

# Approved Building Consent Documents

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

## Inspection booking timeframes

Call received	before 3pm inspection will be done	after 3pm inspection will be done
Monday	Wednesday	Thursday
Tuesday	Thursday	Friday
Wednesday	Friday	Monday
Thursday	Monday	Tuesday
Friday	Tuesday	Wednesday

Building inspections and enquiries phone: 03 347 2839

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



**RECORD OF TITLE**  
**UNDER LAND TRANSFER ACT 2017**  
**FREEHOLD**  
**Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

SDC - Approved Building Consent Document - BC222012 - Pg 2 of 416 - 20/10/2022 - homanm

**Identifier** 887801  
**Land Registration District** Canterbury  
**Date Issued** 23 July 2019  
**Prior References**  
CB39A/507

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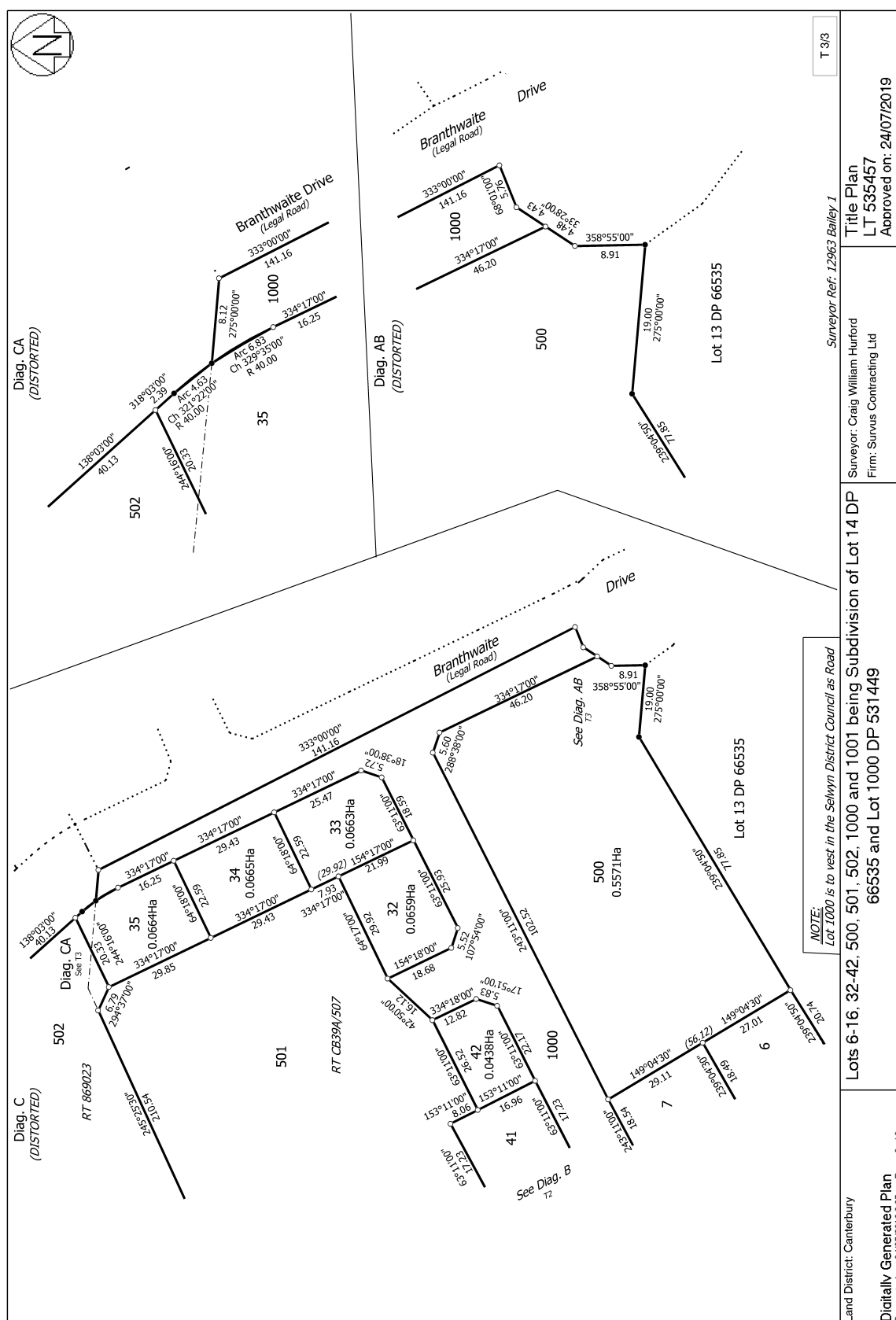
**Estate** Fee Simple  
**Area** 663 square metres more or less  
**Legal Description** Lot 33 Deposited Plan 535457

**Registered Owners**  
Jaspreet Singh and Inderjeet Kaur

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**Interests**  
Subject to Part IV A Conservation Act 1987  
Subject to Section 11 Crown Minerals Act 1991  
11482545.8 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 23.7.2019 at 2:10 pm  
Land Covenant in Covenant Instrument 11482545.13 - 23.7.2019 at 2:10 pm  
11215525.2 Mortgage to Westpac New Zealand Limited - 13.8.2021 at 2:46 pm





**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:

Suburb:

Town/City:

Postcode:

**THE OWNER**

Name(s):

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Phone number:

**BASIS FOR PROVIDING THIS MEMORANDUM**

I am providing this memorandum in my role as the: Please tick the option that applies (✓)	
<input type="checkbox"/>	<b>sole</b> designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
<input checked="" type="checkbox"/>	<b>lead</b> designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
<input type="checkbox"/>	<b>lead</b> designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the other designers will provide their own memoranda relating to their specific RBW design
<input type="checkbox"/>	<b>specialist</b> designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

**IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)**

I \_\_\_\_\_ the following design work that is restricted building work

**PRIMARY STRUCTURE: B1**

Design work that is restricted building work	Description	Carried out/ supervised	Reference to plans and specifications
<i>Tick ✓ if included</i>	<i>[If appropriate, provide details of the restricted building work]</i>	<i>[Specify whether you carried out this design work or supervised someone else carrying out this design work]</i>	<i>[If appropriate, specify references]</i>

**Primary structure**

<b>All RBW Design work relating to B1</b>		Carried out Supervised	
Foundations and subfloor framing		Carried out Supervised	
Walls		Carried out Supervised	

Roof ( )		( ) Carried out ( ) Supervised	
Columns and beams ( )		( ) Carried out ( ) Supervised	
Bracing ( )		( ) Carried out ( ) Supervised	
Other ( )		( ) Carried out ( ) Supervised	

**EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2**

All RBW design work relating to E2 ( )		( ) Carried out ( ) Supervised	
Damp proofing ( )		( ) Carried out ( ) Supervised	
Roof cladding or roof cladding system ( )		( ) Carried out ( ) Supervised	
Ventilation system (for example, subfloor or cavity) ( )		( ) Carried out ( ) Supervised	
Wall cladding or wall cladding system ( )		( ) Carried out ( ) Supervised	
Waterproofing ( )		( ) Carried out ( ) Supervised	
Other ( )		( ) Carried out ( ) Supervised	

**FIRE SAFETY SYSTEMS: C1 – C6**

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other ( )		( ) Carried out ( ) Supervised	
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**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.

**Note:** continue on another page if necessary.

**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]


**Note:** continue on another page if necessary.

#### ISSUED BY

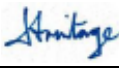
Name:		LBP or Registration number:	
The practitioner is a:	<input checked="" type="checkbox"/> Design LBP	<input type="checkbox"/> Registered architect	<input type="checkbox"/> Chartered professional engineer
Design Entity or Company (optional):			
Mailing address (if different from below):			
Street address / Registered office:			
Suburb:		Town/City:	
PO Box/Private Bag:		Postcode:	
Phone number:		Mobile:	
After Hours:		Fax:	
Email address:		Website:	

#### DECLARATION

I \_\_\_\_\_ *[name of practitioner]*, LBP,

state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- 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: 

Date:



06 November 2019,

Generation Homes Ltd  
1 Richmond Avenue  
Halswell  
CHRISTCHURCH 8025

Attention: Mr E Beker

Dear Evan

### SHALLOW GEOTECHNICAL INVESTIGATION REPORT AT LOT 33, BRANTHWAITE, ROLLESTON.

We are pleased to confirm that we have completed our site investigation on the site above to determine the design bearing capacity and to recommend the suitable foundation types for your project. Results of the tests are appended for your information.

#### Background

We understand that you are intending to construct a single level dwelling with pressed metal tile roofing, brick cladding and an on-grade concrete foundation.

#### Site Description

##### Geology

The mapping of the geology for the area<sup>1</sup> shows it to be underlain by grey river alluvium beneath plains or low-level terraces.

##### Technical Category

The site is mapped in the New Zealand Geotechnical Database<sup>2</sup> as being inside the Canterbury Earthquake Recovery Authority (CERA) "Green Zone" and is designated by the Ministry of Business, Innovation and Employment (MBIE) as N/A - Rural & Unmapped which carries the following description.

*Normal consenting procedures apply in these areas. Technical Category N/A means that non-residential properties in urban areas, properties in rural areas or beyond the extent of land damage mapping, and properties in the Port Hills and Banks Peninsula have not been given a Technical Category.*

### Previous Investigations

The database does not include any test results on immediately adjoining sites. There are however numerous test results in the area. The results indicate quite variable conditions but with good bearing capacity and are consistent with our investigation.

A detailed subdivision geotechnical report dated 16 February 2017 has been completed by Aurecon which concludes in Section 4.5 that the site can be considered to achieve TC1 performance levels.

### **Recommended Approach**

The Ministry of Business, Innovation and Employment has developed guidance documents for the repairing and rebuilding of houses affected by the Canterbury earthquakes<sup>3</sup> which include recommendations for geotechnical investigations.

For normal sites, outside of the DBH Mapping area a shallow subsurface investigation procedure is recommended and therefore no deep investigation or site-specific liquefaction analysis has been undertaken.

### **Site Investigation Results**

Our site investigation was completed on the 05<sup>th</sup> November 2019 to establish the nature and bearing capacity of the soil. The site investigation consisted of three Scala penetrometer tests undertaken in accordance with the recommendations of NZS 3604<sup>4</sup> to determine the bearing capacity, and one hand auger bore log with soil descriptions in accordance with the NZ Geotechnical Society Guidelines<sup>5</sup> to determine the sub-surface soil type (refer attached plan for locations). Penetrometer test results and site bore logs are attached.

The hand auger bore log results generally indicate an organic silty topsoil layer overlaying silty firm moist soil. The water table was not encountered. Hand augers could not continue beyond 500mm due to the density of the materials.

The Scala Penetrometer tests indicate that a Geotechnical Ultimate Bearing Capacity (UBC) of 300kPa, which equates to an Allowable Bearing Capacity of 100kPa, is achieved and maintained at depth of 100mm below the existing ground level.

### **Conclusion and Foundation Options**

The site testing indicates that suitable bearing capacity for standard NZS 3604 foundations or waffle slab is achieved at 100mm below ground level (BGL).

The foundation should be founded below the topsoil layer at 400mm below ground level.

Site preparation should ensure that all grass & organic topsoil material is removed prior to the construction of foundations or placement of gravel fill in accordance with MBIE document section 5.3 & NZS3604:2011 clause 7.5.9.2. Where filling is required, well compacted hard fill (AP65 or AP40) shall be used to backfill up to founding level and shall be compacted in layers no greater than 150mm thick.

Please contact us after excavation is complete and before construction of the foundations so that we may verify the conditions on site and sign off the foundation design.

## References

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<sup>1</sup> Forsyth, P.J.; Barrell, D.J.A; Jongens, R. (compilers) 2008. Geology of the Christchurch Area. Institute of Geological and Nuclear Sciences 1:250 000 geological map 16. 1 sheet + 67 p. Lower Hutt, New Zealand. GNZ Science.

<sup>2</sup> New Zealand Geotechnical Database (<https://www.nzgd.org.nz>)

<sup>3</sup> Department of Building & Housing Guidance Document, “Repairing and rebuilding houses affected by the Canterbury Earthquakes”. Version 3, December 2013.

<sup>4</sup> NZS 3604:2011 Timber-framed buildings sets a minimum standard for the design and construction of timber-framed buildings.

<sup>5</sup> New Zealand Geotechnical Society, 2005: Guidelines for the Field Classification and Description of Soil and Rocks for Engineering Purposes.

## Limitations

This Limitation shall be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement for Consultant Engagement.

This report has been prepared for the use of the client referred to in the agreement for consultant engagement and for the purposes described in the background above. No liability is accepted for the use of any part of this report for any other purpose or by any other person or entity.

Assessments made in this report are made based on the ground conditions indicated from published sources as described in the references above. Subsurface investigations and site inspections have been completed based on accepted usual industry practice in representative sample locations. Variations in site conditions may exist between test locations and have therefore not been accounted for in this report.

We trust the enclosed is sufficient for your needs now, however should you have any queries please do not hesitate to contact the undersigned. Thank you for using Procerto for this work, we look forward to assisting you in the future.

Yours faithfully

**PROCERTO GROUP LIMITED**



**ROY HAMILTON**  
Director

*Cell 021 968 613*  
*roy@procerto.co.nz*

Enclosed:

- Site Location Plan
- Hand Auger Borehole and Scala Penetrometer Logs












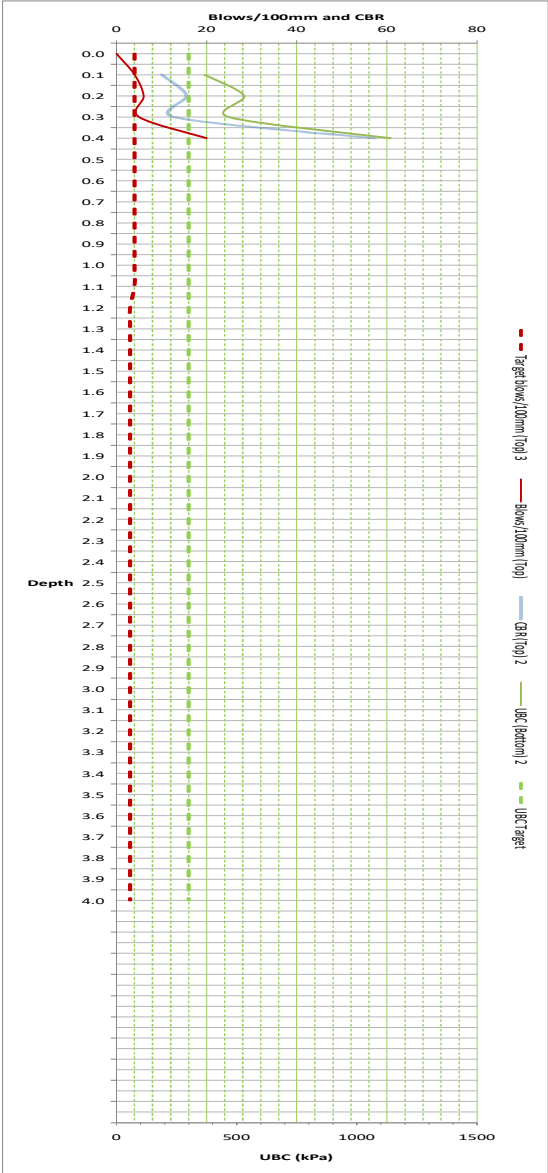









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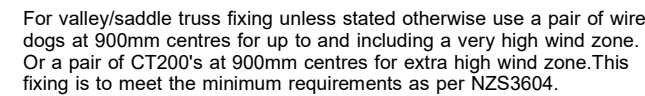


procerto		BUILDING PROJECT CERTAINTY		Doc No: G1 Rev No: 1a Page: 1 of 1		F 1	
<b>Bore Log / Scala Penetrometer (DCP) Test Results</b>							
Job Name: Lot 33, Branthwaite		Job No: J000545		Date: 6/11/2019			
Client: Generation Homes		Client Contact: Evan Beker		Issue No: 1			
Date of Test: 5/11/2019		Logged by: RH, SD		MBIE Site Classification		TC1	
Time of Test: 2:10pm		Weather: Warm, Dry		CERA Classification		Green	
Test Location: DCP 1		Equipment used: DCP		Site Level		43m approx	
				Log Graphs			
Depth	Soil Description	USCS 4 Graph Log 5	Water Table	Blows/100mm (Top)	mm/blow	CBR (Top) 2	UBC (Bottom) 2
0.0				0	4		
0.1				4	25	10	365
0.2				5	20	13	466
0.3				5	20	13	466
0.4				12	8	33	837
0.5				12	8	33	837
0.6				4	25	10	365
0.7	END OF TEST		R	20	5	57	1141
0.8				4			
0.9				4			
1.0				4			
1.1				4			
1.2				3			
1.3				3			
1.4				3			
1.5				3			
1.6				3			
1.7				3			
1.8				3			
1.9				3			
2.0				3			
2.1				3			
2.2				3			
2.3				3			
2.4				3			
2.5				3			
2.6				3			
2.7				3			
2.8				3			
2.9				3			
3.0				3			
3.1				3			
3.2				3			
3.3				3			
3.4				3			
3.5				3			
3.6				3			
3.7				3			
3.8				3			
3.9				3			
4.0				3			
<b>Notes:</b>							
1 Dynamic Cone Penetrometer and Test Bore log tests give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This report does not cover slope stability or suitability of the site for building.							
2 Dynamic Cone Penetrometer Ultimate Bearing Capacity and CBR from correlations from Stockwell, M.J. Determination of allowable bearing pressure under small structures. New Zealand Engineering, Vol. 32, No. 6, June 1977: 132-135.							
3 NZS3604:2011 'Good Ground' Criteria: Number of blows / 100mm of penetration below underside of footing: 5 blows / 100mm to a depth equal to twice the width of the widest footing and 3 blows / 100mm at depths greater than twice the width of the footing.							
4 The Unified Soil Classification System (USCS) is a soil classification system used in engineering and geology to describe the texture and grain size of a soil. The classification system can be applied to most unconsolidated materials, and is represented by a two-letter symbol.							
5 Field Description of Soil and Rock, Guideline for the Field Classification and Description of Soil and Rock for Engineers (Supersedes all previous versions).							
Issue Date: 6/11/2019		Signed:		GR HAMILTON			

