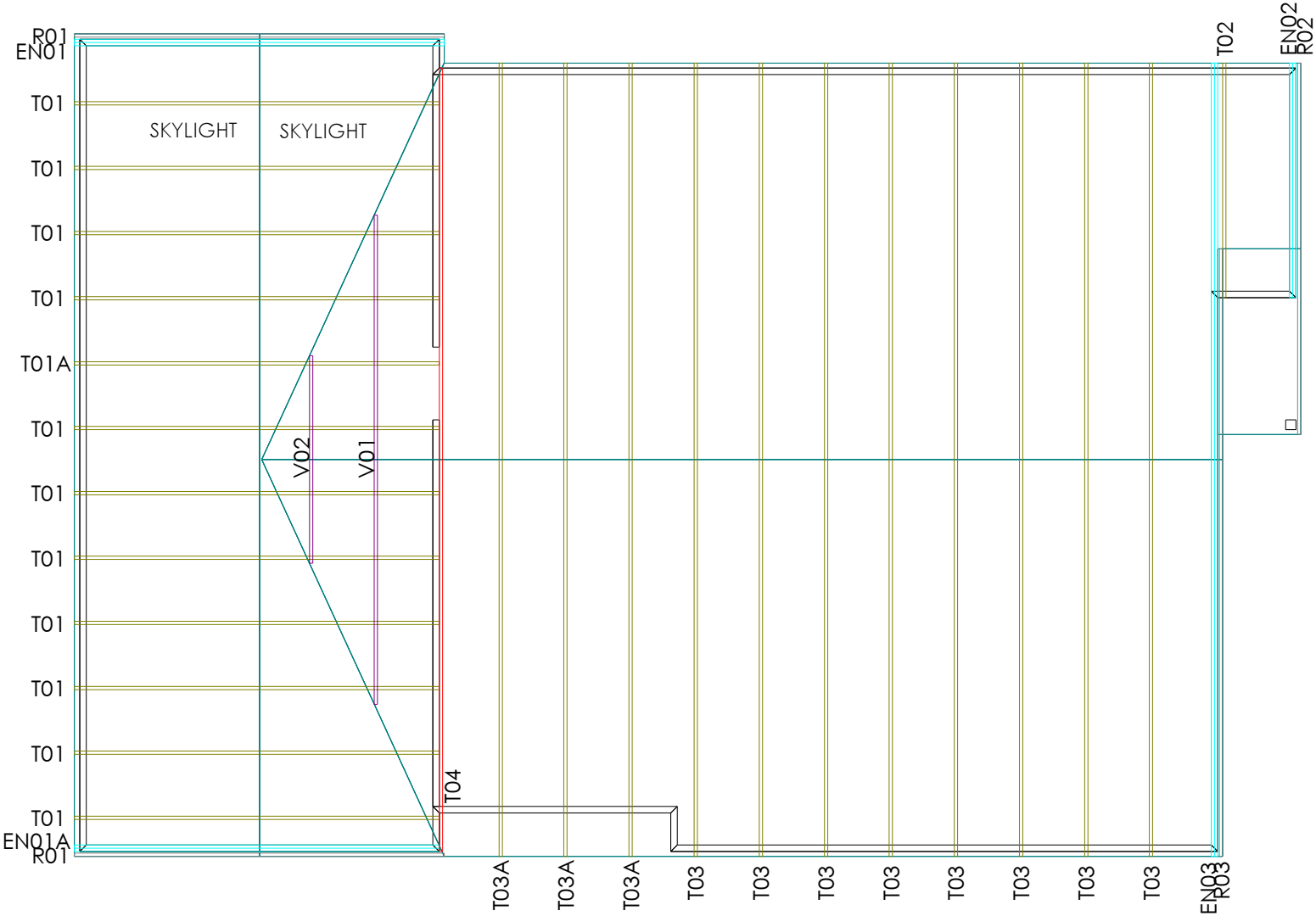
TYPE FS2 - 450mm Strip footing



Number of Understuds

NOTES:

The numbers found within the hatched area are the number of studs required below each truss.
Refer to:
CLANG-NAIL Internal Load Bearing on Concrete Floor Slabs brochure 10/2011



NO SLAB THICKENING REQUIRED

Akarana timbers
Ph: 03 3477 818

Site Address :
Lot 61 Arbor Green
115 Solihull Drive
Rolleston

Sheet Title :
Buildable Design
Slab Thickening/Dimensions

Date : 5 Feb,2026 | Drawn : Standard
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 18.50deg	Truss Centres	: 900mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.523kPa	Overhang	: 70mm

PrimeCad v4.7.346

Job Title : 2600037
Sheet : 2
Revision Number :

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Lintel Fixing Details

TYPE E 1.4kN

TYPE F 4.0kN

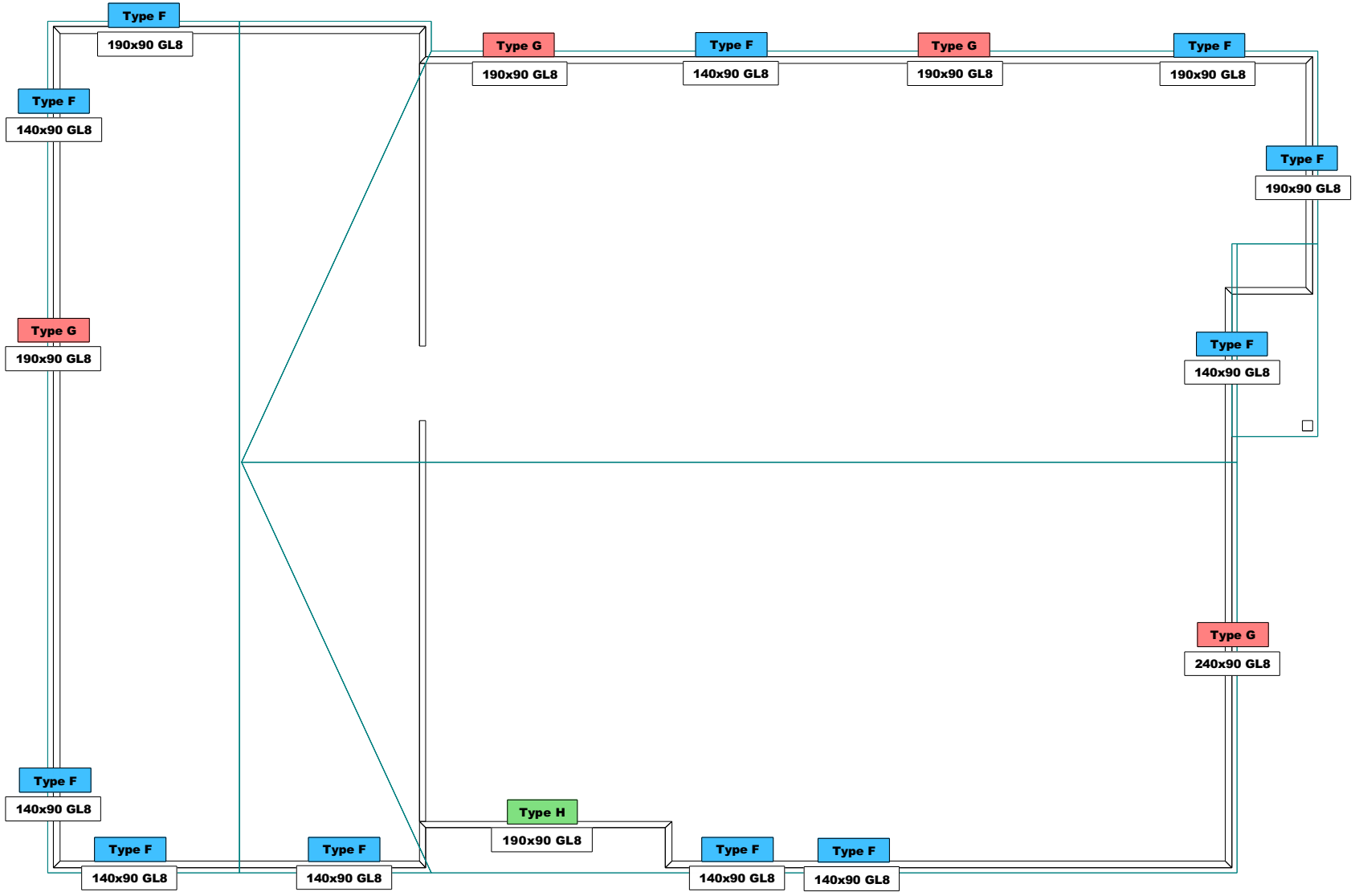
TYPE G 7.5kN

TYPE H 13.5kN

L1 = 140x90 GL8

L2 = 190x90 GL8

4.6m Garage Door = 240x90 GL8



NOTES:

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

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

Akarana timbers
Ph: 03 3477 818

Site Address :
Lot 61 Arbor Green
115 Solihull Drive
Rolleston

Sheet Title :
Buildable Design
Framing Dimensions

Date : 5 Feb,2026 | Drawn : Standard
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 18.50deg	Truss Centres	: 900mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.523kPa	Overhang	: 70mm

PrimeCad v4.7.346

MiTek

Job Title : 2600037
Sheet : 3
Revision Number :

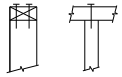
SDC - Approved Building Consent Document - BC260549 - Pg 26 of 297 - 30/03/2026 - ben.dallimore

Stud to top plate fixing details

Type A is minimum fixing required unless specified otherwise

FIXING TYPE A
0.7kN

2/ 0x3.33 plain steel wire nails driven vertically into stud.

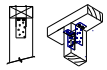


FIXING TYPE B
4.7kN

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

AND

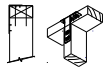
Pl s 2x LUMBERLOK CPC40



Recommended for internal wall options to avoid lining issues.

OR

Pl s LUMBERLOK Stud Strap (One face only)



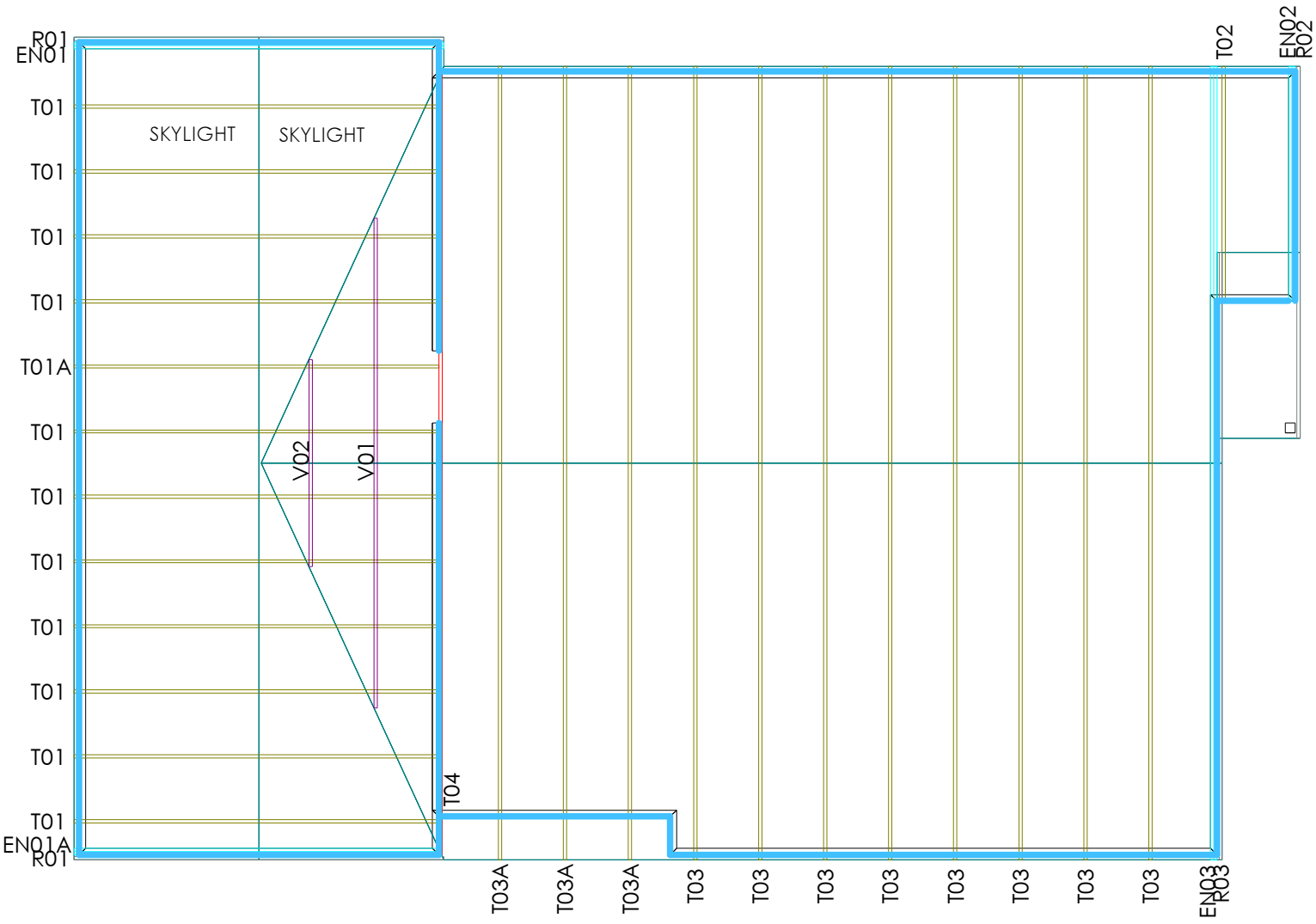
Lintel Fixing Details

TYPE E 1.4kN	TYPE F 4.0kN
TYPE G 7.5kN	TYPE H 13.5kN

NOTES:

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

(Alternative to NZS3604:2011 Table 8.18)



Akarana timbers
Ph: 03 3477 818

Site Address :
Lot 61 Arbor Green
115 Solihull Drive
Rolleston

Sheet Title :
Buildable Design
Top Plate/Lintel Fixings

Date : 5 Feb,2026 | Drawn : Standard
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 18.50deg	Truss Centres	: 900mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.523kPa	Overhang	: 70mm

PrimeCad v4.7.346

MiTek

Job Title : 2600037
Sheet : 4
Revision Number :

SDC - Approved Building Consent Document - BC2600549 - Pg 27 of 287 - 30/03/2026 - ben.dallimore

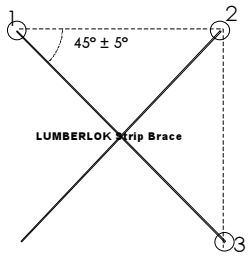
Truss Fixings

A - LUMBERLOK JH47x90 Joist Hanger
B - LUMBERLOK JH47x120 Joist Hanger
D - LUMBERLOK JH47x190 Joist Hanger
E - LUMBERLOK JH95x165 Joist Hanger
C - Pair of LUMBERLOK CT200 Ceiling Ties
M - Pair of LUMBERLOK Multi Grips
NP - LUMBERLOK Nailon Plate
N - LUMBERLOK N21 Diagonal Cleat
P - LUMBERLOK TTP 16kN Truss to Top Plate set
Q - LUMBERLOK TTP 9kN Truss to Top Plate set

Roof Bracing

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

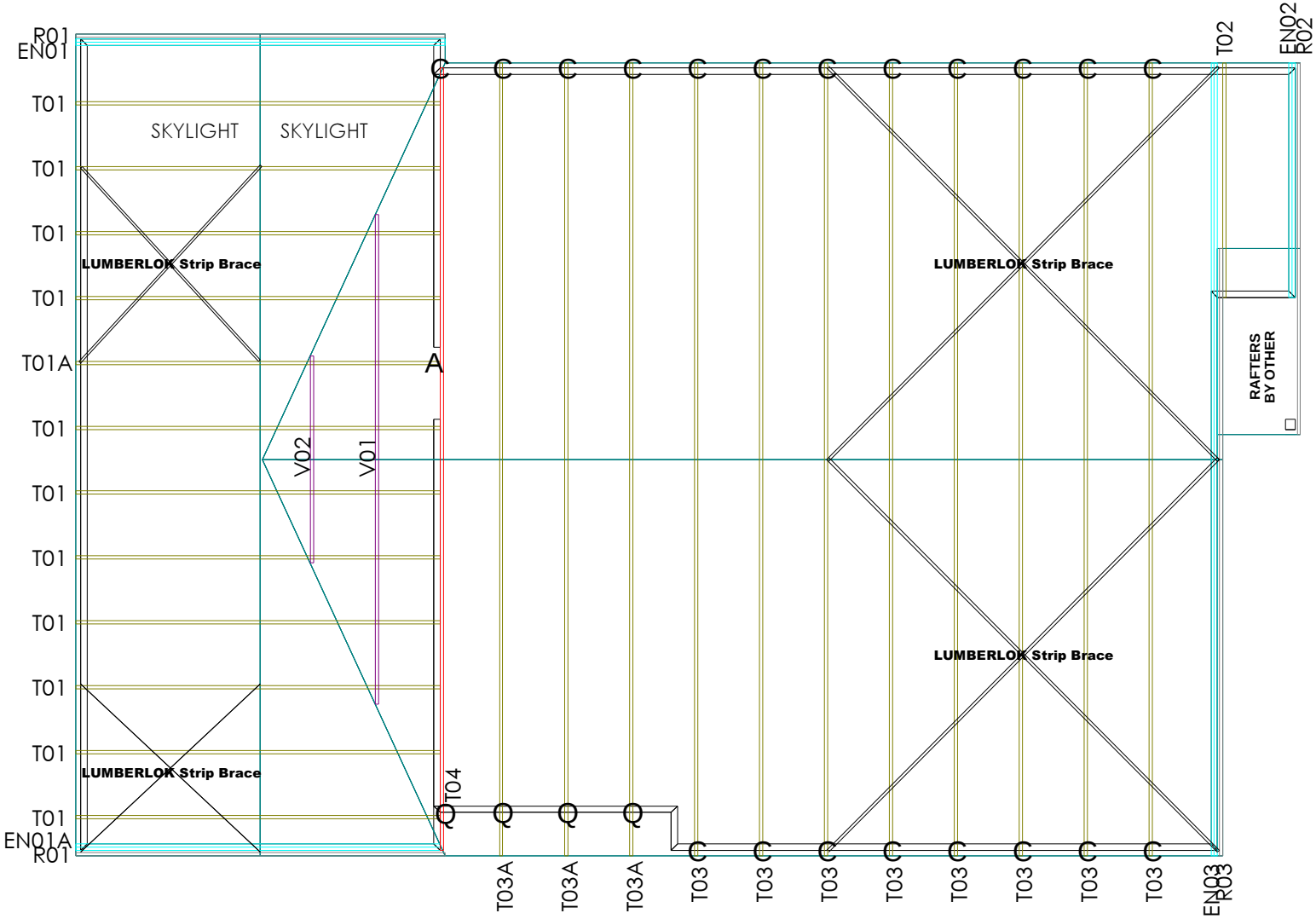
The brace must be located such that it forms an angle of 45°± 5°to the wall



NOTES:

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

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



Akarana timbers
Ph: 03 3477 818

Site Address :
Lot 61 Arbor Green
115 Solihull Drive
Rolleston

Sheet Title :
Buildable Design
Truss Fixings & Roof Bracing

Date : 5 Feb,2026 | Drawn : Standard
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 18.5 / 36 deg	Truss Centres	: 900mm
Roof Material	: Galv Iron .5mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Gib Board 13mm	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.523kPa	Overhang	: 70mm

PrimeCad v4.7.346

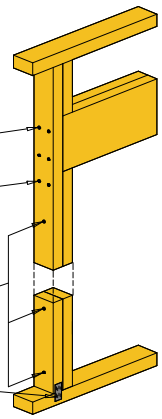
MiTek

Job Title : 2600037
Sheet : 5
Revision Number :

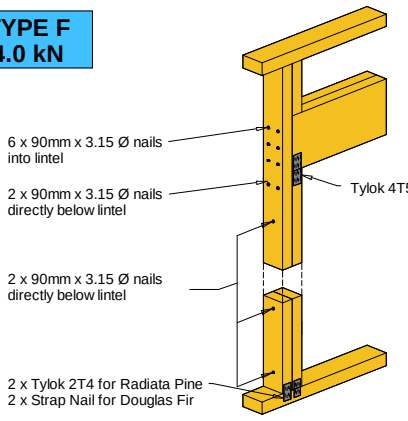
LUMBERLOK® LINTEL FIXING OPTIONS

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TYPE E 1.4 kN



TYPE F 4.0 kN



Tylok Plate Installation

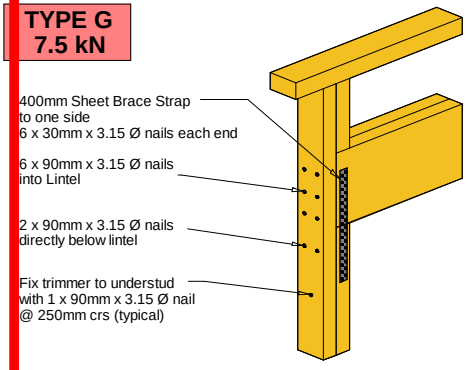
Notes:

For fixing of jack studs to lintel and top plate, refer to Stud to Top Plate Fixing Schedule

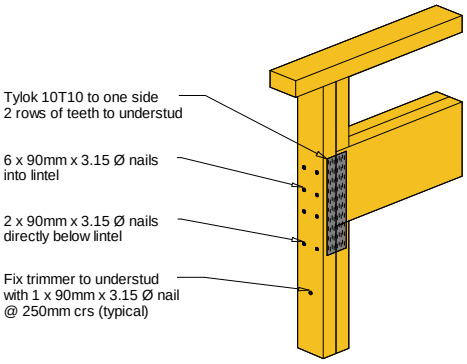
Stud numbers indicative only. Refer to Table 8.5 NZS 3604:2011

LUMBERLOK Lintel Fixing Schedule 10/2011, MiTek Structural Fixings On-Site Guide for Building Code Compliance (Alternative to Table 8.14 & Figure 8.12 NZS 3604:2011)

TYPE G 7.5 kN



OR

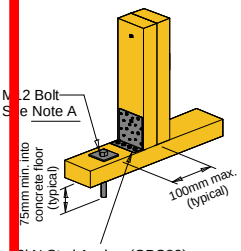


Note A:

M12 proprietary concrete fixing bolt with 50x50x3mm square washer

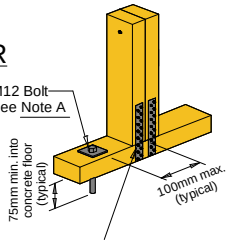
Or

M12 x 150mm coach screw with 50x50x3mm square washer into timber joist/bearer



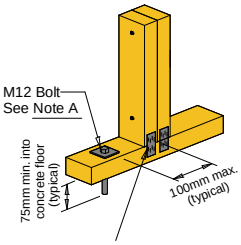
6kN Stud Anchor (CPC80)

OR



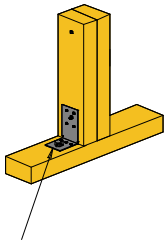
2 x 200mm Sheet Brace Strap to one side. Each Strap to have 3 x 30mm x 3.15 Ø nails into stud & 3 x 30mm x 3.15 Ø nails into bottom plate

OR



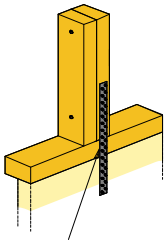
2 x Tylok 2T4 both sides for Radiata Pine
2 x Strap Nail both sides for Douglas Fir

OR



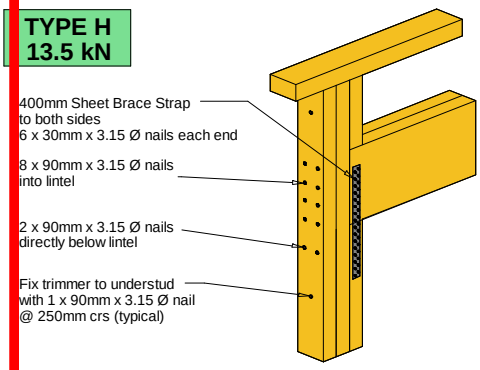
GIB HandiBrac

OR

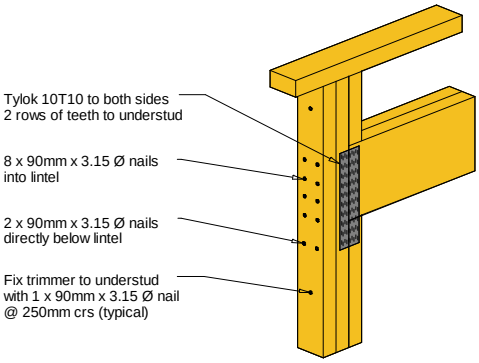


400mm Sheet Brace Strap to one side.
6 x 30mm x 3.15 Ø nails into stud.
3 x 30mm x 3.15 Ø nails into bottom plate.
6 x 30mm x 3.15 Ø nails into timber joist/bearer

TYPE H 13.5 kN



OR

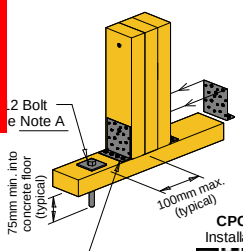


Note A:

M12 proprietary concrete fixing bolt with 50x50x3mm square washer

Or

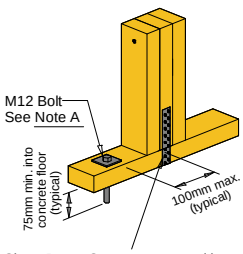
M12 x 150mm coach screw with 50x50x3mm square washer into timber joist/bearer



2 x 6kN Stud Anchor (CPC80)

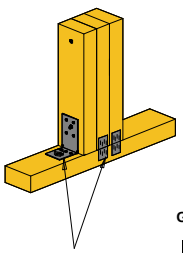
CPC80 Installation

OR



400mm Sheet Brace Strap wrap around bottom plate and up the other side.
6 x 30mm x 3.15 Ø nails into each side of stud.
3 x 30mm x 3.15 Ø nails into each side of bottom plate.

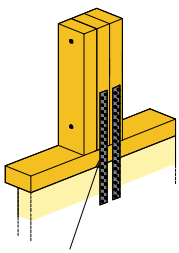
OR



GIB ® HandiBracT M and
2 x Tylok 2T4 both sides

GIB HandiBrac Installation

OR



2 x 400mm Sheet Brace Strap to one side.
6 x 30mm x 3.15 Ø nails into stud.
3 x 30mm x 3.15 Ø nails into bottom plate.
6 x 30mm x 3.15 Ø nails into timber joist/bearer

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Job No: 2600037 Client: I. Shephard Homes Ltd Site: Lot 61 Arbor Green
Job Name: Lot 61 Arbor Green, 115 Solihull Drive Building Consent No:

DESIGN STATEMENT
MiTek Beam Program v1.11 September 2017

Certification of MiTek Beam Program v1.11 September 2017

The MiTek Beam Program v1.11 September 2017 has been developed by MiTek New Zealand Ltd for the design of these beams: Timber, Glulam, GANGLAM and GANG-NAIL FLITCH BEAMS. The beam designs calculated by this program are prepared using sound and widely accepted engineering principles, and in accordance with Compliance Documents of the New Zealand Building Code and Verification Method B1/VM1 to satisfy the requirements of Clause B1 of the Building Code. We believe on reasonable grounds that these beams for the proposed building, if constructed in accordance with the drawings, specifications and other documents provided will comply with the relevant provisions of the NZ Building Code. This is subject to all proprietary products meeting their performance specification requirements; the provision of adequate bracing and fixings; and the correct input of design data carried out by suitably trained personnel. This document may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

Summary of MiTek Beam Program v1.11 September 2017 Data and Output

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

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

Snow
Area: 0.9 kPa

Wall
Type: NA

Floor
Live Load: NA

Beam List

Opening Label	Beam Material	Beam Size	Beam Length	Design Status	Opening Label	Beam Material	Beam Size	Beam Length	Design Status
L1	GL8 GLULAM	140x90 GL8	1510	OKAY					
L2	GL8 GLULAM	190x90 GL8	2400	OKAY					
4.6m Garage Door	GL8 GLULAM	240x90 GL8	4600	OKAY					

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

The design input has been carried out by:

Signed: A Clayworth

Date: 5/02/2026

Name of Computer Operator:

Qualifications and Title:

Company:

GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

Name:	Lot 61 Arbor Green
Street and Number:	115 Solihull Drive
Lot and DP Number:	Lot 61 DP 624732
City/Town/District:	Rolleston
Designer:	Karen
Company:	Karen van der Mespel Architectural Drafting
Date:	Saturday, 13 December 2025

Building Specification

Number of Storeys	1
Floor Loading	2 kPa
Foundation Type	Slab
	Single
Cladding Weight	Light
Roof Weight	Light
Room in Roof Space	No
Roof Pitch (degrees)	36
Roof Height above Eaves (m)	2.1
Building Height to Apex (m)	4.8
Ground to Lower Floor (m)	0.2
Average Stud Height (m)	2.4
Building Length (m)	16.83
Building Width (m)	11.25
Building Plan Area (m²)	174.59

Building Location

Wind Zone = High

Earthquake Zone 2

Soil Type D & E (Deep to Very Soft)

Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	**639**	**858**

Bracing Units required for Earthquake

	Along & Across
Single Level	**714**

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Single Level Along Resistance Sheet

Job Name: Lot 61 Arbor Green

									Wind	EQ
									Demand	
									639	714
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1288 202%	1172 164%
a	1	1.20		2.4	BL1-H	GIB®	154	125		
	2	0.50		2.4	BL1-H	GIB®	47	50		
	3	0.50		2.4	BL1-H	GIB®	47	50		
	4	0.50		2.4	GS1-N	GIB®	28	29		
	External Length = 16.83								275 OK	254 OK
b	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	2.40		2.4	GS1-N	GIB®	166	144		
	External Length = 1.08								248 OK	216 OK
c	1	2.00		2.4	GS1-N	GIB®	138	120		
	2	4.80		2.4	GS1-N	GIB®	331	288		
									469 OK	408 OK
d	1	0.60		2.4	BL1-H	GIB®	59	61		
	2	0.60		2.4	BL1-H	GIB®	59	61		
	3	0.50		2.4	BL1-H	GIB®	47	50		
	4	0.50		2.4	BL1-H	GIB®	47	50		
	5	1.20		2.4	GS1-N	GIB®	83	72		
	External Length = 15.75								295 OK	294 OK

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Single Level Across Resistance Sheet

Job Name: Lot 61 Arbor Green

									Wind	EQ
									Demand	
									858	714
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1452 169%	1314 184%
m	1	0.70		2.4	GS1-N	GIB®	41	41		
	2	3.80		2.4	GS1-N	GIB®	262	228		
	3	0.60		2.4	GS1-N	GIB®	34	35		
	External Length = 11.25								338 OK	304 OK
n	1	2.60		2.4	GS1-N	GIB®	179	156		
	2	1.40		2.4	GS1-N	GIB®	97	84		
	External Length = 0.94								276 OK	240 OK
o	1	2.00		2.4	GS1-N	GIB®	138	120		
	2	3.00		2.4	GS1-N	GIB®	207	180		
	3	0.80		2.4	GS1-N	GIB®	49	47		
	External Length = 0.54								394 OK	347 OK
p	1	3.00		2.4	GS1-N	GIB®	207	180		
									207 OK	180 OK
q	1	0.60		2.4	BL1-H	GIB®	59	61		
	2	0.60		2.4	BL1-H	GIB®	59	61		
	3	0.60		2.4	BL1-H	GIB®	59	61		
	4	0.60		2.4	BL1-H	GIB®	59	61		
	External Length = 10.85								237 OK	242 OK

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H1/AS1 5th Edition Calculation Method Spreadsheet

Version: 21-Oct-2022

Client	I Shephard Homes
Project name	Lot 61 Arbor Green
Address	115 Solihull Drive, Rolleston
Designer	Karen van der Mespel
Date	8.12.25
Territorial Authority	Selwyn District
Climate Zone	5
When submitted	After 2 November 2023
Application	Housing

Proposed Building

Element		Area (m²)	Proposed Building Heat Loss (W/K)
Slab-on-ground_Floors		138.1	115.1
Other_Floors		0.0	0.0
Roof		136.9	20.0
Skylights		1.2	3.0
Walls		108.6	40.7
Glazing (in walls & doors)	(20.9% of total wall area)	29.2	58.4
Doors (opaque)		1.6	1.6
		415.6	**Total** **238.7**

Reference Building

Element	Area (m²)		Reference Building Heat Loss (W/K)
Slab-on-ground Floors	138.1	1.6	**86.3**
Other_Floors	0.0	3.0	**0.0**
Total Roof (includes skylight area)	138.1	6.6	**20.9**
Walls (70% of total wall area)	97.6	2.0	**48.8**
Glazing allowance (30% of total wall area)	41.8	0.50	**83.7**
	415.6	**Total**	**239.7**

Comparison of proposed building against the reference building **PASS**

HIG 6th Ed

	Element type	Description	ID	Embed heating?	Area (m²)	Construction R-value (m².K/W)	Heat Loss (W/K)	Errors
1	Slab-on-ground_Floors	Ribraft floor		No	138.1	1.2	115.1	
2	Roof	R7 insulation		No	128.8	7.2	17.9	
3	Roof	R4.5 Perimeter insulation		No	8.1	3.9	2.1	
4	Walls	Graphex, 90mm, R2.8		No	66.8	3.0	22.3	
5	Walls	Abodo, 90mm, R2.8		No	10.4	2.2	4.7	
6	Walls	Garage internal walls R2.8		No	31.5	2.3	13.7	
7	Doors (opaque)	gge int door -polycore		No	1.6	1.00	1.6	
8	Glazing (in walls & doors)	Thermally broken Al.		No	29.2	0.50	58.4	
9	Skylights	Velux FSM04		No	1.2	0.40	3.0	
10				No				
11				No				
12				No				
13				No				
14				No				
15				No				
16				No				
17				No				
18				No				
19				No				
20				No				
21				No				
22				No				
23				No				
24				No				

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel.

- Floors (●)
- Walls ( )
- Roofs ( )

Date: 13/12/2025

Element Name (optional) — 1.20 m²°C/W

Type: Floor: Raft Slab Floor - H1/AS1 Edition 5 and H1/AS2 Edition 1

Raft Slab Floor - H1/AS1 Edition 5 and H1/AS2 Edition 1

Table F Slab Insulation (H1 Edition 5) - H1 Acceptable Solutions and Verification Methods

Slab floor area [m²]: 138.0

Area Perimeter Ratio: 2.34

Adding underfloor insulation?

Perimeter:

	Length*	Masonry Veneer Wall	External Wall Thickness*	Edge Insulation
-	59.04 m	☐	90 mm	☐
+				

* required data. If empty the perimeter type will be ignored.

Construction R-value calculated by DesignNavigator ©

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

f your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail rawing (pdf) of it.

lease select the element type. Then choose the construction details and enter the R-value of the insulation either directly in he text box or by choosing a product from the right panel.

- Floors ○
- Walls ◉
- Roofs ○

Date: 25/09/2025

Element Name (optional) — 3.06 m²°C/W

Type: Wall: Timber Frame with vented Cavity

Timber Frame with vented Cavity [view detail]

external surface 0.03

Cladding : Resene Construction Systems Graphex 50mm
R-value: 1.56

Air Barrier : generic - Building paper
R-value: 0.01

Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 800mm

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 0.75*	Insulation : 2.8
	still Airgap: none *R-value: 0.00*

Wall Lining : generic - gypsum Plasterboard 10mm
R-value: 0.04

internal surface 0.09

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

f your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail rawing (pdf) of it.

lease select the element type. Then choose the construction details and enter the R-value of the insulation either directly in he text box or by choosing a product from the right panel.

- Floors ○
- Walls ◉
- Roofs ○

Date: 25/09/2025

Element Name (optional) — 2.23 m²°C/W

Type: Wall: Timber Frame with vented Cavity

Timber Frame with vented Cavity [view detail]

external surface 0.03

Cladding : generic - Weatherboard Rusticated or Shiplap
R-value: 0.16

Air Barrier : generic - Building paper
R-value: 0.01

Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 480mm

Wall Frame Area: 17.9%	*Cavity Area: 82.1%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 0.75*	Insulation : 2.8
	still Airgap: none *R-value: 0.00*

Wall Lining : generic - gypsum Plasterboard 10mm
R-value: 0.04

internal surface 0.09

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel.

- Floors ○
- Walls ◉
- Roofs ○

Date: 25/09/2025

Element Name (optional) **2.27** m²°C/W

Type: Wall: Timber Frame (direct fixed Cladding)

Timber Frame (direct fixed Cladding) [view detail]

external surface 0.03

Cladding : generic - Gypsum plasterboard 10mm into still air (garage, etc.)
R-value: 0.10

Air Barrier : generic - none
R-value: 0.00

Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 800mm

Wall Frame Area: 14.4% *Cavity Area: 85.6%*

Framing :
R-value: 0.75

Insulation : 2.8

still Airgap: none
R-value: 0.00

Wall Lining : generic - gypsum Plasterboard 10mm
R-value: 0.04

internal surface 0.09

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel.

- Floors ○
- Walls ○
- Roofs ◉

Date: 25/09/2025

Element Name (optional) — 7.20 m²°C/W

Type: Roof: Timber framed truss Roof, flat Ceiling

Timber framed truss Roof, direct fixed or battened flat Ceiling [view detail]

external surface 0.03

Roofing : generic - Metal corrugate Iron with building paper
R-value: 0.01

Insulation :

Timber Frame & Cavity : 90mm rafters or joists @ 900mm, battens covered with insulation

Roof Frame Area: 5.0%	*Cavity Area: 95.0%*
Roof space (still air) 0.11	Roof space (still air) 0.11
Framing : *R-value: 0.75*	Pink(c)Batts(c) Superbatts R7.0 Ceiling 7 Insulation covering bottom chord ☑

Ceiling Lining : generic - gypsum Plasterboard 13mm
R-value: 0.06

internal surface 0.09

Non-IC-rated recessed downlights
Ceiling Area [m²]: Number of downlights: Clearance from lamp holder side [m]:

[Print Page]

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Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel.

- Floors ○
- Walls ○
- Roofs ◉

Date: 25/09/2025

Element Name (optional) — 3.97 m²°C/W

Type: Roof: Timber framed truss Roof, flat Ceiling

Timber framed truss Roof, direct fixed or battened flat Ceiling [view detail]

external surface 0.03

Roofing : generic - Metal corrugate Iron with building paper
R-value: 0.01

Insulation :

Timber Frame & Cavity : 90mm rafters or joists @ 900mm, battens covered with insulation

Roof Frame Area: 5.0%	*Cavity Area: 95.0%*
Roof space (still air) 0.11	Roof space (still air) 0.11
Framing : *R-value: 0.75*	Pink(c)Batts(c) Skillion Roof R4.5 4.5 Insulation covering bottom chord ☐

Ceiling Lining : generic - gypsum Plasterboard 13mm
R-value: 0.06

internal surface 0.09

Non-IC-rated recessed downlights
Ceiling Area [m²]: Number of downlights: Clearance from lamp holder side [m]:

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CMNZ70056

Firth

OCTOBER 2024

RibRaft®

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TECHNICAL MANUAL









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This document contains design and installation information. A variation to any of the information given requires specific engineering design and is hence beyond the scope of this document.

The Firth RibRaft® Floor System can be constructed for all slab-on-ground concrete floors for domestic or residential buildings that fall within the scope of NZS 3604 "Timber Framed Buildings" and Clause 3 "Scope" of Section 1 of this Manual. The design and installation details in this Manual shall be used to design and construct such a floor.

The Firth RibRaft® Floor System is covered by the MBIE CodeMark®. This is conditional on the system being used as described in Bureau Veritas Australia certification decision, which in turn requires design in accordance with Section 1 and installation in accordance with Section 2 of this Manual and on site verification in accordance with Section 3.

Note that a MBIE CodeMark® means that if this Manual is rigidly followed the relevant Building Control Authority will automatically provide a building permit without the need for producer statements. To comply with the Manual does mean that Firth Certified Concrete® must be used.

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THIS MANUAL CONSISTS OF 3 SECTIONS:

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1

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1.0 THIS SECTION OF THIS MANUAL CONTAINS DESIGN INFORMATION NOT REQUIRING SPECIFIC ENGINEERING INPUT FOR THE FIRTH RIBRAFT® FLOOR SYSTEM (THE SYSTEM).

FULL INFORMATION ON THE INSTALLATION PROCEDURES ARE DESCRIBED IN *SECTION 2: INSTALLATION INFORMATION.*

WHERE STANDARDS ARE REFERENCED IN THIS MANUAL, THESE SHALL INCLUDE THE LATEST AMENDMENTS.

Notes: 1. Additional admixtures to standard RibRaft® mixes to be approved by the Firth Plant Engineer. 2. Firth concrete mixes are generally formulated to have a lower carbon footprint, typically EC10* or greater. Options for additional carbon reduction (greater EC rating) are available on request.

Footnote: *For explanation of the EC rating system, refer to Firth's EPD for concrete.

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2.0 TECHNICAL INFORMATION

2.1 Overview

The Firth RibRaft® Floor System is a reinforced concrete waffle raft floor slab-on-ground. Typically it consists of an 85mm thick slab supported by a grid of ribs normally 100mm wide at 1200mm x 1200mm centres. The overall depth is 305-410mm depending on the thickness of the pods and topping. Edge beams and ribs under load bearing walls are 300mm wide to provide for the extra load carried by these members. Where heating coils of less than 25mm diameter are embedded in the topping, the slab concrete thickness shall be 110mm. Where the top floor surface is honed to provide a decorative finish, a slab thickness of 100mm (before honing) should be specified.

2.2 Pods

Firth RibRaft® polystyrene pods 1100mm square and 220mm thick are placed directly on leveled ground and are arranged in such a way as to form a reinforced concrete floor slab with a grid of reinforced concrete ribs and edge beams when concrete is placed onto them. Pods may be cut to suit specific architecture layout and also to accommodate services. 300mm thick pods are available if needed for deeper edge beams and internal ribs, and when greater insulation is required. An alternative to the 220mm thick polystyrene pods is the Cleva Pods® which is a similarly dimension pod made from recycled plastic.

2.3 Steel

Reinforcing mesh in the slab shall consist of Welded Reinforcing Mesh complying with AS/NZS 4671:2019 with a minimum weight of 2.27kg/m^2, a lower characteristic stress of 500MPa, square configuration of orthogonal bars between 150 to 200mm centres, and ductility class L or E, hereafter referred to "mesh". The presence of Class E reinforcing bars in the ribs and beams provides adequate ductility of the system which allows the use of class L mesh. Typically the topping mesh reinforcement will be 665 mesh (class L) or SE62 ductile mesh, each being equally applicable. The reinforcing bars in the ribs and edge beams shall conform to AS/NZS 4671:2019 "Steel Reinforcing Materials". Specifically designed spacers are used to position the polystyrene pods and the rib and edge beam reinforcing steel bars in a secure manner until the concrete is placed. The reinforcing mesh is held in place by mesh chairs. Conventional timber or steel formwork is used to form the slab edge.

2.4 Concrete

One of the following Firth concrete products shall be used in the system:

1) RaftMix® a 20MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. For Cleva Pod® use Firth 20MPa (mix code: RC2019AW).
2) RaftMix® 25: a 25MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. This mix shall be specified for buildings constructed in the 'sea spray zone' (i.e. within 500m of the sea including harbours, within 100m of tidal estuaries or inlets, on offshore islands and elsewhere defined as exposure zone D in 4.2.3.3 of NZS3604). For Cleva Pod® use Firth 25MPa (mix code: RC2519AW).

2.5 Insulation

For larger area to perimeter ratios (A/P) RibRaft® floors may meet H1 compliance without additional insulation. However, when required, the RibRaft® floor can be insulated with one or more of the following to meet H1 compliance,

- Firth HotEdge® - used for slab edge insulation below masonry veneers.
- Firth HotEdge Extra®, used as a slab edge insulation that sits below 90mm or greater thickness framing.
- Firth HotEdge Base® - used to insulated the underside of the 300mm wide perimeter foundation beam.
- Or in place of HotEdge Base®, insulation below the entire footprint comprising of either 50mm H grade polystyrene or 75mm XPS. 90mm of Slab X 200 polystyrene can be used as an alternative to 75mm XPS.

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3.0 SCOPE

This Clause sets out the limitations that apply to the use of the system to ensure that specific engineering input is not required. The concrete floor slab for buildings or ground conditions that do not meet this scope must be subjected to specific engineering design to comply with the requirements of the New Zealand Building Code.

3.1 Structure Limitations

Specific engineering input shall not be required only where the structure supported by the system complies with the following criteria:

- The structure supported by the system is constructed in a location where the Seismic Hazard Factor Z (defined in NZ1170.5) is less than or equal to 0.45 (refer to Figure 6).
- The system is laid level, or has a maximum step of 600mm detailed in accordance with this Manual.
- The structure supported by the system has no basement, part basement or foundation walls.
- The total height from the lowest ground level to the highest point of the roof shall not exceed 10m.
- The structure supported by the system has a roof pitch limited to 60 degrees maximum from the horizontal.
- Where ground snow load is between 2 to 2.5kPa then the roof pitch shall be greater than 20 degrees from horizontal
- The maximum height of a single or top storey is 4.8m and any other storey is 3m.
- The roof truss span shall be less than or equal to 12m when the roof and ceiling loads are supported entirely by the external walls. Where internal support of roof trusses is used the footings below point loads identified by the truss designer shall comply with this Manual.
- Where internal load bearing walls are used to support the roof or floors, the loaded dimensions stated in Tables 8.2 and 14.10 of NZS3604:2011 shall apply, and the load bearing wall shall be supported on a 300mm wide load bearing rib as detailed in this Manual.
- For two storied construction, suspended floor shall be as defined by Fig. 1.3 of NZS3604 and within a loaded dimension on a perimeter beam of less than 3.0m.
- Floors may be of unlimited size provided that the maximum dimension between free joints shall not exceed 30m. Where free joints are required they should be detailed in accordance with this Manual.
- 45mm or greater width studs are used for walls above perimeter beams incorporating HotEdge Extra.

3.2 Live Loading

The live loading cases of structures covered by these designs are:

- 1.5kPa and 3.0kPa as per NZS3604 “Timber Framed Buildings”.
- 13kN concentrated load in garage over area of 0.3 x 0.3m (vehicle limited to 2500kg gross).

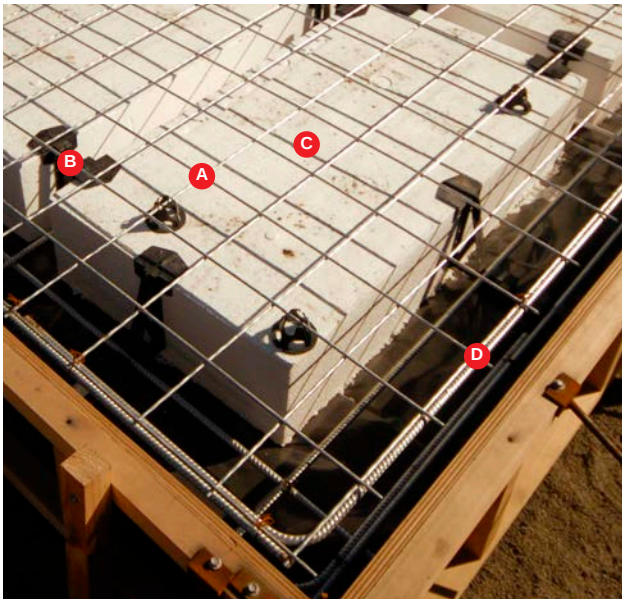
3.3 Snow Loading

Open ground snow loading as defined in NZS3604 of up to 2.5kPa, in subalpine locations as defined in AS/NZS 1170.3.

3.4 Dead Loading for Use with This Manual

The dead load cases of structures covered by these designs are:

- Light external walls with total mass not exceeding 60kg/m² – e.g. timber framing with weather boards and interior wall linings.
- Heavy external walls with total mass greater than 60kg/m² but not exceeding 220kg/m² – e.g. timber framing with masonry veneer.
- Internal walls with total mass not exceeding 45kg/m² – e.g. timber framing and linings, with load on floor not exceeding equivalent uniform load of 0.2kPa (same assumption as NZS3604).
- Light roofs with total mass not exceeding 45kg/m² – e.g. ceiling linings and metal roof, including framing.
- Heavy roofs with total mass greater than 45kg/m² but not exceeding 85kg/m² – e.g. ceiling lining and concrete tiles or slates, including framing.
- Mid-floors with total mass not exceeding 60kg/m² – e.g. timber framing and flooring, including ceiling linings.
- Heavy internal walls and/or load bearing internal walls supported on a load bearing rib.



The RibRaft® System

A Steel mesh reinforcing
B Firth 100mm spacer
C Firth RibRaft® polystyrene pods
D Steel reinforcing

3.5 Foundation Requirement for Different Building Types

The designs given in this Manual are limited to where the system supports Building Types as described in Table 1. The classification of wall and roof weights are as detailed in Clause 3.4 of this Section. Single and two storey shall be as defined in NZS 3064.

Table 1. Foundation Soil Class

NUMBER OF STOREYS	ROOF	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	1.5KPA LIVE LOAD & UP TO 1KPA SNOW LOAD	1.5KPA LIVE LOAD & UP TO 2.5KPA SNOW LOAD	3KPA LIVE LOAD & /OR 2KPA SNOW LOAD
SINGLE STOREY	Light	Light		A	A	A
	Heavy	Light		A	B	B
	Light	Heavy		B	B	B
	Heavy	Heavy		C	C	C
DOUBLE STOREY	Light	Light	Light	C	D	D
	Heavy	Light	Light	D	E	E
	Light	Heavy	Light	D	E	E
	Heavy	Heavy	Light	E	G	G

NOTE: refer to Table 2. for definitions of soil classes A to G

3.6 Foundation Soils

The system may be used when the supporting ground meets the definitions of "good ground" given in Section 3 of NZS 3604 (as modified by B1 of the Building Compliance Documents). In addition, the system shall not be used for damp sites i.e. where it can be reasonably expected that the ground water level could come within 600mm of the underside of the system. The acceptability of the ground shall be verified in accordance with Clause 3.1.3 of NZS 3604.

Solutions for soils prone to liquefaction or expansive soils are available using the Firth RibRaft® technology, however these are outside the scope of this Manual and require specific engineering design.

Where the ultimate bearing capacity required of the supporting ground is verified by Scala Penetrometer testing in accordance with Clause 3.3 of NZS3604 or for cohesive soils using a calibrated shear vane in accordance with the NZGS Guideline for Hand Held Shear Vane Test, the bearing capacity shall exceed the values in Table 2 for the proposed building type. For scala penetrometer testing, the bearing capacity shall be considered adequate when the number of blows per 300mm depth of penetration below the underside of the system at each test site exceeds the values given in Table 2 below.

For RibRaft® foundations compliance with Table 2 allows ultimate bearing capacities of less than 300kPa. However, with the exception of bearing capacity all other requirements in NZS3604 for "good ground" shall be complied with.

Table 2. Scala Penetrometer Blows Required and Ultimate Bearing Capacity

FOUNDATION SOIL CLASS	ULTIMATE BEARING CAPACITY (KPA)	MIN. BLOWS PER 300MM DEPTH FOR SCALA TESTING
A	140	4
B	175	5
C	210	6
D	240	7
E	275	8
G	Good ground	9

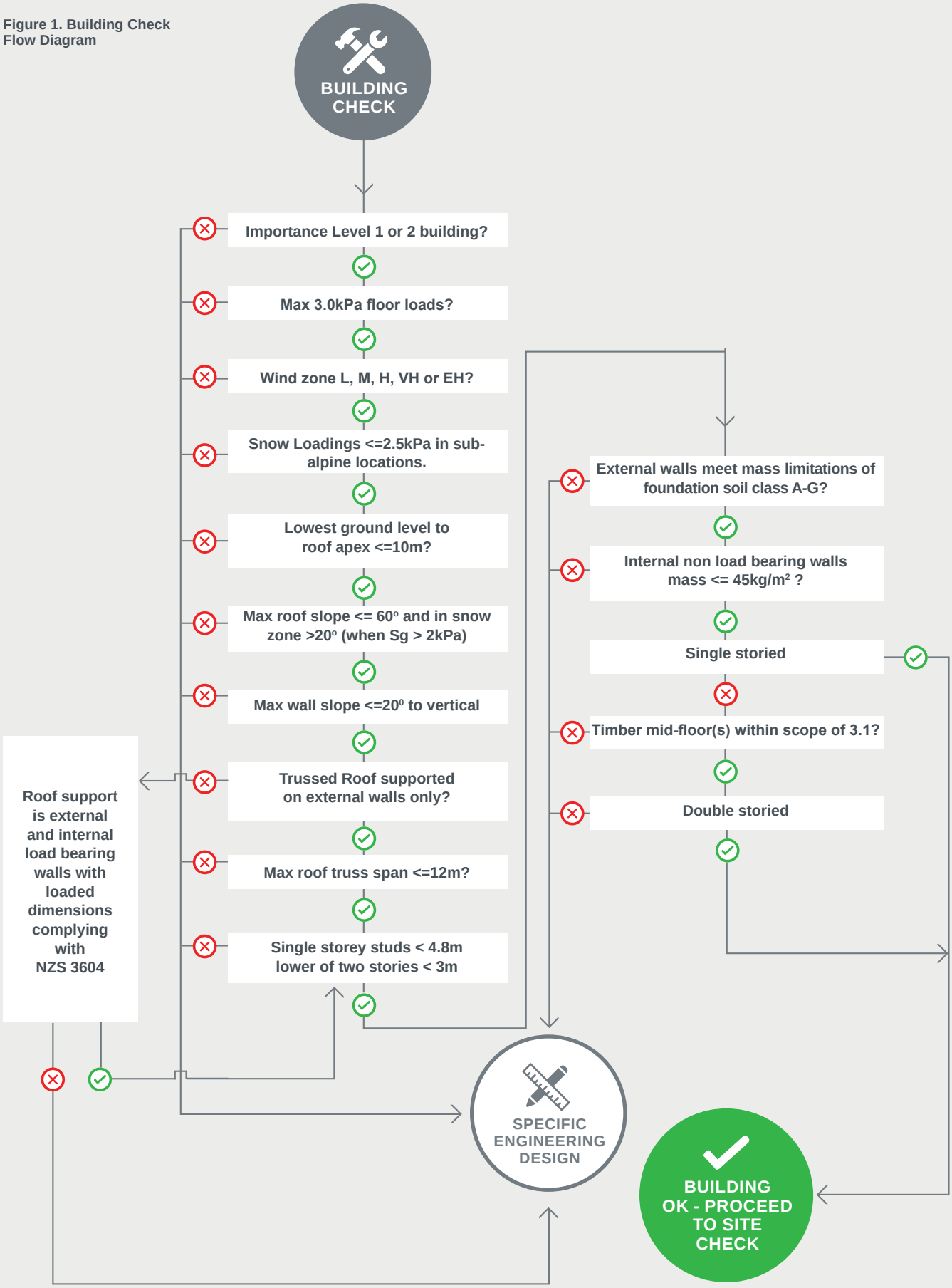
3.7 Flow Diagrams

The flow diagrams on the following pages (adapted from NZS3604) will help in determining whether the non-specific details for the system can be used for the purposes of the concrete floor slab construction. There are two checks in the process. The first is to determine whether the proposed building complies with the requirements set out in this Manual (Building Check), and the second is to determine whether the site complies with the requirements set out in this Manual (Site Check).

Note: NZS3604 provides for parts of buildings to be considered as individual buildings. These flow diagrams apply to those parts of the building where slab-on-ground is being considered and where the part of the building can be considered as an individual building under NZS3604.

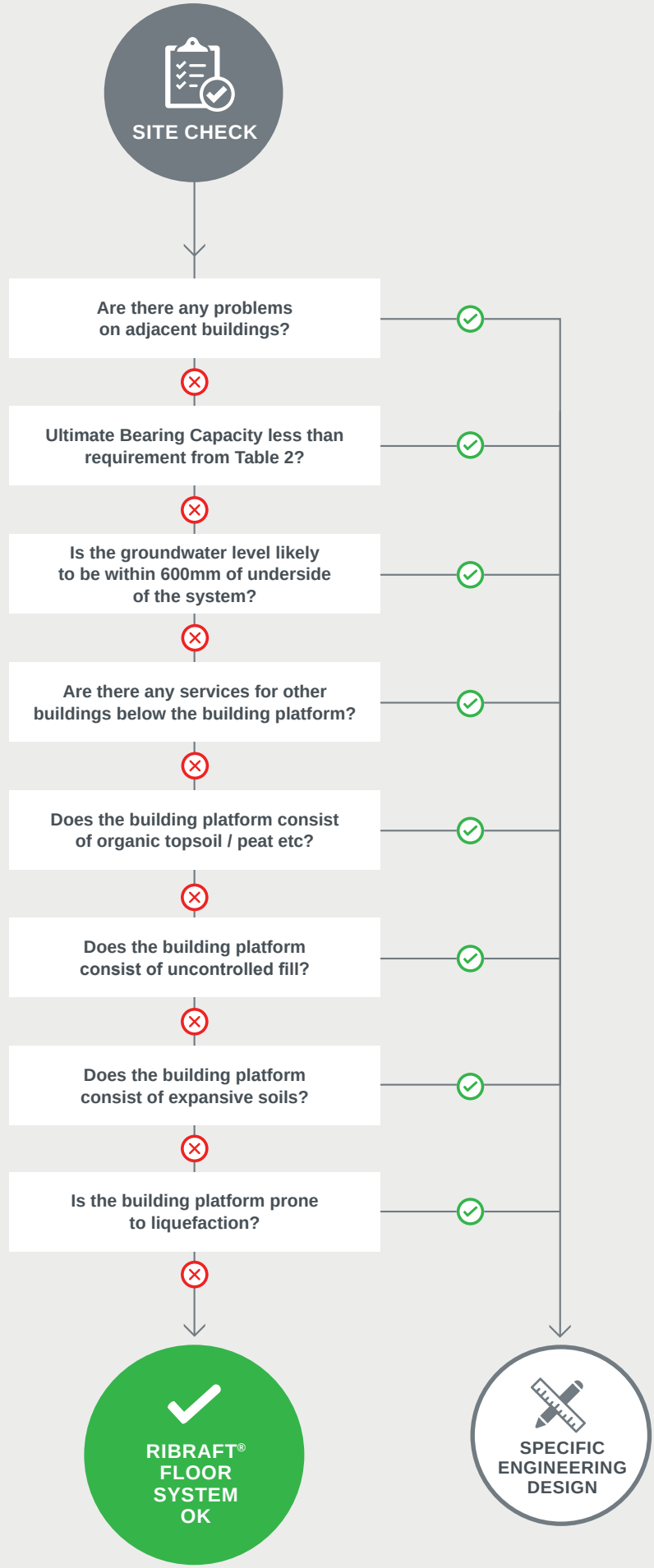
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Figure 1. Building Check Flow Diagram



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Figure 2. Building Check Flow Diagram



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4.0 CONSTRUCTION DETAILS

Standard construction details for the system are provided here for buildings that fall within the scope.

4.1 Pod Layout

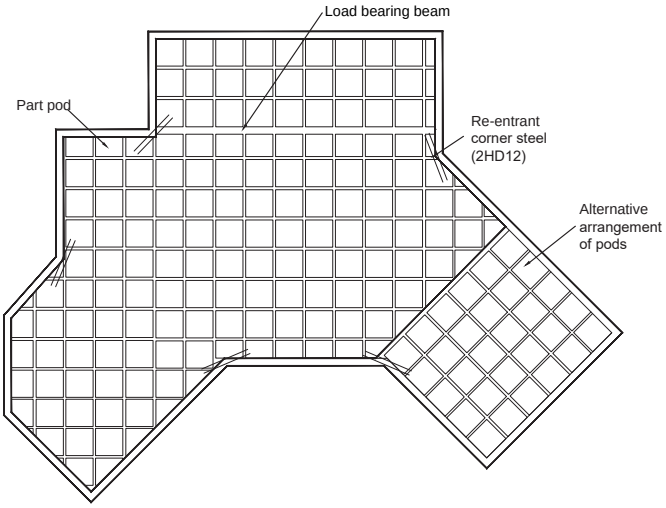
RibRaft® polystyrene pods supplied by Firth (1100 x 1100 x 220mm or 300mm thick) shall be placed on leveled ground and arranged in a waffle pattern. The pods are used as *void formers* while the concrete is curing. Cleva Pods® are plastic pods with dimensions of 1100 x 1100 x 220mm. They are made of recycled material and may be used in place of the polystyrene pods.

Pods shall be placed so that the maximum clear separation from any rib or beam shall not exceed 1.1m. Pods maybe cut down to size but shall not be added to.

Figure 3 shows a typical layout of the pods and ribs. Note the part pods around the edge, where the building shape dictates, and adjacent to the 300mm rib.

Firth suggests that when drawing the building plan, a generic RibRaft® grid (100mm wide ribs at 1200mm centres) is set out using the corner of the building as a starting point. The location of any load bearing ribs, or point loads greater than 10kN, are identified and pods cut to establish 300mm wide ribs or foundation pads as described in this Manual. The most cost effective solution being a simple grid layout which requires minimum cutting of the pods. Ribs can be used at less than 1200mm centres, however it is more cost effective to use the 1200mm centres wherever practicable.

Figure 3. Typical RibRaft® Plan



4.2 Edge Beam Width and Reinforcement

Edge beams around the perimeter of the floor slab shall be 300mm concrete thickness to provide bearing capacity for external load bearing walls, and contain 2-HD12 bars (Grade 500E) as bottom steel and 1-HD12 bar (Grade 500E) in the top. This top bar shall be tied to the underside of the reinforcement mesh. Refer Figures 5, below for construction details. The edge beam shall be rebated for brick veneers where necessary as shown in Figures. 5E / 5F / 5G

4.3 Internal Ribs (non-load bearing) Width and Reinforcement

Each standard internal rib shall be 100mm wide and shall contain 1-HD12 steel bar (Grade 500E) held in place at the bottom of the rib by a Firth spacer. Refer Figure 5A for construction details.

4.4 Internal Ribs (load bearing) Width and Reinforcement

For load bearing walls that support floors and heavy internal walls, the pods shall be cut to create a 300mm wide rib directly under the load bearing wall, with 2-HD12 (Grade 500E) steel bars as bottom steel. Refer Figure 4B for construction details under load bearing walls. Where the load bearing ribs meet and terminate at an edge beam or internal rib the bottom reinforcement from the load bearing rib shall be bent into the adjacent rib and tied together. The reinforcement shall lap for at least 720mm.

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4.5 Point Loads

Truss manufacturers often support the roof trusses internally on posts or studs within a wall, which are described on the truss manufactures drawings as falling into various ultimate limit state categories. Table 3 summaries when individual footings are required below the reactions, and the form these should take.

Table 3. Foundation Requirements for Individual Point Loads

	FOUNDATION OPTIONS BELOW POINT LOAD:
ULTIMATE LIMIT POINT LOAD REACTION	BEAM OPTION, BEARING CAPACITY GREATER THAN 140KPA (1)
Up to 10kN	No thickening required
Up to 20 kN	300mm wide load under point load as detailed in Figure 4A
Up to 30kN	300mm wide load under point load as detailed in Figure 4A

Notes:
(1) Refer section 3.6 for confirmation of bearing capacity. With exception of bearing capacity all other requirements in NZS3604 for good ground shall be complied with.

Table 4. Details for Beam Option Thickening Under Point Loads

ULTIMATE LIMIT LOAD P FROM TRUSS DESIGNER	MINIMUM EDGE DISTANCE X IN MM
20kN	200 *
30 kN	400 *

* If minimum edge distances cannot be achieved extend thickening to next 100mm ribs

Figure 4A.

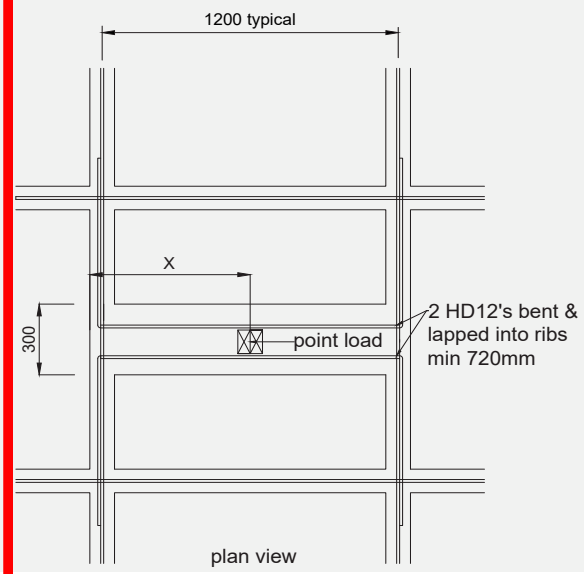
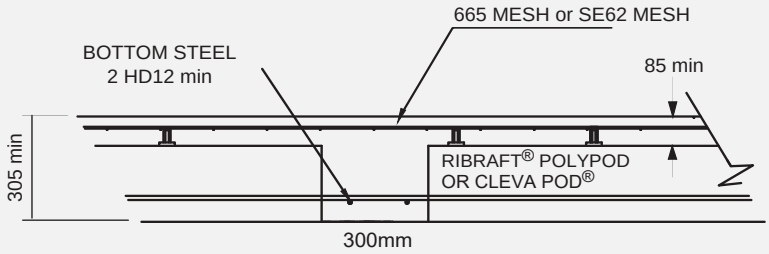


Figure 4B



SECTION UNDER INTERNAL LOAD-BEARING WALLS

4.6 Mesh Reinforcement

The entire floor slab shall be reinforced with 665 or SE62 mesh supported on mesh chairs to achieve a minimum of 30mm cover to the top surface sitting on the poly-styrene or Cleva Pods®.

4.7 Re-entrant Corners

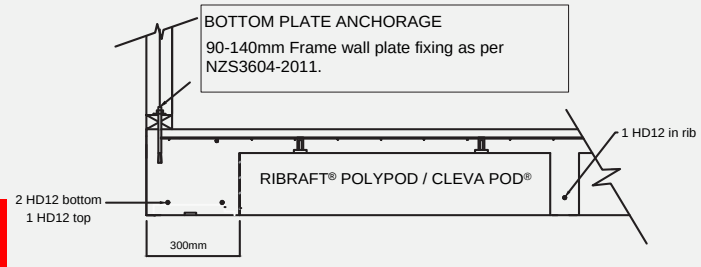
In order to limit the width of cracking at the re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover from the internal corner – refer Figure 3.

4.8 Wingwalls

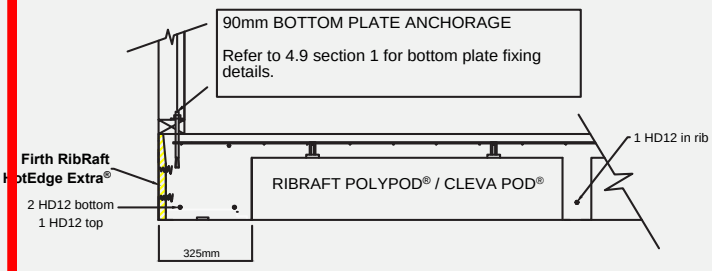
Non Load bearing wingwalls up to 600mm in length can be accommodated as detailed in this manual. The timber framing of the wingwall shall be latterly supported at floor levels and at the eaves. Load bearing wingwalls and wingwalls greater than 600mm or not supported laterally at eaves and floor level will require SED. See construction details refer Figure 12E.

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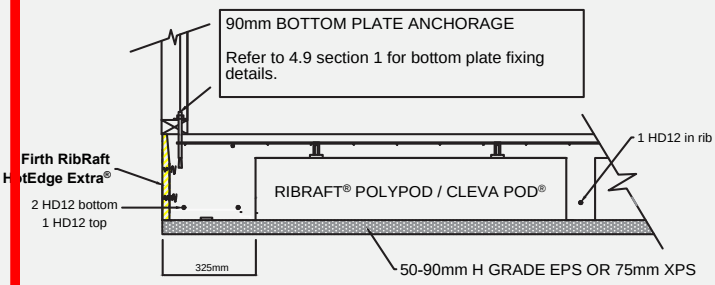
Figure 5. Standard RibRaft® Construction Details



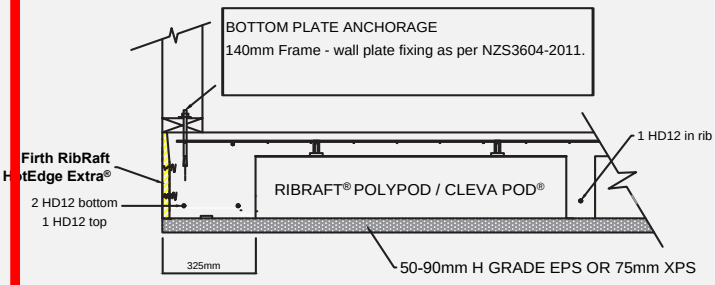
Ⓐ 220mm FIRTH RIBRAFT® POLYPOD
90-140mm WALL FRAME - NO INSULATION
FIRTH RAFTMIX 20 OR 25MPa



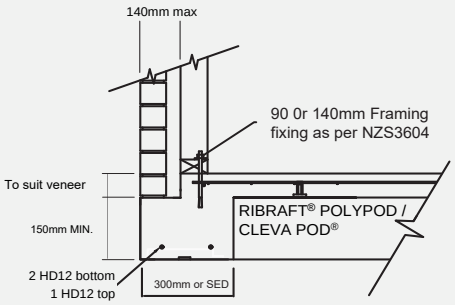
Ⓑ 220mm FIRTH RIBRAFT® POLYPOD
90mm WALL FRAME HOTEDGE EXTRA®
FIRTH RAFTMIX 20 OR 25MPa



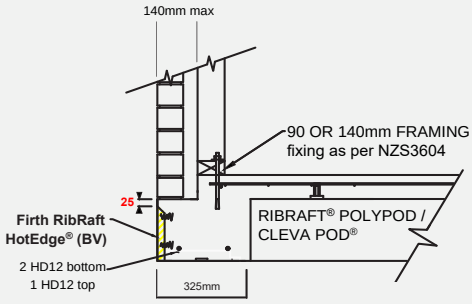
Ⓒ 220mm FIRTH RIBRAFT® POLYPOD
90mm WALL FRAME HOTEDGE EXTRA® & UNDERSLAB INSULATION
FIRTH RAFTMIX® 20 OR 25MPa



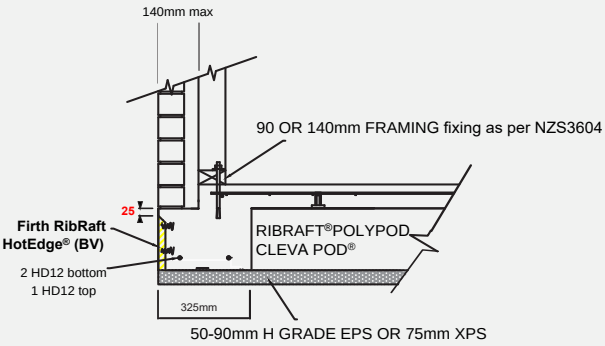
Ⓓ 220mm FIRTH RIBRAFT® POLYPOD
140mm WALL FRAME HOTEDGE EXTRA® & UNDERSLAB INSULATION
FIRTH RAFTMIX® 20 OR 25MPa



Ⓔ 220mm FIRTH RIBRAFT POLYPOD®
BRICK VENEER - NO INSULATION
FIRTH RAFTMIX 20 OR 25MPa



Ⓕ 220mm FIRTH RIBRAFT® POLYPOD
BRICK VENEER HOTEDGE®
FIRTH RAFTMIX® 20 OR 25MPa



Ⓖ 220mm FIRTH RIBRAFT® POLYPOD
BRICK VENEER HOTEDGE® & UNDERSLAB INSULATION
FIRTH RAFTMIX® 20 OR 25MPa

4.9 Bottom Plate and Anchors

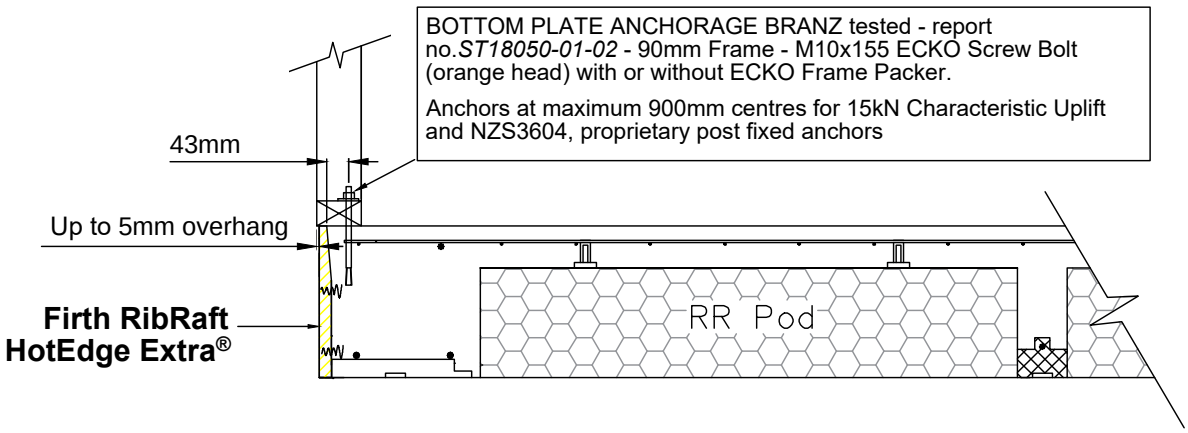
NZS3604 requires bolts securing bottom plates to have capacities greater than specified in clause 2.4.7. The ECKO M10 155mm screw bolt (orange top) has been BRANZ tested (ST18050-01-02) with 90mm framing and HotEdge Extra® to demonstrate compliance.
This test has also demonstrated characteristic uplift loads of 15kN as required by some bracing systems.

Alternative bolt arrangements can be used where cyclic testing demonstrates bolt capacities meet or exceed the requirements of NZS3604 or as required by the bracing system.

Where HotEdge Extra is installed below 90mm wide bottom plates, the bottom plate shall be as defined in NZS 3604 for all situations within the scope of this manual, with the exception below:

- **LVL where the design live load on the suspended floor is 3kPa.**

Where 140mm framing is used, or 90mm framing with no edge insulation, bottom plate anchor solutions defined in NZS3604 can be used.



① 220mm FIRTH RIBRAFT® POLYPOD

90mm WALL FRAME HOTEDGE EXTRA®
FIRTH RAFTMIX 20 OR 25MPa

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5.0 LATERAL RESISTANCE

5.1 Earthquake Resistance

Unlike conventional foundation systems, the Firth RibRaft® system is not embedded into the ground. Sliding resistance to horizontal seismic loads is provided by frictional contact with the soil. In locations where the Seismic Hazard Factor Z is greater than 0.45, shear keys maybe required to resist seismic loads. Such buildings require specific engineering design and are outside the scope of this document. Refer to Figure 6.

Depending on the wind zone and the weight of the building elements this frictional resistance may not be sufficient to provide sliding resistance to wind loads, and specific shear keys may be required, as detailed in Clause 5.2.

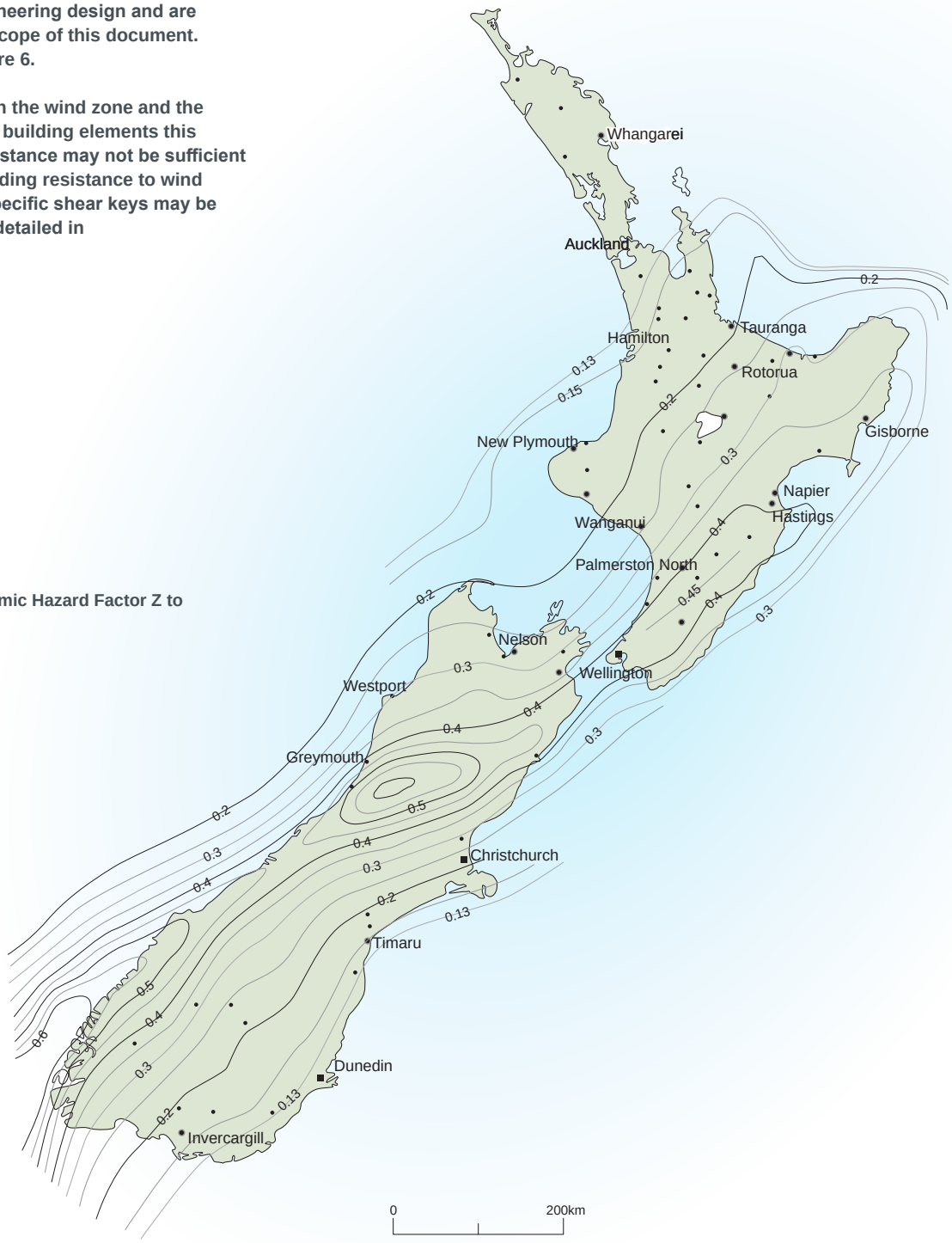


Figure 6. Seismic Hazard Factor Z to NZS 1170.5.

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5.2 Wind Resistance

The building's bracing demand from wind loading shall be assessed from Section 5 of NZS 3604 for both directions (i.e. along and across the building). The bracing capacity of the system must exceed the greater of the bracing demands determined.

The bracing capacity of the system shall be determined as the sum of the bracing capacity provided by frictional resistance (i.e. friction between the system and the ground) and the bracing capacity provided by the shear keys (if any) necessary to meet the requirements of Clause 5.2.

The bracing capacity provided by frictional resistance shall be determined from Table 4 depending on the building type, roof weight, and floor live loading. The bracing capacity provided by the shear keys shall be the sum of the bracing capacity of the individual shear keys determined as follows;

- If the shear key is in clay, each shear key shall be considered to contribute 170 BU's.
- If the shear key is in sand, each shear key shall be considered to contribute 200 BU's.
- If the bracing capacity of the system, determined from the frictional resistance and the shear keys as described above, is less than the bracing demand further shear keys shall be added until the bracing demand is met.

Table 4. Bracing Capacity Provided By Frictional Resistance Per 100m² Of Ground Floor Area

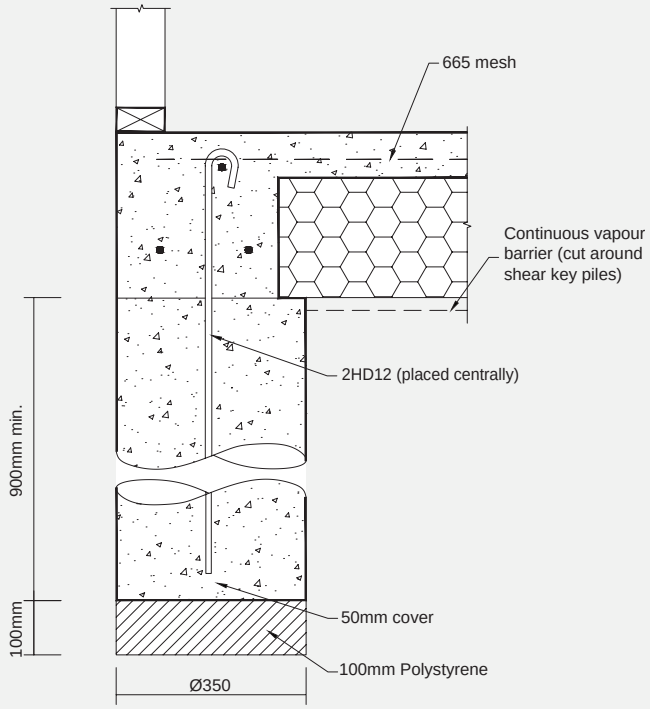
BUILDING TYPE	ROOF TYPE	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	BU's PROVIDED PER 100M² 1.5KPA	FOR LIVE LOADING OF: 3.0KPA
Single Storey	Light	Light		1630	1746
Single Storey	Heavy	Light		1737	1857
Single Storey	Light	Heavy		1802	1922
Single Storey	Heavy	Heavy		1909	2029
Double Storey	Light	Light	Light	2163	2403
Double Storey	Heavy	Light	Light	2270	2510
Double Storey	Light	Heavy	Light	2335	2575
Double Storey	Heavy	Heavy	Light	2442	2682
Double Storey	Light	Heavy	Heavy	2524	2764

5.3 Shear Keys

Shear key piles required by Clause 5.2 must be uniformly distributed around the perimeter of the building, and be located at the edge beam/internal rib junction. Where a shear key is required, the minimum number of shear keys shall be two per floor plan. Where two shear keys are used they shall be placed at diagonally opposite ends of the floor plan.

Construction details of the shear keys shall be as shown on Figure 7. Shear keys shall be a minimum of 900mm long. The holes shall be over-drilled at least 100mm and a polystyrene RibRaft® Shear Key Support placed into the bottom of each hole. This will support only the plastic (wet) concrete and then allow movement of the shear key if settlement of the supporting ground occurs. The effective end bearing of the shear keys is therefore eliminated.

Figure 7. RibRaft® Shear Key



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5.4 Design Example For Lateral Resistance Calculation

The following is a short example to demonstrate the process of determining whether shear piles are required.

Consider a 180m^2 single storey home with a light roof located in Palmerston North in a VH wind zone as defined by NZS3604. Assume the building height is 6m with 3m above the eaves. The length for across wind considerations is 15m and the width (along wind) is 12m.

First consider seismic actions. From Figure 6. the seismic hazard factor is 0.4. Since this is less than 0.45 shear keys will not be required for earthquake resistance.

Now consider wind loading. Table 5.5 of NZS3604 requires 95 bracing units per meter (BU/m) across the building and 90 BU/m along. As it's a very high wind zone these figures need to be increased by a factor of 1.3.

The BU demand for across building wind is therefore = 95 x 1.3 x 15 = 1853BU
The BU demand along the building = 90 x 1.3 x 12 = 1404BU

From Table 4. for a single storey light weight roof with 1.5kPa live load the capacity is 1630BU per 100m^2. Therefore for 180m^2 the capacity is 2934BU. As the capacity (2934) is greater than the demand (1853) no shear keys are required.

If the demand had exceeded the capacity then any shortfall can be provided by supplying shear keys in accordance with Section 5.3 with each shear key providing the BU specified in Section 5.2.

6.0 OTHER DESIGN DETAILS

6.1 R-Values

The insulation performance of a building element is measured by the "R-Value". Recent revisions to clause H1 of the Building Code has significantly changed the method used to calculate the insulation values of slabs supported on the ground. The most significant change being that the ground is now assumed to have a default thermal conductively of 2 W/(m·K) (more conductive than previously assumed) and modelling of the floor units are conducted in accordance with ISO 13370. The information provided in the R Value calculator has been developed using method described in H1/VM1.

A further subtle change is that the way the area to perimeter ratio is calculated (A/P ratio). H1/AS1 defines this as:

$$slab\ area\ to\ perimeter\ ratio\ \left(\frac{A}{P}\right) = \frac{A_{slab,internal}}{P_{slab,internal}}$$

Alternatively, where external dimensions are known the following can be used.

$$slab\ area\ to\ perimeter\ ratio\ \left(\frac{A}{P}\right) = \frac{A_{slab,external}}{P_{slab,external}} - \frac{w}{2}$$

Where *w* equals the horizontal distance between the slab edge and the interior surface of the wall.

The acceptable solutions for H1, provides 3 methods of demonstrating compliance with the Building Code requirements. These being:

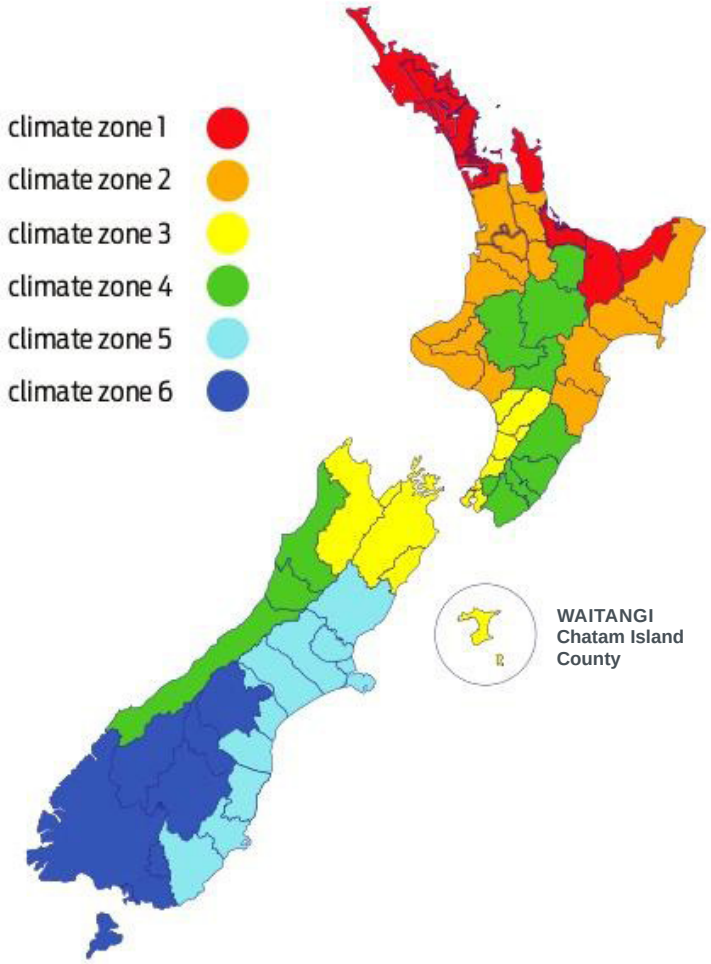
- The schedule method
- The calculation method
- Modelling using H1-VM1

H1 now splits New Zealand into 6 climate zones. Compliance by the schedule method involves providing a solution with a calculated R value in excess of the minimum scheduled value for the relevant climate zone. Tabled below are the minimum required R values for slabs on ground

BUILDING ELEMENT	CONSTRUCTION R VALUES (M2.K/W)					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Slab on ground	R1.5	R1.5	R1.5	R1.5	R1.6	R1.7
Slabs on ground with embedded heating coils	R2.5	R2.5	R2.5	R2.8	R3.0	R3.0

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New Zealand Climate Zones



The Firth HotEdge® range provides a suite of products to achieve compliance with the minimum R-values stipulated by the H1 schedule method. The construction R-values for the various Firth solutions can be found by using the R-value calculator at www.firth.co.nz/r-value-calc/

The calculation method described within H1 allows, optimised solutions to be developed by offsetting R-values within different elements of the building. Refer to H1 for details. There is a requirement that the R-values are not reduced by more than 50% of the Schedule Method. The exception being floors containing heating elements. For heated floors the R-values cannot be reduced below those specified in the schedule method. To conduct comparisons between the heat loss of the reference building and the proposed structure requires information on the actual R-value of the flooring system.

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6.2 Shrinkage Control

Shrinkage control joints reduce the risk of unwanted cracks, and their placement needs to be carefully considered where uncontrolled cracking could be unacceptable. Two types are described here: saw cut joints (which are tied joints), and free joints.

6.3 Saw Cut Joints

Saw cuts are located at positions in which the concrete is likely to crack due to stresses induced by restrained shrinkage. The aim of providing them is for the concrete to crack at the bottom of the saw cut thus minimizing the potential for a visible crack wandering over the surface. The level of reinforcement provided in a RibRaft® mean that cracks have no structural implications (i.e. Building Code compliance) being only an aesthetics issue. Therefore saw cuts are not mandatory for B1 compliance. Factors to consider are the type of floor finish, the location of ribs and ground beams, underfloor heating, and the effect of piles restraining shrinkage.

Preference should be given to using early entry saws which are used immediately after finishing. Shrinkage control joints cut using diamond blades shall be cut as early as possible which is typically within 24 hours of hardening in summer, and 48 hours in winter. They shall be cut to a depth of 25mm. Shrinkage control joints do not guarantee elimination of all visible or unwanted cracks but should minimise the number.

It is recommended to use saw cuts where the slab is restrained by either stepdowns or shear keys.

Joints shall be positioned to coincide with major changes in floor plan. Where concrete is to be exposed, for example in a garage, or brittle covering placed over, the maximum intermediate bay sizes should be limited to 5m. Bay dimensions formed by shrinkage control joints shall be limited to a maximum ratio of length:width of 1.5:1. Shrinkage control joints shall be placed over 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide load bearing rib, then the joint shall be located directly above one edge of that rib.

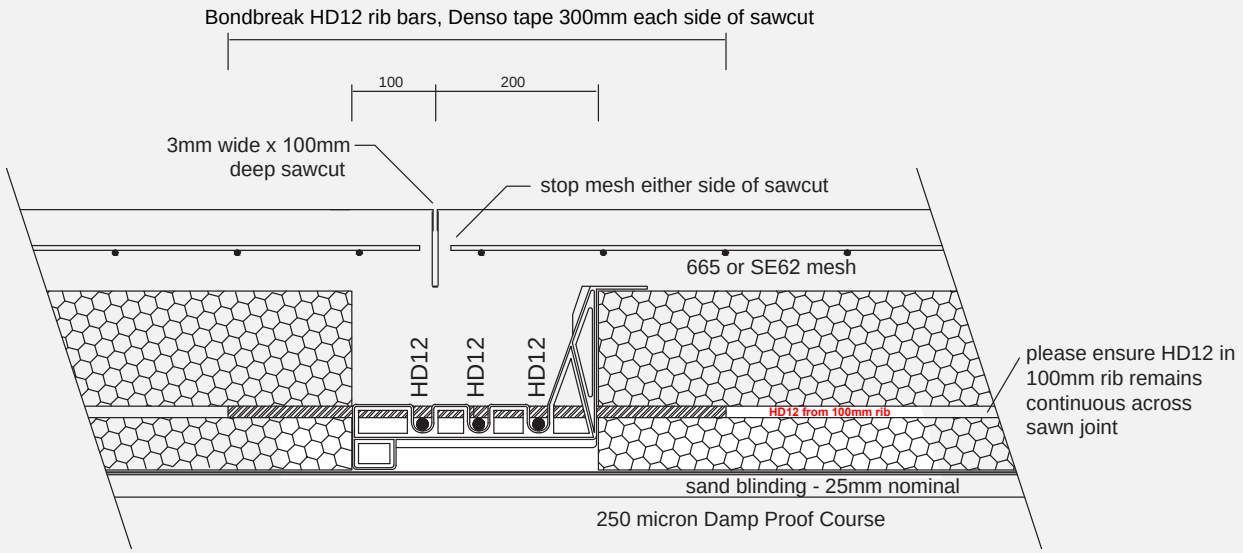
In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 3.