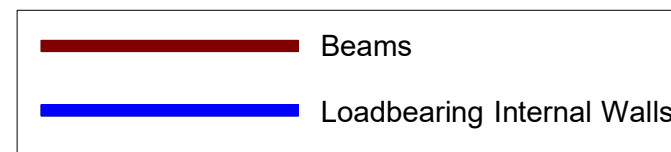
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<b>Notes:</b> 1 Dynamic Cone Penetrometer and Test Bore log tests give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This report does not cover slope stability or suitability of the site for building. 2 Dynamic Cone Penetrometer Ultimate Bearing Capacity and CBR from correlations from Stockwell, M.J. Determination of allowable bearing pressure under small structures. New Zealand Engineering, Vol. 32, No. 6, June 1977: 132-135. 3 NZS3604:2011 "Good Ground" Criteria: Number of blows / 100mm of penetration below underside of footing: 5 blows / 100mm to a depth equal to twice the width of the widest footing and 3 blows / 100mm at depths greater than twice the width of the footing. 4 The Unified Soil Classification System (USCS) is a soil classification system used in engineering and geology to describe the texture and plasticity of a soil. The classification system can be applied to most unconsolidated materials, and is represented by a two-letter symbol. 5 Field Description of Soil and Rock, Guideline for the Field Classification and Description of Soil and Rock for Engineers, Department of Scientific Research 1988.																																																																																																																																																																																																																																																																																																																																																																																																																																											
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1 Dynamic Cone Penetrometer and Test Bore log tests give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This report does not cover slope stability or suitability of the site for building.																																																																																																																																																																																																																																																																																																																																																																																																																																											
2 Dynamic Cone Penetrometer Ultimate Bearing Capacity and CBR from correlations from Stockwell, M.J. Determination of allowable bearing pressure under small structures. New Zealand Engineering, Vol. 32, No. 6, June 1977: 132-135.																																																																																																																																																																																																																																																																																																																																																																																																																																											
3 NZS3604:2011 "Good Ground" Criteria: Number of blows / 100mm of penetration below underside of footing: 5 blows / 100mm to a depth equal to twice the width of the widest footing and 3 blows / 100mm at depths greater than twice the width of the footing.																																																																																																																																																																																																																																																																																																																																																																																																																																											
4 The Unified Soil Classification System (USCS) is a soil classification system used in engineering and geology to describe the texture and grain size of a soil. The classification system can be applied to most unconsolidated materials, and is represented by a two-letter symbol.																																																																																																																																																																																																																																																																																																																																																																																																																																											
5 Field Description of Soil and Rock, Guideline for the Field Classification and Description of Soil and Rock for Engineers, Department of Scientific Research 1988.																																																																																																																																																																																																																																																																																																																																																																																																																																											
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SDC - Approved Building Consent Document - BC222012 - Pg 15 of 416 - 20/10/2022 - homanm



## Your Building Partner

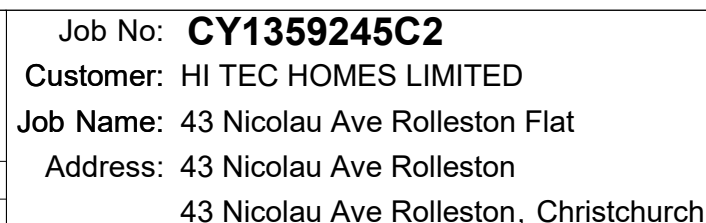


- Lintel as per plan
- Notification of point loaded lintels or point loads on internal walls where the downward load is higher than 8kN (85mm raft type slab) or 10kN (100mm standard slab), or the upward load is greater than 10kN. These loads are Ultimate Limit State Loads.
- If no loads are shown no thickening is required.

<b>A = 47x90 Joist Hanger</b>
<b>B = 47x120 Joist Hanger</b>
<b>C = CT200 (pair)</b>
<b>D = 47x190 Joist Hanger</b>
<b>E = 95x165 Joist Hanger</b>
<b>F = SH-140 Split Hanger</b>
<b>G = SH-180 Split Hanger</b>
<b>H = SH-220 Split Hanger</b>
<b>J = 2x6kN Strap (12kN)</b>
<b>K = 6kN Strap</b>
<b>L = Multigrip (single)</b>
<b>M = Multigrips (pair)</b>
<b>N = Nailon Plate (240x110x1)</b>
<b>P = 16kN Pack</b>
<b>Q = 9kN Pack</b>
<b>S = CPC 40 Single Cleat</b>
<b>T = CPC 40 Short (pair)</b>
<b>U = CPC 80 Single Cleat</b>
<b>V = 16kN Uplift</b>
<b>Z = Engineers Design</b>

Any roof loads as stated on this layout over 16kN lift are outside the scope of NZS3604, and the architect / draughtsperson is responsible for the design to transfer the loads to the ground.

Snow Zone:	Christchurch (N4)
Wind Area:	High
TC Restraints:	900 mm
Roof Material:	Galv Iron 0.55mm
Roof Pitch:	25.00 °
Snow Altitude:	100.000 m
Design Wind Speed:	44.0 m/s
BC Restraints:	600 mm
Ceiling Material:	Standard Plaster Board 13mm
Ground Snow Load:	0.900 kPa
Truss Centres:	900 mm



If a gable truss requires a windbeam brace, the type of MiTek brace will be noted as such on the layout. The truss fixings can be substituted for other fixings of the same or greater capacity. All verge framing to be fixed according to the MiTek On-Site Guide if not covered by NZS3604. If bottom chord restraints are 35mm Metal battens, then they must be fixed with either two nails or screws. If the metal battens are fixed with a single nail or screw then 90x45mm bottom chords restraints will be required at 1800mm centres

All loads shown on this page regarding the truss fixings are characteristic loads



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.mitek.nz.co.nz

Printed: 14:39:53 02 Aug 2022

MiTek 20/20 Engineering 4.7.346.0

## PRODUCER STATEMENT for MiTek 20/20<sup>®</sup> TRUSS DESIGN - Version 4.7

ISSUED BY: **MiTek New Zealand Limited**  
TO: **Carters Building Supplies Ltd**  
IN RESPECT OF: **MiTek<sup>®</sup> Truss Designs**

This producer statement covers the MiTek 20/20<sup>®</sup> truss design and the structural performance of the GANG-NAIL<sup>®</sup> connector plate for the job reference **359245C2** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

The MiTek 20/20<sup>®</sup> truss design program has been developed by MiTek New Zealand Limited for the design of MiTek<sup>®</sup> timber roof, floor and attic trusses in New Zealand. The truss designs computed by MiTek 20/20<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> 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: Tuesday, August 2, 2022**

In line with, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)  
**TECHNICAL SERVICES MANAGER, MiTek New Zealand Limited**



Job: 359245C2	Client: HI TEC HOMES LIMITED	Site: 43 Nicolau Ave Rolleston Flat 43 Nicolau Ave Rolleston	Phone:
Description: Building Consent No.: MiTek 20/20 Engineering 4.7.346.0	MiTek New Zealand Limited		Printed: 14:39:53 02 Aug 2022

## MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **Carters Building Supplies Ltd**, 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.

### 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.

<b>Job Details</b>		Importance Level :	2	Design Working Life :	50 years
<b>Roof Truss</b>					
Timber Group:	MSG8 DDP H1.2	Pitch:	25.000 deg	Nominal Overhang:	600 mm
<b>Roof</b>		<b>Ceiling</b>		<b>Wind</b>	
Material:	Longrun	Material:	Gib 13mm/Timber Battens	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	<b>Snow</b>	
Live Load:	Qur = 0.250 kPa	Live Load:	Qc = 1.400 kN	Location:	Christchurch (N4) at 100 m
	Qc = 1.100 kN			Open Ground Load:	0.900 kPa
				Basic Roof Load:	0.441 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, Fxx = 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)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
CG1	1D	6961	25.000	900	J3	2	1463	25.000	900	*HB1	3	5440	18.249	900
CT1	1	6961	25.000	900	J3A	2	1463	25.000	900	*HB2	1	2653	18.249	900
CT2A	1	6961	25.000	900	J4	2	3126	25.000	900	*HB3	2	3005	18.249	900
CT6	1D	7051	25.000	900	J4A	1	3126	25.000	900	*R1	1	1154	25.000	900
CJ1	1	2753	25.000	900	J4C	1	3126	25.000	900	*R1A	1	944	25.000	900
CJ1A	1	2843	25.000	900	J5	1	1326	25.000	900	*R2	2	891	25.000	900
CJ2	1	2706	25.000	900	J5A	1	1326	25.000	900	*R2A	2	891	25.000	900
CJ2A	1	2706	25.000	900	J6	2	955	25.000	900	*R3	1	1017	25.000	900
J1	1	3263	25.000	900	J6A	1	955	25.000	900	*R4	2	646	25.000	900
J1A	1	3263	25.000	900	J7	1	3126	25.000	900	*R4A	2	646	25.000	900
J1B	1	3263	25.000	900	T1	2	3126	25.000	900	*R5	5	120	25.001	900
J2	1	2363	25.000	900	TG1	1	3126	25.000	900					
J2A	1	2363	25.000	900	V1	1	1317	25.000	900					

Total quantity : 53

The computer design input has been carried out by:

MiTek 20/20 Software Operator: Keren Pascua

MiTek Candidate Number and Qualifications:

Accredited Fabricator:

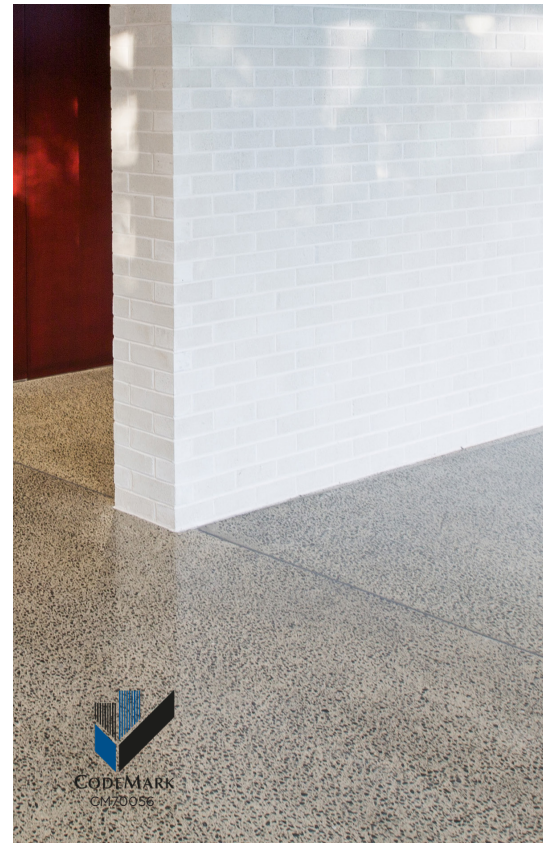


Tuesday, August 2, 2022



# **RibRaft®**

TECHNICAL  
MANUAL







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 3604:2011 "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 CertMark Australasia 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.

# THIS MANUAL CONSISTS OF 3 SECTIONS:

## SECTION

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Contains information  
principally useful for  
the specifier or  
building designer

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person on site installing  
the Firth RibRaft®  
Floor system

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## SECTION

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verification checks

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## SECTION: DESIGN INFORMATION

# 1

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 IS DESCRIBED IN SECTION 2 OF THIS MANUAL (INSTALLATION INFORMATION). WHERE STANDARDS ARE REFERENCED IN THIS MANUAL, THESE SHALL INCLUDE THE LATEST AMENDMENTS.

## 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 305mm. 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 meaning the overall thickness is 330mm. 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 levelled 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.

### 2.3 Steel

Reinforcing steel in the slab shall consist of Welded Reinforcing Mesh complying with AS/NZS 4671:2001 with a minimum weight of 2.27kg/m<sup>2</sup>, 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 4671:2001 "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 edge of the slab.

### 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.
- 2) Raftmix25: 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).

Note: Additional admixtures to standard RibRaft® mixes to be approved by the Firth Plant Engineer.



### 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.
- > The maximum height of a single or top storey is 4.8m and any other storey is 3m.
- > Only ground floor walls of the structure supported by the system are permitted to be "heavy external walls" (as defined in Clause 3.3).
- > 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 and floor, the loaded dimensions stated in tables 8.2 and 14.10 of NZ3604:2011 shall apply, and these load bearing walls shall be supported on a 300mm wide load bearing rib as detailed in this manual.
- > 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.

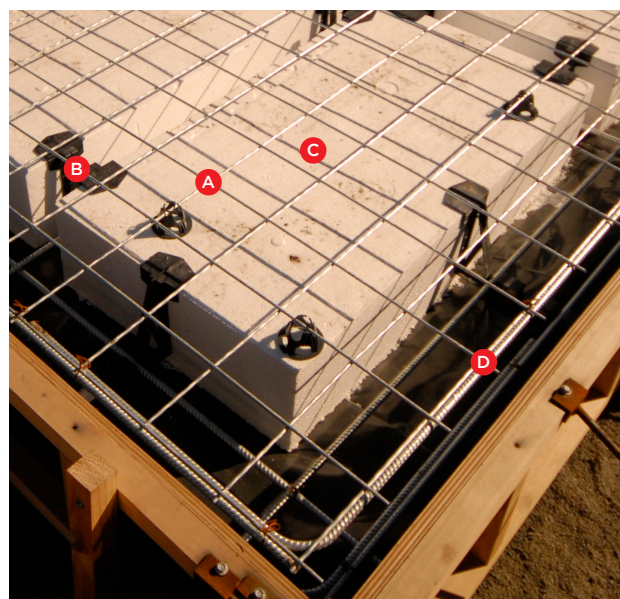
#### 3.3 Snow Loading

Open ground snow loading as defined in NZS3604 of up to 2kPa.

#### 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/m<sup>2</sup> – e.g. timber framing with weather boards and interior wall linings.
- > Heavy external walls with total mass greater than 60kg/m<sup>2</sup> but not exceeding 290kg/m<sup>2</sup> – e.g. timber framing with masonry veneer or partially filled 20 series masonry blocks.
- > Internal walls with total mass not exceeding 45kg/m<sup>2</sup> – e.g. timber framing and linings.
- > Light roofs with total mass not exceeding 45kg/m<sup>2</sup> – e.g. ceiling linings and metal roof, including framing.
- > Heavy roofs with total mass greater than 45kg/m<sup>2</sup> but not exceeding 85kg/m<sup>2</sup> – e.g. ceiling lining and concrete tiles or slates, including framing.
- > Mid-floors with total mass not exceeding 60kg/m<sup>2</sup> – 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

#### 3.2 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).

### 3.5 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 3604:2011.

Table 1 Foundation Type Identifier

NUMBER OF STORIES	ROOF	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	1.5KPA LIVE LOAD & UP TO 1KPA SNOW LOAD	3KPA LIVE LOAD & /OR 2KPA SNOW LOAD
SINGLE STOREY	Light	Light		A	A
	Heavy	Light		A	B
	Light	Heavy		B	B
	Heavy	Heavy		C	C
DOUBLE STOREY	Light	Light	Light	C	D
	Heavy	Light	Light	D	E
	Light	Heavy	Light	D	E
	Heavy	Heavy	Light	E	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 3604:2011 (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 3604:2011.

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 NZS3604:2011 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 NZS3604:2011 for “good ground” shall be complied with.

Table 2 Scala Penetrometer Blows Required and Ultimate Bearing Capacity

FOUNDATION TYPE	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 NZS3604:2011) 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: NZS3604:2011 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 NZS3604:2011).

Figure 1 Building Check Flow Diagram

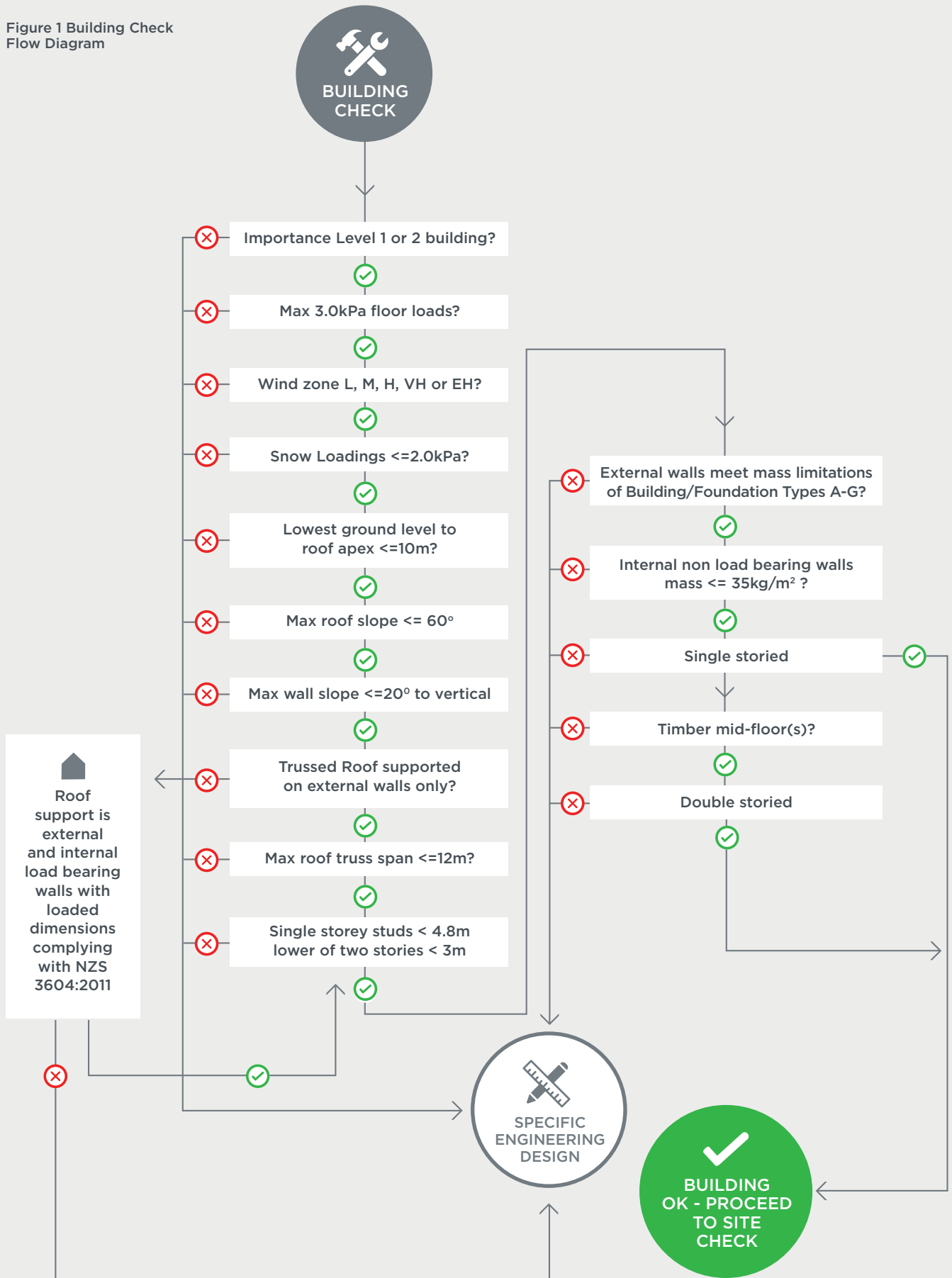
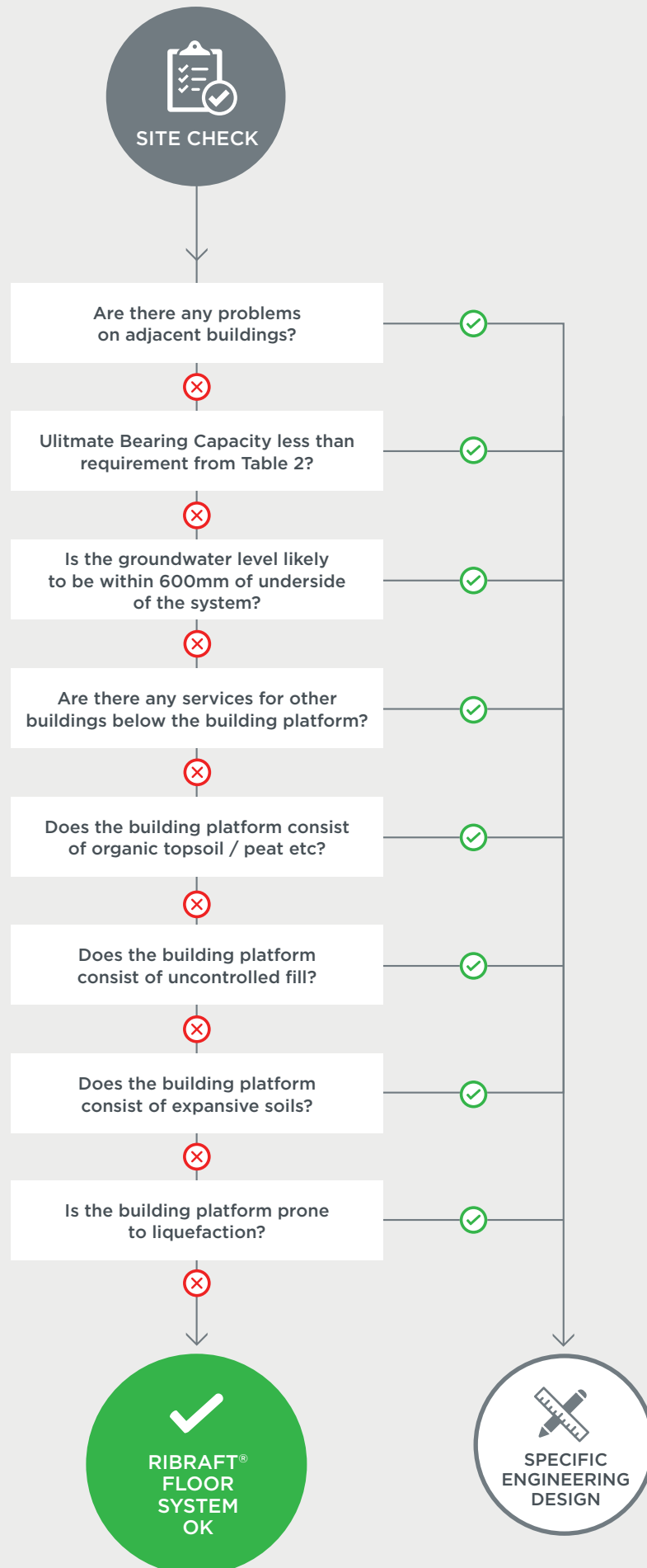


Figure 2 Building Check Flow Diagram



## 4.0 CONSTRUCTION DETAILS

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

### 4.1 Pod Layout

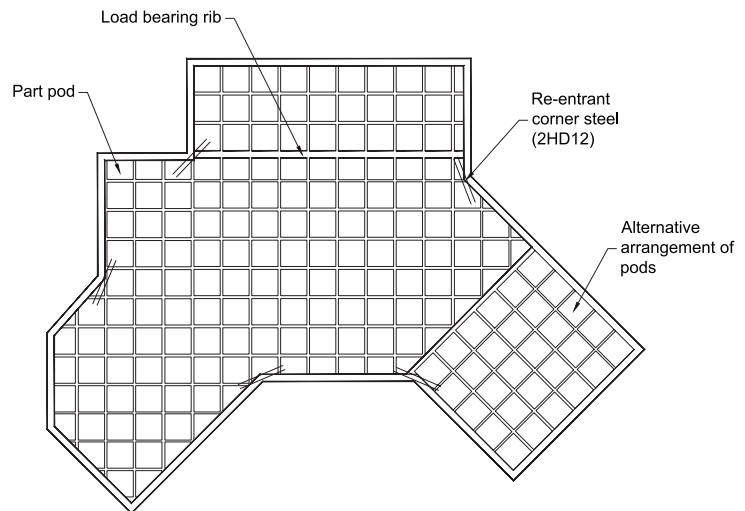
RibRaft® polystyrene pods supplied by Firth (1100 x 1100 x 220mm thick) shall be placed on levelled ground and arranged in a waffle pattern. The pods are used as void formers while the concrete is curing. These pods are an integral component of the system and shall not be substituted.

Pods shall be placed so as to provide the necessary spacing between the edge beams and ribs as described below. The first rib out from the edge beam shall have a maximum clear separation of 1100mm however in all other cases the centre to centre distance between the ribs, whether they are 100mm or 300mm wide, shall be 1200mm. In the case of 100mm ribs this centre to centre spacing is achieved by the 1100mm square pods however between 100mm and 300mm ribs, or between two 300mm ribs, the pods shall be cut down to suit. Pods may be cut down to size but shall not be added to, where this is necessary to suit the building layout, penetrations or orientation of beams and ribs.

**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 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 Figure 5, below for construction details. The edge beam shall be rebated for brick veneers where necessary as shown in Figure 5(C).

### 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 5E for construction details.

### 4.4 Internal Ribs (load bearing) Width and Reinforcement

For load bearing walls that support the roof and floors and heavy internal walls, the pods shall be cut to create a 300mm wide rib directly under the load bearing wall, Refer Figure 5(D) 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.



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 manufacturer's 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	PAD OPTION, GOOD GROUND	BEAM OPTION, BEARING CAPACITY GREATER THAN 140KPA <sup>(3)</sup>
Up to 10kN	No thickening required	No thickening required
Up to 20 kN	375x375 pad <sup>(1)</sup>	300mm wide load under point load as detailed in Figure 5
Up to 30kN	450x450 pad <sup>(2)</sup>	300mm wide load under point load as detailed in Figure 5

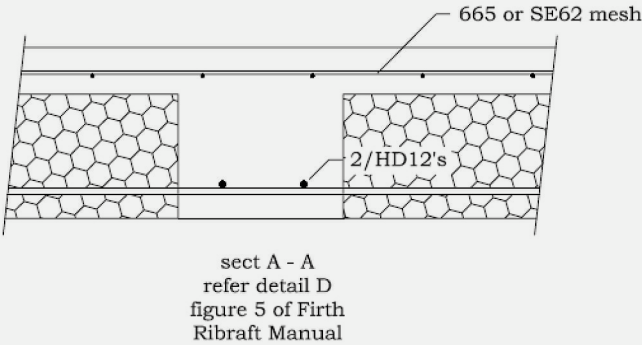
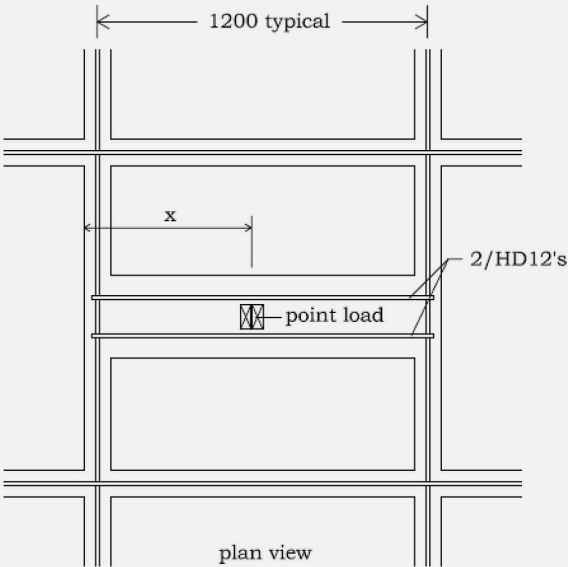
Notes

- (1) Pad thickness to match depth of pods plus topping (bears on ground not polystyrene) and reinforced with 2 x D12 Bars both ways
- (2) Pad thickness to match depth of pods plus topping (bears on ground not polystyrene) and reinforced with 3 x D12 Bars both ways
- (3) 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.

Figure 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



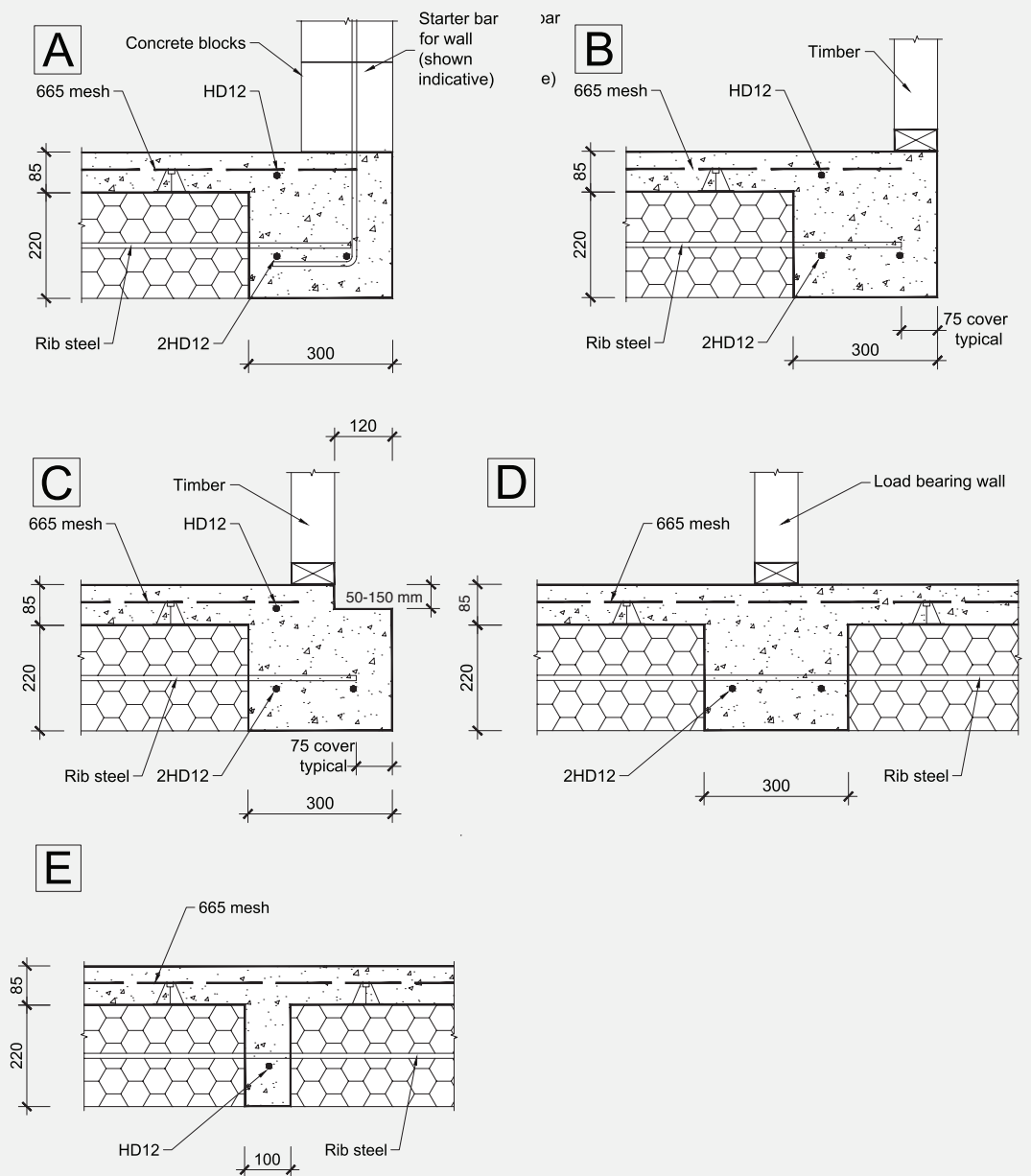
#### 4.6 Mesh Reinforcement

The entire floor slab shall be reinforced with 665 mesh supported on 40mm mesh chairs sitting on the polystyrene 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.

Figure 5  
Standard RibRaft®  
Construction Details



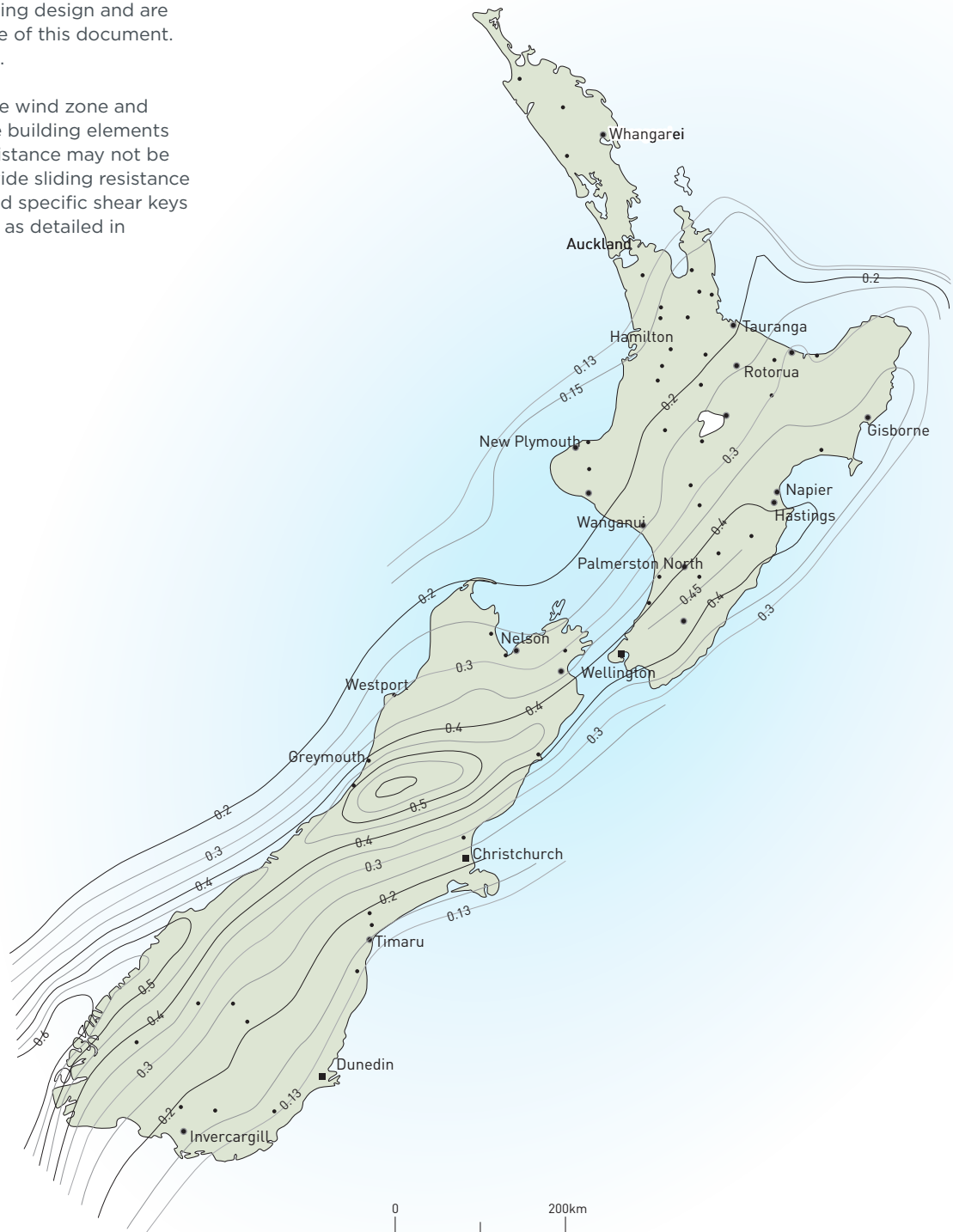
## 5.0 LATERAL RESISTANCE

### 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



## 5.2 Wind Resistance

The building's bracing demand from wind loading shall be assessed from Section 5 of NZS 3604:2011 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.

## 5.3 Shear Keys

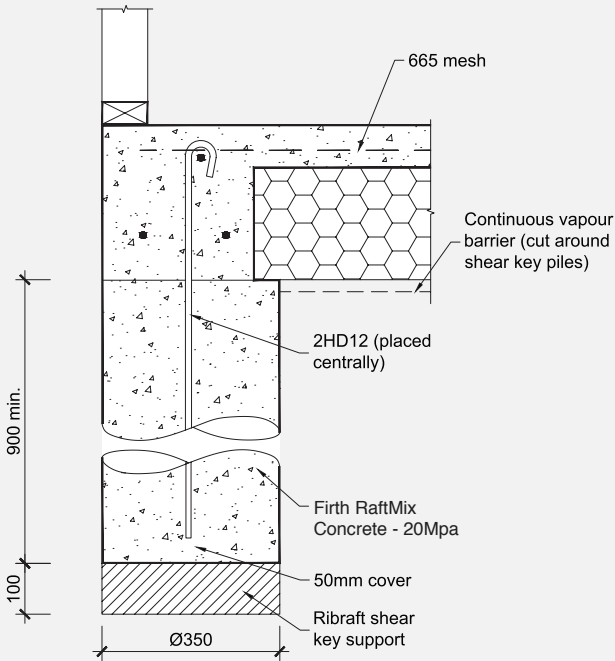
Shear key piles required by Clause 5.2 must be uniformly distributed around the perimeter of the building, and be located at the edge beam/internal rib junction. Where a shear key is required, the minimum number of shear keys shall be two per floor plan. Where two shear keys are used they shall be placed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

BUILDING TYPE	ROOF TYPE	GROUND FLOOR EXTERNAL WALLS	SECOND STOREY EXTERNAL WALLS	BU's PROVIDED PER 100M <sup>2</sup> 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

Table 4 Bracing Capacity Provided By Frictional Resistance Per 100m<sup>2</sup> Of Ground Floor Area

Figure 7 RibRaft® Shear Key



## 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<sup>2</sup> 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 =  $95 \times 1.3 \times 15 = 1853\text{BU}$   
The BU demand along the building =  $90 \times 1.3 \times 12 = 1404\text{BU}$

From Table 4 for a single storey light weight roof with 1.5kPa live load the capacity is 1630BU per 100m<sup>2</sup>. Therefore for 180m<sup>2</sup> 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". The schedule method is the simplest method to achieve compliance with Clause H1 of the Building Code. Using this method the minimum R-Values required for floors are R1.3 for light timber frame construction, and typically R1.5 for masonry construction. R-values of R1.3 can be used for masonry construction if glazing with greater insulation is used (refer NZBC, Clause H1). If in-floor heating is used the minimum required R-Value is increased to R1.9, and the resistance to thermal movement into the room must be one tenth of that to the outside environment.