6.4 Free Joints

Where the length of the floor exceeds 30m, a free joint shall be provided as detailed in Figure 8. Movement, shrinkage and thermal, will occur over this joint so it shall be positioned to minimize the impact of this movement on floor coverings and wall elements.

Where the bottom of the RibRaft® is not flat (for example the floor incorporates a step down), free joints shall be provided if the distance from the step down to edge of slab exceeds 15m.

Figure 8. Free Joint Details



RibRaft® control / free joint detail at 300mm wide thickening align sawcut with internal corner where possible

6.5 Services Detailing

Two options exist for running services, both of which are appropriate, however some regional Building Consent Authorities and builders have clear preferences. The options being within slab, or under slab. Experience from the Christchurch earthquakes shows that the most seismically robust solution is for services to run within the plane of the pods (within slab).

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6.6 Within Slab Running of Services

Pipes services can be run within the plane of the pods either exiting out of the side of the perimeter ring beam or going underground at the edge beam. Pipes shall be laid at a fall to comply with NZBC G13/AS1. For pipe up to 65mm diameter the minimum gradient is typically 1 in 40, while for 100mm pipes it's 1 in 60, however greater falls may be required dependent upon the required number of discharge units. Table 5. provides distances from the edge of the slab to pipe surface penetration to achieve minimum pipe gradients. A 300mm pod alternative is often used where the proposed positioning of the service means minimum required gradients cannot be achieved. Where gradients cannot be achieved with a 300mm pod, then services will require to be run under the slab.

Pipes shall be located to pass perpendicular to the ribs and beams and shall not be laid along the length of ribs or beams. Pods are cut as required to achieve the required fall and position. Pipes shall be laid to ensure 15mm concrete cover between pipe and reinforcement in the perimeter beam. All pipes in contact with concrete shall be lagged with an impermeable material of at least 6mm thickness.

Table 5. Maximum Distance From Exterior To Entrance Point Of Plumbing Pipes

PIPE DIAMETER (ID)MM	GRADIENT	MAXIMUM DISTANCE TO EDGE WITH 220MM THICK POD	MAXIMUM DISTANCE TO EDGE WITH 300MM THICK POD
40	1 in 40	3400	6600
50	1 in 40	3000	6200
65	1 in 40	2400	5600
100	1 in 60	1200	4400

6.7 Under Slab Running Of Services

For this option, services ducts shall be conveyed underground to their plan location then brought up through the polystyrene or plastic pod and the concrete floor slab, within the limitation as per Table 6. Services are not to be placed within any concrete except to cross that section of concrete i.e. services shall not run along ribs or edge beams.

In accordance with AS/NZS3500.5:2015 pipes penetrating through concrete shall be:

> Installed at right angles to the slab surface.

> Lagged with an impermeable material for the full depth of the concrete penetration.

> Lagging must be at least 6mm thick.

The maximum diameter of the services shall be as outlined in Table 6.

Any services crossing ribs or the edge beam horizontally shall be placed only within the middle third of the member. Except as noted in Figure 9, services crossing the ribs vertically shall also be constrained to the middle third of the width of the edge or internal load bearing rib. Except as noted in Figure 10 at no stage shall any of the reinforcement bars be relocated or cut to allow for the services (it is acceptable, however to cut the mesh). In some instances this will dictate the location of the ribs. The pods shall be cut to allow for this and if necessary, the spacing of the ribs shall be decreased locally. There shall be 600mm minimum clear spacing in each direction between penetrations equal to or greater than 100mm.

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Table 6. Maximum Diameter Of Pipe Services

ELEMENT	VERTICAL SERVICE	HORIZONTAL SERVICE
300mm wide edge beam	50mm nominal bore pipe	100mm NB pipe
500mm localized wide edge beam (1)	100mm NB pipe	100mm NB pipe
300mm wide internal load bearing rib	50 NB pipe	100mm NB pipe
100mm wide internal rib	Nil	100mm NB pipe
Slab	100 NB pipe, or for large services 450mm square see also Note (3)	Nil

Notes:

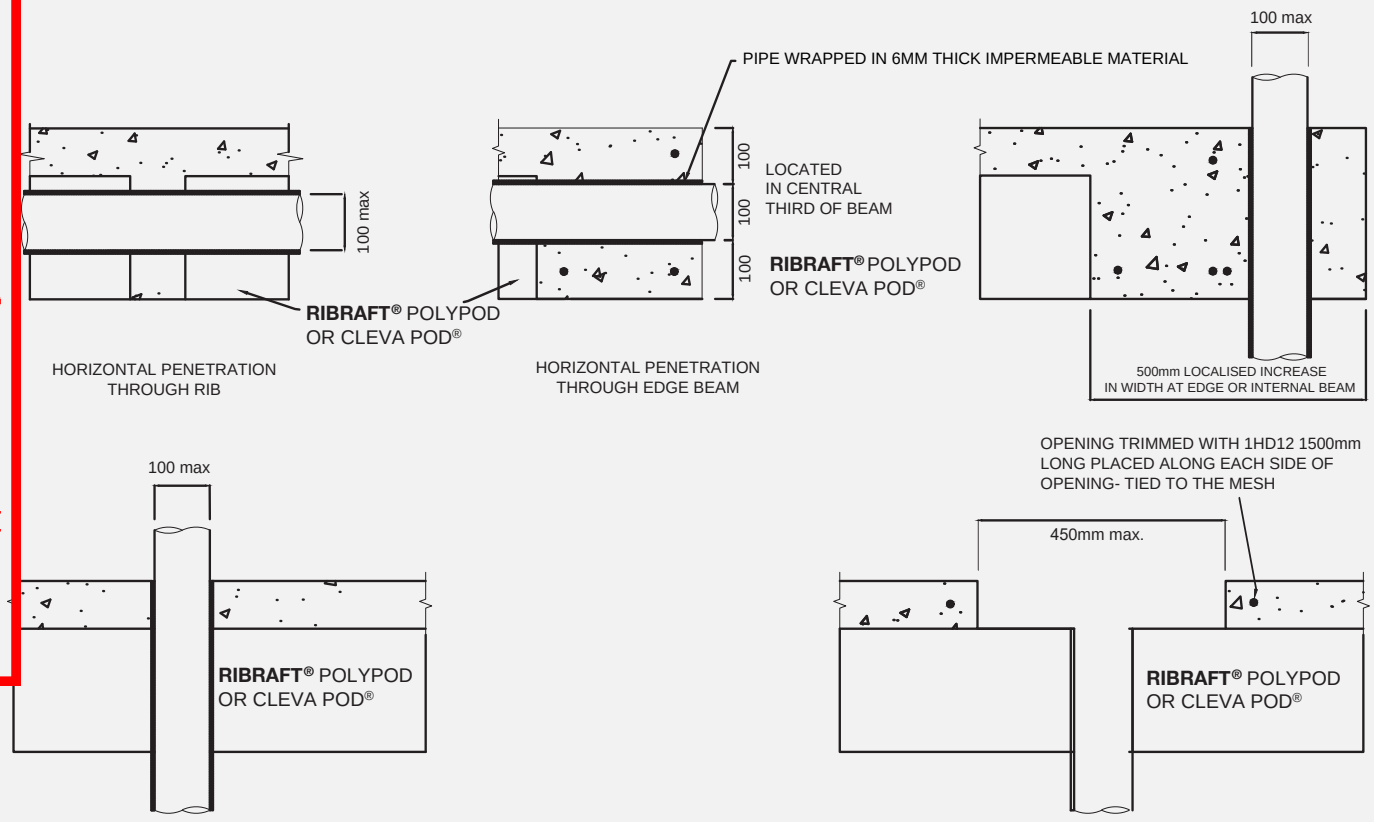
(1) For situations where a 100mm diameter pipe is required to pass vertically through the edge beam or internal load bearing beam, the beam shall be locally increased in width to a minimum of 500mm wide. This shall be achieved by keeping flush the outside face of the edge beam and removing 200mm from the pod. The width shall remain at 500mm for a distance of 600mm beyond the service pipe. Refer to Figure 10. for details for pipes passing vertically through beams and internal ribs.

(2) Where a gas pipe line runs through the RibRaft® floor system, in addition to the requirements above, the pipeline shall enter the building through the outside face of the perimeter foundation beam, be concrete encased and located in the plane of the pods. The aim being to ensure that damage to the gas pipe will most likely occur outside the building envelope should movement occur between the ground and RibRaft® in a large earthquake.

(3) Larger penetrations or voids up to 450mm square (e.g. for shower waste/traps) are permitted through the slab provided all the conditions of this paragraph are met. These openings shall be trimmed with 1 HD12 (Grade 500E) bar 1500mm long placed along each side of the opening, tied to the mesh. One set of parallel bars shall be placed on top of the mesh and the other set placed under the mesh. These openings shall not be placed over a rib or edge beam. If necessary, the rib spacing shall be reduced or the pod layout altered to ensure that the opening occurs solely in the slab above a polystyrene pod. Penetrations such as these shall not be installed in garages or other areas where large (>3kN) point loads could be present. Only one penetration greater than 120mm is permitted in the slab above any single pod or part pod. Where two large openings are required to be in close proximity, an internal rib shall separate them. For these large penetrations/voids in the slab, the services shall not be within 25mm of the edges of the void through which they pass, and the opening shall be sealed to prevent materials entering the sub-floor cavities. (This type of opening is normally only required for a shower waste/trap and the installation of the shower will ensure that the void is sealed/covered).

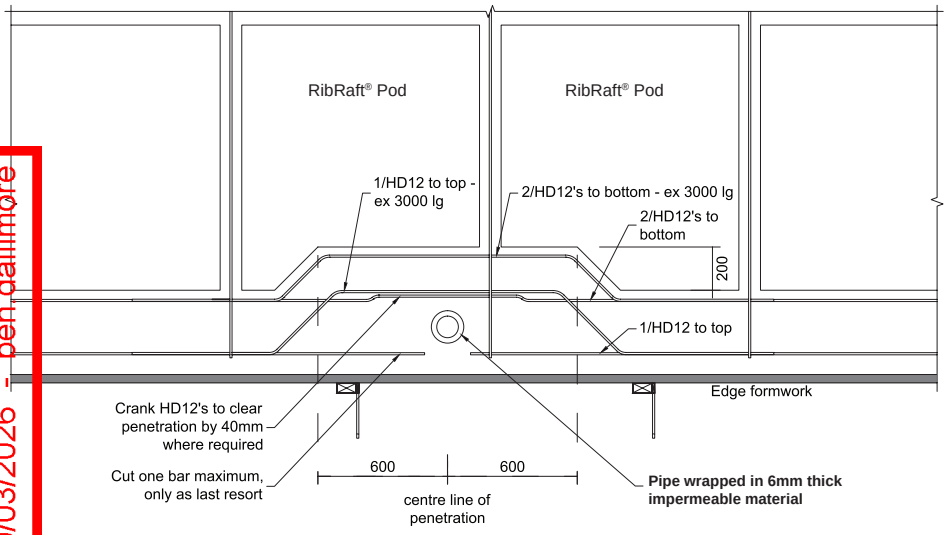
A pictorial of some of the above requirements is illustrated in Figures 9. and 10.

Figure 9. Example of Detailing Requirements For Services

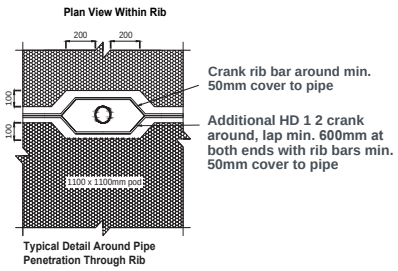


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Figure 10. Localised Increase In Width At Edge Beam Where Vertical Service Up To 100mm Diameter Are Required



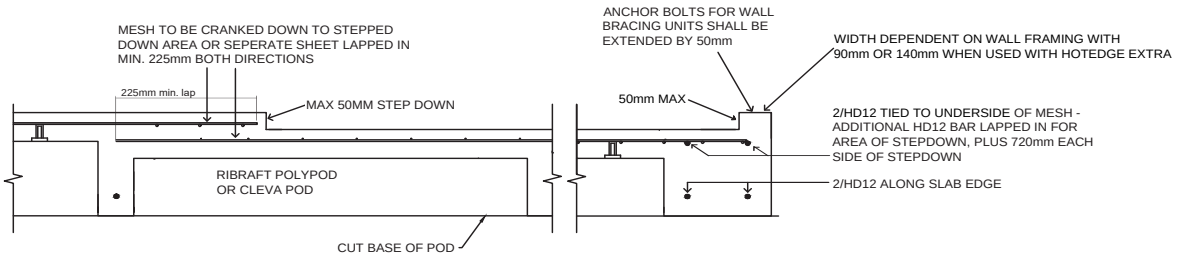
Plan View: Within Rib



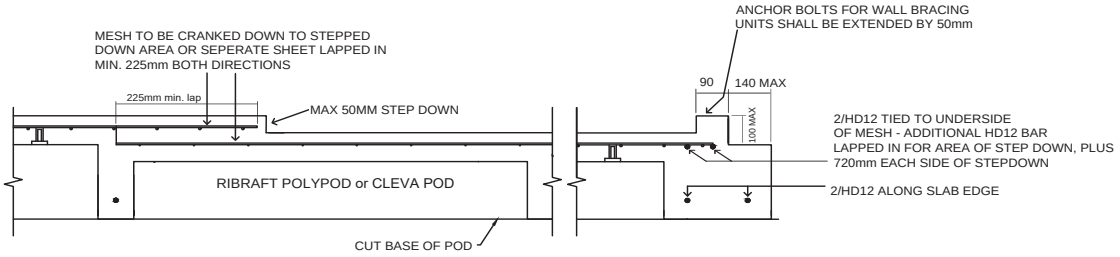
6.8 Recesses for Showers

Where showers are rebated up to 50mm into the RibRaft® concrete topping, the details specified shall be in accordance with Figure 11.

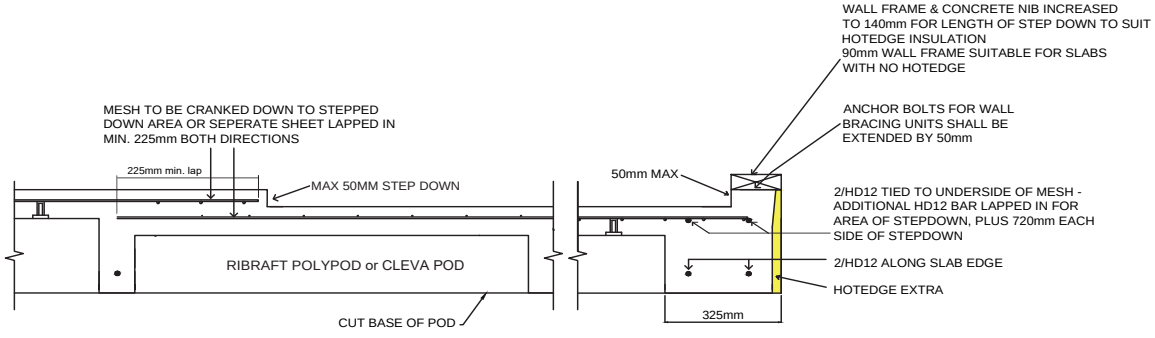
Figure 11. Details where recesses of up to 50mm are required for rebated showers



RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER



RIBRAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER- BRICK REBATE

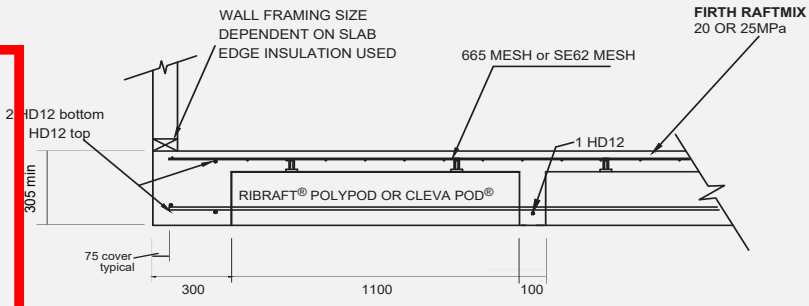


RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER WITH HOTEDGE EXTRA

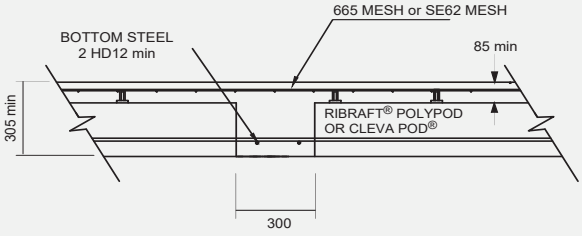
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Figure 12. Construction Details

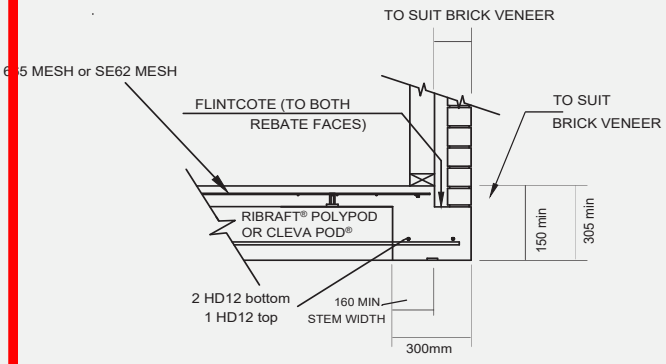
Note: Slab edge and underfloor insulation not shown, for clarity, refer Figure 5. (P11) also when combining with insulation.



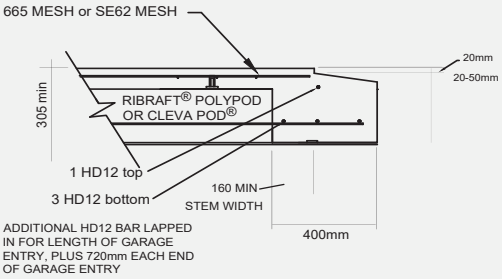
A PERIMETER BEAM & RIB CONSTRUCTION DETAIL



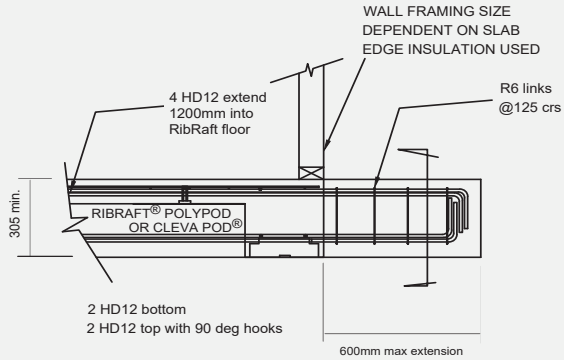
B SECTION UNDER INTERNAL LOAD-BEARING WALLS



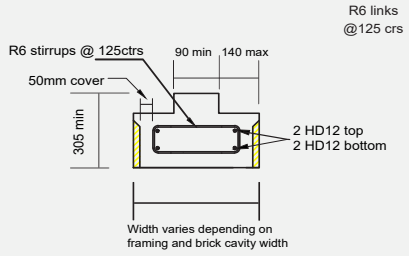
C BRICK VENNER CONSTRUCTION DETAIL



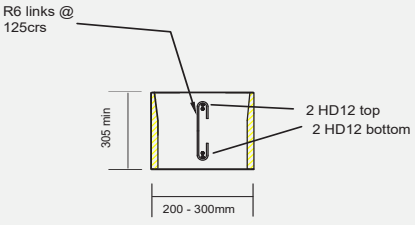
D GARAGE DOOR CONSTRUCTION DETAIL



E **Note: Refer section 4.8 for limitation**
NON-LOAD BEARING WINGWALL DETAIL
(refer to section 4.8 for Wingwall limitations)



BRICK VENEER WINGWALL SECTION



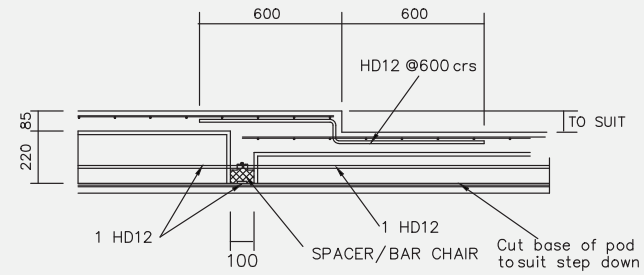
TIMBER FRAMING WINGWALL SECTION

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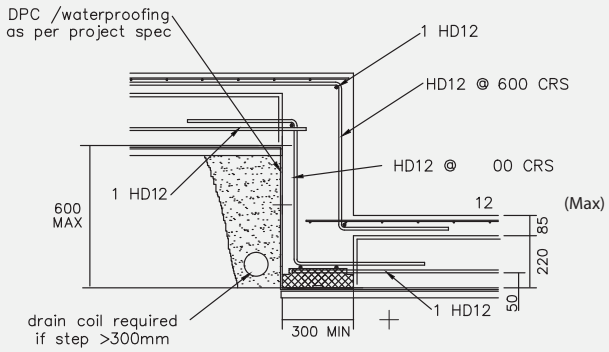
6.9 Step Down Of Up To 600mm In The RibRaft® Floor

Where the site topography requires a step down in the slab, steps of up to 600mm can be accommodated using one of the details provided in Figure 13. A step down in the RibRaft® floor system anchors the floor in that location with respect to volume changes associated with drying shrinkage. As required by 6.4, a free joint shall be provided if the distance from the step down to the slab edge exceeds 15m.

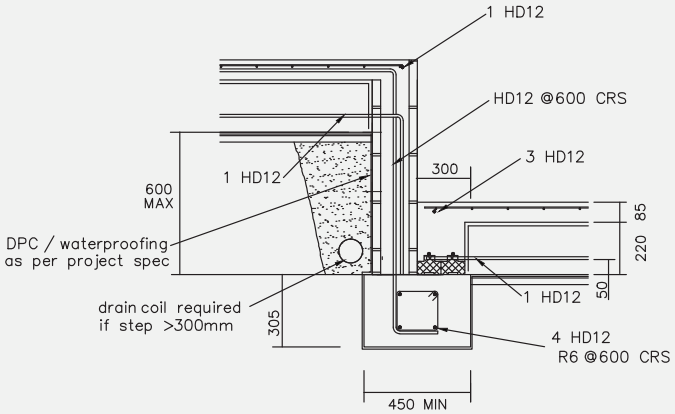
Figure 13. Details where step downs are required in the floor



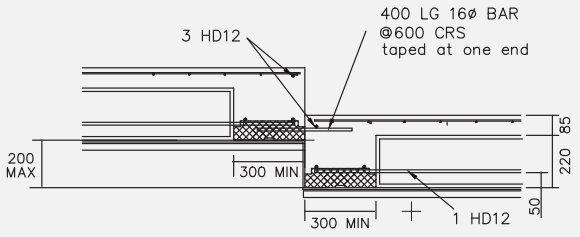
7/S2 SET-DOWN DETAIL FOR STEP UP TO 100mm
(LIMITED TO RECESSES LESS THAN 6m².
USE DETAIL IN 8 BELOW FOR GREATER AREAS).
1:20



8/S2 SET-DOWN DETAIL IN CONCRETE FOR STEP LESS THAN 600mm
1:20



9/S2 SET-DOWN DETAIL IN MASONRY FOR STEP LESS THAN 600mm
1:20



10/S2 SET-DOWN DETAIL FOR STEP 100 TO 200mm FOR SEPARATELY POURED SLABS.
1:20

SECTION: INSTALLATION INFORMATION

2

1.0 THIS SECTION DETAILS THE INSTALLATION INFORMATION REQUIRED FOR THE FIRTH RIBRAFT® FLOOR SYSTEM (THE SYSTEM). FULL INFORMATION ON THE DESIGN PROCEDURES NOT REQUIRING SPECIFIC ENGINEERING INPUT, AND REQUIREMENTS FOR THE SITE ASSESSMENT ARE DESCRIBED IN SECTION 1 OF THIS MANUAL (DESIGN INFORMATION). WHERE STANDARDS ARE REFERENCED IN THIS MANUAL THESE SHALL INCLUDE THE LATEST AMENDMENTS.

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2.0 SITE REQUIREMENTS

2.1 General

The site requirements of this Manual are concerned solely with the soil conditions under or immediately adjacent to the system. If a site does not comply with this Manual, the system shall be subject to specific engineering design.

This Section shall only apply for building sites such that:

> The ground is as specified in Section 1 of this Manual;

> Any system erected at the top of a slope (whether fill compacted in accordance with NZS4431, or natural ground) shall be located as shown in Figure 14 so that the finished ground is always outside the dashed line shown. (The vertical distance, V, shall be measured to 50mm below the underside of the slab).

Where the finished ground does not comply with Figure 14, the slope shall be retained by a specifically designed retaining wall.

2.2 Temporary Excavations

No excavation shall take place at a location or in a manner where the stability of the foundation material is likely to be compromised. The backfilled material shall match the compaction and strength of, and have similar properties to, the surrounding material. The sides of the excavation shall be propped as necessary.

Temporary excavations shall be open for no longer than 48 hours and shall take place only above the critical depth line as shown on Figure 15. Should temporary excavations be required below this line, specific engineering design is required.

2.3 Surface Water

Surface water from the site shall not flow across the slab platform. For example, on cut and fill sites the ground uphill from the system shall be graded to direct any surface run-off away from the system as shown in Figure 16.

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Figure 14. Relationship of RibRaft® to Sloping Ground Surface

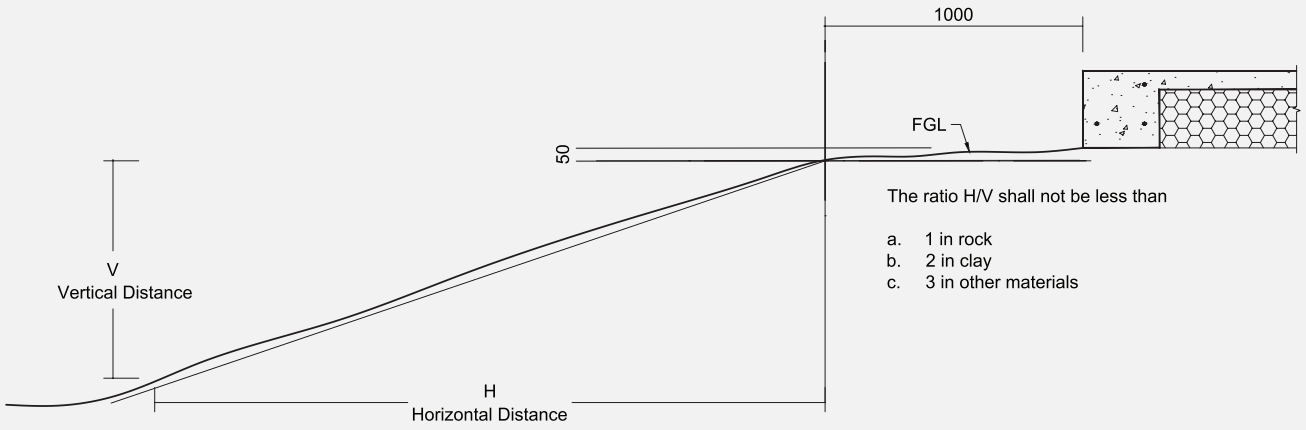


Figure 15. Temporary Excavation Limited

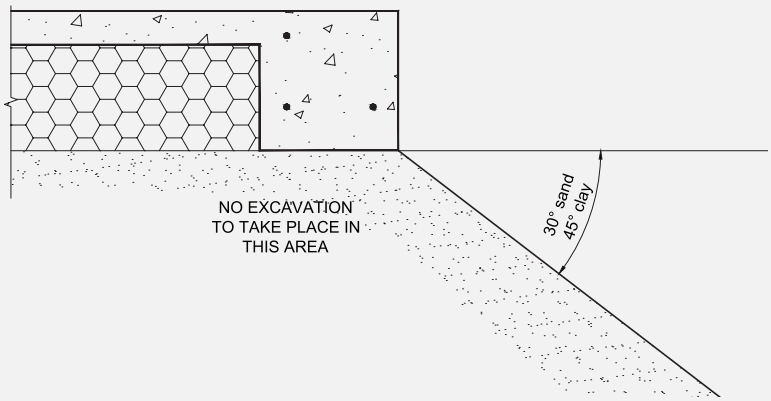
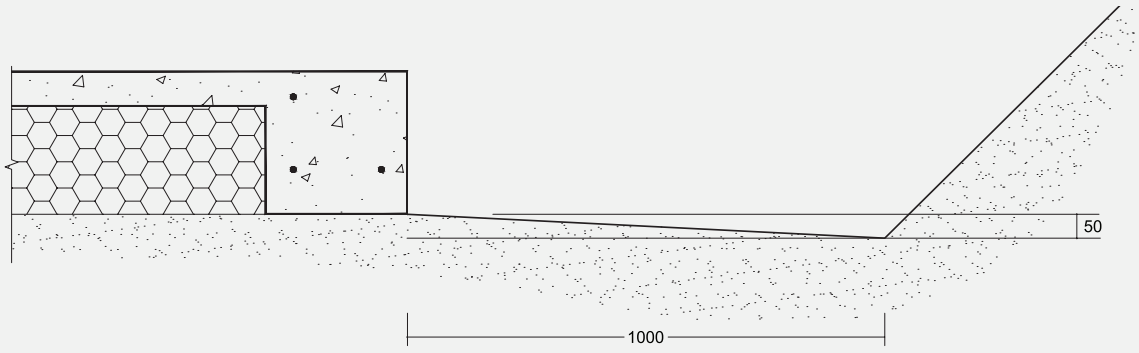


Figure 16. Site Grading



3.0 INSTALLATION PROCEDURE

3.1 Site Preparation

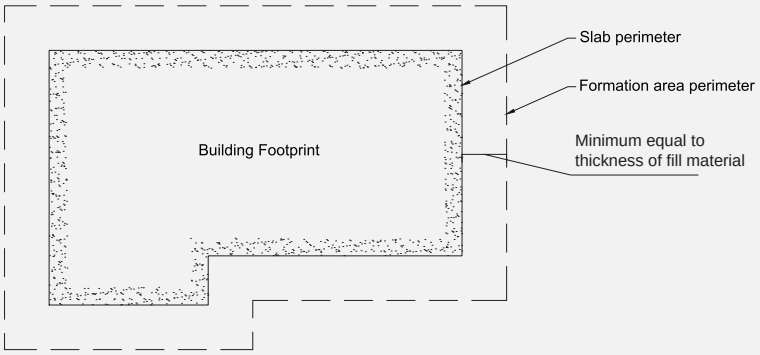
All vegetation, topsoil and other organic or deleterious material shall be removed from the area to be covered by the building (formation area) prior to commencing construction of the system.

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3.2 Earthworks

The formation area shall be cut or filled to a level approximately equal to the floor thickness (including insulation layers) plus 25mm below finished floor level. Where fill is required to achieve this level, the fill shall be certified by a geotechnical engineer (outside the scope of this Manual) or shall be granular fill in accordance with Clause 7.5.3 of NZS 3604 "Timber Framed Buildings". The formation area shall also extend a distance equal to the thickness of the fill material beyond the slab perimeter as shown in Figure 17. The installer shall confirm the acceptability of the ground over the entire building platform before proceeding with the construction. Refer to Clause 3.5 of Section 1 (Design Information) for requirements.

Figure 17. Plan of Formation Area



3.3 Shear Keys

Where shear keys are required, the holes shall be drilled following the site clearing and earthworks, in accordance with Clause 4 in this section, and prior to the construction of the system commencing.

3.4 Plumbing and Services

Plumbing and services required beneath the system should preferably be conveyed underground to their plan location then brought up through the system.
The trenching, placing, and bedding of the pipes/ducts and the backfilling of the trenches shall conform to the requirements of the consent documentation. Services shall not run along ribs or edge beams. The maximum diameters of the services shall be as dictated in
Clause 6.7 of Section 1.

Where required, the services can be installed by removing unnecessary pods and placing pipes within the pod depth. All pipes shall be held firmly in place and have temporary end covers. Any services crossing ribs or the edge beam horizontally shall be placed only within the middle third of the member. Except as noted in
Figure 9 (Section 1) services crossing the ribs vertically shall also be constrained to the middle third of the width of the edge or internal load bearing rib. Except as noted in Figure 9 (Section 1) at no stage shall any of the reinforcement bars be relocated or cut to allow for the services (it is acceptable, however to cut the mesh). In some instances this will dictate the location of the ribs. The pods shall be cut to allow for this and if necessary, the spacing of the ribs shall be decreased locally. There shall be 600mm minimum clear spacing in each direction between penetration equal to or greater than 100mm.

Where the services pass through the top of the pods, the opening shall be sealed to prevent materials entering the sub-floor cavities. (This can be achieved with Denso tape and a type of easily compressible foam.)

Larger penetrations or voids that are required, up to 450mm square (e.g. for shower waste/traps), shall be installed in accordance with all the conditions of this paragraph. These openings shall be trimmed with 1 HD12 bar (Grade 500E) 1500mm long placed along each side of the opening, tied to the mesh. One set of parallel bars shall be placed on top of the mesh and the other set placed under the mesh. These openings shall not be placed over a rib or edge beam. If necessary, the rib spacing shall be reduced or the pod layout altered to ensure that the opening occurs solely in the slab above a pod. Penetrations such as these shall not be installed in garages or other areas where large (>3kN) point loads could be present. Only one penetration greater than 120mm is permitted in the slab above any single pod or part pod. Where two large openings are required to be in close proximity, an internal rib shall separate them. For these large penetrations/voids in the slab, the services shall not be within 25mm of the edges of the void through which they pass, and the opening shall be sealed to prevent materials entering the sub-floor cavities. (This type of opening is normally only required for a shower waste/trap and the installation of the shower ensure that the void is sealed/covered).

Where a recess of up to 50mm is required in the topping to provide a rebate for a shower, the construction details shall be as shown in Figure 13. (Section 1).

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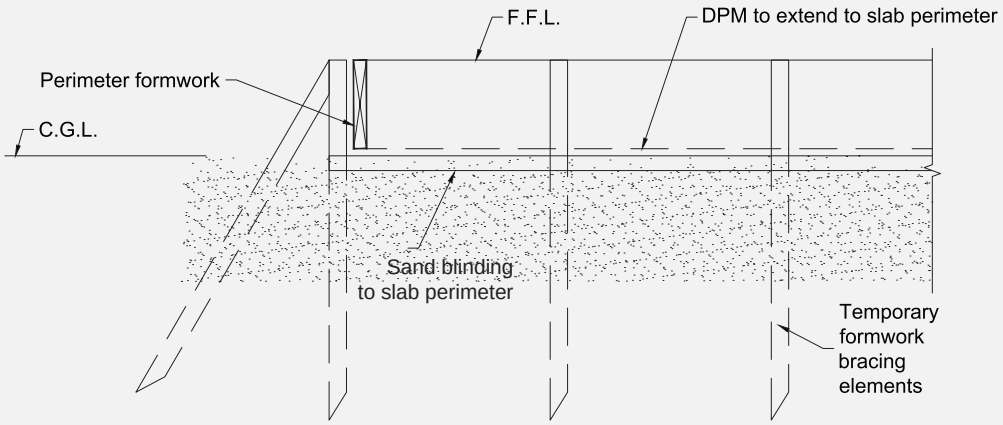
3.5 Sand Blinding

A layer of sand shall be placed, screeded and compacted over the building platform, extending to the outside edge of the perimeter foundation, refer Figure 18. The maximum thickness of this blinding layer shall be 50mm. The surface shall be level and a minimum of the floor thickness below finished floor level. A small plate compactor, vibrating roller or similar, should be used to compact the sand blinding layer. When the building platform is clay, it is essential that the blinding sand is compacted onto a clay surface that has not been softened by construction activities. If the clay has been softened (i.e. has a muddy surface layer due to construction activities), remove the softened material from under the RibRaft® ribs before placing the sand. If excavation lowers the clay surface to more than 50mm below the underside of the RibRaft®, fill shall be placed in accordance with Clause 7.5.3 of NZS 3604 “Timber Framed Buildings”. The sand is required to be level to ensure that pods or underfloor insulation remain stable throughout the installation of the system.

3.6 Damp Proof Membrane

The damp proof membrane (DPM) material shall be polyethylene sheet in accordance with NZS 3604:2011. The DPM shall be laid over the entire building platform directly on top of the sand blinding layer, extending to the outside of the edge beam – refer Figure 18. below.
The joints shall be lapped not less than 150mm and sealed with pressure sensitive tape not less than 50mm wide.
All penetrations of the DPM by plumbing and services or punctures during construction shall also be sealed with pressure sensitive tape. The DPM may extend beyond the edge of the slab i.e. underneath the formwork, or may be folded and stapled up the inside of the formwork. The minimum requirement is that the DPM extends to the outside of the edge beam. It is very important that the DPM is not bunched up at the formwork. The installer shall ensure a square and tidy finish at the underside and at all corners of the
edge beam.

Figure 18. Sand blinding / DPM / Formwork Details



3.7 Edge Formwork

The edge formwork shall be constructed ensuring that the requirements of NZS 3109:1997 “Concrete Construction” are adhered to. The formwork shall be adequately supported and braced to prevent any buckling or warping. If the wall is to be constructed in masonry veneer, formwork for a masonry veneer rebate should be adequately fixed to the perimeter formwork.

Thorough cleaning of re-useable formwork and the use of release agents enhances the life and performance of formwork and maintains a quality surface finish.

3.8 Laying insulation, Pods, HotEdge® and spacers

Where below pod insulation has been specified on the drawings, lay polystyrene sheets over the entire foot print on the DPM. Butt joint sheets against each other and to the internal face of the formwork or insulation. Cut as necessary to fit.

The Firth RibRaft® polystyrene pods or Cleva pods shall be laid out over the DPM or underfloor polystyrene as appropriate. Where the drawings specify 300mm pods with XPS in ribs, lay 50mm XPS cut to fit in all ribs and beams. Where the drawings specify Firth HotEdge® or HotEdge Extra® and/or HotEdge Base®, install as per Firths literature (refer Firth website). The edge beam shall be formed using the Firth approved 300mm spacers (refer Figure 22. p29). These shall be placed at a maximum of 1200mm centres along the perimeter of the slab and one per pod or part pod. Ribs supporting a load bearing wall shall be formed using a minimum of one Firth approved 300mm spacer along the edge of each pod or part pod.

For the insulation of Cleva Pods® refer to the Cleva Pod installation guide www.clevaco.co.nz

For poly pods, except where a 300mm wide rib is required, each pod or part pod shall always be separated by 100mm using a minimum of one Firth approved 100mm spacer along each edge of each pod or part pod. The ribs in both directions shall form a waffle pattern throughout the slab. It is essential that the ribs and edge beams are straight when the concrete is poured, i.e. the pods need to be lined up. Figure 19. shows a detailed layout of the pods and spacers.

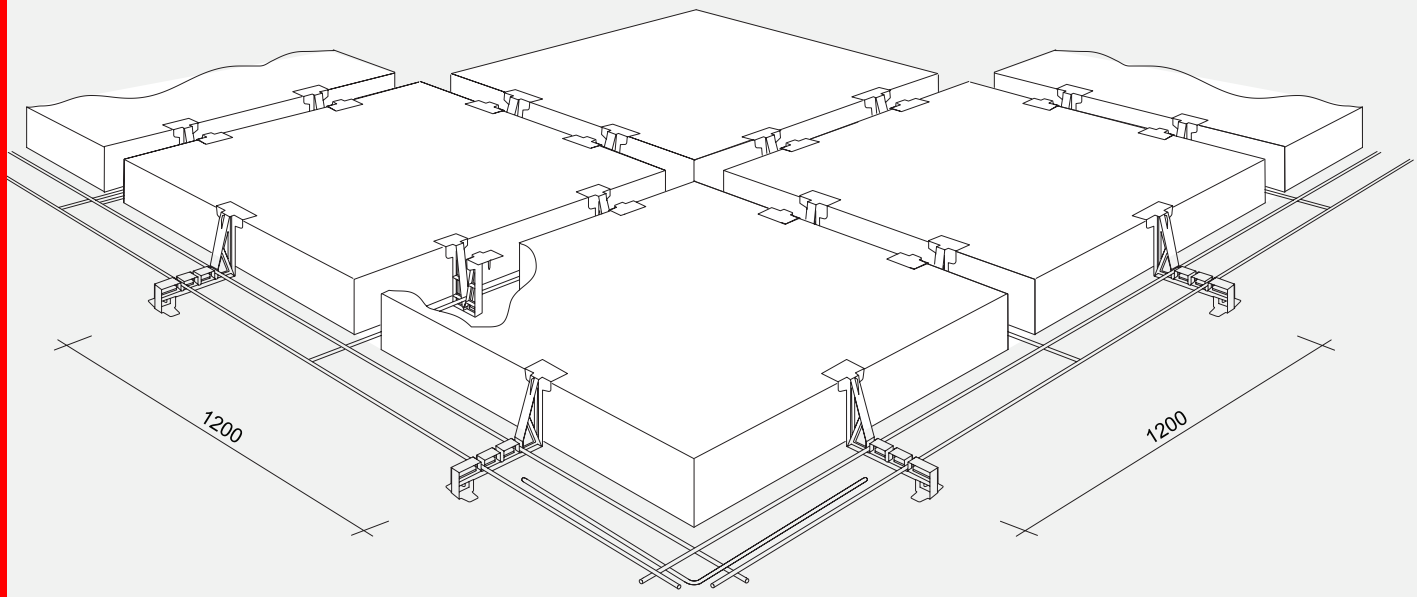
Where the shape of the house plan dictates, it may be more practical to consider the floor to be made up of different segments. The pods in each segment shall be in a regular waffle pattern – refer right hand side of Figure 20. Where these segments meet, the pods shall be cut to suit and the ribs made to join. The non right-angle rib junctions created by this approach are acceptable.

Alternatively, it is also acceptable to keep the orientation of the pods constant throughout the plan and have non right-angle junctions between the ribs and edge beam – refer left hand side of Figure 20.

As can be seen from Figure 20. it is not necessary for the pods to line up perfectly with the edge beam. It is acceptable to cut the pods (i.e. use part pods).

Firth 100mm spacers and Firth 300mm spacers can not be used with 300mm pods. WJ100 & WJ101 are suitable for both 220 & 300mm pods.

Figure 19. Detailed layout of Pods and spacers (mesh and top steel omitted for clarity)



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3.9 Reinforcing Steel

Reinforcing bars shall conform to NZS 4671:2019 “Steel Reinforcing Materials”. All bars shall be of deformed type (Grade 500E). All bends shall be made cold without fracture and in accordance with the bend diameters given in NZS 3109 “Concrete Construction”. Welded lap joints are not permitted.

Reinforcing steel in the slab shall consist of Welded Reinforcing Mesh complying with AS/NZS 4671:2019 with a minimum weight of 2.27kg/m, a lower characteristic stress of 500MPa, square configuration of orthogonal bars between 150 to 200mm centres, and ductility class L or E, hereafter referred to as “mesh”. The presence of Class 500E reinforcing bars in the ribs and beams provides adequate ductility of the system which allow the use of class L mesh. Typically the topping mesh reinforcement will be 665 mesh (class L) or SE62 ductile mesh, each being equally applicable

Figure 19. shows the detailed layout of the spacers and the steel in the edge beam and the standard ribs.

Figure 20. Typical Pod And Rib Layout

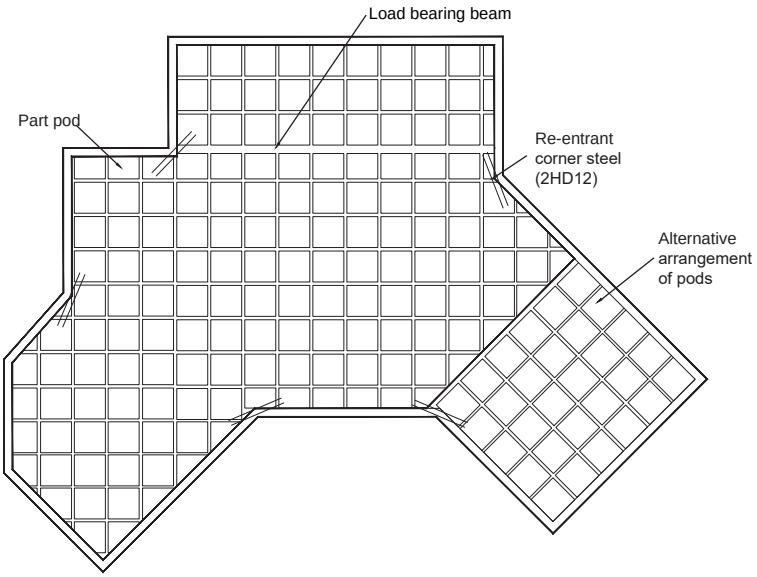
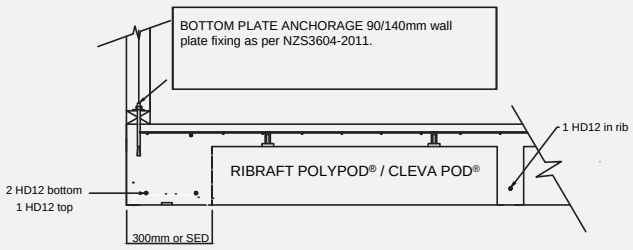
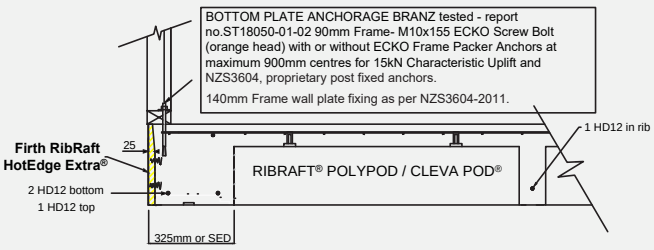


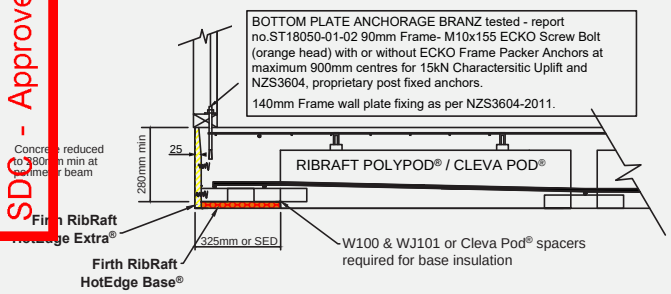
Figure 21.



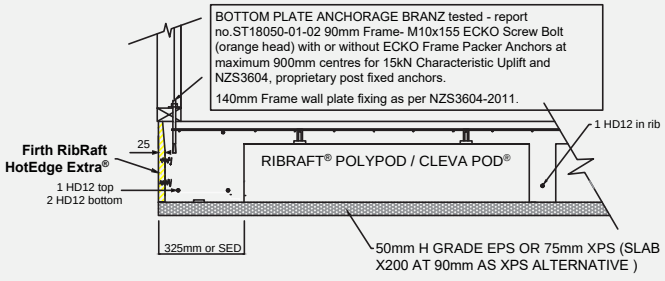
Ⓐ 220mm FIRTH RIBRAFT® POLYPOD
90mm WALL FRAME- NO INSULATION
FIRTH RAFTMIX 20 OR 25MPa



Ⓑ 220mm FIRTH RIBRAFT® POLYPOD
90mm WALL FRAME HOTEDGE EXTRA®
FIRTH RAFTMIX® 20 OR 25MPa



Ⓒ 220mm FIRTH RIBRAFT® POLYPOD
90mm WALL FRAME HOTEDGE EXTRA® & HOTEDGE BASE®
FIRTH RAFTMIX® 20 OR 25MPa



Ⓓ 220mm FIRTH RIBRAFT® POLYPOD
140mm WALL FRAME HOTEDGE EXTRA® & UNDERSLAB INSULATION
FIRTH RAFTMIX® 20 OR 25MPa

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3.10 Edge Beam Steel

Two edge beam reinforcing bars shall be placed in the bottom of the edge beam and supported in the correct position by the Firth spacers, as shown in Figure 21. One edge beam bar shall be tied below the mesh at the perimeter of the area covered by the polystyrene pods as shown in Figure 21.

All steel shall be lapped a minimum of 60 bar diameters (720mm for 12mm steel). Tying of the edge beam steel is only required at corners. Figure 22. shows the layout for the edge beam bottom steel bars at the corner. The inner bottom bars and the top bars shall cross each other and extend to 75mm from the outside face of the edge beam as shown. These bars shall be tied together where they cross. For solutions using veneer rebates the top bars shall terminate 50mm from the inside face of the rebate and be tied where they cross.

3.11 Rib Steel

Rib reinforcing steel shall be placed in the bottom of the internal ribs and supported in the correct position by approved spacers. Figure 23. shows the spacers, and Figure 19 shows a detailed section identifying how the steel is located in the spacers. The 300mm spacer shall be used for the 300mm wide internal ribs. These spacers ensure that cover to DPM below the base is greater than 50mm and cover to the exterior perimeter is 75mm.

All steel shall be lapped a minimum of 60 bar diameters (720mm for 12mm steel). At junctions with the edge beam, each rib steel bar shall sit on top of the edge beam bars, and extend to the outermost bar. The 75mm cover to the edge of the beam shall still be allowed for. Two HD12 bar (Grade 500E) shall be placed in the bottom of each 300mm wide rib. For perimeter 300mm edge beams a HD12 bar is also required in the top at the beam.

3.12 Mesh Reinforcing

Mesh reinforcing shall be placed over the pods and supported on mesh chairs to achieve minimum concrete cover. At laps the overlap of the outermost cross wires of the sheets shall be the spacing of the wires plus 50mm.

3.13 Re-entrant Corner Steel

Two HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner as detailed in Figure 20 (this steel is to help reduce the width of cracks that may develop at this location)

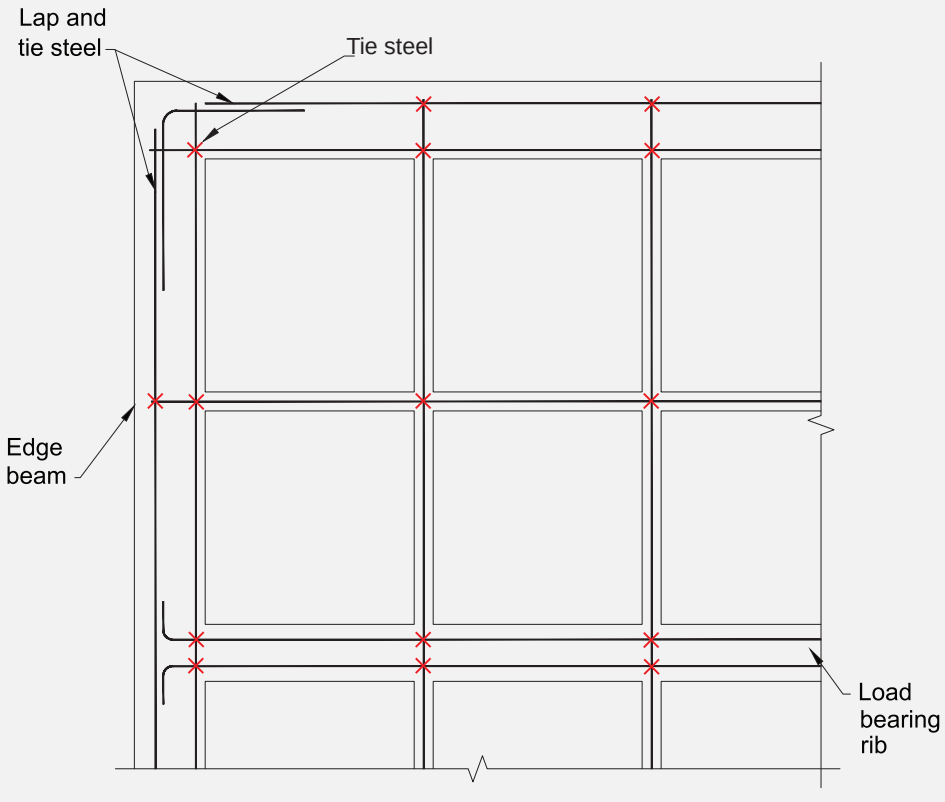


Figure 22. Corner steel layout

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3.14 Concrete Installation

To comply with this manual, Firth Certified Concrete must be used. Concrete placing, finishing and curing shall be in accordance with NZS 3109:1997, Clause 7.

3.15 Placing

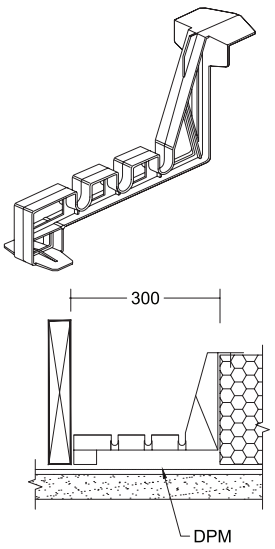
Only RaftMix® or RaftMix® 25 concrete supplied by Firth Industries, shall be used in the floor. These two different concrete mixes shall be used in the following instances:

- **RaftMix® – a 20MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. For Cleva Pod® use Firth 20MPa (mix code: RC2019AW).**
- **RaftMix® 25 – a 25MPa 100mm slump mix available as a pump mix suitable for 100mm pump lines available in either a 13mm or more usually a 19mm nominal aggregate size, or as a structural (non-pump) mix. This mix shall be specified for buildings constructed in the 'sea spray zone' (i.e. within 500m of the sea including harbors, within 100m of tidal estuaries or inlets, on offshore islands and elsewhere defined as exposure Zone D in 4.2.3.3 of NZS3604). For Cleva Pod® use Firth 25MPa (mix code: RC2519AW)..**
- **Check the drawings for the project. Where the specifier aims to achieve a lower carbon footprint, the concrete specification may request an EC rating. These mixes are designed to achieve the specified strength and a maximum specified carbon footprint. When ordering concrete ensure the EC rating is communicated when its specified.**

Figure 23. Spacer Details

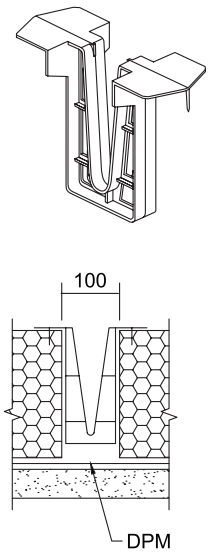
Firth 300mm Spacers

Use only with 220mm polystyrene pods where HotEdge Base® is not utilised.



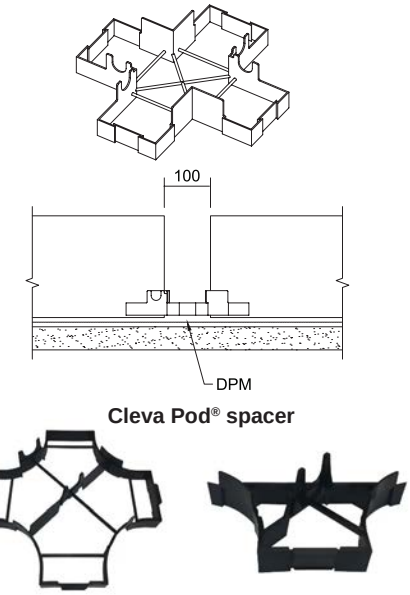
Firth & Cleva Pod® 100mm spacers

Use for 220mm pods



WJ100mm spacer & Cleva Pod® spacer

Use for 220 or 300mm pods or for options using HotEdge Base®. Use a WJ101 extension with WJ100 Spacer when creating a 300mm perimeter beam extension.



Cleva Pod® spacer

The concrete supplied by Firth shall be poured in such a way to ensure that the pods remain in position during placing (Firth recommends that small amounts of concrete be placed on top of the pods prior to the ribs being filled). The concrete shall be compacted with the use of an immersion vibrator around all steel and into all corners of the formwork.

3.16 Finishing

Screeding with the aid of a level shall commence immediately after compaction. Unless specifically installed as a screeding datum, the top of the formwork shall not be assumed as level and thus shall not be used for screeding purposes. Final finishing with a trowel shall take place after all the bleed water has evaporated. The edge of the slab and rebates shall be tooled to prevent chipping of the top of the slab.

Early age care of the slab shall be in accordance with good trade practice appropriate for the weather conditions – refer Concrete New Zealand website sections if further guidance is required:

https://concretenz.org.nz/page/early_age_crack	Early Age Crack Control
https://concretenz.org.nz/page/hot_cold_weather	Hot and Cold Weather Concreting

The surface shall be a blemish-free surface to class U3 finish (Refer NZS 3114:1987 "Specification for Concrete Finishes").

3.17 Curing

Proper curing of the concrete must take place immediately after finishing the concrete. One of the following methods of curing is recommended:

> Ponding or continuous sprinkling of water.

> Placing a wet covering or plastic membrane over the slab.

> The use of liquid membrane curing compounds. However if these are used, they must be compatible with any subsequent applied surfacing.

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3.18 Shrinkage Control Joints

Shrinkage control joints reduce the risk of unwanted cracks, and their placement needs to be carefully considered where uncontrolled cracking could be unacceptable. Two types are described here: saw cut joints (which are tied joints), and free joints.

3.19 Saw Cut Joints

Saw cuts are located at positions in which the concrete is likely to crack due to stresses induced by restrained shrinkage. The aim of providing them is for the concrete to crack at the bottom of the saw cut thus minimizing the potential for a visible crack wandering over the surface. The level of reinforcement provided in a RibRaft® mean that cracks have no structural implications being only an aesthetics issue. Factors to consider are the type of floor finish, the location of ribs and ground beams, underfloor heating and the effect of piles restraining shrinkage.

When warm sunny days are followed by cool nights, the change in temperature can cause cracking. Hence preference should be given to using early entry saws which are used immediately after finishing. Shrinkage control joints cut using diamond blades shall be cut as early as possible which is typically within 24 hours of hardening in summer, and 48 hours in winter.

They shall be cut to a depth of 25mm. Shrinkage control joints do not guarantee to eliminate all visible or unwanted cracks.

Joints shall be positioned to coincide with major changes in floor plan. Where concrete is to be exposed, for example in a garage, or brittle covering placed over, the maximum intermediate bay sizes shall be limited to 5m. Bay dimensions formed by shrinkage control joints shall be limited to a maximum ratio of length:width of 1.5:1. Shrinkage control joints shall be placed over 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide load bearing rib, then the joint shall be located directly above one edge of that rib.

In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 20.

It is reccommended to use saw cuts where the slab is restrained by either stepdowns or shear keys.

3.20 Free Joints

Where the length of the floor exceeds 30m a free joint shall be provided as detailed in Section 1, Figure 8. Movement, shrinkage and thermal, will occur over this joint so it shall be positioned to minimize the impact of this movement on floor coverings and wall elements.

Where the bottom of the RibRaft® is not flat (for example the floor incorporates a step down), free joints shall be provided if the distance from the step down to edge of slab exceeds 15m.

3.21 Removal of Formwork

The formwork shall not be removed prior to 12 hours after the slab has been finished. No installation loads are to be placed on the system before adequate curing has taken place.

3.22 Masonry Veneer

Where the building is to be clad with masonry veneer, the rebate in the edge beam shall be waterproofed with a bituminous sealer due to the possibility of ponding of water. Firth recommends a Flintcote® or equivalent coating on both the vertical and horizontal faces of the rebate.

3.23 Landscaping/Paving

Landscaping and/or paving adjacent to the slab shall be kept as a minimum the specified distance below finished floor level as required by NZS 3604. The landscaping shall allow for large trees to be kept sufficiently away from the edge of the slab. This is to prevent the tree roots from disturbing the soil moisture conditions under the slab. As a guide, trees should be as far away from the edge of the slab as they are tall when fully grown.

3.24 Ongoing Maintenance

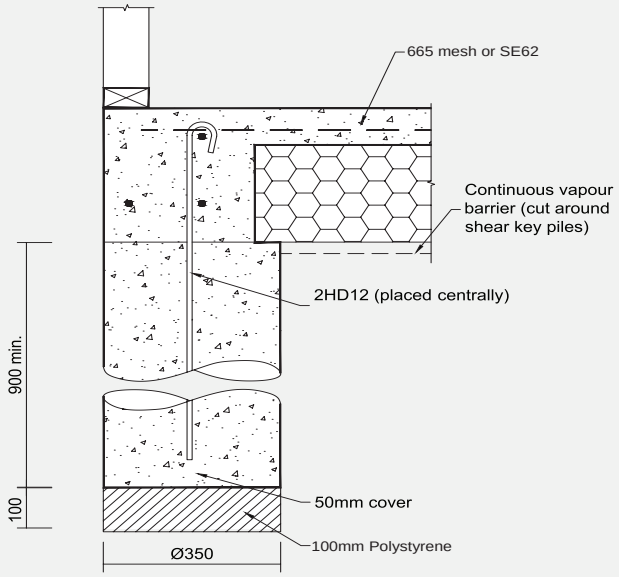
The building owner shall ensure that the ground surrounding the system be maintained so that the integrity of the system is not jeopardised. In other words, at no time shall the ground immediately adjacent to the system be allowed to settle away to expose the underside of the slab.

4.0 SHEAR KEYS

Shear keys, if required, shall be provided to conform to the requirements of Section 1 of this Manual. Holes for the shear keys shall be drilled at least 1000mm deep. Into the bottom of each hole a RibRaft® Shear Key Support shall be placed. Every precaution shall be taken to ensure that the shear key support is laid level and at the base of the hole. The minimum depth of concrete placed on the support shall be 900mm. Refer to Figure 24 for construction details.

The connection steel (2HD12 Grade 500E) shall be secured in place and held during pouring to ensure the bars are correctly located. The concrete for the shear keys can be placed separately to the rest of the floor and shall be finished level to the top of the sand blinding layer, or poured in one pour with the RibRaft® floor. If poured separately the top surface of the shear key shall be finished rough to ensure a good join to the Firth RaftMix concrete in the system and the DPM shall be neatly cut around the shear keys.

Figure 24. Shear Pile Construction Detail



5.0 BOTTOM PLATE ORIENTATION

When 90mm framing is used in combination with HotEdge Extra, care is required to achieve the correct overhang of the bottom plate relative to the exterior face of the HotEdge Extra board. As the overhang increases, the edge distance of the hold down bolts decreases, as does the bearing area of the bottom plate.

Figure 25. Overhang Detail for 90mm framing with HotEdge Extra

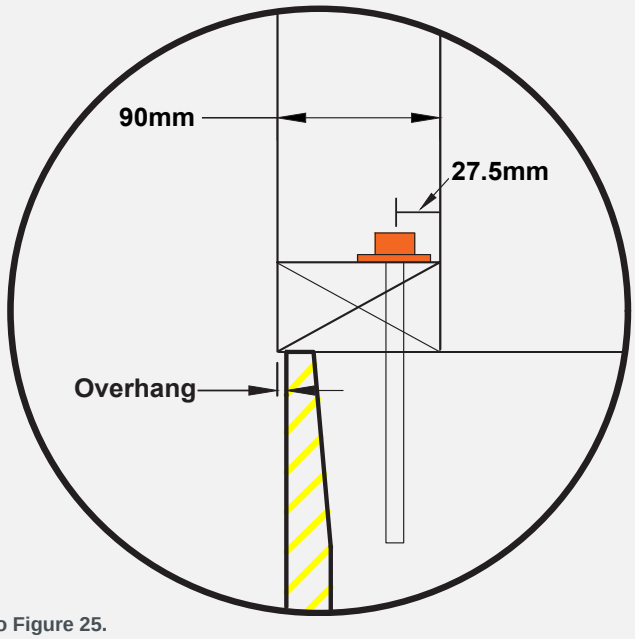


Table 6. Overhang mm at hold down bolt or stud location with reference to Figure 25.

OVERHANG DETAILS	
0 - 5mm	Target overhang, details as per this technical manual.
>5 - 10mm	Over target, reduce hold down bolt spacing from 900mm ctr to 600mm ctr. If bracing (15kN) anchors required, duplicate anchor each side of stud. Where duplication not possible seek specific engineering advice.
>10mm	Overhang outside scope of this manual, seek specific engineering advice.

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CMNZ70056

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1.0 DESIGN

Verification that the design complies with the structural limitation outlined in this Manual is the responsibility of the designer, and shall be confirmed by the Building Consent Authority issuing the Building Consent. Solutions outside the limitations outlined in this Manual will require specific engineering design.

2.0 CONSTRUCTION

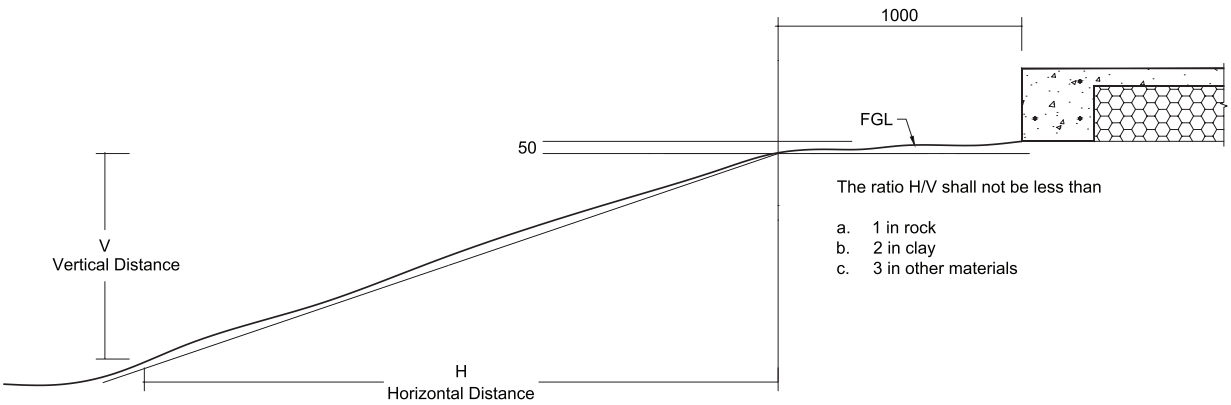
The RibRaft® foundation system has been designed to accommodate structures complying with the non specific design standards NZS3604 or NZS4229. With these types of structures the Building Consent Authority specifies the inspections required and often conducts these. A similar construction verification process shall be applied to the RibRaft® system.

To assist inspection the following check list has been prepared for structures complying with the limitation:

PRE-LAYOUT INSPECTION CHECK LIST

- GOOD GROUND CONFIRMED AS PER NZS3604, CLAUSE 3.1.3. OR SCALA OR SHEAR VANES TESTS CONFIRM ADEQUATE BEARING CAPACITY.
- VEGETATION, TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL REMOVED.
- PROXIMITY TO SLOPE-GROUND SURFACE IS ALWAYS ABOVE DASH LINE SHOWN IN FIGURE 25.
- SHEAR PILES (WHERE REQUIRED) IN PLACE AND REINFORCEMENT PROTRUDING.
- FORMATION AREA EXTENDS AT LEAST THE DEPTH OF GRANULAR FILL BEYOND BUILDING FOOTPRINT AND COMPLIES WITH SECTION 3.2 OF PART 2.
- STEPS IN THE FORMATION ARE DETAILED IN ACCORDANCE WITH THIS MANUAL.

Figure 25. Relationship of RibRaft® To Sloping Ground Surface



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PRE POUR INSPECTION CHECK LIST

PERIMETER FOUNDATION	○ WIDTH 300MM(1)
	○ REINFORCEMENT 2 X HD12 BOTTOM, 1 X HD12 TOP
	○ FIRTH SUPPLIED SPACER USED AT 1.2M MAXIMUM CENTRES
	○ HOTEDGE®, HOTEDGE EXTRA® OR HOTEDGE BASE® INSULATION INSTALLED AS SPECIFIED
INTERNAL RIBS	○ WIDTH 100MM
	○ REINFORCEMENT 1 X HD12
	○ FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
LOAD BEARING RIBS	○ WIDTH 300MM
	○ REINFORCEMENT 2 X HD12 BOTTOM
	○ FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
PODS	○ FIRTH SUPPLIED RIBRAFT® POD OR CLEVA PODS®
MESH	○ MESH CHAIRS 1.2M MAX CENTRES, MIN TWO PER POD OR ONE PER PART POD
	○ MESH IN PLACE AND 665 OR SE62
	○ MESH LAPS OVERLAP OF OUTERMOST CROSSWIRE = MESH SPACING + 50MM
REINFORCEMENT	○ 2 X HD12 BARS 1.2M LONG PROVIDED AT RE-ENTRANT CORNERS
	○ LAPS FOR 12MM REINFORCEMENT MINIMUM OF 720MM
CONCRETE	○ COVER PODS TO MINIMUM OF 85MM OR 110MM IF IN-FLOOR HEATING USED
	○ FIRTH RAFTMIX® ORDERED
SERVICE PENETRATIONS	○ NO REINFORCEMENT (WITH EXCEPTION OF MESH) CUT TO ALLOW PASSAGE OF SERVICE PIPES. REFER CLAUSE 6.7 OF SECTION 1 FOR EXCEPTIONS
	○ PIPES WRAPPED WITH MINIMUM 6MM THICKNESS OF IMPERMEABLE COMPRESSIBLE MATERIAL WHERE IN CONTACT WITH CONCRETE
	○ DIAMETER/SIZE OF PENETRATIONS AS PER TABLE 5, SECTION 1 OF THIS MANUAL

FRAMING BOTTOM PLATE INSPECTION CHECK LIST

APPLICABLE ONLY WHEN 90MM FRAMING IS USED WITH HOTEDGE EXTRA

BOTTOM PLATE OVERHANG (AT STUD OR BOLT LOCATIONS)	○ AS SPECIFIED IN 5.0 SECTION 2
BOTTOM PLATE ANCHOR	○ AS SPECIFIED IN 4.9 SECTION 1
BOTTOM PLATE GRADE	○ AS SPECIFIED IN 4.9 SECTION 1

(1) At locations of service penetrations the width of the perimeter foundation may be locally increased. Refer Figure 10 Section 1 for details. When RibRaft HotEdge is used, the 300mm refers to the concrete width, see Fig. 5 Section 1.

NOTES:

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CONCRETE & MASONRY PRODUCTS: A SUSTAINABLE BUILDING OPTION & SOLUTION

- Environmentally compliant manufacturing plants
- Surplus water and some aggregates recycled
- Low transport impacts
- Leftover concrete returned from construction sites
- Passive solar heated thermal mass makes completed buildings more energy-efficient
- Most wash water returned from construction sites
- Highly durable, low maintenance buildings and no rot
- High degree of noise control
- Inherent fire resistance
- Overall longer effective building life
- Demolished concrete can be recycled as hard fill or aggregate

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ABODO

Abodo CodeMark
Weatherboard Cladding System



CodeMark
(CMNZ70046)

Carefully Crafted Timber

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1.Scope

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1.1. Intended Use

The Abodo CodeMark weatherboard system is designed for use as cladding for residential and small commercial buildings. It is only suitable for buildings with a 'Risk Score' of 20 or below as per the 'Weather Tightness Risk Matrix' outlined in E2/AS1. Refer to the Department of Building and Housing's booklet titled 'External moisture - a guide to using the risk matrix' for more information.

This is an Alternative Solution in terms of NZBC compliance.

1.2. Performance

When installed and maintained as specified by a qualified tradesman using accepted trade practices it will meet the following requirements of the NZBC (New Zealand Building Code as contained in the Building Regulations Act 1992):

- B1 Structure
- B2 Durability
- E2 External Moisture
- F2 Hazardous Building Material

1.3. Wind Zones

This solution is only acceptable for wind zones up to and including 'Very High' as defined in NZS 3604. Extra High wind zones will require a rigid underlay and larger flashings.

1.4. Mass

All products are approximately 12 kg/m2 – classed as a 'light weight cladding' under NZS3604.

1.5. Minimum Life

All weatherboards have minimum 15-year durability as required by NZS 3602, given normal maintenance.

1.6. Serviceable Life

In addition to the above minimum life, this cladding system is expected to have a serviceable life of at least:

Sand Primed	H3.2 treated, paint finish	50 years
Sand	H3.2 treated, stain finish	40 years
Vulcan Primed	Thermally Modified, paint finish	40 years
Vulcan	Thermally Modified, stain finish	30 years
Stratos Primed	H3.1 Azole treated, paint finish	30 years
Stratos	H3.1 Azole treated, stain finish	25 years
Tundra	Stain finish	25 years

This serviceable life is subject to the installation, Paint, Coating and Maintenance requirements specified in this manual.

1.6.1. Coating and priming

Although these are generally factory-coated products, on-site fi nish coating will be required to achieve serviceable life span.

All coating is to be done according to coating manufacturer's instructions in a well-ventilated area. Refer to the coating/ primer supplier for all matters relating to health and safety. All relevant sections of standard AS/NZS 2311:2009 (Guide to the painting of buildings) shall be adhered to.

1.6.1.1. Stain finish weatherboards

To achieve the above serviceable life:

- All cut, notched and/or timber-exposed areas must be coated with 2 coats of oil or stain or Abodo end seal.
- All exposed faces must be coated with at least 2 coats of quality stain or penetrating wood oil, non-exposed faces must have at least 1 coat.
- Refer Coating section on stained weatherboards for further details

1.6.1.2. Paint finish weatherboards

To achieve the above serviceable life:

- All cut, notched and/or timber-exposed areas must be coated with primer.
- All exposed faces must be coated with 2 coats of alkyd or 100 percent acrylic exterior paint top coat.
- Refer Coating section on paint finish weatherboards for further details.

1.6.2. Maintenance

The life spans specified above apply to structural performance and weather tightness only. Appearance will degrade over time if maintenance requirements are not adhered to in accordance with the maintenance section of this manual.

1.7. Handling

- Weatherboards and accessories must be kept clean dry, under cover and out of the weather prior to installation.
- Timber must be stored horizontally on bearers at least 100mm off the ground.
- Wear dust mask, gloves, ear and eye protection when working with timber.

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1.8. Resource and forestry certification

All timber for Abodo CodeMark weatherboards is sourced from plantation forests in New Zealand. Generally the products are supplied as FSC (Forest Stewardship Council) Mixed Credit CoC certified. FSC Pure certification is available on request. FSC No. SGS-COC-004944.

1.9. Limitations

- Abodo CodeMark weatherboards must be installed by a Licensed Building Practitioner.
- This document is not exhaustive in its scope. Responsibility for design lies with the specifier or responsible party for the project to ensure the final design meets the requirements of the intended application and the NZBC
- For designs outside the scope of this technical specification, specific design must be undertaken by the architect or designer. Advice on this is available from Abodo.

2.Critical System Components

All critical system components must be supplied or approved by Abodo. Using non-approved components will invalidate the CodeMark certification.

Critical components are:

i. Timber substrates

i.1. Sand – H3.2 treated radiata pine

i.2. Vulcan – Thermally Modified radiata pine

i.3. Stratos – Azole treated radiata pine

i.4. Tundra – Douglas fir heart wood

ii. Sand weatherboards

iii. Vulcan weatherboards

iv. Stratos weatherboards

v. Tundra weatherboards

vi. Cavity Battens

vi.1. Cavity batten

vi.2. Castellated cavity batten

vii. Wall underlay

viii. Mouldings

ix. Flashings

x. Fixings

2.1. Timber Substrate Types

2.1.1. Sand and Sand Primed

2.1.1.1. Material

New Zealand Radiata pine treated to H3.2 hazard class according to NZS3640 with ACQ (alkaline copper quat) or MCA (micronized copper azole). Both treatments are low human toxicity, non-chrome, non-arsenic preservative systems.

Sand features vertical or 'quarter sawn' grain orientation in all boards that creates enhanced stability and reduces surface checking (cracking) in service.

2.1.1.2. Lamination

Sand weatherboards may be supplied in laminated form with vertical grain orientation on the face of the board. The laminations are made according to NZS1328 with Type 1 polyurethayne adhesive that is approved for Service Class 3 applications (exterior exposed to the weather). No added formaldehyde.

2.1.1.3. Grade

Generally supplied as Clears, Select or Premium grade according to Abodo appearance grade rules.

2.1.1.4. Durability

Expected serviceable life- above ground

Sand Primed H3.2 treated paint finish – above-ground durability 50 years

Sand H3.2 treated stain or oil finish – above-ground durability 40 years

Warranty 30 years against fungal decay and insect attack (subject to terms and conditions - warranty documentation is available on request).

2.1.1.5. Coating

Sand Primed must have alkyd or acrylic primer applied all sides and 2 coats of alkyd or 100 percent acrylic exterior top coat applied to front face and edges. Then it must be maintained periodically as described in the maintenance section of this manual as required.

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Sand must be coated with at least 1 coat of stain (eg Resene Woodsman) or oil (eg: Abodo Protector) all sides and 2 coats on the front face and edges. Then maintained every 2-3 summers as appropriate in the maintenance section of this manual.

All cut ends and notches must be sealed with a coat of paint, stain or oil, or wax end sealer as appropriate to the product being used

Colours with an LRV of 45% or more shall be used to reduce the chance of timber warping in service. Dark colors such as black are not recommended, especially in heavy sun-exposed situations.

All coating is to be done according to coating manufacturer's instructions in a well ventilated area. Refer to the coating/ primer supplier for all matters regarding application.

2.1.1.6. Resource and forestry certification

Sourced from plantation forests in the North Island of New Zealand. Generally supplied as FSC Mixed Credit CoC certified FSC No. SGS-COC-004944 (FSC Pure certification is available on request).

Living Building Challenge- 'Red List' free

2.1.1.7. Technology

The technology behind Sand weatherboards is covered by NZ patent 601245.

2.1.1.8. Corrosivity

ACQ preserved timber shall be isolated from contact with metal and requires stainless steel, silicone bronze or copper fixings. MCA preserved timber has been shown to have very low corrosivity on metals- similar to untreated timber. Therefore it can be placed in contact with most materials and regular fixings can be used.

2.1.2. Vulcan and Vulcan Primed

2.1.2.1. Material

New Zealand radiata pine thermally modified to a minimum TM230 degrees schedule. The thermal modification process uses high temperature and steam to drive out resin and permanently modify the cell structure of the timber. This creates a natural timber product that is chemical free, non-toxic and that has very low resin content, increased stability, high durability, enhanced thermal properties and a homogenous brown colour though out the timber.

Vulcan stain finish cladding features engineered vertical or 'quarter sawn' grain orientation in all boards that creates enhanced stability and reduces surface checking (cracking) in service.

2.1.2.2. Colour

The colour of Vulcan is a rich chocolate brown. The colour will fade quickly with exposure to the weather if left uncoated.

2.1.2.3. Timber Strength

The thermal modification process leads to some reduction in stiffness (MOR) of around 30%, however bending strength (MOE) is reduced slightly and compression strength is maintained.

2.1.2.4. Fixings holding strength

Nail holding strength remains the same as for radiata pine. Screw hold strength is 20% less than radiata pine.

2.1.2.5. Thermal Performance

Thermal conductivity of thermally modified wood is reduced by 20-25% compared with normal softwood timber. Approximately 0.099W/(mk)

2.1.2.6. Moisture Content

Approximately 7% when packed at the factory

2.1.2.7. Density

Approximately 430 kg/ m3

2.1.2.8. Hardness

Low-medium

2.1.2.9. Lamination

Vulcan weather boards may be supplied in laminated form with vertical grain orientation on the face of the board. The laminations are made according to NZS1328 with Type 1 polyurethayne adhesive that is approved for Service Class 3 applications (exterior exposed to the weather). No added formaldehyde.

2.1.2.10. Grade

Generally supplied as Select grade or fingerjointed clear according to Abodo appearance grade rules.

2.1.2.11. Durability

Minimum expected serviceable life- above ground

Vulcan Primed paint finish – 40 years

Vulcan stain or oil finish – 30 years

Extensive testing has been made on thermally modified timber at SCION, Rotorua, NZ showing excellent durability and

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stability over extended periods of exposure testing. Suitable for uses described in NZS3602:2003 Table 2A 'Requirements for wood-based building to achieve a 15 year durability performance Members exposed to exterior weather conditions and dampness'. Durability Class 1 (EN350-1), Class 2 above ground (AS5604).

Warranty 15 years against fungal decay (subject to terms and conditions- warranty documentation is available on request).

2.1.2.12. Coating

Vulcan Primed must have alkyd primer only applied all sides and 2 coats of 100 percent acrylic exterior top coat applied to front face and edges. Then it must be maintained periodically as described in the maintenance section of this manual.

Vulcan Charred is generally supplied as factory pre-finished solid timber with heavy char to face and edges and one coat of Char Oil all sides. Refer to Vulcan Charred data sheet for specific information on this product.

Vulcan must be coated with at least 1 coat of stain or oil (eg: Abodo Protector) all sides and 2 coats on the front face and edges. Then maintained every 2-3 summers as appropriate in the maintenance section of this manual.

All cut ends and notches must be sealed with paint, stain/oil or wax end grain sealer as appropriate - Protector – End Seal is recommended for best results.

Dark colours are allowed for both Vulcan and Vulcan Primed. For Vulcan Primed paint finish, Resene CoolColour system is recommended when using dark colours (<45% LRV) to reduce the chance of timber warping in service.

All coating is to be done according to coating manufacturer's instructions in a well-ventilated area. Refer to the coating/ primer supplier for all matters relating to health and safety. All relevant sections of standard AS/NZS 2311:2009 (Guide to the painting of buildings) shall be adhered to.

2.1.2.13. Resource and forestry certification

Sourced from plantation forests in the North Island of New Zealand. Generally supplied as FSC Mixed Credit CoC certified FSC No. SGS-COC-004944.

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2.1.2.14. Technology

The technology behind **Vulcan** weatherboards is covered by NZ patent no. 601245

2.1.2.15. Corrosivity

Thermally modified timber has been shown to have very low corrosivity on metals- similar to untreated timber. Therefore it can be placed in contact with most materials including aluminium and regular hot dipped galvanised and stainless steel fixings can be used.

2.1.3. Stratos and Stratos Primed

2.1.3.1. Material

New Zealand Radiata pine treated to H3.1 level according to NZS3640 and H3 AS1604 using azole, insecticide, water repellant and anti-mould preservative system.

The treatment is a low toxicity, metal free, non-chrome, non-arsenic system developed by Abodo specifically for exterior above ground timber products.

Stratos stain finish features vertical or 'quarter sawn' grain orientation in all boards that creates enhanced stability and reduces surface checking (cracking) in service.

2.1.3.2. Lamination

Stratos weatherboards may be supplied in laminated form with vertical grain orientation on the face of the board. The laminations are made according to NZS1328 with Type 1 Purbond adhesive that is approved for Service Class 3 applications (exterior exposed to the weather).

2.1.3.3. Grade

Generally supplied as Clears, Select or Premium grade according to Abodo appearance grade rules.

2.1.3.4. Durability

Expected serviceable life- above ground

Stratos Primed H3.1 treated, paint finish – above-ground durability 35 years+

Stratos H3.1 treated, stain or oil finish – above-ground durability 25 years+

Warranty 25 years against fungal decay and insect attack (subject to terms and conditions- warranty documentation is available on request).

2.1.3.5. Coating

Stratos Primed must have alkyd or acrylic primer applied all sides and 2 coats of alkyd or 100 percent acrylic exterior top coat applied to front face and edges. Then it must be maintained periodically as described in the maintenance section pg21 as required.

Stratos must be coated with at least 1 coat of stain (eg Resene Woodsman) or oil (eg: Abodo Protector) all sides and 2 coats on the front face and edges. Then maintained every 2-3 summers as appropriate in the maintenance section of this manual.

All cut ends and notches must be sealed with paint, stain or oil, or wax end sealer as appropriate to the product being used

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Colours with an LRV of 45% or more are recommended to reduce the chance of timber warping in service. Dark colors such as black are not recommended, especially in heavy sun-exposed situations

All coating is to be done according to coating manufacturer's instructions in a well ventilated area. Refer to the coating/ primer supplier for all matters relating to health and safety. All relevant sections of standard AS/NZS 2311:2009 (Guide to the painting of buildings) shall be adhered to.

2.1.3.6. Resource and forestry certification

Sourced from plantation forests in the North Island of New Zealand. Generally supplied as FSC Mixed Credit CoC certified FSC No. SGS-COC-004944 (FSC Pure certification is available on request).

Living Building Challenge- 'Red List' free

2.1.3.7. Technology

The technology behind Stratos weatherboards is covered by NZ patent app no. 601245

2.1.3.8. Corrosivity

Azole preserved timber has been shown to have very low corrosivity on metals- similar to untreated timber. Therefore it can be placed in contact with most materials including aluminium and regular fixings can be used.

2.1.4. Tundra

2.1.4.1. Material

New Zealand heart wood Douglas Fir, graded to ensure that only the durable heart wood timber is present in the finished product.

Douglas fir heart wood is chemical free, non-toxic material with good stability and durability.

2.1.4.2. Grade

Standard Grade- Generally a rustic knotty grade, with sound knots and defects allowed accentuating the natural timber characteristics.

Note- A range of natural and machine defects are allowed. As this is a visually graded product up to 5% of the volume may be supplied as 'out of grade', allowing for variation in grade interpretation.

Some grading and cutting out of defects may be required to meet customer expectations and/or requirements of the NZBC

2.1.4.3. Durability

Tundra stain or oil finish – above-ground durability minimum 25 years

Extensive testing has been made on douglas fir timber at SCION, Rotorua, NZ showing excellent durability and stability of heart wood timber for over 20 years in an exterior above ground application. Suitable for uses described in NZ3602:2003 Table 2A 'Requirements for wood-based building to achieve a 15 year durability performance Members exposed to exterior weather conditions and dampness'.

Douglas fir has a long history of successfully application in cladding and decking in Europe.

Tundra is a rustic product that may experience some surface cracking and board movement as part of the natural weathering process

2.1.4.4. Coating

Tundra must be coated with at least 1 coat of waterborne stain (eg: Protector – Water Borne) all sides and 2 coats on the front face and edges. Then maintained every 2-3 summers as appropriate in the maintenance section of this manual. Plant based wood oils are not recommended for coating due to possible staining issues in service.

Speciality finishes such as Iron Vitriol, Charred/ Burnt and Brushed and Sioo:x are generally supplied factory pre-finished. Refer to relevant data sheets for specific information on these products including maintenance.

All cut ends and notches must be sealed with paint, stain/oil or wax end grain sealer as appropriate - Protector – End Seal is recommended for best results.

Light colours are recommended to reduce the chance of timber warping in service.

All coating is to be done according to coating manufacturer's instructions in a well-ventilated area. Refer to the coating/ primer supplier for all matters relating to health and safety. All relevant sections of standard AS/NZS 2311:2009 (Guide to the painting of buildings) shall be adhered to.

2.1.4.5. Resource and forestry certification

Sourced from plantation forests in the North Island of New Zealand.

Generally supplied as FSC Mixed Credit CoC certified FSC No. SGS-COC-004944 (FSC Pure certification is available on request).

Living Building Challenge- 'Red List' free

2.1.4.6. Corrosivity

Tundra has very low corrosivity on metals as with untreated timber. Therefore it can be placed in contact with most materials including aluminium and regular fixings can be used. The timber should however not be put into contact with zinc.

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2.2 Abodo Weatherboard Profiles

2.2.1. Stain finish weatherboards

Timber substrates: Sand, Stratos, Vulcan, Tundra*
Surface Finish: Light band sawn only

*Tundra is available in ex-150x25mm profiles only.

Profile availability may vary depending on substrate.
For stock profiles please see page 23.

2.2.1.1. Horizontal Bevel back

All profiles must have minimum 32mm overlap, with matching opposed 8x6mm weather grooves 10mm from the edge of each edge.

Profiles: **AW61, AW62**
Refer Abodo Cladding Architectural Profile Drawings

2.2.1.2. Horizontal Rusticated

All profiles must have minimum 25mm overlap, with matching opposed 6x3mm weather grooves 10mm from the edge of each edge, and allowing for a minimum 2mm expansion gap between boards.

Profiles: **AW67, AW68, AW700, AW701, AW702, AW703, AW704, AW705, AW706**

Refer Abodo Cladding Architectural Profiles Drawings

2.2.1.3. Vertical Shiplap

All profiles must have minimum 25mm overlap, with matching opposed 6x3mm weather grooves 10mm from the edge of each edge, and allowing for a minimum 2mm expansion gap between boards.

Profiles: **AW50, AW51, AW52, AW53, AW54, AW55, AW56, AW57, AW58, AW59, AW60, AW507**

Refer Abodo Cladding Architectural Profile Drawings

2.2.1.4. Horizontal and Vertical WB10 Secret Fix

All profiles must have a 20mm deep tongue and groove secret nail positioning groove 12mm from the tongue edge and allowing for a minimum 2mm expansion gap between boards.

Profiles: **WB10 - 145x20mm, WB10 - 180x20mm**

2.2.1.5. Vertical WB12 Secret Fix

All profiles must have a 20mm deep tongue and groove secret nail positioning groove 12mm from the tongue edge and allowing for a minimum 2mm expansion gap between boards.

Profiles: **WB12 - 138x20mm, WB12 - 180x20mm, WB12 - 90x40mm, WB12 - 90x60mm, WB12F - 180x20mm**

2.2.2.Paint Finish Weatherboards

Substrates: Sand Primed, Stratos Primed, Finish: Vulcan Primed Smooth dressed face

Profile availability may vary depending on substrate.
For stock profiles please see page 23.

2.2.2.1. Horizontal Bevel back

All profiles must have minimum 32mm overlap, with matching opposed 8x6mm weather grooves 10mm from the edge of each edge. The exposed leading edge may optionally have a 3mm pencil round finish for better paint adhesion.

Profiles: **AW61P - 140x18mm, AW62P - 180x18mm**

Refer Abodo Cladding Architectural Profile Drawings

2.2.2.2. Horizontal Rusticated

All profiles must have minimum 25mm overlap, with matching opposed 6x3mm weather grooves 10mm from the edge of each edge, and allowing for a minimum 2mm expansion gap between boards. The exposed leading edge may optionally have a 3mm pencil round finish for better paint adhesion.

Profiles: **AW67P - 138x18mm, AW68P - 180x18mm**

Refer Abodo Cladding Architectural Profile Drawings

2.2.2.3. Vertical Shiplap

All profiles must have minimum 25mm overlap, with matching opposed 6x3mm weather grooves 10mm from the edge of each edge, and allowing for a minimum 2mm expansion gap between boards. The exposed leading edge may optionally have a 3mm pencil round finish for better paint adhesion.

Profiles: **AW51P - 135x18mm, AW52P - 180x18mm**

Refer Abodo Cladding Architectural Profile Drawings

2.2.2.4. Horizontal and Vertical WB10 Secret Fix

All profiles must have a 20mm deep tongue and groove secret nail positioning groove 12mm from the tongue edge and allowing for a minimum 2mm expansion gap between boards.

Profiles: **WB10P - 135x18mm, 180x18mm**

Refer Abodo Cladding Architectural Profile Drawings

2.3. Cavity Battens

- Cavities must comply with E2/AS1 of the NZBC paragraphs 9.1.8 to 9.1.9.4
- Timber cavity battens shall be minimum 45mm x 18mm to match height of framing and be minimum H3.1 treated according to NZS3640. Structurally fixed cavity battens shall be H3.2 treated.
- Cavity battens shall be supplied by Abodo or shall be approved by Abodo prior to construction.

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2.3.1. Horizontal weatherboard systems

Shall use solid vertical cavity battens as follows:

CB-V-20x45 or CB-V-45x45

2.3.2. Vertical weatherboard systems

Shall use castellated (notched) and beveled horizontal cavity battens as follows:

CB-H-20x45 or CB-H-45x45
Horizontal cavity battens shall be castellated type with 20mm x 7mm notches spaced at approximately 100mm centers alternating on either side of the batten, and with the top edge of the batten to be beveled at an 18-20 degree angle to allow for water run-off.

2.4. Rigid Wall Underlays

A Rigid Wall Under Lays shall be included as part of the cladding system:

- In locations defined as Extra High Wind Zones according to Table 3 E2/AS1.
- Where interior walls are not lined or for external walls of attached garages that are unlined and shall be installed according to Table 23 E2/AS1.
- Where additional weather tightness of the building envelope is desired.

Approved Rigid Wall Underlays are as follows:

- Fiber cement sheet (eg: James Hardie, BGC).
- Minimum 6.5mm H3.2 DD Plywood manufactured to AS/ NZS2269 and tested in accordance with AS/ NZS4284 (eg: CHH Ecoply).

Rigid Wall Underlays shall be fixed in accordance with the manufacturer's installation instructions and/ or Clause 9.1.7.2 E2/AS1.

Other Rigid Wall Underlays may be used subject to approval and shall be independently appraised by an IANZ or similarly approved accreditation agency or testing facility.

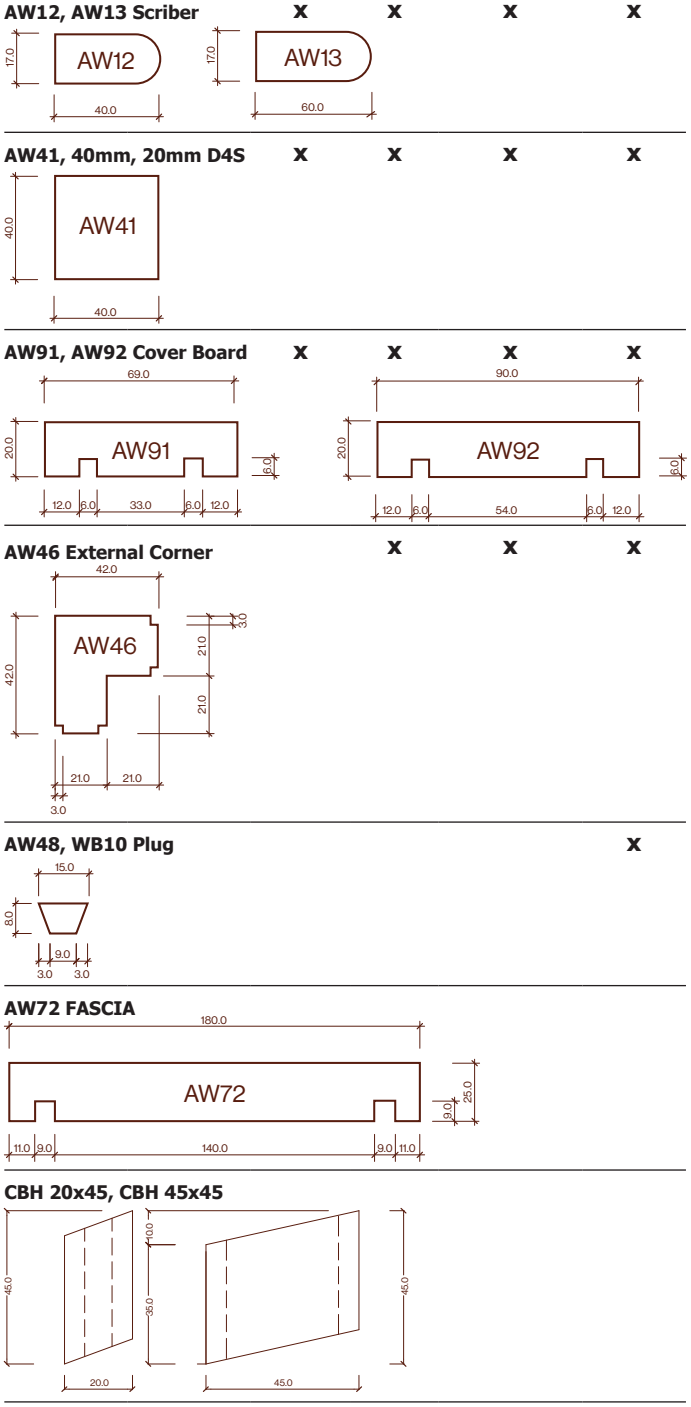
2.5. Finishing Mouldings

- Abodo exterior mouldings must be supplied by Abodo and shall be specified to match the relevant timber substrate and weatherboard system.
- Mouldings shall generally be fixed with nails at maximum 450mm centers positioned so as not to penetrate through flashings. Mouldings shall have a continuous bead of sealant applied where they meet weatherboards, neighbouring mouldings or joinery.

2.5.1. Mouldings options

The **chart above** shows mouldings that can be used for each weatherboard system.

Profile	Bevelback	Rusticated	Vertical Shiplap	WB10/WB12
AW12, AW13 Scriber	X	X	X	X
AW41, 40mm, 20mm D4S	X	X	X	X
AW91, AW92 Cover Board	X	X	X	X
AW46 External Corner		X	X	X
AW48, WB10 Plug				X
AW72 FASCIA				
CBH 20x45, CBH 45x45				



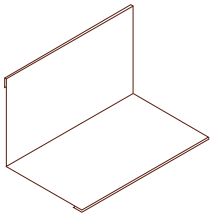
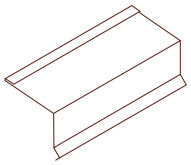
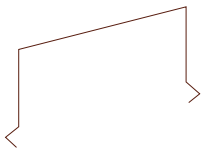
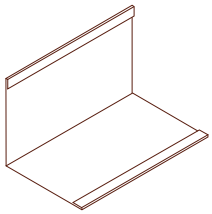
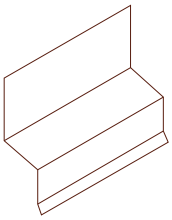
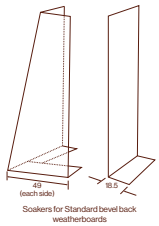
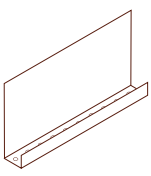
Note: Oil finish profiles have bandsawn faces.
Primed profiles are generally finished to 18mm thickness and have eased edges.

2.6. Flashings

- Flashings shall be made from Stainless Steel, Galvanised Steel, UPVC or Aluminium.
- Soakers for bevel back weather board may also be made from copper.
- All flashing materials shall be compatible with neighboring materials and comply with Tables 20, 21, 22 of E2/AS1 NZBC.
- Flashings can be supplied by Abodo or by the builder according to this specification.
- Unhemmed corner flashings may be used for flat profile weatherboard systems (eg WB10, Rusticated) provided flashing provides minimum 75mm cover behind weatherboard cladding.
- Extra high wind zones and above require 75mm cover as well as folded hem.

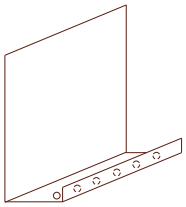
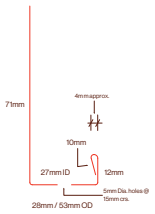
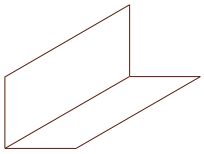
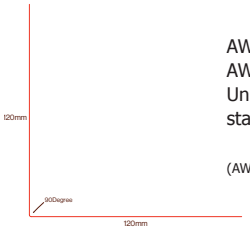
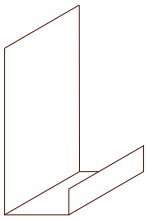
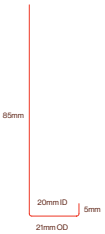
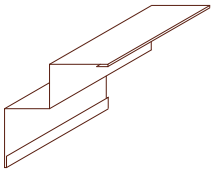
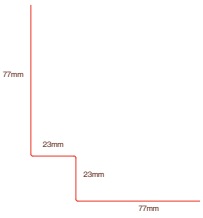
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Flashings – Supplied by others

Flashing	Description
	Hemmed External Corner Flashing **14** - 50mm, **4** - 90mm (Code 04 shown)
	**23** - Sill flashing
	**107**, **108**, Parapet Saddle Capping
	Hemmed Internal Corner Flashing **3** - 50mm, **40** - 70mm, **3** - 90mm (Code 03 shown)
	**22** - 40mm interstory Z flashing
	Bevel Back Corner and Flat Soakers
	**06 –** 20mm Cavity Closer

Note: Flashings and codes shown above are by quickflash.co.nz as example only.
Other flashings may be used provided they are in conformance with E2/AS1 and this manual.

Flashings Range – Supplied by Abodo

Flashing	Line Drawing	Description
		AWF1 WB10 20mm Cavity Closer AWF6 WB10 45mm Cavity Closer Stainless steel, 3.0m length (For use with horizontally fixed WB10 cladding only)(WB10 45mm closer is a non-stock made to order item)
		AWF2 100x100mm, AWF4 120x120mm Unhemmed corner flashing, stainless steel, 3.0m length (AWF2 shown)
		AWF3 Window/Door Jamb Flashing Stainless steel, 3.0m length (For Rusticated and WB10 Horizontal Profiles)
		AWF5 100x100 Unhemmed Internal Corner W-Flashing Stainless steel, 3.0m length

2.7. Fixings

- Shall be in accordance with table 24 of NZBC E2/AS1 and NZS3604 unless otherwise advised below.
- Fixings can be supplied by Abodo or by the builder according to this specification.
- For buildings located in sea spray 'Zone D' Exposure) conditions according to NZS3604, stainless 316 fixings must be used.
- **For ACQ or CUAZ treated timber (eg: Sand) stainless steel, copper or silicone bronze fixings must be used.**

2.7.1. Fixings for stain finish weatherboards

Shall be of the following specification:

- Pentagon or Rose Head nail.
- Annular grooved.
- Stainless steel or silicone bronze or copper. (Note: Silicone bronze and copper fixings can be subject to oxidation during weathering, resulting in discolouration and weeping around fixing head).
- To allow minimum 30mm penetration into the framing (when using packer cavity battens) or 30mm penetration into the batten and framing combined (when using structural cavity battens).

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- Screw fix method is allowed allowing minimum 30mm into batten and/or stud, subject to pre-approval.

Fixings guide	Minimum Required Fixing Sizes		
Profile	**Packer Cavity Batten**	**Structural Cavity Batten**	**Pack Cavity with Rigid Wall Underlay**
Bevelback	85x3.15mm	65x3.15mm	
Rusticated	70x3.15mm	50x2.80mm	85x3.15mm
Vertical Shiplap	70x3.15mm	50x2.80mm	85x3.15mm
Mouldings	40x2.80mm	40x2.80mm	40x2.80mm

2.7.2. Fixings for paint finish weatherboards

Shall be of the following specification:

- Jolt head nail
- Stainless steel, silicone bronze or hot dip galvanized.
- To allow minimum **35mm penetration into the framing** (when using packer cavity battens) or 35mm penetration into the batten and framing combined (when using structural cavity battens).
- Screw fix method is allowed subject to pre-approval from Abodo.
- Fixings must be punched, puttied and primed prior to painting.

Fixings guide	Minimum Required Fixing Sizes		
Profile	**Packer Cavity Batten**	**Structural Cavity Batten**	**Packer Cavity with Rigid Wall Underlay**
Bevelback	90x4.0mm	75x3.15mm	
Rusticated	75x3.15mm	60x2.80mm	90x3.15mm
Vertical Shiplap	75x3.15mm	60x2.80mm	90x3.15mm
Mouldings	40x2.80mm	40x2.80mm	40x2.80mm

2.7.3. Fixings for WB10, WB12 Secret fix weatherboards - stain and paint finish

Shall be of the following specification:

- **Flat Round head**
- **Annular grooved/ ring shank nail power or hand driven**
- Or self-countersinking head, self-drilling screw
- Stainless steel
- To allow minimum **30mm penetration into the framing** (when using packer cavity battens) or 30mm penetration into the batten and framing combined (when using structural cavity battens).
- For power driven nails a protective rubber attachment (eg Paslode No Mar tip) must be used on the nail gun tip to prevent damage to the timber.
- Fixing must be driven so head is flush with timber surface.
- If face-fix method is preferred, then the fixing specification for Vertical Shiplap (refer 2.7.1) shall be used.
- Tip: Screw fixing method is recommended for easiest installation.

Fixings guide	Minimum Required Fixing Sizes		
Profile	**Packer Cavity Batten**	**Structural Cavity Batten**	**Packer Cavity with Rigid Wall Underlay**
WB10/WB12 Secret Fix	60x3.15mm Flat Head or 6gx50mm self c/s head screw or power driven 65x2.87mm Ring R-drive	40x2.80mm Flat Head or 6gx40mm self c/s head screw or power driven 55x2.87mm Ring R-drive	75x3.15mm Flat Head or 8gx60mm self c/s head screw or power driven 75x3.06mm Ring R-drive
Mouldings	40x2.80mm	40x2.80mm	40x2.80mm

2.7.4. Fixings into steel framing – paint finish weatherboards

Shall be of the following specification:

- Self-tapping wing-tek screws
- Hot dip galvanized
- To allow minimum **20mm penetration through the steel stud**
- Face fixing must be countersunk below timber surface, puttied, primed and painted

Refer to NASH http://nashnz.org.nz/ for further information on compatibility of stainless steel with galvanized steel framing.

Fixings guide	Minimum Required Fixing Sizes	
Profile	**Packer Cavity Batten**	**Packer Cavity with Rigid Wall Underlay**
Bevelback	10gx90mm	
Rusticated	10gx70mm	10gx80mm
Vertical Shiplap	10gx70mm	10gx80mm
WB10 Secret Fix	10gx60mm	10gx70mm
Mouldings	10gx40mm	10gx40mm

2.7.5. Fixings into steel framing – stain finish weatherboards

All profiles shall be fixed into a 45x45mm structurally fixed cavity batten.

Shall be of the following specification:

- Pentagon or Rose Head nail.
- Annular grooved.

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- Stainless steel or silicone bronze or copper.
- To allow minimum **30mm penetration into 45mm structural cavity batten**

Fixings guide	Minimum Required Fixing Sizes
Profile	**Structural Cavity Batten**
Bevelback	65x3.15mm
Rusticated	50x2.80mm
Vertical Shiplap	50x2.80mm
Mouldings	40x2.80mm

Fixings for **WB10/WB12 secret fix** shall be of the following specification:

- **Flat Round head**
- **Annular grooved/ ring shank nail power or hand driven**
- Or self-countersinking head, self-drilling screw
- Stainless steel or silicone bronze or hot dip galvanised.
- To allow minimum **30mm penetration into 45mm structural cavity batten**
- For power driven nails a protective rubber attachment (eg Paslode No Mar tip) must be used on the nail gun tip to prevent damage to the timber.
- Fixing must be driven so head is flush with timber surface.

Fixings guide	Minimum Required Fixing Sizes
Profile	**Structural Cavity Batten**
WB10 Secret Fix	40x2.80mm Fat round head or 6gx40mm self c/s head screw or power driven 40x2.87mm Ring R-drive
Mouldings	40x2.80mm
Cladding Screw 	Abodo Cladding Screw 6g x 45mm stainless steel 304 for use with WB10/ WB12 profiles using structurally fixed cavity battens.

3.Proprietary System Components

These items are not supplied by Abodo. They shall to be sourced and supplied by the builder to a specification that conforms to NZBC requirements and are deemed fit for use in the end use application.

3.1. **Flexible Sealant –** modified exterior type- SikaFlex 11FC or equivalent

3.2. **Epoxy adhesive –** two pot exterior eg: Holdfast or equivalent

3.3. **Flexible Wall Underlay (Building wrap) or Rigid Wall Underlay -** to conform with Table 23 of E2/ AS1

3.4. **PEF Backing Rod –** closed cell type designed for use as a backing rod, sized 25% larger than the gap it is to fill

3.5. **Flashing tape –** compatible with other components in the system including the building wrap

3.6. **Thermal break –** for steel framing, compatible with other components in the system including the timber treatments

3.7. **Flashings –** in accordance with E2/AS1.

4.Installation Preparation

4.1. Framing

- Generally, timber framing must comply with NZS 3604 (Timber-Framed Buildings), however where specific engineering design is required the framing shall be at least of equivalent stiffness to the framing provisions of NZS 3604.
- The moisture content of the framing must not exceed 18% at the time of fixing the weatherboard (problems may occur later due to excessive timber movement if framing is too wet).
- Additional framing may be required at soffits, corners, window and door openings.
- Cladding must be in dry condition (less than 16% moisture content) prior to installation.

4.1.1. For Horizontal Weatherboards:

- Studs must be at a spaced at a maximum of 600mm between centres.
- Dwangs (noggins) must be spaced at a maximum of 800mm between centres or other wise as specified where a proprietary wall system is being used.
- Studs and dwangs must form a flush plane for cavity battens and weatherboards to be fixed to.

4.1.2. For Vertical Weatherboards:

- Studs must be at a spaced at a maximum of 600mm between centres.
- Dwangs (noggins) must be spaced at a maximum of 480mm between centres, or 800mm between centres if using structurally fixed 45x45 cavity battens or other wise as specified where a proprietary wall system is being used with structural 45x45 cavity battens.

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- Studs and dwangs must form a flush plane for cavity battens and weatherboards to be fixed to.

4.2. Steel Framing

Steel framing may be used, provided it is designed in accordance with NZS3604 Steel Framed Buildings and B1/AS, or by specific design.

Spacing of studs and nogs shall be as specified above in 4.1.1 and 4.1.2

4.2.1. Thermal Break

- Shall cover all exposed steel framing and be minimum R-value 0.25 and comply with NZBC clauses E3 and H1.
- Shall be compatible with surrounding materials and timber treatments.
- Shall have building wrap installed on the outside in accordance with 4.3 below and/or E2/ AS1
- It is recommended to use full thermal break panels (eg: R-Board or R-Board+) positioned underneath building wrap and with cavity battens fixed over top into studs or nogs as appropriate as per Figure 5 below

Recommended best practice installation method- cavity onto steel frame:

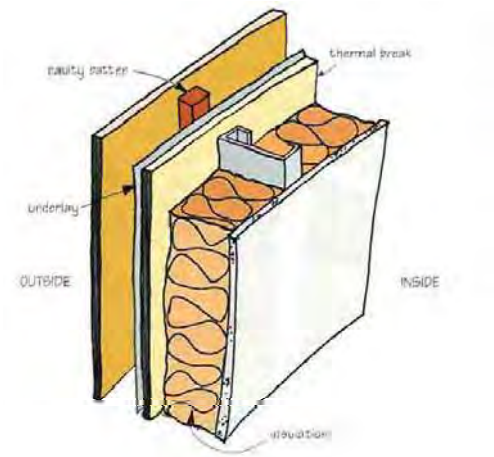


Fig. 5 Thermal break sheath inside underlay

Drawing used courtesy of NASH, from NASH N-11 Home isulation guide http://nashnz.org.nz/wp-content/uploads/2014/05/Download-N-11-House-Insulation-Guide.pdf

4.3. Flexible Wall Underlay (Building wrap)

A waterproof, breathable building wrap must be fixed underneath battens and weatherboards in accordance with Table 23 of E2/AS1 NZBC.

Flexible wall underlays shall also be:

- Fixed in accordance with 9.1.7.1 E2/AS1.Cut and dressed into openings in accordance with figure 72A and 72B E2/AS1.
- Have compliant and compatible flexible flashing tape applied to head and sill framing in accordance with E2/AS1.
- Have polypropylene strap or wire applied to prevent bulging of wrap into cavity in accordance with 9.1.8.5 E2/AS1.
- Extend minimum 35mm over bottom plate.

4.4. Rigid Wall Underlay

- Rigid Wall Underlays are required in Extra High wind zones according to Table 3 and 23 E2/ ES1.
- Rigid Wall Underlays shall be fixed in accordance with the manufacturer's installation instructions and Clause 9.1.7.2 E2/AS1 including:

a Sheet edges shall be fixed over solid framing with a 1-2mm expansion gap between sheets for fiber cement and 2-3mm gap for plywood. This may vary and must be verified with manufacturer's specification prior to installation.

b Shall have flexible underlay folded into opening reveals as per 9.1.5 a) E2/AS1

c Shall be over-fixed with flexible wall underlay from Table 23 and installed in accordance with 9.1.7.1 E2/ AS1 (note: some proprietary systems may not require this)

d Shall have flexible flashing tape applied to head, sill framing openings and all sheet joins including corners with a minimum 50mm lap to the RAB. Flexible tape must be compatible with the wall underlay and other surrounding materials.

e Shall extend past the bottom plate 15-25mm – this shall be confirmed with the manufacturer prior to installation.

f Shall have flexible flashing tape to the rigid wall underlay and overlapping the cavity closer at the bottom of the cavity.

- Flashing tapes may be substituted with BEP Blue Barrier system http://www.abep.co.nz/our-products/building-envelope-protection-bep/ subject to approval by the respective RAB manufacturer and provided it is installed according to Blue Barrier Codemark Installation manual.

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4.5. Drained Cavity Construction

- All systems shall be installed onto a drained cavity. Cavities shall comply with E2/AS1 of the NZBC paragraphs 9.1.8 to 9.1.9.4.
- Horizontal timber cavity battens shall be Abodo castellated (notched) and beveled at 18-20 degrees. The batten shall be installed with the top bevelled edge falling away from the wall underlay towards the back of the weatherboards.

4.5.1. Packer cavity batten fixing method

4.5.1.1.20mm thickness cavity batten

Temporarily fix x 20x45mm timber battens to the framing (if running vertically) or nogs (if running horizontally) at 800mm centres with:

- 40 x 2.5mm flat head, hot dipped galvanised nails; or
- 50 x 2.8mm 'D' flat head, power-driven, galvanised nails

4.5.2. Structural cavity batten fixing method

4.5.2.1. 20mm thickness cavity batten

Fix battens to the framing (if running vertically) or nogs (if running horizontally) at 300mm centres with fixings staggered 12mm either side of the batten centerline with:

- 60 x 2.8mm flat head, ring shank stainless steel nails; or
- Paslode Impulse (or equivalent) 65 x 2.87mm 'D' flat head, power-driven, stainless steel nails
- 8g x 50mm stainless steel c/s head screws

4.5.2.2. 45mm thickness cavity batten

Fix battens to the framing maximum 600mm centres with fixings staggered 12mm either side of the batten centerline with:

- 90 x 3.2mm flat head, ring shank stainless steel nails; or
- Paslode Impulse (or equivalent) 90 x 3.15mm 'D' flat head, power-driven, stainless steel nails
- 8g x 75mm stainless steel c/s head screws

4.5.3. Cavities onto masonry fixing method

If fixing to masonry, structurally fix 45x45mm cavity battens at 600mm centers staggered 12mm either side of the batten center line with:

- Ramset (or similar) M6x75mm 316 stainless steel countersunk head split drive masonry anchor

4.5.4. Cavities onto steel framing fixing method

4.5.4.1. 20mm packer cavity batten method

- Shall be used for **paint finish** weatherboards only.
- Temporarily fix 20x45mm battens into the framing (if running vertically) or nogs (if running horizontally), fix at 800mm centres with:

a 50x2.8mm flat or jolt head bullet tip, power driven HDG nails; or

b 10gx50mm self-tapping wing-tek HD Galv screws

4.5.4.2. 45mm structural cavity batten

- May be used for **stain and paint finish** weatherboards.
- Fix battens to the framing at maximum 600mm centres, with fixings staggered 12mm either side of the batten centerline with:

a 10g x 80mm self-tapping wing-tek HD Galv screws

4.5.5. Inter-story Junctions

- An inter-story junction shall be used for continuous cavities over two stories or 7 meters.
- A 'Z' flashing shall be used with at least 35mm cover over the weatherboard and with a minimum 15 degree fall and allowing 5mm minimum gap between flashing and weatherboard in accordance with E2/ AS1.

4.5.6. Base of wall cavity

The base of walls including above window heads and inter-story flashings:

- Shall have a cavity base closer with minimum ventilation area 1000mm2 per meter length.
- The cavity closer shall be positioned to allow at least 10mm drip edge to wall cladding or 15mm above window and door head flashings, in accordance with 9.1.8.3 E2/AS1.
- For WB10 horizontal cladding, Abodo AWF1 horizontal cavity closer may be used with the bottom groove of the profile sitting into the flashing up turn. This avoids need for face fixing of the base board.

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4.5.7. Top of wall cavity

Shall be sealed off from the roof space using a solid (non-castellated) vertical cavity batten running horizontally.

- Top-vented cavities may be allowed subject to design approval from Abodo and provided that the roof space is sealed off from the wall cavity.

4.5.8. Internal and external corners

- Shall have vertical cavity battens fixed with at least 10mm gap between battens.

4.6. Head Flashings

- Shall be fixed with a flashing up stand of minimum 35mm cover with tape or underlay lapped over the flashing.
- Extra High Wind Zones shall have minimum 75mm cover flashing to head flashing up-stand and extend minimum 60mm over the weatherboard.
- Shall have a minimum 15 degree fall with 5mm gap between head flashing and weatherboard in accordance with E2/ AS1.
- Shall be fixed with stop-ends, with 30mm cover and, if scribers are used, extend 20mm past the scriber in accordance with E2/ AS1.
- Shall have air seals between reveal or frame in accordance with 9.1.6 E2/ AS1, installed with self-expanding polyurethane foam over PEF backing rod.

4.7. Window and Door Joinery

- May be timber, aluminium or uPVC.
- Shall meet the requirements of NZS4211.
- Shall be designed in accordance with the relevant Wind Zone.
- Shall meet the requirements of E2/AS1.
- Shall have sill support bars installed in accordance with E2/AS1 and where possible sill trays are recommended.
- Shall have flexible flashing tape around openings and over cavity closer above joinery head.
- Jambs shall be scribed with AW12 with scriber or plugs sealed to weatherboards and be made weather tight with a foam bond break and a continuous bead of sealant along the jamb line.
- Where flat horizontal profiles (Rusticated, WB10 horizontal) meet the jamb, boards shall butt into Abodo folded jamb flashing.
- Shall have flexible air seal all sides of joinery penetration, comprising self-expanding polyurethane foam or sealant installed over closed PEF backing rod
- For Very High and Extra High wind zones, the head flashing shall be sealed to the window flange in accordance with E2/AS1
- Recessed windows may be allowed provided they are flashed as per E2/AS1 and subject to approval by Abodo.

4.8. Ground Clearance

Ground clearance between bottom of cladding and the ground shall be in accordance with 9.1.3 and Table 18 EZ/AS1. The base of the cladding shall:

- overlap the concrete slab/ basee of wall by minimum 50mm.
- finish 100mm above a paved surface.
- finish 175mm above an unpaved surface.

The ground shall have a slope of at least 1:30 to allow water to flow away from the building.

4.9. Decking

Refer to E2/AS1 for requirements specific to the type of deck being used.

- Where cladding finishes above a deck it shall finish minimum 35mm above a decking surface and have a 10mm drip edge.
- Where cladding finishes next to slatted decking there shall be at least a 12mm gap between the decking and the cladding wall surface.

4.10. Meter Boxes

- Shall be manufactured from durable, UV resistant, non-combustible material with minimum 20 year service life expectation.
- Shall be designed with sills so as to allow water to easily drain away from possible entry points.
- Shall have flashing tape around the entire opening.
- Shall have the building wrap over lapping the 'Z' head flashing, and with the flashing to be riveted and sealed to the top meter box flashing with a minimum 10mm overlap.
- Shall be sealed around all sides with self-expanding polyurethane foam over PEF backing rod.

4.11. Pipe Penetrations

- Shall be in accordance with 9.1.9, 9.1.9.1, 9.1.9.3 and figure 68 E2/AS1.

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- Pipes shall be installed with a 5 degree fall, with appropriate support nogging underneath.
- Shall use an appropriate pipe flashing approved by Abodo or flashing tape to seal the pipe to the building wrap or RAB in accordance with E2/AS1.
- Shall have sealant applied over PEF rod to make the penetrations through both weatherboard and interior lining weather tight.

4.12. Parapets/ Enclosed Balustrade

- Capping shall have minimum 50 year durability and shall have 'birds beak' style drip edge.
- Fixing penetrations through the capping shall be made through the side of the only.
- Capping shall be separated from timber by roof underlay or other suitable material
- The slope of the cap shall be minimum of 5 degrees.
- The capping shall overlap the weatherboards by:
  - 50mm – Low to High Wind Zones
  - 70mm – Very High Wind Zones
  - 90mm – Extra High Wind Zones
- Expansion joints may be required for lengths over 8m- refer to E2/ AS1.

5. Installation Fixing Details

5.1. Bevel Back

Fixings shall be a driven through the wall underlay and in the framing in accordance with Table 24 E2/AS1

- Fixings shall be hand driven
- Weatherboards shall be predrilled prior to application of fixing with a drill bit slightly smaller than the fixing.
- Nail placement shall be 10mm above the lap.
- The lap between boards shall be 32mm
- Opposing weathergrooves shall be lined up to form an 8x10mm weathergroove.
- Nails should be applied at an upward angle so as to reduce water ingress through the fixing point.
- Weatherboards shall be fixed to framing at maximum 600mm centres.
- Weatherboard fixings shall not penetrate through the flashings under any circumstances as this may jeopardize the weather tightness of the cladding system.

Refer to Abodo Architectural drawings for further Bevel Back fixing details.

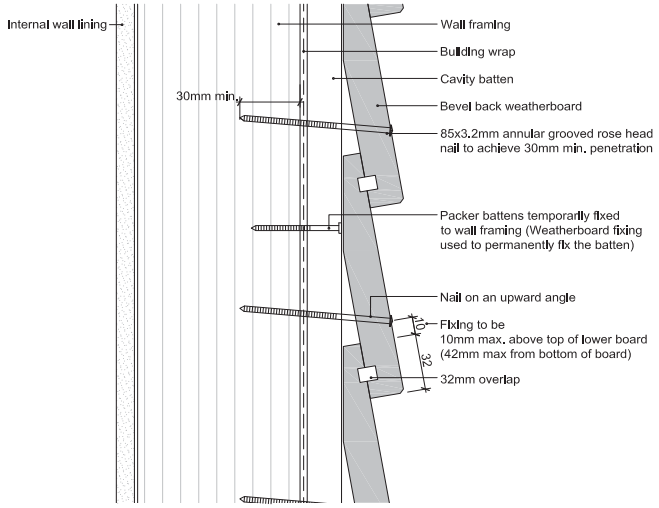


Fig 1- Bevel back fixing- Stain finish packer cavity batten

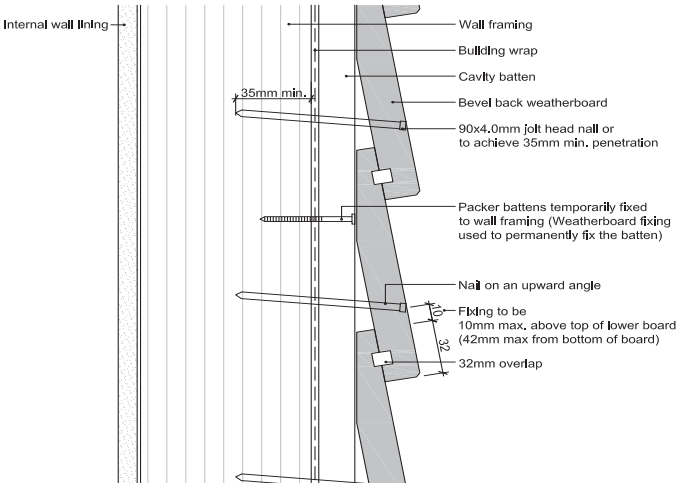


Fig 2- Bevel back fixing- Paint finish packer cavity batten

5.1.1. Joins

- Scarf joins shall be mitered at 35 degrees and made over battens only with one nail applied either side of the join predrilled at least 12mm from the ends.

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- The join shall have a continuous bead of sealant applied eg: Sikaflex 11FC or equivalent and optionally be covered with a corrosive resistant flat soaker.
- Joins shall be staggered by at least 600mm.

5.1.2. Corners

5.1.2.1. Internal corners

- Shall be made weather tight with folded flashings according to the type of corner being used and the Wind Zone.

Shall be either:

a Scribed and notched with 90x90mm hem folded corner flashing; or

b Butted to AW41 40x40mm internal corner mould with 90x90mm hem folded corner flashing .

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring moudlings or joinery.

5.1.2.2. External Corners

- Shall be made weather tight with hem folded 50x50 or 70x70 flashings.
- Shall be either:

a Mitered and covered with corrosion resistant soakers with 50x50 hem folded flashing; or

b Covered with external cover boards AW91, AW92 in conjunction with AW11 scribers.

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring moudlings or joinery.

5.2. Rusticated

- Fixings shall be a driven through the wall underlay and in the framing in accordance with Table 24 E2/ AS1
- Fixings shall be hand driven.
- Weatherboards shall be predrilled prior to application of fixing with a drill bit slightly smaller than the fixing.
- Nail placement shall be 35mm from the edge of the weatherboard and/ or 10mm from the side of the lap.
- The lap between boards shall be 25mm with a minimum 2mm expansion gap between boards.
- Weathergrooves shall be lined up to form a 6x6mm weathergroove.
- Nails should be applied at an upward angle so as to reduce water ingress through the fixing point.

Refer to Abodo Architectural drawings for further Rusticated fixing details.

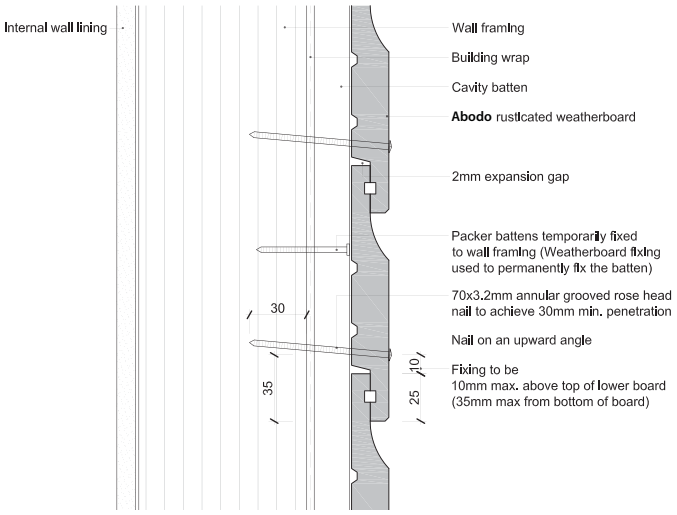


Fig 3 - Rusticated fixing- Stain finish packer cavity batten

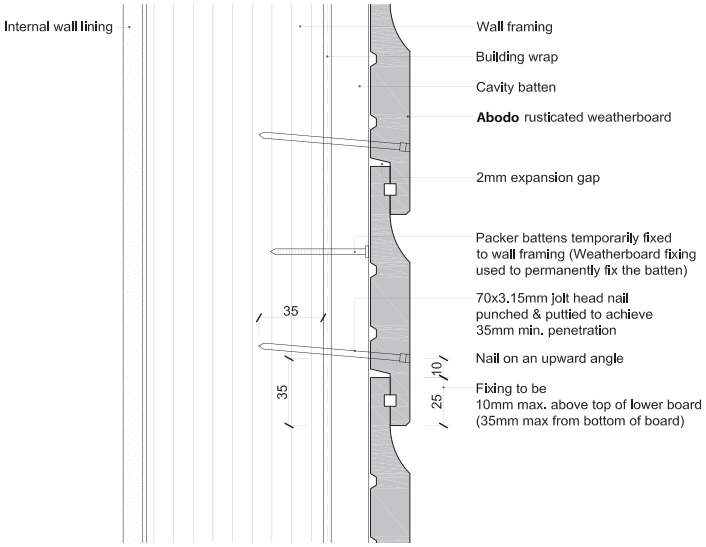


Fig 4 - Rusticated fixing- Paint finish packer cavity batten

5.2.1. Joins

- Scarf joins shall be mitered at 35 degrees and made over battens with one nail on each side of the join predrilled at least 12mm form the ends.

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- The join shall have flashing tape applied to the back of the board, shall have sealant e.g. SikaFlex 11FC or equivalent applied to the join and be optionally covered with a corrosive resistant flat soakers.
- Joins shall be staggered by at least 600mm.

5.2.2. Corners

5.2.2.1. Internal corners

- Shall be made weather tight with flashings according to the type of corner being used and the wind zone.

Shall be either:

a Boards butted evenly into a folded 'W' flashing; or

b Boards butted with AW41 D4S corner mould into corner.

c Boards butted with AW46 corner mould;

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

5.2.2.2. External Corners

- Shall be made weather tight with folded flashings according to the type of corner being used and the wind zone.

Shall use either:

a AW46 corner mould; or

b Covered with external cover boards AW91, AW92 and scribed or plugged.

(Note: only b) corner detail is suitable for Extra High Wind Zones)

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

5.3. Vertical Shiplap

- Fixings shall be a driven through the wall underlay and in the framing in accordance with Table 24 E2/AS1
- Fixings shall be hand driven.
- Weatherboards shall be predrilled prior to application of fixing with a drill bit slightly smaller than the fixing.
- Nail placement shall be 35mm from the edge of the weatherboard and/ or 10mm from the side of the lap.
- The lap between boards shall be 25mm with a minimum 2mm expansion gap between boards.
- Weathergrooves shall be lined up to form a 6x6mm weathergroove.
- Nails should be applied at an upward angle so as to reduce water ingress through the fixing point.
- Weatherboard fixings shall not penetrate through the flashings under any circumstances as this may jeopardize the weather tightness of the cladding system.

Refer to Abodo Architectural drawings for further Vertical Shiplap fixing details.

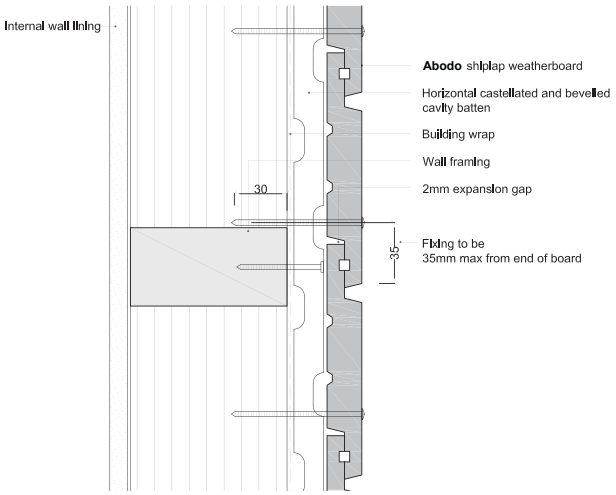


Fig 5 – Birds eye view - Vertical shiplap fixing- Stain finish packer cavity batten

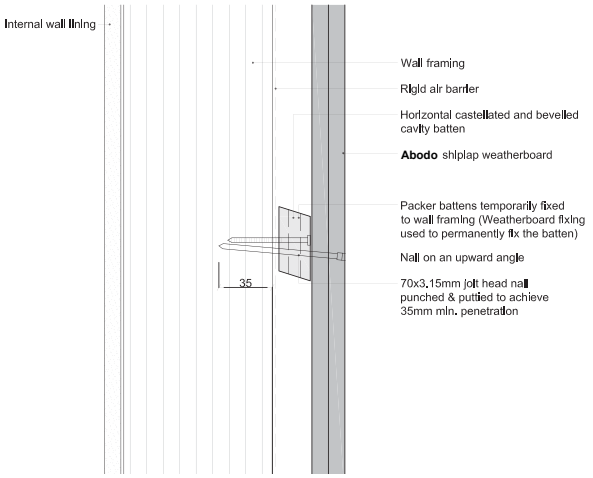


Fig 6 – Side View- Vertical shiplap fixing- Paint finish packer cavity batten

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5.3.1. Joins

- Scarf joins shall be mitered 35 degrees so as to allow water run off down the face of the cladding and be made over battens with one nail on each side of the join predrilled at least 12mm from the ends.
- The join shall have flashing tape applied to the back of the board, shall have sealant eg: SikaFlex 11FC or equivalent applied to the join and be optionally covered with a corrosive resistant flat soakers.
- Joins shall be staggered by at least 450mm.

5.3.2. Corners

5.3.2.1. Internal corners

- Shall be made weather tight with flashings according to the type of corner being used and the Wind Zone.

Shall be either:

a Boards butted evenly into a 70x70 hem folded 'W' flashing; or

b Boards butted, with (optional) AW41 D4S corner mould on top.

c Boards butted to AW46 corner mould.

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

5.3.2.2. External Corners

- Shall be made weather tight with flashings according to the type of corner being used and the wind zone.

Shall use either:

a AW46 corner mould; or

b Routed and notched together and sealed with construction adhesive; or

c Be covered with external cover boards AW91, AW92.

(Note: only b and c) corner detail is suitable for Extra High Wind Zones)

A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

5.4. WB10/WB12 Secret Fix

- WB12 shall be installed vertically only. WB10 may be installed vertically or horizontally.
- Fixings shall be a driven through the wall underlay and into the framing.
- Fixings shall be hand driven or power driven (eg: Paslode).
- Fixings at ends of boards shall be minimim 12mm from end and predrilled prior to application of fixing with a drill bit slightly smaller than the fixing.
- For power driven nails a protective rubber attachment (eg: Paslode No Mar tip) must be used on the nail gun tip to prevent damage to the timber.
- Fixing must be driven so head is flush with timber surface only.
- Nail or screw placement shall be into the positioning groove 12mm from the edge of the tongue.
- There shall be a 2mm expansion gap between boards.
- If face-fix method is preferred, then the fixing specification for Vertical Shiplap (refer 2.7.1) shall be used.
- Tip: Screw fixing method is recommended for easiest installation.

Refer to Abodo Architectural drawings for further fixing details.

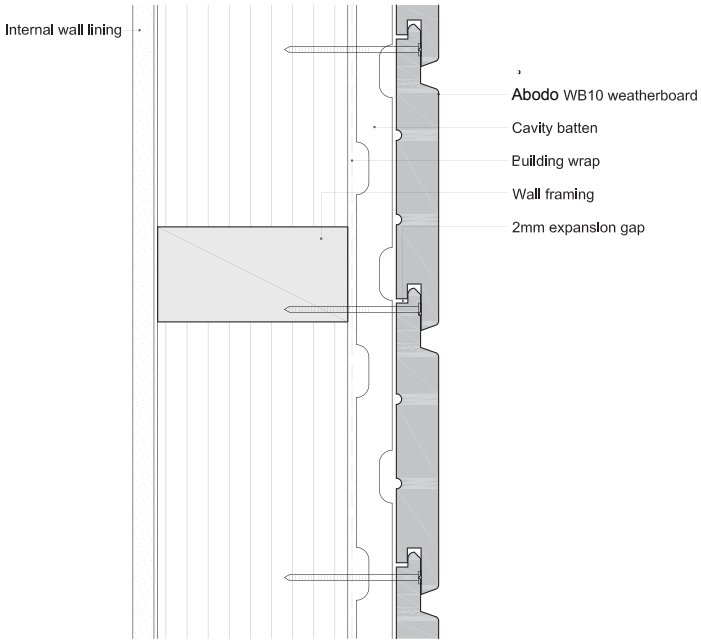


Fig 7 - WB10/ WB12 Vertical fixing

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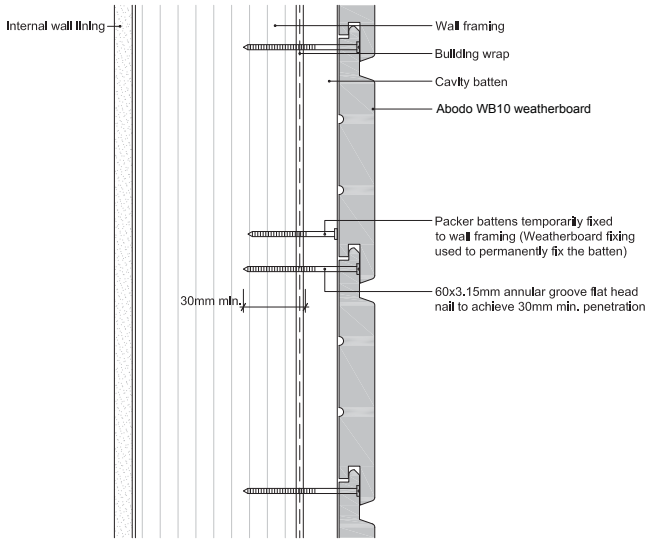


Fig 8- WB10 Horizontal fixing

5.4.1.1. Joins

- Scarf joins shall be mitered 35 degrees and made over battens with one secret nail predrilled at least 12mm from each side of the join.
- End-matched boards may be joined off-batten by way of the tongue and groove profile.
- The join shall have flashing tape applied to the back of the board, shall have sealant eg: SikaFlex 11FC or equivalent applied to the join and be optionally covered with corrosive resistant flat soakers.
- Joins shall be staggered by at least 450mm.

5.4.1.2. Corners

5.4.1.2.1. Internal Corners

- Shall be made weather tight with folded flashings according to the type of corner being used and the wind zone.

Shall be either:

Vertical and Horizontal weatherboards-

a Boards butted evenly into 'W' flashing; or

b Boards butted to AW46 corner mould with moulding screw fixed from back into Abodo 120x120 unhemmed metal flashing; or

Horizontal weatherboards only-

c Boards butted to AW41 corner mould with Abodo 120x120 unhemmed metal flashing; or

Vertical weatherboards only-

d Boards butted into corner with optional AW41 D4S corner mould fixed on top, over back-flashing.

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

5.4.1.3. External Corners

Shall be made weather tight with folded flashings according to the type of corner being used and the wind zone.

- Shall use either:

Vertical and Horizontal weatherboards-

a Boards butted to AW46 corner mould with mould screw fixed from back into Abodo 120x120 unhemmed metal flashing; or

b Be covered with external cover boards AW91, AW92 and plugged or scribed (required for horizontally fixed boards only) over back-flashing.

Vertical weatherboards only-

c 'T&G' Routed and notched together, pinned and sealed together with construction adhesive over back-flashing; or

- A continuous bead of sealant eg: SikaFlex 11FC or equivalent shall be applied where mouldings meet weatherboards and neighbouring mouldings or joinery.

(Note: only option b and c) corner detail is suitable for Extra High Wind Zones)

5.4.1.4. Base of Wall

- WB10 horizontal cladding only shall have either:

a Abodo AWF1 horizontal cavity closer with the bottom groove of the weather board profile sitting into the flashing up turn. This avoids the need for face-fixing of the base board.

b Regular cavity closer and face-fix the starter board with flat or rose head nail approximately 75mm above the edge bottom.

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6. Coating

- For specialist finishes not covered below such as Sioo:x, Iron Vitirol and Charred please refer to specific data sheets for application and maintenance details.
- All relevant sections of standard AS/NZS 2311:2009 (Guide to the painting of buildings) shall be adhered to.
- Please refer to section 2.1 of this manual for specific coating requirements of each timber substrate.

6.1. Stain Finish

- For optimal coating performance, especially for dark colours, a third coat is recommended during the following summer after cleaning.
- All cut ends and notches must be sealed with 2 coats of stain or oil, or end sealer.
- Within 60 days installation minimum of 1 coat shall be applied to the front face and edges.
- Light colours are recommended for Sand, Tundra, Stratos to reduce the chance of timber warping in service. Dark colours may be used for Vulcan.
- The coating must be maintained every 2 summers as appropriate in the maintenance section of this manual.

6.2. Paint Finish

- Paint finish weatherboards must have 2 coats alkyd primer applied all sides prior to fixing. All cut ends and notches must be sealed with paint or primer.
- Within 60 days of installation, 2 coats of quality 100 percent acrylic exterior top coat shall be applied to front face and edges.
- Colours with an LRV of 45% or more are recommended to reduce the chance of timber warping in service.
- For Vulcan Primed only - Dark colours are permitted. For best results it is recommended to use Resene Cool Colour technology with white or Resene TruePrime blue primer.
- Tip: If using dark colours, apply the first coat of paint to the lap and/or full face of the weatherboard before fixing.
- The coating must be maintained periodically as described in the maintenance section.

7. Maintenance

7.1. Stain finish weatherboards

7.1.1. Things to expect

- The wood will begin to go grey and pigment will fade or wear away after about 24 months of exposure to the weather if it is not re-coated
- Cladding in North facing (southern hemisphere) or heavy weather-exposed aspects will fade and age quicker than timber located in other aspects
- Grey pigment colours (eg: Protector Patina) will weather more gracefully over time allowing wood to weather naturally.
- Darker, heavy pigment colours (eg: Protector Walnut) will have longer fade resistance than lighter pigment colours (eg: Protector Teak)
- Some movement of timber as it expands and contracts
- Possible minor surface cracking (checking)
- Possible 'fibre pull' splitting at the lamination glue lines
- The surface may appear blotchy or dirty, this may be due to mould growth which can occur, especially in humid or wet environments.

7.1.2. Minimum maintenance

- Cladding must be cleaned regularly (minimum every 12 months) with mild detergent and soft brush, rinse with water. Note: High pressure water blasting is not allowed.
- A maintenance assessment is required at least every two summers as follows:

a Clean the cladding

b Apply 1 or 2 coats of penetrating stain according to coating manufacturer's recommendation as colour starts to fade and timber becomes dry. Re-coat expectation between 2-5 years.

Note: The regularity of re-coat will depend on the aspect of timber to the weather and design of house eg: presence of eaves and overhangs.

- Check all weatherboards, junctions, flashings, mouldings and replace or remediate as required to maintain weather tightness of the cladding system.

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7.1.3. In the case of light mould or discolouration

- Use Abodo Rejuvenator or other oxygenating type cleaner and a soft brush, rinse with water.
- Apply 1 or 2 coats of penetrating stain to dry wood according to coating manufacturer's recommendation colour starts to fade.

7.1.4. In the case of heavy and persistent mould

- Use a sodium hypochlorite based cleaner such as Resene Resene Moss and Mould Killer or 30 Seconds Outdoor Cleaner apply with a soft brush and leave for 10 minutes, then rinse thoroughly with water.
- Wait until wood is dry and then spray on a long acting mouldicide such as Resene Deep Clean or 30 seconds 'Spray and walk away'.
- Apply 2 coats of stain or oil onto dry timber.

7.2. Paint finish weatherboards

7.2.1. Things to expect

- Cladding in North facing (southern hemisphere) or south facing (northern hemisphere) or heavy weather-exposed aspects age quicker than timber located in other aspects
- Some movement of timber as it expands and contracts
- Possible minor surface cracking (checking)

7.2.2. Minimum maintenance

- Cladding must be cleaned regularly (minimum every 12 months) with mild detergent and soft brush, rinse with water. Note: High pressure water blasting is not allowed.
- A maintenance assessment is required at least every two summers as follows:

a Sand back areas of weatherboard where flaking or cracking is occurring- putty, sand as appropriate- then spot prime and apply two coats of exterior paint as required. Check all weatherboards, junctions, flashings, mouldings and replace or remediate parts as required to maintain weather tightness of the cladding system.

c Recoat the weatherboards with exterior paint as required by the coating manufacturer's recommendations (typically around 10 years).

8. Disclaimer

The recommendations contained in this document are based on good building practice, but are not an exhaustive statement of all relevant information. The successful performance of the system relies on many factors outside the control of Abodo Wood Ltd such as quality of workmanship and design. Abodo Wood Ltd shall not be liable for the recommendations made in its literature and the performance of the system including conformance with the NZBC, regulations and standards. It is the responsibility of the building designer to ensure that the details and recommendations provided are suitable for the intended project and that the design is executed appropriately.

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Appendix 1 - Standard Profiles

Standard Profiles - Vulcan Cladding



WB10 145x20 (125mm cover)



WB10 180x20mm (160mm cover)



WB12 138x20 (118mm cover)



WB12 180x20mm (160mm cover)



WB12 90x60mm (70mm cover)



WB12 90x40mm (70mm cover)



Fineline WB12F 180x20mm (160mm cover)



Bevelback AW62 180x20mm (148mm cover)

Standard Profiles - Vulcan Primed Cladding



WB10P 135x18 (115mm cover)



WB10P 180x18mm (160mm cover)



Bevelback AW62P 187x18mm (155mm cover)



WB10FP-180x18 (160mm cover)

Standard Profiles - Tundra Cladding



Bevelback AW61 140x20mm (108mm cover)



Rusticated AW702 140x20mm (115mm cover)



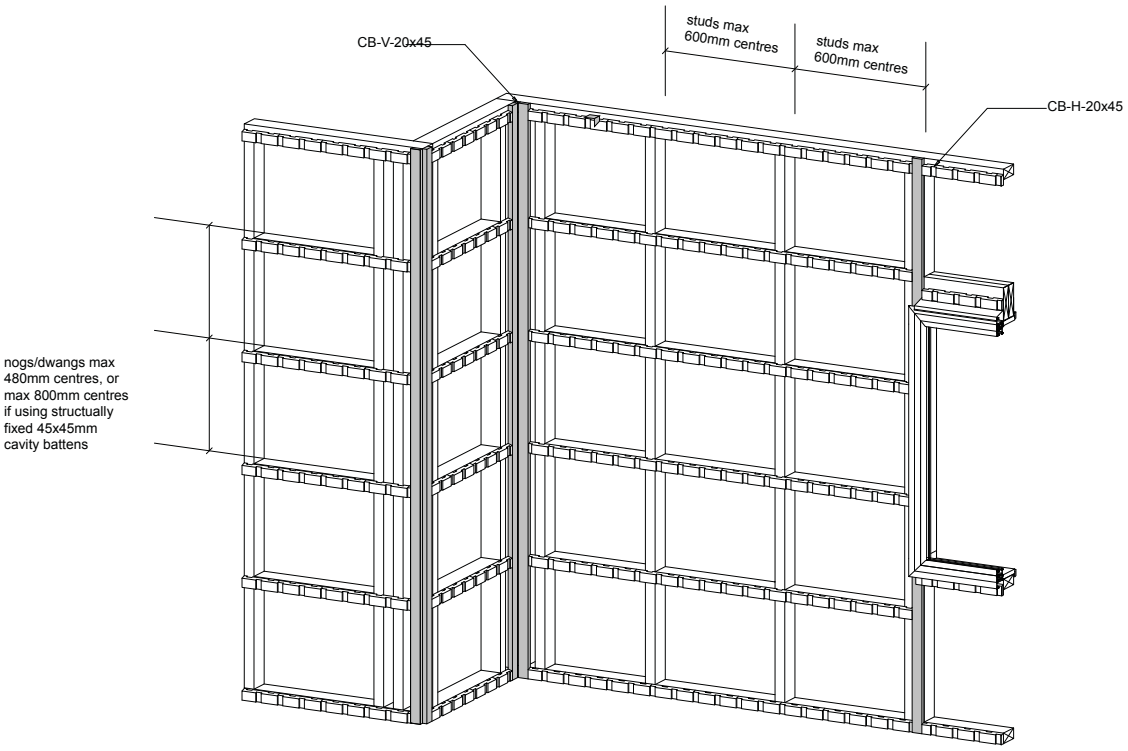
Vertical Shiplap AW51 135x20 (110mm cover)

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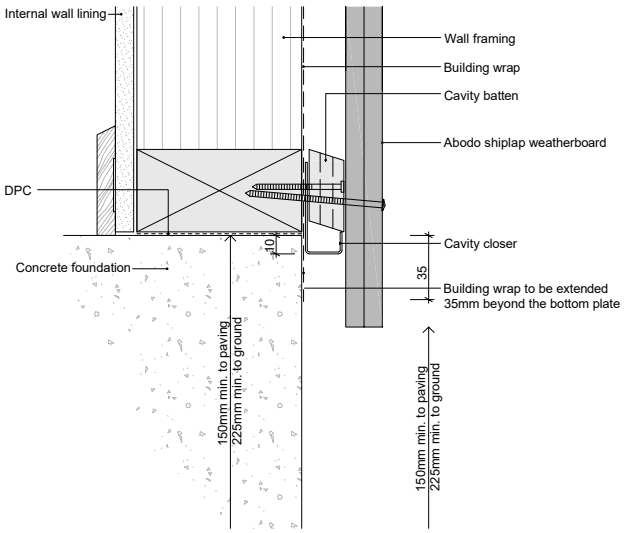
Appendix 2 - Detail Drawings

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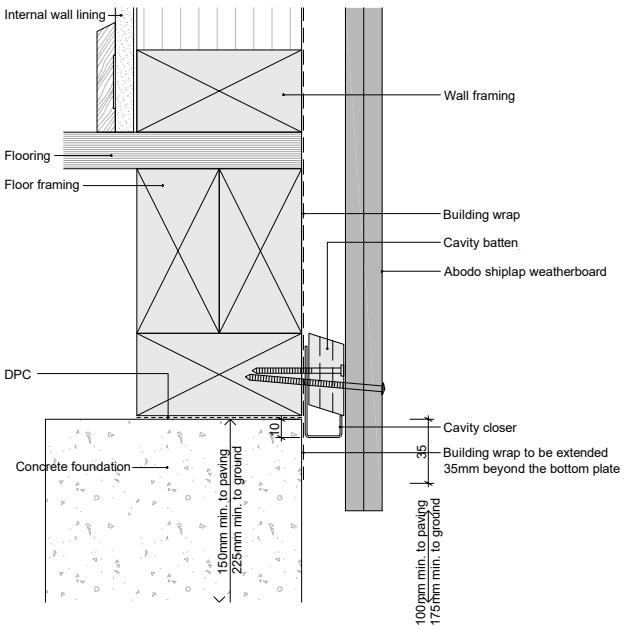
Vertical Shiplap- Horizontal Batten Fix - Layout



Vertical Shiplap Weatherboard
Base of Wall - Concrete Floor

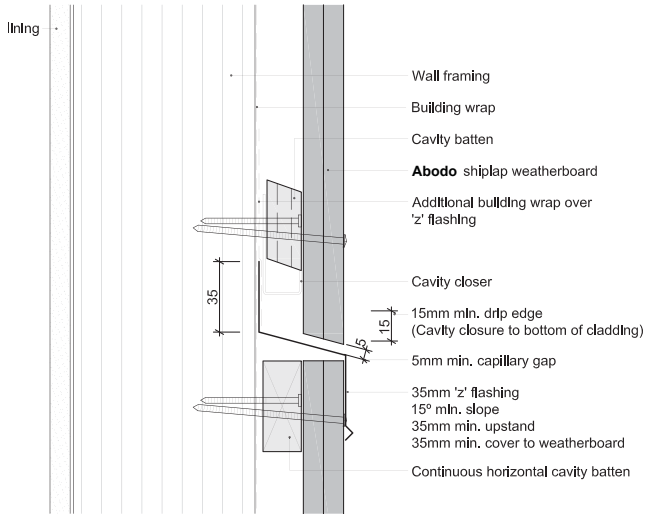


Vertical Shiplap Weatherboard
Base of Wall - Timber Floor

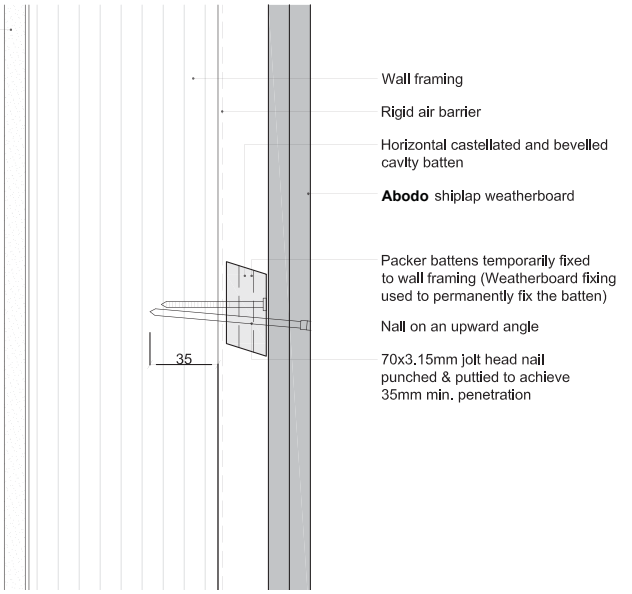


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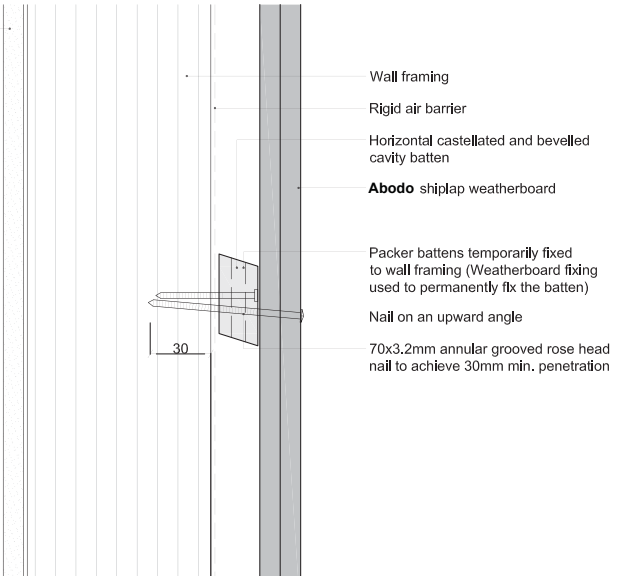
Vertical Shiplap Weatherboard
Inter-Storey Cavity Junction



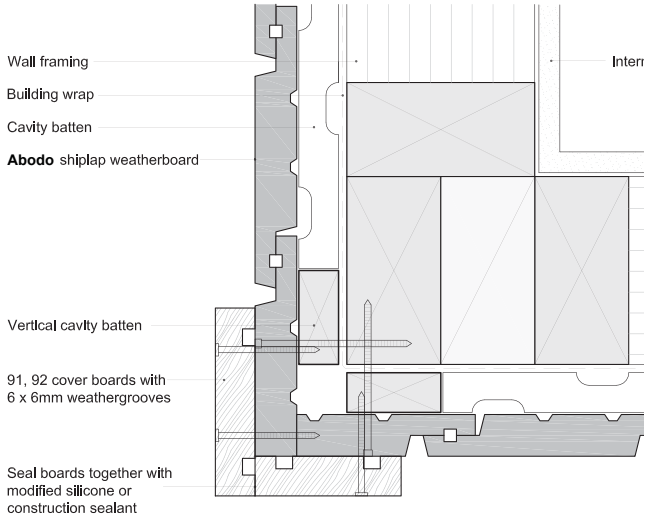
Vertical Shiplap Weatherboard
Packer Cavity Batten - Painted



Vertical Shiplap Weatherboard
Packer Cavity Batten - Stained

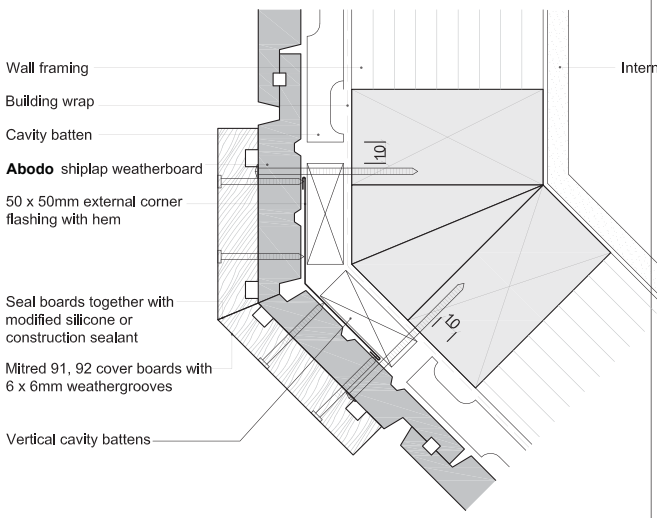


Vertical Shiplap Weatherboard
External 90° Corner - Boxed

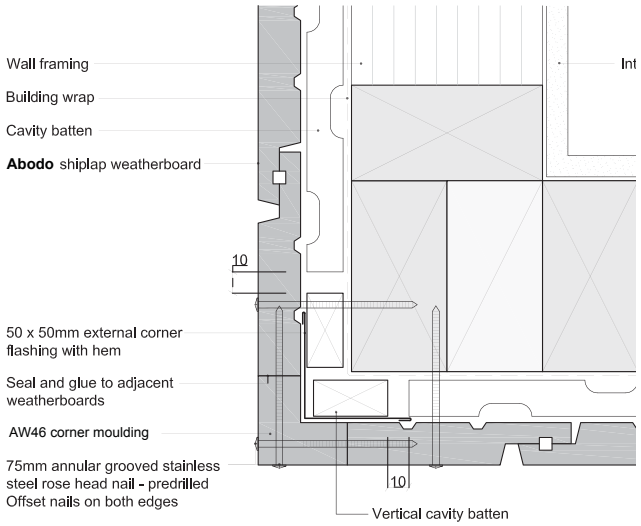


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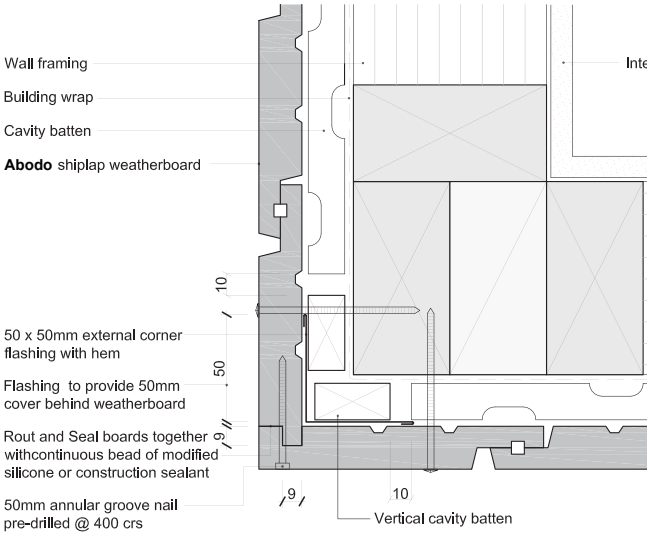
Vertical Shiplap Weatherboard
External 135° Corner - Boxed



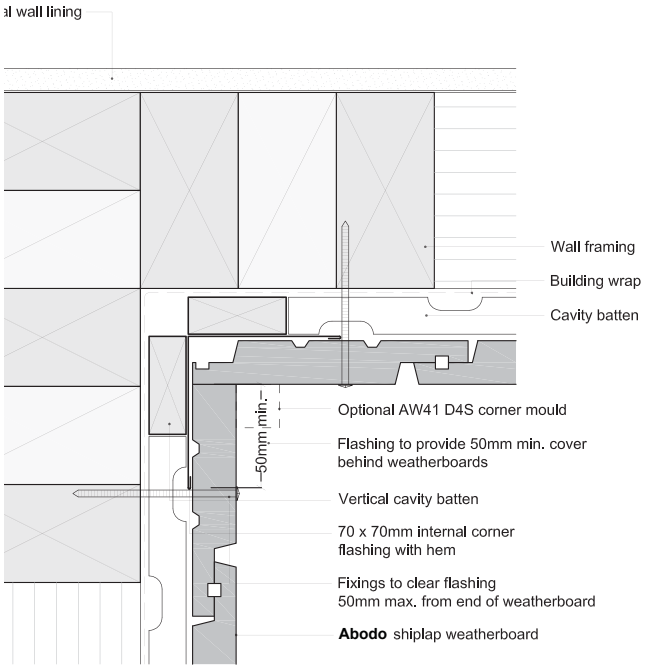
Vertical Shiplap Weatherboard
External 90° Corner - AW46 Moulding



Vertical Shiplap Weatherboard
External 90° Corner - Rebated

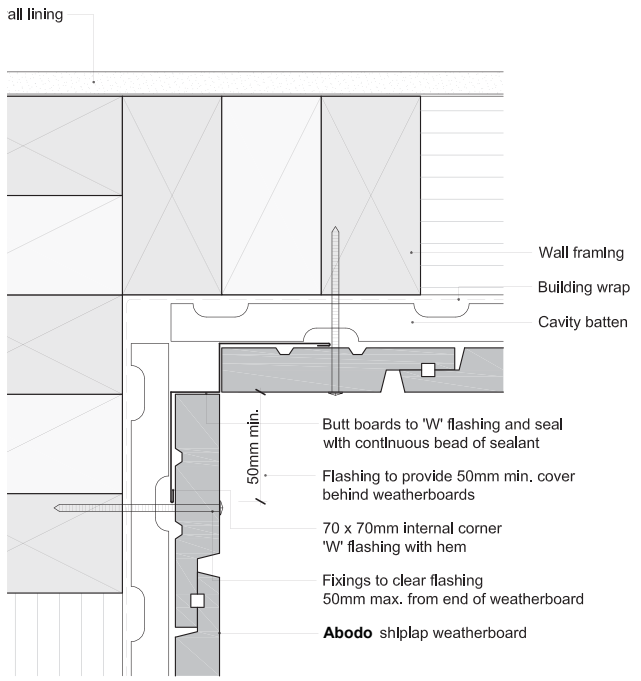


Vertical Shiplap Weatherboard
Internal 90° Corner - Butted

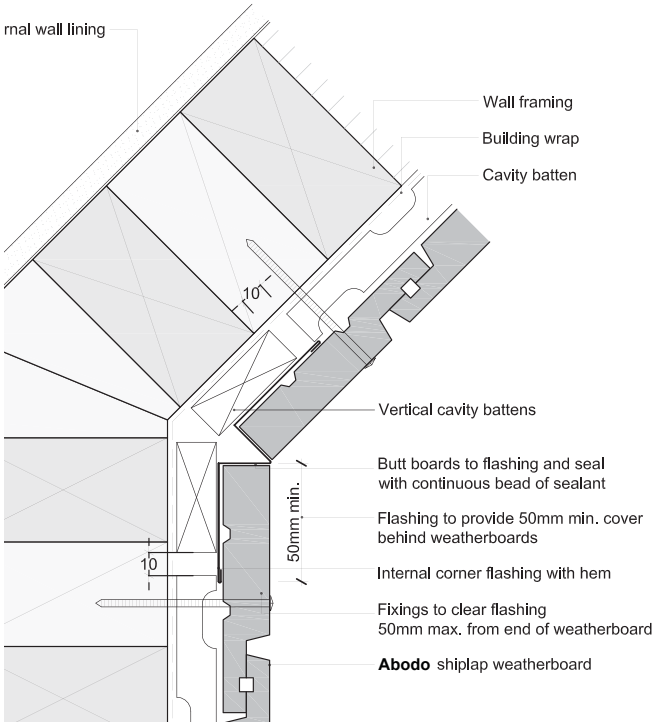


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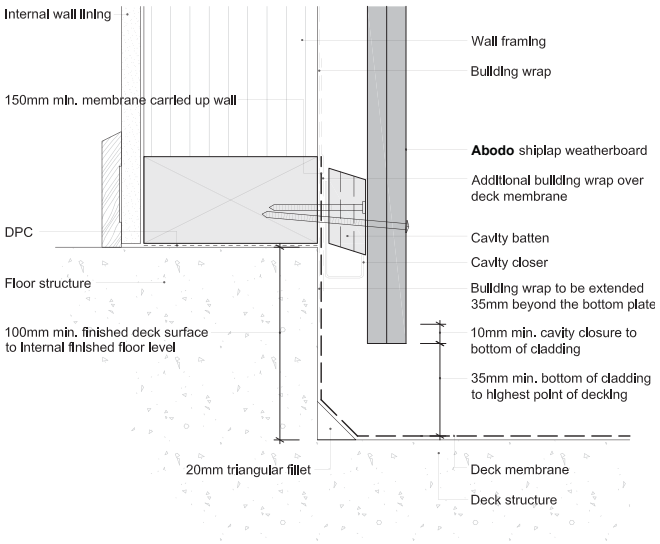
Vertical Shiplap Weatherboard



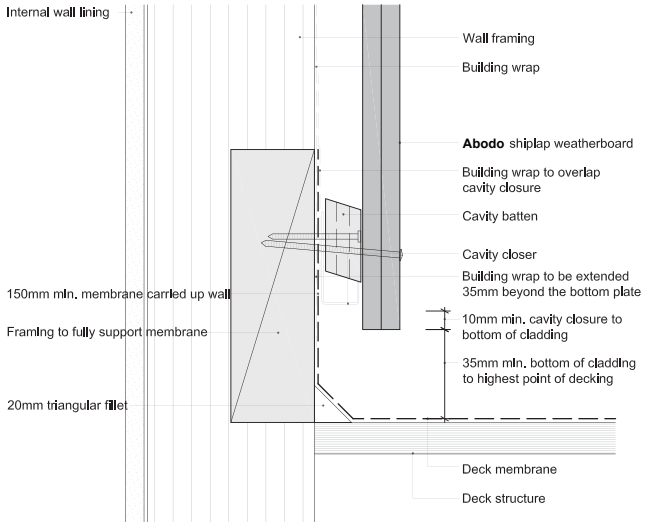
Vertical Shiplap Weatherboard
Internal 135° Corner - Flashing



Vertical Shiplap Weatherboard
Enclosed Deck - Concrete Substrate

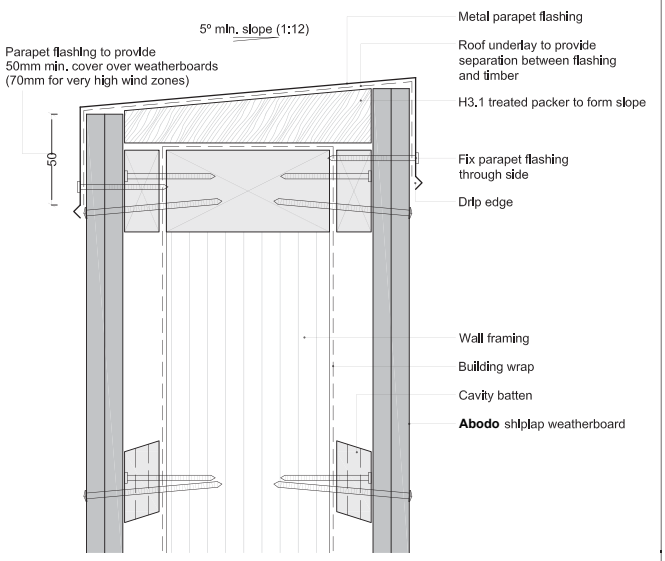


Vertical Shiplap Weatherboard
Enclosed Deck - Timber Substrate

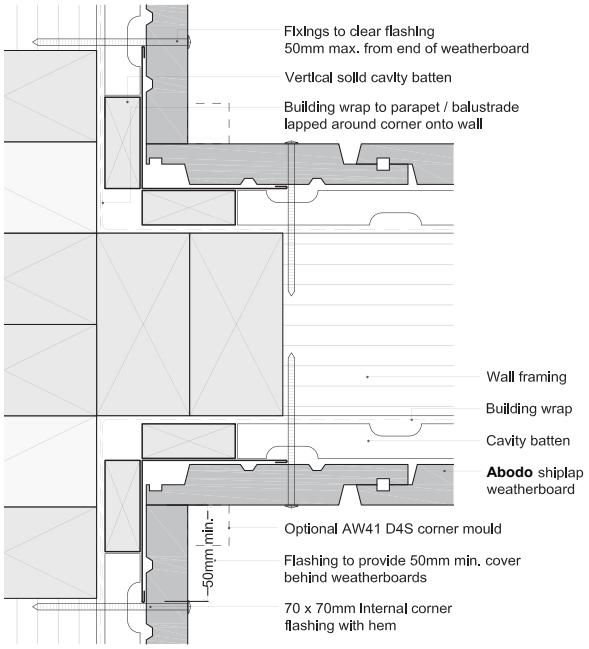


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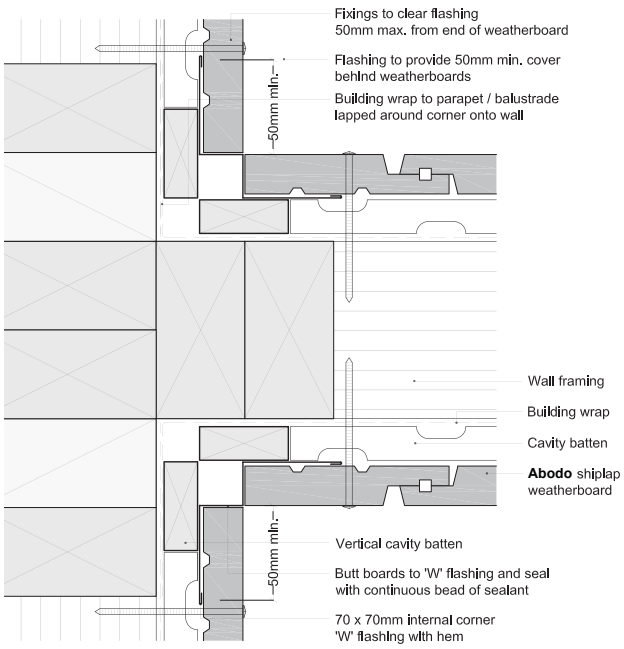
Vertical Shiplap Weatherboard
Parapet Balustrade Cap Flashing



Vertical Shiplap Weatherboard
Parapet Balustrade Intersection With Wall - Butted

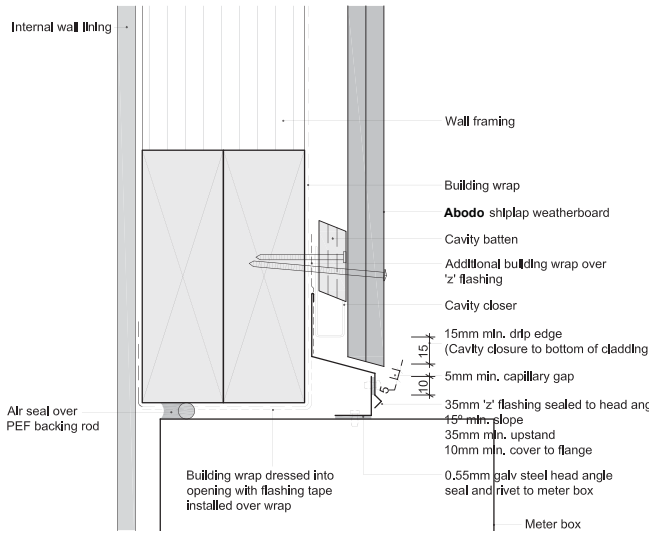


Vertical Shiplap Weatherboard
Parapet Balustrade Intersection with Wall - Flashing

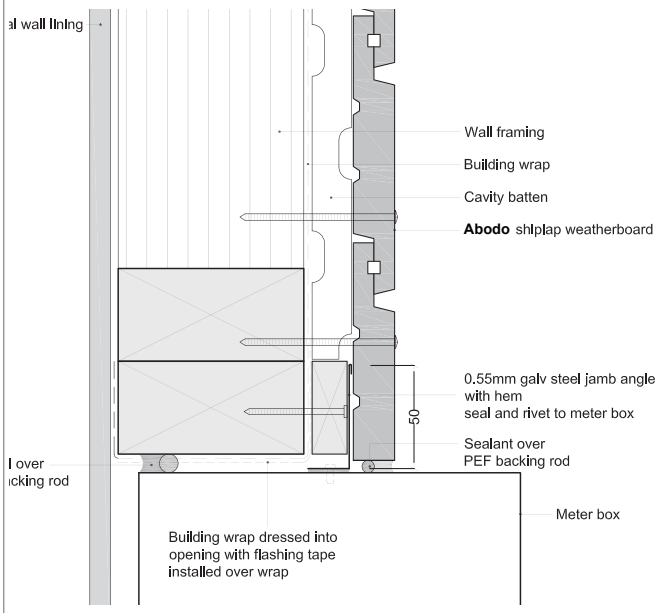


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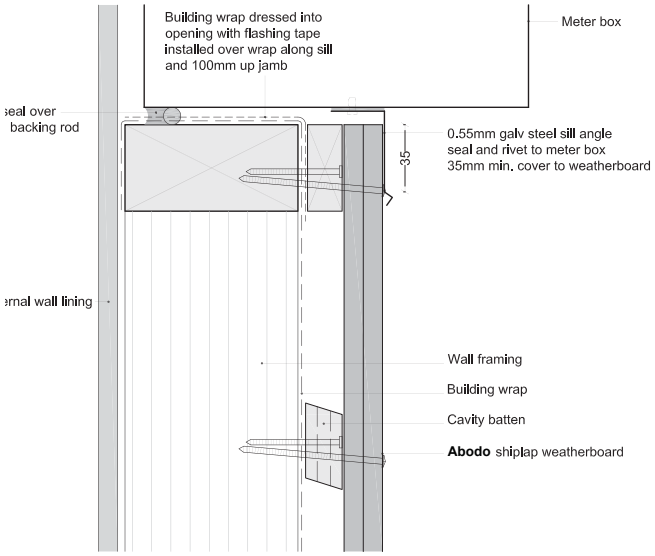
Vertical Shiplap Weatherboard
Meter Box Head



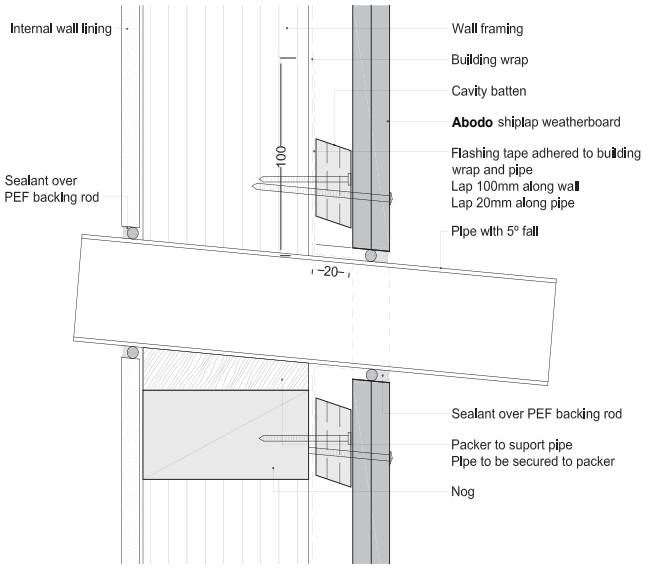
Vertical Shiplap Weatherboard
Meter Box Jamb



Vertical Shiplap Weatherboard
Meter Box Sill



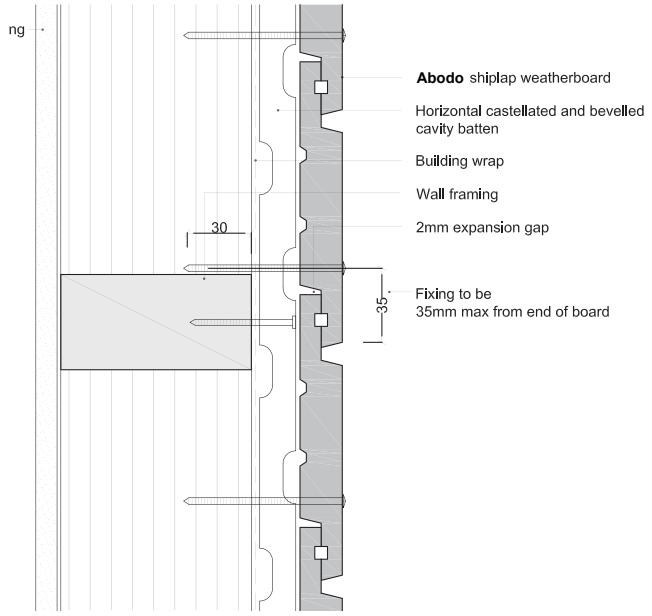
Vertical Shiplap Weatherboard
Pipe Penetration



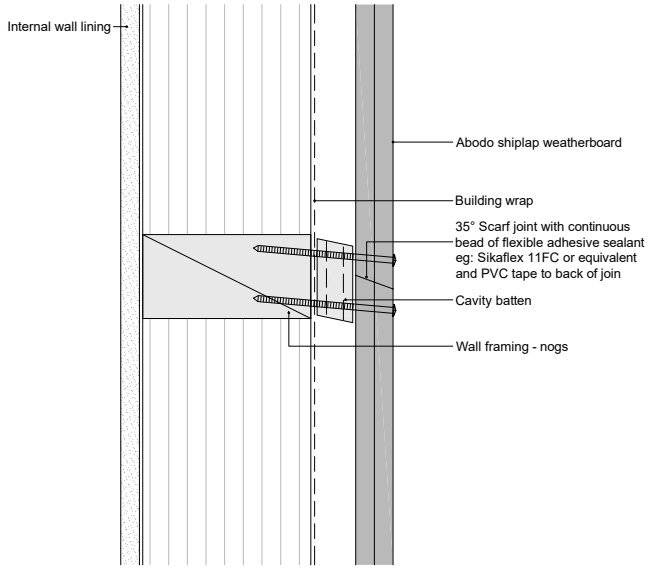
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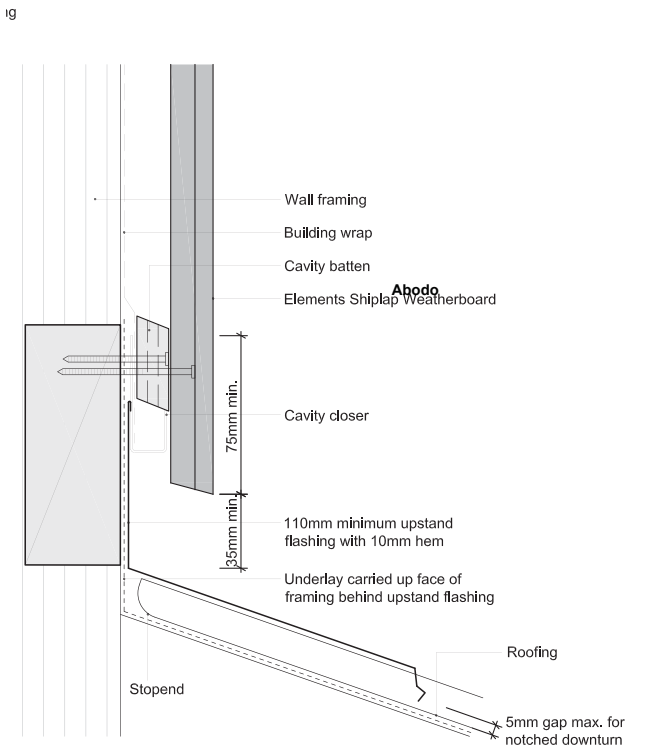
Vertical Shiplap Weatherboard
Weatherboard Join - Birdseye



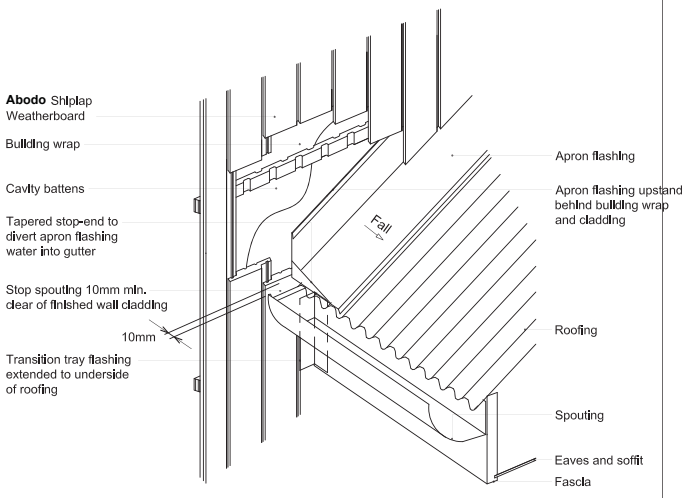
Vertical Shiplap Weatherboard



Vertical Shiplap Weatherboard
Apron Flashing

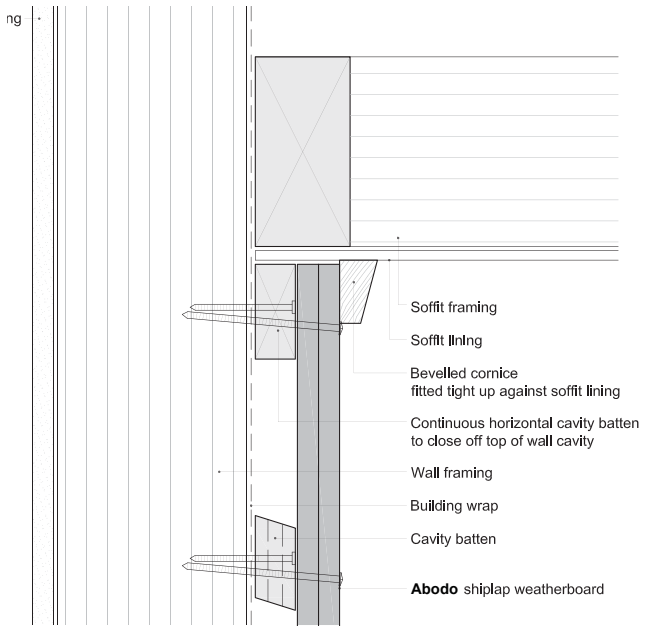


Vertical Shiplap Weatherboard
Roof Kick-out Flashing Cavity Detail

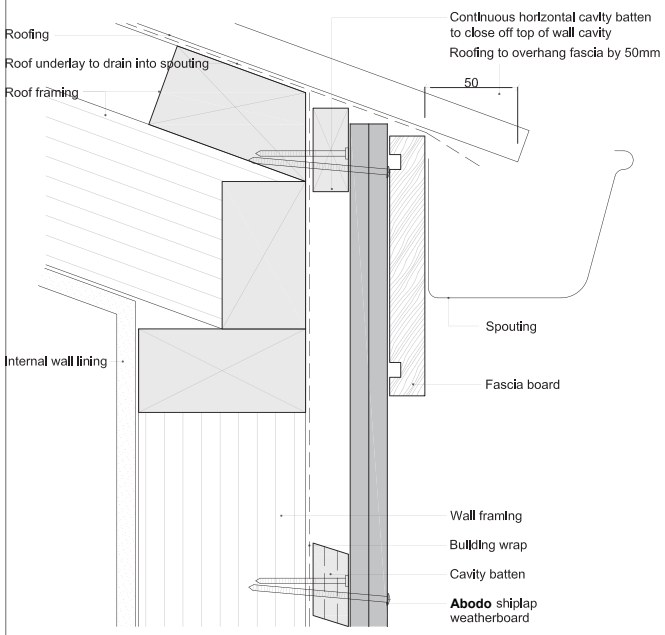


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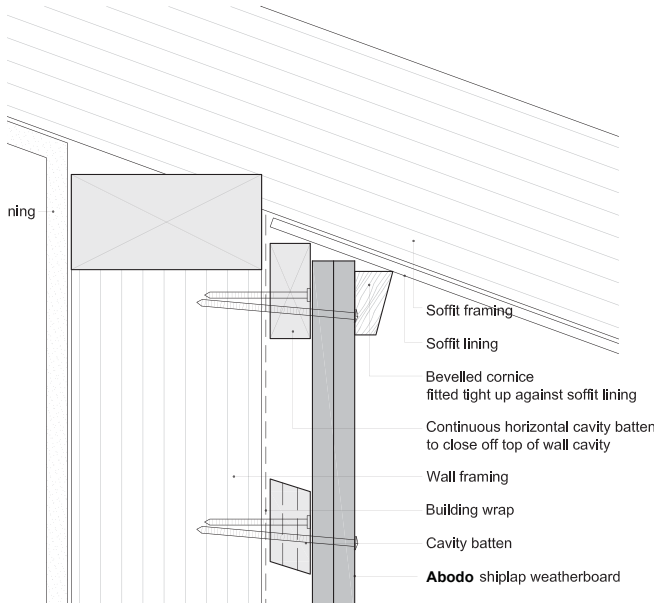
Vertical Shiplap Weatherboard
Top of Wall - Flat Soffit



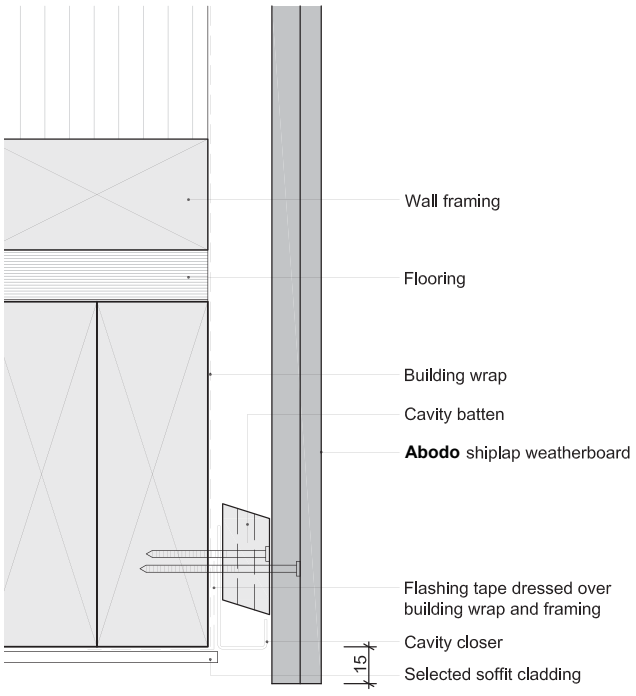
Vertical Shiplap Weatherboard
Top of Wall - No Soffit