The fourth edition of H1 (amendment 3, January 2017) states that "Concrete slab-on-ground floors are deemed to achieve a construction R-value of 1.3, unless a higher R-value is justified by calculation or physical testing". RibRaft® is therefore a deemed to comply solution however in some instances designers may wish to determine the R-value as part of the design process. There are numerous methods for calculating R-values for slabs on ground, with many of the processes giving quite different R-values. NZBC clause H1 prescribed that an "Acceptable methods for determining the thermal resistance (R-values) of building elements are contained in NZS 4214."

The R-values provided in this Manual use the NZS4214 methodology.

If the R-value calculation is required to demonstrate compliance with the Building Code, then the NZS4214 methodology is probably the best alternative due to its reference in H1. However, more technically robust calculation methodologies exist and where the R-values are important, for example heated floors, use can be made of the BRANZ Home Insulation Guide. For these instances edge insulation is also recommended.

When slab edge insulation is specified, it is recommended that Firth HotEdge® is used as it has been designed to be compatible with Firth RibRaft®.

The R-Value of a concrete floor is dependent on the floor area to perimeter ratio, and the details of the floor perimeter. The R-Value for various solutions are illustrated below. The R-Values have been independently calculated using NZS4214:2006 "Methods of Determining the Total Thermal Resistance of Parts of Buildings," though modified for perimeter heat loss using recommendations from the Building Research Establishment.

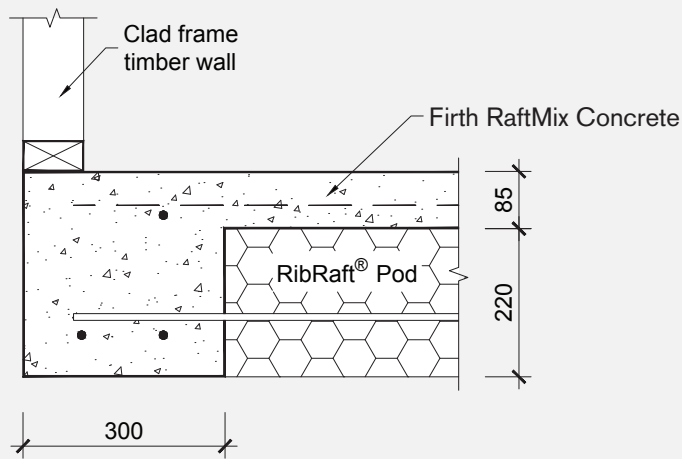


Figure 8  
RibRaft® R Values  
For 90mm Thick  
Walls On The  
Floor Edge

	FLOOR AREA TO PERIMETER RATIO M <sup>2</sup> /M										
	1.00	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m <sup>2</sup> °C/W	1.28	1.40	1.52	1.64	1.75	1.86	1.97	2.07	2.17	2.38	2.57

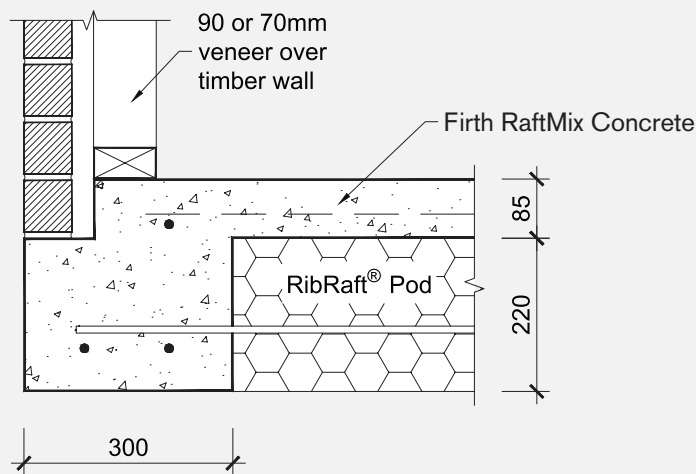


Figure 9  
RibRaft® R Values  
For 70-90mm  
Thick Veneer,  
Cavity, and  
90mm Walls.

	FLOOR AREA TO PERIMETER RATIO M <sup>2</sup> /M									
	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m <sup>2</sup> °C/W	1.54	1.67	1.80	1.93	2.05	2.17	2.28	2.40	2.62	2.84

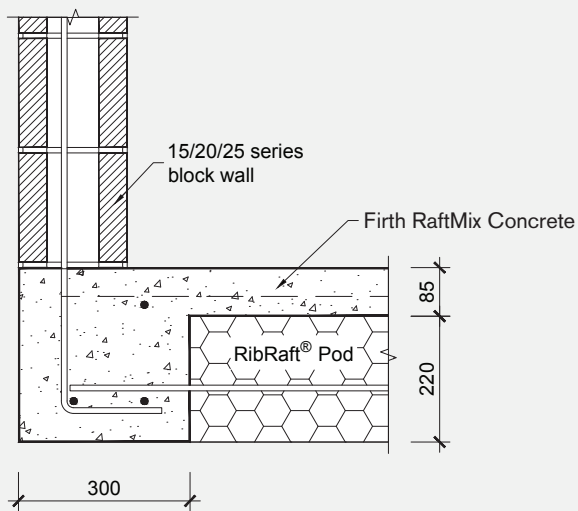


Figure 10  
RibRaft® R Values  
For Various  
Thicknesses  
Of Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M <sup>2</sup> /M									
		1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m <sup>2</sup> °C/W	15 SERIES	1.48	1.60	1.73	1.85	1.96	2.08	2.19	2.30	2.51	2.72
	20 SERIES	1.54	1.67	1.80	1.93	2.05	2.17	2.28	2.40	2.62	2.84
	25 SERIES	1.59	1.73	1.86	1.99	2.12	2.24	2.37	2.49	2.72	2.95

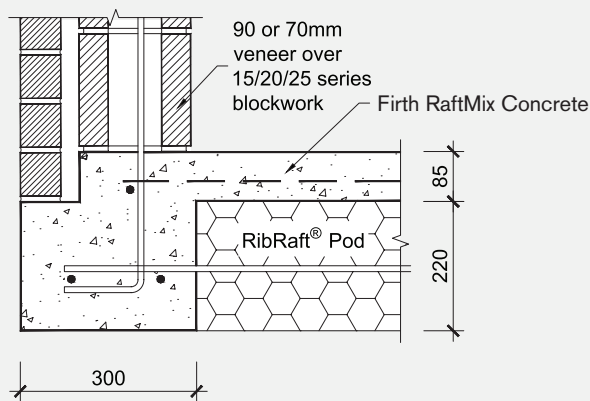


Figure 11  
RibRaft® R-Values  
For 70-90mm Thick  
Veneer, Cavity, And  
Various Thickness  
Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M <sup>2</sup> /M									
		1.25	1.50	1.75	2.00	2.25	2.0	2.75	3.0	3.5	4.00
R-Value m <sup>2</sup> °C/W	15 SERIES	1.59	1.73	1.86	1.99	2.12	2.24	2.37	2.49	2.72	2.95
	20 SERIES	1.64	1.78	1.92	2.06	2.19	2.32	2.44	2.56	2.81	3.04
	25 SERIES	1.69	1.83	1.98	2.11	2.25	2.38	2.51	2.64	2.88	3.12

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® means 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.

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.

### 6.2.2 Free Joints

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.

Bondbreak HD12 rib bars, Denso tape

100 200

3 mm wide x 100mm deep sawcut

stop mesh either side of sawcut

665 or SE615 mesh

HD12 HD12 HD12

HD12 from 100mm rib

sand blinding - 25mm nominal

250 micron Damp Proof Course

please ensure HD12 in 100mm rib remains continuous across sawn joint

17



### 6.3 Services Detailing

Two options exist for running services, both of which are appropriate, however some regional Building Control 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).

#### 6.3.1 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 service 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

#### 6.3.2 Under Slab Running Of Services

For this option, services ducts shall be conveyed underground to their plan location then brought up through the polystyrene pod and the concrete floor slab, within the limitation imposed by Table 8. Services shall not 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/NZS3500.4:2015 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 13, 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 15 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 through the system.

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, the edge 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 14 for details for pipes passing vertically through edge beam and internal rib.
  - (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 and be 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 110mm 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 subfloor 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 Figure 13 and 14.

Figure 13 Example of Detailing Requirements For Services

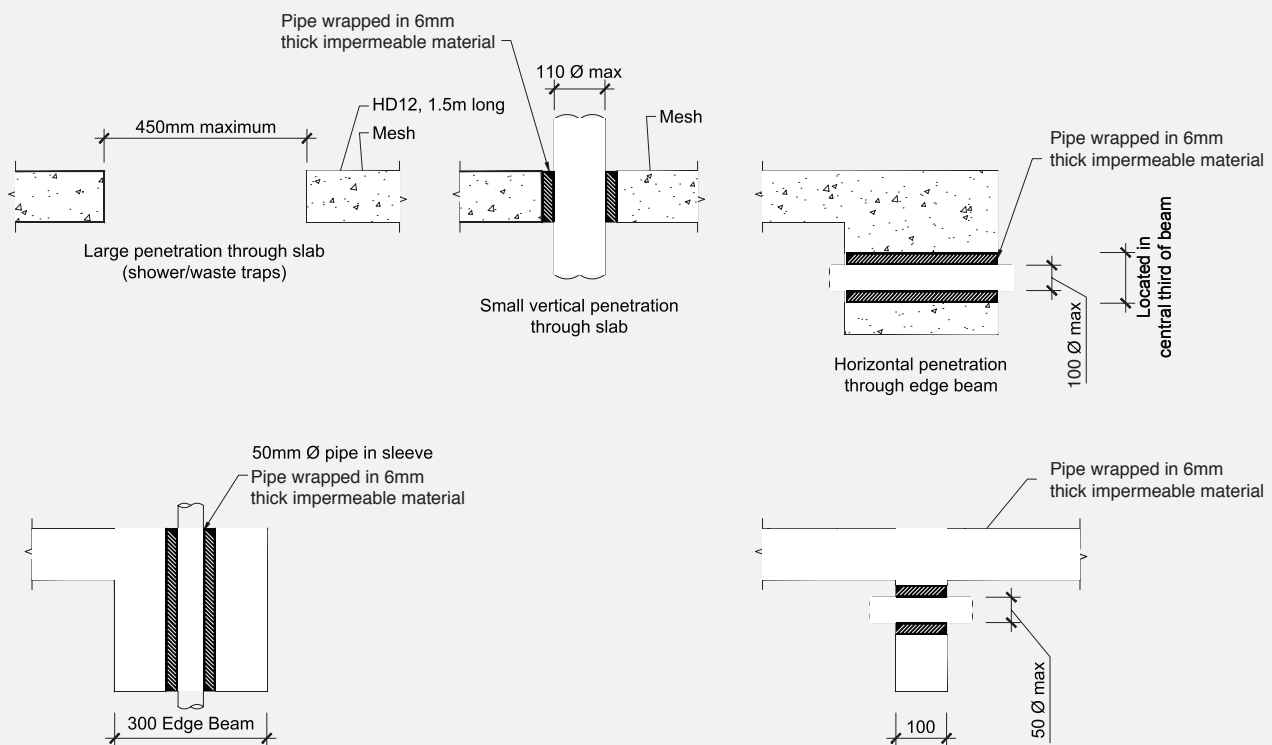
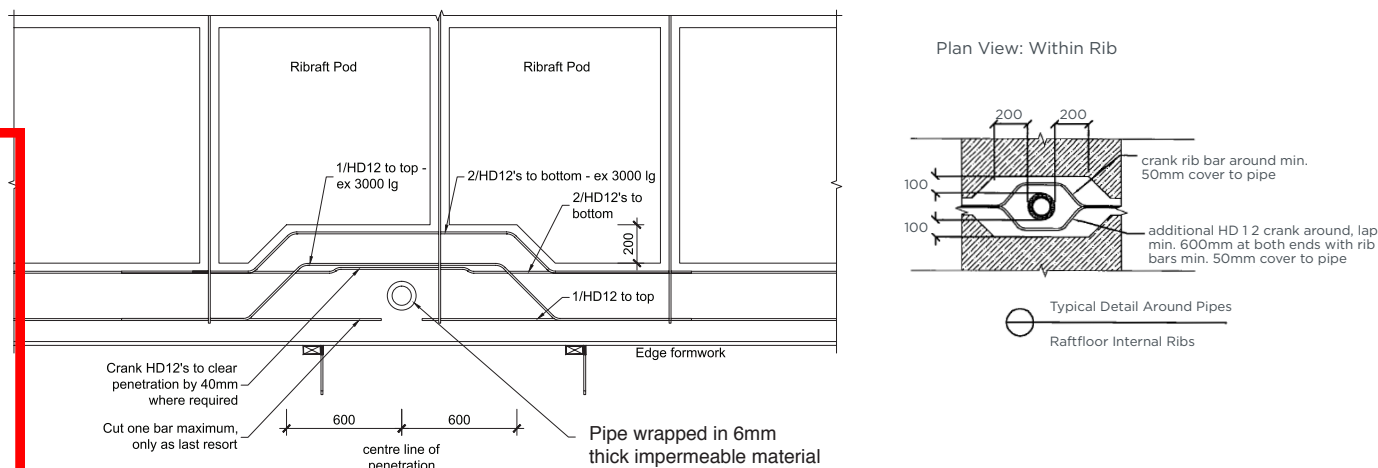


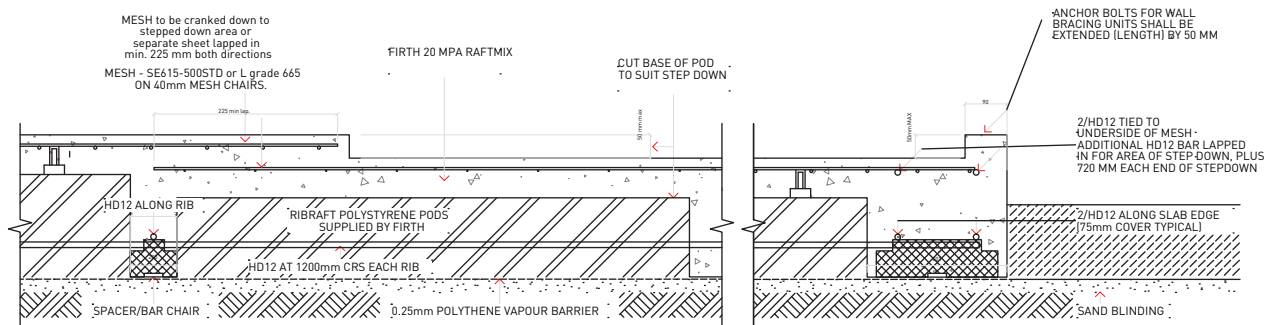
Figure 14  
Localised Increase In Width At Edge Beam Where Vertical Service Up To 100mm Diameter Are Required



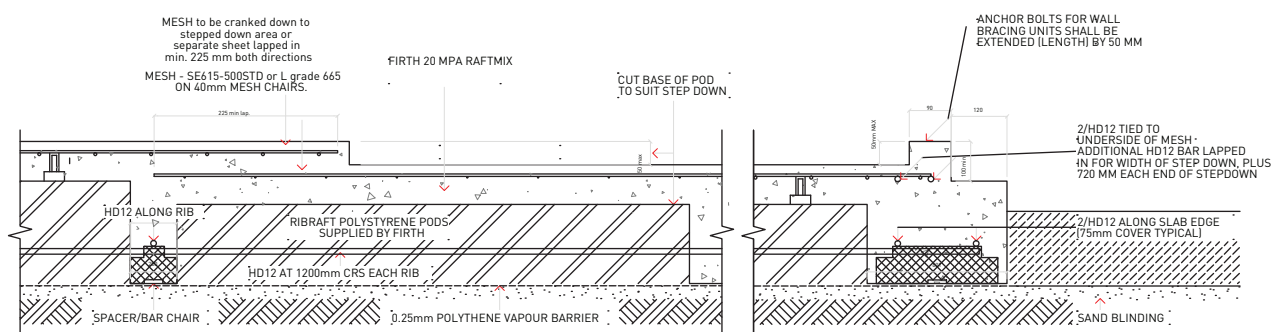
### 6.3.3 Recesses for Showers

Where showers are rebated up to 50mm into the RibRaft® concrete topping, the details specified shall be in accordance with Figure 15.

Figure 15 Details where recesses of up to 50mm are required for rebated showers

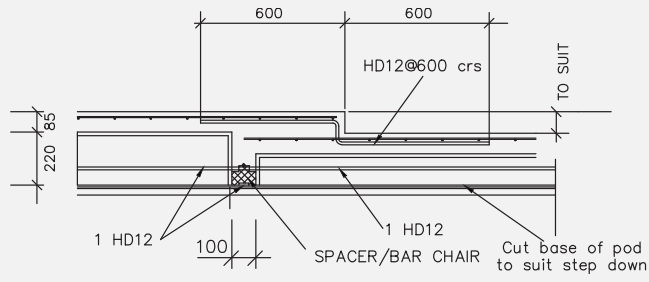


### RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER

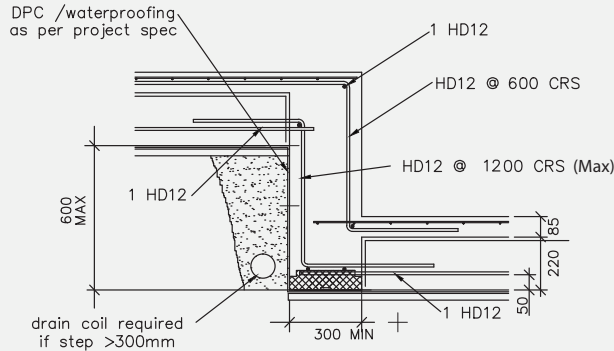


### RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER

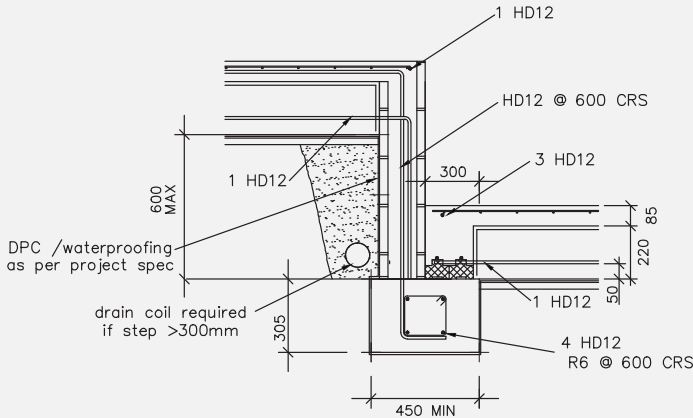
Figure 16 Details where step downs are required in the floor



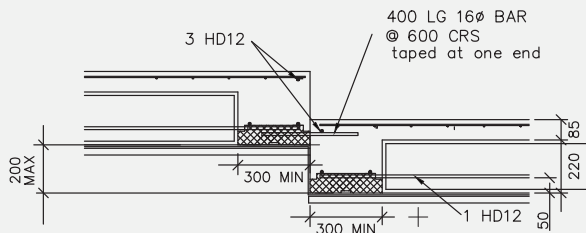
7  
S2  
SET-DOWN  
DETAIL FOR STEP  
UP TO 100mm  
1:20



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



8  
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

### 6.3.4 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 16. 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 6.2.2, a free joint shall be provided if the distance from the step down to the slab edge exceeds 15m.

## SECTION: INSTALLATION INFORMATION

# 2

1.0 THIS SECTION DETAILS THE INSTALLATION INFORMATION REQUIRED FOR THE FIRTH FIBRAFT® 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.

### 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 1 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 1, 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 2. 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 3.

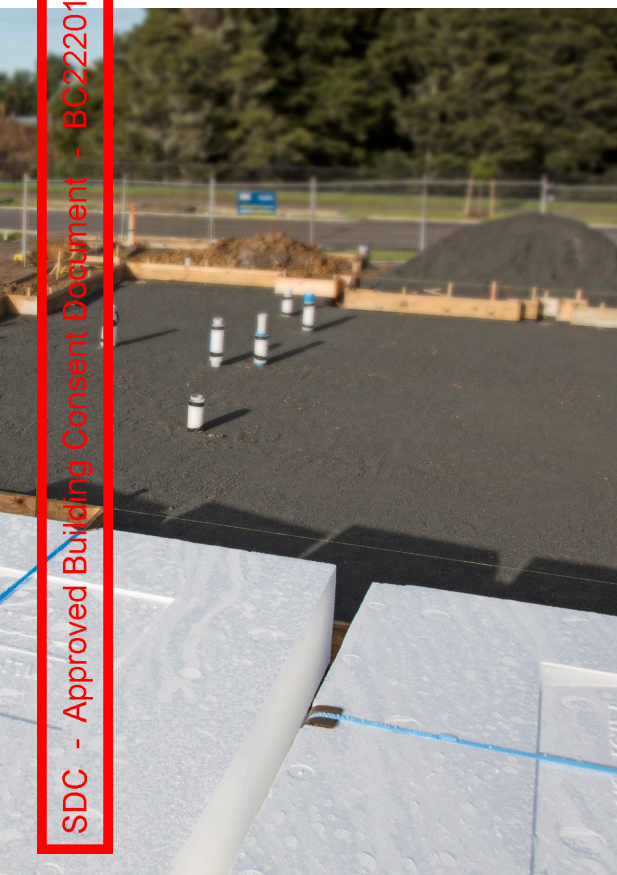


Figure 1  
Relationship  
Of RibRaft®  
To Sloping  
Ground Surface

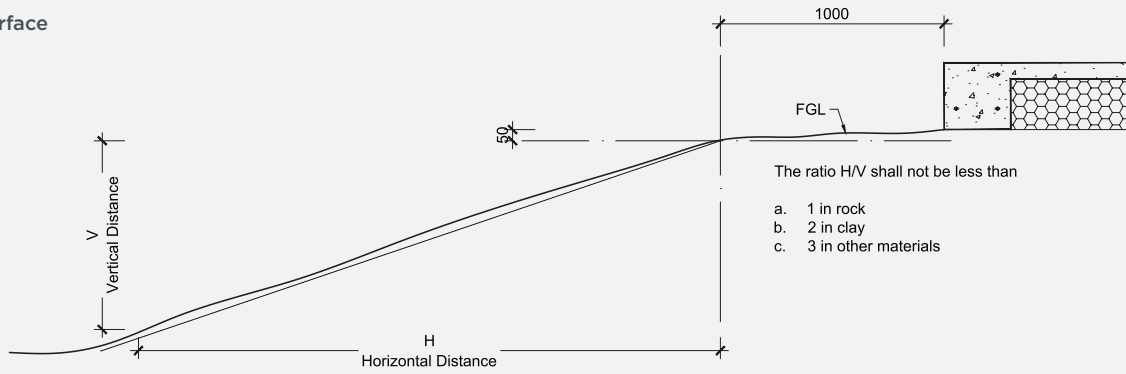


Figure 2  
Temporary  
Excavation  
Limited

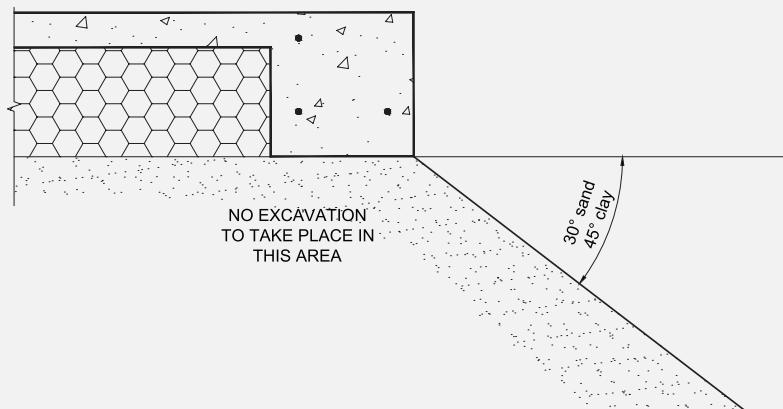
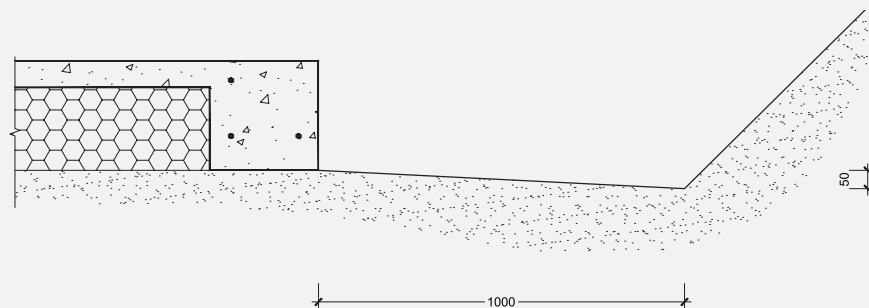


Figure 3  
Site Grading



### 3.0 INSTALLATION PROCEDURE

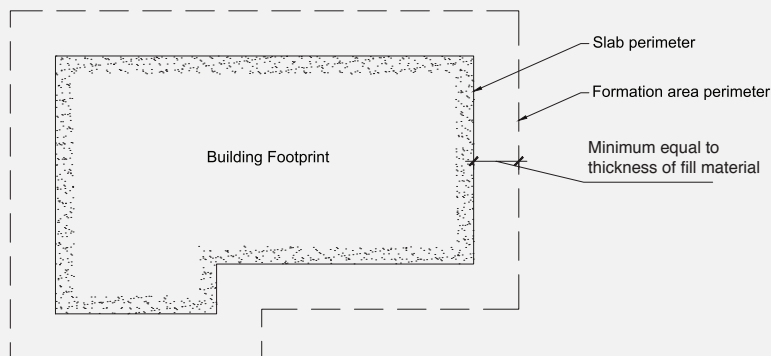
#### 3.1 Site Preparation

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.

#### 3.2 Earthworks

The formation area shall be cut or filled to a level approximately 330mm 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 3604:2011 "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 4. 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 4 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 6.3 of Section 1.

Where required, the services can be installed by removing unnecessary polystyrene 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 14 (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 13 (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 penetrations through the system.

Where the services pass through the top of the pods, the opening shall be sealed to prevent materials entering the

subfloor 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 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 110mm 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 subfloor 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 15 (Section 1).



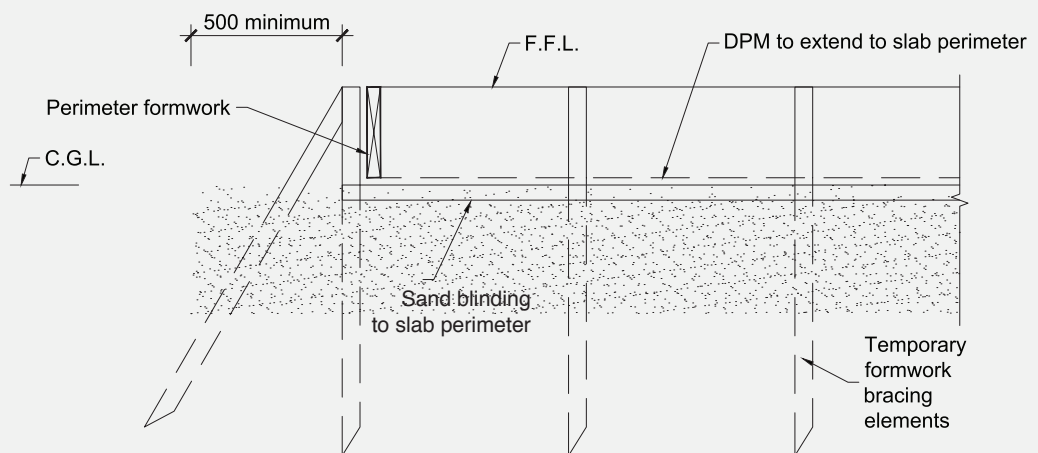
### 3.5 Sand Blinding

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 5. The maximum thickness of this blinding layer shall be 50mm. The surface shall be level and a minimum of 305mm 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 3604:2011 "Timber Framed Buildings". The sand is required to be level to ensure that pods 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 5 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 5 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 the Pods and Spacers

The Firth RibRaft® polystyrene pods shall be laid out over the DPM in a regular waffle pattern ensuring direct contact with the ground across the entire pod. The edge beam shall be formed using the Firth approved 300mm spacers (refer Figure 9). 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.

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 6 shows a detailed layout of the pods and spacers.

Figure 6  
Detailed layout  
of Pods and  
spacers (mesh  
and top steel omit-  
ted for clarity)

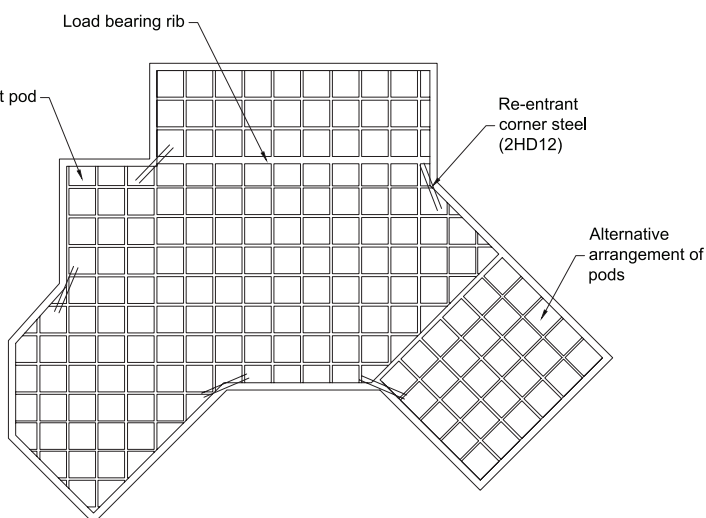
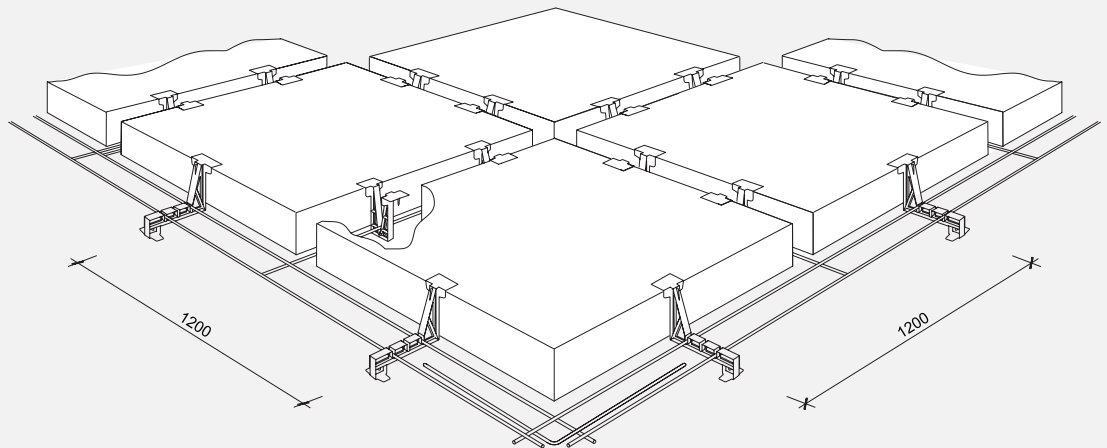


Figure 7 Typical Pod And Rib Layout

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 7. 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 7.

As can be seen from Figure 7, 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).

### 3.9 Reinforcing Steel

Reinforcing bars shall conform to NZS 4671:2001 “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 4671:2001 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 E 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 10 shows the detailed layout of the spacers and the steel in the edge beam and the standard ribs.

3.9.1 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 10. 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 10.

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 8 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.

3.9.2 Rib Steel

Rib reinforcing steel shall be placed in the bottom of the internal ribs and supported in the correct position by the Firth or Wilton Joubert spacers (WJ). Figure 9 shows the detail of the Firth and WJ spacers, and Figure 10 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 45mm 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. One HD12 bar (Grade 500E) shall be placed in the bottom of each 300mm wide rib. For perimeter 300mm ribs a HD12 bar is also required in the top at the beam.

3.9.3 Mesh Reinforcing

Mesh reinforcing shall be placed over the pods and supported on 40mm mesh chairs spaced at a minimum of 1200mm centres, with at least two mesh chairs placed per pod and at least one per part pod. At laps the overlap of the outermost cross wires of the sheets shall be the spacing of the wires plus 50mm.

3.9.4 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 7 (this steel is to help reduce the width of cracks that may develop at this location)

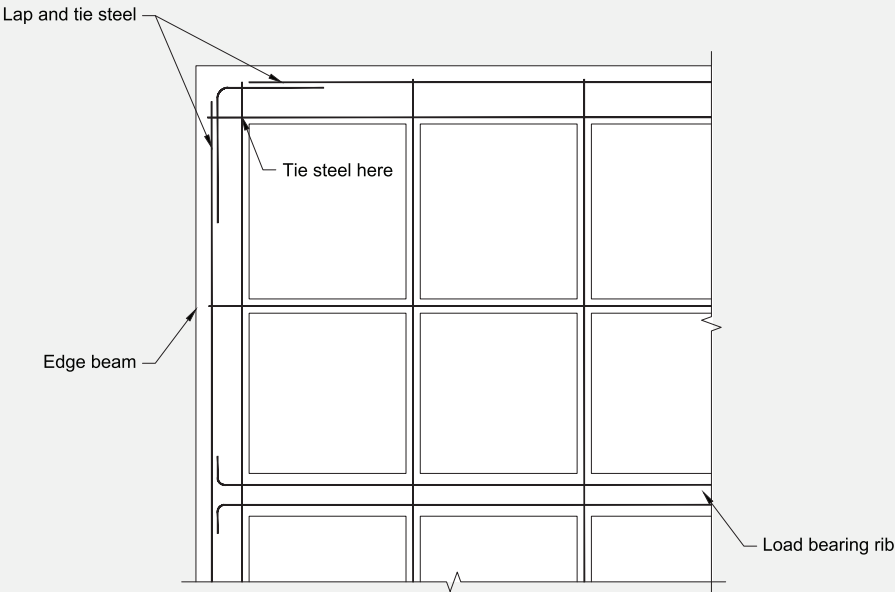


Figure 8 Corner steel layout

### 3.10 Concrete Installation

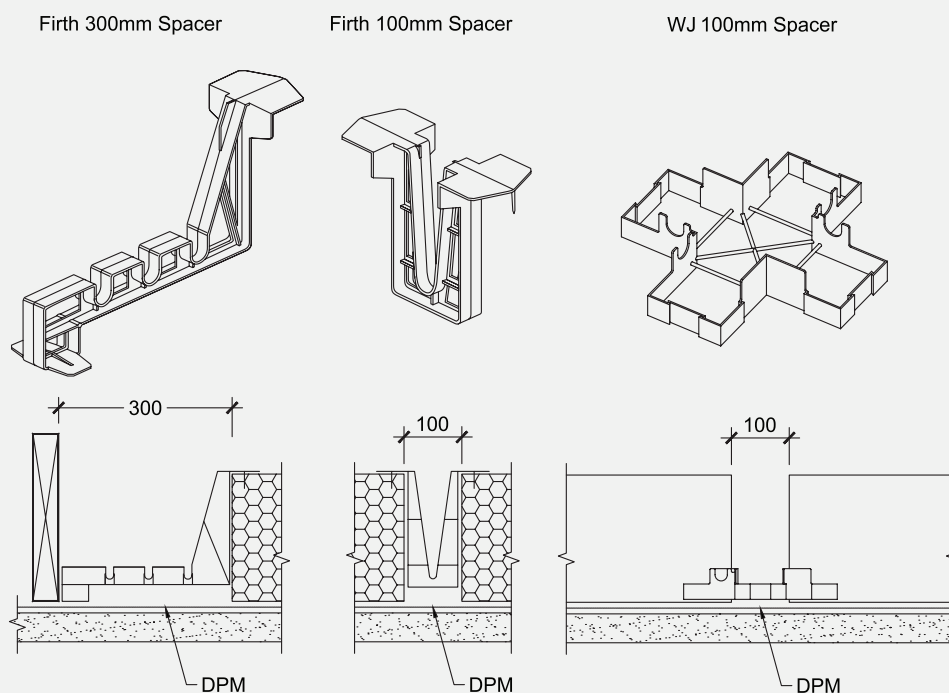
To comply with this manual, Firth Certified Concrete® must be used. Concrete placing, finishing and curing shall be in accordance with NZS 3109:1997, Clause 7.