Vertical Shiplap Weatherboard
Top of Wall - Sloping Soffit

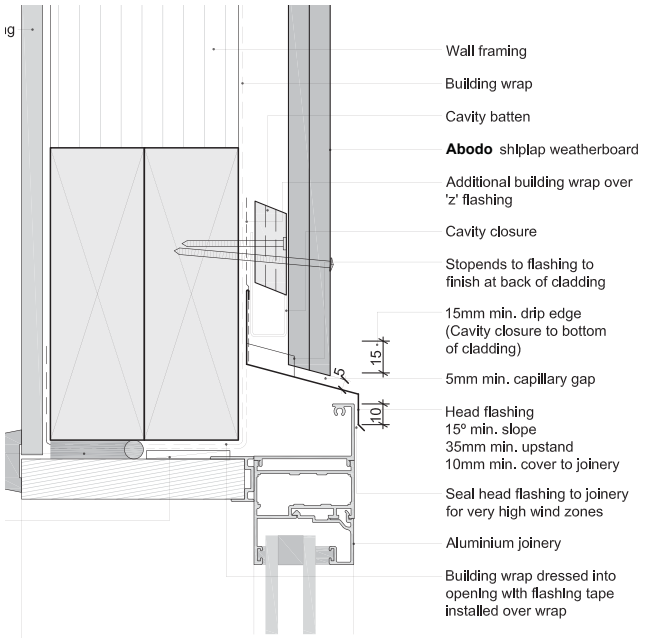


Vertical Shiplap Weatherboard
Soffit Detail

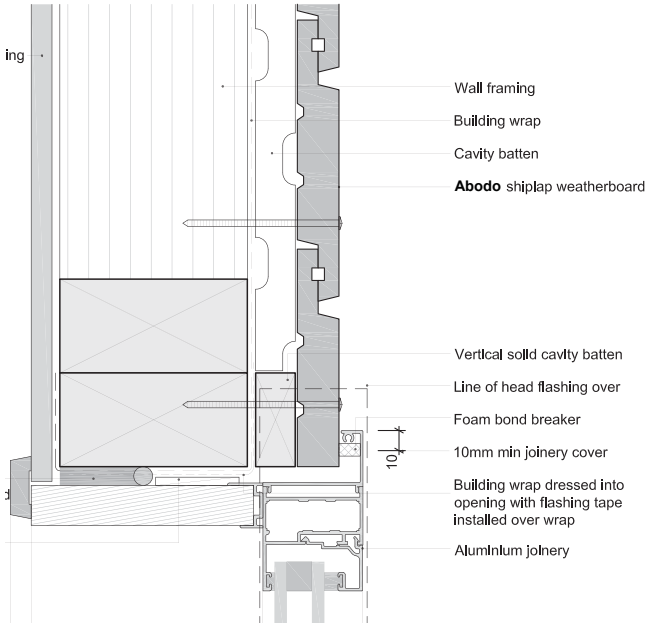


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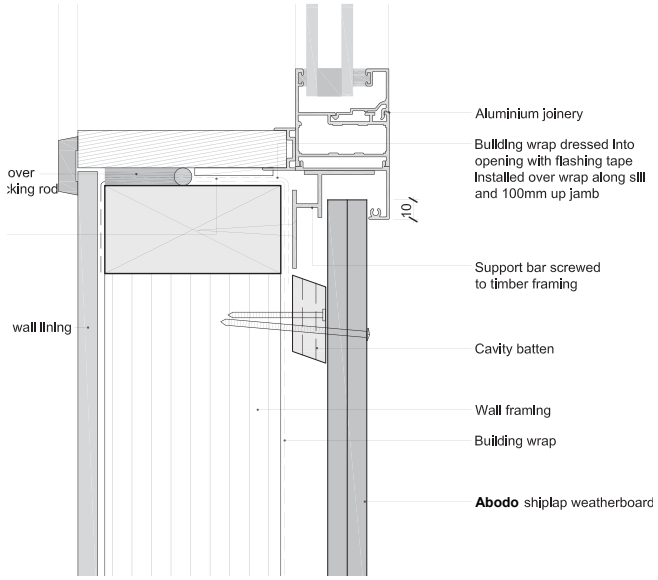
Vertical Shiplap Weatherboard
Window Head



Vertical Shiplap Weatherboard
Window Jamb

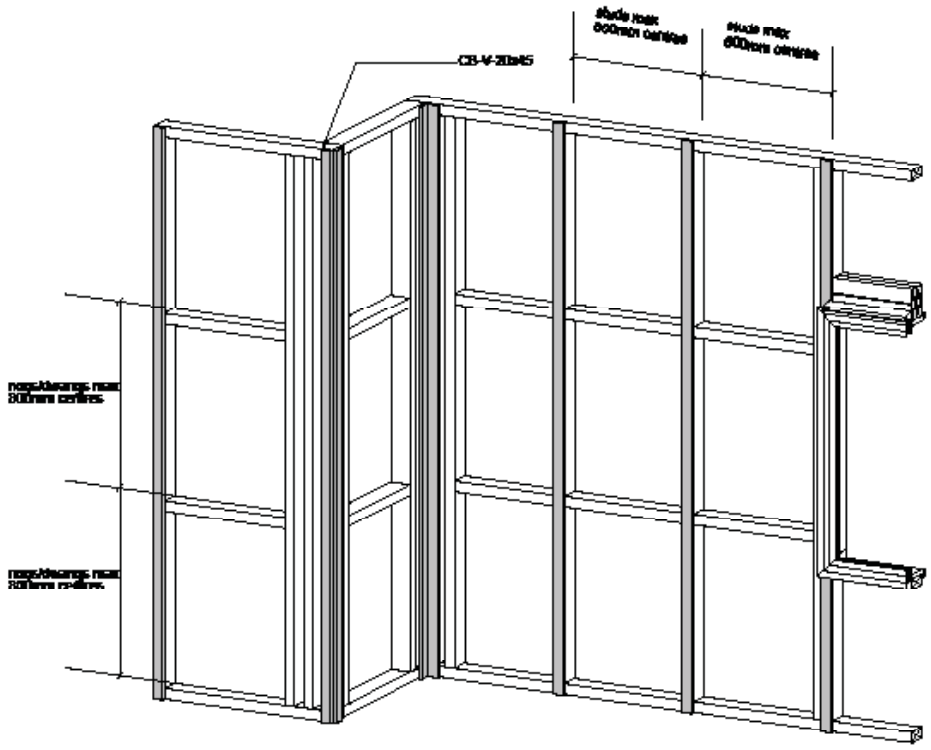


Vertical Shiplap Weatherboard
Top of Wall - Sloping Soffit

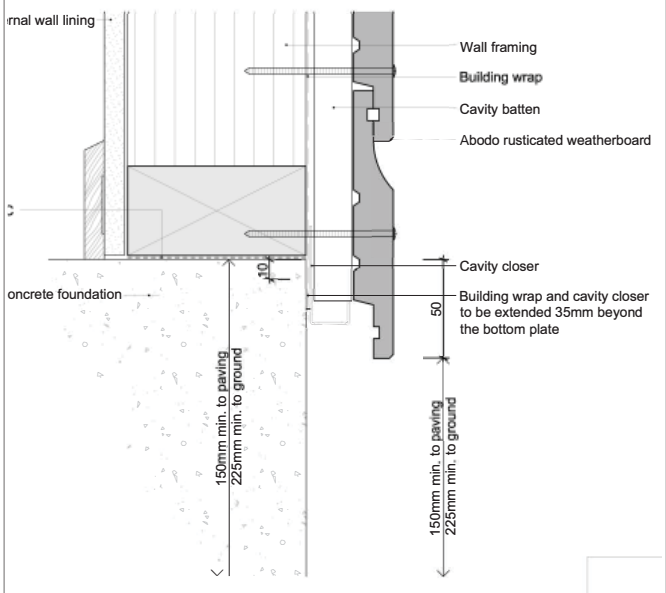


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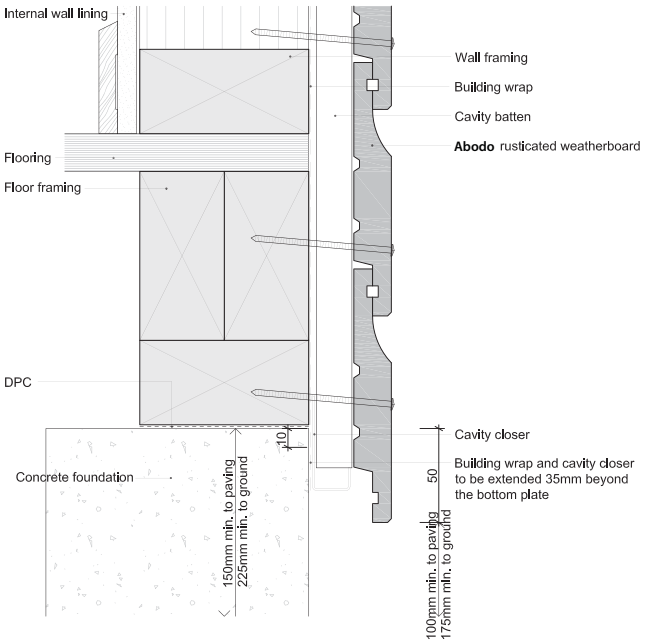
Rusticated - Vertical Batten Fix - Layout



Rusticated Weatherboard
Base of Wall - Concrete Floor

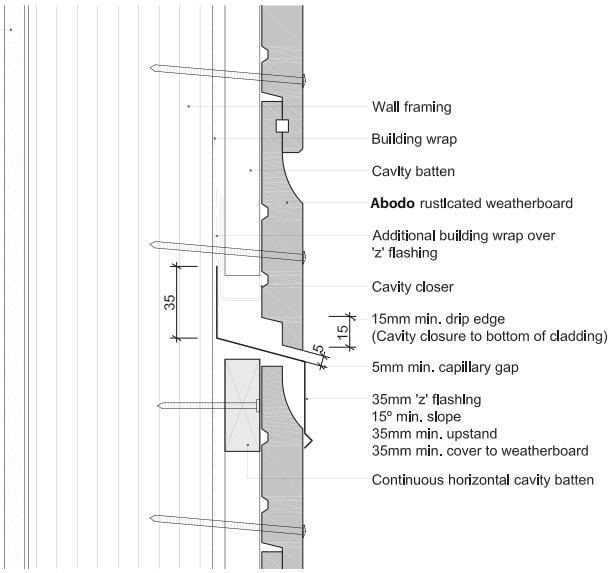


Rusticated Weatherboard
Base of Wall - Timber Floor

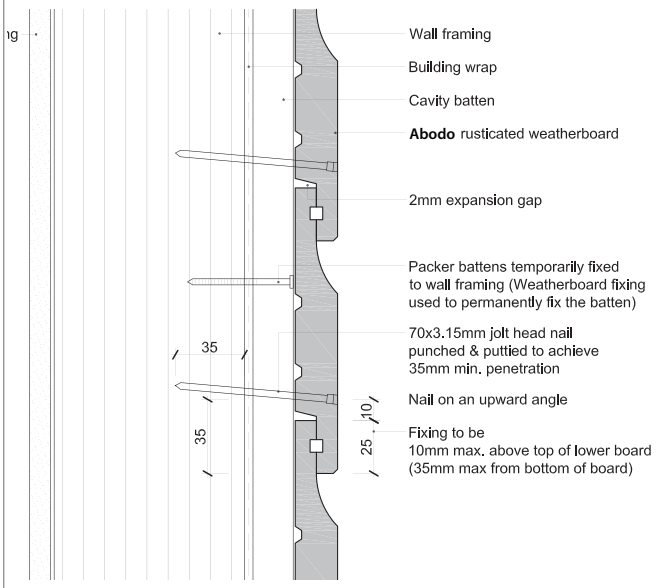


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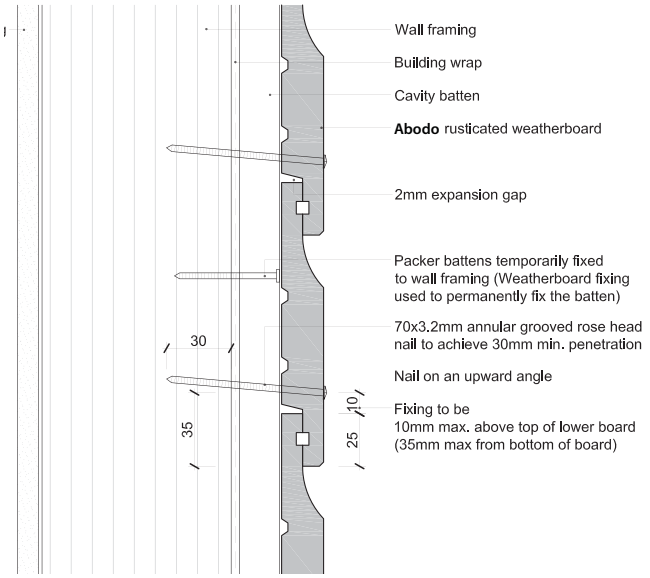
Rusticated Weatherboard
Inter-Storey Cavity Junction



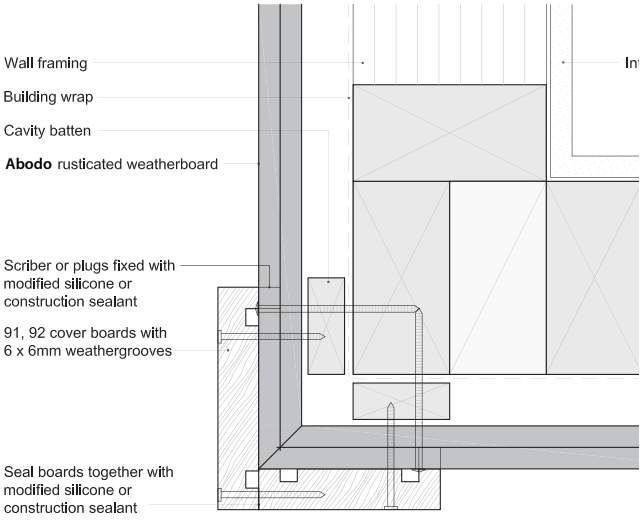
Rusticated Weatherboard
Packer Cavity Batten - Painted



Rusticated Weatherboard
Packer Cavity Batten - Stained

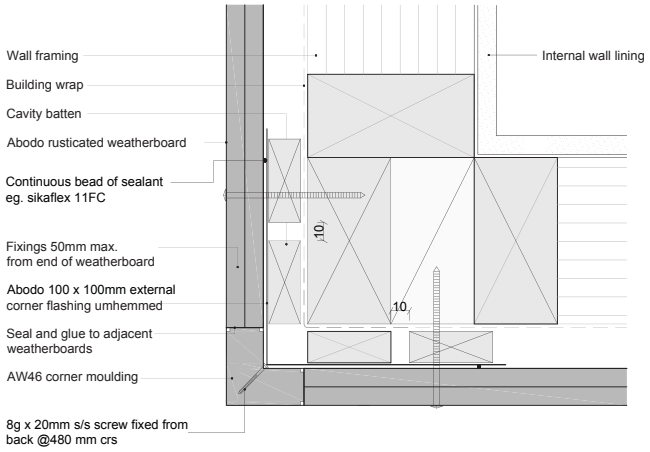


Rusticated Weatherboard
External 90° Corner- Boxed Cover Boards

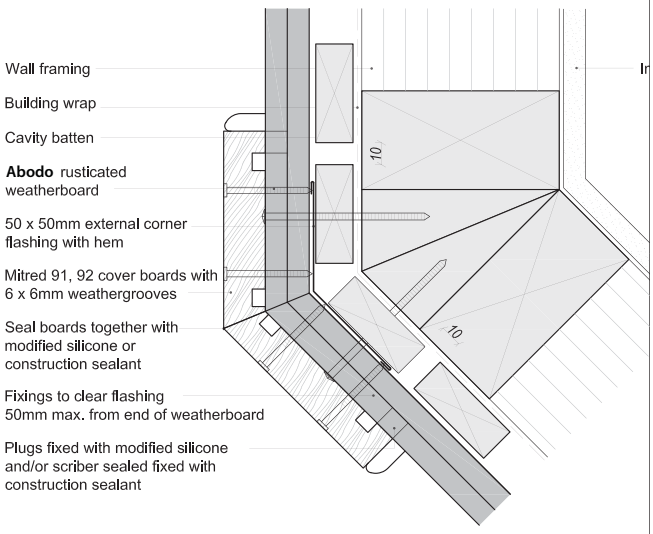


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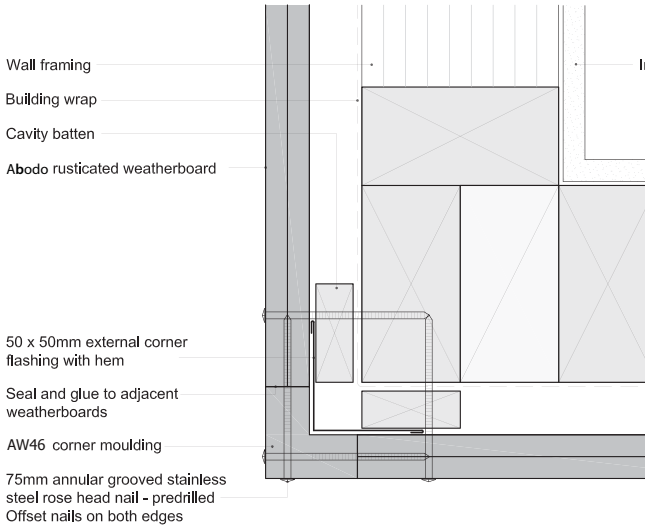
Rusticated Weatherboard
External 90° Corner- AW46



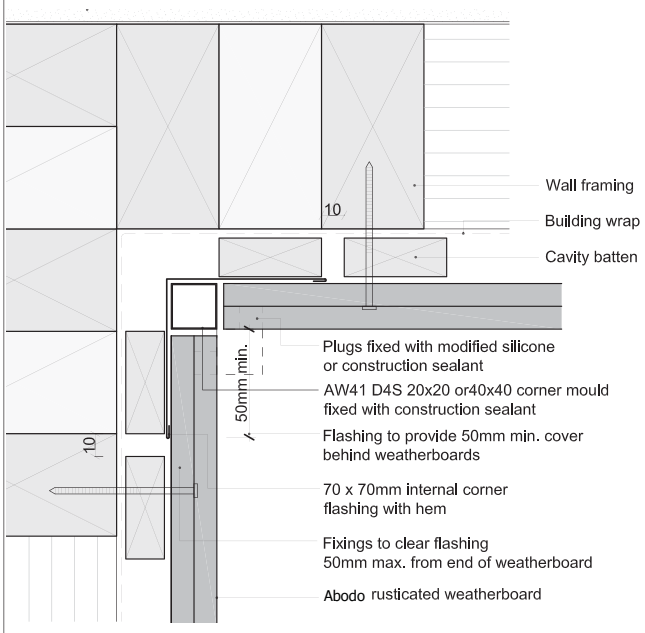
Rusticated Weatherboard
External 135° corner- Cover boards



Rusticated Weatherboard
External 90° Corner - AW46 Moulding Face Fix

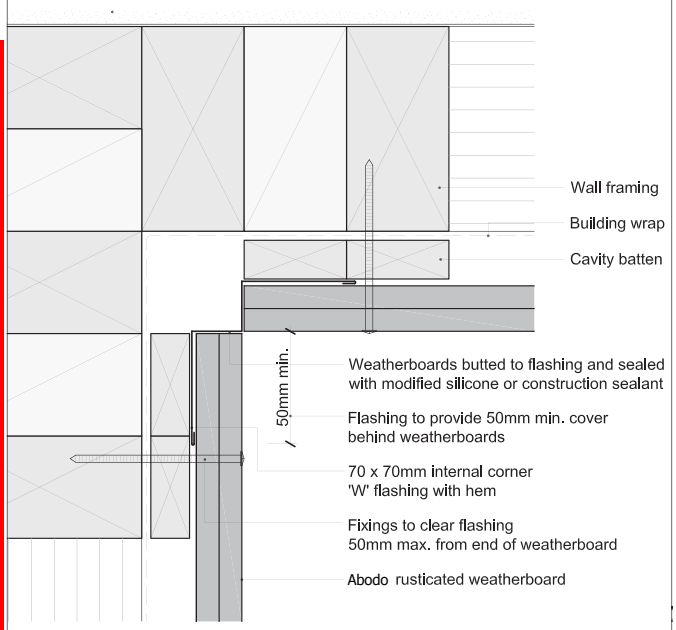


Rusticated Weatherboard
Internal 90° Corner - Butted

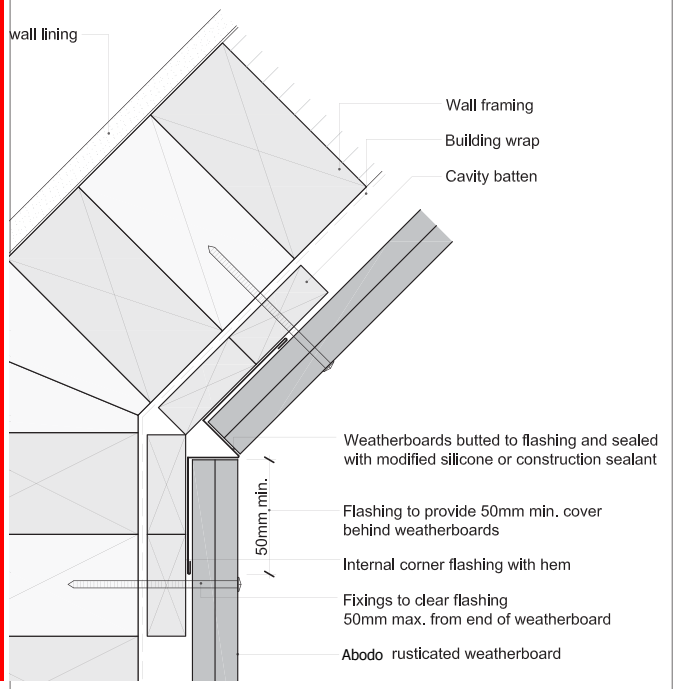


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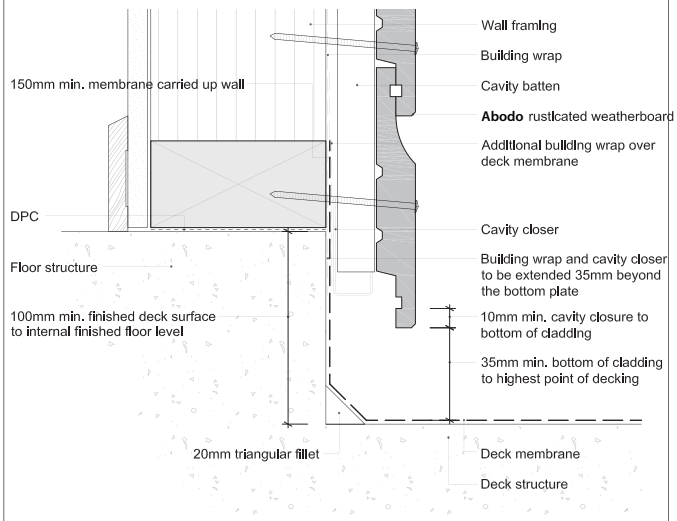
Rusticated Weatherboard
Internal 90° Corner - Flashing



Rusticated Weatherboard
Internal 135° Corner - Flashing

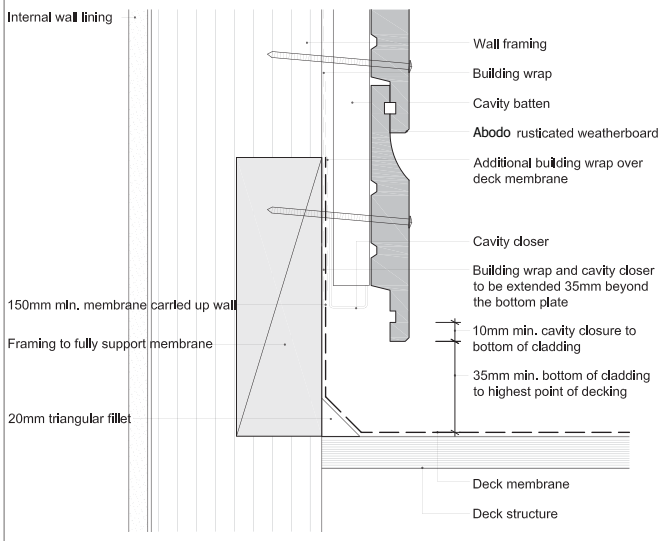


Rusticated Weatherboard
Enclosed Deck - Concrete Substrate

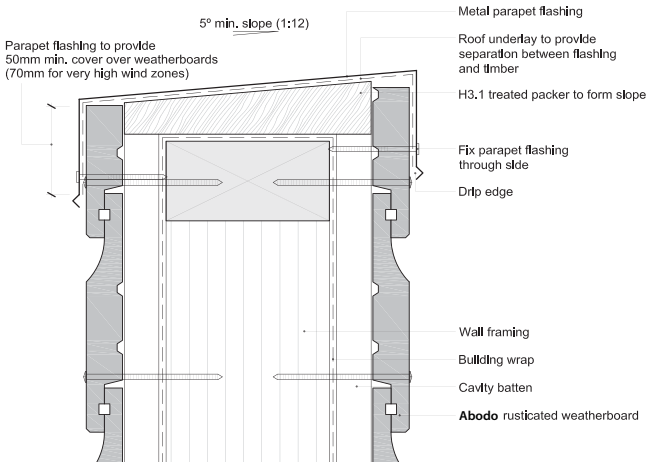


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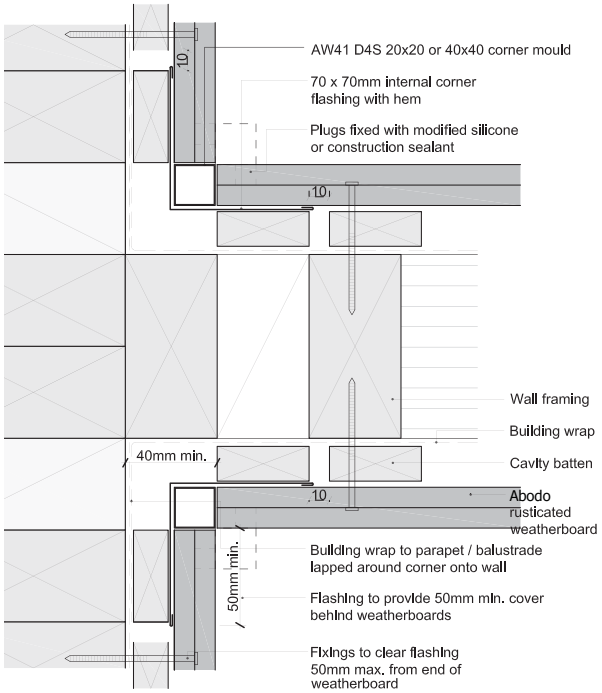
Rusticated Weatherboard
Enclosed Deck - Timber Substrate



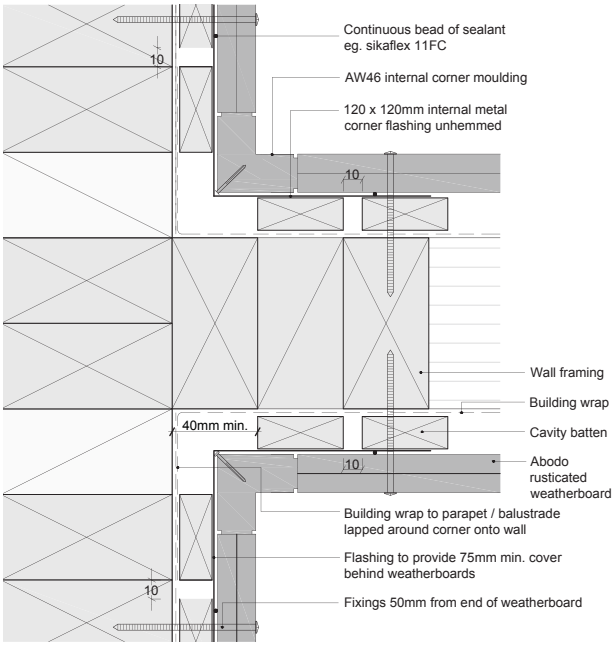
Rusticated Weatherboard
Parapet Balustrade Cap Flashing



Rusticated Weatherboard
Parapet Balustrade Intersection with Wall - Butted

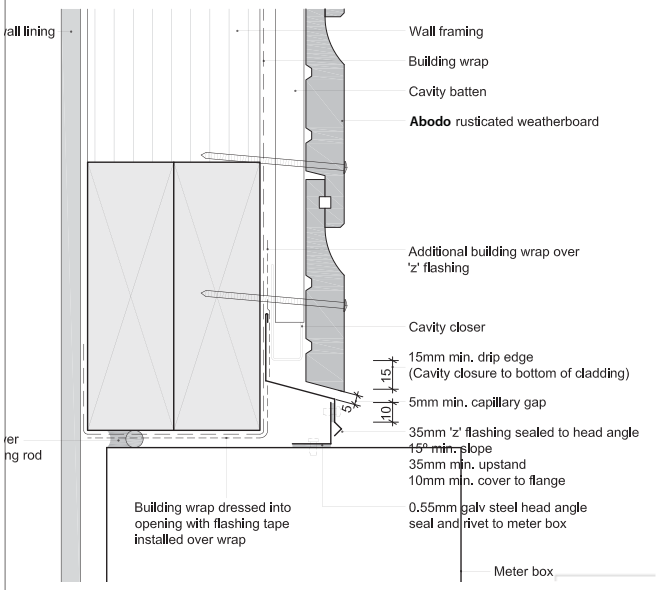


Rusticated Weatherboard
Parapet Balustrade Intersection with Wall - AW46 Moulding

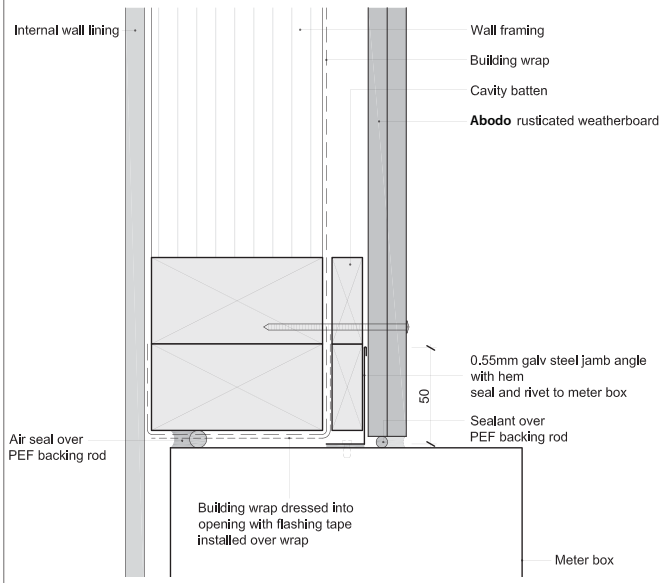


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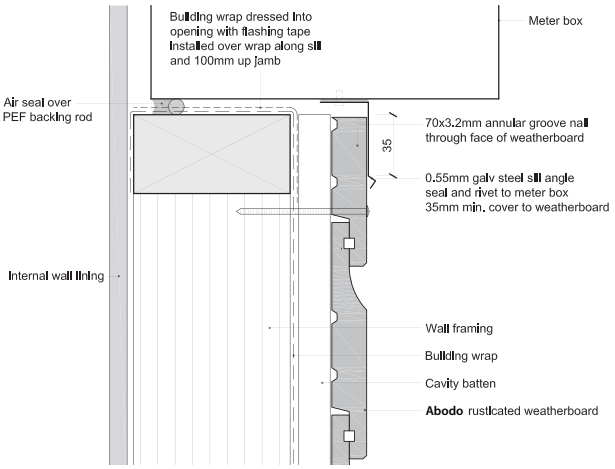
Rusticated Weatherboard
Meter Box Head



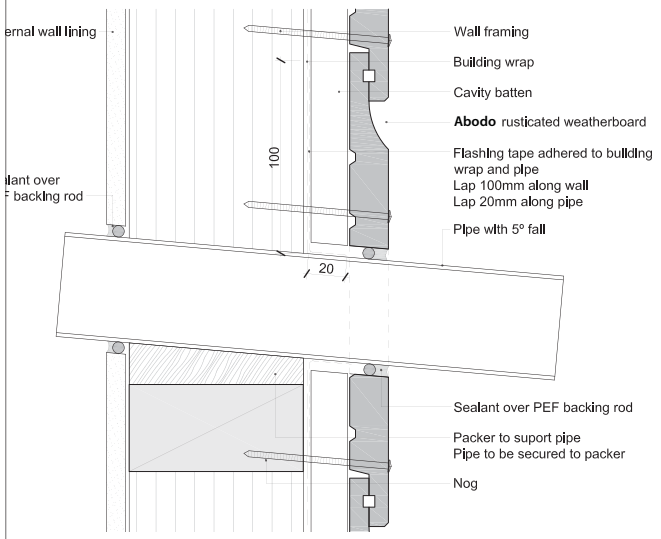
Rusticated Weatherboard
Meter Box Jamb



Rusticated Weatherboard
Meter Box Sill

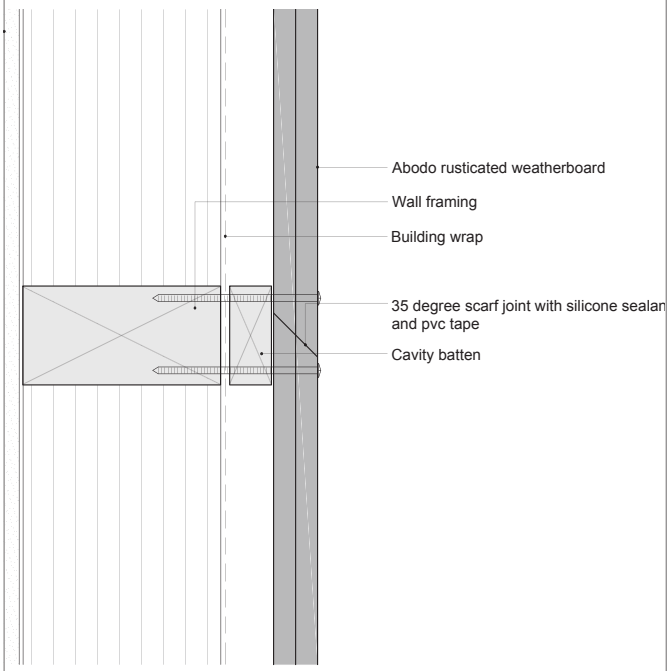


Rusticated Weatherboard
Pipe Penetration

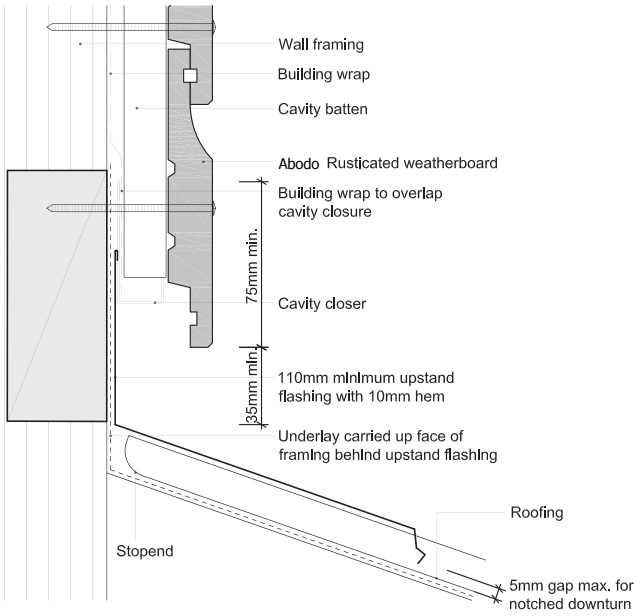


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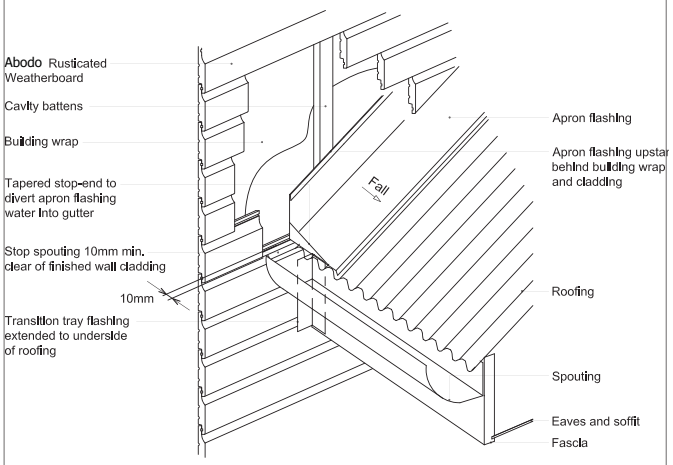
Rusticated Weatherboard



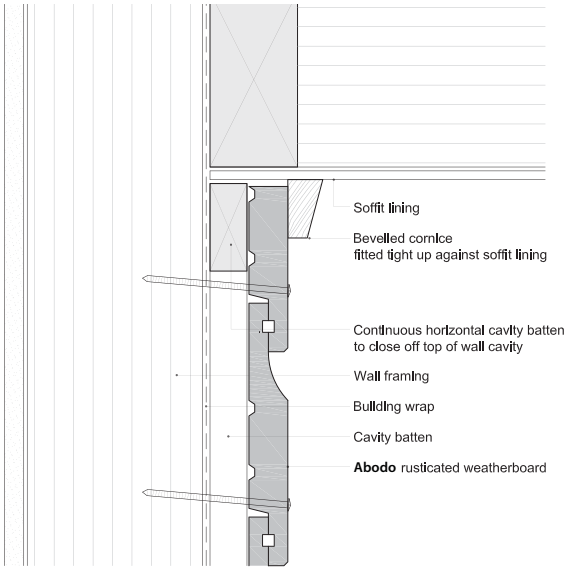
Rusticated Weatherboard
Apron Flashing



Rusticated Weatherboard
Roof Kick-out Flashing Cavity Detail

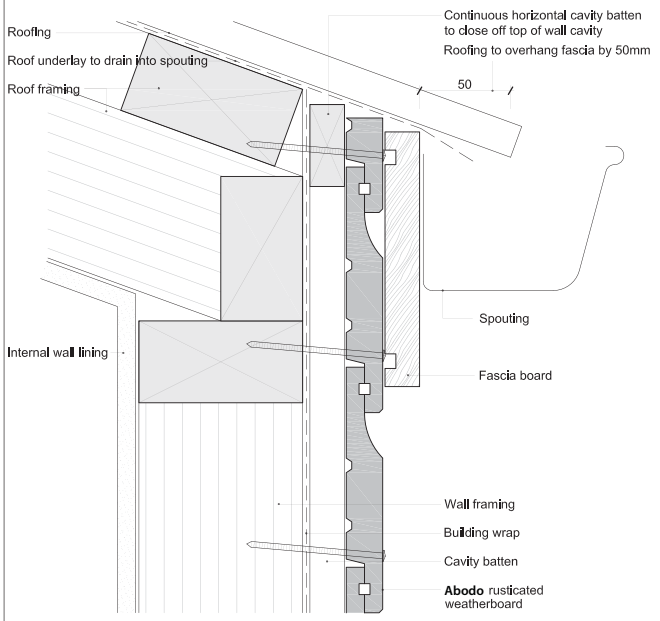


Rusticated Weatherboard
Top of Wall - Flat Soffit

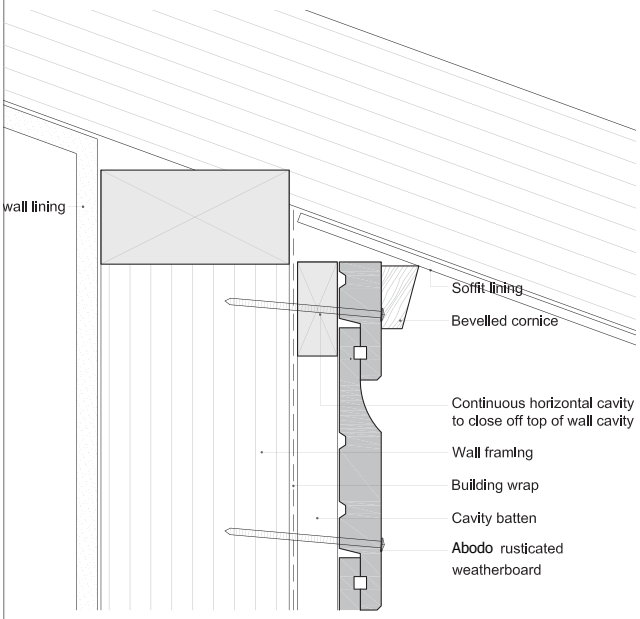


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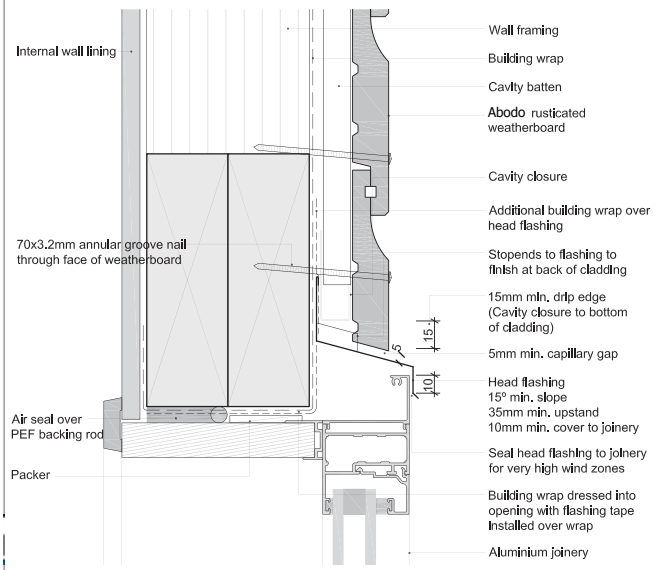
Rusticated Weatherboard
Top of Wall - No Soffit



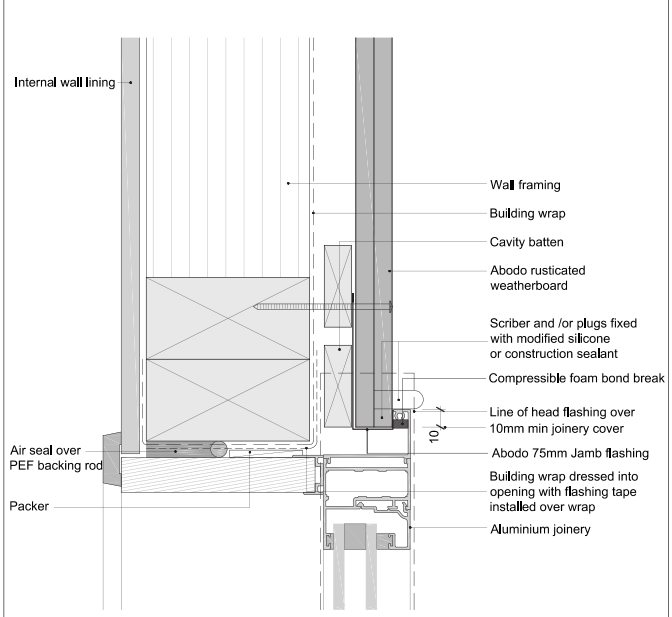
Rusticated Weatherboard
Top of Wall - Sloping Soffit



Rusticated Weatherboard
Window Head

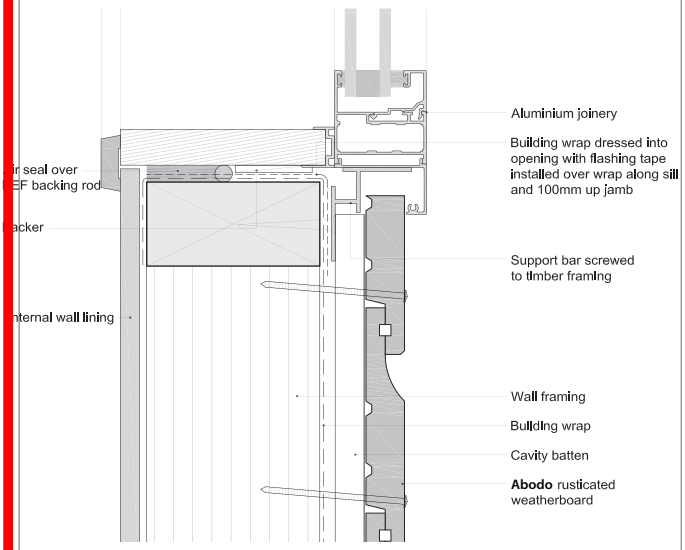


Rusticated Weatherboard

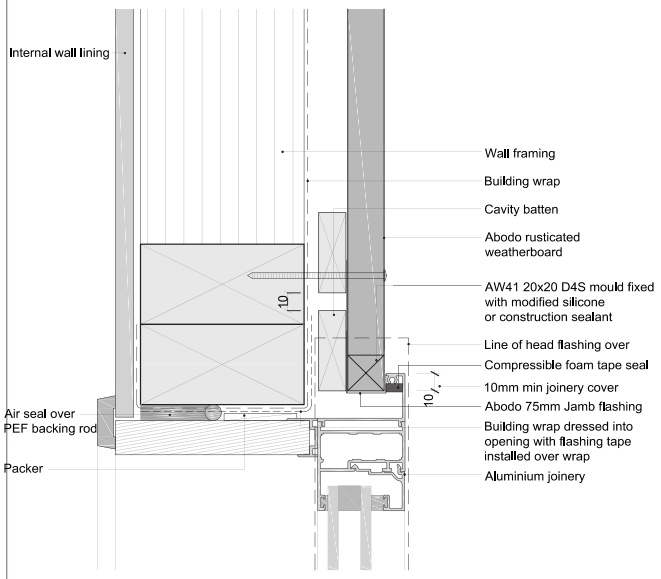


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Rusticated Weatherboard
Window Sill

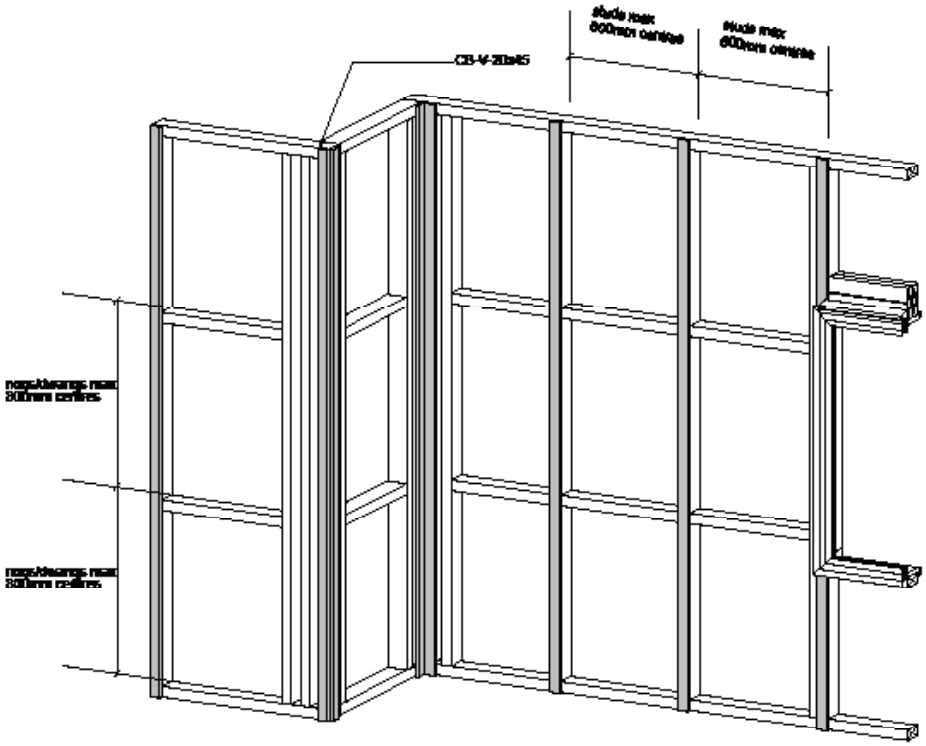


Rusticated Weatherboard
Window Jamb Option 2

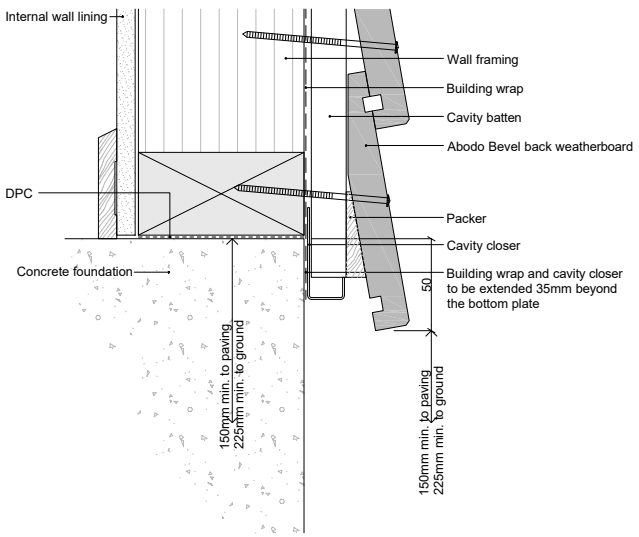


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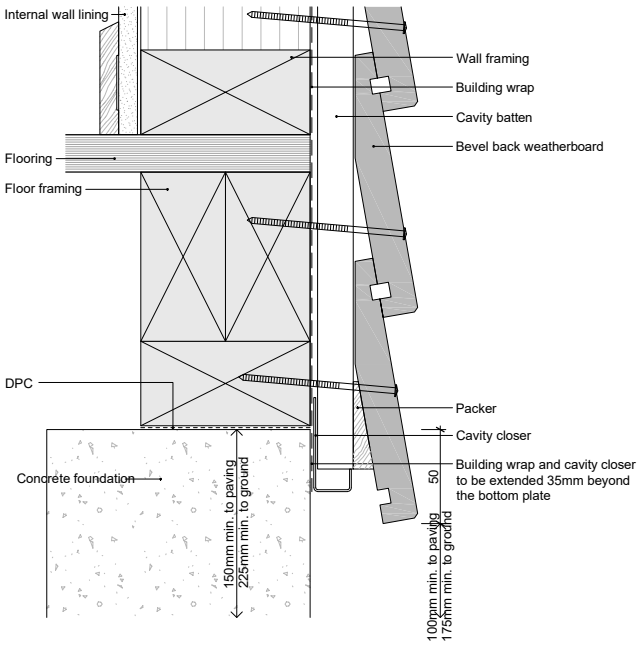
Bevel Back - Vertical Batten Fix - Layout



Bevel Back Weatherboard
Base of Wall - Concrete Floor

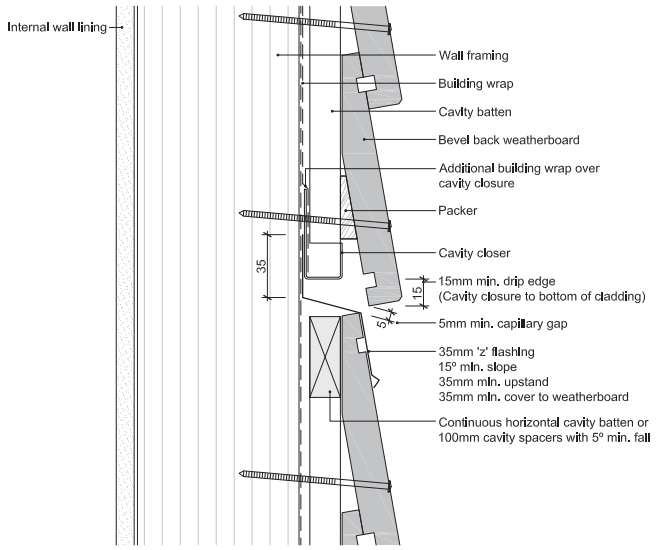


Bevel Back Weatherboard
Base of Wall - Timber Floor

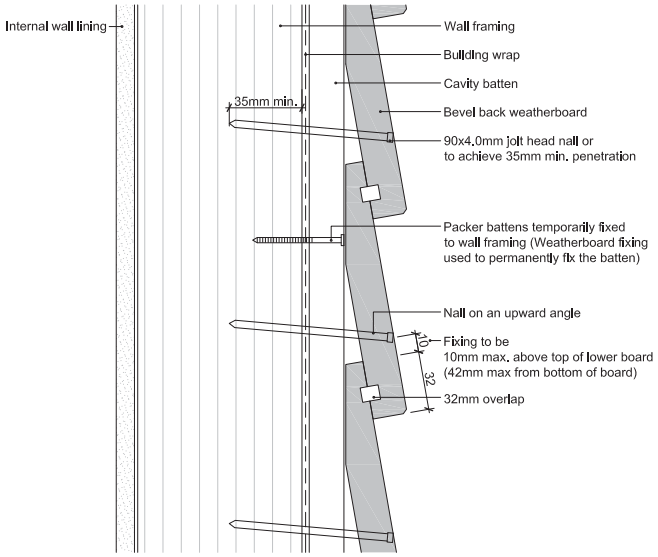


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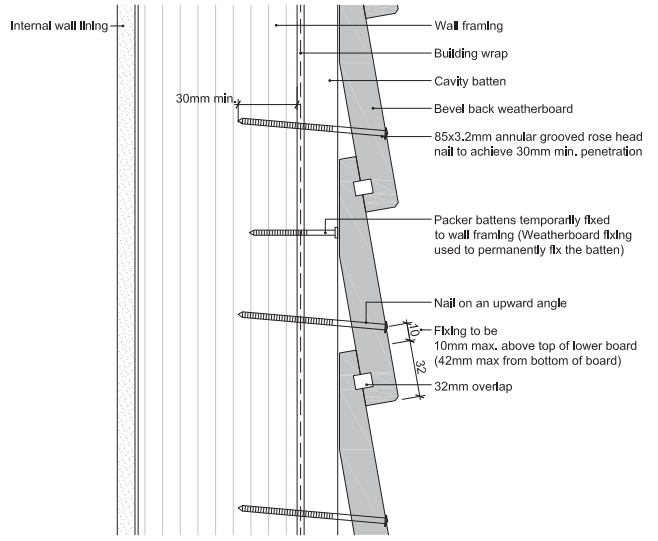
Bevel Back Weatherboard
Inter-Storey Cavity Junction



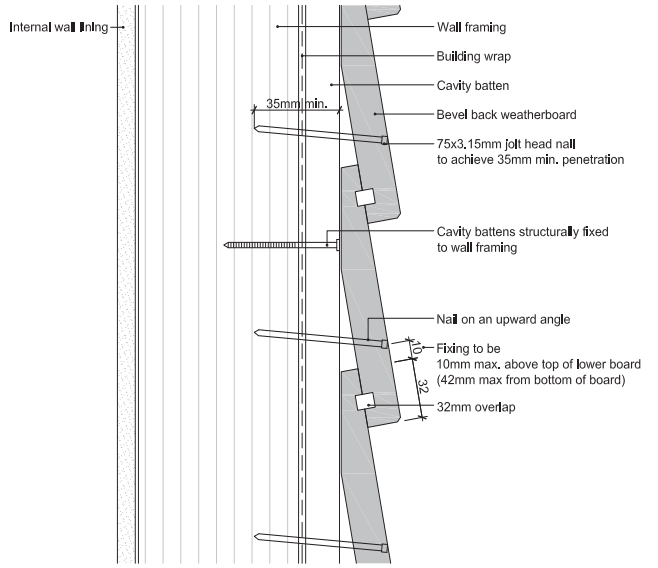
Bevel Back Weatherboard
Packer Cavity Batten - Painted



Bevel Back Weatherboard
Packer Cavity Batten - Stained

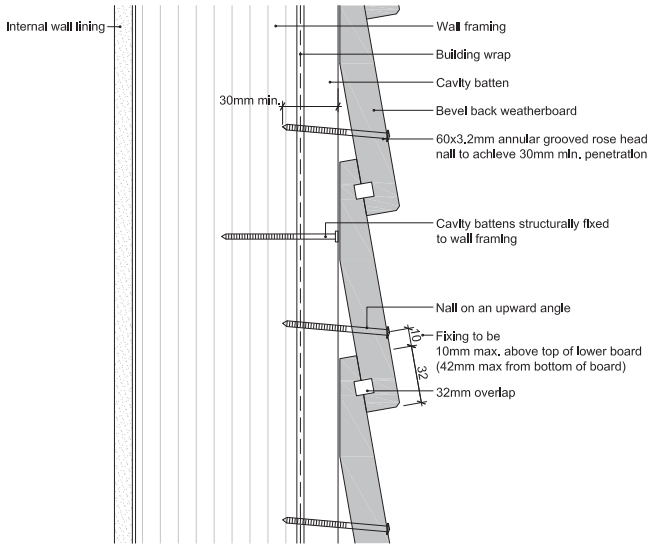


Bevel Back Weatherboard
Structural Cavity Batten - Painted

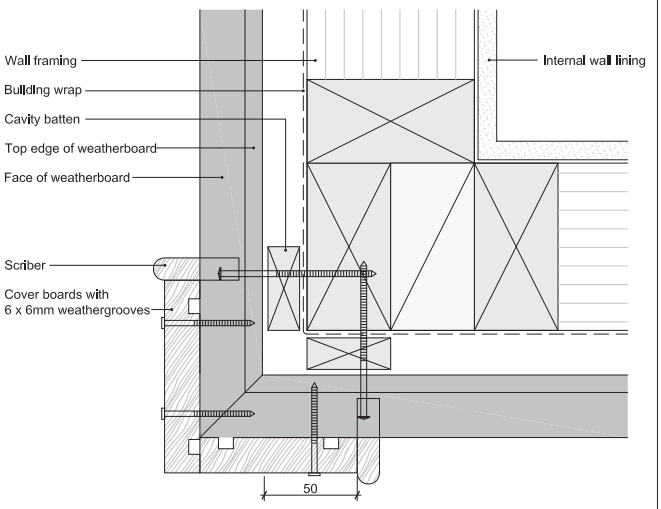


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Bevel Back Weatherboard
Structural Cavity Batten - Stained

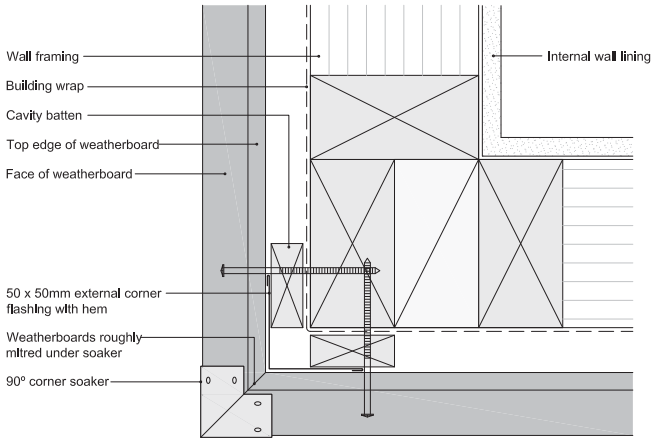


Bevel Back Weatherboard
External 90° Corner- Boxed Cover Boards

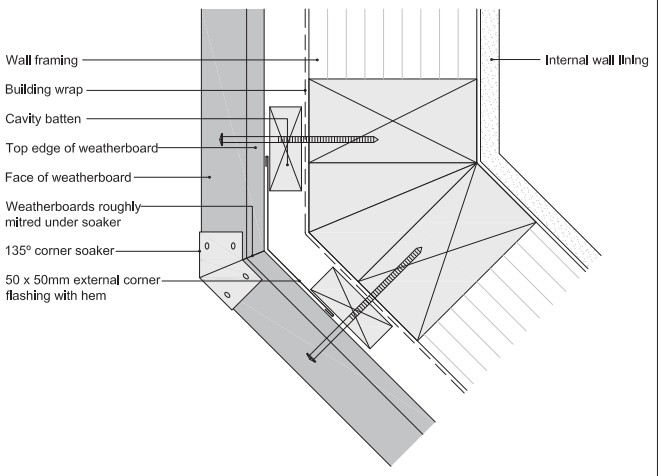


EXTERNAL 90° CORNER - BOXED

Bevel Back Weatherboard
External 90° Corner - Soakers

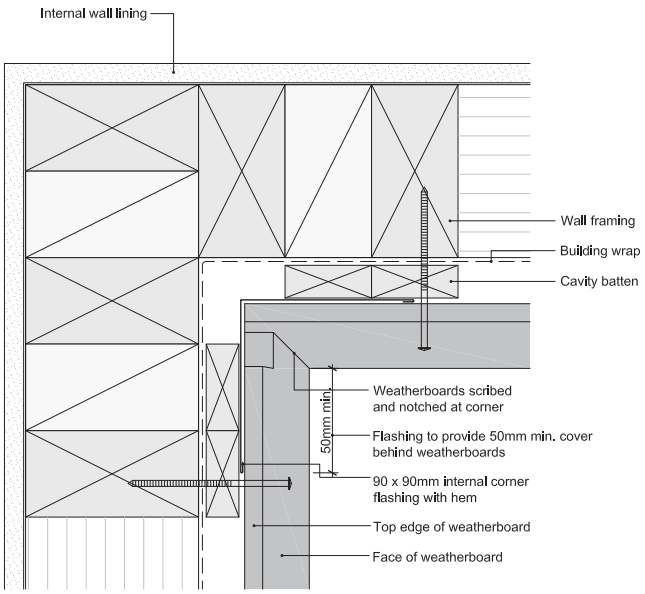


Bevel Back Weatherboard
External 135° Corner - Soakers



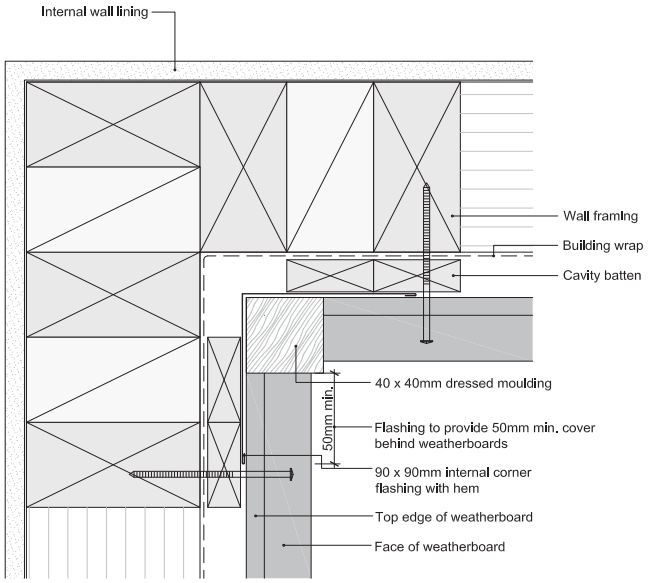
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Bevel Back Weatherboard
Internal 90° Corner - Scribed & Notched

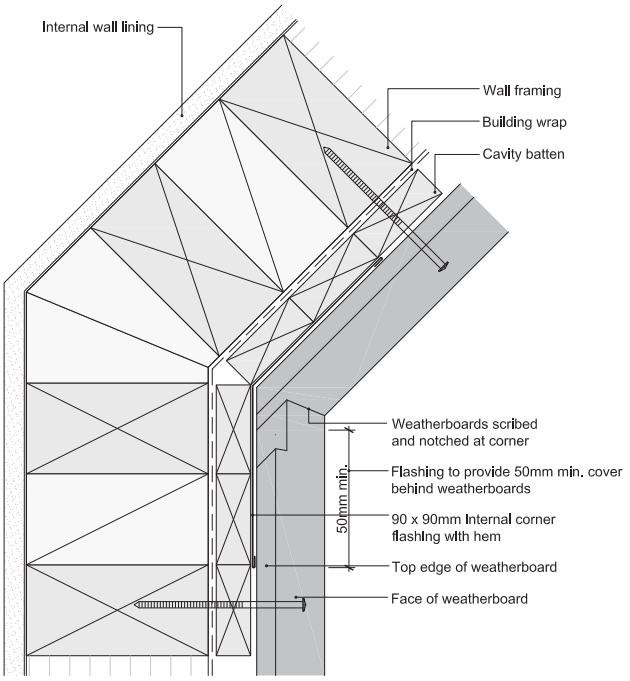


INTERNAL 90° CORNER - SCRIBED AND NOTCHED

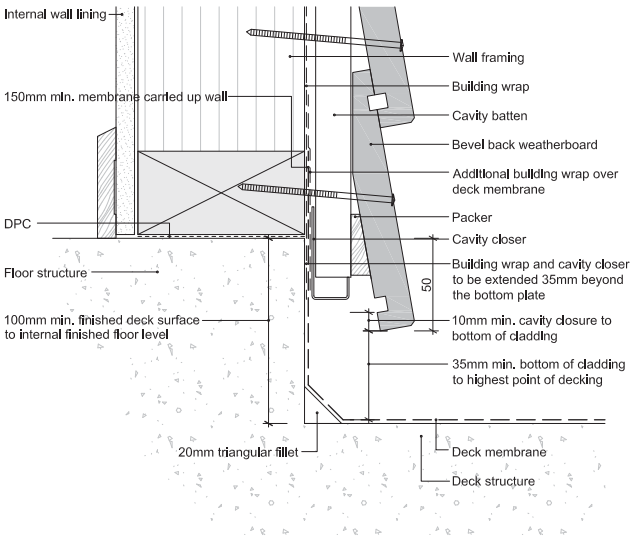
Bevel Back Weatherboard
Internal 90° Corner - With Moulding



Bevel Back Weatherboard
Internal 135° Corner - Scribed & Notched

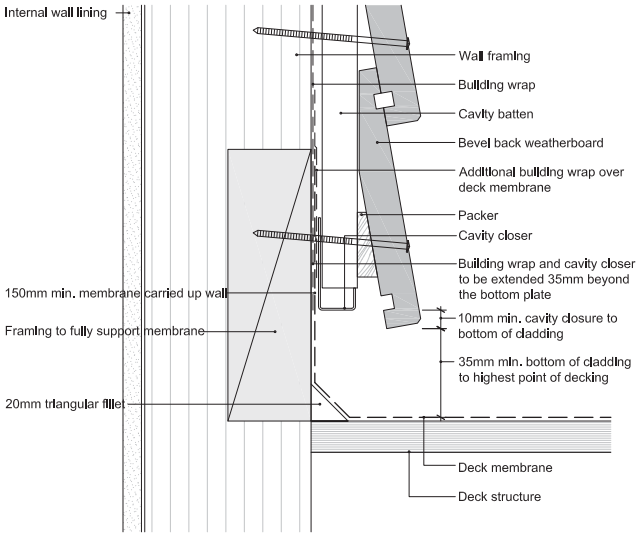


Bevel Back Weatherboard
Enclosed Deck - Concrete Substrate

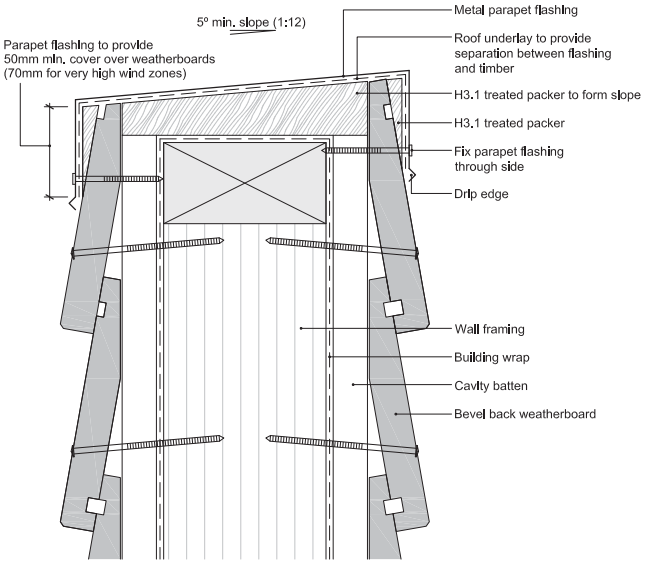


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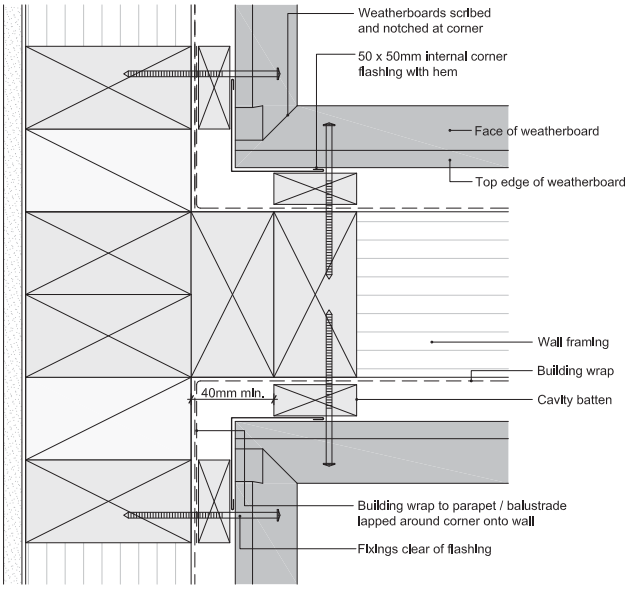
Bevel Back Weatherboard
Enclosed Deck - Timber Substrate



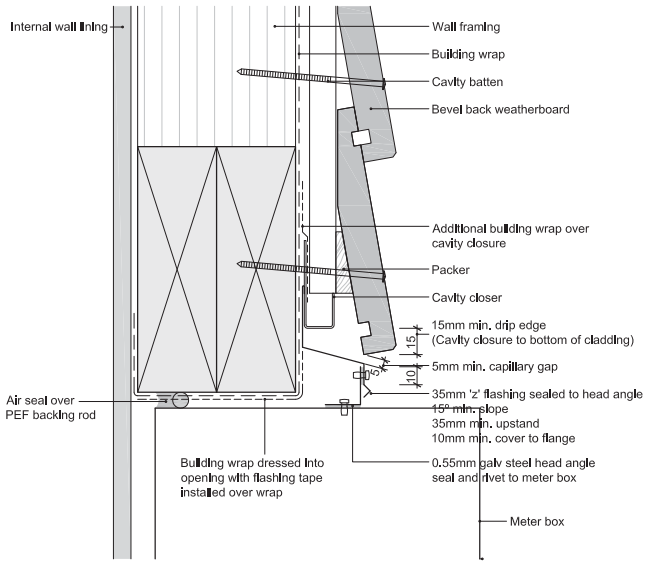
Bevel Back Weatherboard
Parapet Balustrade Cap Flashing



Bevel Back Weatherboard
Parapet Balustrade Intersection with Wall

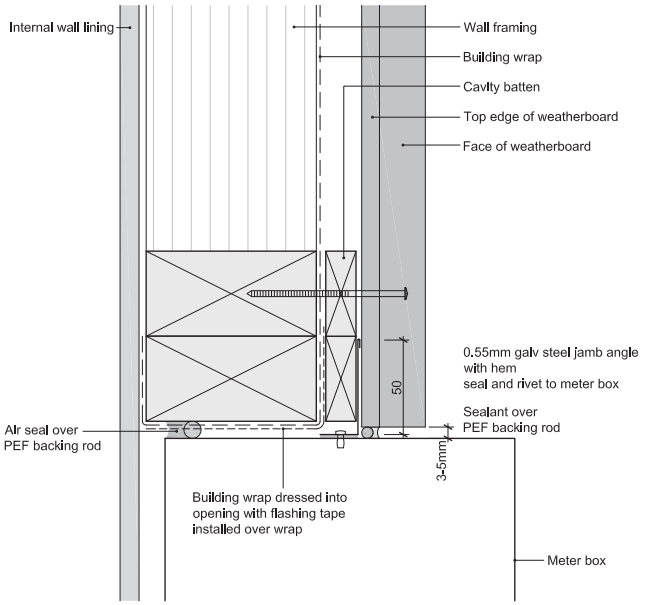


Bevel Back Weatherboard
Meter Box Head

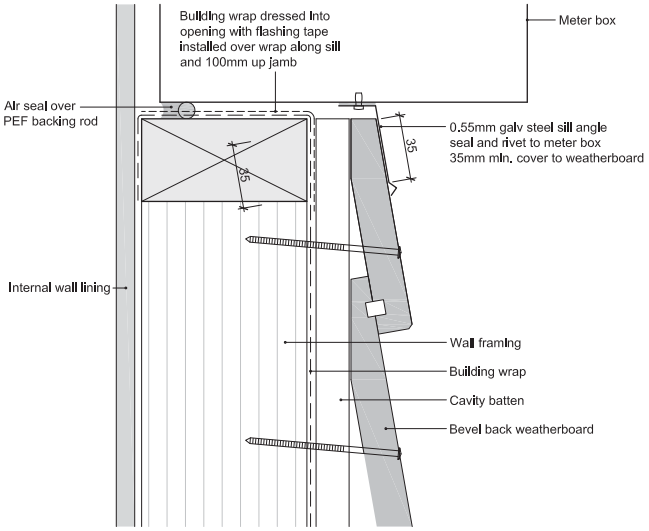


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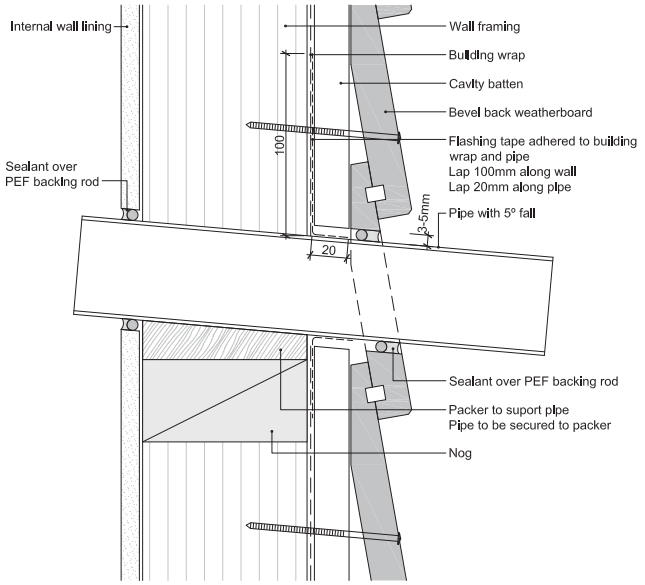
Bevel Back Weatherboard
Meter Box Jamb



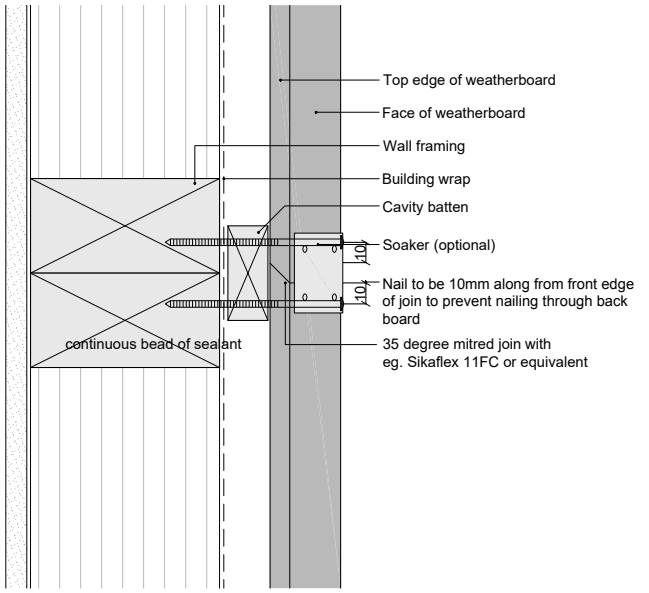
Bevel Back Weatherboard
Meter Box Sill



Bevel Back Weatherboard
Pipe Penetration

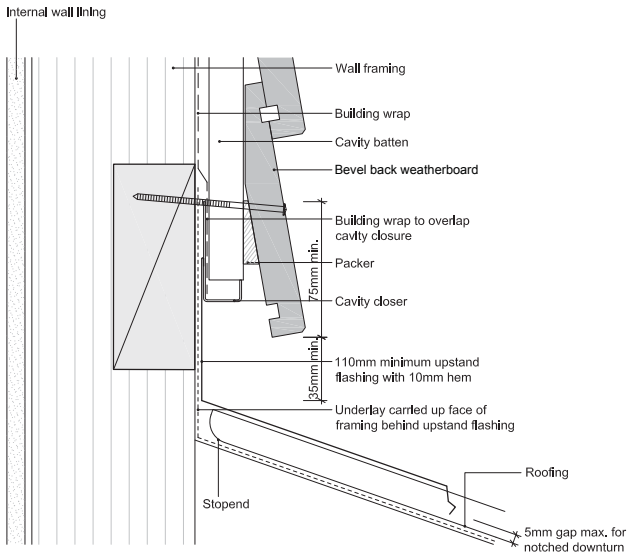


Bevel Back Weatherboard



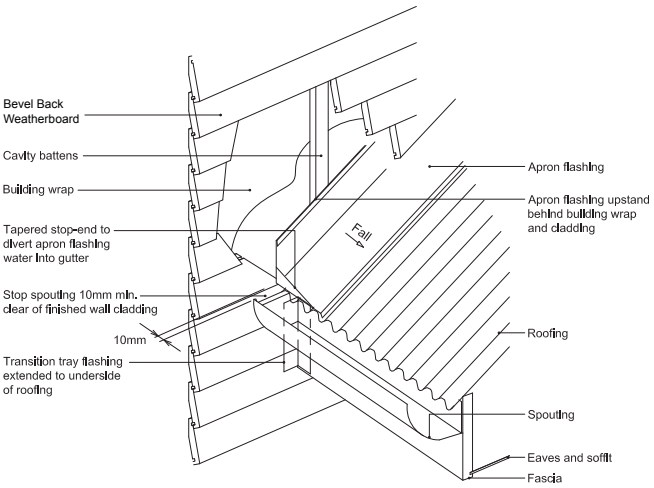
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Bevel Back Weatherboard
Apron Flashing



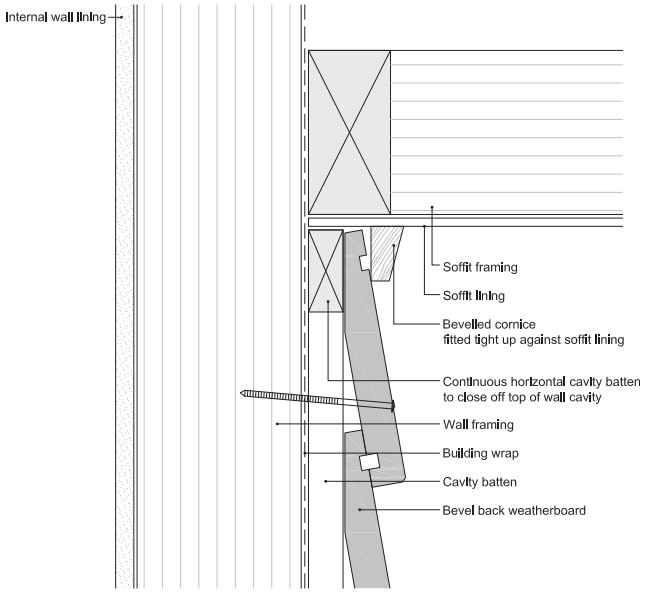
Note: refer to NZBC E2/AS1 Table 7 for apron flashing cover over roofing

Bevel Back Weatherboard
Roof Kick-out Flashing Cavity Detail

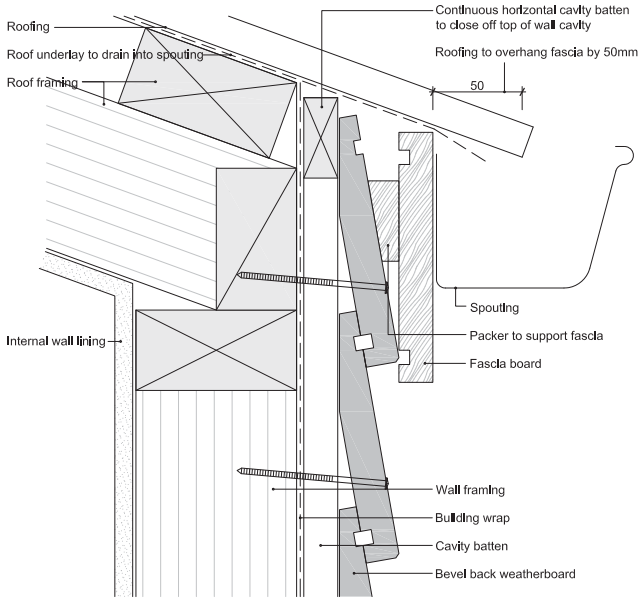


Note: refer to NZBC E2/AS1 Table 7 for apron flashing cover over roofing

Bevel Back Weatherboard
Top of Wall - Flat Soffit

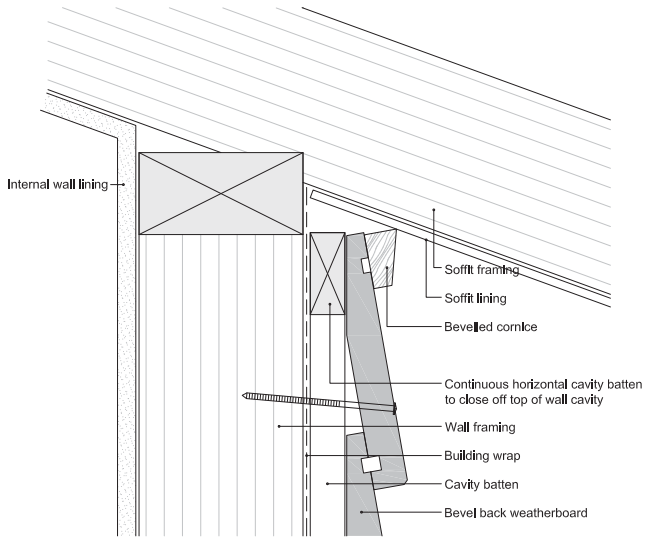


Bevel Back Weatherboard
Top of Wall - No Soffit

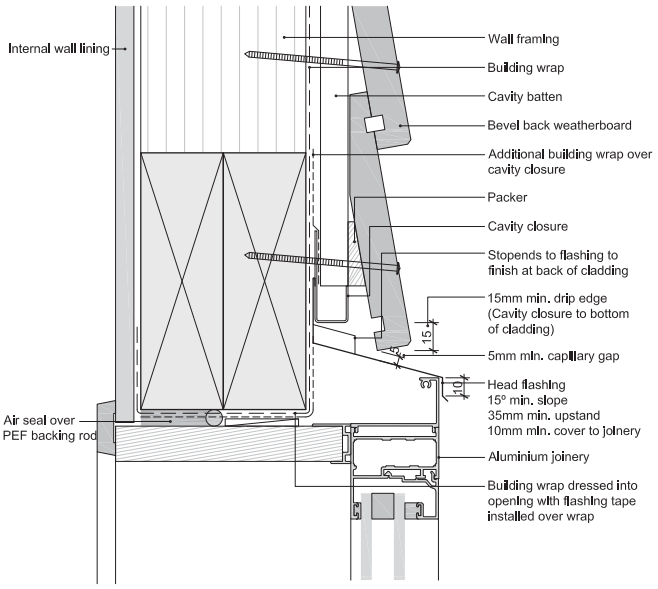


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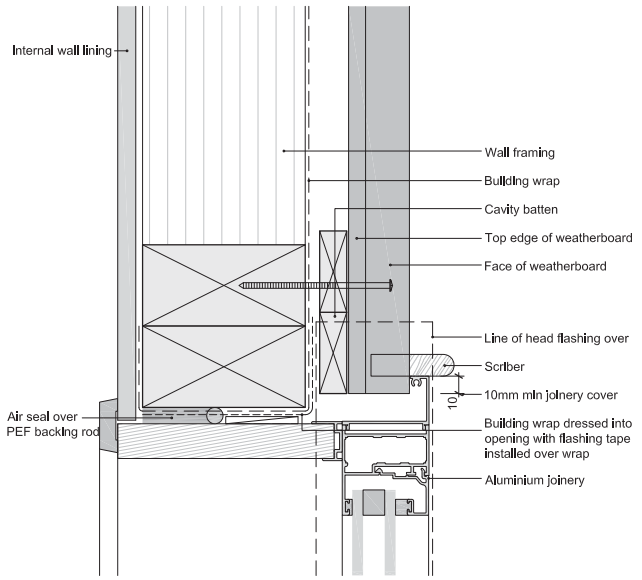
Bevel Back Weatherboard
Top of Wall - Sloping Soffit



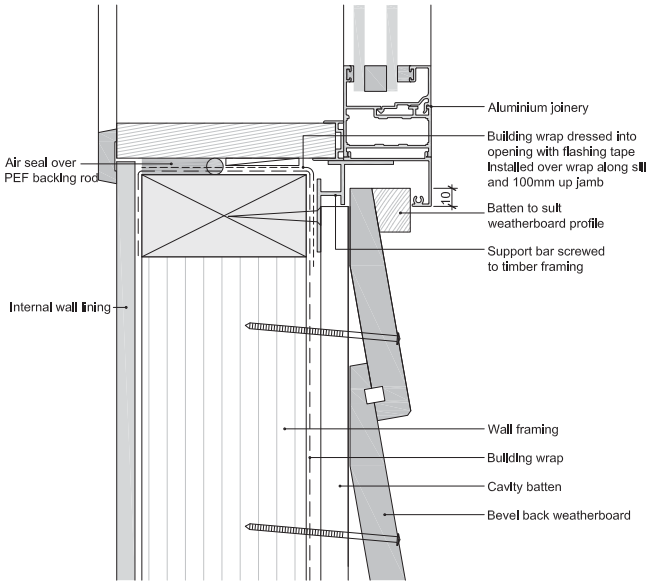
Bevel Back Weatherboard
Window Head



Bevel Back Weatherboard
Window Jamb

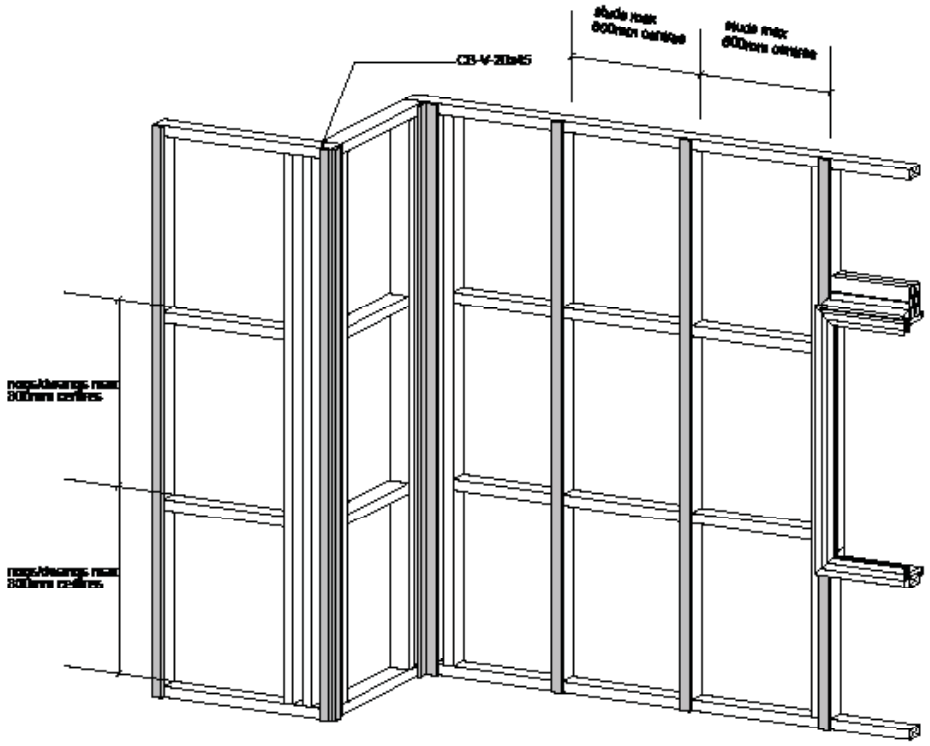


Bevel Back Weatherboard
Window Sill

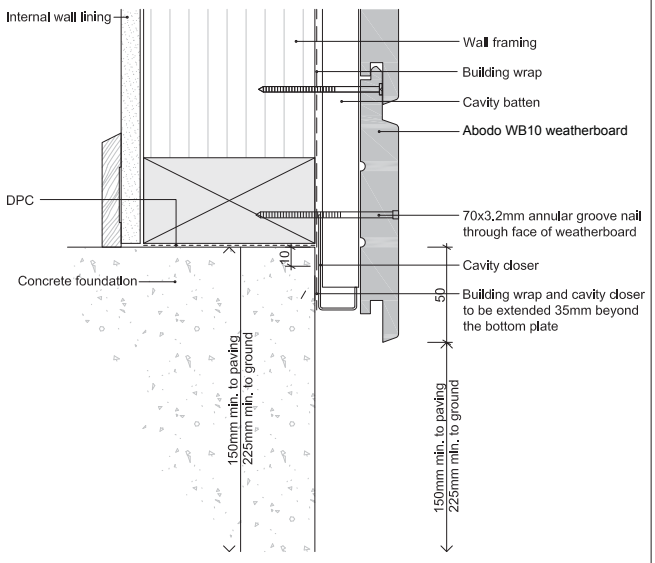


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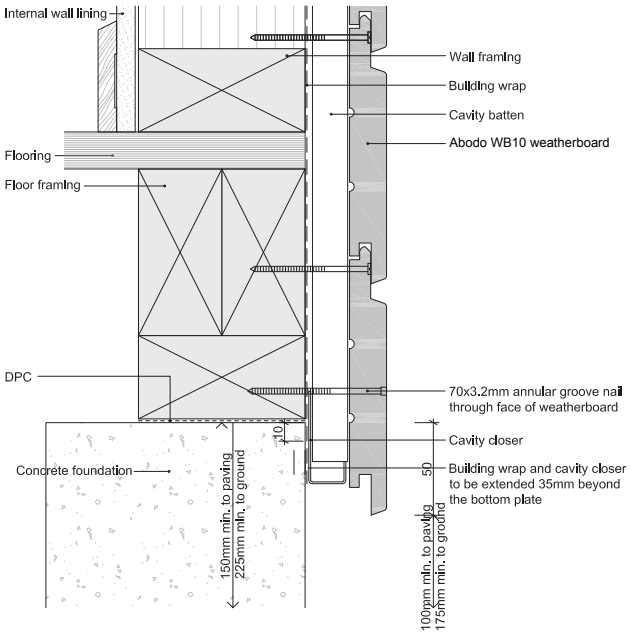
WB10 Horizontal - Vertical Batten Fix - Layout



WB10 Horizontal Weatherboard
Base of Wall - Concrete Floor



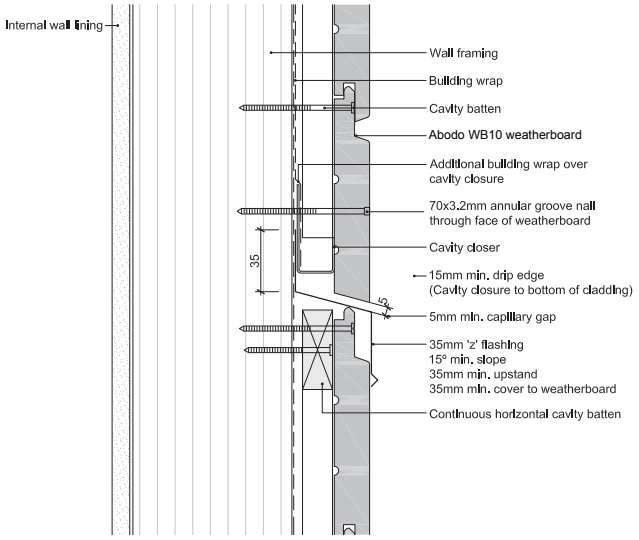
WB10 Horizontal Weatherboard
Base of Wall - Timber Floor