#### 3.10.1 Placing

Only Raftmix or Raftmix25 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
- > Raftmix25 – 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).

Figure 9  
Spacer  
Details



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.

### 3.10.2 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 CCANZ website sections if further guidance is required:

[www.ccanz.org.nz/page/Early-Age-Crack-Control.aspx](http://www.ccanz.org.nz/page/Early-Age-Crack-Control.aspx)

Early Age Crack Control

[www.ccanz.org.nz/page/Hot-and-Cold-Weather-Concreting.aspx](http://www.ccanz.org.nz/page/Hot-and-Cold-Weather-Concreting.aspx)

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”).

### 3.10.3 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.

### 3.11 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.

#### 3.11.1 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.

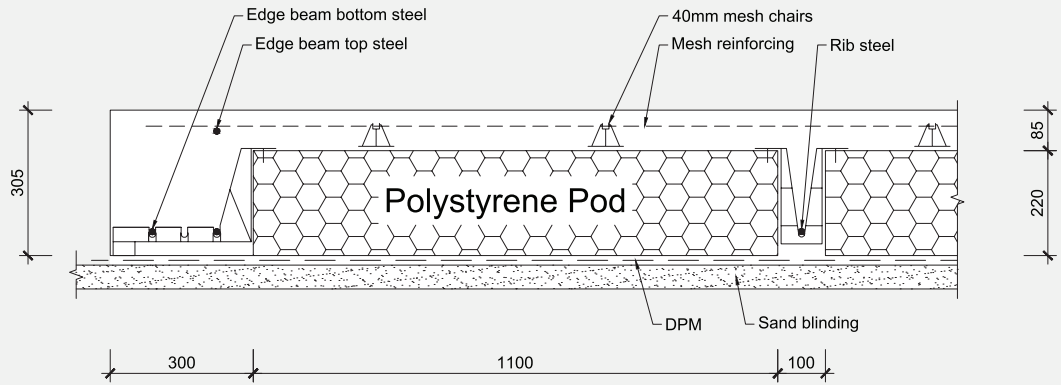
In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 7.

### 3.11.2 Free Joints

Where the length of the floor exceeds 30m a free joint shall be provided as detailed in Section 1, Figure 12. 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 10 Detailed Section



### 3.12 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.

### 3.14 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 3604:2011. 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.

### 3.13 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.

### 3.15 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.

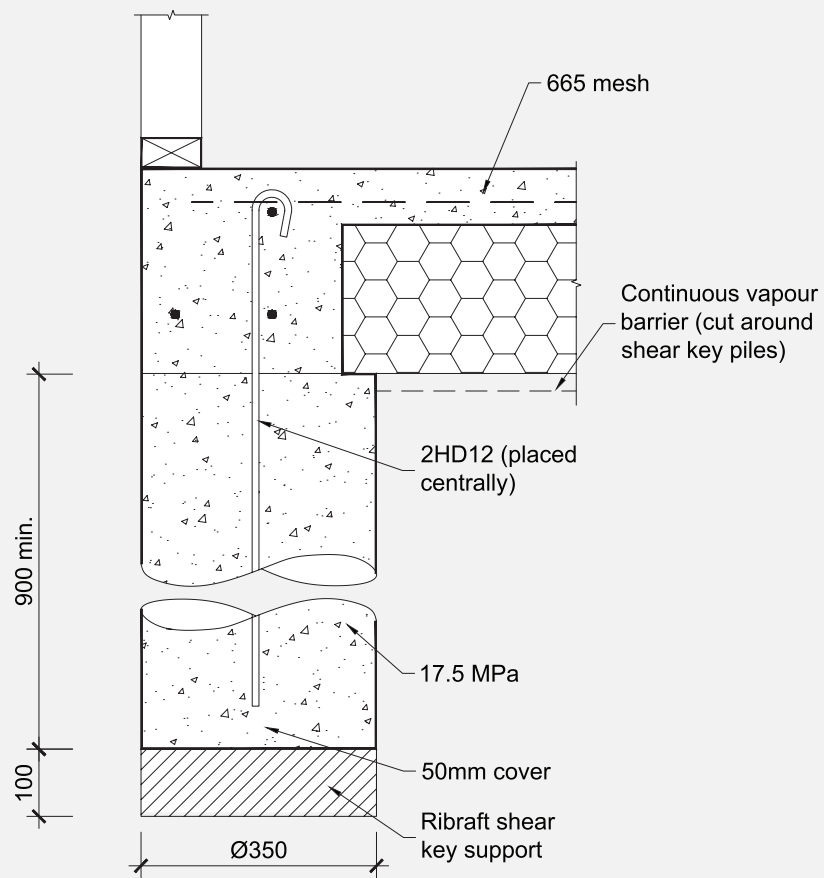


#### 4.0 SHEAR KEYS

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 11 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 11 Shear Pile Construction Detail



**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 Control Authority issuing the Building Consent. Solutions outside the limitations outlined in this Manual will require specific engineering design.

**2.0 CONSTRUCTION**

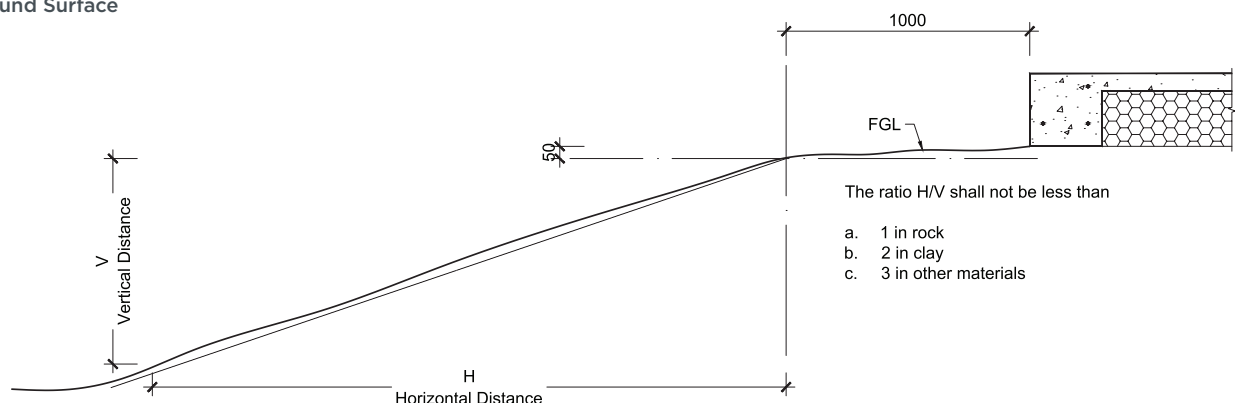
The RibRaft® foundation system has been designed to accommodate structures complying with the non specific design standards NZS3604 or NZS4229. With these types of structures the Building Control Authority specifies the inspections required and often conducts these. A similar construction verification 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-POUR 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 1.
- ☐ SHEAR PILES (WHERE REQUIRED) IN PLACE AND REINFORCEMENT PROTRUDING.
- ☐ FORMATION AREA EXTENDS AT LEAST THE DEPTH OF GRANULAR FILL BEYOND BUILDING FOOTPRINT.
- ☐ STEPS IN THE FORMATION ARE DETAILED IN ACCORDANCE WITH THIS MANUAL.

**Figure 1**  
Relationship of  
RibRaft® To Sloping  
Ground Surface



## PRE-LAYOUT INSPECTION CHECK LIST: DAMP PROOF MEMBRANE IN PLACE

PERIMETER FOUNDATION	<input type="radio"/> WIDTH 300MM <sup>(1)</sup> <input type="radio"/> REINFORCEMENT 2 X HD12 BOTTOM, 1 X HD12 TOP <input type="radio"/> FIRTH SUPPLIED SPACER USED AT 1.2M MAXIMUM CENTRES
INTERNAL RIBS	<input type="radio"/> WIDTH 100MM <input type="radio"/> REINFORCEMENT 1 X HD12 <input type="radio"/> FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
LOAD BEARING RIBS	<input type="radio"/> WIDTH 300MM <input type="radio"/> REINFORCEMENT 2 X HD12 BOTTOM <input type="radio"/> FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
PODS	<input type="radio"/> FIRTH SUPPLIED RIBRAFT® POD
MESH	<input type="radio"/> 40MM CHAIRS, 1.2M MAX CENTRES, MIN TWO PER POD OR ONE PER PART POD <input type="radio"/> MESH IN PLACE AND 665 OR SE62 <input type="radio"/> MESH LAPS OVERLAP OF OUTERMOST CROSSWIRE = MESH SPACING + 50MM
REINFORCEMENT	<input type="radio"/> 2 X HD12 BARS 1.2M LONG PROVIDED AT RE-ENTRANT CORNERS <input type="radio"/> LAPS FOR 12MM REINFORCEMENT MINIMUM OF 720MM
CONCRETE	<input type="radio"/> COVER TO PODS MINIMUM OF 85MM OR 110MM IF INFLOOR HEATING USED. <input type="radio"/> FIRTH RAFTMIX ORDERED
SERVICE PENETRATIONS	<input type="radio"/> NO REINFORCEMENT (WITH EXCEPTION OF MESH) CUT TO ALLOW PASSAGE OF SERVICE PIPES. REFER CLAUSE 6.3 OF SECTION 1 FOR EXCEPTIONS <input type="radio"/> PIPES WRAPPED WITH MINIMUM 6MM THICKNESS OF IMPERMEABLE COMPRESSIBLE MATERIAL WHERE IN CONTACT WITH CONCRETE <input type="radio"/> DIAMETER/SIZE OF PENETRATIONS AS PER TABLE 6, SECTION 1 OF THIS MANUAL

(1) At locations of service penetrations the width of the perimeter foundation maybe locally increased. Refer Figure 14 Section 1 for details.





## ✓ 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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**0800 FIRTH 1** (347841)  
**FIRTH.CO.NZ**



# Fire & Acoustic Design Manual

November 2022 New Zealand





## We value your feedback!

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

**Ask James Hardie™**  
[literaturefeedback@jameshardie.co.nz](mailto:literaturefeedback@jameshardie.co.nz)

### **Make sure your information is up to date**

When specifying or installing James Hardie products, ensure that you have the current manual. Additional installation information, warranties and warnings are available at [www.jameshardie.co.nz](http://www.jameshardie.co.nz) or **Ask James Hardie™** on 0800 808 868.



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# 1 Introduction

This manual provides information about **James Hardie's two way fire and acoustic systems** using timber or steel frames in internal or external wall applications.

In terms of the New Zealand Building Code (NZBC) requirements, fire rating performance is referred to as FRR (Fire Resistance Rating) and is measured in minutes e.g. a FRR 30/30/30 means a fire rating for 30 minutes. Further explanation in this matter is provided in section 4.14 of this design manual.

## 1.1 James Hardie's Fire And Acoustic System Description

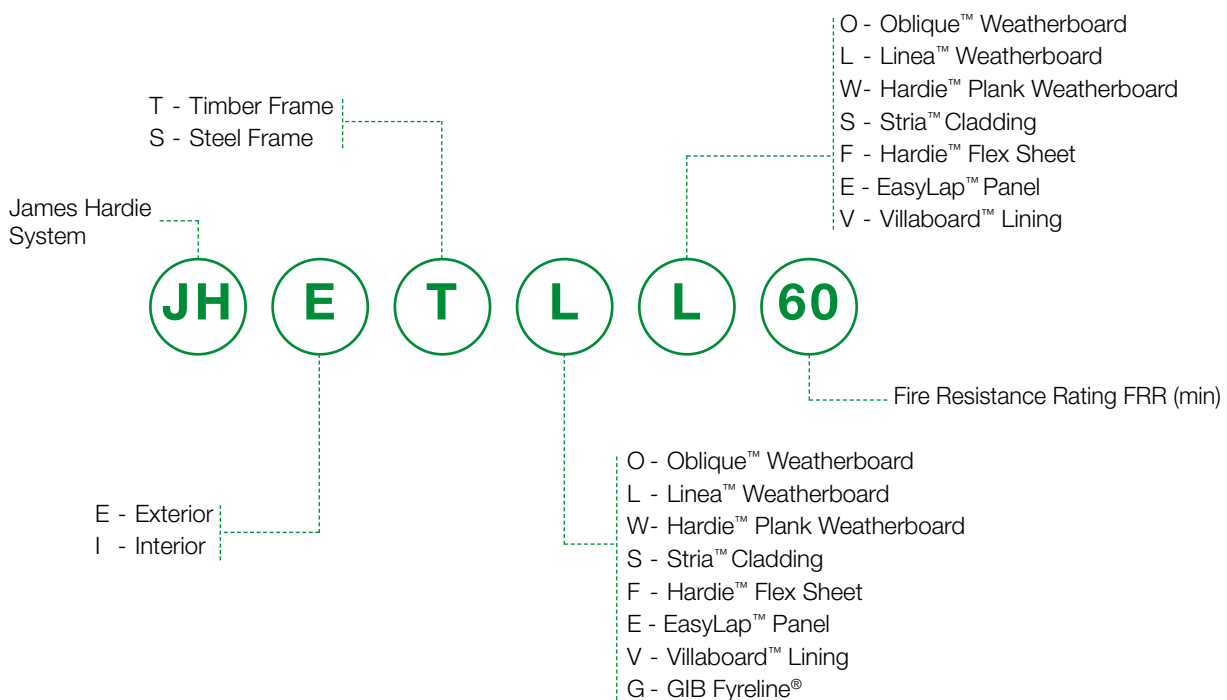
Each FRR system is identified by a unique specification number (e.g. JHETLL60) to identify it as one of James Hardie's fire resistance rated wall systems.

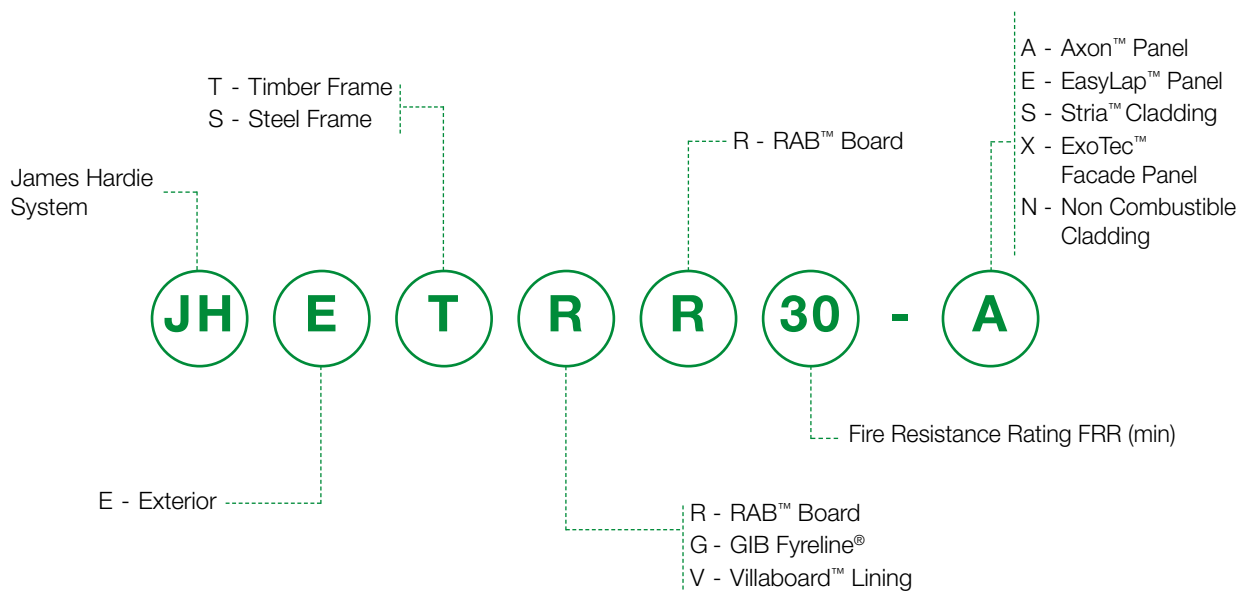
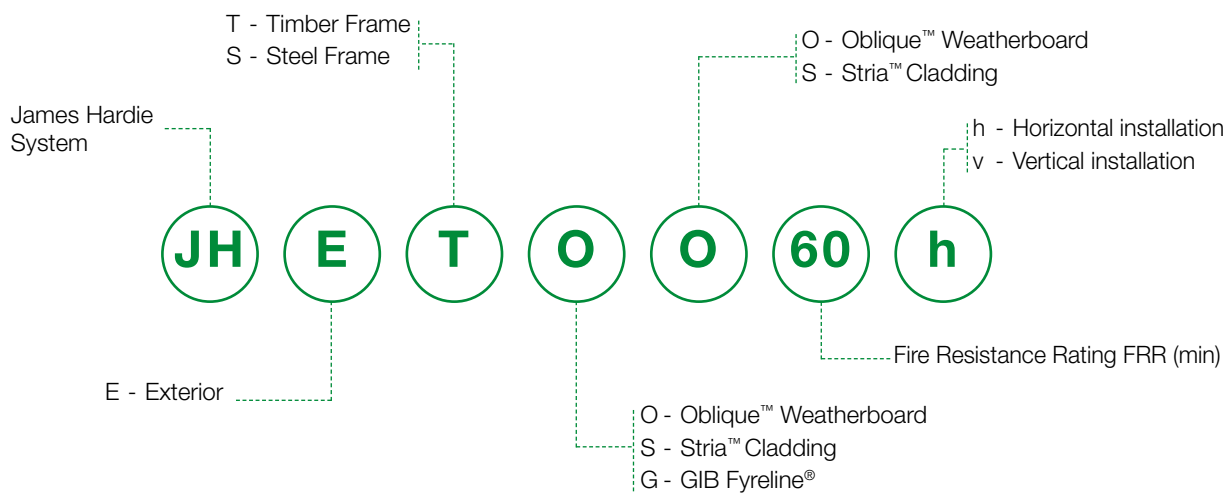
The explanation of specification numbers used are as follows:

JHETLL60

JHETOO60h

JHETRR30-A





# 2 Application and scope

## 2.1 Application

The fire and acoustic rated walls and floor systems described in this design manual can be used in a wide range of applications as indicated in this section.

This manual is intended to assist designers in selecting a suitable Hardie™ fibre cement product and choose a system which will meet their performance requirements.