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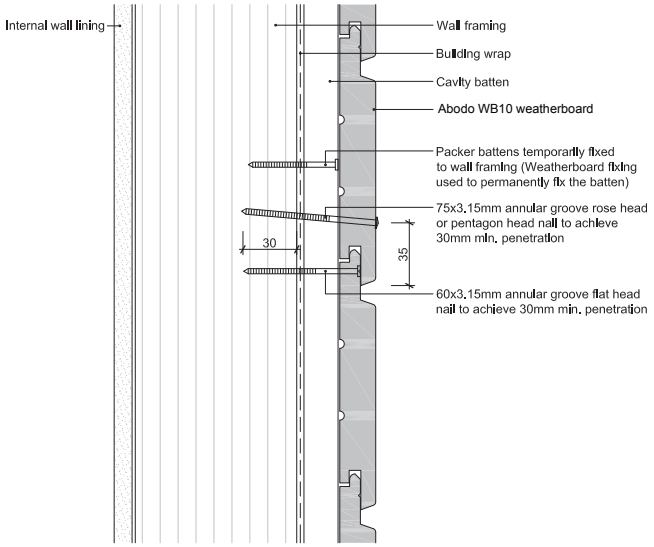
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WB10 Horizontal Weatherboard

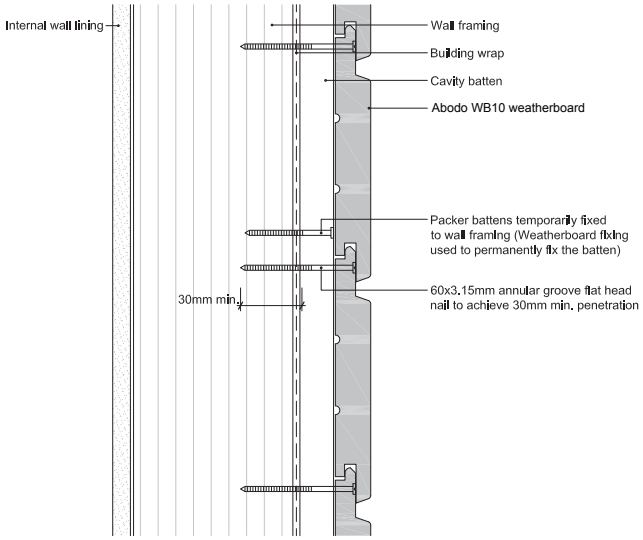


INTER-STOREY CAVITY JUNCTION

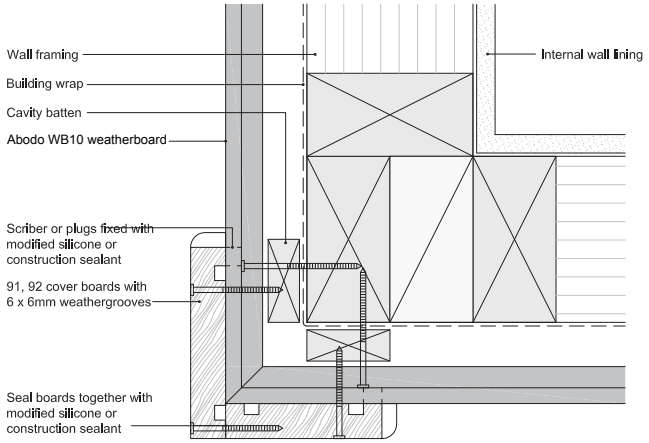
WB10 Horizontal Weatherboard
Packer Cavity Batten - Stained, Face Fixed



WB10 Horizontal Weatherboard
Packer Cavity Batten - Stained



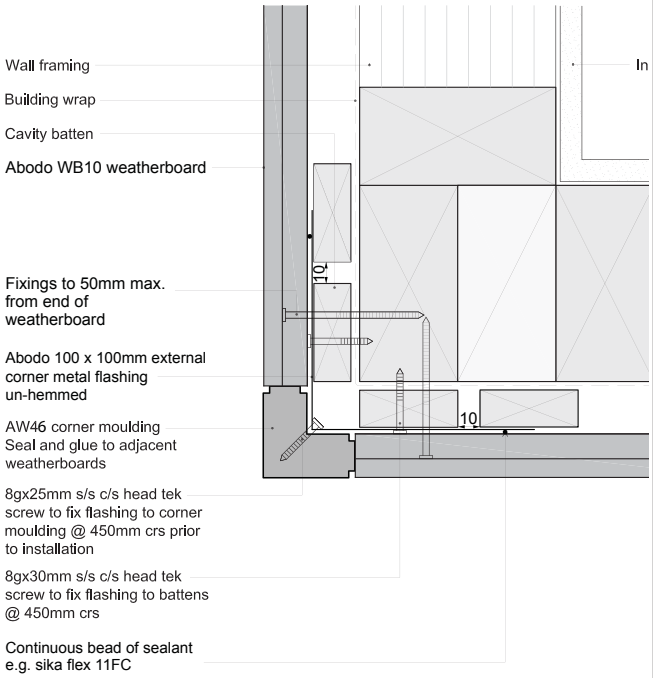
WB10 Horizontal Weatherboard
External 90° Corner - Boxed



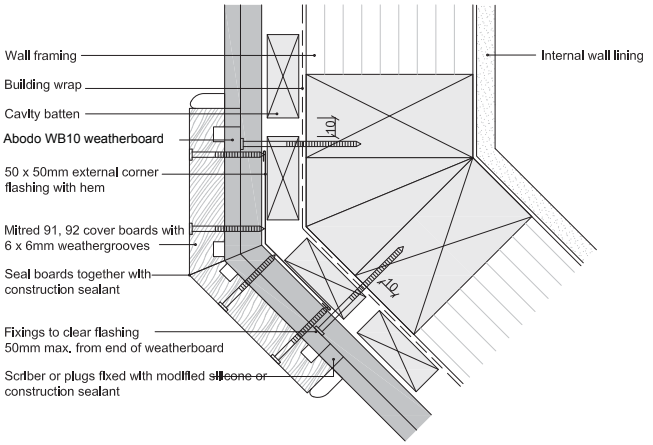
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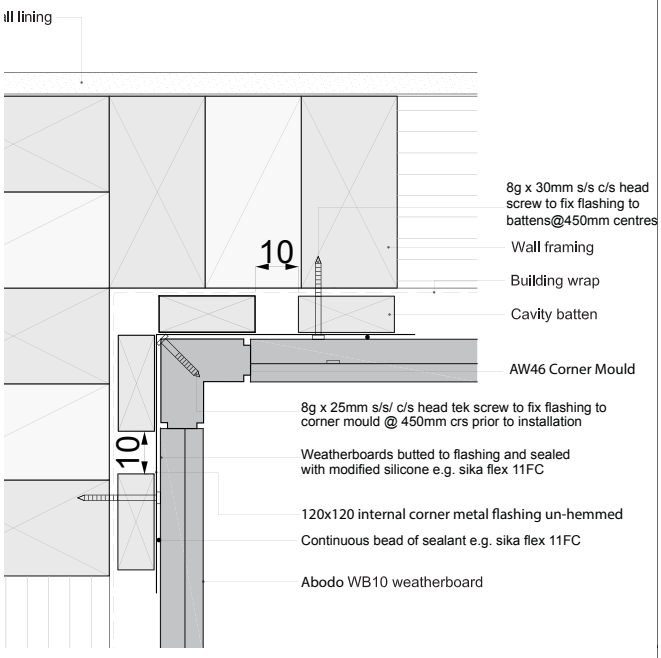
WB10 Horizontal Weatherboard
External 90° Corner - AW46 Moulding



WB10 Horizontal Weatherboard
External 135° Corner - Mitred & Boxed

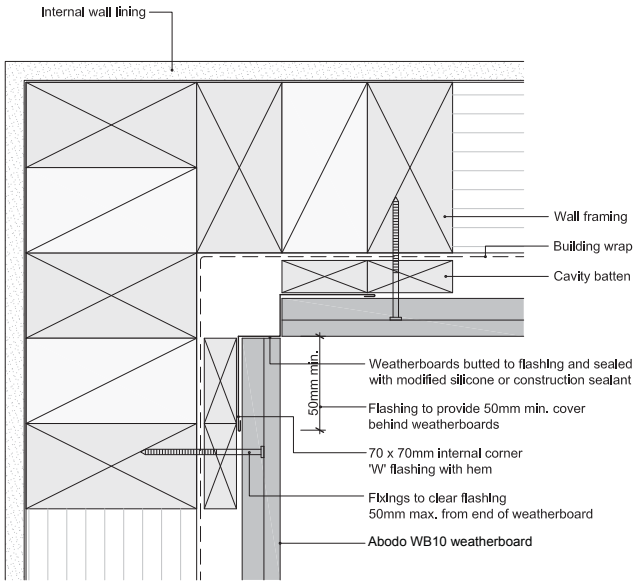


WB10 Horizontal Weatherboard
Internal 90° Corner - AW46 Moulding

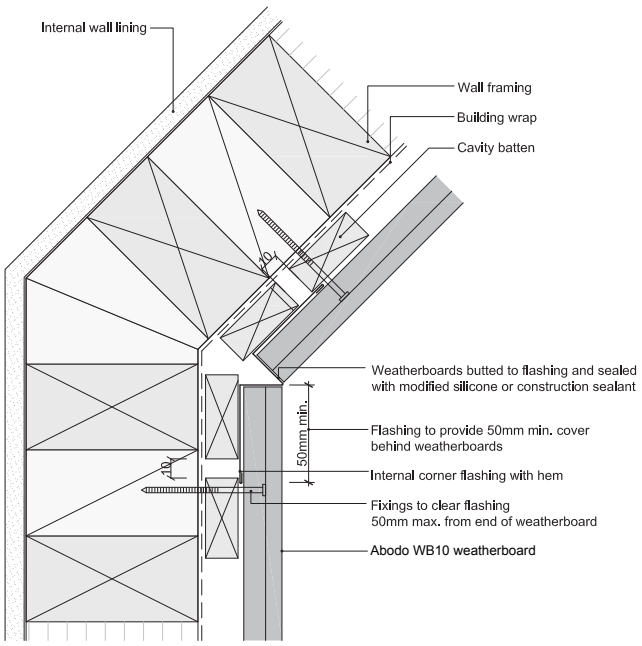


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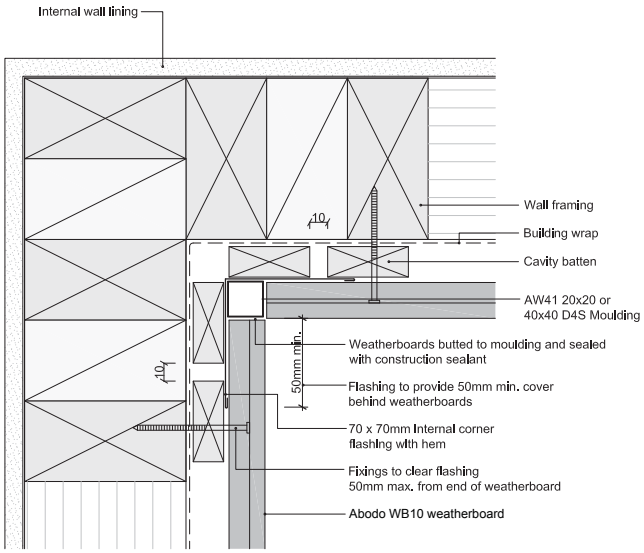
WB10 Horizontal Weatherboard
Internal 90° Corner - W-Flashing



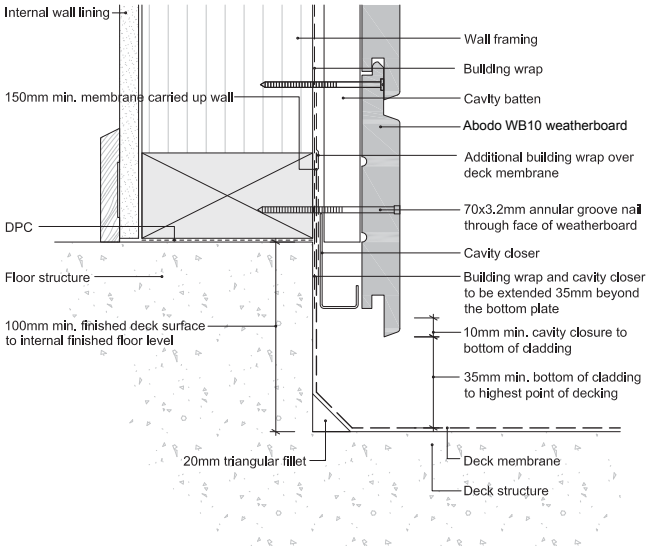
WB10 Horizontal Weatherboard
Internal 135° Corner - W-Flashing



WB10 Horizontal Weatherboard
Internal 90° Corner - AW41 Moulding

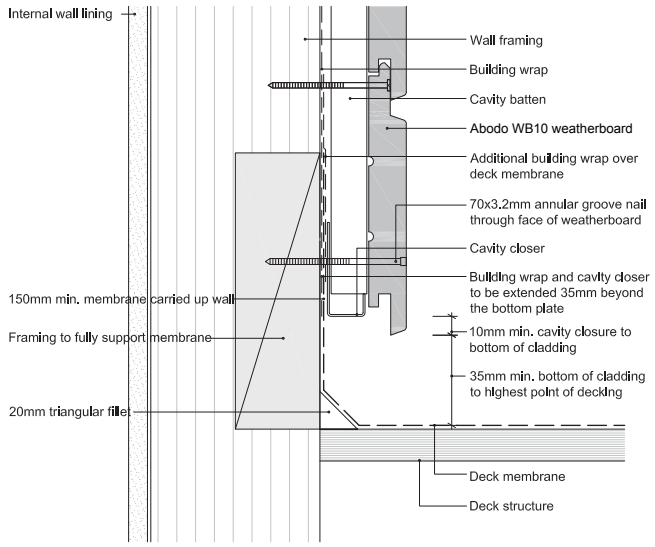


WB10 Horizontal Weatherboard
Enclosed Deck - Concrete Substrate

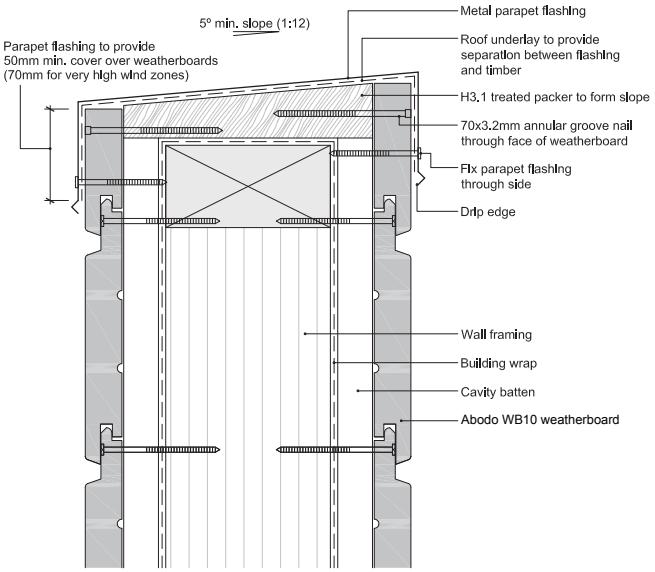


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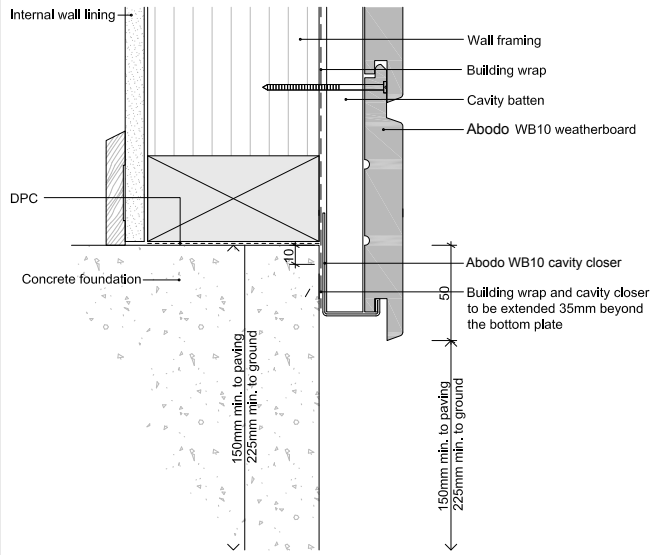
WB10 Horizontal Weatherboard
Enclosed Deck - Timber Substrate



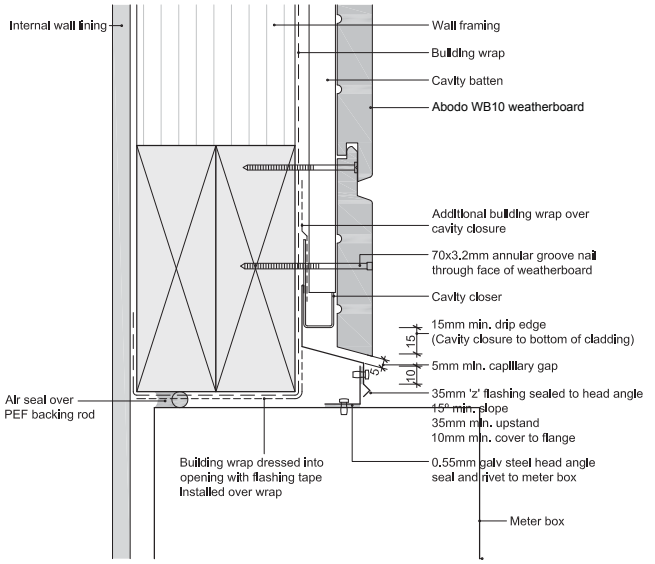
WB10 Horizontal Weatherboard
Parapet Balustrade Cap Flashing



WB10 Horizontal Weatherboard
Base of Wall - Concrete Floor

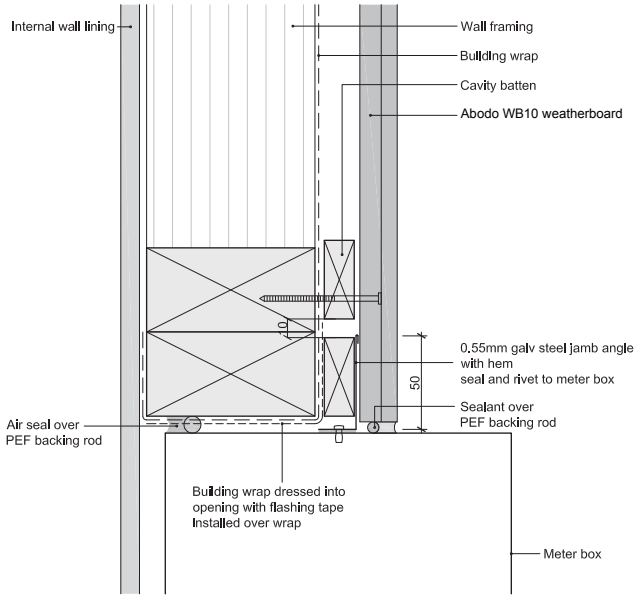


WB10 Horizontal Weatherboard
Meter Box Head Detail

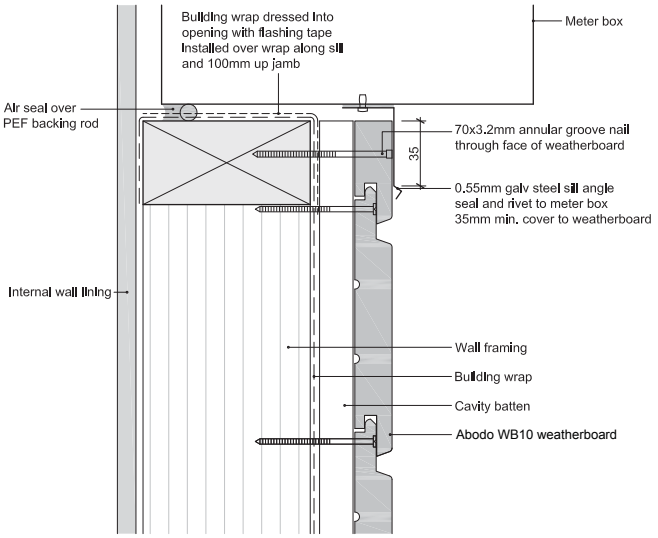


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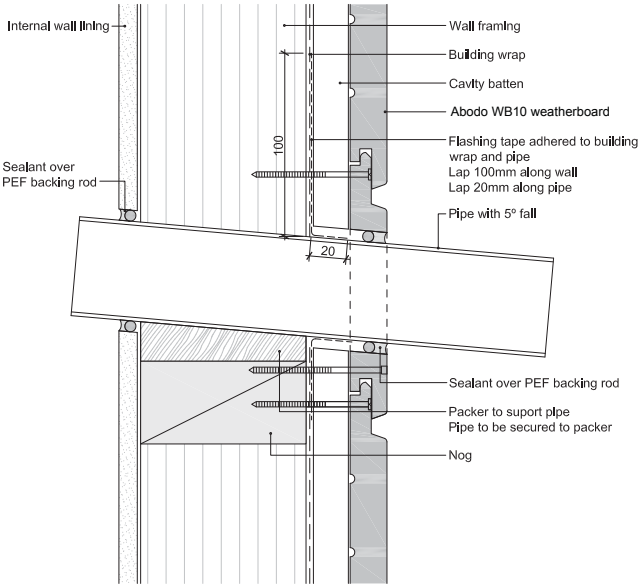
WB10 Horizontal Weatherboard
Meter Box Jamb Detail



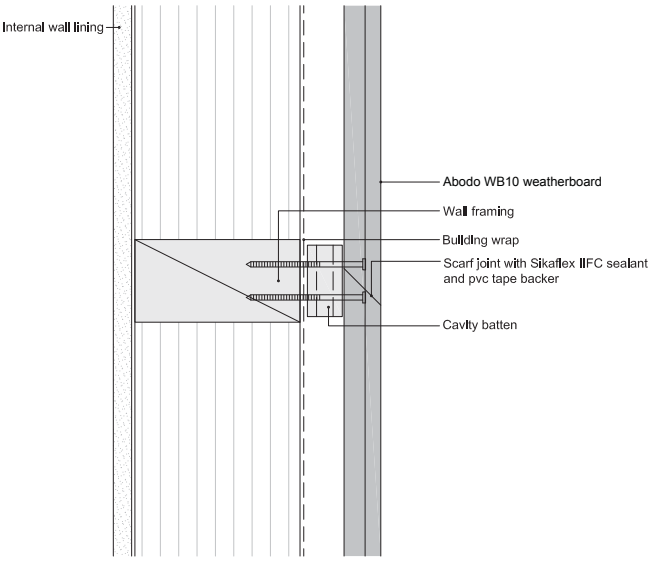
WB10 Horizontal Weatherboard
Meter Box Sill Detail



WB10 Horizontal Weatherboard
Pipe Penetration

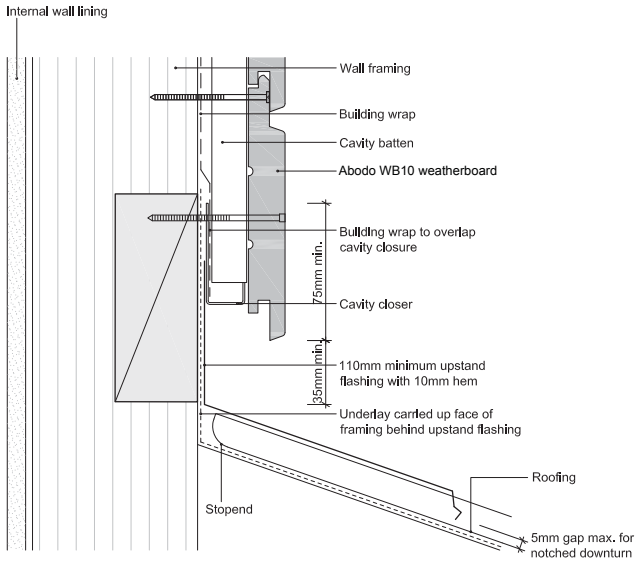


WB10 Horizontal Weatherboard
Weatherboard Join - Birdseye



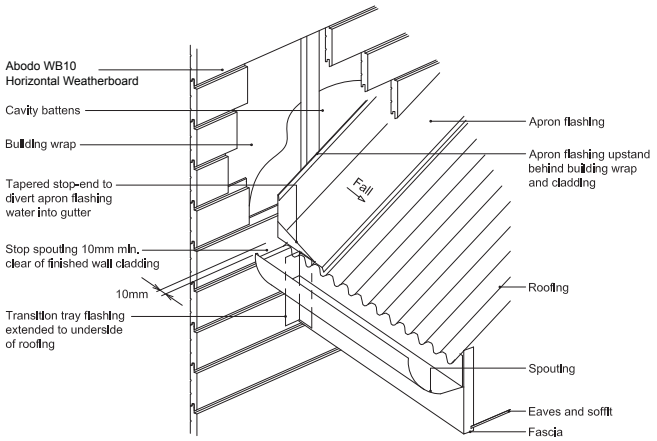
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WB10 Horizontal Weatherboard
Apron Flashing

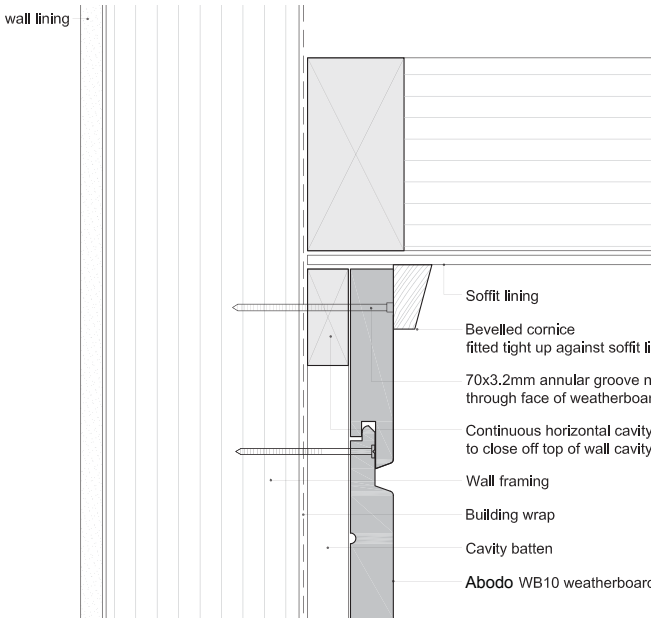


Note: refer to NZBC E2/AS1 Table 7 for apron flashing cover over roofing

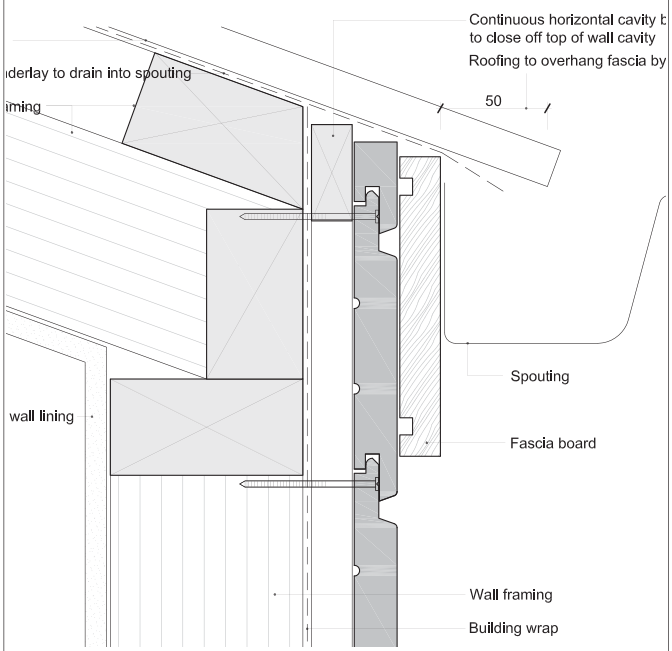
WB10 Horizontal Weatherboard
Roof Kick-out Flashing Cavity Detail



WB10 Horizontal Weatherboard
Top of Wall - Flat Soffit

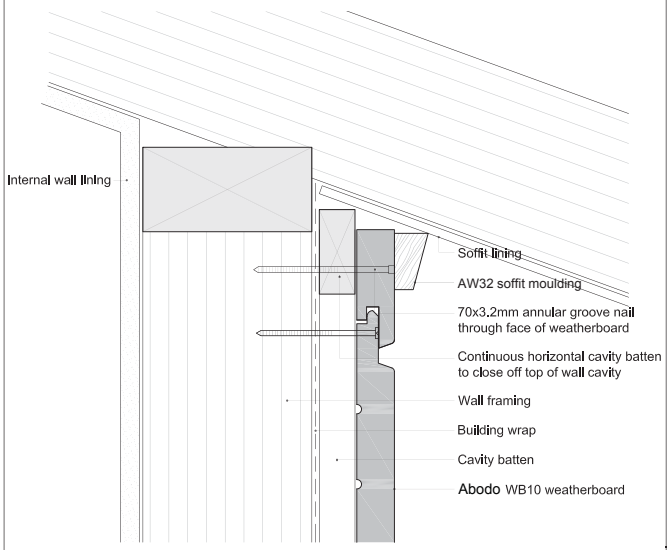


WB10 Horizontal Weatherboard
Top of Wall - No Soffit

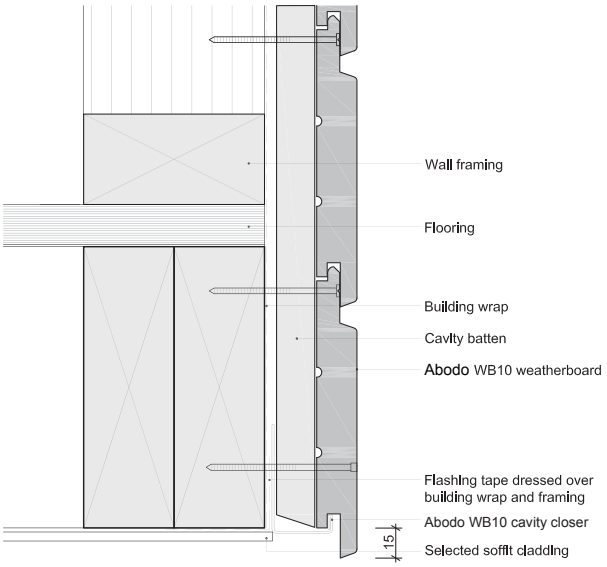


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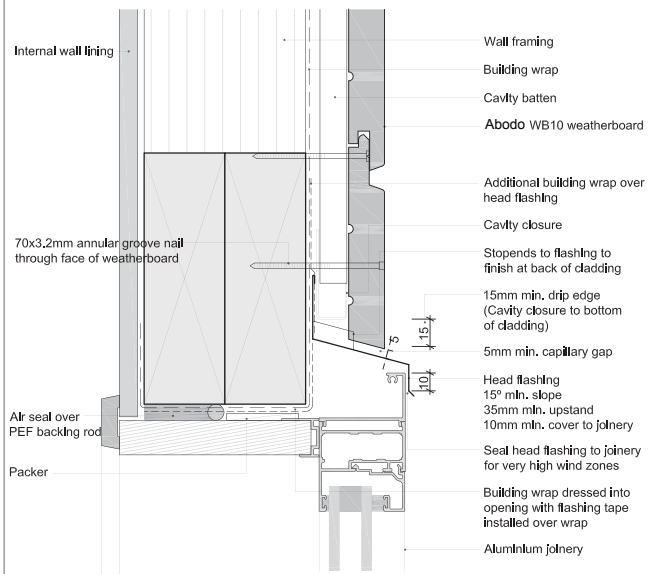
WB10 Horizontal Weatherboard
Top of Wall - Sloping Soffit



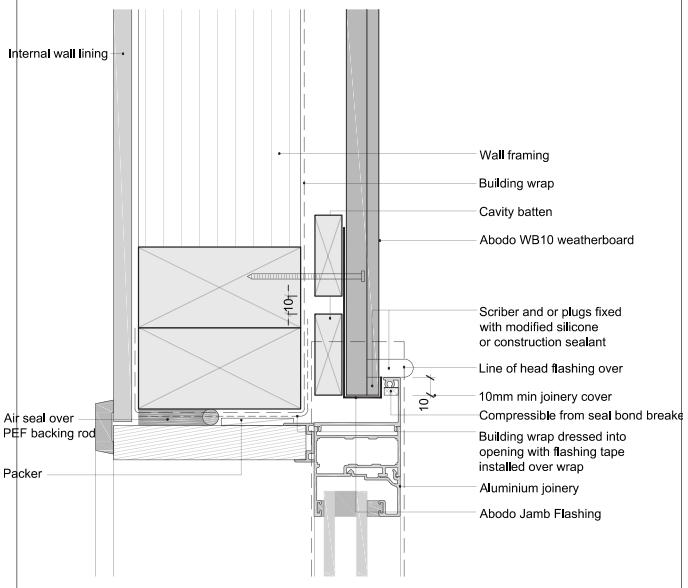
WB10 Horizontal Weatherboard
Soffit Detail



WB10 Horizontal Weatherboard
Window Head

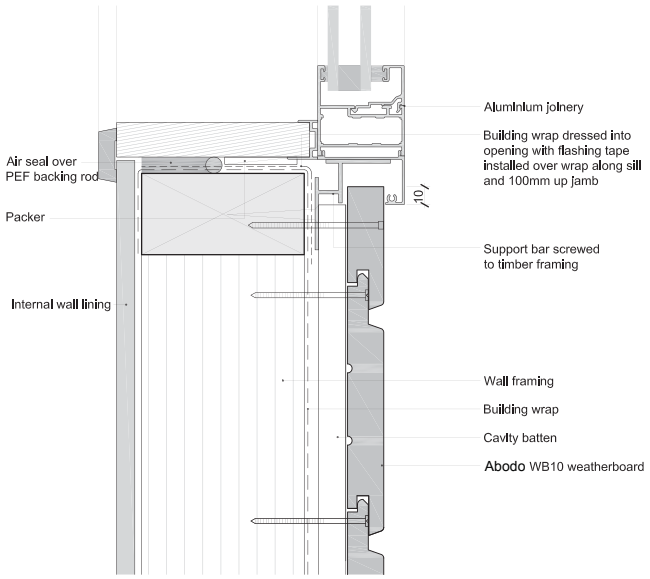


WB10 Horizontal Weatherboard
Window Jamb Option 1- Plugged/ Scribed

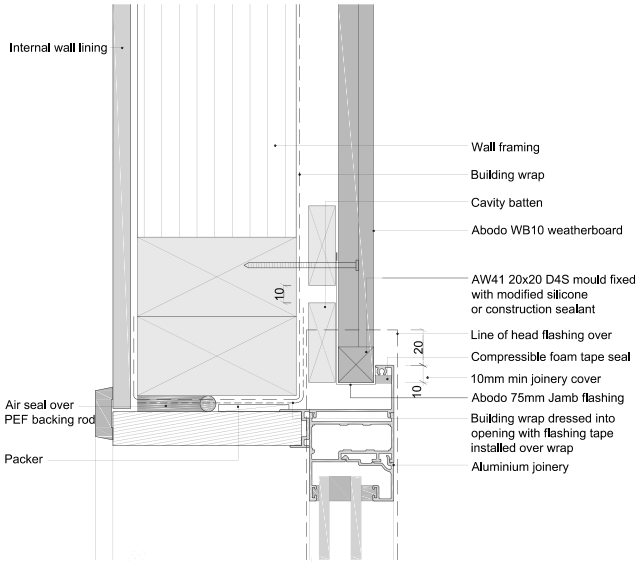


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WB10 Horizontal Weatherboard
Window Sill

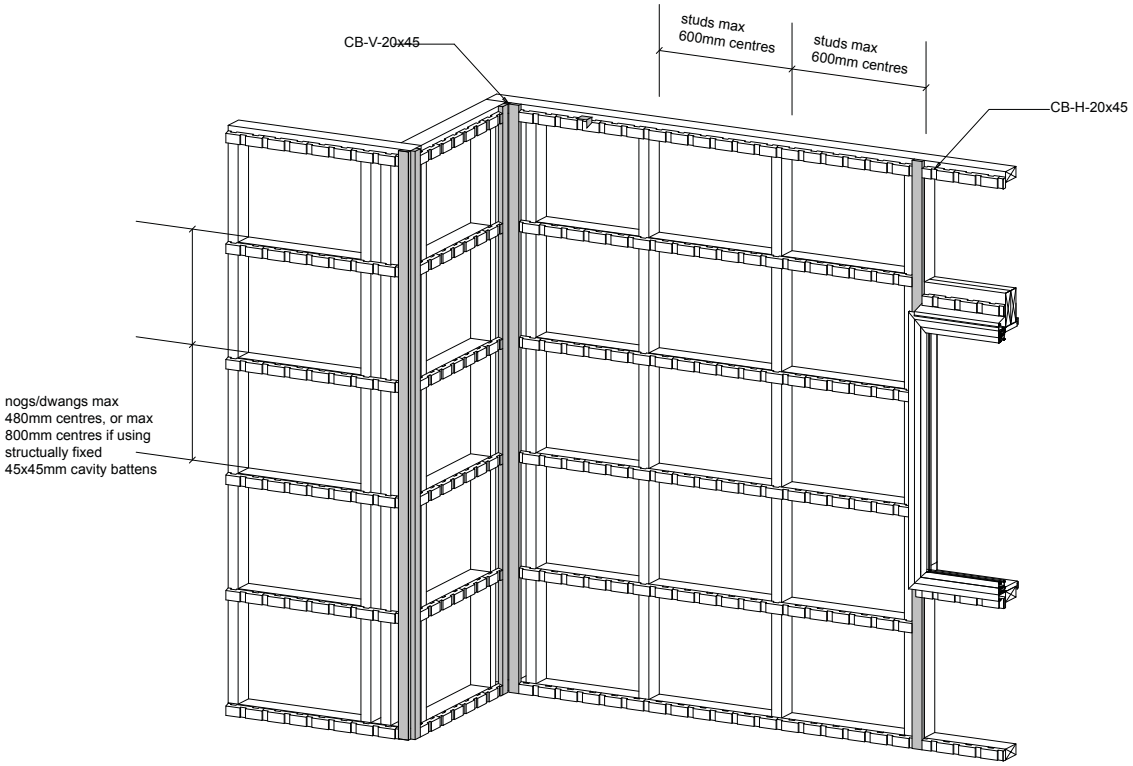


WB10 Horizontal Weatherboard
Window Jamb Option 2- AW41 moulding

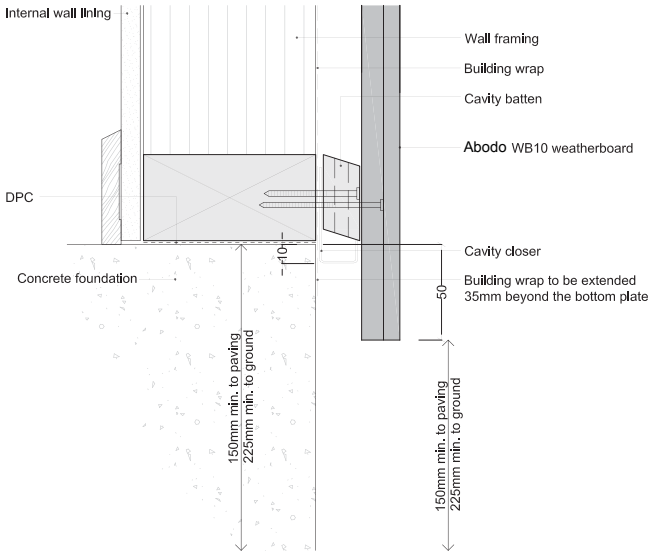


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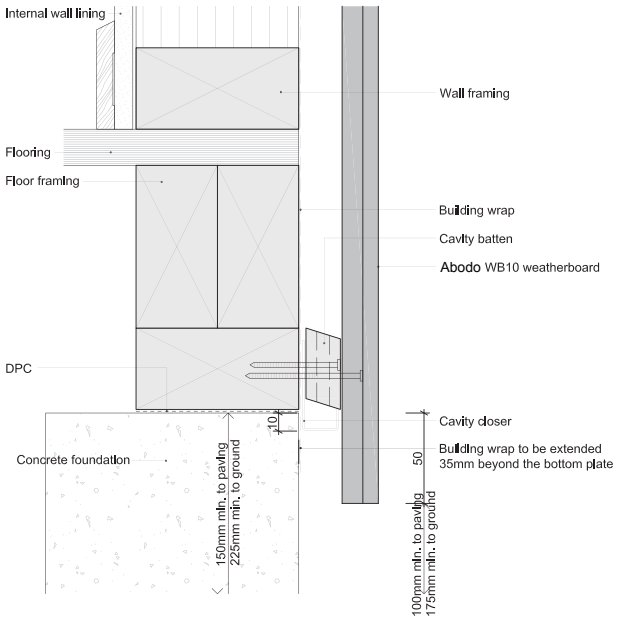
WB10/ WB12 - Horizontal Batten Fix - Layout



Vertical Weatherboard
Base of Wall - Concrete Floor

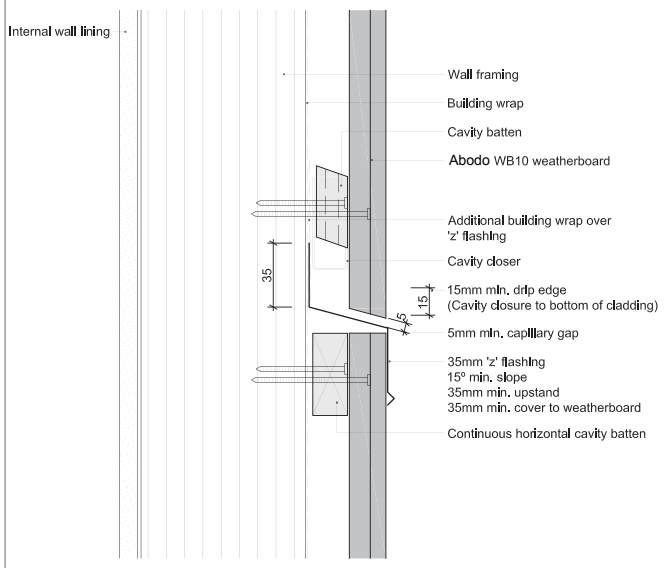


Vertical Weatherboard
Base of Wall - Timber Floor

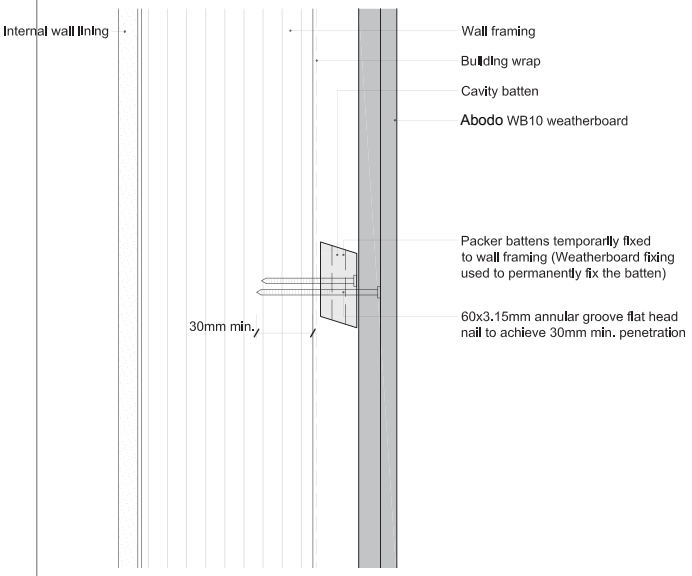


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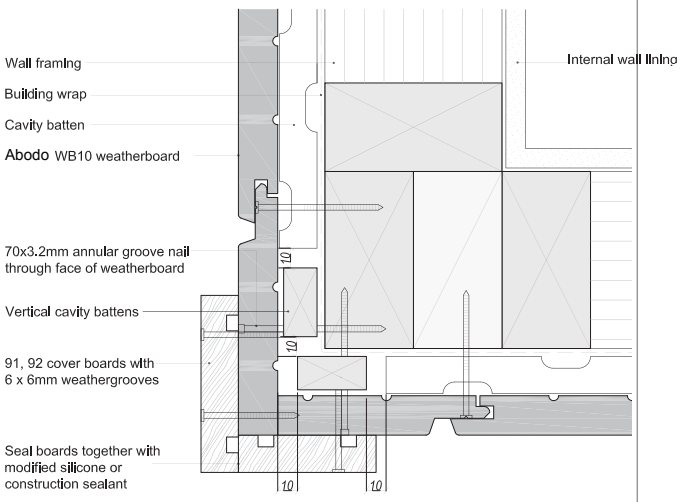
WB10 Vertical Weatherboard
Inter-Storey Cavity Junction



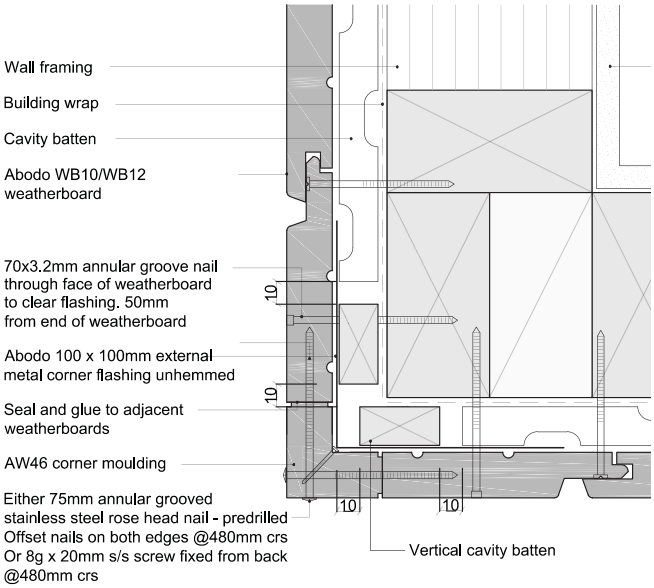
WB10 Vertical Weatherboard
Packer Cavity Batten - Stained



WB10 Vertical Weatherboard
External 90° Corner - Boxed

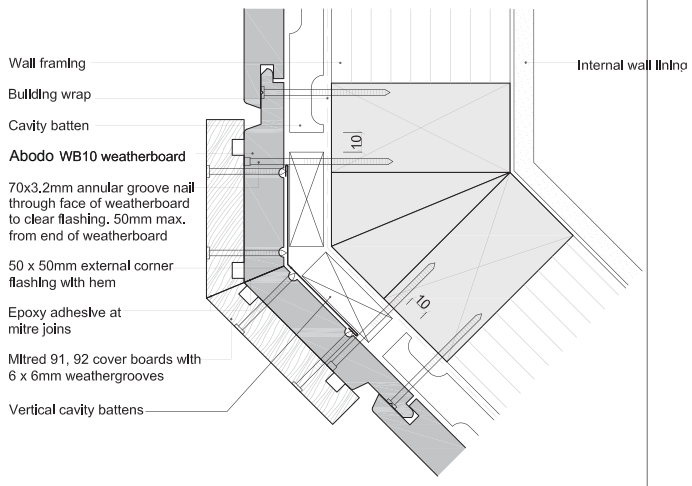


WB10 Vertical Weatherboard
External 90° Corner - AW46 Moulding

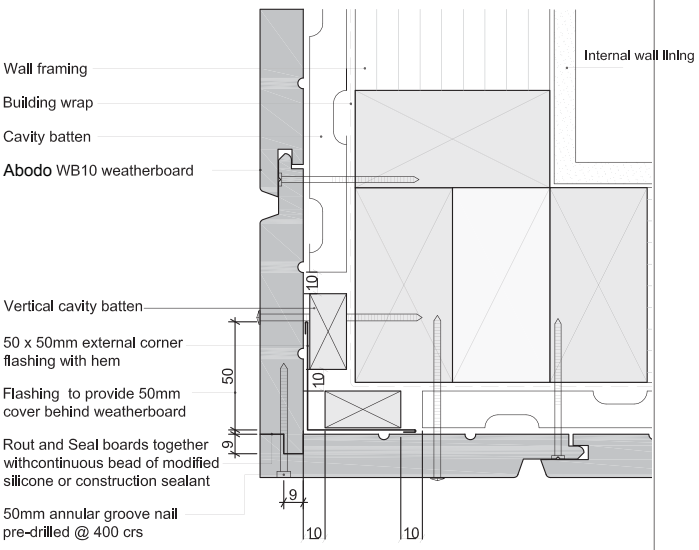


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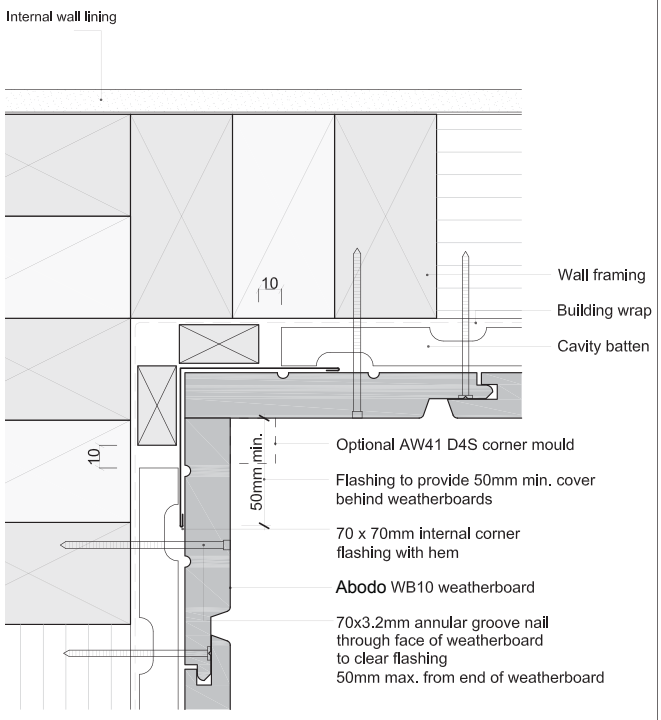
WB10 Vertical Weatherboard
External 135° Corner - Boxed



WB10 Vertical Weatherboard
External 90° Corner - Rebated

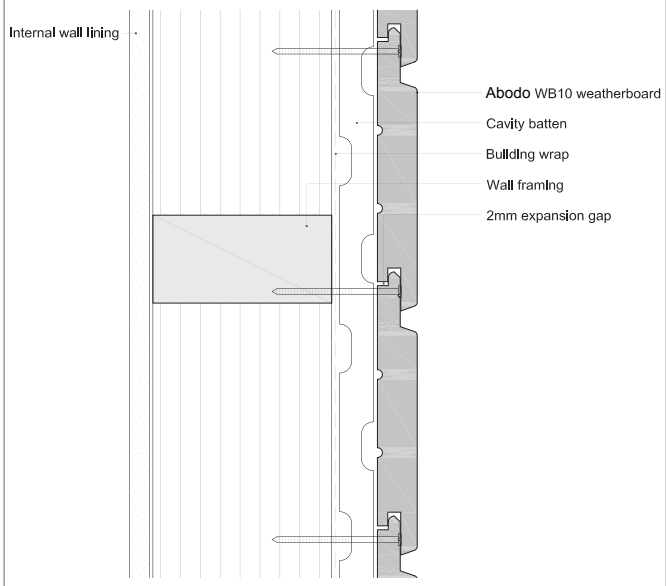


WB10 Vertical Weatherboard
Internal 90° Corner - Butted

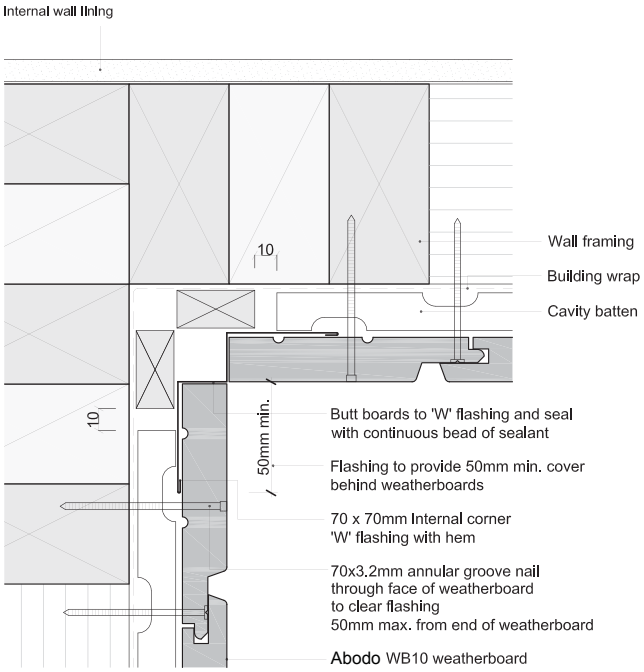


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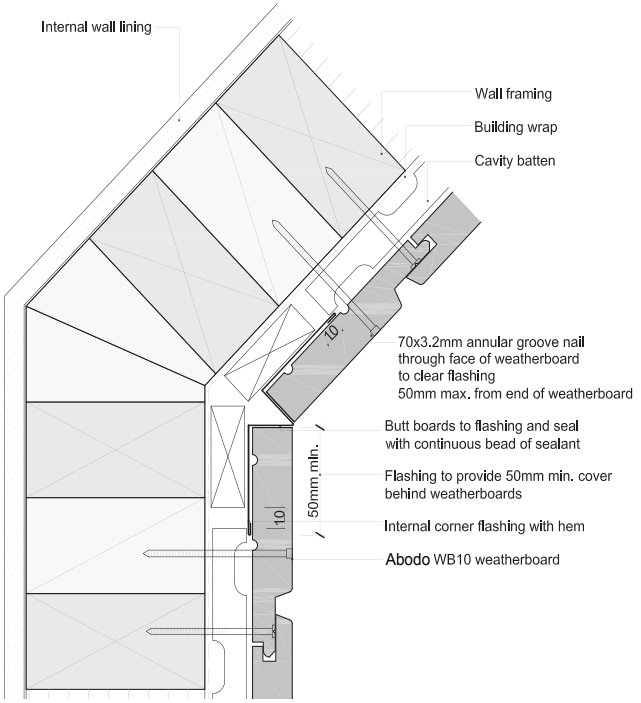
WB10 Vertical Weatherboard
Weatherboard Fix - Birdseye



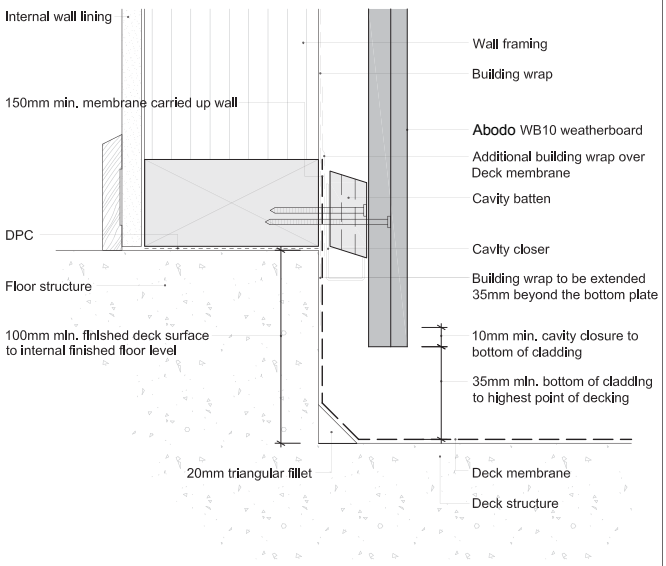
WB10 Vertical Weatherboard
Internal 90° Corner - Flashing



WB10 Vertical Weatherboard
Internal 135° Corner - Flashing

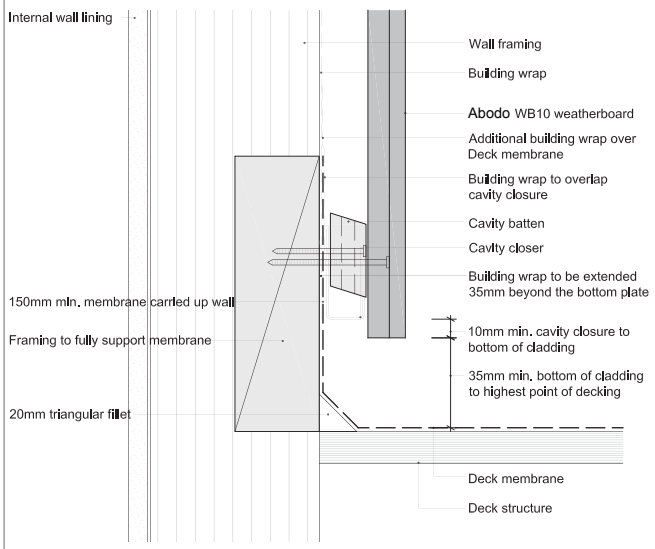


WB10 Vertical Weatherboard
Enclosed Deck - Concrete Substrate

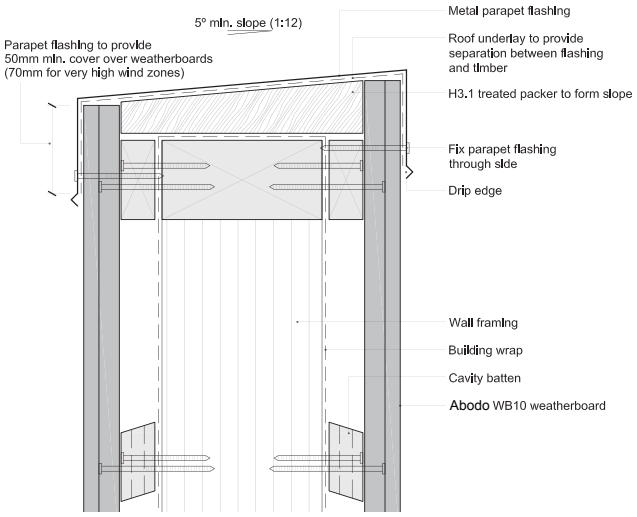


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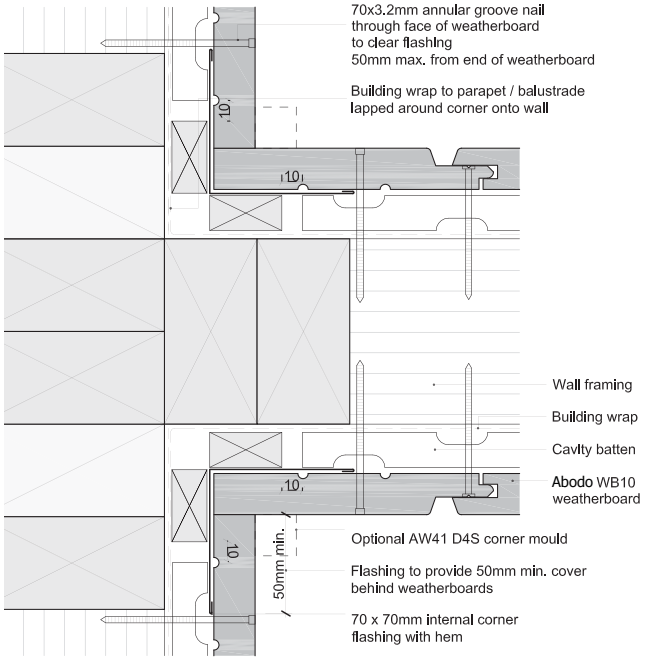
WB10 Vertical Weatherboard
Enclosed Deck - Timber Substrate



WB10 Vertical Weatherboard
Parapet Balustrade Cap Flashing

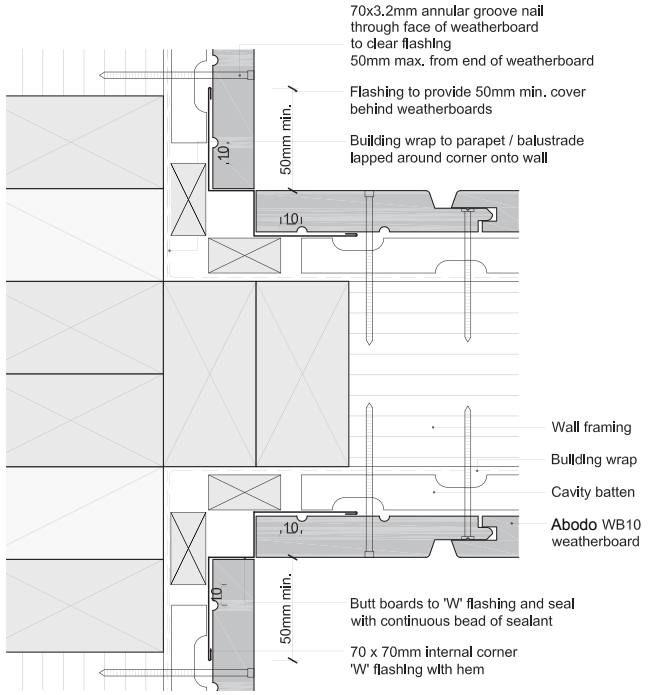


WB10 Vertical Weatherboard
Parapet Balustrade Intersection with Wall - Butted

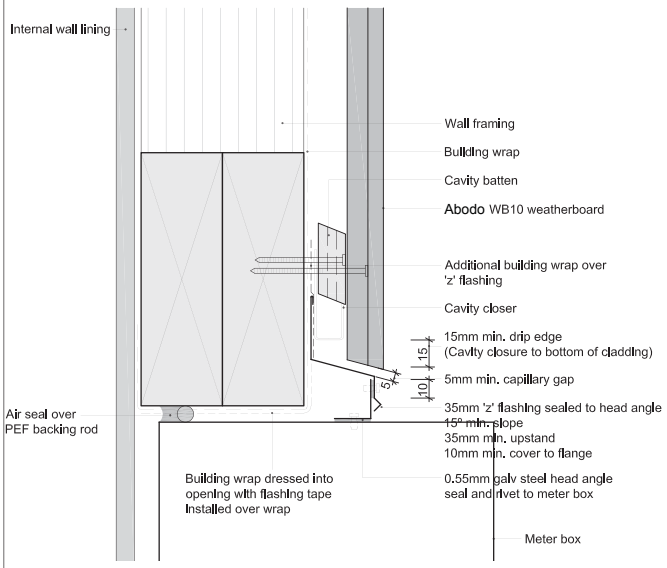


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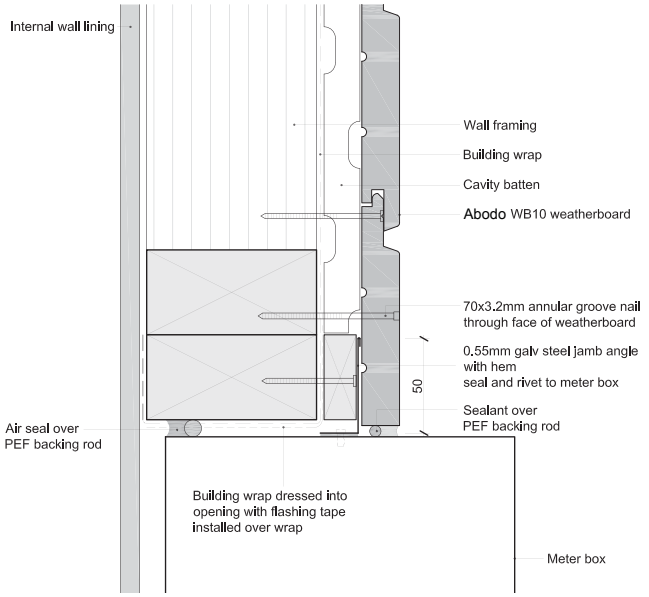
WB10 Vertical Weatherboard
Parapet Balustrade Intersection with Wall - Flashing



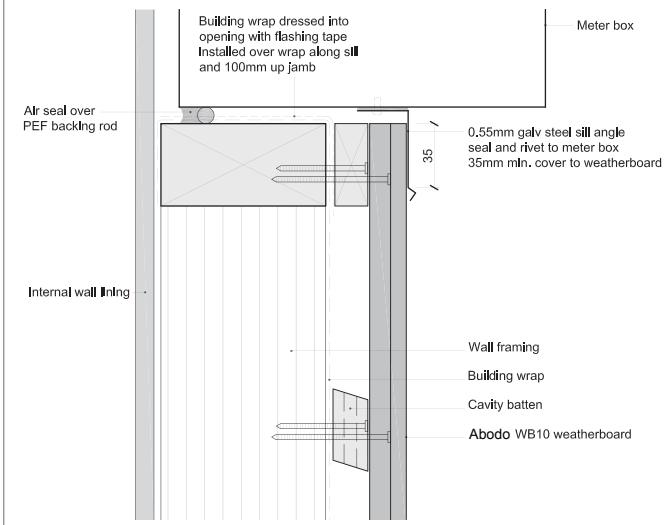
WB10 Vertical Weatherboard
Meter Box Head



WB10 Vertical Weatherboard
Meter Box Jamb

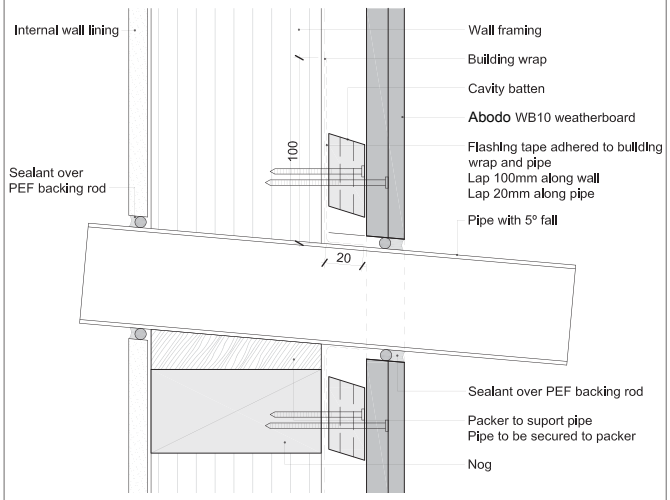


WB10 Vertical Weatherboard
Meter Box Sill

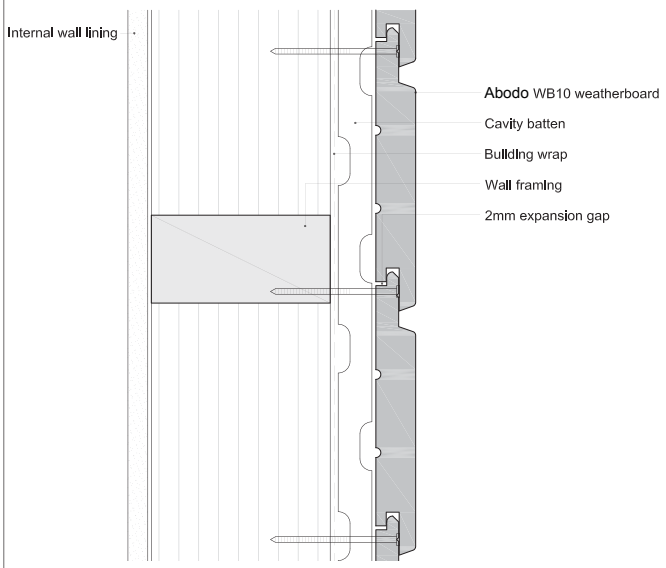


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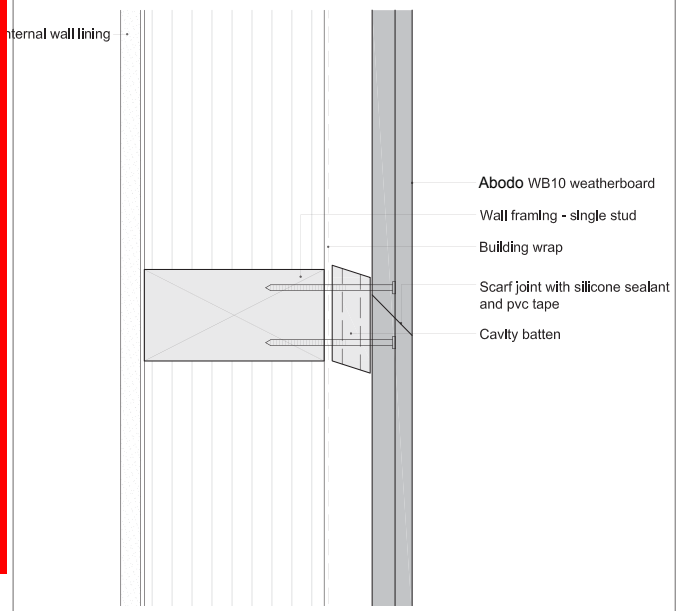
WB10 Vertical Weatherboard
Pipe Penetration



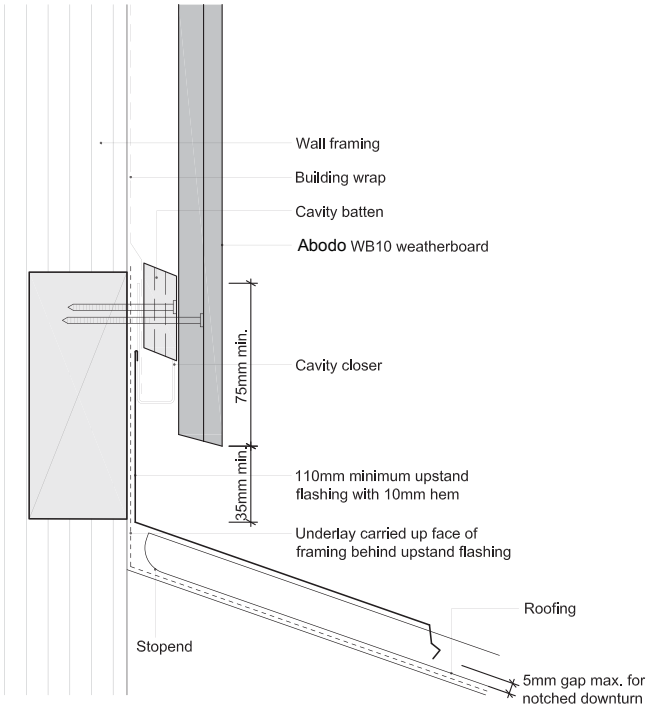
WB10 Vertical Weatherboard
Weatherboard Fix - Birdseye



WB10 Vertical Weatherboard
Weatherboard Join - Vertical



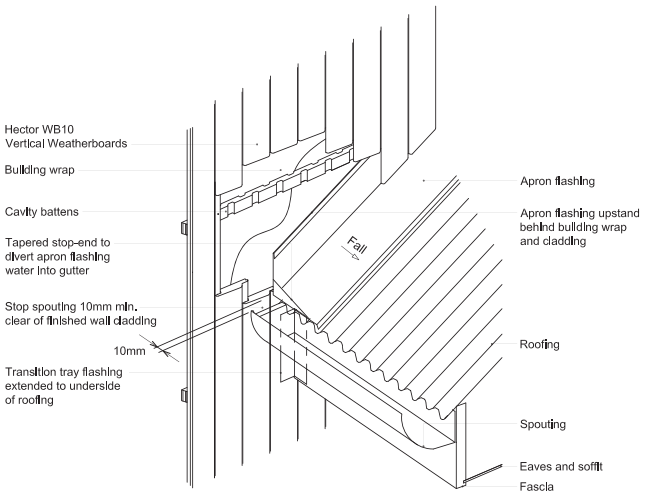
WB10 Vertical Weatherboard
Apron Flashing



Note: refer to NZBC E2/AS1 Table 7 for apron flashing cover over roofing

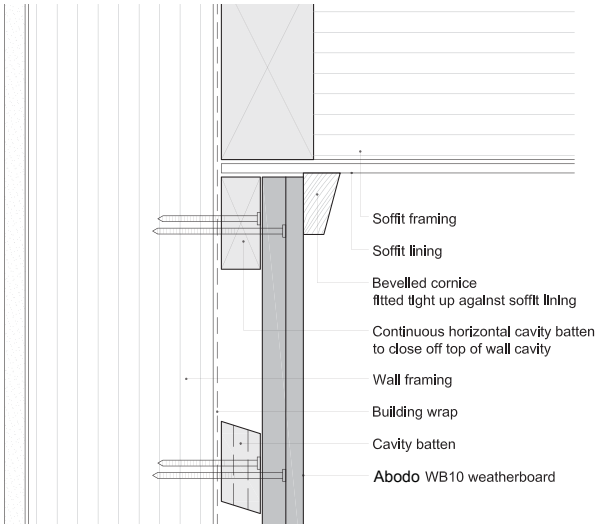
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WB10 Vertical Weatherboard
Roof Kick-out Flashing Cavity Detail

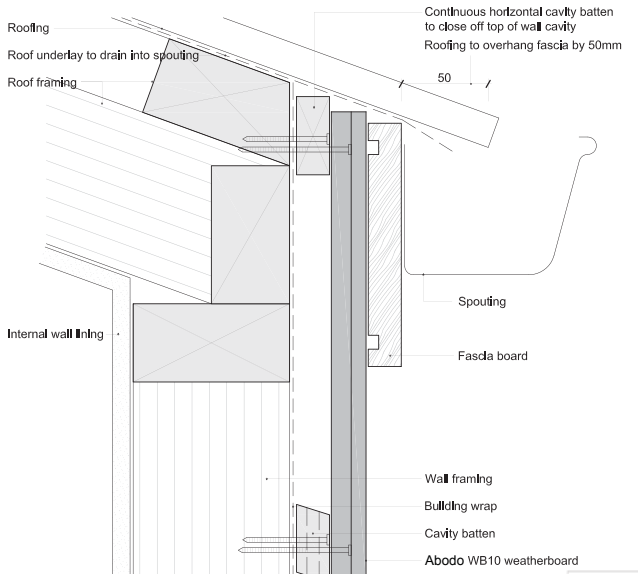


Note: refer to NZBC E2/AS1 Table 7 for apron flashing cover over roofing

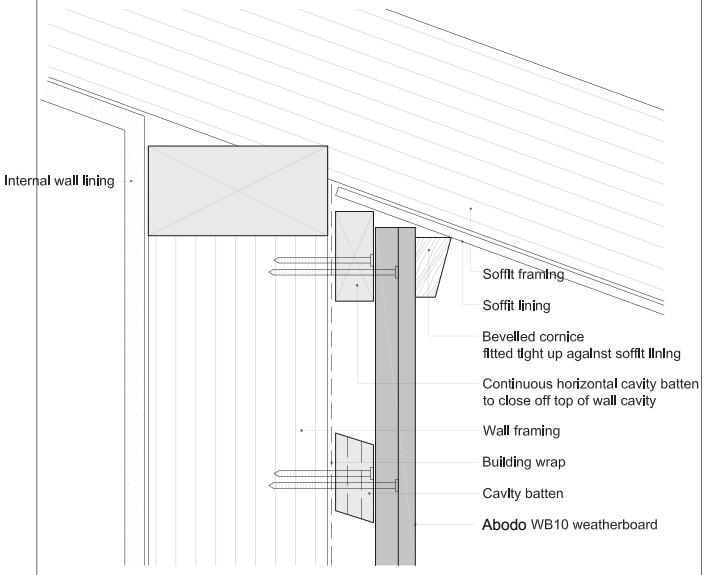
WB10 Vertical Weatherboard
Top of Wall - Flat Soffit



WB10 Vertical Weatherboard
Top of Wall - No Soffit



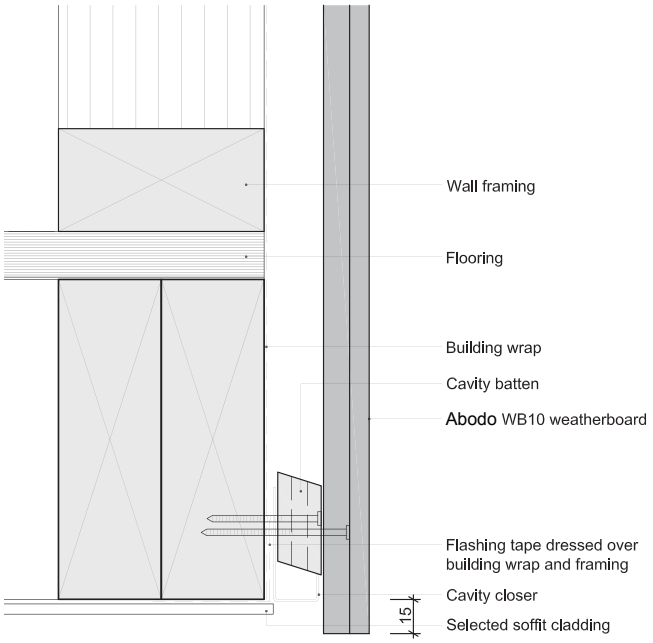
WB10 Vertical Weatherboard
Top of Wall - Sloping Soffit



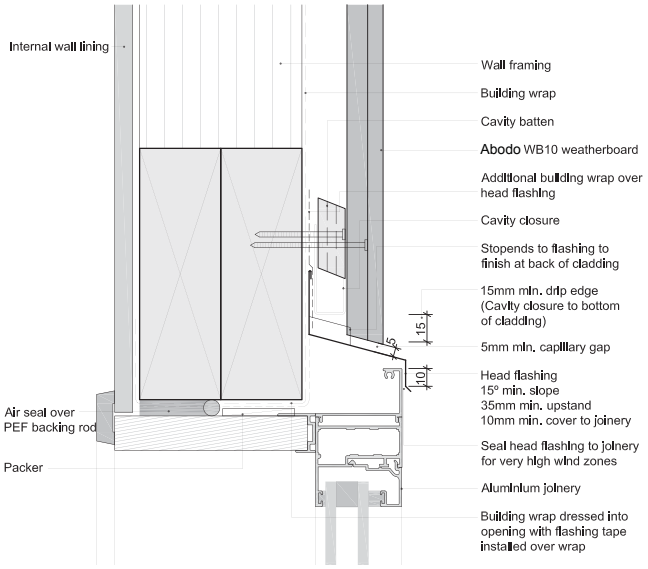
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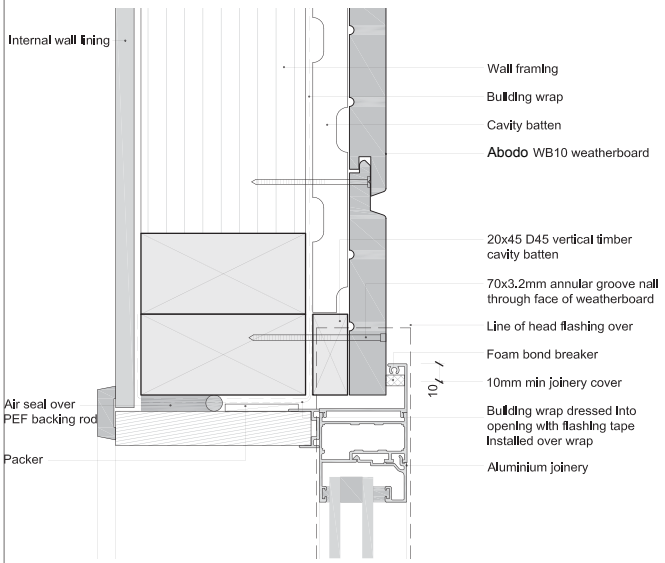
WB10 Vertical Weatherboard
Soffit Detail



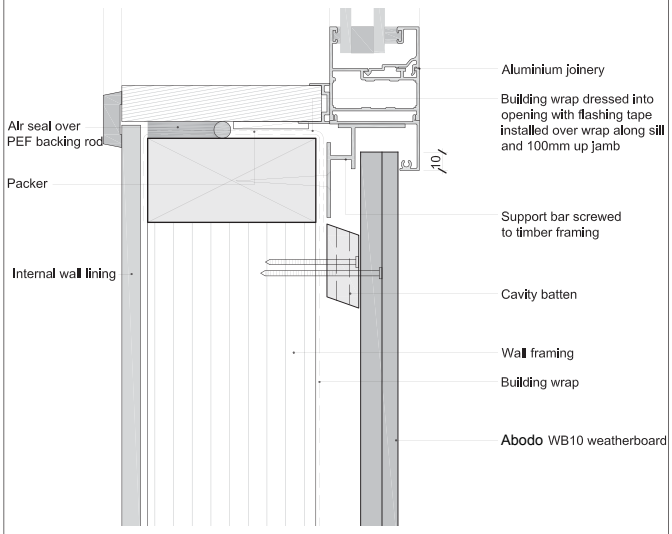
WB10 Vertical Weatherboard
Window Head



WB10 Vertical Weatherboard
Window Jamb

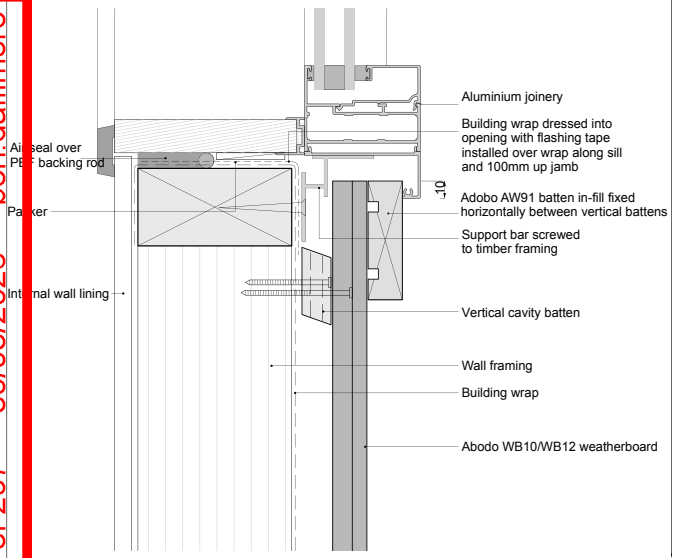


WB10 Vertical Weatherboard
Window Sill

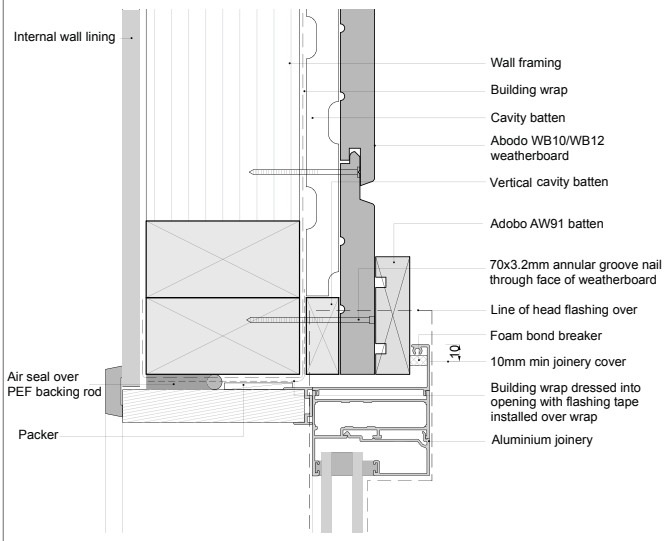


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WB12 Vertical Weatherboard
Window Sill



WB12 Vertical Weatherboard
Window Jamb



WB12 Vertical Weatherboard
Window System Front



WB12 Vertical Weatherboard
Window System Isometric



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GRAPHEX Insulated Facade System - Graphex 50mm Panel on 20mm Cavity - Acrylic RenderSpec

General

Properties

Graphex Panels have the following material properties:

- R-Value 1.56, derated by 45% with a cavity to 0.858
- Weight: approx 7kg/m2 coatings and substrate, considered a light weight cladding in terms of NZS3604

Building Code Compliance

If the project has a building consent then the following clauses apply.

B1 - Structure

This specification complies with the requirements as set out in B1 - Structure which requires buildings, building elements and sitework to withstand the combination of loads and physical conditions they are likely to experience during construction, alteration and throughout their lives. Loads and physical conditions include self-weight, temperature, water, earthquakes, snow, wind, fire.

B2 - Durability

This specification complies with the requirements as set out in B2 - Durability which must always be considered when demonstrating compliance with each of the clauses of the Building Code. It ensures that a building throughout its life will continue to satisfy the performance of the Building Code. It confirms the use of materials that will remain functional throughout the specified intended life of the building, but not less than 50, 15 or 5 years

This cladding system meets the expected durability of the NZBC of at least 15 years

E2 - External Moisture

This specification complies with the requirements as set out in E2 - External Moisture which demonstrates External roof, wall claddings and external openings will prevent external moisture from causing undue dampness or damage.

F2 - Hazardous building materials

This specification complies with the requirements as set out in F2 - Hazardous building materials which safeguards people from illness and injury from quantities of gas, liquid, radiation and solid particles caused by exposure to building materials

On Going Maintenance Instructions

Provide ongoing maintenance instructions required to meet the performance requirements of the NZBC.

Building Consent Authority Requirements

All the appropriate inspections are to be carried out by a BCA representative and that it complies with the NZBC requirements.

Documents

Abbreviations

The following abbreviations are used throughout this work section:

- BCA - Building Consent Authority
- LBP - Licensed Building Practitioner
- PPCS - Proprietary Plaster Clading System
- MPNZA - Master Painters of New Zealand Association
- MSDS - Material Safety Data Sheet
- NZBC - New Zealand Building Code

Manufacturers Documents

Copies of the above relevant company documents referred to in this specification are available at;

Resene Construction Systems
Web: reseneconstruction.co.nz
Telephone: 0800 50 70 40

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No Substitutions

Substitutions are not permitted to any specified Resene Construction Systems system. Materials and execution to Resene Construction Systems specification except where varied by this specification and supported by architectural detailing.

Qualifications

Use only LBP registered plasterers licensed to apply the Resene Construction Systems exterior render systems.

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Documentation

Finish Sample

Submit one 300 mm x 300 mm sample of the selected texture finish and colour for approval on request by the main contractor or specifier. Obtain signature of acceptance on sample and return to the Registered Plasterer.

Maintenance Instructions

Provide Resene Construction Systems Maintenance Guide on or before practical completion of the contract for issuing to the building owner. Resene Construction Systems Maintenance Guide to be provided on request.

Producer Statement

If the project has a building consent then a producer statement shall be supplied by the plasterer in the form as required by the BCA.

Health and Safety

Refer to the requirements of the Health and Safety in Employment Act 2015 and Worksafe NZ: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards and risks is not possible then minimise hazards and risks in this work on site by using the proper equipment and techniques as required in the MPNZA Painters hazard handbook. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put into place procedures for dealing with emergencies. Obtain from Resene Construction Systems the Material Safety Data Sheets for each product. Keep sheets on site and comply with the required safety procedures. Confirmation at the start of the project as to whether a Site Specific Safety Plan is to be produced by the Registered Plasterer prior to works starting.

Warranty

Warrant this system under normal environmental and use conditions against failure. Resene Construction Systems system warranty.
Materials: by Resene Construction Systems - 15 Years Materials only
Execution: by Registered Plasterer - 5 Years Workmanship only

On Site Assistance

Allow to inspect the whole of the work at each stage. Determine a programme for onsite assistance including notification when each part and stage of the work is ready for inspection prior to the work commencing. Permit representatives of Resene Construction Systems to inspect the work in progress and to take samples of their products from site if requested.

Components Used

GRAPHEX Cavity Battens 21mm (self adhesive)

- 40mm x 20mm H-Grade Graphex Peel and Stick Batten
- Supplied in Boxes
- 228 units in a box
- AS 1366 Part 3 Class H (with fire retardant).

Graphex 50mm (2400mm x 1200mm) - South Island Only

- 2400 x 1200
- 50mm Thick
- Allow for 10% Wastage when Installing
- AS 1366 Part 3 Class H (with fire retardant).

Nails (Preloaded) 100mm

- Flat-head, hot-dipped galvanised and 40 mm diameter nylon washers.
- 100mm x 4.0mm

Resene Construction Systems Cavity Closer (20-30mm)

- Supplied in 2400mm Lengths

- Suitable for 20-30mm Cavities

Resene Construction Systems Channel - 50mm

- Supplied in 2400mm Lengths
- Suitable for 50mm Substrates

Resene Construction Systems EdgeSeal Window Flashing

- Used for sill and jamb installations
- Supplied in 2400mm lengths

Resene Construction Systems EdgeSeal Head Flashing

- Supplied in 2.4m Lengths
- Generally requires the Drip Edge Flashing

Resene Construction Systems Drip Edge - Small

- Supplied in 2400mm Lengths
- Used with both the EdgeSeal Head Flashing and also the Universal Starter Strip

Resene Construction Systems Pre-meshed Corners

- Supplied in 2400mm Lengths

Sondal Gorilla Grab Construction Adhesive 300ml

Gorilla Grab Construction Adhesive is a high performance, paste like construction adhesive formulated to bond a variety of common construction materials.

Supplied in 300mls cartidges

Coarse Mesh Render

- Supplied in 20kg Bags

Mesh - Blue (1200mm wide)

- Alkali Resistant 6mm x 5mm Weave mesh supplied in 50m rolls

Resene Limelock

- Water based acrylic polymer dispersion. Supplied in 10 litre pails.

Classico Texture

- 100% acrylic, high-build texture coating. Supplied in 15 Litre pails

Resene X200

- Acrylic reinforced waterproof membrane. Supplied in 4 and 10 litre pails. Tinted to the selected colour

Sondal Gorilla MS Sealant White

Gorilla MS is a high performance MS sealant, which is UV-resistant, waterproof, paintable*, solvent-free and with superior flexibility.

Ideal for the sealing of expansion and connection joints with a wide range of movement. Suitable for a wide range of substrates including blockwork, brickwork, granite, marble, timber, coated and uncoated aluminum.

Supplied in 420gm cartidges

Features and Benefits:

- Non slump
- The whitest of whites
- 900% elongation of break
- High performance MS
- BRANZ Appraised
- Works on damp surfaces
- Paintable 1 hour after application
- UV resistant
- AsureQuality tested
- Easily repairable

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- Interior & exterior
- Solvent-free

Installation/Application

Timber Frame

Check Fixings

Timber Framing must comply with NZS 3604 for building or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases, studs must be at a maximum of 600 centres.

It is the builder's or framing installer's responsibility to ensure it is set out true in the correct alignment, as required by the Designer. Before installing insulation boards, check framing is true and in the correct alignment with studs at a 600 mm maximum centres and blocking is provided for support of the substrate, e.g., around all openings, at soffits, at joints, and at internal corners.

Ensure that any framing has a moisture content of no more that 18% mc prior to installing substrate. Refer to E2/AS1 section 11

Alignment of Walls

To be plumb, level and in true alignment.

A check should be made prior to render installation, using a straight edge to ensure the wall is flat. Any irregularities should be taken out by straightening the studs.

Builder to re-align framing when it is not in the correct alignment, and insert additional blocking if required.

Builder Supplied Flashings

Make sure all builder metal flashings, saddles flashings and back flashings are in place.

Battens - Graphex 20mm

General

Drained and ventilated cavities are seen as one way of dealing with moisture that may enter through the exterior envelope. Resene Construction Systems recommends the use of cavities.

When a drainage cavity is used, it should consist of an air space outboard of a building underlay fixed to the framing, with approved flashings to drain water to the outside face of the cladding.

Limitations

Vapour from freshly LOSP-treated timber may melt styrene based battens.

Fixing Battens

Adhesive fixing to the building underlay. This is probably the quickest method of fixing battens. The adhesive acts as a temporary fixing, and it will be permanently fixed upon nailing the substrate in place. Under no circumstances should any solvent-based adhesives be used, as these will melt the battens.

Remember the battens only need to be temporarily held in place, for when you fix the substrate at the appropriate centres this will secure all the battens in place.

Fix vertical battens on stud lines. Vertical battening must be the full height of the cavity, but battens may be joined (butted) to achieve this.

Take account of where cladding fixings will be needed for the exact location of the battens. For example, at corners or cladding junctions, provide additional or wider battens as required for fixing the cladding, back-flashings or facings.

Where an intermediate or horizontal fixing is required, for example to fix the top or bottom edge of sheet cladding, install a cavity spacer (short length of batten) on a minimum 5° slope. Leave a minimum 50 mm gap between the spacer and the vertical battens (the gap is to provide drainage and ventilation)

Closing off the top of the cavity

Close off the top of the cavity to prevent damp air from the cavity getting into interior spaces, roof framing or eaves. This is particularly important where the cavity finishes beneath a soffit or other area that might be open to a roof space.