Various sections in this manual have been arranged to ensure quick familiarisation with James Hardie's fire and acoustic systems. Readers must also familiarise themselves with the relevant Hardie™ cladding and lining product literature.

## 2.2 Scope

The fire and acoustic systems provided in this design manual are suitable for vertical or horizontal fire separation applications. The fire rated systems published are suitable for load bearing walls within the scope of the NZS 3604. Beyond the scope of the NZS 3604, a specific engineering design (SED) must be followed. Ask James Hardie™ on 0800 808 868 for further assistance.

## 2.3 Compliance

### **NZBC Clause C 'Protection From Fire'**

The fire resistance rating (FRR) of James Hardie's fire rated systems have been verified through full scale testing and technical assessments. The systems published in this design manual are suitable to achieve passive fire protection requirements of the NZBC Clause C/AS1 - C/AS2 'Protection From Fire'.

### **NZBC Clause B2 'Durability'**

Hardie™ fibre cement products meet the serviceable life of 50 years and satisfy the performance requirements of the NZBC Clause B2 'Durability'. It must be ensured the Hardie™ fibre cement products are installed and maintained in accordance to their published technical specifications.

### **NZBC Clause G6 'Airborne & Impact Sound'**

The STC and IIC ratings for the systems published in this design manual have either been established through testing or acoustic modelling.

Designers/specifiers must ensure that the ratings published in this manual are suitable for the intended applications. In case higher ratings are required, ask James Hardie on 0800 808 868 for assistance.

### **Sound**

For compliance with clause G6 of the NZBC (STC > 55) James Hardie's fire and acoustic systems have either been tested at the Acoustic Testing Service, University of Auckland, or have been conservatively derived by technical opinions from acoustic consultant Marshall Day Acoustics. Data values published here have an expected accuracy of  $\pm 3$  STC points.

## 2.4 Responsibility

### Specifier

If you are a designer/specifier ensure that you are familiar with the approved document for Fire Safety, Clause C of the NZBC and check its requirements. Ensure that the information in this document is appropriate for the intended application and that you undertake specific design and detailing for areas which fall outside the scope of this manual.

### Installers

If you are an installer ensure that you follow the complete system requirements as mentioned in this manual to achieve the required performance levels. Follow the design, associated details and material selection provided by the designer. The systems provided in this manual must be read and installed in conjunction with the project specifications. Any material specified for a fire rated system, when substituted, will affect the system performance. All Hardie™ fibre cement products shall be installed as per the relevant product technical literature.

### Make sure your information is up to date

When specifying or installing products by James Hardie, ensure that you have the current manual. Additional installation information, warranties and warnings are available at [www.jameshardie.co.nz](http://www.jameshardie.co.nz) or Ask James Hardie™ on 0800 808 868.

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

## 2.5 Safe Working Practices

We understand the importance of creating a safe and healthy work environment when using Hardie™ fibre cement products. Refer to recommended safe working practices in each specific product technical specification or installation manual before starting any cutting or machining of Hardie™ fibre cement products.

# 3 Systems Summary Table

## 3.1 External Walls - Timber Frame

30 minute fire rated system					
System #	Description	Insulation	FRR	STC	Page
JHETGL30	Linea™ Weatherboard 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	20
JHETGO30h	Oblique™ Weatherboard horizontal 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	21
JHETGO30v	Oblique™ Weatherboard vertical 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	22
JHETGW30	Hardie™ Plank Weatherboard 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	45	23
JHETGS30h	Stria™ Cladding horizontal 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	24
JHETGS30v	Stria™ Cladding vertical 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	25
JHETGF30	Hardie™ Flex Sheet 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	42	26
JHETGE30	EasyLap™ Panel 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	42	27
JHETGA30	Axon™ Panel 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	41	28
JHETGR30-A	Axon™ Panel - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	45	29
JHETGR30-S	Stria™ Cladding - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	30
JHETGR30-E	EasyLap™ Panel - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	46	31
JHETGR30-X	ExoTec™ Facade Panel - Top hat system RAB™ Board 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	47	32
JHETGR30-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 RAB™ Board 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	42	33



60 minute fire rated system						
System #	Description	Insulation	FRR	STC	Under 10m	Over 10m or EH Wind Zone
JHETGL60	Linea™ Weatherboard 13mm GIB Fyrelite®	R2.2 glass wool	60/60/60	46	Page 34	Page 35
JHETGO60h	Oblique™ Weatherboard horizontal 13mm GIB Fyrelite®	R2.2 glass wool	60/60/60	46	Page 36	Page 37
JHETGO60v	Oblique™ Weatherboard vertical 13mm GIB Fyrelite®	R2.2 glass wool	60/60/60	46	Page 38	Page 39
JHETGW60	Hardie™ Plank Weatherboard 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	45	Page 40	
JHETGS60h	Stria™ Cladding horizontal 13mm GIB Fyrelite®	R2.2 glass wool	60/60/60	46	Page 41	Page 42
JHETGS60v	Stria™ Cladding vertical 13mm GIB Fyrelite®	R2.2 glass wool	60/60/60	46	Page 43	Page 44
JHETGF60	Hardie™ Flex Sheet 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	42	Page 45	
JHETGE60	EasyLap™ Panel 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	42	Page 46	Page 47
JHETGA60	Axon™ Panel 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	42	Page 48	Page 49
JHETGR60-A	Axon™ Panel - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	45	Page 50	
JHETGR60-S	Stria™ Cladding - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	46	Page 51	
JHETGR60-E	EasyLap™ Panel - Hardie™ CLD™ Structural Cavity Batten RAB™ Board 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	46	Page 52	
JHETGR60-X	ExoTec™ Facade Panel top hat system RAB™ Board 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	47	Page 53	
JHETGR60-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 RAB™ Board 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	42	Page 54	

**60 minute fire rated system**

System #	Description	Insulation	FRR	STC	Under 10m	Over 10m or EH Wind Zone
JHETVR60-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 RAB™ Board Villaboard™ Lining 6mm or 9mm	Hardie™ Mineral	60/60/60	55*		Page 55

\*STC value for IT wall

**120 minute fire rated system**

System #	Description	Insulation	FRR	STC	Page
JHETVR120-N	Villaboard™ Lining 9mm RAB™ Board 9mm Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2	2 x layers Hardie™ Mineral	120/120/120	56	56

**3.2 External Walls - Steel Frame****30 minute fire rated system**

System #	Description	Insulation	FRR	STC	Page
JHESGR30-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 RAB™ Board over thermal fire batten 2 x layers 10mm GIB Fyrelite®	Hardie™ Mineral	30/30/30	47	58

**60 minute fire rated system**

System #	Description	Insulation	FRR	STC	Page
JHESGR60-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 RAB™ Board over thermal fire batten 2 x layers 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	48	59

### 3.3 Parapet & Wing Walls - Timber Frame

60 minute fire rated system					
System #	Description	Insulation	FRR	Under 10m	Over 10m or EH Wind Zone
JHETLL60	Linea™ Weatherboard each side	Hardie™ Mineral	60/60/60	Page 61	Page 62
JHETOO60h	Oblique™ Weatherboard horizontal each side	Hardie™ Mineral	60/60/60	Page 63	Page 64
JHETOO60v	Oblique™ Weatherboard vertical each side	Hardie™ Mineral	60/60/60	Page 65	Page 66
JHETWW60	Hardie™ Plank Weatherboard each side	Hardie™ Mineral	60/60/60	Page 67	
JHETSS60h	Stria™ Cladding horizontal each side	Hardie™ Mineral	60/60/60	Page 68	Page 69
JHETSS60v	Stria™ Cladding vertical each side	Hardie™ Mineral	60/60/60	Page 70	Page 71
JHETFF60	Hardie™ Flex Sheet each side	Hardie™ Mineral	60/60/60	Page 72	
JHETEE60	EasyLap™ Panel each side	Hardie™ Mineral	60/60/60	Page 73	Page 74
JHETAA60	Axon™ Panel each side	Hardie™ Mineral	60/60/60	Page 75	Page 76
JHETRR60-A	Axon™ Panel - Hardie™ CLD™ Structural Cavity Battens each side RAB™ Board each side	Hardie™ Mineral	60/60/60	Page 77	
JHETRR60-S	Stria™ Cladding - Hardie™ CLD™ Structural Cavity Battens each side RAB™ Board each side	Hardie™ Mineral	60/60/60	Page 78	
JHETRR60-E	EasyLap™ Panel - Hardie™ CLD™ Structural Cavity Battens each side RAB™ Board each side	Hardie™ Mineral	60/60/60	Page 79	
JHETRR60-X	ExoTec™ Facade Panel top hat system each side RAB™ Board each side	Hardie™ Mineral	60/60/60	Page 80	
JHETRR60-N	Non-combustible/limited combustible cladding complying with C/AS1 or C/AS2 each side RAB™ Board each side	Hardie™ Mineral	60/60/60	Page 81	

### Cladding options for Parapet & Wing Walls

Claddings specified in the fire rated systems under Section 3.3 on timber cavity battens can be replaced with any Hardie™ cladding 6mm or thicker.

### 3.4 Internal Walls - Timber Frame

30 minute fire rated system					
System #	Description	Insulation	FRR	STC	Page
JHITGV30	Villaboard™ Lining 6 or 9mm 10mm GIB Fyrelite®	R2.2 glass wool	30/30/30	42	83

60 minute fire rated system					
System #	Description	Insulation	FRR	STC	Page
JHITGV60	Villaboard™ Lining 6 or 9mm 13mm GIB Fyrelite®	Hardie™ Mineral	60/60/60	42	84
JHITVV60	Villaboard™ Lining 6 or 9mm each face	Hardie™ Mineral	60/60/60	55*	85
JHITVR60	Villaboard™ Lining 6 or 9mm RAB™ Board 6 or 9mm	Hardie™ Mineral	60/60/60	55*	86

\*STC value for IT wall

### 3.5 Internal Floors / Ceilings - Timber Frame

60 minute fire rated system					
System #	Description	FRR	STC	IIC	Page
JHFTGS60	Secura™ Interior Flooring 16mm GIB Fyrelite®	60/60/60	46	33	88
JHFTGSS60	2 x layers Secura™ Interior Flooring 2 x layers 13mm GIB Fyrelite®	60/60/60	67	57	89

# 4 Design guidelines

To achieve the performance levels as described in each system, all materials as specified in the system must be used. The basic information regarding the materials to be used can be found in the individual system specification. Refer to James Hardie's product technical specification/installation manuals for further information about their installation.

## 4.1 Boundary Wall – Post Fire Stability

The fire rated walls built close to boundary are required to achieve post fire stability as per section 2.2.4 of B1/VM1 of the NZBC. James Hardie has developed a few design solutions for concrete slab and timber foundations/floors.

The bottom plate of these walls can be fixed in accordance with post fire stability details published in this design manual using **Pryda® Brace Anchor** or **GIB HandiBrac®** on both sides of the stud. If the published solutions are not suitable for the project, contact the project structural engineer for an alternate design to achieve post fire stability.

Post fire stability for steel framing must be as per SED.

## 4.2 Acoustic Performance

Hardie™ fibre cement products are suitable to achieve superior acoustic ratings. The STC ratings published in this manual are specific to the wall build-up as described within each FRR system. To achieve higher acoustic ratings, Ask James Hardie on 0800 808 868.

The Impact Insulation Class (IIC) criteria as per Clause G6 of the NZBC is applicable to intertenancy floors.

Secura™ Interior Flooring is commonly used in floors by acoustic engineers for an improved impact sound performance which is measured in IIC. The sound attenuation performance of ceilings is measured in STC. The IIC and STC ratings for floor/ceiling systems have been tested and are published in the system specification.

## 4.3 Framing

The frame sizes and their spacing mentioned in this manual are a minimum requirement. Bigger framing sections required to suit a proprietary cladding system, or to suit higher wind pressures or higher loading, does not affect the FRR published.

## 4.4 Timber

Timber framing must either be in accordance with the NZS 3604 or in accordance with SED. The stud, nogs/dwangs and floor joist spacing, timber size must meet the following minimum requirements:

### For walls:

- Framing size 90 x 45mm minimum
- Stud spacing 600mm maximum
- Nogs/dwangs spacing 800mm maximum
- For post fire stability design, framing size and hold down anchors, refer to the construction details

### For floors:

- Minimum 45mm wide floor joists shall be used
- Strutting of floor joists is required as per the NZS 3604
- Bottom plate fixing in timber floors must penetrate through floor into joists or solid blocking
- Secura™ Interior Flooring systems are suitable for 3kPa floor loads

## 4.5 Steel

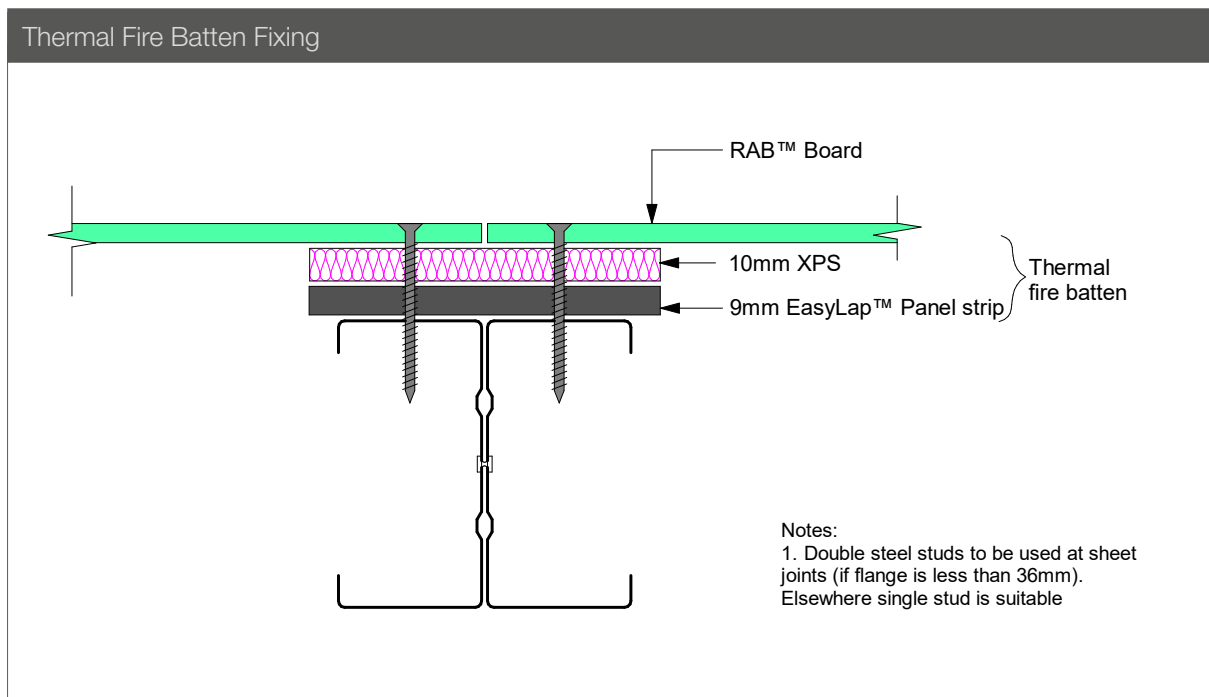
Steel framing for fire rated walls must be in accordance with the NASH standard for residential and low rise buildings. The framing shall also meet the following requirements:

- Steel sections shall have a base metal thickness (BMT) of 0.55mm minimum for non-load bearing walls and 0.75-1.6mm for load bearing walls
- Steel stud for use in external walls shall be 92mm deep x 36mm wide minimum
- Stud spacing 400mm centres maximum for load bearing walls
- Nogs/dwangs spacing 800mm centres maximum

## 4.6 Thermal Fire Batten

Fire battens are used on all FRR steel systems and must be used between Hardie™ cladding and steel framing members. For steel framing in interior/exterior applications the NZBC also requires additional external insulation to achieve adequate thermal resistance. These insulated battens are assembled on site by cutting a 100mm wide strip from 9mm thick EasyLap™ Panel and adhering a 10mm thick x 100mm wide XPS (extruded polystyrene) on its face.

All fire battens are fixed horizontally and vertically to all steel members. All battens must be neatly cut and tightly fitted covering all steel members. All thermal fire battens must be fitted with the polystyrene to the exterior face. The batten is tacked to the steel framing as shown in the following detail.





## 4.7 Structural Steel Members

When structural steel members are located inside the fire rated wall cavity such as columns, or beams in a floor/ceiling cavity, these structural members must be independently fire rated.

## 4.8 Insulation

### 4.8.1 Hardie™ Mineral Insulation

Hardie™ Mineral Insulation is used in James Hardie's fire rated systems in accordance with the system specification. Hardie™ Mineral Insulation has been tested with James Hardie's fire rated systems and cannot be substituted with any other insulation material.

Also refer to clause H1 of the NZBC for further information on construction R-value requirements.

Hardie™ Mineral Insulation has the following properties:

- Size: 600 x 800 x 90mm - 2.4m<sup>2</sup> per bale
- R-Value: 2.74m<sup>2</sup>K/W
- Density: 80kg/m<sup>3</sup>

Fit the Hardie™ Mineral Insulation tightly in all framing cavities. Hardie™ Mineral Insulation is pre-cut 50mm bigger in length and width than the cavity size to ensure a tight friction fit in the cavity. If the cavity to be insulated is smaller than the size of insulation supplied, the insulation may be cut on site to fit to size. Ensure that insulation is at least 50mm bigger in each direction than the size of frame cavity to be filled so that a tight friction fit is achieved.

### 4.8.2 GLASS WOOL Insulation

Where R2.2 glass wool insulation is specified in a system, any brand of R2.2 glass wool insulation which weighs 12–18kg/m<sup>3</sup> may be used. A higher R-value glass wool insulation can be used to achieve higher insulation requirements.

## 4.9 Flexible Underlay

In a FRR system, any flexible underlay that complies with Table 23 of E2/AS1 and has a Flammability Index not exceeding 5, when tested to AS 1530.2 may be used.

## 4.10 RAB™ Board

RAB™ Board by James Hardie can be used to achieve fire ratings up to 120 minutes. Flexible underlay is not required when using RAB™ Board.

## 4.11 Cavity Construction

The fire ratings are not affected when the Hardie™ cladding is fixed using a timber cavity batten (18-25mm) construction method. Follow the cavity construction specification developed for each cladding material supplied by James Hardie.

## 4.12 Control Joints

The cladding must be separated at the vertical joint between claddings at tenancy junctions. Refer to figures 8 and 9.

## 4.13 Coatings and Finishes

All Hardie™ cladding systems require protective coatings to meet the NZBC requirements. Refer to relevant technical literature by James Hardie for the product selected. All claddings must be maintained in accordance with product literature. Also refer to coating manufacturer's recommendations.