One way of closing off the top of the cavity is to use a continuous length of horizontal batten. The horizontal batten also supports fixings at the top edge of sheet claddings where required.

Another way to close of the cavity is to use flashing tape between the underlay and soffit framing prior to fixing the soffit in place (this is the recommended method if you are top venting your facade)

Ventilation is not required at the top of a cavity (note that masonry veneer uses a different cavity system that does require top venting). For those that want to ventilate the top of the cavity make sure you utilise the RCS "Vented Soffit Flashing" and ensure you use flashing tape rather than a horizontal batten.

Cavity walls over two storeys

Refer to E2/AS1 Paragraph 9.1.9.4

Cavities may be continuous up to two storeys or 7m maximum but not more, due to limits on drainage and drying. If the wall is greater than two storeys or 7m, divide the cavity using a horizontal flashing that bridges the cavity. Provide ventilation to the cavity above the junction, as described for the base of the wall.

It is the builder's responsibility for the supply and installation of the horizontal flashing according to E2/AS1.

Existing Substrates – over timber framing

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Generally deals with existing weatherboard or rigid backing boards (fibre cement sheet)
Battens must be screw fixed to ensure positive fixing through to the structural framing.

Screw fixing of battens is recommended as existing internal linings may be damaged if nails are hammered into the structural framing.

Graphex Sheets 50mm (SI)

There must be no horizontal surfaces which will be subject to water ponding; a minimum slope of 5 degrees is required (for metal caps only, 10 degrees for liquid membranes).

Ground Clearances

It is important that ground clearances are maintained after completion and occupation of the building, with the exterior ground sloped to carry water away from the exterior walls.

Garage floors

Need to be low enough to drive onto and high enough to provide a minimum 50 mm step-down to exterior paving, while maintaining cladding clearances either side of the garage door. To achieve this it may be necessary to construct the garage floor lower than the floor level of the building.

In these situations, providing a 'nib' at garage doorways allows the cladding to continue in a straight line while maintaining minimum clearances at the bottom of wall cavities for ventilation.

E2/AS1 : reference section 9.1.3 and Figure 65 and Table 18

It is the landscaper or other external contractor's responsibility for ground level compliance in relation to cladding clearance and that ground clearances are maintained after completion and occupation of the building.

Decking Clearances / Level thresholds

35mm minimum clearance at the highest point of the deck to the cladding is required.

E2/AS1 : reference section 7.0

Control/Expansion Joint Set outs

- Where columns intersect beamwork control joints should be formed so that they are running vertically and horizontally of the intersection
- Large doors & windows ie Ranch Sliders, & Bi-Fold type where the window area is greater than 8.0m2
- Junctions between dissimilar materials, ie Masonry to Resene Construction Systems Graphex System
- Where there are small widths of plaster (ie. less than a trowel width)
- Where the wall length is greater than 8 metres in length a vertical control joint will need to be installed
- Where a two storey dwelling wall height exceeds 6 metres a horizontal control joint is required
- Control Joints are required at all interfloor levels on multi-level construction (eg. 3 or more floors)

Substrate Installation

All Graphex insulation boards must be installed; vertically, be fully supported on all edges and butt-jointed hard against each other. Where a sheet join is fully supported on timber framing, one nail and washer may be used to fix both sheets. Any gaps between sheets must not be greater than 5mm. All gaps must be foam filled.

Substrate Preparation

Check should be made using a straight edge to ensure the wall is flat, plumb and true. Any irregularities should be taken out by straightening using a rasp.

The substrate must be rasped to provide keying for the Render application.

The Render coating is not designed to straighten deviations that exceed the specified Render System thickness.

Once the substrate is deemed ready for plaster, then the main contractor can continue to fix the internal linings. This is so that the main contractor can minimise the chance of any damage to the external plaster cladding that may be caused by the fixing process of the internal linings.

Nails (Preloaded) 100mm

Fix insulation boards with fasteners and washers as given in the Table 1 – Fastener Sizes

Fix fasteners into studs at the fixing centres shown in Table 2 – Fastening centres.

Fixings must be flush with the recess in the washer, so that the washer is hard against the insulation board, and pulls the sheet hard back against the framing / batten.

Table 1 – Fastener Sizes

8g x 100 mm ** 8g x 100 mm **

Substrate Thickness (mm)	Timber Frame Nail size	Timber Frame Screw size	Timber Frame Screw size (countersinking)	Steel Frame Screw size
40mm +20mm Batten	90 x 3.55 mm *	8g x 80 mm **	8g x 70 mm **	8g x 80 mm **
50mm +20mm Batten	100x 4.0 mm *	8g x 100 mm **	8g x 80 mm **	8g x 100 mm **
60mm +20mm Batten	110x 4.0 mm *	8g x 100 mm **	8g x 80 mm **	8g x 100 mm **
75mm +20mm Batten		10g x 120 mm **	8g x 100 mm **	
80mm +20mm Batten		10g x 120 mm **	8g x 100 mm **	
100mm +20mm Batten		12g x 150 mm **	10g x 120 mm **	

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* Nail type = Galvanised flat head
** Screw type = Class 4, countersunk

Table 2 – Fastening centres

NZS 3604 Building Wind Zones	Maximum vertical fixing centres (mm) along studs	Maximum horizontal fixing centres (mm) along top and bottom plates	Maximum horizontal fixing centres (mm) along dwangs
Low	300	300	300
Medium	300	300	300
High	300	300	300
Very High	200	200	200
Extra High	150	200	150

50mm Substrate and 20mm Cavity Flashing Solution

General Notes

Comply with the Trade Specific penetration flashing guidelines. Carry out to the required standard of execution to ensure water does not penetrate.

Refer to Resene Construction Systems technical drawings for the specified system being installed.

Priming Flashings

All Resene Construction Systems Flashings must be primed. It is a requirement of Resene Construction Systems to use a solution of 50% Acrylbond, 50% Water and Rockcote MultiStop Bedding compound or AAC Panel Compound. This is then brushed onto the flashings and left to 24 hours so that it can adhere and cure.

Fixing flashings

Use 40mm clouts to temporarily fix flashings in place.

Starter Strip/Channel Installation

Must be installed directly after sheet installation at ground level to prevent contamination of the bottom edge.

Vertical control joint installation

Where a vertical control joint intersects with starter strips, the starter strip must be cut to allow for substrate movement.

10mm space between adjacent substrates must be allowed for the positioning of the horizontal control joint.

Must be one continuous length. If the cladding section exceeds flashing length, the joint must be under-flashed with Butyl based flashing tape to the underside of the flashing prior to installation.

Horizontal control joint installation

10mm space between adjacent substrates must be allowed for the positioning of the horizontal control joint.

Must be one continuous length. If the cladding section exceeds flashing length, or at an external or internal corner the joint must be under-flashed with EIFS butyl tape to the underside of the flashing prior to installation.

Corner Beads

Fix to external corners or other exposed edges of the substrate ensuring a plumb, straight edge is formed.

Dissimilar cladding junctions

Refer to Resene Construction Systems and adjacent cladding manufacturers technical drawings.

Horizontal

Must have apron/z-flashing installed unless otherwise detailed.

Vertical junction

Must have back flashing installed prior to cladding installation.

10 - 15mm space must be provided from any adjacent cladding/substrate.

Oversize PEF Backing Rod must be inserted into the space 5mm-7mm below the outside line of the cladding.

Sealant must be applied to this junction.

EdgeSeal™ Flashing Suite Installation

Preparation – aluminium joinery

Clean the surface/substrate to which the Resene Construction Systems EdgeSeal™ Flashing Suite is being applied with Resene Construction Systems IPA wipes. Lightly rub the surface to which you are applying the Resene Construction Systems EdgeSeal™ Flashing Suite.
This process degreases and removes any pre and post-construction site residue.
DO NOT USE OTHER NON APPROVED CLEANER as the powder coat warranty may be voided.

Ensure the joinery has been set out of the framing at least 20mm or outside the line of the battens.

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The EdgeSeal™ Flashing Suite acquires maximum hold after 72 hours. Cladding installation can continue during this curing period. Once cured the flashing cannot be removed without difficulty and risk of damage to the surface to which it adheres.

The EdgeSeal™ Flashing Suite can be made up of 2 lengths, please ensure that the flashing is tightly butted with the adjoining flashing.

Joinery Screws

If the Aluminium joinery has protruding screws along any edge, then you must trim the EdgeSeal™ Window Flashing adhesive and uPVC edge accurately around these and seal with MS sealant prior to priming.

Drainage holes

If the Aluminium joinery has drainage holes located along the underside of the aluminium 'sill' edge you must leave these areas clear of plaster and sealant. When you are installing the EdgeSeal Flashing make sure you remove out a section of the EdgeSeal Flashing so that the drainage holes on the joinery are left clear. The upstand on the EdgeSeal Flashing must remain upright and continuous behind the holes. This will prevent wind-driven rain from entering the back of the cavity, and maintain drainage to the outside face of the cladding system.

EdgeSeal™ Sill Installation

1. Measure the length of EdgeSeal™ Window Flashing 'oversize' by 20mm (10mm on each side of the opening).
2. This measurement is to the outside edge of the 'flexible elbow' of the jamb flashing.
3. To ensure accuracy 12mm past the outside edge of the opening.
4. Remove a corner of the backing tape from the adhesive edge of the prepared flashing.
5. Applying horizontally across the edge of the aluminium joinery so that the edge of the adhesive is flush, not proud of the front face of the aluminium joinery.
6. Slowly pull off the tape while holding the flashing in position
7. Apply pressure to the front of the flashing to make sure an adequate bond has been achieved between flashing and joinery
8. Tack the flashing in place to maintain its shape

EdgeSeal™ Jamb Installation

1. Measure the length of the jamb from the top corner of the joinery unit to the exposed surface of the installed EdgeSeal™ sill flashing.
2. Cut the Rockcote EdgeSeal™ Window Flashing approximately 1mm proud of total length – cutting 1mm extra length will allow for a tight 'compressed' joint where the EdgeSeal™ Window Flashing junctions to the sill.
3. Remove 100mmof the backing tape from the adhesive edge of the prepared flashing.
4. Install the flashing by slipping and butting firmly under the EdgeSeal™ Window Head Flashing (or aluminium flashing depending on what is being used) first, then align the front edge of the flashing flush with the joinery unit..
5. Slowly pull off the tape while holding the flashing in position.
6. Apply pressure to the front of the flashing to make sure an adequate bond has been achieved between the flashing and joinery unit.
7. Tack the flashing in place to maintain its shape

EdgeSeal™ Head Installation

1. Measure the length of the Window Head and allow an extra 5mm on either side of the joinery unit (sill flashing should be measured and cut to the same dimension)
2. Cut the EdgeSeal™ Window Head Flashing to length.
3. Remove 100mm of the backing tape from the adhesive edge of the prepared flashing.
4. Place the EdgeSeal™ Window Head Flashing on top of the Window Head and slowly pull off the tape while holding the flashing in position
5. Apply firm pressure to the front of the flashing to make sure an adequate bond has been achieved between flashing and joinery
6. Using the same measurement as above, cut a length of Head Flashing tape that is compatible with the building wrap (eg. 3M All Weather Flashing Tape)
7. Adhere the Head Flashing Tape to the top part of the EdgeSeal™ Window Head Flashing and run this up onto the building wrap
8. At either end create a small stop end by turning up the tape against the cavity batten, you need to prevent moisture from tracking off the ends of the Flashing Tape.
9. Install the cladding substrate and decide whether you are plastering or painting the heads.
10. If you are painting the heads install the Universal Drip Edge Flashing between the cladding substrate and the EdgeSeal™ Window Head Flashing

Check and Prepare Graphex

Preparation based on new substrate installations.

Preliminary Checks

Check should be made using a straight edge to ensure the wall is flat, plumb and true. Any irregularities should be taken out by straightening using a rasp.

The Render coating is not designed to straighten deviations which exceed the specified Rockcote Render System thickness.

Once the substrate is deemed ready for plaster then the main contractor can continue to fix the internal linings, this is so that the main contractor can minimise the chance of any damage to the external plaster cladding that may be caused from the fixing process of the internal linings.

Builder Supplied Flashings

Make sure all builder-supplied flashings are in place. The architectural drawings provide a list of possible flashings.

RCS Flashing Installation

Refer to the flashings as outlined within the Resene Construction Systems Specification

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For more information about control joints refer to the technical note on the Resene Construction webpage at the following link https://reseneconstruction.co.nz/control-joints/

The main contractor/substrate installer is responsible for all control joints, which must comply with the substrate supplier's specifications.

Clean Surface

If the substrate has been left exposed to UV / sunlight for more than two weeks, dust and dirt may build up on the surface, the surface may also discolour (yellow) you must remove all surface dust, oxidisation, and other contaminants to reveal fresh polystyrene. Use a rasp or a stiff broom to prepare the substrate.

Masking

Before applying the render, masking must be applied to all joinery, pipes, roofs, and all areas likely to be marked by the render. Use drop cloths and ground covers to keep the working areas clean.

Colour selection

For more information about light reflectance values refer to the technical note on the Resene Construction webpage at the following link https://reseneconstruction.co.nz/light-reflectance-values/

Penetrations

PVC sheathed electrical cables must be prevented from direct contact with the sheets. When cables must penetrate the sheets for exterior electrical connections, the cable must be directly supported by passing through an electrical conduit.

Plaster Systems Coarse Mesh Render - Base Coat

Surface Preparation

Ensure surface is clean, sound, dry and free from dust, dirt, grease, mould and lichen.

Application

Plaster can be applied with a steel trowel, pump or broad-knife at approximately 3-5mm thick (3m2 per bag). Apply plaster only when the temperature is between 5°C and 30°C and will be in that range for the 24 hours period following application.

Curing:

Render should be protected from hot drying winds and direct sunlight for the first 16 hours. Protect newly applied plaster from rain and water run off for the first 24 hours.

Resene Construction Systems Mesh (Standard Weave)

General

Measured and cut slightly longer than the height/length of the area to be covered.

Application of Fibreglass Mesh

Apply the pre-measured mesh from the top of the wall.

Press the fibreglass mesh into the render mix with a steel trowel starting at the centre and working outwards towards the sides, so that it is completely embedded with the render mix forced right through the mesh holes.

Ensure there are no wrinkles or trapped bubbles in the mesh and that it is fully embedded just below the surface of the render.

Do not embed the leading edge of mesh as this locates your next mesh layer.

Mesh must not be exposed but retained as close to the surface as possible.

Overlap mesh 100 mm with the adjacent drop of mesh, and trowel to embed together.

Ensure the fibreglass mesh covers all exposed areas of the substrate, including any recesses around the exterior joinery and internal corners.

Fibreglass Mesh must be bought to the outside edge of all Flashings.

Apply 450 x 150 mm strips of fibreglass mesh `butterflies' diagonally at every corner of openings for window and door joinery, meter boxes etc.

After the render mix has cured, trim off excess length accurately against the flashing edge.

Plaster Systems Coarse Mesh Render - Level Coat

Surface Preparation

Ensure surface is clean, sound, dry and free from dust, dirt, grease, mould and lichen.

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Application

Plaster can be applied with a steel trowel, pump or broad-knife at approximately 2-3mm thick (6m2 per bag). Apply plaster only when the temperature is between 5°C and 30°C and will be in that range for the 24 hours period following application.

Curing:

Render should be protected from hot drying winds and direct sunlight for the first 16 hours. Protect newly applied plaster from rain and water run off for the first 24 hours.

Resene Limelock Sealer

Application

Apply to trowelled plasters immediately after final trowelling (Dependent on surface porosity, typically 5-8m2 per litre). Apply one coat of Resene Limelock over the fresh substrate by commercial grade knapsack sprayer, spray, long pile roller or brush and allow to dry. Evenly coat all fresh surfaces to ensure uniform curing and that free lime cannot be transferred through weak points.

Rockcote Classico Texture Finish

Limitations

Check colour before use
Ensure same batch numbers are used on a single wall where possible
Should not be applied in temperatures below 5ºC or above 35ºC
Not suitable for areas of continual damp or areas submerged in water

Surface Preparation:

Ensure surface is clean, sound, dry and free from dust, dirt, grease, mould and lichen.

Application

Texture is applied not less than 1mm with a steel trowel to a flat finish then float using a circular action to an even texture over the following five minutes with a plastic float. Apply plaster only when the temperature is between 5°C and 30°C and will be in that range for the 24 hours period following application.

Coverage approximately 12m2 per pail

Resene X200 Paint Finish (2 Coats)

Application

Use a 12-20mm synthetic fibre roller or texturing roller depending on surface. Apply two coats, First coat 2 sq. metres per litre, Second coat: 3.5 sq. metres per litre

Maintenance

Plan what maintenance you propose to undertake.

Take into consideration the type of work that is required, & the time of year you want to get it done. Most external maintenance is completed in the summer as this is generally the best weather for drying and for general outside work such as gardening. If you are planning on fixing brackets, security lights or any other fixture to the exterior make sure you have the skills & equipment to undertake the task.

If you are unsure call a specialist.

If it relates to a penetration through the exterior cladding call us direct on 0800 50 70 40 - a simple phone call could save you time & money later. Maintenance sounds difficult & costly - in fact, it can be quite the opposite.

It can become difficult & costly if it is never undertaken, by which time other issues may have arisen that could have been acted upon sooner through regular general maintenance.

There are virtually no “maintenance free” exterior claddings on the market, in fact, almost nothing is maintenance-free - many people tend to throw things away these days when they breakdown as it is cheaper than getting it fixed. This is not the case with your exterior cladding, you can't just throw it away, it is protecting your family & your belongings. It is quite interesting to note that most people maintain their garden, & vehicle so they look good. Yet when it comes to cleaning the exterior windows, & walls or clearing leaves from a blocked gutter it seems to get left alone as it is perceived to be “difficult” or there are better things to do, maybe the dirt & leaves will simply disappear one day. This generally isn't the case & regular maintenance is required.

One of your major life investments is property so why not look after it? General Maintenance is a requirement of the Resene Construction Systems Performance Guarantee.

Extent of Maintenance

The extent and nature of necessary maintenance is dependent on the

- Type of cladding or components used
- Position of cladding or components on the building
- Geographical Location of the building
- Specific site conditions.
- Areas that are considered non-maintainable
- Heavily textured areas

Wash Exterior Surfaces

You will need to clean down your Resene Construction Systems Plaster Finish every 12 -18 mths. Most airborne dirt particles accumulate on exterior surfaces during the summer months. So before the winter rain washes the dirt down over the walls, give these areas a clean, this will dramatically reduce the chances of your Resene Construction Systems Plaster Finish being stained.

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Washing by rain removes most atmospheric contaminants, but sheltered areas, such as walls directly below eaves, are protected from the direct effects of rain and require regular manual washing. This work should be completed using a low-pressure water blaster (300 psi or less), keep the blaster at a 45-degree angle and 300mm away from the cladding when cleaning. For best results use “Resene Roof wash and paint cleaner”. Apply the diluted solution with a soft broom, & wash off with copious amounts of freshwater. Most detergents have a detrimental effect on fish life so avoid letting the washings runoff into the stormwater system. DO NOT use harsh solvent-based cleaners.

However, it is important that high-pressure water is not directed at sensitive junctions such as window surrounds and other flashings. Great care must be taken to avoid water being driven past anti-capillary gaps and flashings into the wall cavities.

Roof Junctions and Spouting

When cleaning, check your spouting to make sure there are no leaves that could block drains, or overflows when it rains. Trim back branches and clear gutters at the same time. Consider fitting gutter guards (however, dirt can still get through, so you do need to check under the gutter guards from time to time). Check apron flashing diverters (kick-outs) to make sure these are diverting water away from the cladding.

Deck and Ground Clearances

Exterior claddings require a minimum ground clearance to ensure no moisture gets to the timber of the wall due to capillary action. Ground clearances between the cladding and ground/deck must be maintained. For more information on required Ground Clearances refer the NZBC..

If your lawn adjoins the house, a 150-225mm wide mowing strip along the edge will stop grass and weeds growing in these difficult-to-mow areas - and keep the area drier. A mowing strip will also prevent damage to the house from hitting the cladding with the mower. You can also use concrete, bricks, pavers or treated timber for a mowing strip, laid on a concrete base or on polythene but make sure there is at least 100mm gap between the pavers and the base of the cladding.

Check Sealants

Check for cracked, missing or loose sealant. You will find sealants have been used around windows, doors, electrical fittings, plumbing fittings and along the soffit line. All deteriorated sealants should be removed and resealed

Check hidden areas

Check behind foliage, under decks and areas that are heavily shaded for signs of algae and mould. If possible increase the circulation of air around these points by pruning foilage. The use of mulch, bark or stones in these areas will also lower the risk of algae appearing on the surface of the coatings.

Damaged Areas

Contact your Registered Plasterer they will provide the necessary expertise to remedy the damage. If you are unable to contact a registered Resene Construction Systems Plasterer call Resene Construction Systems - FreePhone 0800 50 70 40 -we will arrange for an inspection & provide an assessment for the repair the exterior cladding.

Non-Maintainable Areas

Parapets are considered non-maintainable areas. They are in such a location as the degree of difficulty to maintain these areas according to the general maintenance requirements of the building code without risk to your health and safety is considered high. If you have areas that are non-maintainable we would require that these are checked every 6 months. Any non-maintainable areas will also need to be repainted/coated every 2-3 years.

Repainting a Dwelling

Repainting the exterior should be undertaken by a professional painter every 7 - 10 years to ensure the integrity of the entire system is kept good. If you select a colour which has an LRV less than 25% you can expect to repaint every 7 years. It is recommended that when you repaint your dwelling that you consider the use of Resene X200 as your choice of paint.

Maintainable Parapet Areas utilising Liquid Membranes

If you have areas that have maintainable liquid membrane eg.large sloping sills, balustrades, chimney breasts we would require that these are checked every 12 months. Any maintainable areas will also need to be repainted/coated every 3-5 years.

Important:

This specification must be read in conjunction with the Resene Construction Systems technical drawings.
No alteration to the Resene Construction Systems RenderSpec® is permitted.
All Technical Data Sheets are available at https://reseneconstruction.co.nz/technical-library/technical-data-sheets/
All Safety Data Sheets are available at https://reseneconstruction.co.nz/technical-library/safety-data-sheets/

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INSTALLATION GUIDE

Thermakraft™ WATERGATE Plus

Thermakraft ONE WRAP SYSTEM
10 Products - One system
One warranty

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Thermakraft™

WATERGATE PLUS

New Zealand's all-purpose, fire retardant wall underlay.

Watergate Plus is specifically designed as a wall underlay for use behind exterior wall cladding. Made from synthetic materials Watergate Plus is fire retardant, water resistant and vapour permeable. The water vapour transfer rate of the product has been optimised to minimise condensation risk in homes without compromising its primary water barrier properties.

Watergate Plus is part of the Thermakraft One Wrap System. Its unique construction allows for easier installation while maintaining performance qualities.

Watergate Plus can only be used in lined applications. Section E2 of the New Zealand Building Code defines lining as "the rigid sheet covering for a wall, ceiling or other interior surface."

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Watergate Plus

Synthetic Wall Underlay

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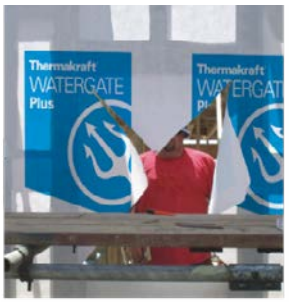
Can only be used in lined applications. Section E2 of the New Zealand Building Code defines lining as "the rigid sheet covering for a wall, ceiling or other interior surface."

Application Method

- Fix Watergate Plus underlay with printed side facing the exterior and run horizontally.
- Fix to all exterior walls from below bearers to the top plate. Watergate Plus underlay is available in widths of 2740mm and 1370mm. The 2740mm width product is generally wide enough to cover from below the bottom plate to the top plate.
- **Timber Framing:** Pull the Watergate Plus underlay tight and fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically.
- **Steel Framing:** Ensure frame is free from oil, dust and dirt. Fix securely using construction grade double-sided tape or adhesive or galvanized flat head screws that are appropriate for external framing and roofing use, at 300mm centres.
  Note: Check adhesive compatibility with Watergate Plus and the steel framing materials before use.
  If using a tape: Apply double-sided tape onto steel frame studs and only peel off the forward-facing liner once Watergate Plus is ready to be installed. When ready, peel off approximately 2m of tape liner at a time and press Watergate Plus firmly onto tape, ensuring it is taut. **Note:** The double-sided tape is to temporarily hold the Watergate Plus in place until the batten and/or cladding is installed. The screws used to fix these are the permanent fixings for Watergate Plus.
- Minimum of 150mm lap is required at joins. All vertical laps must be made over studs. Horizontal laps to be laid ship lap style allowing water to be shed to the outer face of Watergate Plus.
- Cover all windows and door openings with Watergate Plus underlay. It is recommended that the Watergate Plus underlay is not cut and prepared for window installation until the arrival of the windows.
- When windows and doors are ready for installation, the Watergate Plus underlay covering the openings should be cut at 45° and folded into the opening and securely fastened. Thermakraft window flashing tapes are recommended as the window flashing system.
  Note: In accordance with NZBC Acceptable Solution E2/AS1 and NASH Building Envelope Solutions: 2019 (E2/AS4), wall underlay must be prevented from bulging into the drained cavity. Where stud spacing is greater than 450mm, Thermakraft Stud Strap or Thermastrap run horizontally at 300 centres is an acceptable means of prevention.
- Once installed, Watergate Plus must not be left exposed to the weather or UV for more than 90 days. Watergate Plus underlays will provide temporary weather protection during construction allowing work to continue. Internal linings and insulation must not be installed until the exterior cladding is completed.
- Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZBC B2 Durability.
- Repair small damaged areas with any Thermakraft window flashing tape or Thermakraft Premium Joining Tape. Any large areas which require repair may be covered with a second layer of underlay with a lap of 150mm and then taping.
- Watergate Plus underlay must be installed by, or under the guidance of a licensed building practitioner.



Fix Watergate Plus securely to the frame.





On arrival of doors and windows, cut Watergate at each opening on a 45° angle away from each corner. Pull the Watergate flaps inside and fasten to the inside of frame.

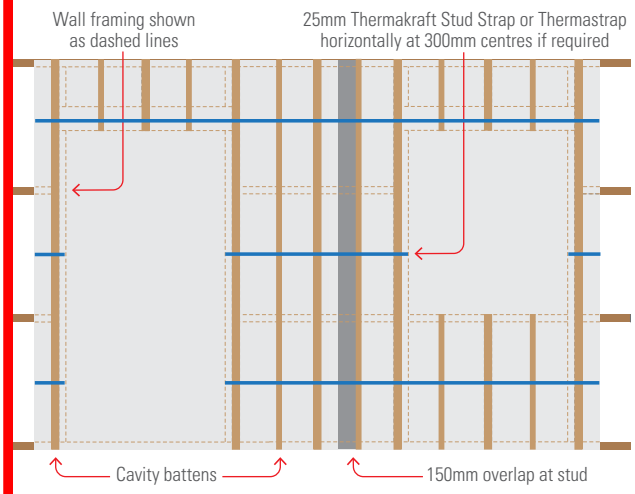
Watergate Plus

Synthetic Wall Underlay

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Application Tips

Watergate Plus is unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent to flash off in a well-ventilated area. Recommended minimum 7 days.



Handling and Storage

Watergate Plus underlay must be handled with care to prevent damage such as tearing and roll deformation. Due to the width of the product, care should be taken when installing in windy conditions.

The product must be stored under cover well away from direct moisture, rainfall contact and sunlight (UV). Care should be taken not stack other materials on top of the product.

BRANZ Appraised
Appraisal No. 695

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Issue 7.0, May 2025



PRODUCT DATA SHEET

Thermakraft™ WATERGATE Plus

Thermakraft ONE WRAP SYSTEM
10 Products - One system
One warranty

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Thermakraft™ WATERGATE PLUS

New Zealand's all-purpose, fire retardant wall underlay.

Kingspan Thermakraft™ Watergate Plus is specifically designed as a wall underlay behind exterior wall cladding. Made from synthetic materials Watergate Plus is fire retardant, water resistant and vapour permeable. The water vapour transfer rate of the product has been optimised to minimise condensation risk in homes without compromising its primary water barrier properties.

Watergate Plus is part of the Thermakraft One Wrap System. Its unique construction allows for easier installation while maintaining performance qualities.

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Kingspan®

Watergate Plus

Synthetic Wall Underlay

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Watergate Plus comes in five roll sizes and two soffit roll sizes:

Roll Dimensions

Product Code	Width	Length	Coverage
WGP1370025	1370mm wide	18.5m long	25m2 coverage*
WGP1370050	1370mm wide	37.0m long	50m2 coverage*
WGP1370100	1370mm wide	73.0m long	100m2 coverage*
WGP2740050	2740mm wide	18.5m long	50m2 coverage*
WGP2740100	2740mm wide	36.5m long	100m2 coverage*

Soffit Roll Dimensions

Product Code	Width	Length	Coverage
WGP600025SOF	685mm wide	36.5m long	25m2 coverage*
WGP600050SOF	685mm wide	73.0m long	50m2 coverage*

* **Note:** m^2 is the roll size. For actual coverage, allow for laps and joins.

Custom Branding Available – Contact your Kingspan Insulation Representative for more details

Product Description

Watergate Plus is a two-layer laminated wall underlay combining a polyester non-woven layer with a high quality vapour permeable film. This allows water vapour to pass through from inside the wall cavity whilst water from the exterior is kept out.

The product is simply fixed to timber framing using construction staples and is made to stretch around corners providing a tight fit and reducing the risk of staple tear. Maximum 90 days exposure for wall application.

Scope of Use

Watergate Plus can be used as a wall underlay on both residential and commercial buildings within the following scope:

- Can only be used in lined applications. Section E2 of the New Zealand Building Code defines lining as "the rigid sheet covering for a wall, ceiling or other interior surface."
- With absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Can be used with timber and steel framing, either directly fixed or in conjunction with an 18mm minimum drained cavity.
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 and E2/AS4.
- Situated in NZS3604:2011 and NASH Building Wind Zones up to (and including) 'Very High' when used as a standalone flexible underlay, and "Extra High" when used as a flexible underlay over a rigid wall underlay.
- Refer to BRANZ Appraisal No. 695 and CodeMark Certificate CMNZ10002 for full details.

General

- Fire retardant.
- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent to flash off in a well ventilated area. Recommended minimum 7 days.
- Watergate Plus is not subject to a warning or ban under section 26 of the Building Act 2004 when used as per the product scope.

Limitations

- Must NOT be used as a roof underlay.
- Must NOT be exposed to the weather or UV for more than 90 days.
- Watergate Plus is NOT a vapour barrier.
- Must NOT be used in any unlined applications, including but not limited to sheds, warehouses, garages, canopies, soffits and lean-to designs. Warranty void when used in unlined applications.

Compliance

- Watergate Plus has been appraised with the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 and E2/AS4, with regards to building height and floor plan area.
- Watergate Plus has also been BRANZ appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Watergate Plus into their design in accordance with the declared properties and the instructions of Kingspan Insulation NZ Ltd.

Watergate Plus
Synthetic Wall Underlay

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Flammability Index
Watergate Plus Underlay has an AS 1530 Part 2:1993 Flammability Index of not greater than 12 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 a), for the requirements of suspended flexible fabric used as an underlay to exterior cladding that is not exposed to view in occupied spaces. Due to the updated scope of use limiting Watergate Plus to lined applications only, the flammability requirement is now **not greater than 12**. Watergate Plus meets a flammability index of **not greater than 5**, it is not suitable for unlined applications due to UV control requirements.

Durability
Meets the Performance Requirements of NZBC Clauses B2, Durability (B2.3.1 (a) 50 years, B2.3.1 (b) 15 years and B2.3.2), E2 External Moisture (E2.3.2), and F2 Hazardous Building Materials F2.3.1, providing:

- It is not damaged.
- Installed in accordance with instruction guide.
- Is not left exposed for more than 90 days.
- Installed by or under guidance of Licensed Building Practitioners.
- Is compatible with cladding system used.*

* **Note:** specifiers and product user must confirm wall cladding system compatibility with the underlay before installation.

Product Warranty
Standard Kingspan Thermakraft Warranty applies. Refer to Kingspan Thermakraft Warranty statement for further details. This is available online at **thermakraft.co.nz** or call **0800 806 595.**

Recycling and Waste
All of our synthetic underlays are fully recyclable through saveBOARD™ New Zealand. For a recycling site nearest you, please contact **info@kingspaninsulation.co.nz** or visit us at **thermakraft.co.nz**.

Property Performance
The following data represents the minimum pass rates required by the NZBC. This product tests well beyond the minimum standards. If you require actual performance results, please contact your local Kingspan Insulation representative.

NZBC E2/AS1 Table 23 (NZS2295:2006) Wall Underlay Properties	Absorbency	Vapour Resistance	Shrinkage	Water Resistance	Air Resistance
Property Performance Requirement	≥ 100gsm	≤ 7 MN.s/g	≤ 0.5%	≥ 20mm	≥ 0.1 MN.s/m^3
Property Performance	Pass	Pass	Pass	Pass	Pass

BRANZ Appraised
Appraisal No. 695

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Issue 12.0, May 2025



INSTALLATION GUIDE

Thermakraft™
THERMAKRAFT
215

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Thermakraft™

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as 'Building Paper' Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

Kingspan®

Thermakraft 215

Self-supporting bituminous wall and roof underlay

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Application Method (Roofing)

Thermakraft 215 is a bituminous building underlay used on roofs in residential buildings.

- Thermakraft 215 can be used for roof construction.
- Run NO longer than 10m.

Long-run metal roofing/vertical or horizontal installation method

- Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings on timber framed structure. Fixing at 300mm centres. Fixing types and requirements for steel framed structure can be found in the NZ Metal Roof and Wall Cladding Code of Practice.
- Refer to table below to determine underlay support requirements.

Roof Pitch	Span	Underlay Support Required	
		Horizontally Installed	Vertically Installed
≥ 10°	> 1200mm	Yes	Yes
	≤ 1200mm	No	No
< 10° (Min 3°)	> 1200mm	Yes	Yes
	≤ 1200mm	No	Yes

- Thermakraft 215 upper sheet lapped over lower sheets (shiplap) to ensure water is shed to the outer face.
  Note: Thermakraft 215 can move downwards. To prevent this, it must be 'Captured' by the fastenings at each purlin. Horizontal fix must not be used on purlin distance greater than 1100mm to allow for 150mm laps.
- Must be laid firmly (tight/taut) without creases. All laps either vertical or horizontal must be a minimum of 150mm lap.
- When underlay support is required, Kingspan recommend using Ausmesh Roof Safety Mesh, Ausnet hexagonal netting or Thermastrap 201.
- Thermakraft 215 can be installed above the battens or purlins for profiled metal roof claddings and otherwise in accordance with NZBC E2/AS1.
- If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice), use Thermakraft Aluband window sealing tape or Thermakraft White General Purpose Tape.
- Thermakraft 215 will provide temporary weather protection during construction, same day coverage recommended. DO NOT over expose the product to the weather or UV for more than 7 days in any roof applications.
- Thermakraft 215 may be unwound to the full length from the gutter to the ridge. However, when ridge ventilation is required Thermakraft 215 may be terminated or slit at the ridge purlin to allow a free passage of air.
- Thermakraft 215 must NOT overhang the gutter line by more than 20 mm, or if eaves flashings are used, terminate on the upper side of the flashing. More details can be found in the NZ Metal Roof and Wall Cladding Code of Practice.
- Flue penetrations must have a minimum distance of 50mm from Thermakraft 215 (refer to NZ Metal Roof and Wall Cladding Code of Practice 10.11.5).
- Thermakraft 215 must be free of tears and punctures, fit tightly and be lap taped around all penetrations (except flue penetrations), to provide drainage for any condensation, or surface water from leaks.

Note: Do not use Aluband on penetrations where Polybutene water pipes have been installed. Refer Pipe Manufacturers for instructions on sealing penetrations.

Concrete/Metal tile roofing

- Thermakraft 215 must be laid over rafters prior to fixing the tile battens. The maximum span between rafters for Thermakraft 215 is 1200mm. Masonry tile roofs must have antiponding boards in accordance with NZBC E2/AS1 Paragraph 8.2.5.
- Installed Thermakraft 215 may be laid over the top of the antiponding boards and draped into the gutter by no more than 20mm. Antiponding boards must be treated in accordance with E2/AS1 8.2.5.
- Do NOT Run Thermakraft 215 longer than 10m in length.

Application Method (Wall)

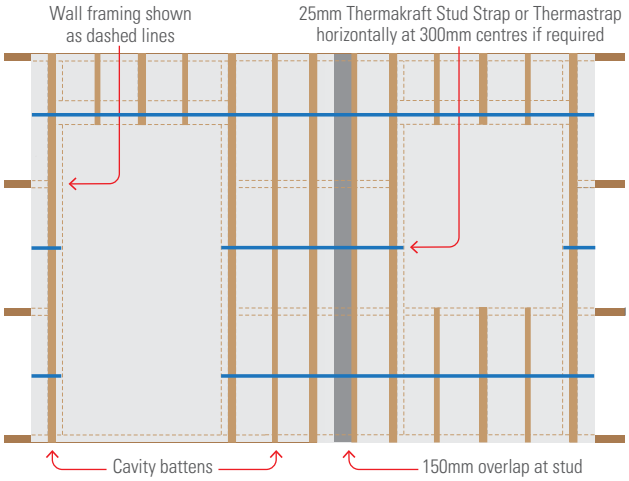
- Fix Thermakraft 215 underlay with the lap line printed side facing the exterior.
- Fix to all exterior walls from below bearers to the top plate. Pull the Thermakraft 215 underlay tight and fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically. Additional fasteners should be used around each opening to be cut out. Fixing types and requirements for steel framed structure can be found in the NZ Metal Roof and Wall Cladding Code of Practice.

Thermakraft 215

Self-supporting bituminous wall and roof underlay

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- When fixing Thermakraft 215 underlay to Steel framing the same procedures applies, use adhesive spray or tape or flat head screws to fasten to the framing or thermal break, the exterior cladding fastenings will act as the permanent fixings.
- Cover all windows and door openings with Thermakraft 215 underlay.
- It is recommended that the Thermakraft 215 underlay is not cut and prepared for window installation until the arrival of the windows. Minimum of 150mm lap is required at joins, all vertical laps must be made over studs. Horizontal laps to be laid ship lap style allowing water to be shed to the outer face of the membrane.
- When windows and doors are ready for installation, the Thermakraft 215 underlay covering the openings should cut at 45° and folded into the opening and securely fastened. Thermakraft window flashing tapes are recommended as the window flashing system.
  Note: In accordance with NZBC Acceptable Solution E2/AS1, wall underlay must be prevented from bulging into the drained cavity. Where stud spacing is greater than 450mm Thermakraft Stud Strap run horizontal at 300 centres is an acceptable means of prevention.
- Once installed, Thermakraft 215 must not be left exposed to the weather or UV for a maximum of 7 days. Thermakraft 215 underlays will provide temporary weather protection during construction allowing work to continue. Internal linings and insulation must not be installed until the exterior cladding is completed.
- Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZS 3604:2011.
- Make good any forced tears with Thermakraft window flashing tapes. Any large areas which require repair may be covered with a second layer of underlay, a lap of 150mm is required.
- Thermakraft 215 underlay must be installed by a licensed building practitioner.



Application Tips

- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in a well ventilated area. Recommended minimum 7 days.

Handling and Storage

Thermakraft 215 underlay must be handled with care to prevent damage such as tearing and roll deformation. Due to the width of the product, care should be taken when installing in windy conditions.

The product must be stored under cover well away from direct moisture, rainfall contact and sunlight (UV). Care should be taken not stack other materials on top of the product.

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Issue 3.0, August 2024



PRODUCT DATA SHEET

Thermakraft™ THERMAKRAFT 215

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Thermakraft™

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as 'Building Paper' Kingspan Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

Thermakraft 215 comes in three roll sizes:

1250mm wide	12m long	15m^2 coverage*
1250mm wide	20m long	25m^2 coverage*
1250mm wide	40m long	50m^2 coverage*

* **Note:** m^2 is the roll size for actual coverage, allow for laps and joins.

Kingspan®

Thermakraft 215

Self-supporting bituminous wall and roof underlay

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Scope of Use (Roof Application)

- Suitable with masonry tile, metal tile and profiled metal roof cladding.
- Can be used on roofs up to and including NZS 3604:2011 'Extra High' wind zones.
- Refer to installation guide regarding underlay support requirements.
- Will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended.

Scope of Use (Wall Application)

- Suitable for use with both timber and steel framing, either direct fix or in conjunction with an 18mm minimum drained cavity.
- Can be used with absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Can be used with masonry veneer in accordance with NZS 3604:2011.
- Suitable for buildings situated in NZS 3604:2011 Building Wind Zones up to and including 'Very High'.
- Thermakraft 215 can be used as an air barrier to reduce wind entry and is highly water resistant.
- Will provide temporary weather protection during construction (maximum 7 day exposure), same day coverage recommended.

General

- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.
- Thermakraft 215 is not subject to a warning or ban under section 26 of the Building Act 2004 when used as per the product scope.

Limitations

- In roof and wall applications must NOT be exposed to the weather or UV for more than 7 days.
- Must NOT be used under translucent sheeting.
- Is not fire retardant.
- Not suitable for School Property, please refer to Ministry of Education: Weathertightness Design Requirements for New School Buildings.
- Recommended NOT to be left exposed in applications such as under unlined canopies, soffits and lean-to designs. Warranty void when used in exposed applications.

Compliance

Thermakraft 215 meets the requirements of NZBC Acceptable Solutions E2/AS1, Table 23 and NZS 2295:2006 for both wall & roof underlay.

Durability

Meets the Performance Requirements of NZBC Clause B2, Durability B2.3.1 (a) 50 years and B2.3.1 (b) 15 years, E2 External Moisture providing:

- It is installed in accordance to Installation Guide.
- Run length is no greater than 10 meters.
- Is not exposed to weather or UV for more than 7 days.
- Is installed by or under guidance of Licensed Building Practitioners.
- Is installed in accordance with the NZ Metal Roof and Wall Cladding Code of Practice.
- Is compatible with the cladding system used.*

* **Note:** roof cladding system compatibility testing must be done first before installation.

Property Performance

The following data represents the minimum pass rates required by the NZBC. This product tests well beyond the minimum standards. If you require actual performance results, please contact your local Kingspan Insulation representative.

NZBC E2/AS1 Roof Underlay Requirements					
NZBC E2/AS1 Table 23 (NZS2295:2006) Roof Underlay Properties	**Absorbency**	**Vapour Resistance**	**pH of Extract**	**Shrinkage**	**Water Resistance**
Property Performance Requirement	≥ 150gsm	≤ 7 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	100mm for 24 hrs
Property Performance	Pass	Pass	Pass	Pass	Pass

Thermakraft 215

Self-supporting bituminous wall and roof underlay

NZS2295:2006 Classification			
NZBC E2/AS1 Table 23 (NZS2295:2006) Roof Underlay Properties	**Flammability Index**	**Wind Zone**	**NZS2295:2006**
Property Performance Requirement	F1 ≤ 5	R2	R2
Property Performance	Non-Fire Retardant	Up to Extra High	Self - Support

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation method to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Ceiling penetrations and entry of warm air into roof cavities.
- Low pitched roof.
- Bulk insulation.
- Building structure's ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer to the NZ Metal Roof and Wall Cladding Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ Metal Roof and Wall Cladding Code of Practice).

Product Warranty

Standard Kingspan Insulation Warranty applies. Refer to Kingspan Insulation Warranty statement for further details. This is available online at **thermakraft.co.nz** or call **0800 806 595.**

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0800 806 595
www.thermakraft.co.nz
Thermakraft and Ausmesh products are brought to you by Kingspan Insulation NZ Limited.

The recommendations contained in Kingspan's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Kingspan (for example quality of workmanship and design), Kingspan shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found online. E&OE.

Issue 8.0, August 2024

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GIB® EzyBrace® Systems

Specification and installation manual



CBI 5113
AUGUST 2016

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NATIONAL SUPPORT

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GIB® HELPLINE

0800 100 442

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Based on learnings derived from the 2011 Canterbury earthquakes GIB EzyBrace® Systems have been updated to offer improved design flexibility and further simplification of the bracing design and build process.

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners[1]
- Encourages more even bracing distribution throughout the building.

[1] Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

- Large hole specification updated to use a more conservative methodology.
- Guidance included for fireplace flues and range hoods.

NEW — GIBFIX® FRAMING SYSTEM

- Reduced potential for fastener pop and joint cracking as a result of timber frame movement.
- Reduced potential for on-site call backs.
- Improved thermal performance.
- Reinforced plasterboard junctions.

BRANZ Appraised
Appraisal No.928 [2016]

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GIB EzyBrace® Systems — August 2016

Winstone Wallboards Ltd accepts no liability if GIB EzyBrace® Systems are not designed and installed in strict accordance with instructions contained in this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication at any time. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Check for the current publication at gib.co.nz/library before using this publication. If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442.

GIB EzyBrace® 2011 software and specification literature remains valid until futher notice.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights reserved.

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 *The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.*

Note 2 *The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.*

Note 3 *Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.*

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Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

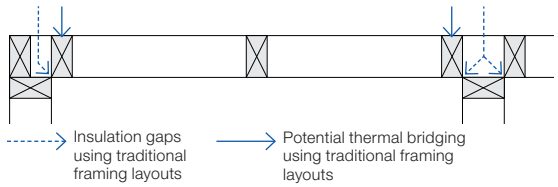
Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

The GIBFix® Framing System can be used in conjunction with GIB EzyBrace® Systems.

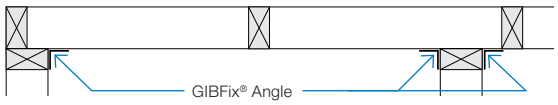
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFIX® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners[1].
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

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Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

It is of prime importance to comply with the details of design, construction and workmanship in this document.

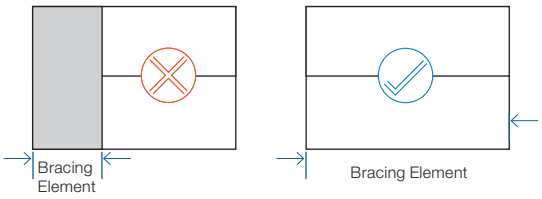
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Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

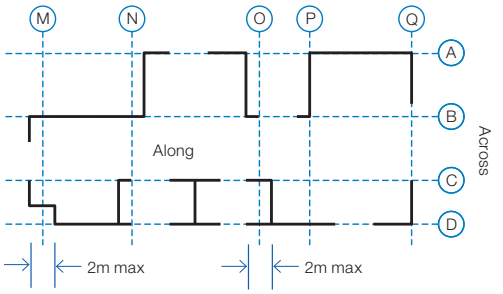
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 ‘rules’ are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- ‘N’ stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)	
Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.

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Bracing demand

GIB EZYBRACE® CALCULATOR

The GIB EzyBrace® calculator is a software tool to determine the wind and earthquake bracing demand and to design the bracing resistance for light timber-framed buildings constructed in accordance with NZS 3604:2011.

The updated GIB EzyBrace® calculator combines an up-to-date user-friendly interface with the latest knowledge relating to the performance of GIB® plasterboard in light timber-framed structures when subjected to high winds or earthquakes. The calculator can be down-loaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

Wind and Earthquake 'Demand' calculates the forces a structure must be able to resist during its 'design life'. The GIB EzyBrace® calculator's Demand sheet determines the number of Bracing Units required depending on building location, building dimensions and materials used. The Demand sheet closely follows the familiar format of our Excel based GIB EzyBrace® calculator, and includes additional features such as a pop-up help facility explaining required input.

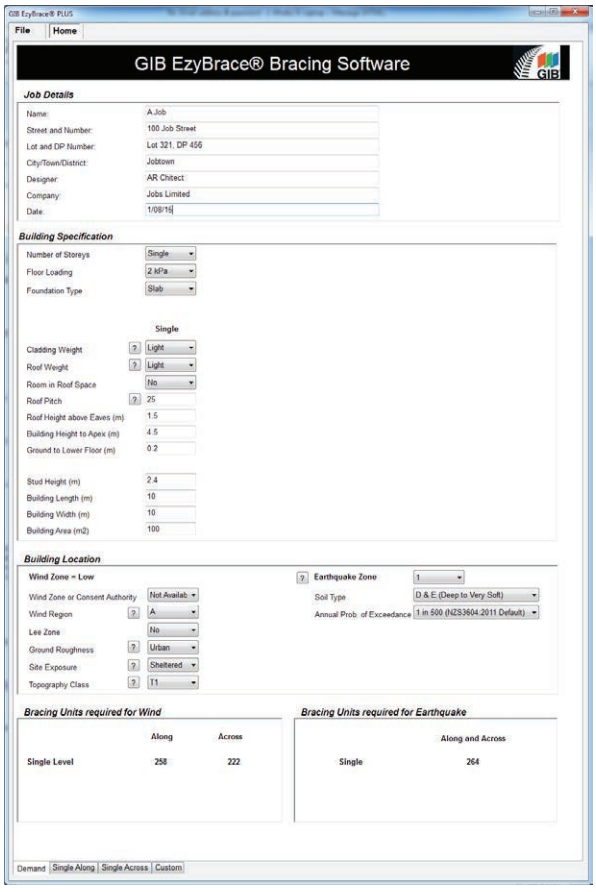
Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

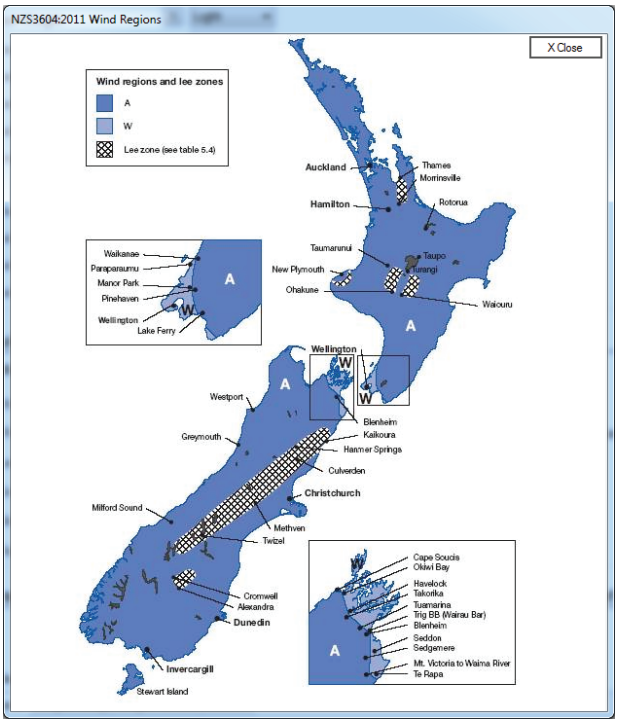
The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design life' of a light timber framed residential structure, a 'return period' of 500 years.

Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

A screen shot of the GIB EzyBrace® 2016 Demand Sheet and Help Facility is shown in figure 5.

FIGURE 5: GIB EZYBRACE® 2016 — DEMAND CALCULATION SHEET AND 'POP UP' HELP FACILITY





Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check. Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

FIGURE 6: GIB EZYBRACE® 2016 — WALL BRACING RESISTANCE CALCULATION SHEET

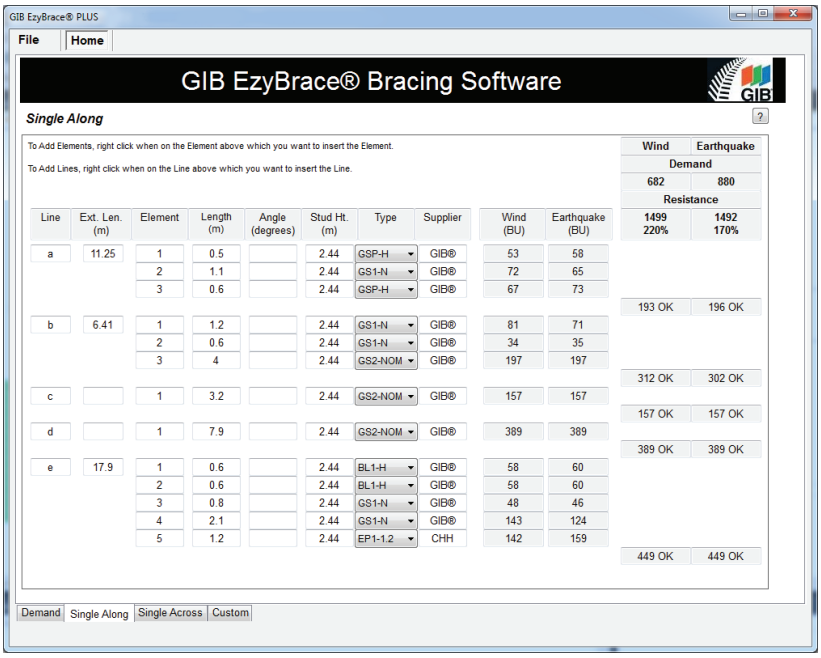
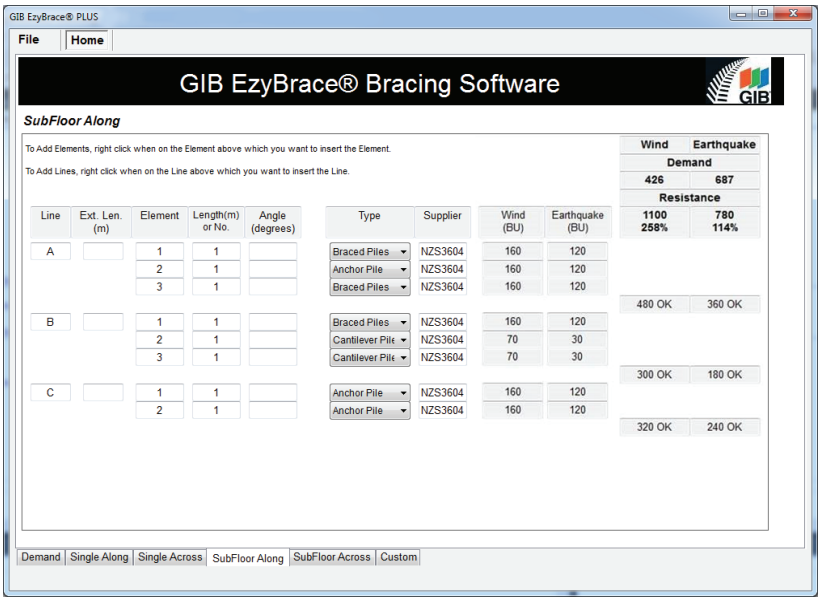


FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET



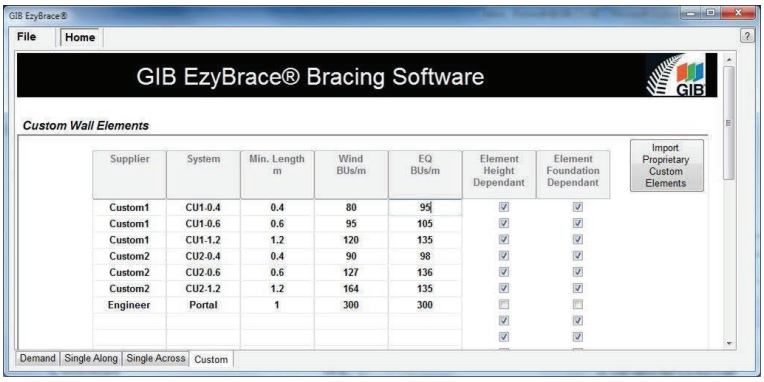
Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET



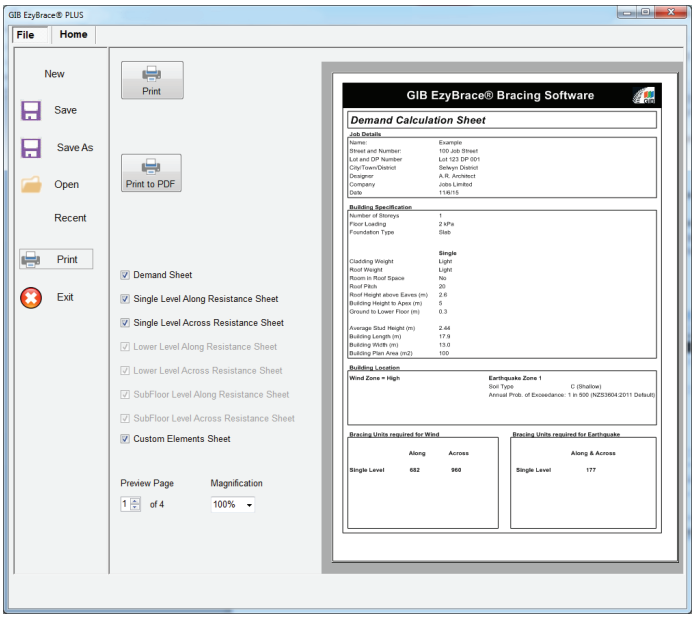
Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.
- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW



Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, 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 and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For futher design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

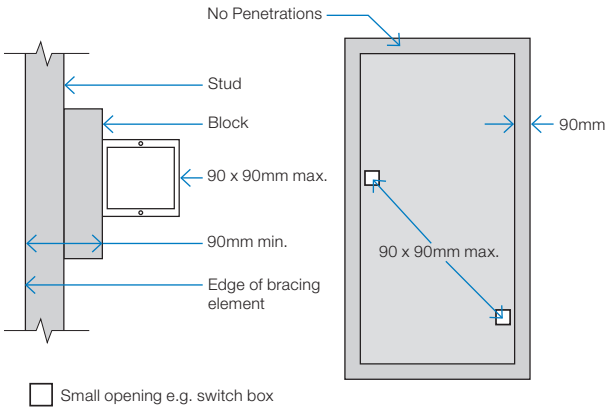
SMALL OPENINGS

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. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

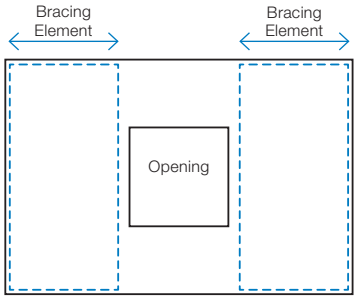
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



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Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

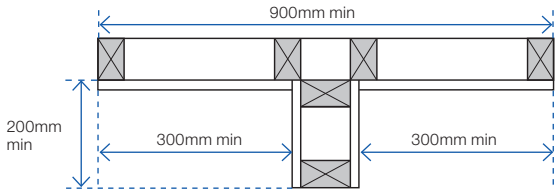
Guidelines for intersection walls

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

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

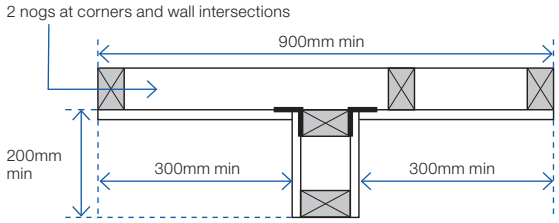
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



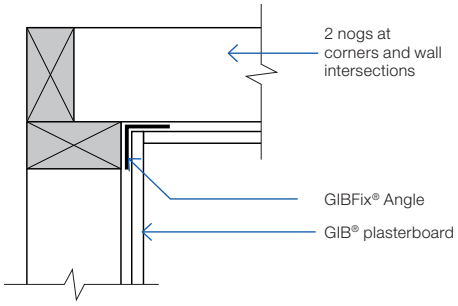
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



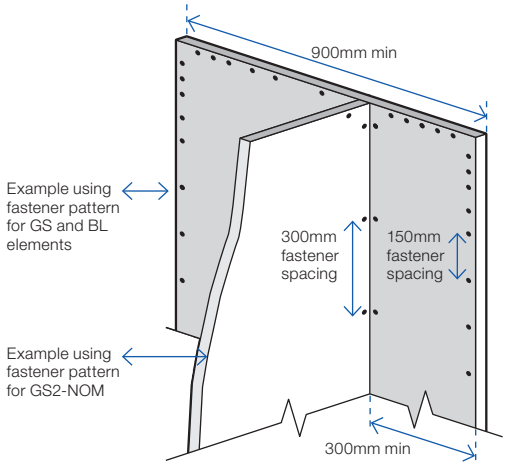
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFIX® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.

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Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR — EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR — INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

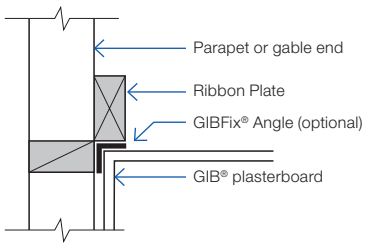
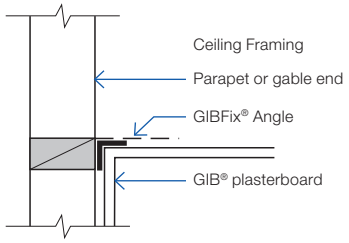


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

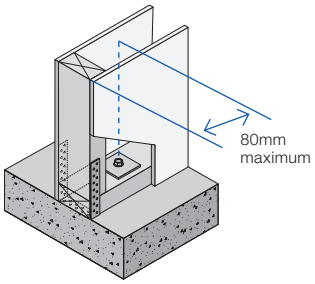
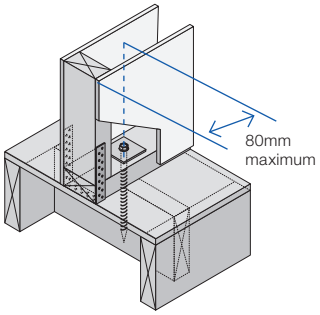
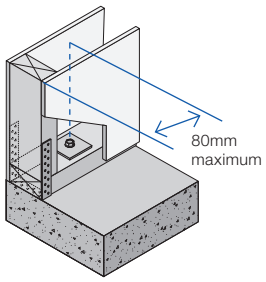
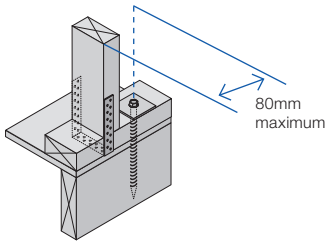
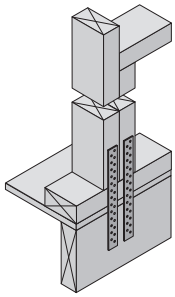
BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	

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Bracing strap installation

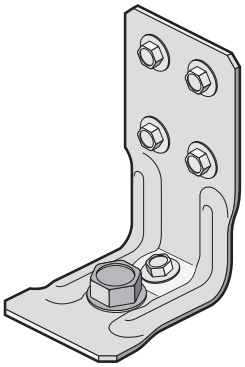
Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor	Timber floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.	
Internal wall	
 GEB004	 GEB005
External wall	
 GEB006	 GEB007
Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.	2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.
	 GEB008

Hold-down fastener requirements	
Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.	12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element

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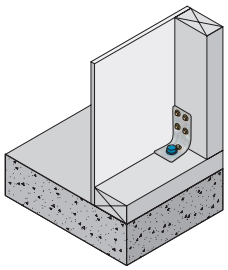
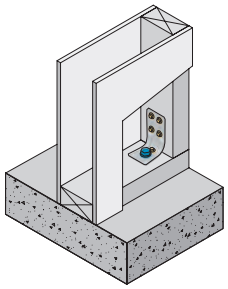
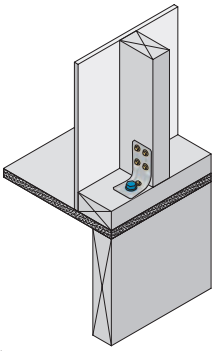
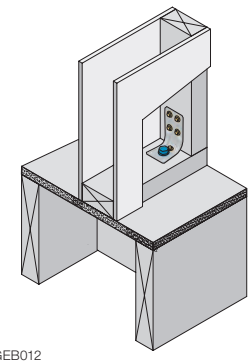
GIB HandiBrac® installation



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

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

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

Concrete floor		Timber floor	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

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GIB HandiBrac® placement with GIBFix® Framing System for concrete floors

Figure 18 shows the preferred positioning of the GIB HandiBrac® panel hold-down brackets within the GIBFix® Framing System layout and where they are required by bracing systems with an 'H' in the specification code.

Note that, in corners and at wall junctions, a single GIB HandiBrac® can serve 'H' type bracing elements in both directions, but additional intermediate concrete anchors may need to be installed to meet the minimum requirements of NZS 3604:2011 for bottom plate fixing.

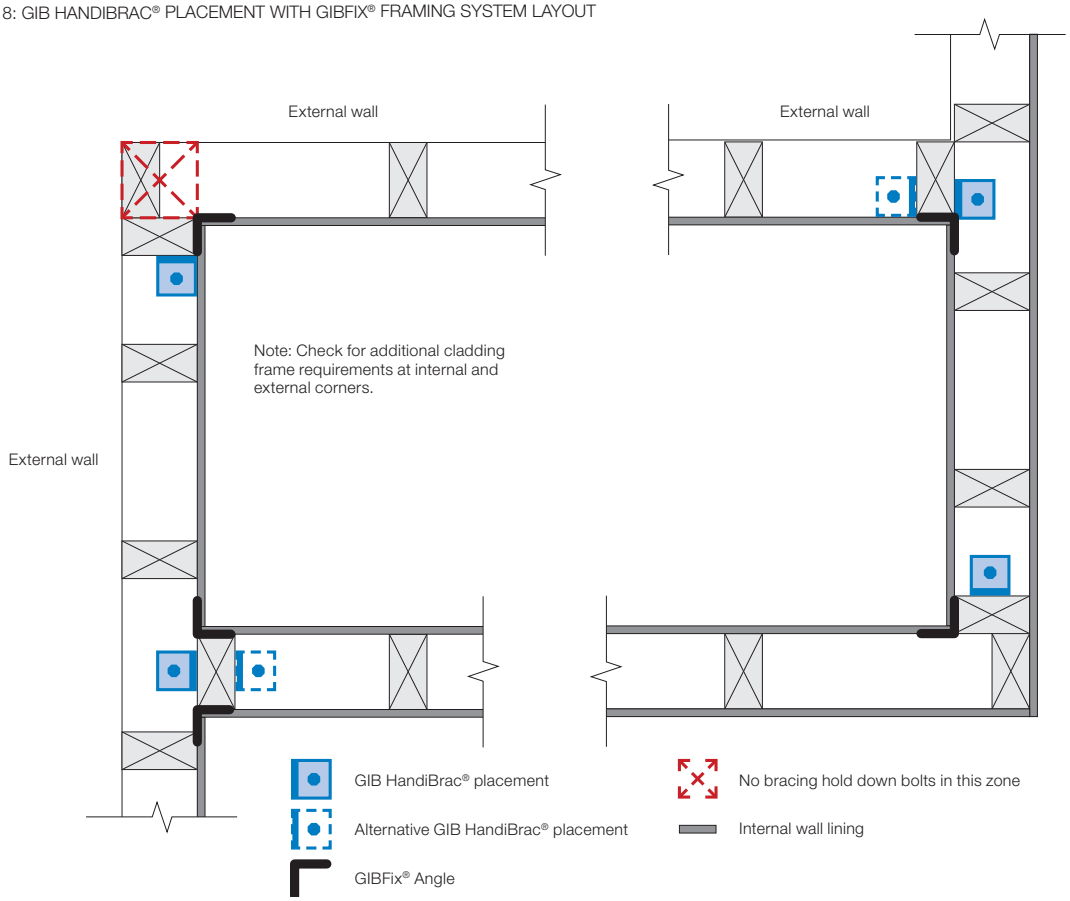
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

For bracing elements with sheet material both sides of the wall connect corner studs using 8/90mm gun nails as shown in figure 19.

TIMBER FLOORS

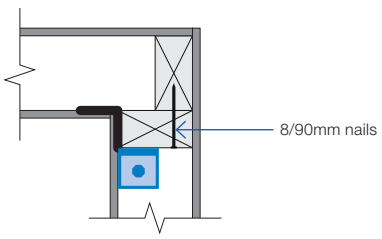
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

FIGURE 18: GIB HANDIBRAC® PLACEMENT WITH GIBFIX® FRAMING SYSTEM LAYOUT



GEB013

FIGURE 19: STUD CONNECTION FOR 'H' TYPE BRACING ELEMENTS WITH SHEET MATERIAL BOTH SIDES



GEB014

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Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, "GIB® Site Guide". All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see "GIB® Site Guide").
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see "GIB® Site Guide" and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

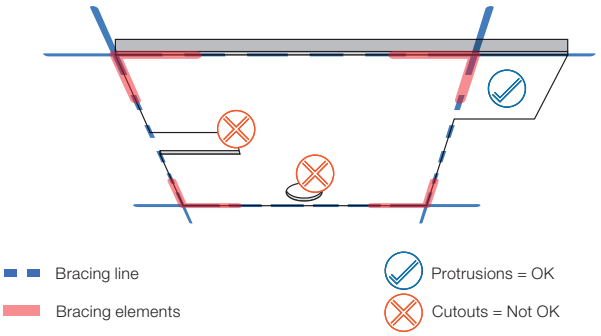


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

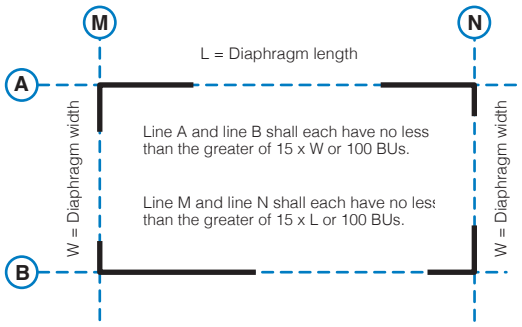
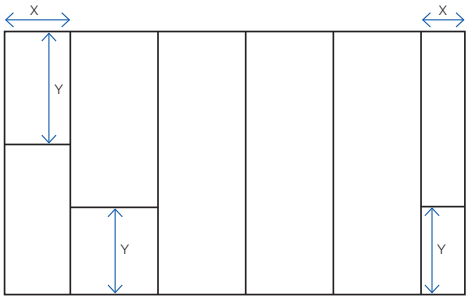


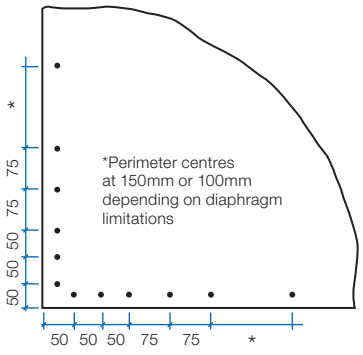
FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm min provided all adjacent joints are back-blocked.

Y = 1800mm min sheet lengths at ends of ceiling diaphragms.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015

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Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:
- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

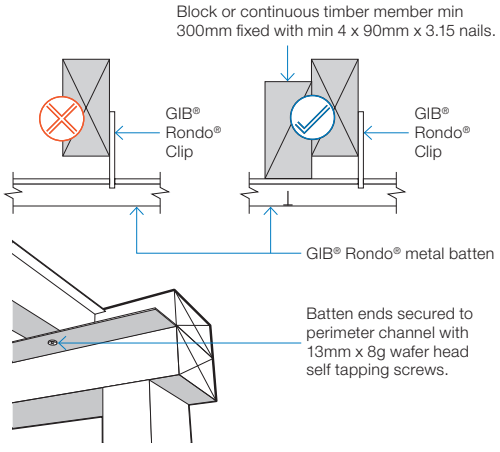
GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

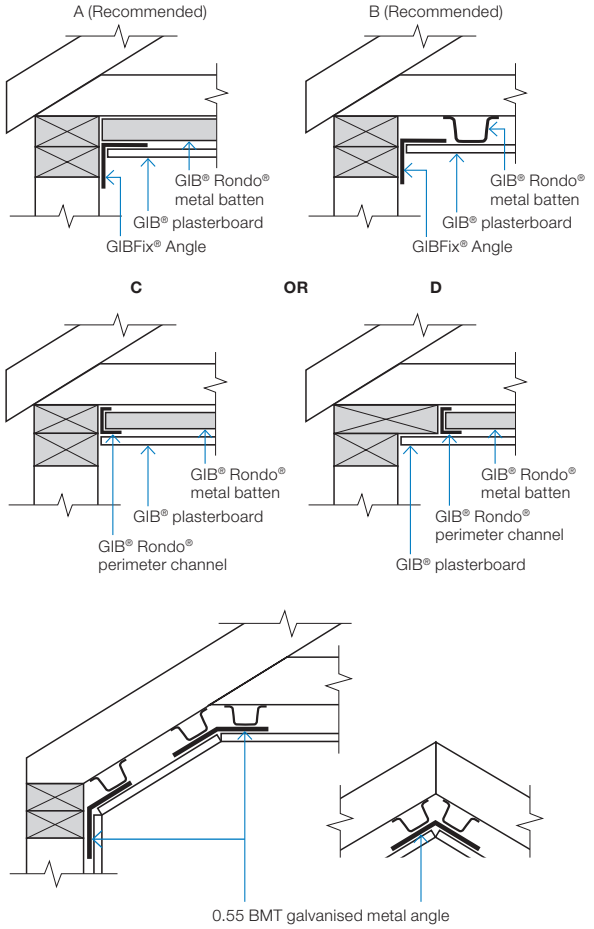
Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



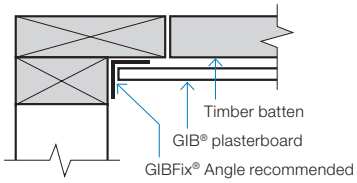
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

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Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed withing the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvansed metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

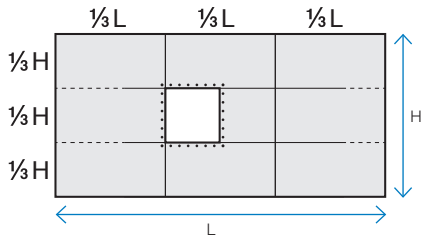
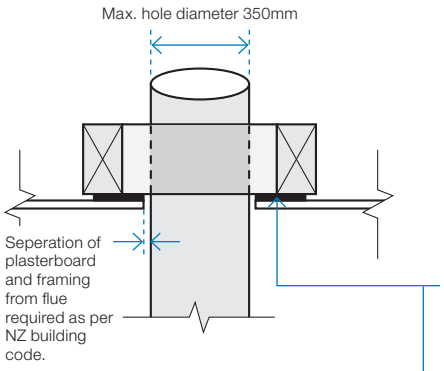
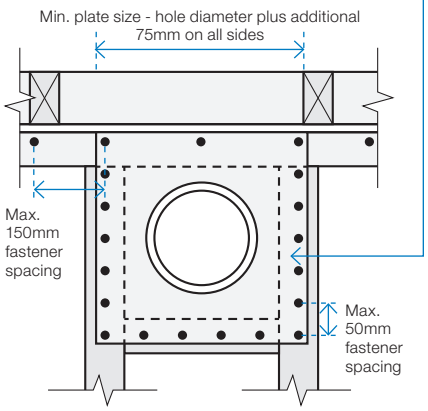


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



Steel plate
0.55 BMT Galvanised sheet Max. opening 350mm diameter. Installed prior to GIB® plasterboard.

Framing
90 x 45mm framing trimmed to provide extra fixing.

GIB® plasterboard ceiling
Installed over the steel plate and into framing using a minimum of 32mm x 6g GIB® Grabber High Thread or 32mm x 7g GIB® Grabber Dual Thread screws at 50mm max centre spacing.

Plasterboard ceiling not shown in plan view

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Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

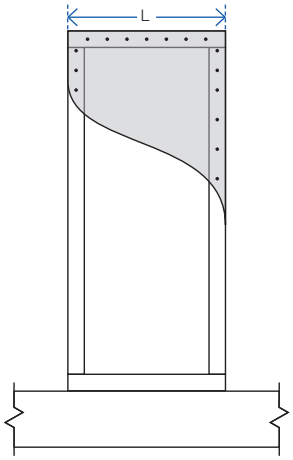
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

The dimension 'L' shall not be less than 400mm.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

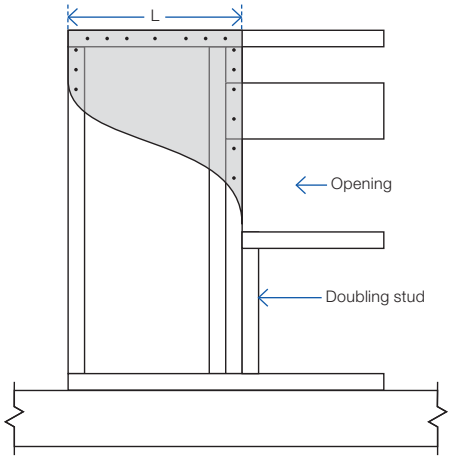
Fastener spacings and diagram scales shown in Figures 29–32 are indicative only. Refer to p.23–30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



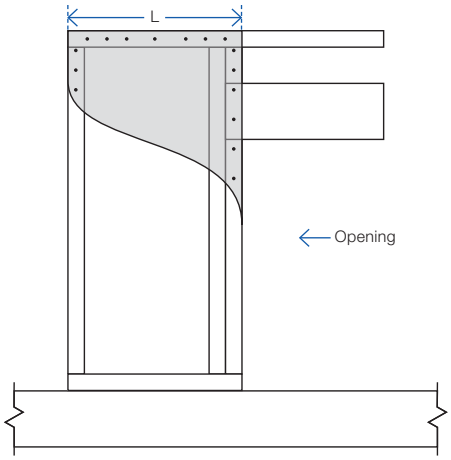
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



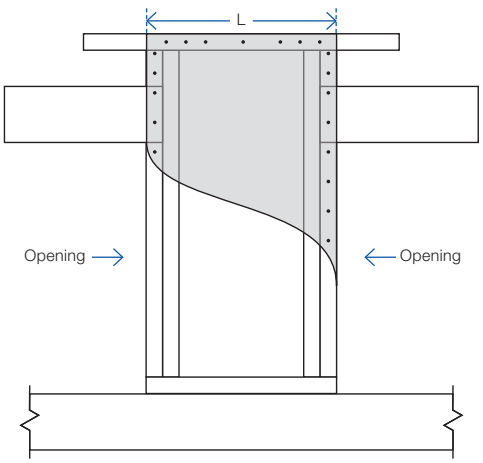
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

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Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

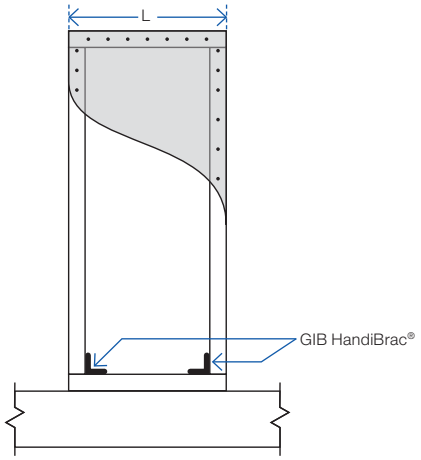
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34-36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB HandiBrac® bolt.

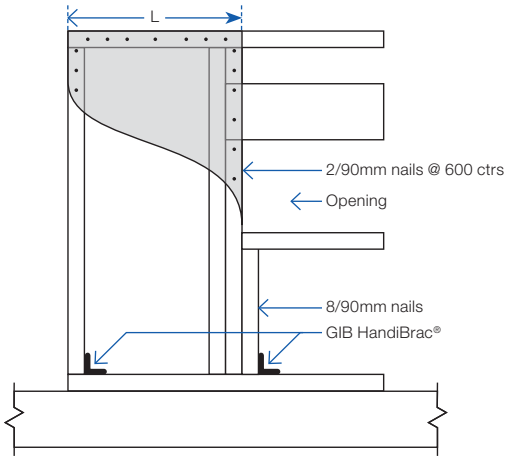
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



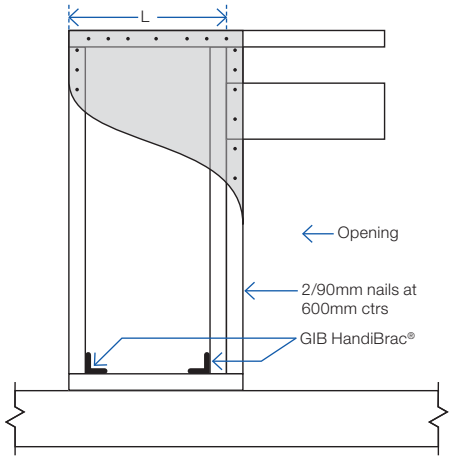
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



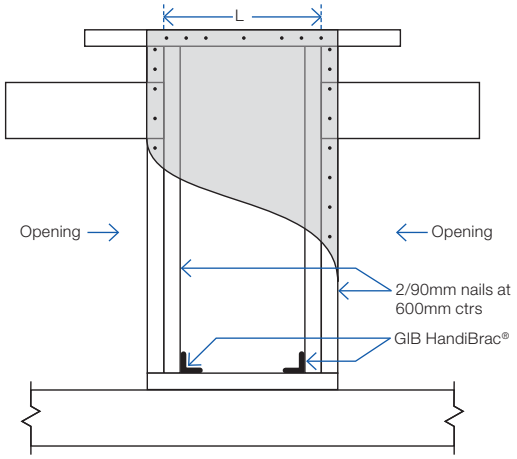
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

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GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

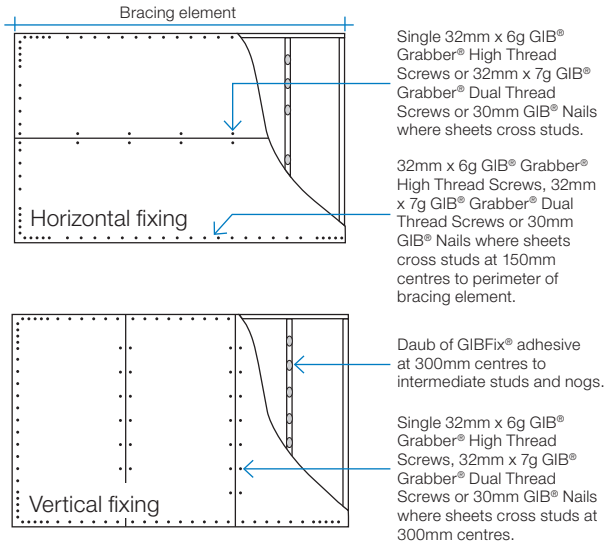
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

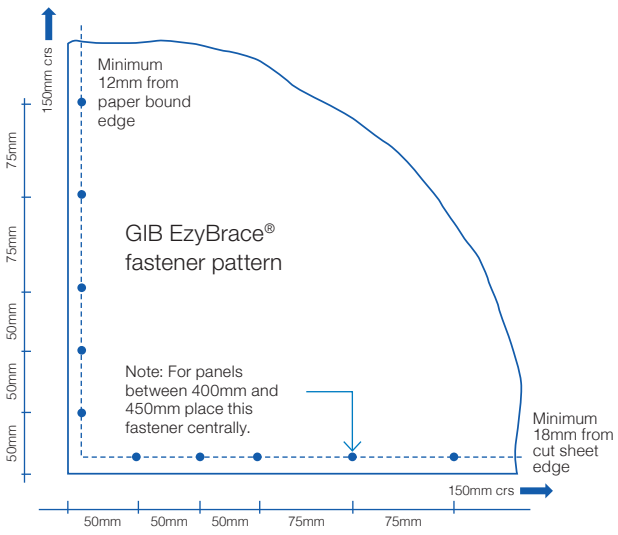
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification GS2-NOM

Specification code	Minimum length (m)	Lining requirement
GS2-NOM	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100mm x 3.75mm nails at 600mm centres; or three power driven 90mm x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75mm x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

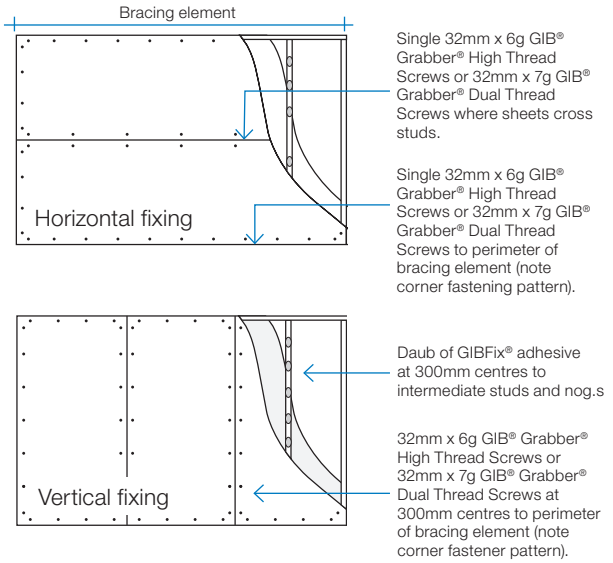
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

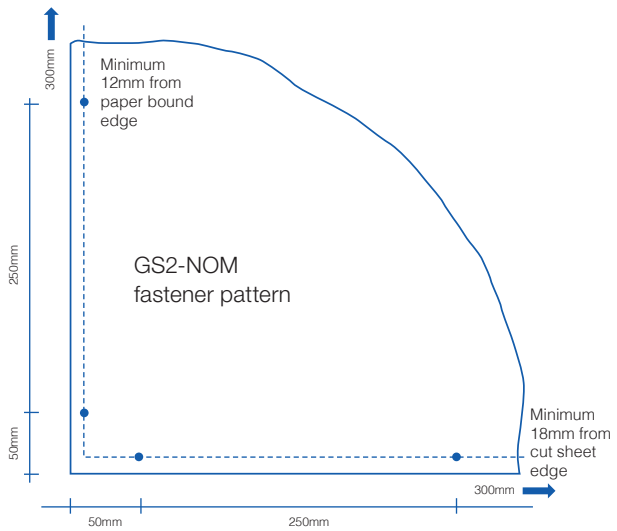
Fastener centres

50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

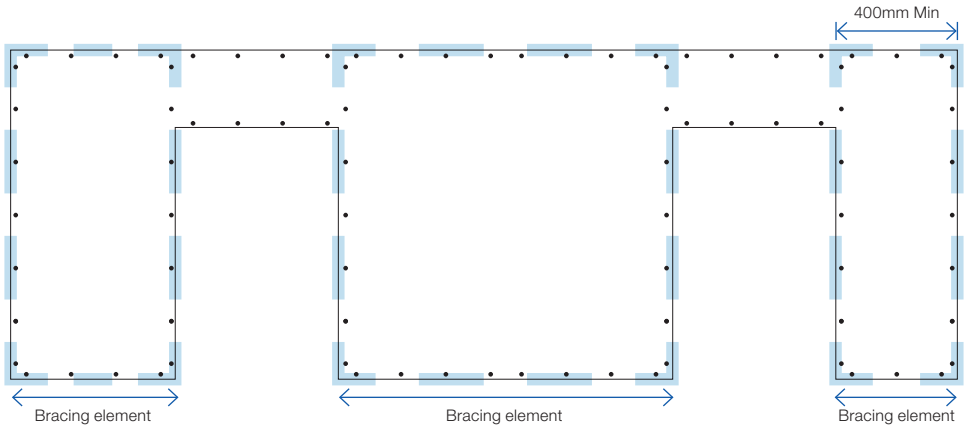
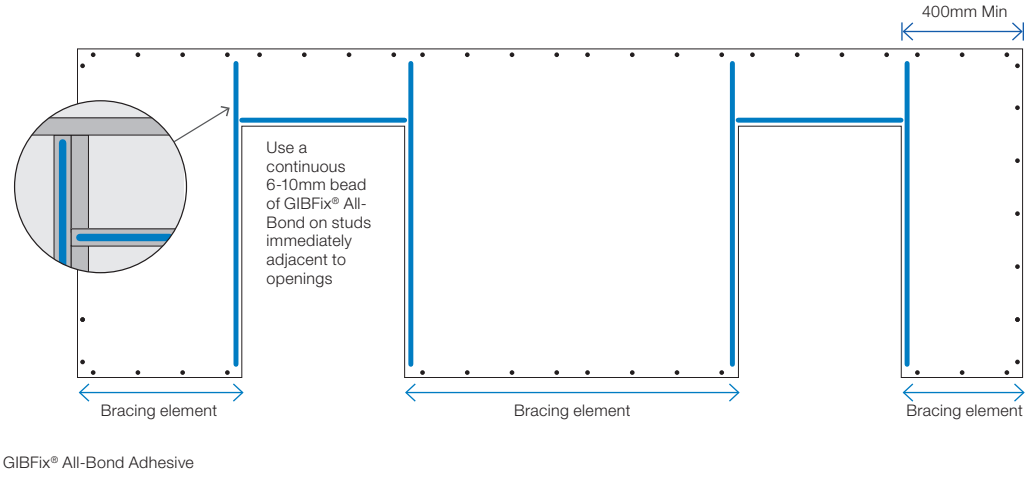
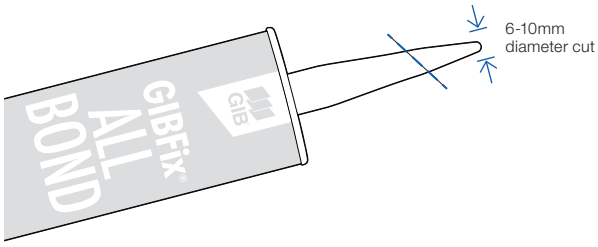


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE



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GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

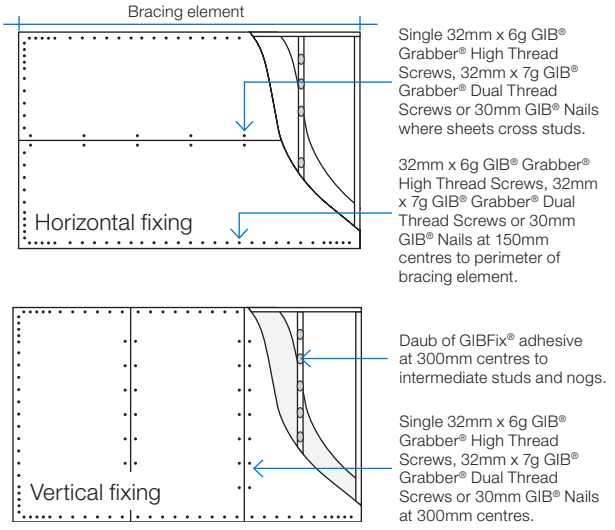
32mm x 6g GIB® Grabber® High Thread Screws,32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

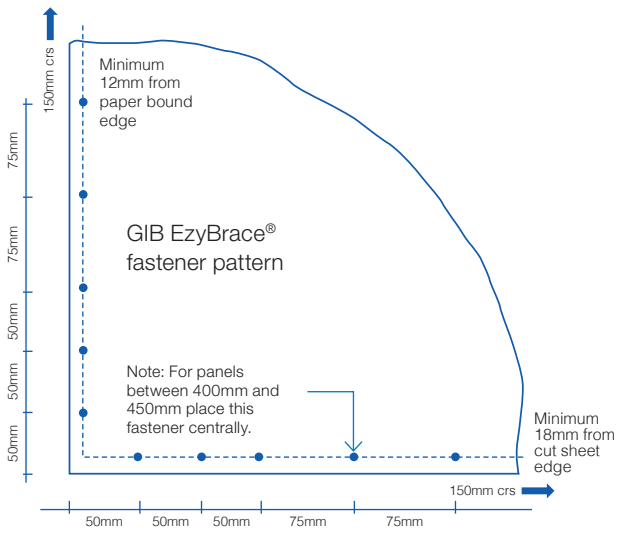
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification GSP-H

Specification Code	Minimum length (m)	Lining requirement	Other requirements
GSP-H	0.4	Any 10mm or 13mm GIB® plasterboard lining to one side of framing and minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally, with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails.

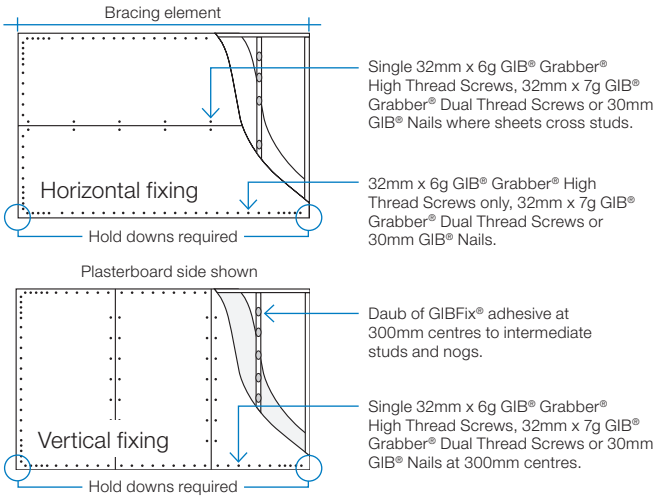
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

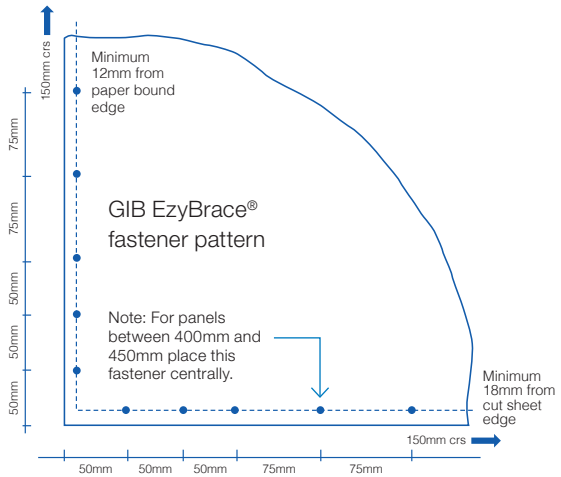
Fastener centres

GIB® plasterboard side: 50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline®
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

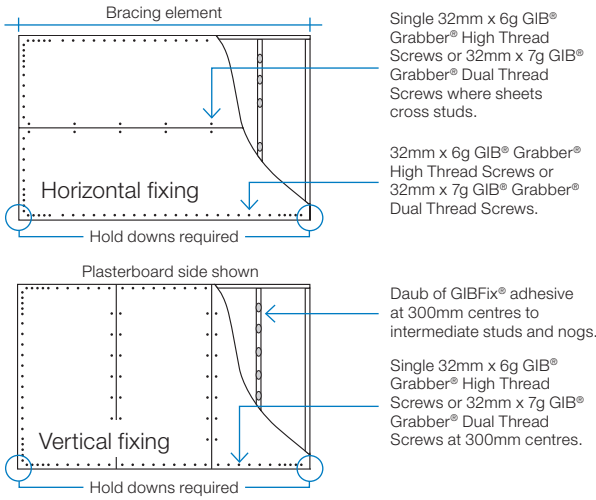
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

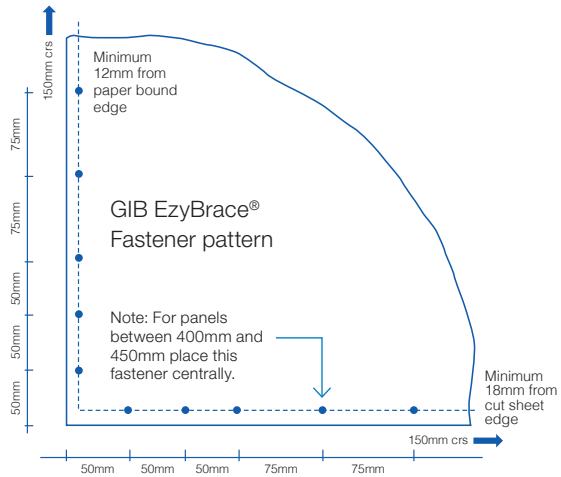
Fastener centres

50,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification BLG-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLG-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus any 10mm or 13mm GIB® plasterboard to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems 2011 or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus any 10mm or 13mm GIB® plasterboard lining to the other side.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws.Other side: 32mm x 6g GIB® Grabber® High Thread Screws, 30mm GIB Nails or 32mm x 7g GIB® Grabber® Dual Thread Screws.

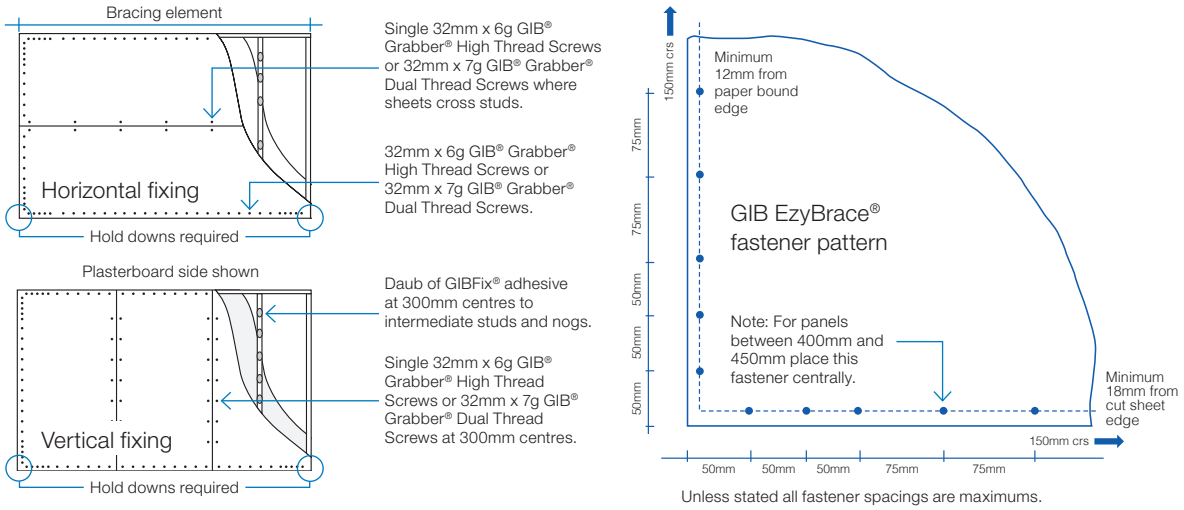
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification BLP-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLP-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

— NZBC B1 — Structure; B1/AS1 Clause 3 Timber (NZS 3604:2011).
— NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB® HandiBrac is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of AS/NZ 2269/0 :2012.

WALL LINING

— A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZS 2269.0 :2012 to the other side.
— Sheets can be fixed vertically or horizontally.
— Plywood is to be fixed vertically with edges supported.
— Sheet joints shall be touch fitted.
— Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

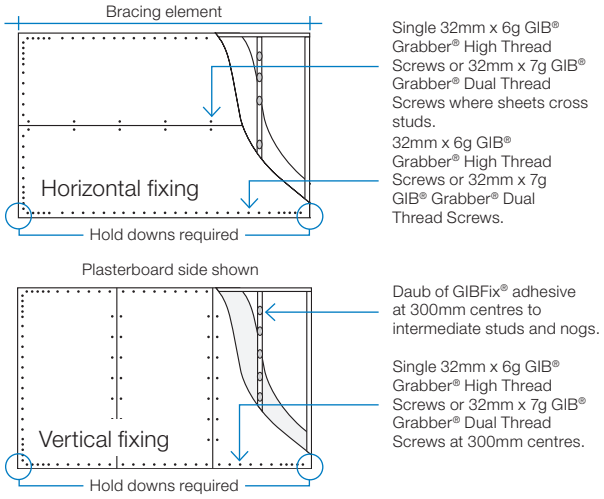
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

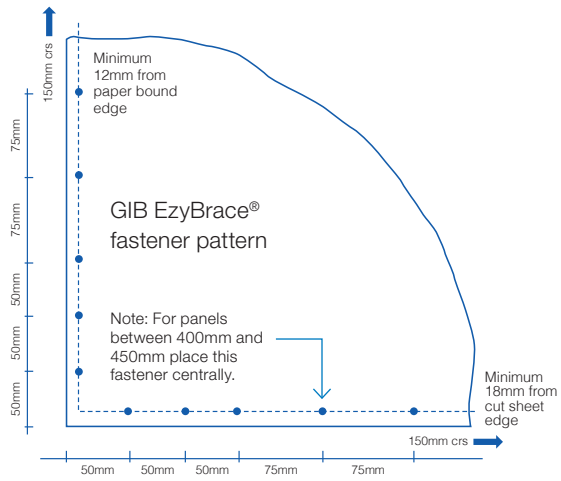
Fastener centres

GIB® Plasterboard side: 50,100,150, 225, 300mm from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERTTM}

The Global GreenTag^{CertTM} certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag.^{CertTM}

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

Declare is a database of non-toxic, sustainably sourced building products.

Many GIB® plasterboard products including GIB® Standard, GIB Braceline®, GIB Noiseline® and GIB Aqualine® have achieved Red List Free status in Declare certification.

For more information on Winstone Wallboards sustainability commitments visit gib.co.nz.

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Winstone Wallboards asserts its moral rights and reserves all other intellectual property rights in the materials contained in this brochure and related to GIBFix® Framing System and GIB EzyBrace® Systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights.

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FOR MORE INFORMATION VISIT

gib.co.nz

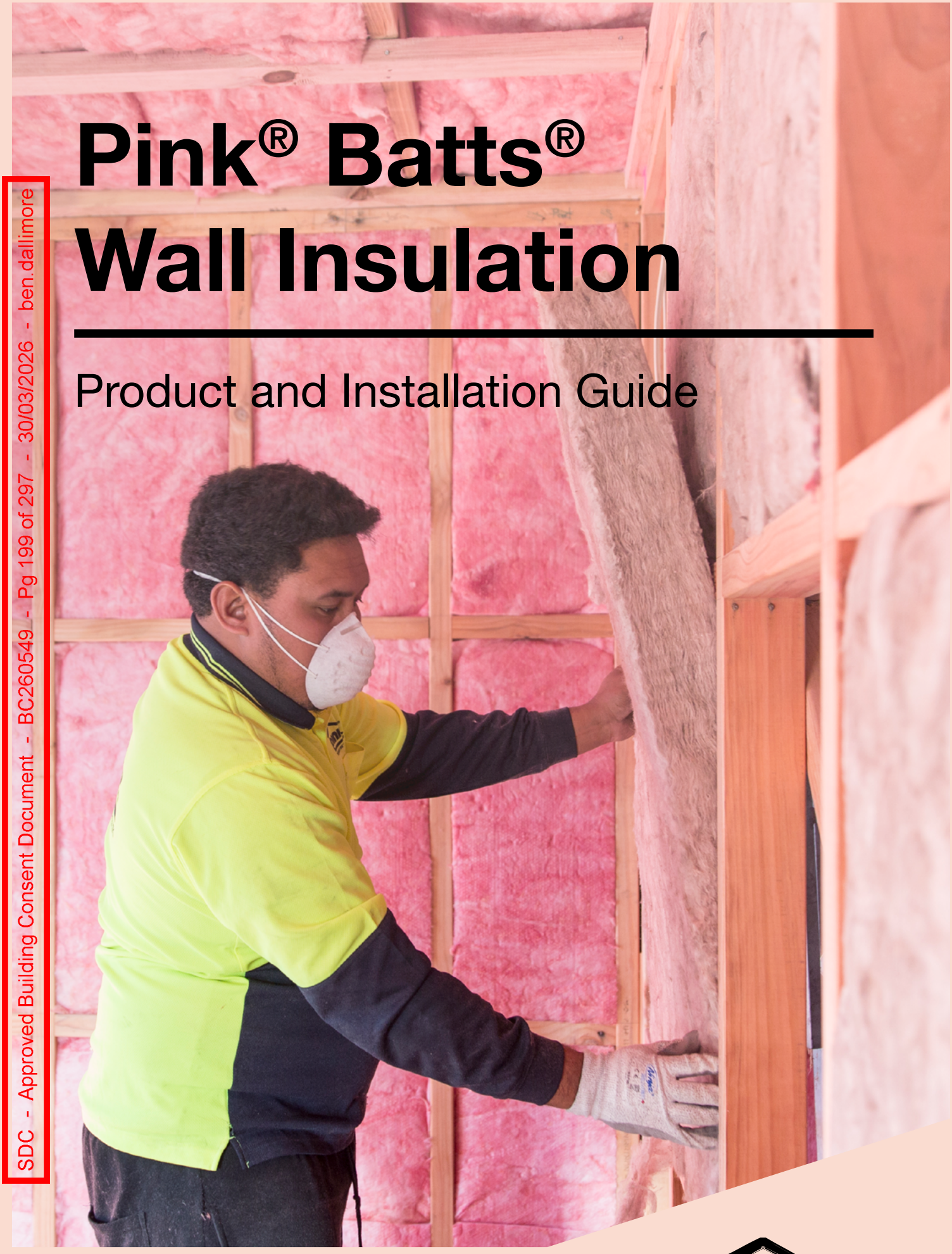
OR CALL THE GIB® HELPLINE

0800 100 442

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Pink® Batts® Wall Insulation

Product and Installation Guide



pink® batts®

BROUGHT TO YOU BY COMFORTECH®

Pink® Batts® Wall Insulation

Product and Installation Guide

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Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
WALL – ACOUSTIC INSULATION									
Pink® Batts® Silencer® 100mm	7317001	1140 x 560	100	12.8	14.9	20	-	✓	x
Pink® Batts® Silencer® 75mm	7317003	1140 x 560	75	16.6	19.5	26	-	✓	x
WALL – THERMAL INSULATION									
INTERIOR SECONDARY INSULATION LAYER - 530mm WIDTH									
R1.0 Pink® Batts® Ultra® Interior Wall	7160271	1220 x 530	35	16.8	18.9	26	✓	✓	238
R1.3 Pink® Batts® Ultra® Interior Wall	7160272	1220 x 530	45	12.9	14.5	20	✓	✓	238
MASONRY WALL - 580mm WIDTH									
R1.0 Pink® Batts® Masonry Wall	7160110	1220 x 580	40	21.2	-	30	✓	✓	238
R1.2 Pink® Batts® Masonry Wall	7160134	1220 x 580	50	17.0	-	24	✓	✓	238
70mm WALL RANGE - 560mm WIDTH									
R.2.2 Pink® Batts® 70mm Wall	7160248	1140 x 560	70	6.4	7.5	10	✓	✓	238
STEEL WALL - 610mm WIDTH									
R2.2 Pink® Batts® Steel Wall	7160214	1220 x 610	90	15.6	15.6	21	✓	✓	238
R2.6 Pink® Batts® Ultra® Steel Wall	7160215	1220 x 610	90	9.7	9.7	13	✓	✓	238
R2.8 Pink® Batts® Ultra® Steel Wall	7160267	1220 x 610	90	6.7	6.7	9	✓	✓	238
90mm WALL RANGE - STANDARD 560mm WIDTH									
R1.8 Pink® Batts® Wall	7127118	1140 x 560	90	16.6	19.6	26	✓	✓	238
R2.2 Pink® Batts® Wall	7127122	1140 x 560	90	13.4	15.8	21	✓	✓	238
R2.4 Pink® Batts® Wall	7127124	1140 x 560	90	10.2	12.1	16	✓	✓	238
R2.6 Pink® Batts® Ultra® Wall	7127126	1140 x 560	90	9.6	11.3	15	✓	✓	238
R2.6 Pink® Batts® Ultra® Wall (OC)	718226	1140 x 560	90	9.6	11.3	15			238
R2.8 Pink® Batts® Ultra® Wall	7127128	1140 x 560	90	6.4	7.5	10	✓	✓	238
R2.8 Pink® Batts® Ultra® Wall (OC)	718228	1140 x 560	90	6.4	7.5	10			238

* Square metre coverage per bale are estimates and actual coverage may differ.

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Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
90mm WALL RANGE - NARROW WALL 360mm WIDTH									
R2.2 Pink® Batts® Narrow Wall	7160243	1140 x 360	90	9.0	11.2	22	✓	✓	238
R2.6 Pink® Batts® Ultra® Narrow Wall	7160244	1140 x 360	90	7.4	9.2	18	✓	✓	238
R2.8 Pink® Batts® Ultra® Narrow Wall	7160247	1140 x 360	90	4.5	5.6	11	✓	✓	238
140mm WALL RANGE - STANDARD 560mm WIDTH									
R3.2 Pink® Batts® Ultra® 140mm Wall	7127132	1140 x 560	140	9.6	11.3	15	✓	✓	238
R3.6 Pink® Batts® Ultra® 140mm Wall	7127136	1140 x 560	140	7.0	8.3	11	✓	✓	238
R4.0 Pink® Batts® Ultra® 140mm Wall	7127140	1140 x 560	140	5.1	6	8	✓	✓	238
R4.3 Pink® Batts® Ultra® 140mm Wall	7127143	1140 x 560	140	3.2	3.8	5	✓	✓	238
140mm WALL RANGE - NARROW WALL 360mm WIDTH									
R3.2 Pink® Batts® Ultra® 140mm Narrow Wall	7160245	1140 x 360	140	7.0	8.6	17	✓	✓	238
R3.6 Pink® Batts® Ultra® 140mm Narrow Wall	7160273	1140 x 360	140	5.7	7.1	14	✓	✓	238
R4.0 Pink® Batts® Ultra® 140mm Narrow Wall	7160246	1140 x 360	140	4.1	5	10	✓	✓	238
R4.3 Pink® Batts® Ultra® 140mm Narrow Wall	7160262	1140 x 360	140	2.9	3.6	7	✓	✓	238

* Square metre coverage per bale are estimates and actual coverage may differ.

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Application

Pink® Batts® wall insulation is a lightweight flexible glass wool insulation product designed to:

- Thermally insulate timber and steel framed walls
- Fit easily into standard wall constructions, or be easily cut to fit in non-standard constructions
- Meet the requirements of the New Zealand Building Code (NZBC) for different designs and environments

Features and Benefits

- High R-values – R-values up to R4.3 to assist in keeping homes above 18°C as per the World Health Organization's recommendation for a healthy and comfortable home
- Easy to install – lightweight, flexible and simple design makes the installation fast and easy
- Internationally certified for Indoor Air Quality – gives assurance that products meet strict chemical emissions limits
- Non-combustible – will not easily burn in the event of a fire
- Made from recycled glass making sustainable use of waste



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Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using recycled glass, making sustainable use of waste
- Energy used during the manufacture of Pink® Batts® products is offset by the energy saved by a home fully insulated with Pink® Batts® products within 3-15 months[1]

Green Star NZ Credits

Green Star is a comprehensive environmental rating system for buildings; materials with certain attributes can receive points that contribute to the overall score of a rated home.

New Zealand Green Building Council (NZGBC) does not test or certify products; they rely on the work done by third party certification bodies and eco labels like Eco Choice Aotearoa. Further information is available at **nzgbc.org.nz**.

Eco Choice Aotearoa

All NZ-made Pink® Batts® Wall insulation products have Eco Choice Aotearoa Accreditation (refer to the Product Specifications)

Independently assessed for:

- **Waste Minimisation:** Recycled content, and recycling of process waste
- **Energy Management:** Effective energy management policies and procedures
- **Manufacturing Process:** Not manufactured using blowing agents with a Global Warming Potential (GWP) or Ozone Depleting Potential (ODP)
- **Product Characteristics:** Durability and performance

Eco Choice Aotearoa
Licence No 2504017

While only BRANZ appraised products are eligible for Eco Choice Aotearoa, all Pink® Batts® thermal insulation products are manufactured in the same environmentally considerate way.

1 (Beca Carter Hollings & Ferner Ltd, Energy Economics of Fibreglass Insulation, 2005)

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Health and Safety

Product Safety

Pink® Batts® insulation is a non-hazardous, safe product.

- IARC (International Agency for Research on Cancer) classifies the glass wool formulation used to manufacture Pink® Batts® products as Group 3: 'Not classifiable as to its carcinogenicity to humans'. This is the same classification as caffeine, tea, hair colouring, chlorinated drinking water and saccharin
- Pink® Batts® insulation is bio-soluble. In the unlikely event any fibres are inhaled into the lungs they will dissolve in the body fluids and be cleared from the body

Indoor Air Quality

- Pink® Batts® insulation is certified under the GREENGUARD Certification Program. Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and formaldehyde), to help create healthier indoor environments

General Health

- Pink® Batts® insulation will assist in meeting the World Health Organisation recommendation for houses to be maintained at a minimum temperature of 18ºC to provide a healthy and comfortable home
- A Wellington School of Medicine study found insulated houses resulted in families with fewer sick days and the economic benefit was double the initial cost of the insulation[2]

2 Howden-Chapman, P. et al. "Effect of insulating existing houses on health inequality: cluster randomised study in the community" British Medical Journal, 2007, p334:460

Technical Data

Properties	Result		Test/Method/Standard	Test Results
Combustibility	Non-Combustible	✓	AS/NZS 1530.1:1994	Group Number 1S
Early Fire Hazards		✓	AS/NZS 1530.3:1993 - Ignitability (Range 0-20) - Spread of Flame Index (Range 0-10) - Heat Evolved Index (Range 0-10) - Smoke Developed Index (Range 0-10)	 = 0 = 0 = 0 = 0-1
R-value	Various*	✓	AS/NZS 4859.1:2018	
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Vermin Resistance	No Food Source	✓	AS/NZS 4859.1:2018-Glass wool exempt	

* Stated thicknesses are values at which stated R-values are achieved and are likely to be minimum values. See table on Page 1.

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New Zealand Building Code (NZBC) and Limitations

Pink® Batts® wall insulation when used, installed and maintained in accordance with the requirements outlined in this datasheet, will meet or contribute to meeting the following provisions of the NZBC:

NZBC Clause B2: Durability
Meets the requirement NZBC B2.3.1 a) 50 years and NZBC B2.3.1 b) 15 years

NZBC Clause E3: Internal Moisture
Contributes to meeting these requirements

NZBC Clause F2: Hazardous Building Materials
Meets this requirement and will not present a health hazard to people

NZBC Clause H1: Energy Efficiency
Contributes to meeting this requirement

Limitations

To meet the provisions of the NZBC as outlined in this datasheet, Pink® Batts® wall insulation MUST be:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2016: Energy Efficiency-Installing bulk thermal Insulation in Residential Buildings

Pink® Batts® wall insulation should NOT be crushed, folded or compressed.

Acoustic Properties

Pink® Batts® insulation will assist with noise control, however penetrations in walls will transmit sound readily.
Superior noise control can be achieved by using Pink® Batts® insulation products in conjunction with good acoustic design.

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Installation Instructions

Correct installation with no compression, gaps or folds is critical to ensure Pink® Batts® wall insulation performance is not compromised.

Safety

Each installation is unique so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of other sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work

Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016

For your local PinkFit® installer call **0800 746 534** or visit **pinkbatts.co.nz/installing-pink-batts/**



Pink® Batts® Wall Insulation
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Installation:

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)

For an efficient installation, the following tools are recommended:

- Stable working platform
- Knife
- Tape measure

To ensure Pink® Batts® wall insulation performance isn't compromised, use only wall products for installing in wall applications.

- Ensure the product and all cavities are dry
- If cutting is required, cut oversize by 5 mm to ensure a good friction fit
- Ensure there are no gaps, folds or compression of the product to achieve optimal performance
- Fill gaps around windows and doors with off-cuts
- Follow the manufacturer's instructions for minimum clearances from hot inbuilt appliances. If they are unknown, refer to NZS 4246:2016
- Do not cover vents. Insulate around vents to allow unhindered ventilation
- Fit Pink® Batts® insulation tight and close around electrical cables and pipes. It's important to minimise compression, gaps and folds in the insulation. For electrical cables and small diameter pipes, partially cut insulation and place around the cables and pipes
- In new construction, it is recommended that Pink® Batts® insulation is installed once the cladding system is completely installed.

Tip: To verify Building Code Compliance, staple a product label and installer information at an easy to find location away from any hot items such as downlights or water cylinders. An alternative is to supply the information to the building owner or authorised person.

Refer to NZS 4246:2016 for further information related to the correct installation of insulation and clearances.

Pink® Batts® Wall Insulation
Product and Installation Guide

Retrofitting insulation in external walls without wall underlay/or in poor condition:

a) Direct Fixed Cladding

- The insulation can be the same thickness as the frame.
- A recent BRANZ study found that the most reliable mitigation measure for retrofitting insulation to an existing cavity is to include a drainage plane mesh, combined with a synthetic underlay, between the mesh and retrofitted insulation. The most effective way to protect the bottom plate was a strip of kraft paper tucked into the gap between the framing and the back of the cladding. Therefore, prior to installing the insulation, our recommendation is to fit an underlay with a water-repellent drainage plane mesh (Dupont Tyvek Metal) into the back of the cavity cut to the size of the opening and use the whole framing cavity. For further information please refer to Build 199 – 49 (Dec/Jan 2024).

BRANZ further advise that, since some existing framing is only 95mm depth (or occasionally 90mm depth), the specific insulation product needs to be chosen to match the framing depth and the installation process. For example, with a 90mm frame depth a suitable product would need to have a thickness of 83mm or less to allow the lining to be correctly installed. We don't currently manufacture a 83mm thickness product. Therefore, for a 90mm frame Pink® Batts® R2.2 70mm product should be used.

b) Drained Cavity

- The insulation can be the same thickness as the frame.
- The use of horizontal strapping is recommended or fit an underlay with a water-repellent drainage plane mesh (Dupont Tyvek Metal) into the back of the cavity cut to the size of the opening and use the whole framing cavity.

Unlined. Walls in Roof Cavities

- Pink® Batts® Wall should be secured in place by using horizontal strapping (max spacing of 300mm)

Pink® Batts® Masonry Wall Insulation

- It is recommended that an absorbent building paper or a waterproof membrane is placed between the insulation and the concrete. This is not intended to replace the DPC which must still be fixed between strapping and masonry.

CAUTION: Electrical cables and equipment installed prior 1989 may overheat and fail when partially or completely covered with bulk thermal insulation.

Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store undercover in clean, dry conditions. The installed product should remain dry at all times. If the product becomes wet or damp, the source of dampness (e.g. leak in building) should be repaired and any wet or damp insulation should be removed and replaced with new insulation of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® insulation.
For further details download the relevant product data sheet from pinkbatts.co.nz

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PREFERRED PINK® BATTS® INSTALLERS

BRANZ Appraised
Appraisal No. 238

Eco Choice Aotearoa
Licence No 2504017

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

GREENGUARD

Comfortech Building Performance Solutions® Certified QMS

Telarc. Registered
Quality
ISO 9001
ISO 45001
ISO 14001

pinkbatts.co.nz **0800 746 522**

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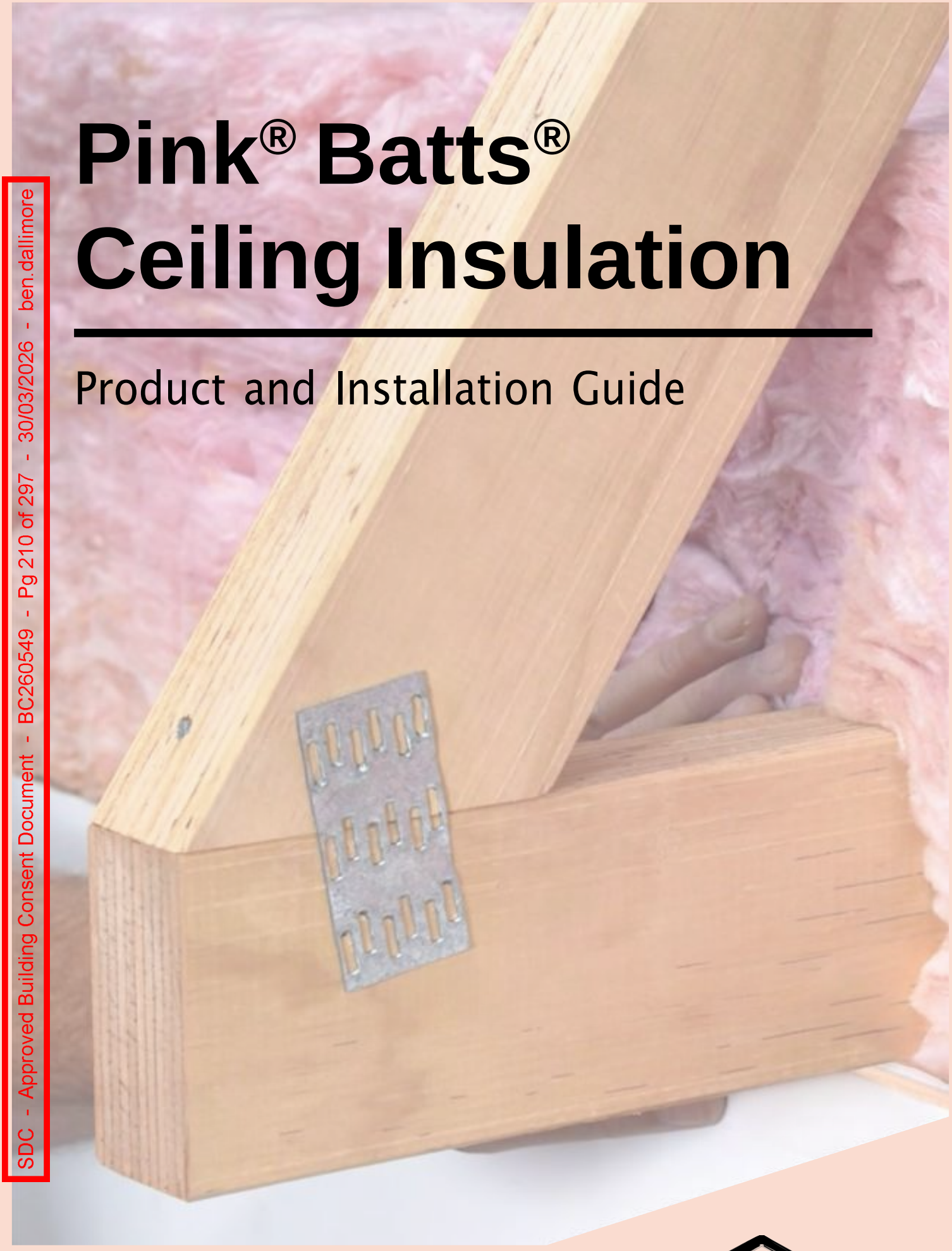
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April 2025

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Pink® Batts® Ceiling Insulation

Product and Installation Guide



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Pink® Batts® Ceiling Insulation
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Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
ROOF – THERMAL INSULATION									
432mm WIDTH RANGE									
R1.8 Pink® Batts® Ceiling	7110118	1220 x 432	95	13.7	14.4	26	✓	✓	238
R2.2 Pink® Batts® Ceiling	7110122	1220 x 432	115	12.6	13.3	24	✓	✓	238
R2.6 Pink® Batts® Ceiling	7110126	1220 x 432	140	10.5	11.1	20	✓	✓	238
R3.2 Pink® Batts® Ceiling	7110132	1220 x 432	170	8.4	8.8	16	✓	✓	238
R3.6 Pink® Batts® Ceiling	7110136	1220 x 432	180	7.4	7.7	14	✓	✓	238
R4.0 Pink® Batts® Ceiling	7110140	1220 x 432	195	6.3	6.6	12	✓	✓	238
460mm WIDTH RANGE									
R4.5 Pink® Superbatts® Ceiling	7113145	1220 x 460	210	5.6	5.5	10	✓	✓	238
R5.0 Pink® Superbatts® Ceiling	7113150	1220 x 460	225	4.5	4.4	8	✓	✓	238
R6.0 Pink® Superbatts® Ceiling	7113160	1220 x 460	245	3.9	3.8	7	✓	✓	238
R7.0 Pink® Superbatts® Ceiling	7113170	1220 x 460	275	3.4	3.3	6	✓	✓	238
ROOF – DOUBLE LAYER SOLUTION - FIRST LAYER THERMAL INSULATION									
R2.6 Pink® Batts® 110mm Ceiling	7160266	1220 x 432	110	9.5	10	18	✓	✓	238
R3.0 Pink® Batts® 160mm Ceiling	7160265	1220 x 432	160	8.4	8.9	16	✓	✓	238
ROOF – SKILLION THERMAL INSULATION									
SKILLION 432mm WIDTH RANGE									
R3.2 Pink® Batts® Skillion Roof	7110232	1220 x 432	115	3.7	3.9	7	✓	✓	767
R3.6 Pink® Batts® Skillion Roof	7110236	1220 x 432	165	6.3	6.6	12	✓	✓	767
R4.5 Pink® Batts® Skillion Roof	7110245	1220 x 432	165	3.2	3.3	6	✓	✓	767
R5.0 Pink® Batts® Skillion Roof	7110250	1220 x 432	180	3.2	3.3	6	✓	✓	767
R6.0 Pink® Batts® Skillion Roof	7110260	1220 x 432	230	3.2	3.3	6	✓	✓	767
R7.4 Pink® Batts® Skillion Roof	7110274	1220 x 432	275	2.6	2.8	5	✓	✓	767

* Square metre coverage per bale are estimates and actual coverage may differ.

Note: Pink® Batts® Skillion Roof R5.0, R6.0 and R7.4 at 432mm width are not currently listed on our BRANZ appraisal, they are however covered by the appraisal,and will be added at the next review.

Pink® Batts® Ceiling Insulation
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Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
ROOF – SKILLION THERMAL INSULATION									
SKILLION 560mm WIDTH RANGE									
R5.0 Pink® Superbatts® Skillion Roof	7113250	1220 x 560	180	4.1	4.4	6	✓	✓	767
R6.0 Pink® Superbatts® Skillion Roof	7113260	1220 x 560	230	4.1	4.4	6	✓	✓	767
R7.4 Pink® Superbatts® Skillion Roof	7113274	1220 x 560	275	3.4	3.7	5	✓	✓	767
SKILLION 580mm WIDTH RANGE - SECONDARY INSULATION LAYER SOLUTION									
R1.0 Pink® Superbatts® Skillion Roof	7113210	1220 x 580	40	17.0	17.6	24	✓	✓	767

* Square metre coverage per bale are estimates and actual coverage may differ.

At Comfortech® our ambition is to create a more sustainable and comfortable future by enabling all Kiwis to live and work in warmer, healthier and more energy-efficient buildings. We're meeting this commitment with our new Pink® Superbatts® range which have been designed specifically to meet the new H1 building code changes for insulation.

To find out more about our vision for better performing New Zealand homes, visit our H1 Hub at **www.comfortech.co.nz**

Our Pink® Superbatts® are at least 25mm wider than our standard Pink® Batts® ceiling range

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Application

Pink® Batts® ceiling insulation is a lightweight flexible glass wool insulation product designed to:

- Thermally insulate ceilings in new homes, be retrofitted into existing homes without insulation, or over existing insulation for better performance
- Fit easily into standard ceiling constructions, or be easily cut to fit in non-standard constructions
- Meet the requirements of the New Zealand Building Code (NZBC) for different designs and environments

Features and Benefits

- High R-values – R-values up to R7.0 to assist in keeping homes above 18˚C as per the World Health Organisation's recommendation for a healthy and comfortable home
- Easy to install – lightweight, flexible and simple design makes the installation fast and easy
- Internationally certified for Indoor Air Quality – gives assurance that products meet strict chemical emissions limits
- Non-combustible – will not easily burn in the event of a fire
- Made from over 80% recycled glass – making sustainable use of waste
- Designed for New Zealand building conditions



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Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% recycled glass, making sustainable use of waste
- Manufactured in New Zealand, reducing shipping distances
- Recyclable packaging

Green Star NZ Credits

Green Star is a comprehensive environmental rating system for buildings; materials with certain attributes can receive points that contribute to the overall score of a rated home.

New Zealand Green Building Council (NZGBC) does not test or certify products; they rely on the work done by third party certification bodies and eco labels like Eco Choice Aotearoa. Further information is available at **nzgbc.org.nz**.

Eco Choice Aotearoa

Pink® Batts® ceiling insulation products have Eco Choice Aotearoa Accreditation (refer to Product Specifications on page 1 for accredited products)

Independently assessed for:

- **Waste Minimisation:** Recycled content, and recycling of process waste
- **Energy Management:** Effective energy management policies and procedures
- **Manufacturing Process:** Not manufactured using blowing agents with a Global Warming Potential (GWP) or Ozone Depleting Potential (ODP)
- **Product Characteristics:** Durability and performance

Eco Choice Aotearoa
Licence No 2504017

While only BRANZ appraised products are eligible for Eco Choice Aotearoa, all Pink® Batts® thermal insulation products are manufactured in the same environmentally considerate way.

1 (Beca Carter Hollings & Ferner Ltd, Energy Economics of Fibreglass Insulation, 2005)

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Health and Safety

Product Safety

Pink® Batts® insulation is a non-hazardous, safe product.

- IARC (International Agency for Research on Cancer) classifies the glass wool formulation used to manufacture Pink® Batts® products as Group 3: 'Not classifiable as to its carcinogenicity to humans'. This is the same classification as caffeine, tea, hair colouring, chlorinated drinking water and saccharin
- Pink® Batts® insulation is bio-soluble. In the unlikely event any fibres are inhaled into the lungs they will dissolve in the body fluids and be cleared from the body

Indoor Air Quality

- Pink® Batts® insulation is certified under the GREENGUARD Certification Program. Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and formaldehyde), to help create healthier indoor environments

General Health

- Pink® Batts® insulation will assist in meeting the World Health Organisation recommendation for houses to be maintained at a minimum temperature of 18ºC to provide a healthy and comfortable home

2 Howden-Chapman, P. et al. "Effect of insulating existing houses on health inequality: cluster randomised study in the community" British Medical Journal, 2007, p334:460

Technical Data

Properties	Result		Test/Method/Standard	Test Results
Combustibility	Non-Combustible	?	AS/NZS 1530.1:1994	Group Number 1S
Early Fire Hazards		?	AS/NZS 1530.3:1993 - Ignitability (Range 0-20) - Spread of Flame Index (Range 0-10) - Heat Evolved Index (Range 0-10) - Smoke Developed Index (Range 0-10)	 = 0 = 0 = 0 = 0-1
R-value	Various*	?	AS/NZS 4859.1:2018	
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Vermin Resistance	No Food Source	?	AS/NZS 4859.1:2018-Glass wool exempt	

* Stated thicknesses are values at which stated R-values are achieved and are likely to be minimum values. See table on page 1.

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Acoustic Properties

Pink® Batts® insulation will assist with noise control, however penetrations in ceilings and walls will transmit sound readily. Superior noise control can be achieved by using Pink® Batts® insulation products in conjunction with good acoustic design.

New Zealand Building Code (NZBC) and Limitations

Pink® Batts® ceiling insulation when used, installed and maintained in accordance with the requirements outlined in this datasheet, will meet or contribute to meeting the following provisions of the NZBC:

NZBC Clause B2: Durability

Meets the requirement NZBC B2.3.1 a) 50 years and NZBC B2.3.1 b) 15 years

NZBC Clause E3: Internal Moisture

Contributes to meeting these requirements

NZBC Clause F2: Hazardous Building Materials

Meets this requirement and will not present a health hazard to people

NZBC Clause H1: Energy Efficiency

Contributes to meeting this requirement

Limitations

To meet the provisions of the NZBC as outlined in this datasheet, Pink® Batts® ceiling insulation MUST be:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2016: Energy Efficiency-Installing bulk thermal Insulation in Residential Buildings

Pink® Batts® ceiling insulation should NOT be crushed, folded or compressed.

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Installation Instructions

Correct installation with no compression, gaps or folds is critical to ensure Pink® Batts® ceiling insulation performance is not compromised.

Safety

Each installation is unique so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work
- Avoid installing during the warmest part of the day. The roof cavity temperature can increase to uncomfortable levels roof temperature
- Do not stand on ceiling lining or ceiling battens

Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016.

For your local PinkFit® installer call **0800 746 534** or visit **pinkbatts.co.nz/installing-pink-batts/**



Pink® Batts® Ceiling Insulation
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Installation

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)
- Kneepads (for retrofitting)

For an efficient installation, the following tools are recommended:

- Stable working platform (for new build)
- Kneeling board or planks (for retrofitting)
- Knife
- Tape measure
- Install rod for tight spaces
- Head torch (for retrofitting)

For retrofitting, take into consideration:

- Using planks laid across joists to walk and work on
- Levelling and refitting any existing insulation if required with correct clearances
- Removing any damp insulation
- Starting installation at the point furthest away from the ceiling access hole

To ensure Pink® Batts® ceiling insulation performance isn't compromised, confirm the correct product and R-value is used in ceiling applications.

- Ensure the product is installed dry
- Friction fit product between framing, ensuring there are NO gaps, folds or compression of the product to achieve optimal performance
- If cutting is required, cut oversize by 5-10mm to ensure a good friction fit
- Ensure that Pink® Batts® ceiling segments are firmly butted against each other
- For retrofitting, install over timber where insulation already exists or where appropriate. Any open-air pockets beside joist/truss cord ends at the roof perimeter to be blocked off with insulation off-cuts
- Fit Pink® Batts® insulation beneath electrical wiring and plumbing work. Minimise tucks
- Maintain a minimum 25mm clearance between the Pink® Batts® insulation and the roofing underlay. If required to maintain the clearance, the insulation may be compressed or a thinner product used if this achieves the required construction R -value.
- We do not recommend thinning the insulation by cutting, feathering or chamfering as the insulation no longer meets the stated R- value. For compressed R values please refer to our Edge Compression R- value Calculator.
- Install to the outer edge of the top plate covering at least 50% of it while ensuring minimal overflow to the eaves
- Insulate access hole cover and secure in place with strapping or glue Remove excess material

Tip: To verify Building Code Compliance, staple a product label at an easy to find location away from any hot items such as down lights or water cylinders e.g. on truss/rafter above ceiling access hole and hot water cupboard.

Note: Pink® Batts® and Pink® Superbatts® ceiling insulation should not be installed in a roof space where foil has been installed as a roof underlay. Refer to NZS 4246:2016 for full details.

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Clearances

Follow the clearances specified by the manufacturer, if they are not known then:

Recessed Luminaire

- CA rated recessed luminaires - None required, can close abut however, do not install insulation on top of the recessed luminaire
- IC rated recessed luminaires - None required, insulation can be installed over the top of the recessed luminaire
- Unmarked - Minimum 100mm

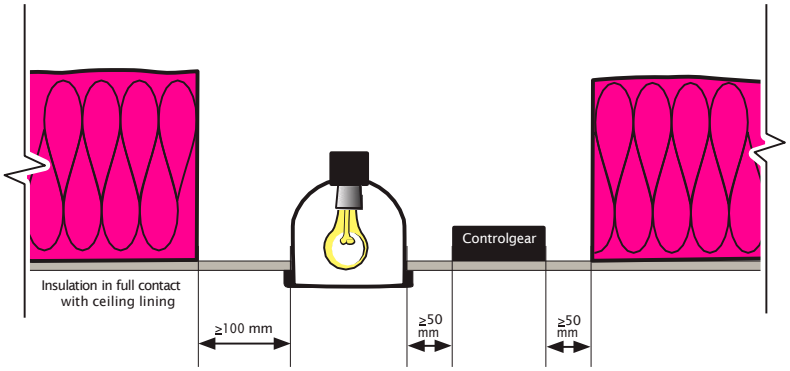
Surface Mounted Luminaire - Minimum clearance 200mm; however it does not apply if the insulation is permanently shielded.

Controlgear

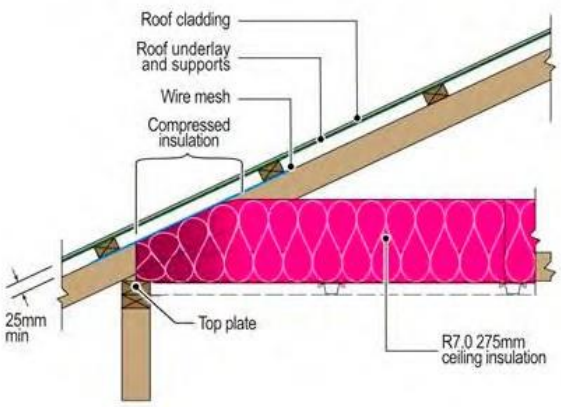
- If possible place it on top of the insulation and leave a minimum clearance of 50mm between controlgear and luminaire
- If not possible to place it on top of the insulation and leave 50mm from the insulation to the controlgear

Controlgear **shall not sink** into the insulation.

- Built in appliances - Minimum 50mm
- Enclosures containing electrical equipment - Minimum 50mm
- Fan/heat/light unit - Minimum 100mm
- Ventilation systems - Minimum 50mm
- Unducted mechanical fan units - Minimum 200mm
- Unducted passive vents that remain functional - Minimum 200mm
- Metal chimney and flues - Minimum 75mm
- Brick chimney - Minimum 50mm
- Roof underlay - Minimum 25mm



Unmarked luminaire and controlgear not placed on top of Pink® Batts® ceiling products.



Note: Pink® Batts® ceiling insulation can be installed from below when the ceiling is to be lined or replaced

Joist cover with insulation can be achieved either with two separate layers of insulation or cutting a single thick layer of insulation such that it spills over the top when tightly fitted.

***Caution:** Electrical cables and equipment partially or completely surrounded with bulk thermal insulation may overheat and fail.

For information on how to install Pink® Superbatts® ceiling insulation, please refer to the Pink® Superbatts® Installation Guide.

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Storage and Maintenance

Pink® Batts® and Pink® Superbatts® insulation should be protected from damage and weather. Store undercover in clean, dry conditions. The installed product should remain dry at all times. If the product becomes wet or damp, the source of dampness (e.g. leak in building) should be repaired and any wet or damp insulation should be removed and replaced with new insulation of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® and Pink® Superbatts® insulation. For further details download the relevant product data sheet from pinkbatts.co.nz





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PREFERRED PINK BATTS INSTALLERS

BRANZ Appraised
Appraisal No. 238

Eco Choice Aotearoa
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AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

GREENGUARD

Comfortech Building Performance Solutions® Certified QMS
Telarc. Registered
Quality
ISO 9001
ISO 45001
ISO 14001

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9-15 Holloway Place, Penrose, Auckland
June 2025

pink® batts®
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Rinnai

Mains Pressure Indoor Enamel Cylinders
Product technical statement

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A product technical statement is a way to show how a product or system is fit for purpose for use in New Zealand and to demonstrate compliance with the New Zealand Building Code (Building Code Amendment Act 2013).

Product description
Designed in New Zealand, and made in China, Rinnai mains pressure indoor enamel hot water cylinders are available in five sizes; 30 L, 50 L, 135 L, 180 L, 250 L, and 300 L. Model and configuration[1] selection will be dependent on the hot water demand of the property.



To meet the New Zealand Building Code requirement[2] to disinfect water for legionella bacteria, the cylinder thermostat has been factory preset to 65 °C.



[1] Refer to the Rinnai website or the hot water pocket guide for available configurations

[2] Clause G12.3.9, Acceptable Solution G12/AS1 6.14.3

Scope of use
Suitable for indoor mains and low pressure residential applications (not commercial). The system should be located and arranged so as to achieve the closest proximity to water draw off points.

They are not suitable as a spa or swimming pool heater, or for solar applications.

Design guidelines
Specification and installation must be in accordance with Rinnai installation requirements and with the Building Code.

Rinnai specify that installation must be in compliance with AS/NZS 3000, and AS/NZS 3500.

Where there is potential of damage occurring from a leaking system, a suitably drained safe tray must be fitted as per AS/NZS 3500.4 5.4 and G12/AS1 6.11.3.

Rinnai.co.nz
0800 746 624

Rinnai

Mains Pressure Indoor Enamel Cylinders
Product technical statement

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Compliance with the NZ Building Code

If specified, installed, and maintained in accordance with all Rinnai requirements the Rinnai mains pressure indoor enamel cylinders will comply with the below provisions of the NZ Building Code.

CODE CLAUSE	EVIDENCE OF COMPLIANCE
G9 Electricity	
G9.2, G9.3.3	Cylinders approved to AS/NZS 60335.2.27
G12 Water supplies	
G12.3.8 G12.3.9	Cylinders approved to AS/NZS 60335.2.27 Acceptable solution G12/AS1 6.14.3, the cylinder thermostat has been factory preset to 65 °C
H1 Energy efficiency provisions	
H1.3.4	Cylinders meet the requirements of the minimum energy performance standards (MEPS) by cylinder approval to NZS 4606 (Storage water heaters - General requirements), and AS/NZS 4692.1:2005 (Electric water heaters - Energy consumption, performance and general requirements)

Additional evidence to support the above statements

Supplier Declaration of Compliance:

- SDoC identification number - 2017 002 EN

Electrical safety approval

- Certificate of approval number - ESV170064

Special conditions: Installation requirements

Full appliance information can be found at www.rinnai.co.nz.

Limitation: To be installed in accordance with all Rinnai installation requirements and by a licensed gasfitter/plumber, and electrician. Upon completion of the installation, a final inspection and test to demonstrate that the cylinder has been installed in accordance with Rinnai's instructions is required by the installer. The installer is to issue an electrical safety certificate upon completion.

Special conditions - maintenance requirements

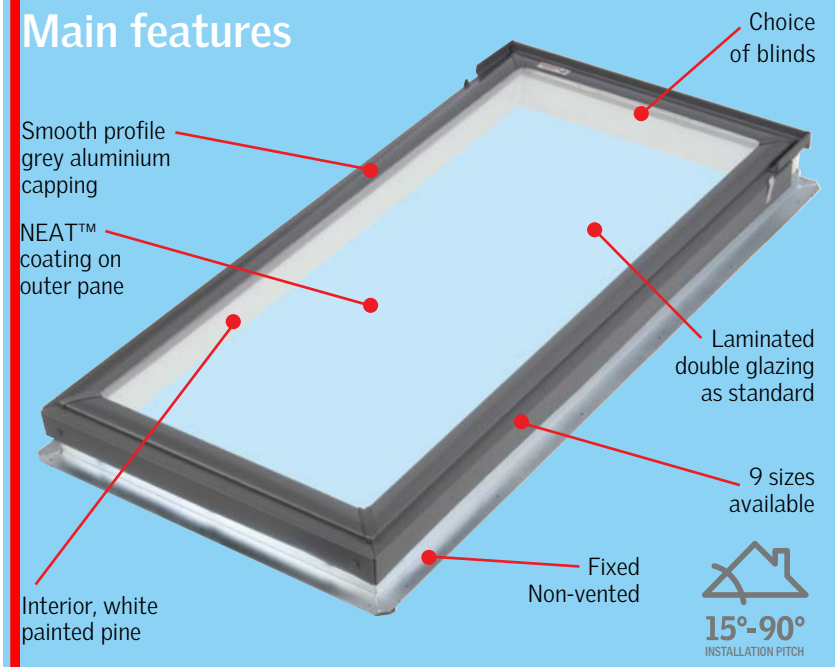
For reliable operation Rinnai cylinders should be maintained and serviced as detailed in the owner and installer guide. Installation, servicing, repair, and removal shall be carried out only by authorised personnel.

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FS Fixed Skylight Pitched roof

Main features

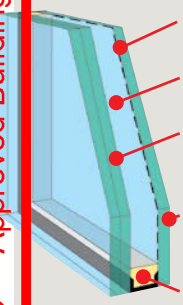


Construction

Quality frame made from Ponderosa pine. Factory treated with a wood preservative and further treated with 2 coats of white enamel paint for clean interior finish.
Aluminium external capping finished in a smooth grey colour, similar to 'COLORSTEEL® Grey Friars'.

The FS Skylight provides a cost-effective solution for creating light-filled rooms where adequate ventilation already exists. Energy efficient double glazing and the use of blinds ensures heat transference is minimised.

High Performance Double Glazing



- Outer – 3mm toughened Low-E³ coated Cardinal glass.
- Cavity – 9mm sealed Argon gas space.
- Inner – 5.36mm clear laminated Cardinal glass (0.76 PV B inter layer).
- NEAT™ Coating on outer pane reduces cleaning frequency.
- Warm edge technology increases energy efficiency.

Benefits:

• Radiant heat block: Complete window	approx 75%
Glass only	approx 70%
• UV Harmful rays block	approx 99%
• WERS rating	5 stars
• Low-E³ coating.	✓
• Reduced cleaning frequency.	✓

New Zealand Standard 4223.4

Laminated glass (standard) must be used for skylights installed 5m or more above floor level.

NEAT™ Photocatalytic Coating

- Silicone Dioxide/Titanium Dioxide coating reacts with the sun's UV rays to decompose surface organic dirt before rinsing away with the next shower of rain, thereby reducing cleaning frequency.
- The coating also makes the glass surface smoother, so water disperses evenly, sheets off, and evaporates quickly; thereby minimising water spotting on the pane.

* For roofs below 15° pitch, skylights need to be raised to at least 15° and custom flashed. (Not supplied by VELUX). Refer to website or contact VELUX for technical advice and drawings.

FS technical performance

CodeMark® is a voluntary scheme owned by the Ministry of Business, Innovation & Employment that provides an easily understood and robust way to show a building product, design or method meets the requirements of the New Zealand Building Code. CodeMark is unchallengeable and has legal status equivalent to that of an Acceptable Solution or Verification Method.

New Zealand Standards

All VELUX Skylights are tested and appraised to the appropriate New Zealand Standards.

NZS4223 NZS3604 NZS1170

AS4285 SKYLIGHTS

(Exceeds Wind Pressure requirement for 'Extra High wind zones – 55m/s, 1.8kpa).

Hailstone Test

VELUX Simulated Tests^ ASTM E822-2009.

^ ASTM E822-2009 standard practice for determining resistance of Solar Collector Covers to Hail impact with propelled ice balls.

H1 Compliance

Listed thermal values (see reverse side) have been verified by BRANZ and can be used for all climate zones to show compliance with NZBC H1/AS1 using Alternative Solution VELUX Schedule Method (CodeMark), or the Calculation Method.

Energy rating

FS Skylights have been energy rated in accordance with the Skylight Energy Rating Scheme (WERS).

★★★★★ **Maximum 5 stars Summer Ratings**

4.5 out of 5 stars for Winter Rating.
4.5 out of 5 stars for Cool Daylight in Summer.

Technical Values

R-value	
Refer to reverse side	
Solar Heat Gain Co-efficient	
Complete skylight	0.26
Visible Light Transmittance	
Complete skylight	0.61
Luminous Efficacy (Ke = VT/SHGC)	
Complete skylight	2.35
Acoustic performance	
Complete skylight	32dB#

#Based on STC value tested to AS1276.1.

CodeMark CMNZ10008

BRANZ Appraised
Appraisal No. 968

WORLD-CLASS QUALITY



LOAD TESTED
(NZBC Clause B1)



DURABILITY
(NZBC Clause B2)
Exceeds requirements for Exposure Zone D (NZ3604).



WEATHERTIGHTNESS
(NZBC Clause E2)



SAFETY GLAZING
(NZBC Clause F2)



ENERGY EFFICIENCY
(NZBC Clause H1)



VENTILATION
(NZBC Clause G4)



NATURAL LIGHT
(NZBC Clause G7)

NB: CodeMark certification and BRANZ appraisal scope does not cover installations over 60°.

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FS Fixed Skylight
Pitched roof

Choice of solar powered blinds

The thermal performance of FS Skylights can be enhanced with the inclusion of a blind. Different levels of light and heat control are available by using either Honeycomb or Blackout blinds. Tailor-made to fit perfectly to each size of skylight, they are easy to install and are supplied with white powder-coated aluminium side channels allowing blinds to be positioned at any point on the skylight.

No additional electrical control system required when adding blinds. (Blinds supplied with wireless wall mounted keypad).

Honeycomb blinds (FSCD)



- Provides near total light reduction.
- Adds a decorative effect.
- Colour: White material and rails.
- Materials: Double layered pleats (polyester) form a 'honeycomb' structure. Inner structure of honeycomb has aluminium coating. White powder-coated aluminium side chanels and top cover.
- Reduce heat by approx 60%.^
- Unique installation system allows easy installation.

Blackout blinds (DSD)



- Provides near total light reduction.
- Colour: White rails and internal fabric, silver coating on external fabric face.
- Materials: Light-tight polyester with heat resistant coating. White powder-coated aluminium side channels and top cover.
- Reduce heat by approx 40%.^
- Unique installation system allows easy installation.

Blinds sold separately.

Choice of flashing

EDW flashing

15°-90°

EDW flashing is used for skylights installed into tiled roofs and profiled metal roofs (such as corrugated iron – not suitable for concealed clip roof profiles or membrane roofs).



EDL flashing

15°-90°

EDL flashing is used for skylights installed into slate or shingle roofs – max 5mm thick. 'L' shaped sections are provided that act as soaker pieces on either side of the skylight.



EKW combination flashing

15°-90°

Designed for installing multiple skylights side-by-side or above-below. Skylights must be spaced 100mm apart. EKW suitable for same roofs as EDW flashing.



Custom flashing

Useful for situations where VELUX flashing isn't suitable. Such as when installing in a roof outside the installation pitch range (15-90°) or when colour matching to roof is preferable. Not supplied by VELUX. Refer to website or contact VELUX for technical advice and drawings.

FS – Technical Data

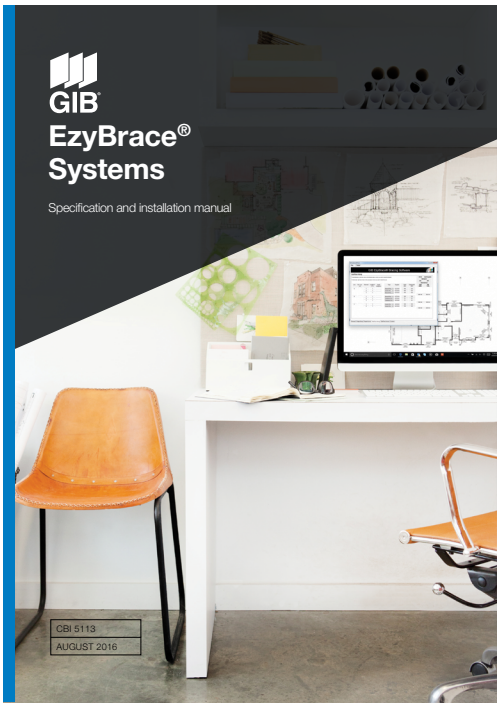
Product/size code ▶	C01	C04	C08	M02	M04	M06	M08	S01	S06
External frame dimensions mm (wxh)	550x700	550x980	550x1400	780x780	780x980	780x1180	780x1400	1140x700	1140x1180
Internal glass size mm (wxh)	462x611	462x891	462x1311	692x691	692x891	692x1091	692x1311	1052x611	1052x1091
Daylight area (m²)	0.28	0.41	0.61	0.48	0.62	0.75	0.91	0.6	1.15
R-Value (BRANZ Verified Horizontal R-Value)*	0.356	0.372	0.385	0.385	0.398	0.406	0.413	0.397	0.430
Weight (kg) including flashing	15.1	19.1	25.5	21.5	25.0	29.3	33.5	26.9	39.7
Weight (kg) excluding flashing	11.7	15.5	21.6	17.5	20.9	25.0	29.0	22.0	34.5

Skylights can only be installed as per orientation depicted above.
^ Based on VELUX internal testing with 3076 model Roof Window.
* Listed thermal values have been verified by BRANZ and can be used for all climate zones to show compliance with NZBC H1/AS1 using Alternative Solution VELUX Schedule Method (CodeMark), or the Calculation Method.

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BRANZ Appraised
Appraisal No. 928 [2021]

GIB EZYBRACE® SYSTEMS



Appraisal No. 928 (2021)

This Appraisal replaces BRANZ Appraisal No. 928 (2016)

BRANZ Appraisals
Technical Assessments of products for building and construction.

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1222 Moonshine Rd,
RD1, Porirua 5381
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Tel: 04 237 1170
branz.co.nz

Product

1.1 GIB EzyBrace® Systems are a range of wall and ceiling bracing systems based on the use of GIB® Standard, GIB Braceline® and other GIB® plasterboards. GIB EzyBrace® Systems are used to resist earthquake and wind loads on timber-framed buildings designed and constructed in accordance with NZS 3604 and the GIBFix® Framing System. The GIB EzyBrace® Bracing Software provides an electronic means of calculating bracing demand and resistance.

Scope

2.1 GIB EzyBrace® Systems and the GIB EzyBrace® Bracing Software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, GIB EzyBrace® Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB EzyBrace® Systems meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 (a), (f), (h) and (j)]. See Paragraphs 8.1-8.10.

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years. GIB EzyBrace® Systems meet this requirement. See Paragraphs 9.1-9.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB EzyBrace® Systems meet this requirement.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB EzyBrace® Systems, and supplied or specified by Winstone Wallboards Ltd are as follows:

GIB® plasterboards

- **GIB® Standard** - GIB® Standard plasterboard is a paper-bound, fibreglass reinforced gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1,200 mm and 1,350 mm (GIB® Wideline). The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2,400 mm to 6,000 mm. The nominal sheet weight is 6.5 kg/m² for 10 mm thick sheets and 8.5 kg/m² for 13 mm thick sheets. GIB® Standard plasterboard face paper is a light buff colour.
- **GIB Braceline®** - GIB Braceline® is a high-density fibreglass reinforced, paper-bound gypsum-plaster core sheet lining material. GIB Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1,200 mm and 1,350 mm, and is available in lengths of 2,400 mm, 2,700 mm, 3,000 mm, 3,600 mm and 4,800 mm. The nominal sheet weight is 9 kg/m² for 10 mm thick sheets and 12.5 kg/m² for 13 mm thick sheets. GIB Braceline® face paper is light blue in colour.
- **Alternative GIB® plasterboards** - in certain situations, as specified in the Technical Literature, substitution is permitted with GIB Aqualine®, GIB Fyreline®, GIB Toughline® and GIB Ultraline®.

Components and Accessories

- **GIB® Accessories and GIB® Jointing Compounds** - as specified in the GIB® Site Guide Technical Literature.
- Fasteners
  - **GIB Grabber® High Thread Screws for fixing directly to timber** – 32 mm x 6 g.
  - **GIB Nail** – 30 x 2.8 mm.
  - **GIB Grabber® screws for fixing to light gauge steel battens** – 32 mm x 6 g.
- Adhesive and Sealants
  - **GIBFix® One** – an off-white acrylic adhesive supplied in 375 ml cartridges and 600 ml sausages.
  - **GIBFix® All-Bond** – a green solvent-based adhesive supplied in 375 ml cartridges and 600 ml sausages.
- GIBFix® Framing Components
  - **GIBFix® Angle** – 45 x 45 x 0.55 mm galvanised steel angle with a knurled surface. Supplied in lengths of 2.4 m and 2.7 m.
  - **GIB Grabber® Dual Thread Screws for fixing to timber through GIBFix® Angle** – 32 mm x 7 g needle-point screw with coarse thread lower section and fine thread upper section.
- Fasteners, Anchors and Connections
  - **GIB® HandiBrac®** – a one-piece, 2 mm thick, galvanised steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with five Type 17 screws, 14 g x 35 mm.
  - **BOWMAC® screw bolt** – M10 x 140 mm screw anchor, with a blue painted hex head.
  - **Coach screws** – 12 mm x 150 mm and 50 x 50 x 3 mm washer, hot-dip galvanised for fixing to timber floors.
  - **Cast-in bolts** – M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors.
  - **Shot-fired fasteners** – minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1-N, GS2-N and GS2-NOM internal line bracing elements to concrete slabs.
  - **Galvanised or stainless steel strap** – 25 x 0.9 mm top and bottom plate connections.
  - **Strap fixings** – 30 x 2.5 mm hot-dip galvanised or stainless steel flat head nails. *(Note: For corrosion protection requirements, refer to NZS 3604, Section 4.)*

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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- **Ceiling Diaphragms** - ceiling diaphragms are constructed using timber ceiling battens, or GIB® Rondo® or similar metal ceiling batten systems.
- Plywood
  - **Plywood** – minimum of 7 mm thick complying with AS/NZS 2269 D-D Structural Grade.
  - **Plywood fixings** – 50 x 2.5 mm hot-dip galvanised or stainless steel annular-grooved, flathead nails.

Handling and Storage

5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.

5.2 All accessories must be kept dry.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB EzyBrace® Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 NZS 3604 provides methods to distribute the bracing elements in walls to resist forces. The use of ceiling diaphragms is defined in the Technical Literature.

7.2 GIB EzyBrace® Systems are for use in dry, internal situations only.

7.3 GIB EzyBrace® Systems must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

GIB EzyBrace® Bracing Software

7.4 The GIB EzyBrace® Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5–5.10 for 2 kPa floor loads or less, or Tables 14.1–14.3 for 3 kPa floor loads.

7.5 The bracing demand calculations contained in the GIB EzyBrace® Bracing Software are based on first principles engineering and calculate wind and earthquake demand, based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The GIB EzyBrace® Bracing Software has been assessed as part of this Appraisal.

7.6 The bracing ratings for GIB EzyBrace® Systems are embedded in the GIB EzyBrace® Bracing Software.

GIBFix® Framing System

7.7 The GIBFix® Framing System utilises GIBFix® Angles fixed at internal corners and at wall/ceiling junctions to reduce the potential for fastener 'popping' and joint cracking due to timber framing movement. The GIBFix® Framing System also offers an alternative arrangement of studs at corners and at intersecting walls to improve insulation and to reduce thermal bridging compared to traditional wall framing layouts. Refer to the Technical Literature for full details.

7.8 Where walls intersect, noggings are required at maximum 900 mm centres to enable fixing of the end stud of the intersecting wall to the main wall framing.

7.9 The GIBFix® Framing System permits the use of a single panel hold-down [e.g. GIB® HandiBrac®] at wall corners and T-intersections for both the across and along bracing directions.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Framing

7.10 GIB EzyBrace® Systems can be installed using conventional timber framing layouts or by using the layouts provided in the GIBFix® Framing System. The bracing ratings embedded in the GIB EzyBrace® Bracing Software are equally applicable to both framing options.

7.11 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.

7.12 Winstone Wallboards Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 mm x 45 mm for external walls and 75 mm x 45 mm for internal walls.

7.13 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 mm x 0.9 mm hot-dip galvanised mild steel strap, three nails each side of joint for 3 kN and six nails each side of joint for 6 kN.

Bracing System GS2-NOM

7.14 Most GIB EzyBrace® Systems require additional fasteners at the corners to achieve the published bracing ratings. The GS2-NOM system only requires fixings at 300 mm centres around the sheet perimeter.

7.15 Where internal doors penetrate a GS2-NOM bracing element and recessed door jambs are used, the sheets may be adhesive fixed around the door opening with GIBFix® All-Bond, instead of screw fixing. This is designed to reduce fastener 'popping' around internal doors when using grooved door frames. Screw fixing should be used where door frames are to be finished with architraves and the architrave will cover the screws. The adhesive fix option around door openings must not be used with any other GIB EzyBrace® Systems.

Alternative GIB® plasterboards

7.16 GIB Ezybrace® Systems have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® plasterboard product. Table 1 provides acceptable alternative options.

Table 1: Permitted Alternatives in GIB EzyBrace® Systems

Specified	Permitted alternative GIB® plasterboard products								
GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10 mm	13 mm	16 mm	19 mm
GIB® Standard	N/A	✓	✓	✓	✓	✓ *Note 1*	✓ *Notes 1 and 3*		
GIB Braceline®	X	X	N/A	✓ *Note 2*	✓	X	✓ *Notes 1, 2 and 3*		

- ***Note 1:*** *The fastener type and length and must be as required for the relevant Fire Resistance Rating (FRR) system but the fixing pattern must be as required for bracing elements.*
- ***Note 2:*** *The bracing element must be 900 mm or longer. Fasteners must be at maximum 100 mm centres to the perimeter of the bracing element. The bracing corner fastening pattern applies to all four corners of the element.*
- ***Note 3:*** *Specify traditional wall framing layout where a FRR is required. See Paragraph 11.4.*

BOWMAC Screw Bolts

7.17 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Structure

Bracing

8.1 The bracing unit (BU) ratings are embedded in the GIB EzyBrace® Bracing Software and vary with the wall length.

8.2 The Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using anchor screws and cast-in bolts (concrete), coach screws (timber), GIB® HandiBrac® or nailed stud-to-plate straps.

8.3 Bracing units derived from the BRANZ P21 test method are based on a wall height of 2.4 m. The GIB EzyBrace® Bracing Software calculates bracing ratings for higher wall heights by multiplying the appropriate bracing rating by 2.4 m and dividing by the actual wall height in metres. For walls less than 2.4 m in height, the GIB EzyBrace® Bracing Software calculates bracing ratings as if they were 2.4 m high.

8.4 NZS 3604 limits wall bracing elements to a maximum of 120 BU/m for timber-framed floors and 150 BU/m for concrete floors.

Ceiling Diaphragms

8.5 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be square or rectangular and the length must not exceed twice the width.

8.6 For ceiling diaphragms not steeper than 15° and not exceeding 7.5 m in length, any GIB® plasterboard may be used provided the perimeter fixing are at 150 mm centres.

8.7 For ceiling diaphragms not steeper than 45° and not exceeding 7.5 m in length, and for diaphragms not steeper than 25° and not exceeding 12 m in length, any GIB® plasterboard may be used provided the perimeter fixings are at 100 mm centres.

Openings in Bracing Elements

8.8 Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

Shower Areas

8.9 GIB EzyBrace® Systems must not be located in shower cubicles or behind baths and the like. GIB EzyBrace® Systems may be used in water-splash areas provided they are protected as required by NZBC Clause E3 Internal Moisture. Refer to BRANZ Appraisal No. 427 GIB® Wet Area Systems.

Impact Resistance

8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon history of use in domestic and light commercial applications.

Durability

9.1 GIB EzyBrace® Systems, including linings and their fixings, have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

9.2 The building must be maintained weatherproof and GIB® plasterboards must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.

9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.

9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Prevention of Fire Occurring

10.1 Separation or protection must be provided to the GIB EzyBrace® Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

11.1 For internal surface finish properties and fire resistance ratings, refer to BRANZ Appraisal No. 289 GIB® Fire Rated Systems.

Internal Moisture

12.1 GIB® plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

Installation Information

Installation Skill Level Requirement

13.1 Installation of GIB EzyBrace® Systems must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

14.1 GIB EzyBrace® Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

14.2 To achieve an acceptable decorative finish, the GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommends a moisture content of 12% or less where buildings are to be air conditioned, centrally heated or have heat pumps installed.

14.3 Where the GIBFix® Framing System is used, GIBFix® Angles are tacked to the framing with flat head clouts prior to installation of the GIB® plasterboard.

Cutting

14.4 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Hold-downs

14.5 GIB EzyBrace® Systems which require hold-downs must either have a GIB® HandiBrac® fitted to each end of the bracing element or alternatively a metal stud-to-plate strap and hold-down anchor may be used. Refer to the Technical Literature for full installation details. Where a metal stud-to-plate strap is used, the hold-down anchor must be placed no more than 80 mm from the end of the bracing element.

14.6 Where the GIBFix® Framing System is used, a single hold-down located at a wall intersection may be used to provide the hold-down in both the across and along bracing directions.

Plasterboard Sheet Fixing

14.7 Corner fixings must be 50 mm away from the sheet corner. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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14.8 Wall bracing plasterboards (except for those used with the GS2-NOM system) are fixed at 150 mm centres around the perimeter framing of the bracing element *(Note: There is a variation for GIB Aqualine® and GIB Fyreline®, see Table 1)*. At the corners of the wall bracing elements, a special fastening pattern is required with fasteners spaced at 50 mm, 100 mm, 150 mm, 225 mm and 300 mm from the corner and thereafter at 150 mm centres. Fixing to other framing is either mechanical or by using GIBFix® adhesives.

14.9 When installing GS2-NOM bracing elements, the GIB® plasterboard is fixed to framing around the bracing element perimeter and at sheet joints with fasteners at maximum 300 mm centres. Where recessed door jambs are used on internal door frames, the GIB® plasterboard may be fixed to the framing around the door opening with GIBFix® All-Bond, see Paragraph 7.15.

14.10 Where GIB Aqualine® or GIB Fyreline® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres and the corner pattern described in Paragraph 14.8 used.

14.11 Full sheets must be used wherever possible.

Fire Resistance Rated Bracing Elements

14.12 Where a bracing element is also used as a fire-rated element, the method of fixing (including the length of the fixing specified) for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres and fixings at corners of the bracing element must be fixed as described in Paragraph 14.8. In two-layer systems, the inner layer must be used for bracing.

Plywood Fixing

14.13 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

Ceiling Diaphragms

14.14 All GIB EzyBrace® System ceiling diaphragms require fixings around the perimeter at 100 mm or 150 mm centres, depending on the ceiling pitch and length. See Paragraphs 8.4-8.6 and refer to the Technical Literature.

14.15 The perimeter of the ceiling diaphragm is fixed to GIBFix® Angles, GIB® Rondo® perimeter channels, or alternatively, to an additional ex 150 x 40 mm timber plate fixed to the top plate.

Jointing and Finishing

14.16 All bracing element joints must be reinforced with GIB® tape and finished in accordance with the GIB® Site Guide.

Health and Safety

15.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

16.1 Bracing tests were carried out by Winstone Wallboards Ltd in accordance with BRANZ Technical Paper P21 to determine the performance of GIB EzyBrace® Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. Winstone Wallboards Ltd's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

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Other Investigations

17.1 The GIB EzyBrace® Bracing Software has been assessed by BRANZ and found to be satisfactory.

17.2 The GIB EzyBrace® Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

17.3 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.

17.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.

17.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, and hard and soft body impact tests.

Quality

18.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.

18.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.

18.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.

18.4 The quality of the application and finish on-site is the responsibility of the installation and stopping contractors.

18.5 Designers are responsible for the design of buildings.

18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 2269.0:2012 Plywood - Structural - Specifications.
- AS/NZS 2588:2018 Gypsum plasterboard.
- BRANZ Technical Paper P21:2010 A wall bracing test and evaluation procedure.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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In the opinion of BRANZ, GIB EzyBrace® Systems are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Winstone Wallboards Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Winstone Wallboards Ltd:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Winstone Wallboards Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Winstone Wallboards Ltd or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
01 December 2021

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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BRANZ Appraised

Appraisal No. 238 [2023]

PINK® BATTS® INSULATION



Appraisal No. 238 (2023)

This Appraisal replaces BRANZ Appraisal No. 238 (2018)

Amended 04 November 2024

BRANZ Appraisals

Technical Assessments of products for building and construction.

COMFORTECH BUILDING PERFORMANCE SOLUTIONS

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WFTAO
WORLD FEDERATION OF TECHNICAL ASSESSMENT ORGANISATIONS

Product

1.1 Pink® Batts® Insulation is a range of resin-bonded, fibrous glasswool thermal insulating material for use in walls, ceilings and roofs of buildings. Pink® Batts® Insulation is pre-cut to suit a range of framing spacings.

Scope

2.1 Pink® Batts® Insulation has been appraised as a thermal insulation material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Pink® Batts® Insulation, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years and B2.3.1 (b) 15 years. Pink® Batts® Insulation meets these requirements. See Paragraph 8.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.1. Pink® Batts® Insulation will contribute to meeting this requirement. See Paragraphs 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Pink® Batts® Insulation meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. Pink® Batts® Insulation will contribute to meeting these requirements. See Paragraphs 14.1 and 14.2.

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Technical Specification

4.1 Pink® Batts® Insulation is a resin-bonded, fibrous, glasswool insulation, manufactured from recycled and/or virgin glass and cured urea extended phenolic resin.

4.2 Pink® Batts® Insulation is manufactured in a range of sizes to suit framing centres and cavity depths. Building Insulation Blanket (BIB) is supplied in rolls for commercial applications. Pink® Batts® Insulation is available as set out in Table 1.

Table 1: Pink® Batts® Insulation Product Table.

R-value	Length (mm)	Width (mm)	Nominal Thickness (mm)	Density (kg/m³)
Roof - Ceiling Thermal Insulation				
1.8	1,220	432	95	8.3
2.2	1,220	432	115	8.2
2.6	1,220	432	140	7.0
2.6	1,220	432	110	10.5
3.0	1,220	432	160	8.2
3.2	1,220	432	170	6.9
3.6	1,220	432	180	7.2
4.0	1,220	432	195	8.1
4.5	1,220	460	210	8.5
5.0	1,220	432	220	9.5
5.0	1,220	460	225	8.9
6.0	1,220	460	245	11.1
7.0	1,220	460	275	12.3
7.0[1]	1,220	460	275	12.6
Roof - Building Insulation Blanket (BIB)				
1.2	24,000	1,200	50	12.0
1.8	20,000	1,200	75	12.0
2.4	16,000	1,200	95	12.0
2.6	14,000	1,200	105	12.0
3.2	12,000	1,200	125	12.0
3.6	10,000	1,200	140	12.5
Wall - Masonry Insulation				
1.0	1,220	580	40	14.0
1.2	1,220	580	50	12.8
Wall - Interior Secondary Insulation Layer[2]				
1.0[2]	1,220	530	35	22.0
1.3[2]	1,220	530	45	22.0
70 mm Wall Range - Thermal Insulation				
2.2	1,140	560	70	30.0

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90 mm Wall Range - Thermal Insulation				
1.8	1,140	560	90	9.1
2.2	1,140	560	90	11.0
2.4	1,140	560	90	13.9
2.6	1,140	560	90	18.0
2.6[1]	1,140	560	90	18.0
2.8	1,140	560	90	25.2
2.8[1]	1,140	560	90	25.5
90 mm Narrow Wall Range - Thermal Insulation				
2.2	1,140	360	90	11.0
2.6	1,140	360	90	18.0
2.8	1,140	360	90	25.2
90 mm Steel Wall Range - Thermal Insulation				
2.2	1,220	610	90	11.0
2.6	1,220	610	90	18.0
2.8	1,220	610	90	25.2
140 mm Wall Range - Thermal Insulation				
3.2	1,140	560	140	9.6
3.6	1,140	560	140	12.4
4.0	1,140	560	140	17.6
4.3	1,140	560	140	28.0
140 mm Narrow Wall Range - Thermal Insulation				
3.2	1,140	360	140	9.6
4.0	1,140	360	140	17.6
4.3	1,140	360	140	28.0

[1]Pink® Batts® Wall range R2.6 and R2.8 and Roof Insulation R7.0 are manufactured by Owens Corning Canada.

[2]Pink® Batts® R1.0 and R1.3 wall products have been assessed as thermal insulation material. The assessment of performance of these when used as a secondary insulation layer for walls specifically impacts on the bracing design of the wall as well as interstitial condensation, these have not been assessed by BRANZ and are outside the scope of this Appraisal.

Note: Customised widths additional to those listed above can be provided by Tasman Insulation NZ Ltd (t/a Comfortech Building Performance Solutions). These must be to the same R-value, thickness and density requirements as the products above.

All Pink® Batts® Insulation products covered by this Appraisal and manufactured in New Zealand have the Eco Choice Aotearoa licence.

4.3 Pink® Batts® Insulation is pink in colour and is baled in polythene bags with labelling in compliance with AS/NZS 4859.1.

4.4 Accessories used with Pink® Batts® Insulation, which are supplied by the insulation installer, are wire netting, plastic strapping and fixings.

Handling and Storage

5.1 Pink® Batts® Insulation must be stored under cover and in dry conditions. Heavy objects must not be stacked on the bales. The bales must be stored in an orientation that avoids excessive compression of the product.

5.2 In general, insulation products are sensitive to the length of time they are stored under compression packaging. Product that does not recover to its nominal thickness may not achieve the stated thermal resistance (R-value).

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Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Pink® Batts® Thermal Solutions: Product Guide, July 2024.
- Pink® Batts® Ceiling Insulation Installation Product and Installation Guide, June 2023.
- Pink® Batts® Wall Insulation Product and Installation Guide, August 2024.
- Pink® Superbatts® Thermal Solutions: Installation Guide, April 2023.
- Pink® Batts® Building Insulation Blanket (BIB) – Product data sheet, Feb22/1080RevD, February 2022.
- Pink® Batts® Building Insulation Blanket (BIB) – Installation instructions, Feb22/1081/RevD, February 2022.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Pink® Batts® Insulation is intended for use as thermal insulation to meet the requirements of the NZBC. Pink® Batts® Insulation can be used to meet the minimum schedule method R-values of the NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Greater construction R-values can be achieved where specific design is used. For construction R-values, refer to the BRANZ House Insulation Guide. Product R-values and dimensions are given in Table 1.

7.2 The R-value of Pink® Batts® Insulation has been determined by testing to AS/NZS 4859.1, which is an acceptable method in NZBC Acceptable Solution H1/AS1.

7.3 Pink® Batts® Insulation is designed to be friction-fitted between wall, ceiling or roof framing. It can also be laid directly on a ceiling lining, over ceiling battens or over joists/truss chords. In other horizontal situations, the insulation must be adequately supported by galvanised wire netting or some other suitable durable material.

7.4 When insulation is installed in a double layer over new or existing insulation, the possibility of compression of the bottom layer must be avoided, or reduction of R-values for the bottom layer of the formed system must be taken into account.

7.5 For new and existing buildings, the R4.5, R5.0, R6.0 and R7.0 Pink® Superbatts® ceiling products are designed to be notched around timber framing and to form a uniform layer above the timber framing, between and on the top of the truss chords.

7.6 At the roof perimeter, Pink® Batts® insulation is designed to be compressed at the roof perimeter rather than cut. To achieve the required construction R-value of R3.3 at the ceiling perimeter, a minimum product R-value of R3.5 and a minimum 115 mm height is required at the midpoint of the top plate to the underside of the insulation guard, to accommodate the compressed insulation. The Pink® Superbatts® range all exceed this product R-value requirement under compression with a 115 mm heel. If the roof slope is less than 20 degrees and the height is less than 115 mm, a raised heel will be required.

7.7 Where the insulation is installed in exterior walls, the nominal thickness of the insulation material must be selected to provide a snug close fit which touches all sides of the insulation cavity between the wall underlay and the interior wall lining.

7.8 Where the insulation is retrofitted in external walls without a wall underlay, and with direct-fixed claddings, the insulation must be at least 20 mm thinner than the framing to allow a gap of at least 20 mm between the insulation and the wall cladding. Horizontal straps must be stapled into the sides of the wall studs at 300 mm centres maximum as support before the insulation is installed. Refer also to NZS 4246, Section 5.4.2.

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7.9 When the insulation is installed in a wall with a drained cavity, it is recommended that specific wall products with a controlled nominal thickness be used. Where the stud spacings are greater than 450 mm, an intermediate means of restraining the insulation from bulging into the cavity must be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

7.10 Building Insulation Blanket is designed specifically for commercial roof and commercial wall applications. In residential applications, installation must be completed in accordance with NZS 4246.

7.11 The building envelope must be constructed to ensure the insulation remains dry during installation and throughout the life of the building.

7.12 The clearance requirements for heating appliances and downlights must be met, and reference made to the manufacturer's instructions and NZS 4246. See Paragraphs 10.1-10.3.

Durability

Serviceable Life

8.1 Where the building is maintained so that the provisions of NZBC Clauses E2 and E3 are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance (e.g. moisture), Pink® Batts® Insulation can be expected to have a serviceable life of at least 50 years.

Maintenance

9.1 Insulation that has become damp must be removed and the cause of dampness repaired. Cavities must be clean and dry before fitting new insulation of an equivalent thermal rating. NZS 4246 gives guidance on thermal insulation maintenance due to water damage.

Prevention of Fire Occurring

10.1 Pink® Batts® Insulation is classified a non-combustible material and need not be separated from heat sources such as fireplaces, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated or protected from heat sources. Part 7 of NZBC Acceptable Solution C/AS1 and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Downlights

10.2 Insulation should maintain 100 mm clearance from all undefined recessed luminaires, treating them as a heat source. For insulation to abut or cover recessed luminaires these must be clearly marked as being suitable for having insulation abutting and covering them, and have been installed in accordance with NZBC Acceptable Solution G9/AS1.

Fire Affecting Areas Beyond the Fire Source

10.2 Pink® Batts® Insulation products are classified non-combustible when tested to AS 1530.1 and can be assigned a Group Number of 1-S. When used in an occupied space, Pink® Batts® Insulation is not required to be enclosed by an internal lining. Refer to the relevant NZBC Acceptable Solution C/AS1 or C/AS2 for specific internal surface finish requirements.

External Moisture

11.1 The total building envelope must be weathertight and comply with the requirements of NZBC Clause E2 to ensure that the insulation remains dry in use.

11.2 The moisture content of the construction materials at the time of installing and enclosing the insulation must meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 10.2 a), or a lower moisture content if required by the lining manufacturer.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Internal Moisture

12.1 Buildings must provide an adequate combination of thermal resistance, ventilation and space temperature to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate. This does not apply to Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings.

12.2 Roofs and walls of housing complying with the Schedule Method for Compliance with NZBC Clause H1.3.2 E will have adequate thermal resistance. Other buildings may require more thermal insulation to satisfy the requirements of NZBC Acceptable Solution E3/AS1 than that to satisfy the energy efficiency provisions alone.

Energy Efficiency

13.1 Pink® Batts® Insulation will contribute to meeting the requirements of NZBC Clause H1, Performance H1.3.1 (a) and H1.3.2 E, by compliance with NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Refer to Paragraphs 7.1-7.8.

13.2 Pink® Batts® Insulation R-values have been determined by testing to AS/NZS 4859.1 and are given in Table 1.

Installation Information

Installation Skill Level Requirement

14.1 All design and building work must be carried out in accordance with the Pink® Batts® Insulation Technical Literature and this Appraisal. All building work must be undertaken by competent and experienced tradespersons conversant with Pink® Batts® Insulation.

General

15.1 Installation of Pink® Batts® Insulation must be in accordance with the Technical Literature and this Appraisal. NZS 4246 should be used as a guide for installing insulation in residential buildings.

15.2 The product must be installed only when the building is enclosed and when the construction materials have achieved the required maximum moisture content or less.

15.3 Pink® Batts® Insulation must be released from the packaging and allowed to re-loft prior to installation. The time to loft will depend upon the length of time the product has been packaged and stored.

15.4 Pink® Batts® Insulation is supplied in segment and blanket form (see Table 1) to suit framing layouts. The product is able to be cut to suit wall cavities and when fitted between roof or ceiling framing. The insulation must be neatly friction-fitted between framing members so that the potential for gaps and convective heat loss is reduced. In wall cavities, the insulation must be neatly friction-fitted between framing members to prevent sagging. In ceiling or roofs, the insulation may be fitted between framing members or fitted over framing members and butted tightly. The insulation must extend to the external wall top plate. The insulation must not be folded or compressed. A close even fit provides the most efficient thermal performance. Whenever possible, the insulation should be fitted beneath wiring or plumbing.

15.5 The clearance requirements for heating appliances and downlights must be followed. Refer also to NZS 4246.

Inspections

15.6 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of Pink® Batts® Insulation installations.

Health and Safety

16.1 Refer to the Technical Literature and NZS 4246 for guidance on health and safety requirements such as personal protective clothing and installation hazard assessment.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

17.1 Thermal resistance testing of Pink® Batts Insulation in accordance with AS/NZS 4859.1 has been completed. The results have been reviewed by BRANZ technical experts.

17.2 Tests have been carried out in accordance with AS 1530.1. Pink® Batts® Insulation is not deemed combustible according to the test criteria. The results have been reviewed by BRANZ technical experts.

Other Investigations

18.1 An assessment of the durability of Pink® Batts® Insulation has been made by BRANZ technical experts.

18.2 The manufacturer's Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

19.1 The manufacture of Pink® Batts® Insulation has been examined by BRANZ, including methods adopted for quality control. Details of the manufacturing processes, and quality and composition of the raw materials used were obtained and found to be satisfactory.

19.2 The range of Pink® Batts® Insulation products have been assessed for their environmental impact by the New Zealand Ecolabelling Trust and comply with the requirements of the Eco Choice Aotearoa Specification, Licence No. 2504017 - Thermal (resistive type) Building Insulants. The products that have the Environmental Choice licence are noted in Table 1.

19.3 Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions) is responsible for the quality of the product supplied.

19.4 Quality of installation of the product on-site is the responsibility of the installer.

19.5 Quality of maintenance of the building to ensure the insulation material remains dry is the responsibility of the building owner.

Sources of Information

- AS 1530.1:1994 Combustibility test for materials.
- AS/NZS 4859.1:2018 Thermal insulation materials for buildings.
- BRANZ House Insulation Guide (Sixth Edition), 2022.
- NZS 4246:2016 Energy efficiency - Installing bulk thermal insulation in residential buildings.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 12 August 2024

This Appraisal has been amended to update Table 1.

Amendment No. 2, dated 04 November 2024

This Appraisal has been amended to update product specifications in Table 1 for products R5.0 ceiling, R6.0 ceiling, R7.0 ceiling and R2.4 wall.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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In the opinion of BRANZ, Pink® Batts® Insulation is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions), and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions):
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and quality of work;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions).
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions) or any third party.

For BRANZ



Claire Falck
Chief Executive

Date of Issue:
30 October 2023

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BRANZ Appraised
Appraisal No. 633 [2024]

INSULATED FAÇADE SYSTEM



Appraisal No. 633 (2024)
This Appraisal replaces BRANZ Appraisal No. 633 (2018)

BRANZ Appraisals
Technical Assessments of products for building and construction.

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WFTAO
WORLD FEDERATION OF TECHNICAL ASSESSMENT ORGANISATIONS

Product

1.1 Insulated Façade System is a cavity-based Exterior Insulation and Finishing System (EIFS) wall cladding. It is an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The system consists of Graphex (Neopor®), expanded polystyrene (EPS), extruded polystyrene (XPS) or polyisocyanurate (PIR) sheets fixed over battens to form the cavity. The plaster coating system consists of 5 mm thickness of fibreglass mesh reinforced, polymer-modified, cement-based plaster, which is finished with a cement-based finishing plaster that is then painted with a 100% acrylic-based paint system. The chosen finishing plaster is applied to give a range of different appearances, such as a sponge, patterned, adobe or spray textured finish. The system incorporates Resene Construction Systems EdgeSeal joinery flashings.

Scope

2.1 Insulated Façade System has been appraised as an external wall cladding system for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 for timber-framed buildings; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Insulated Façade System has also been appraised for weathertightness and structural wind loading when used as an external wall cladding system for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber and steel framing subject to specific engineering design; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.

2.3 Insulated Façade System must only be installed on vertical surfaces (except for tops of parapets, sills and balustrades, which must have a minimum 10° slope and be waterproofed in accordance with the Technical Literature).

2.4 The system is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(Note: The Appraisal of Insulated Façade System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.)*

2.5 Installation of components and accessories supplied by Resene Construction Systems and its approved installers must be carried out only by Resene Construction Systems approved installers.

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Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Insulated Façade System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Insulated Façade System meets the requirements for loads arising from self-weight, wind, impact and creep [i.e. B1.3.3 (a), (h), (j) and (q)]. See Paragraphs 10.1-10.4.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years, B2.3.1 (c) 5 years and B2.3.2. Insulated Façade System meets these requirements. See Paragraphs 11.1-11.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Insulated Façade System meets this requirement. See Paragraphs 16.1-16.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Insulated Façade System meets this requirement.

Technical Specification

4.1 System components and accessories supplied by Resene Construction Systems are as follows:

Cavity Battens

- **Graphex peel 'n' stick battens** – manufactured to meet the requirements of AS 1366.3 with an approximate density of 18 kg/m^3. The battens are 45 mm wide by 21 mm thick, are supplied in 1,200 mm lengths and are coated on the back face with an acrylic adhesive, which is protected prior to installation by a removable film.
- **Standard EPS cavity battens** – manufactured from high density (Class H) EPS with an approximate density of 24 kg/m^3. The battens are 40 mm wide by 22 mm thick and are supplied in 2,400 mm lengths.
- **Timber cavity battens** – nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to minimum Hazard Class H3.1.

Graphex

- **Graphex sheets** are 50-100 mm thick with an approximate density of 18 kg/m^3. The sheets are supplied in lengths ranging from 2.4-3.6 m by 1.2 m wide and are manufactured to meet the requirements of AS 1366.3.

EPS Sheets

- **EPS sheets** are 40-100 mm thick Class H with an approximate density of 24 kg/m^3, or 50 or 60 mm minimum thickness if using Class S with an approximate density of 16 kg/m^3. The sheets are supplied in lengths ranging from 2.4-3.6 m by 1.2 m wide and are manufactured to meet the requirements of AS 1366.3.

XPS Sheets (XTherm Blue)

- **XPS sheets** are 50 mm thick with an approximate density of 34 kg/m^3. The sheets are supplied in lengths ranging from 1.2-2.2 m by 0.6 m wide and are manufactured to meet the requirements of AS 1366.3.

PIR Sheets (XTherm Gold)

- **PIR sheets** are 50-100 mm thick with an approximate density of 35 kg/m^3. The sheets are supplied in 2.4 m lengths by 1.2 m wide and are manufactured to meet the requirements of AS 1366.3.

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Base, Levelling and Waterproofing Plasters

A base [mesh] coat is applied using one of the following renders, followed by a subsequent coat of the same render to level the surface.

- **Coarse Mesh Render** is a polymer-modified, portland cement-based plaster supplied in 20 kg bags and mixed on site with clean drinking water. It is applied as the base coat in a minimum 2 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.
- **Rockcote PM100 Quick Render** is a dry mix, cement-based, polymer-modified plaster supplied in 20 kg bags and mixed on-site with clean water. It is used as a base coat for bonding and bedding the fibreglass mesh and is trowel-applied to an approximate thickness of 4-5 mm.
- **Resene Construction Systems RMaxx** is a high-yielding, cement-free dispersion based base coat plaster supplied in 20 kg pails. It is applied as the base coat in a minimum 1.5 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. An additional 1-1.5 mm is applied to fully encase the mesh.
- **HydroPlast** is an acrylic dry powder with cement activator, that when mixed with water creates a flexible waterproofing render for use over plastered balustrade and fixing blocks. It is supplied in 10 kg bags and is applied over the levelling render with a trowel in a 1 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.

Primer

- **Rockcote Render Prime** is a water-borne acrylic, polymer dispersion, tintable coating supplied in 15 L pails. It is brush or roller-applied as a primer between the selected base coat and acrylic texture.
- **Resene Limelock** is a water-borne acrylic, polymer dispersion, tintable coating supplied in 10 L pails. It is brush or roller applied as a primer between the mineral textures and the finishing system.

Mineral Texture Coating

- **Resene Construction Systems Mineral Texture Coatings** are dry mix, cement-based, polymer-modified plasters, supplied in 20 kg bags and mixed on site with clean water. They are trowel or spray applied to an approximate thickness of 1-3 mm.

Acrylic Texture Coating

- **Resene Construction Systems Acrylic Texture Coatings** are ready mixed, tintable, mineral-filled, polymer-based, elastomeric high-build coating with in pail and dry film preservatives, supplied in 15 L pails. They are spray or trowel applied to an approximate thickness of 0.5–2 mm. The selected Resene Construction Systems texture colour must have a minimum light reflectance value [LRV] of 25%.

uPVC Primer, Plaster Modifier, Waterproofing Plaster and Finishes

- **Multistop bedding compound** is used as a uPVC primer when mixed with diluted Acrylbond resin or water.
- **Acrylbond** is a water-based co-polymer resin supplied in 4 and 15 L pails used as a plaster modifier.
- **Resene Lumbersider** is a water-borne 100% acrylic-based protective finish for use over mineral and acrylic textures. It is supplied in 4 and 10 L pails and is brush or roller applied. The protective finish coat must have a minimum LRV of 25%.
- **Resene X200** is an acrylic waterproofing membrane for use as a protective finish over mineral and acrylic textures. It is supplied in 4 and 10 L pails and is brush, roller or spray applied. The protective finish coat must have a minimum LRV of 25%.

Accessories

- **Reinforcing mesh** - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 5 x 4 mm square and a weight of 160 g/m² for use in domestic and light commercial situations.
- **uPVC components** – starter strip flashing, standard corner flashing, vertical control joint, horizontal control joint, EdgeSeal sill, jamb and head flashings, and 40, 50, 60 mm and universal ventilated starter strips.

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- **3M All Weather Flashing Tape 8067** – flexible flashing tape with a proprietary backing and an acrylic pressure sensitive adhesive to seal the EdgeSeal head flashing to the building underlay. The tape is available 76 mm wide in rolls 22.8 m long.
- **Sticky Mesh** - alkali-resistant fibreglass, 150 mm wide corner pieces.
- **Graphex/EPS/XPS/PIR sheet nail fixings (timber frame)** – hot-dip galvanised steel flat head nails with 40 mm diameter washers. Refer to Table 1 for fixing length requirements.
- **Graphex/EPS/XPS/PIR sheet screw fixings (timber frame)** – 8 g AS 3566 Corrosion Class 4 hot-dip galvanised wood screws with 40 mm diameter washers in NZS 3604 defined exposure zones B, C and D. Refer to Table 2 for fixing length requirements.
- **Graphex/EPS/XPS/PIR sheet screw fixings (steel frame)** – 8 g self-drilling AS 3566 Corrosion Class 4 hot-dip galvanised screws with 40 mm diameter washers in NZS 3604 defined exposure zones B, C and D. Refer to Table 3 for fixing length requirements.

(Note: Hot-dip galvanising must comply with AS/NZS 4680.)

- **Washers** - 40 mm diameter polypropylene washers.

Table 1: Graphex/EPS/XPS/PIR sheet fixing lengths (nails to timber frame)

Sheet Thickness	Nail Size (mm)
40	90 x 3.55
50	100 x 3.75
60	110 x 4.0
70	125 x 5.3
80	150 x 6.0
90	150 x 6.0
100	150 x 6.0

Table 2: Graphex/EPS/XPS/PIR sheet fixing lengths (screws to timber frame)

Sheet Thickness	Minimum Screw Length (mm)
40	80
50	100
60	110
70	120
80	130
90	140
100	150

Table 3: Graphex/EPS/XPS/PIR sheet fixing lengths (screw to steel frame)

Sheet Thickness	Minimum Screw Length (mm)
40	80
50	95
60	95
70	105
80	115
90	125
100	135

4.2 Accessories used with the system which are supplied by the approved applicator are:

- **Waterproof membrane tapes** - tapes covered by a valid BRANZ Appraisal for use as waterproofing membranes over tops of plastered parapets, balustrades, fixing blocks and the like.
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
- **Adhesive** - compatible adhesive for gluing uPVC components to the Graphex EPS/XPS/PIR sheets as and where required.

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4.3 Accessories used with the system, which are supplied by the building contractor are:

- **Flexible wall underlay** - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible wall underlay support** - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible building underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *(Note: Mesh and wire galvanising must comply with AS/NZS 4534.)*
- **Rigid wall underlay** - plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
- **Flexible sill and jamb flashing tapes** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetration openings.

Handling and Storage

5.1 Handling and storage of all materials supplied by Resene Construction Systems or the approved installer, whether on-site or off-site, are under the control of Resene Construction Systems approved installers. Dry storage must be provided on-site for the fibreglass mesh and bags of plaster. Graphex/EPS/XPS/PIR sheets, battens, uPVC flashings and profiles must be protected from direct sunlight and physical damage, and should be stored flat and under cover. Liquid components must be stored in frost-free conditions.

5.2 Handling and storage of all materials supplied by the building contractor, whether on-site or off-site, are under the control of the building contractor. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- EPS Insulated Facade System - 50 mm EPS over Timber Frame - RMaxx RenderSpec, dated August 2024.
- EPS Insulated Facade System - 50 mm EPS over Timber Frame - Acrylic RenderSpec, dated August 2024.
- EPS Insulated Facade System - 50 mm EPS over Timber Frame - Mineral RenderSpec, dated August 2024.
- Insulated Facade System, EPS Panel 50 mm (20 mm Cavity) standard details:
  - Foundation, Sheet 71.02.00, dated 1 November 2017.
  - External Corner, Sheet 71.03.00, dated 1 November 2017.
  - Internal Corner, Sheet 71.04.00, dated 1 November 2017.
  - Window Sill, Sheet 71.05.00, dated 4 November 2020.
  - Window Jamb, Sheet 71.06.00, dated 4 November 2020.
  - Window Head - Option 1, Sheet 71.07.00, dated 4 November 2020.
  - Soffit, Sheet 71.08.00, dated 1 November 2017.
  - Roof Apron, Sheet 71.09.00, dated 1 November 2017.
  - Vertical Control Joint - Option 1, Sheet 71.10.00, dated 1 November 2017.
  - Horizontal Control Joint, Sheet 71.11.00, dated 1 November 2017.

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6.2 BRANZ has assessed the set of core weathertightness and installation details and specifications listed above. Resene Construction Systems has an extensive library of CAD details and specifications for various combinations of foam type and thicknesses, cavity depth and plaster finishes. The designer must select the correct details for their building design and confirm their suitability. Contact Resene Construction Systems for assistance.

6.3 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber wall framing behind Insulated Façade System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases, studs must be at maximum 600 mm centres for buildings designed to NZS 3604 in Wind Zones up to, and including, Very High and at maximum 400 mm centres for buildings situated in NZS 3604 Wind Zone Extra High and specifically designed buildings situated in Wind Zones above NZS 3604 defined Extra High. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

7.3 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. *[Note: If sheets are fixed to framing with a moisture content of greater than 24%, problems may occur at a later date due to excessive timber shrinkage.]*

Steel Framing

7.4 Steel framing must be to a specific design meeting the requirements of the NZBC.

7.5 The minimum framing specification is 'C' section studs and nogs of overall section size of 75 mm web and 32 mm flange. Steel thickness must be minimum 0.55 mm.

7.6 For steel-framed buildings situated within NZS 3604 defined Wind Zones up to, and including, Very High, studs must be at maximum 600 mm centres. For all other buildings, studs must be at maximum 400 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

Graphex/EPS/XPS/PIR Sheet Setout

7.7 All vertical sheet edges must be supported and fixed through the cavity battens to the framing. Horizontal sheet edges must be supported at fixing locations with cavity spacers 100 mm maximum, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.2 f). At the base of the wall, the sheets must hang 50 mm below the supporting framing.

7.8 Additional framing will be required at soffits, internal and external corners and window and door openings for the support and fixing of sheet edges.

General

8.1 When the Insulated Façade System is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres and sheet fixing centres are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.

8.2 Openings in the cavity vent strip provide a minimum ventilation opening area of 1,000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 b).

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8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.

8.4 At balcony, deck or roof/wall junctions, the bottom edge of Insulated Façade System must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.

8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to, and including Very High, and rigid underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the fixing lengths must be increased by a minimum of the thickness of the underlay.

8.6 Where penetrations through the system are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities. A minimum 10 mm gap must be left between the bottom of the vertical cavity batten and the flashing to the opening.

8.7 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. The Technical Literature provides some guidance. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Electrical Cables

8.8 PVC sheathed electrical cables must be prevented from direct contact with the sheets. When cables must penetrate the sheets for exterior electrical connections, the cable must be directly supported by passing through an electrical conduit.

Control Joints

9.1 Control joints must be constructed in accordance with the Technical Literature, and be provided as follows:

- **Horizontal control joints** - at maximum 6 m centres.
- **Vertical control joints** - at maximum 8 m centres; aligned with any control joint in the structural framing; where the system abuts different cladding types, or where the system covers different structural materials.

[Note: Horizontal and vertical control joints must be located over structural supports. The design of vertical control joints where the system abuts different cladding types is outside the scope of this Appraisal and is the responsibility of the designer - refer to Paragraph 8.7.]

Inter-storey Junctions

9.2 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey joints must be provided to limit continuous cavities to the lesser of two-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b).

Structure

Mass

10.1 The mass of the Insulated Façade System is approximately 7 kg/m^2, therefore it is considered a light wall cladding in terms of NZS 3604.

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Impact Resistance

10.2 The system has adequate resistance to hard body impacts likely to be encountered in normal residential use. Where a greater level of impact protection is required, a heavier grade of reinforcing mesh may be used. The heavy-grade fibreglass reinforcing mesh (360 g/m^2) embedded in 5 mm thick plaster provides approximately four times the hard body impact strength of the standard grade mesh in 3 mm thick plaster. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

10.3 Insulated Façade System is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa design differential ULS wind pressure where buildings are specifically designed.

Graphex/EPS/XPS/PIR Sheet Fixing

10.4 Sheets must be fixed through the cavity battens and cavity spacers to the wall framing at maximum centres specified in Table 4.

Table 4: Sheet Fixing Centres for Edges and Body of the Sheet

Maximum Fixing Centres (mm) in Relevant NZS 3604 Wind Zone						
Stud Centres	Low[1]	Medium[1]	High[1]	Very High[2]	Extra High[3]	SED up to 2.5 kPa[3]
400 mm	300	300	300	200	150	150
600 mm	300	300	300	250	-	-

1. One fixing is also required into each dwang and top and bottom plates at mid length.

2. Fixings are also required to each dwang at 300 mm centres and top and bottom plates at mid-dwang length.

3. Fixings are also required at 300 mm centres along top and bottom plates.

Durability

11.1 Insulated Façade System meets the performance requirements of NZBC Clause B2.3.1 (b) 15 years for the cavity system and plaster finish, and the performance requirements of NZBC Clause B2.3.1 (c) 5 years for the exterior paint system.

Serviceable Life

11.2 Insulated Façade System is expected to have a serviceable life of at least 30 years, provided the system is maintained in accordance with this Appraisal, and the sheets, fixings and plaster are continuously protected by a weathertight coating and remain dry in service.

11.3 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of sheets in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

12.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.

12.2 Regular cleaning (at least annually) of the paint coating is required to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Paint systems must be re-coated at approximately 8-10 yearly intervals in accordance with the paint manufacturer's instructions.

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12.3 Annual inspections must be made to ensure that all aspects of the cladding system, including the coating system, plaster, flashings and any sealed joints remain in a weatherproof condition. Any cracks, damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings and the like must be repaired in accordance with the instructions of Resene Construction Systems.

12.4 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *[Note: Failing to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Insulated Façade System.]*

Prevention of Fire Occurring

13.1 Separation or protection must be provided to Insulated Façade System from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1 and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Control of Internal Fire and Smoke Spread

14.1 The Insulated Façade System includes Graphex/EPS/XPS/PIR sheets, which are combustible insulants. When used on walls, the insulation, including any surface lining product enclosing the insulation from the adjacent occupied space, must achieve the Group Number for internal surface finish requirements as specified in NZBC Acceptable Solution C/AS1, Paragraph 4.2.2.1 or NZBC Acceptable Solution C/AS2, Paragraph 4.17.2 and Table 4.3.

14.2 The Graphex/EPS/XPS/PIR sheets used with the system must meet the flame propagation criteria of AS 1366 as specified in NZBC Acceptable Solution C/AS1, Paragraph 4.2.2 or NZBC Acceptable Solution C/AS2, Paragraph 4.17.2.

Control of External Fire Spread

15.1 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

Vertical Fire Spread

15.2 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

15.3 Where the external wall is not protected by a sprinkler system or separated from the relevant boundary as required by NZBC Acceptable Solutions C/AS1 or C/AS2, the cladding system will need to be installed over a Fire Resistance Rated (FRR) external wall with the required FRR.

External Cladding Systems

15.4 Insulated Façade System comprising Graphex or XTherm Gold (PIR) sheets, mineral base coat with mineral texture finish, Resene Limelock, and Resene Lumbersider or X200 painted finish achieves a Type A classification suitable for use on external walls in accordance with NZBC Acceptable Solutions C/AS1, Table 5.3.1.1 and NZBC Acceptable Solution C/AS2, Section 5.8.

15.5 Insulated Façade System comprising EPS sheet, mineral base coat with mineral texture finish, Resene Limelock, and Resene Lumbersider or X200 painted finish coat achieves a Type B classification suitable for use on external walls in accordance with NZBC Acceptable Solutions C/AS1, Table 5.3.1.1 and NZBC Acceptable Solution C/AS2, Section 5.8.

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External Moisture

16.1 Insulated Façade System, when installed in accordance with this Appraisal and the Technical Literature, prevents the penetration of moisture that could cause undue dampness or damage to building elements.

16.2 The cavity must be sealed off from the roof and subfloor space to meet code compliance with NZBC Clause E2.3.5.

16.3 Insulated Façade System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.

16.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

16.5 The use of Insulated Façade System where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for junctions, penetrations, etc. to remain weather-resistant.

Internal Moisture

17.1 Insulated Façade System alone does not meet NZBC Acceptable Solution E3/AS1, Paragraph 1.1.1 (a). Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

17.2 Insulated Façade System is not a barrier to the passage of water vapour, and when correctly installed will not create or increase the risk of moisture damage resulting from condensation.

17.3 When Insulated Façade System is installed over a steel frame, the battens and insulated drainage cavity will act as a thermal break to the steel frame in accordance with NZBC Acceptable Solution E3/AS1.

Installation Information

Installation Skill Level Requirement

18.1 Installation and finishing of components and accessories supplied by Resene Construction Systems and its approved installers must be completed by trained installers, approved by Resene Construction Systems.

18.2 Installation of the accessories supplied by the building contractor must be carried out in accordance with Insulated Façade System Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License Class.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

19.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of Insulated Façade System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid wall underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

19.2 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Aluminium Joinery Installation

19.3 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5-10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

Insulated Façade System

19.4 The system must be installed in accordance with the Technical Literature by Resene Construction Systems approved installers.

19.5 The plaster system must only be applied when the air and substrate temperature is within the range of 5-30°C.

Inspections

19.6 The Technical Literature must be referred to during the inspection of Insulated Façade System installations.

Finishing

19.7 The paint manufacturers' instructions must be followed at all times for application of the paint finish. The plaster must be cured for a minimum of 2-3 days and must be dry before commencing painting.

Health and Safety

20.1 Safe use and handling procedures for the components that make up Insulated Façade System are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

21.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC Clause E2 code compliance for Insulated Façade System was based on evaluation of all details within the scope and as stated within this Appraisal and testing of the Resene Construction Systems Insulated Facade System to NZBC E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, vertical and horizontal control joints, internal and external corners and balustrade to wall junction with a plastered cap. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for drained cavity claddings.

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- Wind face load and fastener pull through testing for EIFS cladding systems. BRANZ determined design wind suction pressures, and by comparing these pressures with AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber and steel-framed walls.
- The Insulated Façade System comprising Graphex or XTherm Gold (PIR) sheet, mineral base coat, mineral texture, Resene Limelock and Resene Lumbersider or X200 painted finish has been tested in accordance with ISO 5660 and achieved a Type A classification. Testing was carried out as per NZBC Acceptable Solution C/AS1, Appendix E, Section E.5.1 and NZBC Acceptable Solution C/AS2, Appendix C, C7.1.
- The Insulated Façade System comprising EPS sheet, mineral base coat with mineral texture finish, Resene Limelock, and Resene Lumbersider or X200 painted finish coat has been tested in accordance with ISO 5660 and achieved a Type B classification. Testing was carried out as per NZBC Acceptable Solution C/AS1, Appendix E, Section E.5.1 and NZBC Acceptable Solution C/AS2, Appendix C, C7.1.

Other Investigations

22.1 Structural and durability opinions have been given by BRANZ technical experts.

22.2 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

22.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

23.1 The manufacture of the plasters and finishes has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

23.2 The quality of materials, components and accessories supplied by Resene Construction Systems is the responsibility of Resene Construction Systems.

23.3 Quality on-site is the responsibility of the Resene Construction Systems approved installers.

23.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, wall underlays, flashing tapes, air seals and joinery head flashings in accordance with the instructions of Resene Construction Systems.

23.5 Building owners are responsible for the maintenance of Insulated Façade System in accordance with the instructions of Resene Construction Systems.

Sources of Information

- AS 1366.3:1992 Rigid cellular plastic sheets for thermal insulation - Rigid cellular polystyrene - Moulded [RC/PS-M]
- AS 3566:2002 Self-drilling screws for the building and construction industries.
- AS/NZS 1170:2002 Structural design action – General principles.
- AS/NZS 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber structures standard.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- NZS 4214:2006 Methods of determining the total thermal resistance of parts of buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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In the opinion of BRANZ, the Insulated Façade System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Rockcote Resene Ltd T/A Resene Construction Systems, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Rockcote Resene Ltd T/A Resene Construction Systems:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and quality of work;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Rockcote Resene Ltd T/A Resene Construction Systems.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Rockcote Resene Ltd T/A Resene Construction Systems or any third party.

For BRANZ



Claire Falck
Chief Executive

Date of Issue:
06 September 2024

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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BRANZ Appraised
Appraisal No. 968 [2023]

VELUX SKYLIGHTS



Appraisal No. 968 (2023)

This Appraisal replaces BRANZ Appraisal No. 968 (2017)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Velux Skylights are for use on roofs to provide natural light into interior spaces within buildings. Velux Skylights come in two ranges – low-pitch models include the FCM, VCM and VCS series, suitable for use on roof pitches between 0° and 60°, and FS, VS, VSE and VSS series which are for use with roof pitches between 15° and 60°. Some models are openable and can be used to provide ventilation.

Scope

2.1 Velux Skylights (FS, VS, VSE and VSS series) have been appraised for use on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard to building height and maximum floor plan area; and,
- with roof structures designed and constructed to meet the requirements of the NZBC; and,
- with masonry tile, pressed metal tile, and profiled metal roof cladding systems complying with NZBC Acceptable Solution E2/AS1; and,
- with a roof pitch between 15° and 60°; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Velux Low-Pitch Skylights (FCM, VCM and VCS series) have been appraised for use on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard to building height and maximum floor plan area; and,
- with roof structures designed and constructed to meet the requirements of the NZBC; and,
- with pitched roof cladding types and profiles and minimum pitches as specified in E2/AS1; or,
- for use on flat or nominally flat roofs making use of membrane roof systems; and,
- with a roof pitch between 0° and 60°; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

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Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Velux Skylights, if designed, used, installed, and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC.**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.3. Velux Skylights meet the requirements for loads arising from snow, wind and impact [i.e. B1.3.3 (g), (h) and (j)]. See Paragraphs 8.1-8.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Velux Skylights meet this requirement. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Velux Skylights meet these requirements. See Paragraph 12.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1 and F2.3.3 (a). Velux Skylights meet these requirements. See Paragraph 7.3.

Clause G4 VENTILATION: Performance G4.3.1 and G4.3.3. Openable Velux Skylights contribute to meeting these requirements. See Paragraph 14.1.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. Velux Skylights contribute to meeting these requirements. See Paragraph 15.1.

Clause G9 ELECTRICITY: Performance G9.3.1. Velux Skylights meet this requirement. See Paragraph 16.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 and H1.3.2E. Velux Skylights contribute to meeting these requirements. See Paragraph 17.1.

Technical Specification

4.1 Velux Skylights (FS, VS, VSE and VSS series) are a range of fixed and opening skylights which are manufactured from preservative treated softwood frames and sashes, finished on the interior faces with a white semi-gloss paint. External cappings are 'grey friars' coloured PVDF lacquered aluminium.

4.2 Velux Low-Pitch Skylights (FCM, VCM and VCS series) are a range of fixed and opening low-pitch skylights which are finished on the interior faces with a white semi-gloss paint. The FCM Low-Pitch Skylight has an aluminium frame to the perimeter of the insulated glazing unit and an integral rubber gasket to seal the unit to the curb. The VCM and VCS Low-Pitch Skylights have aluminium frames and sashes with white PVC interior frames. External cappings for Velux Low-Pitch Skylights are aluminium. All aluminium components of Velux Low-Pitched Skylights are pre-finished with a 'grey friars' coloured PVDF lacquer. Velux Low-Pitch Skylights are primarily suited for use with roof membranes and wide-profile metal roofing. Flashings and roof detailing for Velux Low-Pitch Skylights must be specifically designed in all instances.

4.3 The Velux Skylight models covered by this Appraisal are:

- FS / VS / VSE / VSS:
  - Size code range C01-S06, dimension range 550 x 700 mm–1,140 x 1,180 mm.
- FCM:
  - Size code range 1430-4646, dimension range 488 x 895 mm–1,302 x 1,302 mm.
- VCM / VCS:
  - Size code range 2222–4646, dimension range 692 x 692 mm–1,302 x 1,302 mm.

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Glazing

4.4 VELUX Skylights are factory glazed using sealed double-glazed insulating glass units (IGU's). The IGU's are Type 04 which is the product code on the packaging and is marked on the IGU itself on the spacer bar between the glazing and on the glass panes.

4.5 Type 04 units comprise either a 3 or 3.9 mm thick toughened outer pane with a low emissivity (Low-E) coating, a 9 mm argon-filled cavity and a 5.36 mm thick inner pane of laminated toughened safety glass. The outer pane has a coating which is designed to reduce the buildup of dirt and ease cleaning.

4.6 The units carry markings to show compliance with American National Standards Institute Standard ANSI Z97.1.

Flashings

4.7 EDW, EDL and EKW Flashings are a range of Kynar 500 painted aluminium flashings designed for use with Velux Skylights (FS, VS, VSE and VSS series). Flashings and roof detailing for the Low-Pitch Skylight must be specifically designed and are outside the scope of the Appraisal.

Handling and Storage

5.1 Handling and storage of all components of Velux Skylights is under the control of the skylight installer. Components must be kept dry and under cover at all times. Care must be taken to avoid surface damage to the skylight components and flashings during the installation process.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Technical Manual - Velux Skylights and Roof Windows - New Zealand - Product: Skylights - April 2020.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Velux Skylights are for use on roofs to provide natural light into interior spaces within buildings. Velux Skylights come in two ranges, low-pitch models include the FCM, VCM and VCS series, suitable for use on roof slopes between 0° and 60°. The FS, VS, VSE and VSS series are appraised with roof slopes between 15° and 60°. Installation of Velux Skylights on roofs with other pitches is outside the scope of this Appraisal and their installation must be specifically designed in all instances.

7.2 Velux Skylights are suitable for most existing timber-framed roofs. For such installations, it is important that the roof structure is checked by a suitably qualified person for structural adequacy and suitability of the existing roof cladding.

7.3 Velux Skylights meet the safety glass requirements of NZS 4223.4 for sloped glazing up to an installed height above floor level of not more than 5 m *(Note: The installed height means the height to the highest part of the glazing).*

7.4 When installed on new roofs, whenever possible, the installation should be carried out concurrently with the roof cladding installation.

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Structure

Wind

8.1 Velux Skylights are suitable for use in NZS 3604 Wind Zones up to, and including, Extra High.

Snow

8.2 Velux Skylights are suitable for use in areas where buildings are designed for a 1 kPa snow loading.

Point Loads

8.3 Velux Skylights have been assessed for point loads from AS/NZS 1170 for situations where supports should be placed over the surface when access is necessary.

Durability

Serviceable life

9.1 Velux Skylights are expected to have a serviceable life of at least 15 years, provided they are maintained in accordance with this Appraisal and the Technical Literature.

9.2 On exposure to the weather, the coil-coated aluminium may gradually lose the original surface finish. A faster reduction in both surface finish and overall serviceable life can be anticipated in severe industrial, geothermal and marine exposures.

Maintenance

10.1 The internal surface of the glazing on Velux Skylights can be simply cleaned from inside the building where reasonable access is provided. The exterior glass surface of Velux Skylights can only be cleaned from the exterior of the building.

10.2 The glazing and external surfaces of the skylights can be cleaned using a mild, non-abrasive glass cleaner along with a soft brush or other non-abrasive applicator to maintain the surface appearance.

10.3 Interior surfaces of Velux Skylight models VSE, VS and FS with pre-finished wood frames need to be inspected annually. As with any finished surface, it is subject to peeling, cracking or fading and will need to be re-finished/re-painted periodically. To re-finish/re-paint the skylight interior wood surfaces, prepare the skylight by removing the factory finish.

10.4 Keep all leaves clear from around Velux Skylights. Ensure all exposed fasteners are secure. Inspect roofing and flashing for excessive wear or scratches on the roofing finish. Scratches in the cladding finish may be fixed with touch-up paint available through Velux New Zealand Ltd. Damaged claddings or flashings should be replaced as soon as they are detected.

10.5 The internal workings of the manual and the Integra electric operators are considered maintenance free over the lifetime of the Velux Skylight. Mechanisms are pre-lubricated and need no additional lubrication. The chains and hinges should be checked and lubricated as required.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Velux Skylights from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

12.1 Velux Skylights, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

Internal Moisture

13.1 Experience with double-glazed skylights has shown that in normal domestic or similar applications, the windows do not pose a significant risk of condensation when correctly installed.

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Ventilation

14.1 Velux Skylights which contain an openable aperture will contribute to the compliance of a building with NZBC Clause G4. Consideration must be given to the 'net openable area' required for a particular space by the designer. NZBC Acceptable Solution G4/AS1 provides guidance on required ventilation.

Natural Light

15.1 Velux Skylights all contain transparent apertures which can contribute to the compliance of a building with NZBC Clause G7. Consideration of the amount of illuminance provided by the skylight for a particular space will depend on a wide range of factors unique to each installation e.g. room size, position, sun orientation, angle, etc. The use of Velux Skylights to supplement natural light from other sources is an Alternative Solution to NZBC Clause G7.

Electricity

16.1 Where a new electrical supply is required for Velux opening skylights, the installation must be completed by a Registered Electrician in accordance with New Zealand Electrical Code of Practice NZECP 51.

16.2 Electrical safety of the electric skylight operator complies with IEC 60335.

Energy Efficiency

Velux Schedule Method

17.1 The Velux Schedule Method may be used as an alternative solution to the Schedule Method contained in the NZBC Acceptable Solution H1/AS1 for housing, and other buildings up to 300 m^2 in floor area. The Velux Schedule Method requires that:

- the sum of the vertical glazing area and the Velux product area (Velux skylights, roof windows and sun tunnels) is 30% or less of the total wall area; and
- the combined glazing area on the east, south, and west facing walls is 30% or less of the combined total area of these walls; and
- the Velux product area is no more than 1.5 m^2 or 1.5% of the total roof area (whichever is greater); and
- the opaque door area is no more than 6 m^2 or 6% of the total wall area (whichever is greater); and
- the roof, wall, floor, window and door glazing R-values are in accordance with section 2.1.2 of NZBC Acceptable Solution H1/AS1.

Calculation and Modelling Methods

17.2 Alternatively, designers can use the calculation methods contained in NZBC Acceptable Solutions H1/AS1 or H1/AS2, or the modelling methods contained in NZBC Verification Methods H1/VM1 or H1/VM2. Contact Velux New Zealand Ltd for the relevant product R-values.

Installation Information

Installation Skill Level Requirement

18.1 The installation of Velux Skylights must be completed by installers trained by Velux New Zealand Ltd or by competent, experienced tradespersons with an understanding of roof window installation and weathertightness details.

System Installation

19.1 Installation must be completed in accordance with instructions given in the Velux Skylights Technical Literature and this Appraisal.

Health and Safety

20.1 There are no particular health and safety issues relating to the installation or use of Velux Skylights. Installers must however observe safe working practices for working on roofs and at heights.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

21.1 Velux Skylights have been subjected to dynamic weather resistance testing by a National Association of Testing Authorities [NATA] registered laboratory in Australia. Velux Skylights have also been subjected to dynamic weather resistance testing by BRANZ.

Other Investigations

22.1 Velux Skylights have been assessed for resistance to impact loads, snow loads and resistance to wind pressures [non-cyclonic regions]. These assessments have been reviewed by BRANZ and were found to be satisfactory.

22.2 An assessment was made of the durability of Velux Skylights by BRANZ.

22.3 The Velux Schedule Method has been reviewed by BRANZ experts.

22.4 Site inspections have been carried out by BRANZ to assess fitness for purpose and the practicability of installation, and to assess in service performance.

22.5 Weathertightness detailing of the Velux Skylights has been assessed by BRANZ and found to be satisfactory. Instructions for installation of units and associated flashing components for different roof types have also been reviewed and found to be satisfactory.

22.6 The Technical Literature for Velux Skylights has been examined by BRANZ and found to be satisfactory.

Quality

23.1 The manufacture of Velux Skylights has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of Uniform Evaluation Service [UES] Evaluation Report Number 199 which covers quality aspects associated with Velux Skylights. BRANZ has also taken note of ETA Denmark European Technical Assessment ETA-13/0764 of 14/10/2015 which covers Velux Flashings.

23.2 The quality of materials, components and accessories supplied to the market is the responsibility of Velux New Zealand Ltd.

23.3 Quality of installation on-site of Velux Skylight components and accessories is the responsibility of the installer.

23.4 Designers are responsible for building design, and specification of natural lighting and ventilation systems.

23.5 Building owners are responsible for any required maintenance of Velux Skylights in accordance with the advice of Velux New Zealand Ltd.

Sources of Information

- ANSI Z97.1:2015 For safety glazing materials used in buildings - safety performance specifications and methods of test.
- AS 4285:1995 Skylights.
- AS/NZS 1170.0:2002 Structural design actions - Permanent, imposed and other actions.
- IEC 60335 Household and similar electrical appliances - safety.
- NZECP 51:2004 New Zealand Electrical Code Of Practice For Homeowner/Occupier's Electrical Wiring Work in Domestic Installations, Ministry of Economic Development, 2004.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4223.4:2016 Code of practice for glazing in buildings - Dead, wind and snow loading.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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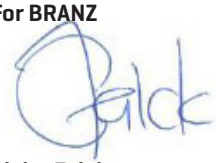
In the opinion of BRANZ, Velux Skylights are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Velux New Zealand Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Velux New Zealand Ltd:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Velux New Zealand Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Velux New Zealand Ltd or any third party.

For BRANZ



Claire Falck
Chief Executive

Date of Issue:
21 August 2023

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

CodeMark

Certificate no: CMNZ70046
Version: 2
Original issue date: 30 April 2020
Version date: 18 June 2025

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1. Certificate Holder Details

ABODO

Abodo Wood Ltd
62 Ascot Road Mangere, Auckland 2022 New Zealand
Email: info@abodo.co.nz
Ph: +64 (0)9 302 9555
www.abodo.co.nz

2. Product Certification Body

Bureau Veritas Australia Pty Ltd
11/500 Collins Street
Melbourne VIC 3000 Australia
product.certification@bureauveritas.com
Ph: 1800 855 190
www.bureauveritas.com.au

Complaints: The complaints process for this certificate can be found here:
www.bureauveritas.com.au/your-feedback

Sam Guindi – Bureau Veritas Product Certification Manager

Product Certificate

Abodo Weatherboard Cladding System

3. Description of Building Method or Product

Name of the product or method in Aotearoa New Zealand, including any brand names used. Description of what it is and the components that make up any system and its physical attributes including the materials and make-up of the product, where applicable. Matters that should be taken into account in the use or application of the building method or product can be found in item 6. Conditions and Limitations of Use. Continuation of description can be found in item 10 – Supporting Information about Description. [Delete if not applicable]. The building method's or building product's catalogue or model identification number or numbers or other unique identifiers that might be used to identify the building product or building method

The Abodo Weatherboard Cladding System consists of weatherboards fixed to cavity battens forming a drained cavity. Weatherboard profiles include Bevelback, Vertical Shiplap, Rusticated and Secret fixing. The weatherboards are available with a smooth dressed face (for a paint finish) or a light band sawn or brushed face (for a stain finish) and manufactured from a range of materials:

- Sand – H3.2 treated radiata pine
- Vulcan – thermally modified radiata pine
- Stratos – Azole treated radiata pine (H3.1)
- Tundra – Douglas fir heart wood

4. Intended use of Building Method or Product

Intended use of the building method or product as described in the product manual and other instructional materials. A statement of the function or purpose of the building method or product. Continuation of intended use can be found in item 11 – Supporting Information about Intended use. [Delete if not applicable]

Abodo Weatherboard Cladding Systems are exterior wall claddings for use over a drained cavity.

5. New Zealand Building Code Provisions

The performance clauses of the New Zealand Building Code that are relevant to the intended use and with which the building method or product complies or contributes to (where used as part of a system).

How the building method or product complies or contributes can be found in item 8. Basis for Certification. Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.

B1 Structure: Performance Clauses B1.3.1, B1.3.2, B1.3.3 (h), B1.3.4
B2 Durability: Performance Clause B2.3.1(b)
E2 External moisture: Performance Clauses E2.3.2 (contributes to), E2.3.5 (contributes to), E2.3.6 (contributes to), E2.3.7 (contributes to)
F2 Hazardous building materials: Performance Clause F2.3.1

JAS-ANZ

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CodeMark

Product Certificate

Abodo Weatherboard Cladding System

BUREAU VERITAS

Certificate no: CMNZ70046
Version: 2
Original issue date: 30 April 2020
Version date: 18 June 2025

6. Conditions and Limitations of Use

The building method or product's use is to be in accordance with the installation instructions and requirements against which the building method or product was assessed.

Conditions or limitations of conformity for the performance requirements the building method or product is compliant with, including any requirements for people with the qualifications and skills to install or use the building method or product, any known or demonstrated situations where the building method or product should not be used. A statement as to whether there are any matters that should be taken into account in the use or application of the building product or building method and, if so, what those matters are.

1. The Abodo Weatherboard Cladding System is certified for use in buildings with a cavity:
   a. designed to either
      i. NZS3604:2011 Timber-framed buildings, or
      ii. NASH Standard Part 2: May 2019 Light Steel Framed Buildings, and
   b. within the scope of of Acceptable Solution E2/AS1 para 1.1, and
   c. with a risk score not greater than 20, and
   d. with a rigid underlay:
      i. In all locations designated as Extra High Zone and above, or
      ii. When used in external walls of unlined attached garages and,
   e. situated:
      i. in all exposure zones (excluding microclimates) as defined in NZS3604:2011, Paragraph 4.2.4, and
      ii. more than 1m from a relevant boundary, and
   f. with joinery meeting the requirements of NZS 4211:2008 Specification for performance of Windows, and
   g. with Stainless steel, copper or silicon bronze fixings in ACQ or Cu azole treated weatherboards (i.e. Sand).
2. The Abodo Weatherboard Cladding System shall be installed in accordance with Abodo CodeMark Weatherboard Cladding Manual April 2020.

7. Health and Safety Information

Health, safety, and well-being declarations associated with installation, maintenance, and use of the building method or product, and their specific editions and dates necessary to ensure the performance requirements of clauses F1 to F9 of the Building Code can be met.

The compliance with any manufacturer's installation instructions, maintenance, OH & S Statements, MSDS's and other Health and Safety declarations will provide the necessary Health and Safety Information pertaining to the product.

8. Basis for Certification

How the performance requirements in the Building Code were met for each of the provisions. Where used as part of a system, the specific contribution to compliance.

B1 Structure: By comparison with weatherboard profiles specified in Acceptable Solution E2/AS1
B2 Durability: By assessment against the provisions of Acceptable Solutions B2/AS1 and E2/AS1, and testing and expert opinion with the provisions of Verification Method B2/VM1.
E2 External moisture: By comparison with the provisions of Acceptable Solution E2/AS1.
F2 Hazardous building materials: By comparison with accepted chemical preservative treatments specified by Acceptable Solution B2/AS1.

JAS-ANZ

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Product Certificate

Abodo Weatherboard Cladding System

Certificate no: CMNZ70046
Version: 2
Original issue date: 30 April 2020
Version date: 18 June 2025

9. Supporting Documentation for Certification

Reference to any acceptable solutions, verification methods, New Zealand Standards, or other compliance pathways referenced against each individual performance requirement the building method or product is compliant with, and their specific version and date. Reference to documents describing tests and evaluations and any other documents relied on for certification or used to prove compliance, including their full title, specific version and date.

1. Acceptable Solutions and Verification Methods For New Zealand Building Code Clause B2 Durability (Amendment 12), 28 November 2019.
2. Verification Methods E2/VM1 and Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3 for New Zealand Building Code Clause E2 External Moisture Third edition (Amendment 10), 5 November 2020.
3. NZS3602:2003 Timber and Wood-based Products for Use in Building.
4. NZS3640:2003 Chemical Preservation of Round and Sawn Timber.
5. WoodMark Quality Assurance Programme for treated timber License Number 435.
6. AsureQuality Timber Treatment Programme Registration No:TTP31.
7. AFRC Opinion on Durability of Thermowood230 with Reference to AS5604-2005 2 August 2018.
8. EPH Test report 2216023-3 Test for Durability of Thermally Modified Radiata Pine 12 October 2016.
9. SCION Report The Durability of Thermowood Thermally Modified Wood - Results from Durability Tests After Eleven Years, July 2015.
10. AFRC Opinion on Durability of Douglas Fir Heartwood with Reference to AS5604-2005 8 August 2018.
11. SCION Report The Above Ground Durability of Cypress Species and Douglas Fir Grown on New Zealand Feb 2011.
12. Fletcher Test Report No. T511 Performance tests on 'Hector WB10" vertical and horizontal weatherboard cladding system in accordance with New Zealand Building Code E2/VM1, 26th May 2016.
13. Abodo CodeMark Weatherboard Cladding Manual April 2020.

10. Supporting Information About Description (Optional)

Any supporting information for section 3.

The Abodo Weatherboard Cladding System includes the following weatherboard profiles:

Stain Finish

- Sand, Stratos, Vulcan,
  - Horizontal Bevelback: AW61, AW62
  - Horizontal Rusticated: AW67, AW68, AW700, AW701, AW702, AW703, AW704, AW705, AW706
  - Vertical Shiplap: AW50, AW51, AW52, AW53, AW54, AW55, AW56, AW57, AW58, AW59, AW60, AW507
  - Horizontal and Vertical WB10, WB18 Secret Fix: WB10, WB18
  - Vertical Fix WB12 Secret Fix: WB12, WB12F
- Tundra (Tundra is available in ex-150x25mm profiles only and is not available in WB10 or WB12)
  - Horizontal Bevelback: AW61
  - Horizontal Rusticated: AW67, AW702, AW703
  - Vertical Shiplap: AW50, AW51, AW53, AW55, AW58, AW503

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Product Certificate

Abodo Weatherboard Cladding System

Certificate no: CMNZ70046
Version: 2
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Version date: 18 June 2025

Paint Finish

- Sand, Stratos, Vulcan
  - Horizontal Bevelback: AW61P, AW62P
  - Horizontal Rusticated: AW67P, AW68P
  - Vertical Shiplap: AW51P, AW52P
  - Horizontal and Vertical WB10 Secret Fix: WB10P, WB10FP, WB18

Other components of the system include:
(refer to the Abodo CodeMark Weatherboard Cladding Manual April 2020 for details about these components)

- Battens: plain and castellated
- Mouldings
- Flashings
- Fixings
- Wall underlay and Rigid wall underlay (where required as per condition and limitations of use, number 1 (d))

11. Supporting Information About Intended Use (Optional)

Any supporting information for section 4.

Further details regarding the use of the product can be found in the Abodo CodeMark Weatherboard Cladding Manual April 2020.

12. Supporting Information About Conditions and Limitations of Use (Optional)

Any supporting information for section 6.

N/A

All CodeMark certificates that are current must be registered with MBIE. MBIE maintains a register of valid product certificates. Please find the register here.

If the certificate is not listed on this register or it appears as (SUSPENDED), it is not a valid CodeMark certificate and does not have to be accepted by a building consent authority as establishing compliance with the New Zealand Building Code.

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CodeMark

Certificate no: CMNZ70056
Version: 4
Original issue date: 20 January 2020
Version date: 22 October 2024

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1 Certificate Holder Details

Fletcher Concrete and Infrastructure Ltd
Firth Industries
810 Great South Road, Penrose, Auckland 1061 New Zealand
info@firth.co.nz
Ph: 0800 800 576
www.firth.co.nz

2 Product Certification Body

Bureau Veritas Australia Pty Ltd
11/500 Collins Street
Melbourne VIC 3000 Australia
product.certification@bureauveritas.com
Ph: 1800 855 190
www.bureauveritas.com.au

Complaints: The complaints process for this certificate can be found here:
www.bureauveritas.com.au/your-feedback

Sam Guindi – Bureau Veritas Product Certification Manager

Product Certificate

Firth Ribraft® Floor System

3. Description of Building Method or Product

Name of the product or method in Aotearoa New Zealand, including any brand names used. Description of what it is and the components that make up any system and its physical attributes including the materials and make-up of the product, where applicable. Matters that should be taken into account in the use or application of the building method or product can be found in item 6. Conditions and Limitations of Use. Continuation of description can be found in item 10 – Supporting Information about Description. [Delete if not applicable]. The building method's or building product's catalogue or model identification number or numbers or other unique identifiers that might be used to identify the building product or building method

The Firth RibRaft® Floor System comprises of polystyrene or recycled plastic pods (Cleva Pods®) steel reinforcing rods, plastic spacers, optional insulation and Firth RibRaft® concrete.

4. Intended use of Building Method or Product

Intended use of the building method or product as described in the product manual and other instructional materials. A statement of the function or purpose of the building method or product. Continuation of intended use can be found in item 11 – Supporting Information about Intended use. [Delete if not applicable]

The Firth RibRaft® Floor System is a method of concrete floor construction, suitable for all slab-on-ground concrete floors for domestic or residential buildings that fall within the scope of NZS 3604:2011 Timber framed buildings.

5. New Zealand Building Code Provisions

The performance clauses of the New Zealand Building Code that are relevant to the intended use and with which the building method or product complies or contributes to (where used as part of a system).

How the building method or product complies or contributes can be found in item 8. Basis for Certification. Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.

B1 Structure: B1.3.1, B1.3.2, B1.3.3 (a, b, f, g, h, q, m), B1.3.4
B2 Durability: B2.3.1(a), B2.3.2(a)
E2 External Moisture: E2.3.3, E2.3.7
F2 Hazardous Building Materials: F2.1.1
H1 Energy Efficiency: H1.3.1 (contributes to), H1.3.2E (contributes to)

JAS-ANZ

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Product Certificate

Firth Ribraft® Floor System

Certificate no: CMNZ70056
Version: 4
Original issue date: 20 January 2020
Version date: 22 October 2024

6. Conditions and Limitations of Use

The building method or product's use is to be in accordance with the installation instructions and requirements against which the building method or product was assessed.

Conditions or limitations of conformity for the performance requirements the building method or product is compliant with, including any requirements for people with the qualifications and skills to install or use the building method or product, any known or demonstrated situations where the building method or product should not be used. A statement as to whether there are any matters that should be taken into account in the use or application of the building product or building method and, if so, what those matters are.

1. The Firth RibRaft® Floor System shall only be used in buildings which fall within the scope of NZS 3604:2011 – Timber-framed buildings, located:
   a. Where the Seismic Hazard Factor Z (defined in NZS 1170.5:2004) is less than or equal to 0.45 (refer to Figure 6 of the Firth RibRaft® Technical Manual October 2024), and
   b. in any wind zones up to and including Extra High, and
   c. in areas with snow loads up to 2.0 kPa, and
   d. in all exposure zones (except microclimates), and
   e. and where the ground Ultimate Bearing Capacity exceeds the value specified in Table 2 for the types of construction in Table 1 of the Firth RibRaft® Technical Manual October 2024.
2. The Firth RibRaft® Floor System shall be designed and installed in accordance with the Firth RibRaft® Technical Manual October 2024.

7. Health and Safety Information

Health, safety, and well-being declarations associated with installation, maintenance, and use of the building method or product, and their specific editions and dates necessary to ensure the performance requirements of clauses F1 to F9 of the Building Code can be met.

The compliance with any manufacturer's installation instructions, maintenance, OH & S Statements, MSDS's and other Health and Safety declarations will provide the necessary Health and Safety Information pertaining to the product.

8. Basis for Certification

How the performance requirements in the Building Code were met for each of the provisions. Where used as part of a system, the specific contribution to compliance.

B1 Structure - By analysis and comparison with Acceptable Solution B1/VM1
B2 Durability – By analysis and comparison with Acceptable Solution B2/AS1 and Verification Method B2/VM1
E2 External moisture – By analysis and comparison with Acceptable Solution E2/AS1
H1 Energy efficiency - By analysis and comparison with Verification Method H1/VM1
F2 Hazardous building materials - By comparison with performance Clause F2.3.1

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Product Certificate

Firth Ribraft® Floor System

Certificate no: CMNZ70056
Version: 4
Original issue date: 20 January 2020
Version date: 22 October 2024

9. Supporting Documentation for Certification

Reference to any acceptable solutions, verification methods, New Zealand Standards, or other compliance pathways referenced against each individual performance requirement the building method or product is compliant with, and their specific version and date. Reference to documents describing tests and evaluations and any other documents relied on for certification or used to prove compliance, including their full title, specific version and date.

1. Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure 1st Edition (Amendment 21), 2 November 2023
2. Acceptable Solutions and Verification Methods For New Zealand Building Code Clause B2 Durability (Amendment 12), 28 November 2019
3. Acceptable Solutions and Verification Methods For New Zealand Building Code Clause E2 External moisture 3rd edition (Amendment 10), 5 November 2020
4. H1 Energy Efficiency, Verification Method H1/VM1, Energy efficiency for all housing, and buildings up to 300 m², Fifth edition Amendment 1, 4 August 2022
5. Structural assessment by Holmes Consulting Firth Ribraft Concrete Floor System, May 2012
6. Assessment of the Proposed Updates Contained in the August 2024 Version of the RibRaft® Technical Manual, Cresco Group, August 2024
7. OPUS Report "Compliance of Firth of Ribraft System with NZBC Clause B2 Durability", 24 May 2010
8. Firth New H1 report 12 May 2022 & Firth - Brick edge Slab R-values, Sustainable Engineering, 20 May 2022
9. Firth RibRaft® Technical Manual, October 2024
10. NZS 3604:2011 Timber framed buildings

10. Supporting Information About Description (Optional)

Any supporting information for section 3.

The system consists of the following components:

- RibRaft® Polystyrene or recycled plastic pods (Cleva Pods®) 1100mm x 1100mm x 220mm. 300mm thick polypods are also available for deeper edge beams and internal ribs.
- Firth Pod and Reinforcement spacer or Cleva Pod® spacer (300mm and 100mm)
- Firth Reinforcement chair
- Reinforcement Grade 500E
- Mesh reinforcement
- Firth RibRaft® Concrete 20MPa or 25 MPa
- RibRaft HotEdge® Insulation, when specified.
- Sand Blinding
- DPM (250 micron polyethylene sheet)
- Underslab insulation when specified

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Product Certificate

Firth Ribraft® Floor System

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11. Supporting Information About Intended Use (Optional)

Any supporting information for section 4.

Further details regarding the use of the product can be found in Firth RibRaft® Technical Manual, October 2024.

12. Supporting Information About Conditions and Limitations of Use (Optional)

Any supporting information for section 6.

N/A

All CodeMark certificates that are current must be registered with MBIE. MBIE maintains a register of valid product certificates. Please find the register here.

If the certificate is not listed on this register or it appears as (SUSPENDED), it is not a valid CodeMark certificate and does not have to be accepted by a building consent authority as establishing compliance with the New Zealand Building Code.

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BRANZ Appraised

Appraisal No. 695 [2023]

WATERGATE PLUS WALL UNDERLAY

Appraisal No. 695 (2023)

This Appraisal replaces BRANZ Appraisal No. 695 [2017]

Amended 1 July 2025



BRANZ Appraisals

Technical Assessments of products for building and construction.

Kingspan Thermakraft

Kingspan Insulation NZ Limited
17 Turin Place
Otara
Auckland 2013
Tel: 09 273 3727
Free phone: 0800 806 595
Email: info@kingspaninsulation.co.nz
Web: www.thermakraft.co.nz

BRANZ

BRANZ
1222 Moonshine Rd,
RD 1, Porirua 5381
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Tel: 04 237 1170
branz.co.nz

WFTAO
WORLD FEDERATION OF TECHNICAL ASSESSMENT ORGANISATIONS

Product

1.1 Watergate Plus is a fire-retardant, flexible synthetic wall underlay for use under direct-fixed and non-direct fixed wall claddings.

Scope

Flexible Wall Underlay

2.1 Watergate Plus has been appraised for use as a flexible wall underlay for lined buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 for timber-framed buildings; or,
- the scope limitations of NASH Building Envelope Solutions, Paragraph 1.1 for steel-framed buildings; and,
- with direct-fixed absorbent and non-absorbent wall claddings; or,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; or,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber-framed buildings or to NASH Building Envelope Solutions for steel-framed buildings; and,
- situated in NZS 3604 Wind Zones up to, and including, Very High.

Use over Rigid Wall Underlay

2.2 Watergate Plus has been appraised for use as a flexible wall underlay over rigid wall underlays on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 for timber-framed buildings; or,
- the scope limitations of NASH Building Envelope Solutions Paragraph 1.1 for steel-framed buildings; and,
- with direct-fixed absorbent and non-absorbent wall claddings [limited to NZS 3604 and NASH Standard Part 2 Wind Zones up to, and including, Very High]; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber-framed buildings or NASH Building Envelope Solutions for steel-framed buildings; and,
- situated in NZS 3604 and NASH Standard Part 2 Wind Zones up to, and including, Extra High.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Specific Design

2.3 Watergate Plus has also been appraised for use on lined buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Watergate Plus into their design in accordance with the declared properties and the instructions of Kingspan Insulation NZ Limited.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Watergate Plus Wall Underlay, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2. Watergate Plus Wall Underlay meets these requirements. See Paragraphs 9.1 and 9.2.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.4 (c). Watergate Plus Wall Underlay meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Watergate Plus Wall Underlay will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Watergate Plus Wall Underlay meets this requirement.

Technical Specification

4.1 Watergate Plus is a white, 105 g/m^2 non-woven, microporous polyolefin fabric underlay.

4.2 The product is supplied in various sizes, refer to Table 1. The product is printed with the Watergate Plus logo repeated along the length of the roll and can also be co-branded with custom printing. The rolls are wrapped in clear polythene film.

Table 1: Roll Dimensions

Width (mm)	Length (m)	Coverage (m^2)
1,370	18.5	25
1,370	37	50
1,370	73	100
2,740	18.5	50
2,740	36.5	100

Accessories

4.3 Accessories used with Watergate Plus, which are supplied by the installer are:

- **Fixings** - 6-8 mm staples, large head clouts minimum 20 mm long, self-drilling screws, proprietary underlay fixings, double-sided tape (for steel framing) or other temporary fixings to attach the wall underlay to the framing.
- **Wall underlay restraint (timber frame)** - polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to restrain the wall underlay in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.
- **Wall underlay restraint (steel frame)** - polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to restrain the wall underlay in accordance with NASH Building Envelope Solutions, Paragraph 9.1.9.5. Thermal break sheathing installed in accordance with NASH Building Envelope Solutions Paragraph 11.4.3.2.

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Handling and Storage

5.1 Handling and storage of the product, whether on-site or off-site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Product Data Sheet Thermakraft® Watergate Plus, Issue 12.0, May 2025.
- Installation Guide Thermakraft® Watergate Plus, Issue 7.0, May 2025.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

7.1 Watergate Plus is intended for use as an alternative to conventional building papers which are fixed over timber or steel-framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain. Refer to Table 2 for material properties.

Table 2: Material Properties

NZS 2295 Property	Property Performance Requirement	Actual Property Performance
Absorbency	≥ 100 g/m^2	Pass
Vapour Resistance	≤ 7 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass
pH of Extract	≥ 6 and ≤ 9	Pass
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	**Edge tear (Average):** Machine direction = 77 N Cross direction = 56 N **Tensile strength (Average):** Machine direction = 2.5 kN/m Cross direction = 1.8 kN/m
Air Barrier	Air resistance: ≥ 0.1 MN s/m^3	Pass. Watergate Plus can be used as an air barrier.

7.2 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

7.3 Watergate Plus must not be exposed to the weather or ultraviolet (UV) light for a total of more than 90 days before being covered by the wall cladding. During use, Watergate Plus must not be exposed to the building interior.

7.4 Watergate Plus must not be used under translucent wall claddings.

7.5 Watergate Plus is suitable for use as an air barrier where walls are not lined, such as attic spaces at gable ends, in accordance with NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, Paragraph 9.1.4 (c), but must not be exposed to the building interior.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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7.6 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be restrained between the battens to prevent the underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity. Refer to NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5 for timber framing or NASH Building Envelope Solutions, Paragraph 9.1.9.5 for steel framing. Wall underlay restraint options include polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens or thermal break sheathing (steel framing only).

Claddings

7.7 Watergate Plus is suitable for use under wall claddings as a wall underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23 on timber-framed buildings and NASH Building Envelope Solutions, Table 23 on steel-framed buildings, including non-absorbent wall claddings such as vinyl and metal-based weatherboards in direct-fixed situations.

Stucco Plaster

7.8 Watergate Plus is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1 for timber framing or NASH Building Envelope Solutions, Paragraph 9.3.5.1 for steel framing. The underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.

7.9 Watergate Plus may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 b) for timber framing or NASH Building Envelope Solutions, Paragraph 9.3.3.1 b) for steel framing.

Structure

8.1 Watergate Plus is suitable for use in all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including, Very High when used as a stand-alone flexible wall underlay, and all Wind Zones of NZS 3604 up to, and including, Extra High when used as an overlay for rigid wall underlays.

Durability

9.1 Watergate Plus meets code compliance with NZBC Clause B2.3.1 (a) not less than 50 years for wall underlays used where the cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry veneer, and code compliance with NZBC Clause B2.3.1 (b) 15 years for wall underlays used where the cladding durability requirement is 15 years.

Serviceable Life

9.2 Watergate Plus is expected to have a serviceable life equal to that of the cladding. This is provided the cladding is maintained in accordance with the cladding manufacturer's instructions, the cladding remains weather-resistant and the underlay is covered by an internal lining. In addition, the product must not be exposed to the weather or UV light for a total of more than 90 days prior to installation of the wall cladding.

Control of Internal Fire and Smoke Spread

10.1 Watergate Plus has an AS 1530 Part 2 flammability index of not greater than 12 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 a), for the requirements of suspended flexible fabric used as an underlay to exterior cladding that is not exposed to view in occupied spaces. Kingspan Insulation NZ Limited requires that Watergate Plus is covered by an internal lining in all applications.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Watergate Plus from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1 and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

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External Moisture

12.1 Watergate Plus must be used behind claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, or claddings covered by a valid BRANZ Appraisal.

12.2 Watergate Plus, when installed in accordance with the Technical Literature and this Appraisal will assist in the total cladding systems compliance with NZBC Clause E2.

Installation Information

Installation Skill Level Requirement

13.1 All design and building work must be carried out in accordance with the Watergate Plus Wall Underlay Technical Literature and this Appraisal by competent and experienced tradespeople conversant with wall underlays. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

Underlay Installation

14.1 Watergate Plus must be fixed to all framing members at maximum 300 mm centres with clouts, staples, self-drilling screws or proprietary underlay fixings. For steel framing, double-sided tape may be used which is applied to each stud in continuous strips. The underlay must be pulled taut over the framing before fixing.

14.2 Watergate Plus must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 150 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.

14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the underlay by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut underlay must be folded inside the opening and stapled to the penetration framing. Excess underlay may be cut off flush with the internal face of the wall frame.

14.4 Watergate Plus can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3 for timber framing or NASH Building Envelope Solutions, Paragraph 9.1.11.3 for steel framing.

14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.

14.6 Any damaged areas of Watergate Plus, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

14.7 The Technical Literature must be referred to during the inspection of Watergate Plus installations.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

15.1 The following tests have been carried out on Watergate Plus in accordance with NZBC Acceptable Solution E2/AS1, Table 23: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6, pH of extract in accordance with AS/NZS 1301.421s and air resistance to BS 6538.3. A range of these tests were completed before and after Watergate Plus was exposed to UV light.

15.2 The flammability index of Watergate Plus has been evaluated in accordance with AS/NZS 1530.2.

Other Investigations

16.1 A durability opinion has been given by BRANZ technical experts.

16.2 An evaluation of the expected performance of Watergate Plus in direct contact with metal wall cladding has been completed by BRANZ.

16.3 The practicability of installation of Watergate Plus has been assessed by BRANZ and found to be satisfactory.

16.4 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.

Quality

17.1 The manufacture of Watergate Plus has not been examined by BRANZ, but details of the methods adopted for quality control and the quality of the materials used, have been obtained and found to be satisfactory.

17.2 The quality of supply to the market is the responsibility of Kingspan Insulation NZ Limited.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall underlay into their design in accordance with the instructions of Kingspan Insulation NZ Limited.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Kingspan Insulation NZ Limited.

Sources of Information

- AS 1530.2:1993 Test for flammability of materials.
- AS/NZS 1301.421s:1998 Determination of the pH value of aqueous extracts of paper, board and pulp - Cold extraction method.
- AS/NZS 4200.1:1994 Pliable building membranes and underlays - Materials.
- AS/NZS 4201.1:1994 Pliable building membranes and underlays - Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2:1994 Pliable building membranes and underlays - Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3:1994 Pliable building membranes and underlays - Methods of test – Shrinkage.
- AS/NZS 4201.4:1994 Pliable building membranes and underlays - Methods of test – Resistance to water penetration.
- AS/NZS 4201.6:1994 Pliable building membranes and underlays - Methods of test – Surface water absorbency.
- BS 6538.3:1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295:2006 Pliable, permeable building underlays.
- NZS 3604:2011 Timber-framed buildings.
- NASH Building Envelope Solutions: 2019 Light steel-framed buildings.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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- NASH Standard Part Two: 2019 Light Steel Framed Buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 14 May 2024

This Appraisal has been amended to update the Technical Literature.

Amendment No. 2, dated 01 July 2025

This Appraisal has been amended to update the Technical Literature and to add internal lining requirements.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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In the opinion of BRANZ, Watergate Plus Wall Underlay is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Kingspan Insulation NZ Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Kingspan Insulation NZ Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Kingspan Insulation NZ Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Kingspan Insulation NZ Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
08 February 2023

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

MAPELASTIC AQUADEFENSE

Ready-to-use, ultra quick-drying, flexible liquid membrane for waterproofing interior and exterior surfaces





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WHERE TO USE

Waterproofing before applying ceramic, stone, and mosaic coverings in:

- bathrooms and shower cubicles;
- laundry rooms;
- saunas and damp environments in general;
- balconies and terraces.

Mapelastic AquaDefense can be applied on:

- concrete;
- cementitious screeds and screeds made using special binders (**Topcem**, **Topcem Pronto**, **Mapecem**, **or Mapecem Pronto**);
- plasterboard (for application in interior only);
- old ceramic tiles, terrazzo, and stone material;
- cementitious render.

ADVANTAGES

Mapelastic AquaDefense is ready to use.

Mapelastic AquaDefense is a rapid product:

- resists rainwater 1 hour after applying the first coat and 3 hours after applying the second coat.;
- ceramic can be bonded after 4 hours
  (at +23°C and 50% R.H. when applied on a dry screed with less than 3% residual moisture).

Mapelastic AquaDefense is elastic: at +23°C it has 3.2 mm crack-bridging capacity without reinforcement.

TECHNICAL CHARACTERISTICS

Mapelastic AquaDefense is a totally solvent-free, ready-to-use, ultra-quick drying, one-component light blue, synthetic resin-based paste in water dispersion.
Mapelastic AquaDefense is easy to apply using a long-haired roller, brush, or trowel on horizontal, sloping, and vertical surfaces. **Mapelastic AquaDefense** dries very quickly to form a flexible membrane without a sticky surface. It is resistant to light pedestrian traffic after just 3 hours and forms an excellent grip with all types of

adhesive for laying ceramic, stone material, and mosaic of all kinds. The flexible nature of **Mapelastic AquaDefense** helps it withstand normal movements caused by expansion and shrinkage of the substrate due to temperature variations and vibration.
Tiles laid on floors waterproofed with **Mapelastic AquaDefense** by using C2F-class MAPEI adhesives (such as **Keraquick Maxi S1**, **Ultralite S1 Flex Quick**, etc.) and grouted with **Ultracolor Plus** can be opened to pedestrian traffic within 12 hours of starting the work.
Mapelastic AquaDefense is resistant to water, lime water (pH >12), and detergents commonly used for cleaning residential environments.

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RECOMMENDATIONS

- Do not apply **Mapelastic AquaDefense** if the temperature is lower than +5°C.
- **Mapelastic AquaDefense** must always be covered with ceramic, mosaic or stone.
- Do not apply **Mapelastic AquaDefense** on cementitious substrates with residual humidity higher than 3% or subject to recurring rising damp.
- Do not apply **Mapelastic AquaDefense** on crumbly cementitious substrates, old floors that are not well bonded to the substrate or surface treatments which could affect the bond.
- Do not use **Mapelastic AquaDefense** to cover cracks.
- Protect the surface from rain for at least 1 hour after applying the first coat and 3 hours after applying the second coat (times refer to +23°C and 50% relative air humidity when the product is applied on dried screeds with residual moisture lower than 3%).

APPLICATION PROCEDURE

Preparation of the substrate

Substrates must be well-cured, sound, clean, dry, and free of oil, grease, cement laitance, old paint, and any other substance which could affect the bond. Cementitious substrates must be stable and dry, with no rising damp. Surface dust must be suitably removed.
Smooth or level the surface with **Planitop Fast 330** or **Adesilex P4**.
On old ceramic floors with hollowed or empty tile joints, or whenever slopes on surfaces need to be restored before the application of **Mapelastic AquaDefense**, it is recommended to smooth or level the surface using **Adesilex P4**. **Such substrates must be thoroughly checked and all coatings, such as wax, water-repellent treatments, etc. must be removed from the surface with a suitable cleaning product (such as UltraCare HD Cleaner**) and/or by abrasion.
Before applying **Mapelastic AquaDefense**, pay particular attention to expansion joints and fillet joints between horizontal and vertical surfaces: in those areas apply **Mapeband** (or as alternatives **Mapeband PE 120**) together with the relevant special pieces, bonded using **Mapelastic AquaDefense**.
To waterproof drains on terraces and balconies, use the special kits from the **Drain** range. Structural joints must be waterproofed with **Mapeband TPE** bonded to the substrate with **Adesilex PG4**.
Eco Prim Grip Plus can be used to further improve the bond of **Mapelastic AquaDefense** on old ceramic or natural stone floors.

Application of the product

Mapelastic AquaDefense must be applied in two thin (approx. 0.4 mm per coat), even coats with a long piled roller, brush or trowel. Wait until the first coat is dry, making sure the product becomes darker with a matt finish, before applying the second coat perpendicular to the first one (approximately 1 hour at +23°C and 50% relative air humidity and with substrates having residual humidity lower than 3%).
The two coats of **Mapelastic AquaDefense** must create a robust, flexible, and continuous film. Make sure there are no interruptions in the film caused by imperfections in the substrate.
If **Mapelastic AquaDefense** is applied to form an anti-fracture membrane on cracked substrates, we recommend embedding the reinforcement fabric **Mapetex 50** into the first coat while it is still fresh.
Mapetex 50 must be pressed down with a spiked roller on the first coat of **Mapelastic AquaDefense** while it is still fresh.
Wait until the first coat is dry, then apply the second coat in order to completely embed **Mapetex 50**.
Drying times may increase as **Mapetex 50** insertion increases the final thickness of the applied film.
Ceramic, stone, and mosaic tiles can be laid 4 hours after the application of the second coat (at +23°C and 50% relative air humidity) MAPEI adhesive to be selected depending on the final use of the flooring or wall and the

tile type and format.
In exterior applications on balconies and terraces, use a Mapei adhesive with minimum class C2S1 according to EN 12004 standard such as **Keraflex Maxi S1 Zero**, **Keraflex Extra S1 Zero** , or **Ultralite S1 Flex Zero**.
In interiors, use a Mapei adhesive with minimum class C2 according to EN 12004 standard, such as **Adesilex P9**, or **Keraflex**.
For the rapid installation of tiles, use an adhesive with minimum class C2F such as **Keraquick Maxi S1** or **Ultralite S1 Flex Quick**.
For mosaic tiles of all types, use **Ultralite S1 Flex Zero** white or **Adesilex P10** + **Isolastic** diluted with 50% of water.
Grout tile joints with a special cementitious grout (such as **Ultracolor Plus** - class CG2WFA, **Keracolor FF**, **Keracolor GG** mixed with **Fugolastic**) or epoxy grout (for example **Kerapoxy**, **Kerapoxy Easy Design,** or **Kerapoxy CQ** - class RG). Seal expansion joints with a special MAPEI sealant (such as **Mapesil AC**, **Mapesil AC Eco**, **Mapesil LM,** or **Mapeflex PU 45 FT**, according to requirements).



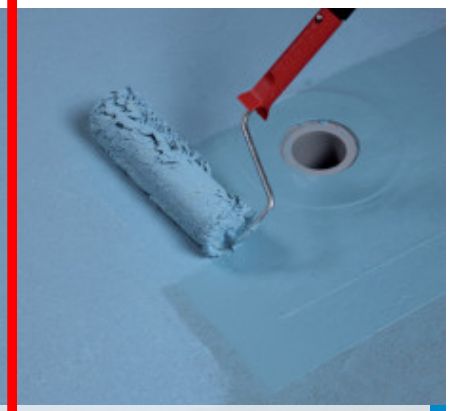
*Impregnating **Drain Vertical** fabric with **Mapelastic AquaDefense***



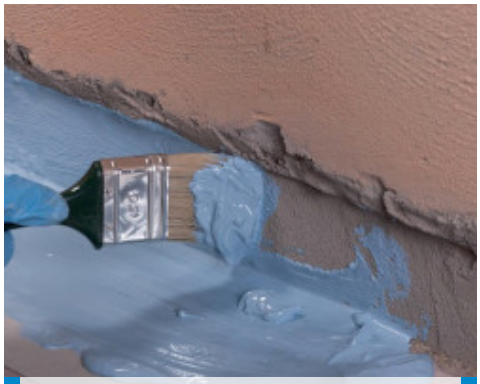
*Application of **Mapeband** on a wall-floor fillet joint with **Mapelastic AquaDefense***



*Application of the first coat of **Mapelastic AquaDefense** on a screed*



*Application by roller of the second coat of **Mapelastic AquaDefense***



*Application of **Mapelastic AquaDefense** by brush between floor and wall before applying **Mapeband***



*Bonding tiles on **Mapelastic AquaDefense***

CLEANING

Mapelastic AquaDefense can be removed easily from tools and surfaces while still fresh with water.

CONSUMPTION

1 kg/m² for 2 coats.

PACKAGING

3.5 kg, 7.5 kg, and 15 kg rectangular bucket.

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STORAGE

Mapelastic AquaDefense can be stored for 24 months in its original packaging in a dry area. Protect from frost.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Instructions for the safe use of our products can be found on the latest version of the SDS available from our website www.mapei.com
PRODUCT FOR PROFESSIONAL USE

TECHNICAL DATA (typical values)

PRODUCT IDENTITY	
Consistency:	paste
Colour:	light blue
Density:	1.30 g/cm³
pH:	9.5
Solid content:	66
Brookfield viscosity:	30,000 mPa·s (needle 6 - 10 rpm)

APPLICATION DATA (at +23°C - 50% R.H.)	
Minimum filming temperature:	+5°C
Recommended application temperature range:	from +5°C to +35°C
Waiting time between each coat:	approx. 60 minutes (when dry touch)
Waiting time before application of the covering:	3–4 hours
Complete drying of 1 mm thick layer:	12 hours

FINAL PERFORMANCE (0.55 mm thickness)		
	EN 14891 acceptance range	**Performance figures for Mapelastic AquaDefense**
Initial adhesion (EN 14891-A.6.2):	> 0.5 N/mm²	1.7 N/mm²
Adhesion after immersion in chlorinated water (EN 14891-A.6.3):	> 0.5 N/mm²	> 1.0 N/mm²
Adhesion after heat ageing (EN 14891-A.6.5):	> 0.5 N/mm²	> 1.8 N/mm²
Adhesion after freeze/thaw cycles (EN 14891-A.6.6):	> 0.5 N/mm²	> 0.9 N/mm²

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Adhesion after immersion in alkaline water (lime water saturated solution) (EN 14891-A.6.9):	> 0.5 N/mm²	> 1.3 N/mm²
Adhesion after immersion in sodium hypochlorite solution (EN 14891-A.6.7):	> 0.5 N/mm²	> 1.2 N/mm²
Crack-bridging ability at +23°C (EN 14891-A.8.2):	> 0.75 mm	3.2 millimeters
Crack-bridging ability at -5°C (EN 14891-A.8.3):	> 0.75 mm	1.6 millimeters
Impermeability to water under pressure (EN 14891-A.7) (1500 kPa):	No penetration	No penetration

*Adhesion strength values according to EN 14891 determined with **Mapelastic AquaDefense** and type C2 cementitious adhesive in compliance with EN 12004*

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application.
Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

LEGAL NOTICE

The contents of this Technical Data Sheet ("TDS") may be copied into another project-related document, but the resulting document shall not supplement or replace requirements per the TDS in force at the time of the MAPEI product installation.
The most up-to-date TDS can be downloaded from our website www.mapei.com.
ANY ALTERATION TO THE WORDING OR REQUIREMENTS CONTAINED OR DERIVED FROM THIS TDS EXCLUDES THE RESPONSIBILITY OF MAPEI.

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Mapelastic Aquadefense

Building Product Information Requirements Compliance Statement

Date: 09/10/23 (version 1)

Product name: **Mapelastic Aquadefense**

Product identifier: **Mapelastic Aquadefense**

Product Line

Mapelastic Aquadefense is a ready to use, ultra quick drying, flexible liquid membrane for internal waterproofing applications.

Product Description

Mapelastic Aquadefense is a single part ready to use liquid waterproofing membrane for internal wet areas, bathrooms, showers and damp environments in general underneath stone, ceramic or mosaic tile finishes. The Mapelastic Aquadefense must be covered by a suitable trafficable floor covering to protect it from UV exposure.

Note: Mapelastic Aquadefense is not BRANZ appraised for exterior applications.

The membranes can be applied over:

- concrete
- cement screeds and screeds made using special binders supplied by MBP (NZ) Limited
- plaster board (internal)
- cement board, tile & slate underlay, and compressed sheet.

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Mapelastic Aquadefense is supplied as a

- 15kg rectangular bucket.
- Colour: light blue

There are several ancillary products used with Mapelastic Aquadefense

- Mapeband SA – self-adhesive butyl rubber tape- used to reinforce all joints.
- Mapeband Easy – range of detailing bands for floor / wall junctions
- Mapetex Sel – nonwoven fabric re- enforcement
- Mapei Primer 3296 – an acrylic primer for non-absorbent surfaces
- Ecoprim Grip PLUS – primer for non-porous substrates.

For a complete range of suitable primers and adhesives please refer to

Mapelastic Aquadefence technical references:

- Mapelastic Aquadefense – Technical datasheet (2103-11-2016-GB)
- BRANZ appraisal 484

Or request support at

www.mapei.com/nz/en/technical-and-commercial-support

Relevant Building Code Clauses

The following clauses of the New Zealand Building Code are relevant to Mapelastic Aquadefense.

Clause B2 Durability: Performance B2.3.1(B) 15 years. Mapelastic Aquadefense meets this requirement.

Clause E3 Internal Moisture: Performance E3.3.6 Interior wet area floors and walls. Mapelastic Aquadefense meets this requirement.

Clause F2 Hazardous Building Materials: Performance F2.2.3.1 Mapelastic Aquadefense meets this requirement.

Compliance with these clauses is confirmed in BRANZ appraisal 484

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Scope and Design Requirements

Mapelastic Aquadefense can be used as a waterproofing system for internal applications within the following scope:

- Mapelastic Aquadefense may be used on interior substrates of concrete, fibre cement compressed sheet, fibre cement sheet underlay. Caution must be used when using with flooring grade plywood
- Applied Mapelastic Aquadefense must be protected from physical damage by traffic floor finishes.
- Movement and control joints must be carried through the membrane and trafficable floor finish.
- The design of and the construction of the substrate and movement and control joints are specific to each building and is there for the responsibility of the building designer and building contractor.
- Mapelastic Aquadefense must not be left exposed.

Conditions and Limitations of Use

Installation of the membrane must always be completed by trained applicators approved by MBP (NZ) Ltd.

Installation of substrates must always be carried out in accordance with the Mapelastic Aquadefense technical literature and under the supervision of a Licensed Building Practitioner (LBP) with the relevant license class.

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Supporting Documentation

The following additional documentation supports the above statements:

Mapelastic Aquadefense BRANZ 484 (Certification)

https://www.mapei.com/nz/en/products-and-solutions/products/detail/mapelastic-aquadefense

Mapelastic Aquadefense - data sheet (2103-11-2016-GB)
https://www.mapei.com/nz/en/products-and-solutions/products/detail/mapelastic-aquadefense

Contact Details

Manufacture location

Mapei SpA

Via Cafiero, 22, 20158

Milano, Italy

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mapei@mapei.it

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Importer NZ Address for Service

MBP (NZ) Ltd

88 Carbine Road

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Importer NZBN: 8080877

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Warnings and Bans

Mapelastic Aquadefense is not subject to a warning or ban under section 26 of the Building Act 2004.

Version History

Version number	Written by	Checked by	Date issued	Changes from previous version
V1 09/10/2023	JP	PT	10/10/2023	New document

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BRANZ Appraised

Appraisal No. 484 [2018]

MAPEGUM WPS, MAPELASTIC, MAPELASTIC SMART AND MAPELASTIC AQUADEFENSE WET AREA MEMBRANES



Appraisal No. 484 (2018)

This Appraisal replaces BRANZ Appraisal No. 484 (2012)

Amended 06 October 2022

BRANZ Appraisals

Technical Assessments of products for building and construction.

MAPEI

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WFTAO
WORLD FEDERATION OF TECHNICAL ASSESSMENT ORGANISATIONS

Product

1.1 Mapegum WPS and Mapelastic AquaDefense are one-component, liquid-applied waterproofing membranes for internal applications under trafficable floor finishes.

1.2 Mapelastic and Mapelastic Smart are two-component liquid-applied waterproofing membranes suitable for internal applications on substrates under trafficable floor finishes.

Scope

2.1 Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes have been appraised for use as waterproofing membranes for the internal wet areas of buildings, within the following scope:

- on floor substrates of concrete, flooring grade particle board, plywood, fibre cement compressed sheet and fibre cement sheet tile underlay, and on wall substrates of concrete, concrete masonry, wet area fibre cement sheet lining systems and wet area plasterboard lining systems; and,
- when protected from physical damage by trafficable floor finishes; and,
- where floors are designed and constructed such that deflections do not exceed 1/360th of the span.

2.2 The use of Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes on concrete slabs where hydrostatic or vapour pressure is present is outside the scope of this Appraisal.

2.3 Movement and control joints in the substrate must be carried through the membrane and trafficable floor finish. The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.

2.4 The trafficable floor finishes are outside the scope of this Appraisal.

2.5 The membranes must be installed by trained applicators, approved by MBP (NZ) Ltd, to the conditions of the Technical Data Sheet (TDS) of the products.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes meet these requirements. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Interior wet area floors and walls incorporating Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes will meet this requirement. See Paragraphs 11.1-11.7.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes meet this requirement.

Technical Specification

4.1 Materials supplied by MBP (NZ) Ltd are as follows:

- **Mapegum WPS** - a one-part, fast drying, polymer-based, ready-to-use, liquid-applied membrane. It is supplied as a light grey-coloured paste in 5, 10 and 25 kg buckets.
- **Mapelastic** - a two-part, flexible, cementitious, liquid-applied membrane. It is supplied as a Part A powder in 24 kg multi-wall bags and a Part B liquid in 8 kg plastic containers. When dry, the membrane is grey in colour.
- **Mapelastic Smart** - a two-part, flexible, cementitious, liquid-applied membrane. It is supplied as a Part A powder in 20 kg multi-wall bags and a Part B liquid in 10 kg plastic containers. When dry, the membrane is light grey in colour.
- **Mapelastic AquaDefense** - a one-part, solvent-free, ultra-quick drying synthetic resin-based paste in water dispersion liquid-applied membrane. It is supplied as a light blue coloured paste in 15 kg drums.
- **Mapeband and Mapeband Gaskets** - a rubber-coated polyester tape for waterproofing expansion joints and sealing around drains and pipes. Available as a tape 120 mm wide in rolls 50 m long, and also in ready-made internal and external corners (90 and 270 degrees) and pipe gaskets 118 x 118 mm and 300 x 300 mm, "T" profiles 515 mm x 315 mm and cross profiles 515 x 515 mm.
- **Mapeband PE120** - a PVC fabric tape used to reinforce wall/wall and floor/wall joints. It is only used with Mapegum WPS and Mapelastic AquaDefense. Available as a tape 120 mm wide, in rolls 10 m and 50 m long, and also as preformed angles 90° and 270°.
- **Mapetex Sel** - a macro-holed non-woven fabric, used to reinforce the first and second layer of the waterproofing membranes. It is supplied as a polypropylene white fabric, in rolls 100 mm, 200 mm and 1 m wide x 25 m long.
- **Mapenet 150** - a glass fibre mesh used to reinforce the membranes. It is supplied as a blue mesh in rolls 1 m wide and 50 m long.
- **Mapeband SA** - a self-adhesive butyl rubber tape used to reinforce all joints. It is supplied as a 2 mm thick, 100 mm wide tape in rolls 25 m long.
- **Mapei Primer 3296** - an acrylic primer for absorbent surfaces. It is an opaque colour and supplied in 5 and 10 kg drums.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The membrane products have a shelf life of 24 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Mapelastic Smart, Version 2013-4-2022-gb, 2022.
- Mapegum WPS, Version 2014-10-2020-en (IT), 2020.
- Mapelastic, Version 331-5-2018-gb, 2018.
- Mapelastic AquaDefense, Version 2013-11-2016-gb, 2016.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes are for use in buildings where an impervious waterproof membrane is required to floors and walls to prevent damage to building elements and adjoining areas.

7.2 Mapegum WPS and Mapelastic AquaDefense are designed to be used where a one-component product is preferred.

7.3 The membranes must be protected from physical damage by the application of trafficable floor finishes.

7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the floor finish specified. Design guidelines can be found in the BRANZ Good Practice Guide: Tiling.

7.5 Timber framing must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

8.1 Plywood must be a minimum of 17 mm thick complying with AS/NZS 2269, CD Grade Structural with sanded C face upwards and treated to H3 (CCA treated). LOSP treated plywood must not be used.

8.2 The plywood must be laid with the face grain at right angles to the floor joists. The plywood must be supported with dwangs or framing with a maximum span of 400 mm in each direction, fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres along the sheet edges and 200 mm through the body of the sheets.

Fibre Cement Compressed Sheet/Fibre Cement Sheet Tile Underlay

8.3 Fibre cement compressed sheet and tile underlay must be manufactured to comply with the requirements of AS/NZS 2908.2 and must be specified by the manufacturer as being suitable for use as a wet area substrate. Installation must be in accordance with the instructions of the manufacturer.

Particleboard

8.4 Particleboard must be specified for the end use in accordance with NZS 3602.

Concrete and Concrete Masonry

8.5 Concrete and concrete masonry substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101, concrete slab-on-ground to NZS 3604 or NZS 4229 and concrete masonry to NZS 4229 and NZS 4230.

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Wet Area Wall Linings

8.6 Plasterboard wall linings must be manufactured to comply with AS/NZS 2588, and be suitable for use in internal wet areas.

8.7 Fibre cement sheet must be suitable for use in wet areas and comply with AS/NZS 2908.2.

8.8 Installation of plasterboard or fibre cement wall linings must be carried out in accordance with the instructions of the manufacturer.

Durability

Serviceable Life

9.1 The Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with trafficable floor finishes with a design service life of 15-25 years.

Maintenance

10.1 No maintenance of the membranes will be required provided significant substrate movement does not occur and the trafficable floor finish remains intact. Regular checks must be made of the floor finish to ensure it is sound and will not allow moisture to penetrate. Any issues must be repaired immediately by repairing the floor finish.

10.2 In the event of damage to a membrane, the trafficable floor finish must be removed and the membrane repaired by removing the damaged portion and applying a patch with sufficient overlap over the damaged section.

10.3 Drainage outlets must be maintained to operate effectively, and floor finishes must be kept clean.

Internal Moisture

11.1 Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes are impervious to water, and when appropriately designed and installed, will avoid the likelihood of water penetrating behind linings or entering concealed spaces.

11.2 Surfaces must be finished with a trafficable floor finish. A means of compliance with NZBC Clause E3.3.3 and E3.3.4 is given in NZBC Acceptable Solution E3/AS1, Paragraph 3.1.1 b), 3.1.2 b) and 3.3.1 b).

11.3 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1,500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.

11.4 Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes are suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of compliance for overflow is given in NZBC Acceptable Solution E3/AS1, Paragraph 2.

11.5 The waterproofing membrane must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1,500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, the BRANZ Good Practice Guide: Tiling, and flooring and wall lining manufacturers.

11.6 Where water resistant wall finishes such as prefinished sheet materials are used, they must be installed as per the NZBC requirements. They must flash over the membrane a minimum of 30 mm.

11.7 BRANZ recommends the entire floor be covered by a waterproof membrane for bath, shower and spa rooms where timber and plywood floors are used.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Installation Information

Installation Skill Level Requirement

12.1 Installation of the membranes must be completed by trained applicators approved by MBP [NZ] Ltd

12.2 Installation of substrates must always be carried out in accordance with the Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

Preparation of Substrates

13.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents.

13.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete substrates can be checked for dryness by using a hygrometer as set out in BRANZ Bulletin No. 585.

13.3 All voids, cracks, holes, joints and excessively rough areas must be filled to achieve an even and uniform surface. Junctions of substrate abutments, such as at wall/floor and wall/wall junctions must have a reinforcement installed as set out in the Technical Literature.

13.4 Refer to the product manufacturer for correct priming requirements.

Membrane Installation

14.1 Installation must not be undertaken where the substrate surface temperature is below 8°C or above 35°C.

14.2 Mapelastic and Mapelastic Smart require the liquid and powder to be mixed and left to stand for 5 minutes before re-mixing, then applying. Mapegum WPS and Mapelastic AquaDefense must be thoroughly stirred before application.

14.3 The membranes must be applied in a minimum of two coats, at the rates set out in the Technical Literature. Subsequent coats must be applied in an opposite direction to the previous coat. The total finished system thickness of the Mapegum WPS and Mapelastic AquaDefense membranes must be a minimum of 1 mm and the Mapelastic and Mapelastic Smart Membranes must be a minimum of 2 mm.

14.4 Application can be made by roller [medium/long nap], brush [long bristle], or a notched steel trowel [finished with a flat steel trowel].

14.5 Reinforcement fabric or Mapeband is bedded into the wet layer between coats to provide movement protection at wall/wall and wall/floor junctions, or any other areas such as joints in the flooring substrate, floor cracks, or around penetrations in the membrane. In all other situations, reinforcement provisions as set out in this Appraisal and the Technical Literature apply.

14.6 Clean up may be undertaken with water.

14.7 For further information, refer to the Technical Literature.

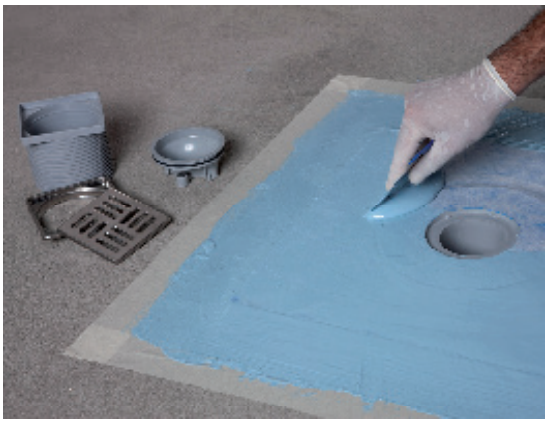
Floor Finishes

15.1 The membranes must be fully cured before installing the trafficable floor finish. The cured membranes must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.

15.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide: Tiling. The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer or MBP [NZ] Ltd.

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Impregnating Drain Vertical fabric with Mapelastic AquaDefense



Application of Mapeband to a wall-floor joint with Mapelastic AquaDefense



Application of the first coat of Mapelastic AquaDefense



Application of the second coat of Mapelastic AquaDefense

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Inspections

16.1 The Technical Literature must be referred to during the inspection of membrane installations.

16.2 Critical areas of inspection are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the membrane.
- Acceptance of the substrate by the membrane installer prior to application of the membrane.
- Installation of the membrane to the manufacturer's instructions, particularly installation to the correct thickness and use of reinforcement.
- Membrane curing and integrity prior to the installation of floor finish including protection from mechanical damage during curing and prior to installation.

Health and Safety

17.1 Safe use and handling procedures for the membranes are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

18.1 The following testing has been undertaken by various organisations:

- Mapegum WPS and Mapelastic Wet Area Membranes in accordance with; EN 14891 for initial tensile adhesion strength, tensile strength after water contact, tensile adhesion strength after heat ageing, tensile adhesion strength after contact with lime water, tensile adhesion strength after contact with chlorine water, tensile adhesion strength after freeze-thaw cycles, waterproofing and crack bridging ability; DIN 53504 for tensile strength and maximum elongation after exposure to air and water immersion (Mapegum WPS only) and; Mapei internal method for water absorption after exposure and water immersion.
- Mapelastic Smart in accordance with EN 1502-4 for bond strength to concrete, freeze thaw, flexibility, static and dynamic crack bridging, water vapour permeability, impermeability to water and bond strength after water immersion, heat ageing, freeze-thaw and alkali ageing.
- Mapelastic in accordance with; EN 14891 for crack bridging after 28 days exposure to air, crack bridging after 7 days exposure to air and 21 days immersion in water, adhesion to concrete surface after 28 days exposure to air, adhesion to concrete surface after 28 days exposure to air and 21 days immersion in water; DIN 52615 for resistance to water vapour transmission and; Mapei internal method for deformability under low temperatures.
- Mapegum WPS in accordance with; EN 1384 for tensile adhesion strength after exposure and water immersion; UNI 8202/22 for water absorption after exposure and water immersion and; DIN 53505 for shore A hardness.
- Mapelastic AquaDefense in accordance with AS/NZS 4858 Appendix A including effect of heat ageing, bleach, detergent and water on tensile and elongation, water vapour transmission to ASTM E96-92 and cyclic movement resistance requirements of AS/NZS 4858 Appendix B. Testing to ANSI 118.10-1999 including seam strength, breaking strength, dimensional stability, resistance to fungi, static head and shear strength to ceramic tile and cement mortar. Also tensile adhesion on a plywood substrate and low temperature flexibility of the membrane.

18.2 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

18.3 Testing of Mapegum WPS and Mapelastic has been undertaken by BRANZ for durability in accordance with AS/NZS 4858, Appendix A covering tensile strength and elongation after immersion in water, bleach, detergent, and after heat ageing.

18.4 Testing for suitability of Mapelastic over particleboard in accordance with AS/NZS 4858, Appendix C has been undertaken by BRANZ and found to be satisfactory.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Other Investigations

19.1 An assessment was made of the durability of the Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic AquaDefense Wet Area Membranes by BRANZ technical experts.

19.2 Site inspections have been carried out by BRANZ to examine the practicability of installation and to examine completed installations.

19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

20.1 The manufacture of the membranes has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

20.2 The quality management system of the membranes manufacturer has been assessed and found to be satisfactory.

20.3 The quality of supply of the membrane system materials to the market is the responsibility of MBP (NZ) Ltd.

20.4 Quality on-site is the responsibility of the MBP (NZ) Ltd trained applicators.

20.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrates.

20.6 Building owners are responsible for the maintenance of the trafficable floor finish in accordance with the instructions of MBP (NZ) Ltd.

Sources of Information

- AS 3958.1:2007 Guide to the installation of ceramic tiles.
- AS/NZS 1170:2002 Structural design actions.
- AS/NZS 2908.2:2000 Cellulose-cement products – Flat sheet.
- AS/NZS 2269:2012 Plywood-Structural.
- AS/NZS 4858:2004 Wet area membranes.
- BRANZ Good Practice Guide: Tiling, April 2015.
- DIN 53504 May 1994 Determination of tensile stress/strain properties of rubber.
- EN 1348: 1997/A1 Adhesives for tiles – Determination of tensile adhesion strength for cementitious adhesives.
- EN 14891 March 2003 Liquid applied waterproofing membranes for use beneath ceramic tiling – Definitions, specifications and test methods.
- NZS 3101:2006 The design of concrete structures.
- NZS 3602:2003 Timber and wood-based products for use in buildings.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4229:2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230:2004 Code of Practice for the design of masonry structures.
- UNI 8202 – 22: 1987 Building. Water proof sheets. Determination of behaviour in water.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 25 February 2021

This Appraisal has been amended to update the Appraisal holder.

Amendment No. 2, dated 06 October 2022

This Appraisal has been amended to include trafficable floors and to remove Mapelastic Turbo.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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In the opinion of BRANZ, Mapegum WPS, Mapelastic, Mapelastic Smart and Mapelastic Aquadefense Wet Area Membranes are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to MBP (NZ) Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. MBP (NZ) Ltd:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by MBP (NZ) Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to MBP (NZ) Ltd or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
09 February 2018

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.