For FRR systems with surface finishes over 1mm thick, designers must ensure that the finishes comply with the requirements of Section 5.8 clause C/AS1 - C/AS2 of the NZBC.

## 4.14 Bracing

The bracing systems specified in the Bracing Design Manual by James Hardie can be combined with the fire and acoustic systems by adhering to the details outlined for the relevant bracing and fire and acoustic systems.

When fire rated systems are combined with bracing systems then the durability of the components used in the system must meet a 50 years durability requirement of Clause B2 of the NZBC.

Bracing cannot be achieved when Hardie™ claddings/pre-cladding are fixed with screws or when steel framing is used.

## 4.15 Fire Resistance Rating

Working through the approved documents will determine the fire resistance rating required for walls that separates the fire cells. These ratings are expressed as Fire Resistance Rating (FRR) of a wall in minutes. The fire engineers may occasionally need to use the actual value in some applications. If this information is required, Ask James Hardie™ on 0800 808 868.

If the project requires a wall to achieve a FRR of 60/60/60 (i.e. Stability/Integrity/Insulation) the wall will have the following characteristics:

- The first 60 figure describes the wall's structural stability requirement for 60 minutes. Within this period the wall must support the structure and other fire rated elements within the same or other fire cells. A dash here indicates the wall is not a structural wall (this is typical for non-load bearing systems such as partition walls).
- The second 60 figure describes the wall's integrity requirement for 60 minutes. During this period the hot gases or flames can not pass through the wall to either side. After this period a failure has occurred as the wall system under test develops cracks or openings through which hot gases and smoke can pass.
- The third 60 figure describes the wall's insulation requirement for 60 minutes. After this period a failure has occurred in the wall system under test, when:
  - a) the average temperature of the unexposed surface of the test specimen increases by more than 140°C above the initial temperature, or
  - b) the temperature at any point on the unexposed surface increases by more than 180°C above the initial temperature.

James Hardie's Fire and Acoustic Systems allow a wide range of framing methods and architectural systems to achieve FRR from 30/30/30 to 120/120/120. When specific fire safety design is required for a specialist application, fire engineers may Ask James Hardie™ on 0800 808 868 for further information.

## 4.16 Internal Linings Group Numbers

The internal lining materials are required to be tested as per ISO 9705 or ISO 5660 in order to identify their 'Group Number.'

All Hardie™ internal linings such as Villaboard™ Lining and Hardie™ Groove Lining have been tested/assessed by BRANZ and they have a 'Group Number 1-S'. Note that this classification only applies to Hardie™ fibre cement lining products without paint or wet finish. Contact the surface finishes supplier for Group Number information about their finishing products.

Our prefinished linings such as Hardie™ Glaze Lining have also been tested/assessed and they have a 'Group Number 1-S'. This means Hardie™ internal lining products are suitable for use as internal linings in exitways and all occupied spaces in schools, hospitals, detention centres, offices, hotels, motels and apartments type buildings etc.

'Group Number 1-S' is the highest performance expectation as per Clause C/AS1 - C/AS2.

## 4.17 Control Of External Fire Spread

Safety requirements for external fire spread protection are:

As per Clause C3.5 of the NZBC, building must be designed & constructed so that fire does not spread more than 3.5m vertically from the fire source over the external cladding of multi-level buildings.

External walls of buildings that are within 1m from the boundary must meet the requirements as per Clause C3.7 of the NZBC.

Refer to Table 5.1 of Section 5.4 of C/AS1 and Table C1.3 of C/AS2 for the information about the various external wall cladding material requirements.

Cladding products by James Hardie have been tested to AS/NZS 3837 and are classified as Type-A cladding material. The James Hardie's fire safety systems have either been tested or assessed at BRANZ. The systems are suitable to achieve the vertical or horizontal fire spread safety requirements as mentioned above, when installed as per the system specification and the details published in this design manual.

When using fire rated systems by James Hardie for buildings over 10m in height, RAB™ Board must be used and the external wall cavity must be blocked off at each floor level or at heights no more than 3.5m to prevent fire spread within the cavity. Refer to Figure 7 for the horizontal joint detail for an inter-storey fire separation in conjunction with our fire rated systems and Hardie™ claddings.

For construction details of Hardie™ claddings with RAB™ Board, Ask James Hardie on 0800 808 868.

## 4.18 Product Substitution

The fire and acoustic performance, durability and maintenance requirements of alternative proprietary products cannot be assured by James Hardie. Many apparently identical products were tested and rejected before selection of materials used in the FRR systems published in this manual. When a product specified in a system is substituted, the performance of the system will be compromised. Therefore the materials specified in the system must not be substituted.

For substituting a Hardie™ product with another Hardie™ product in a specified system Ask James Hardie™ 0800 808 868.

## 4.19 Plasterboard

Plasterboard lining must be fixed and stopped in accordance with the plasterboard manufacturer's recommendations. Regarding the use of GIB® plasterboard lining products, the following substitutions are allowed.

Acceptable GIB Fyrelite® alternatives	
10mm GIB Fyrelite® can be replaced with	10mm GIB Braceline®/Noiseline® 10mm GIB Ultralite® 10mm GIB Aqualite® 13mm GIB® Standard
13mm GIB Fyrelite® can be replaced with	13mm GIB Braceline®/Noiseline® 13mm GIB Aqualite® 13mm GIB Toughline® 13mm GIB Toughline® Aqua

Other plasterboard suppliers e.g. USG Boral® and Elephant Plasterboard® have also developed various fire rated systems in conjunction with Hardie™ claddings. Refer to these plasterboard manufacturer's for information on their fire rated systems.

# 5 Product Warranty

Fire & Acoustic components supplied by James Hardie are backed by a warranty. The warranty period will vary based on the specific system component. For warranty terms & conditions refer to [www.jameshardie.co.nz](http://www.jameshardie.co.nz) or Ask James Hardie™ on 0800 808 868.

# External Walls Timber Frame

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**30 Minute Fire Rated System**

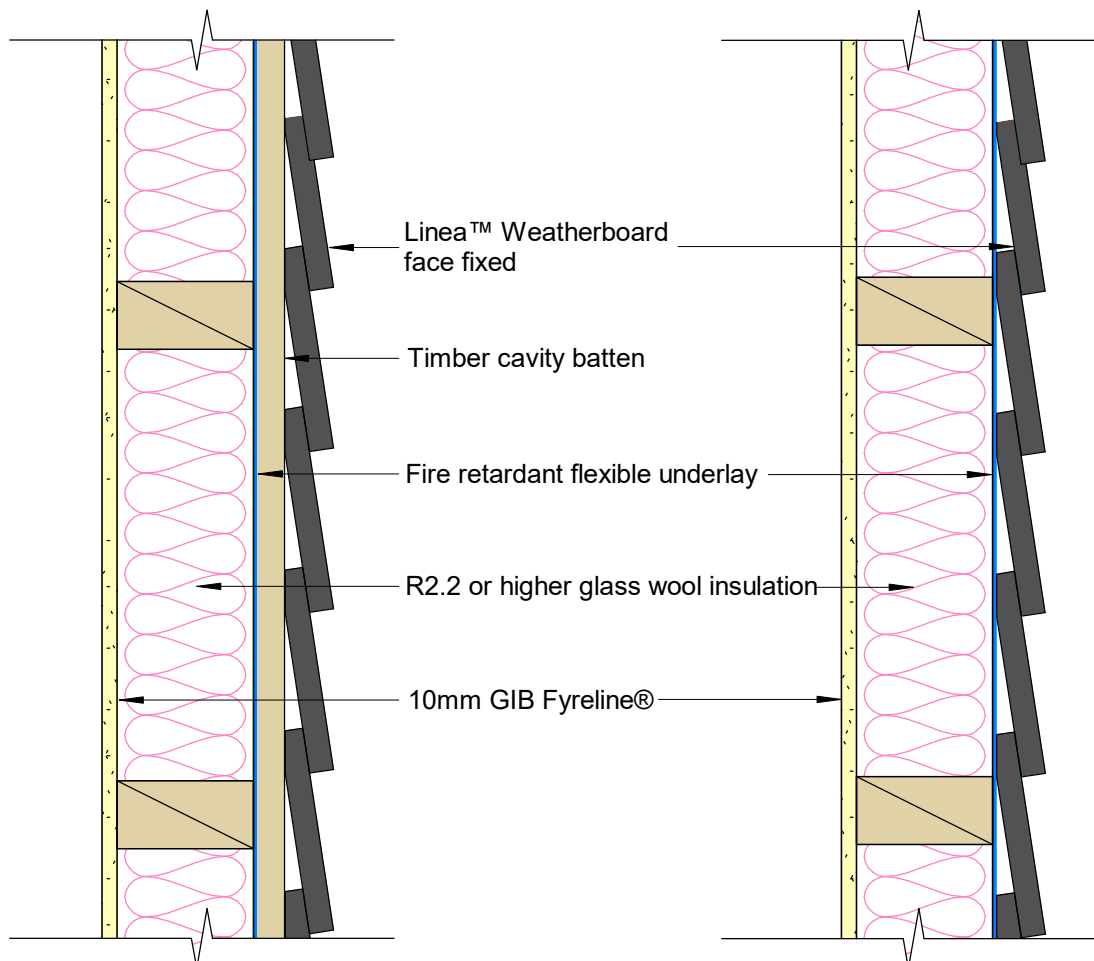
**60 Minute Fire Rated System**

**120 Minute Fire Rated System**

**JHETGL30****Fire Resistance** 30/30/30**STC** 46

<b>Cladding</b>	Linea™ Weatherboard	<b>Lining</b>	10mm GIB Fyreline®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm.	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> Face fixed with 60 x 2.87mm jolt head nails to studs <b>Cavity Fix:</b> Face fixed with 75 x 3.15mm jolt head nails to studs	<b>Lining Fixing</b>	Fix GIB Fyreline® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

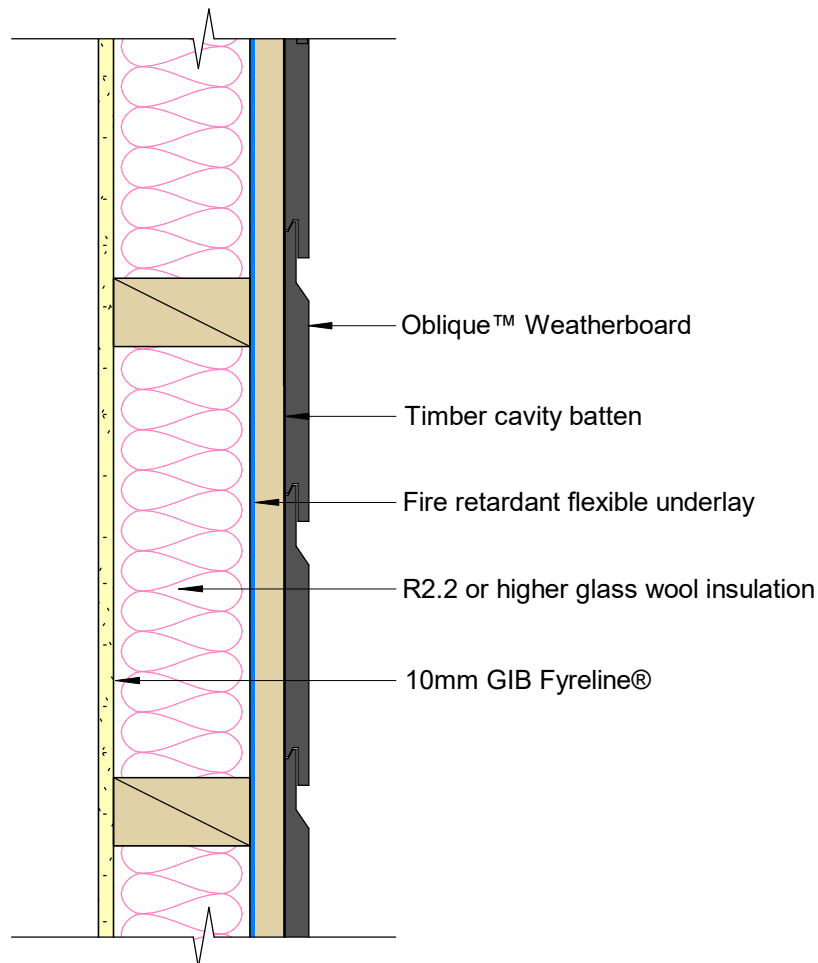
For further information refer to Linea™ Weatherboard cavity fix or direct fix technical specifications.





<b>Cladding</b>	Oblique™ Weatherboard - Horizontal	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>200mm wide weatherboard:</b> 65 x 2.87mm D-Head or round head nail to stud <b>300mm wide weatherboard:</b> Two nails per stud, 65 x 2.87mm D-Head or round head nail	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

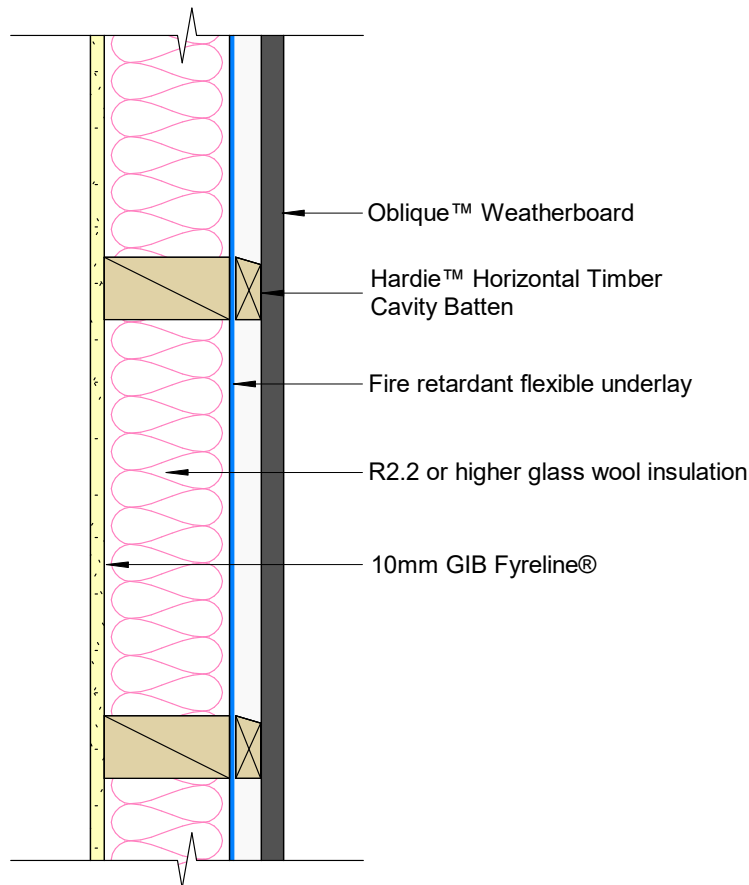
For further information refer to Oblique™ Weatherboard horizontal installation technical specification



**JHETGO30v****Fire Resistance** 30/30/30**STC** 46

<b>Cladding</b>	Oblique™ Weatherboard - Vertical	<b>Lining</b>	10mm GIB Fyreline®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>200mm wide weatherboard:</b> 65 x 2.87mm D-Head or round head nail to nog <b>300mm wide weatherboard:</b> Two nails per nog, 65 x 2.87mm D-Head or round head nail	<b>Lining Fixing</b>	Fix GIB Fyreline® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

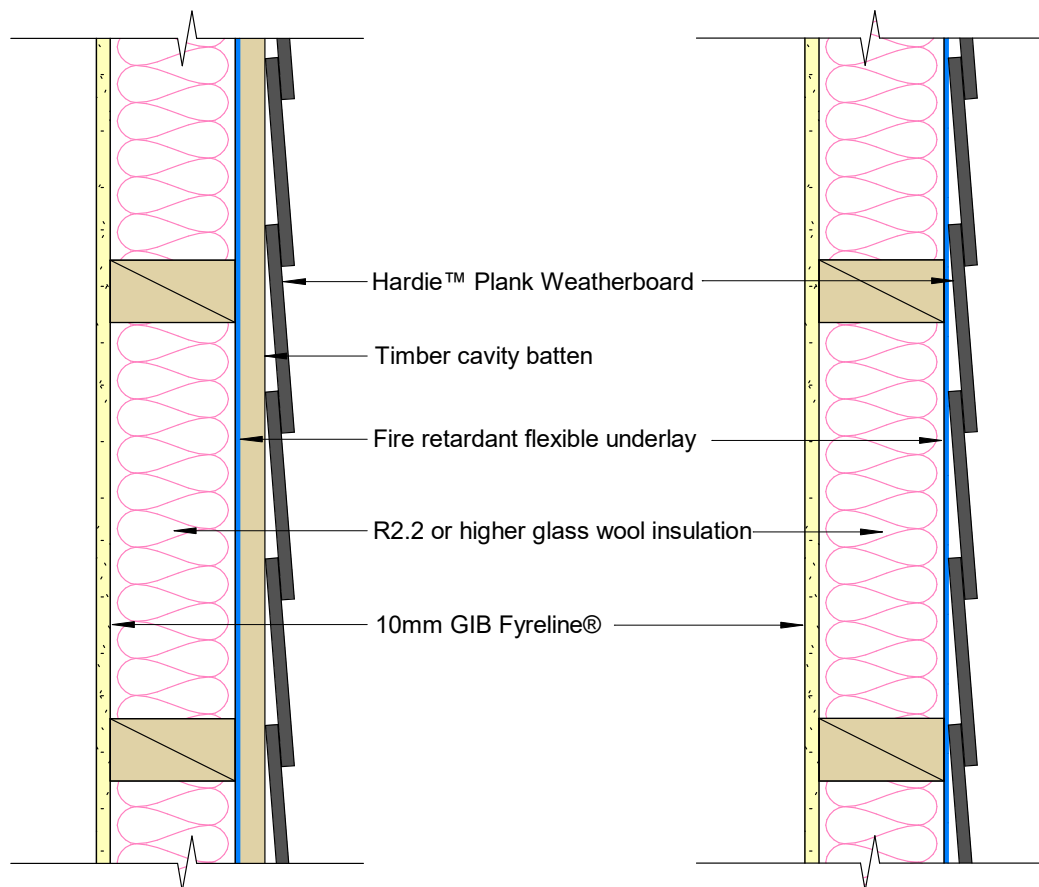
For further information refer to Oblique™ Weatherboard vertical installation technical specification



**JHETGW30****Fire Resistance** 30/30/30**STC** 45

<b>Cladding</b>	Hardie™ Plank Weatherboard	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> Face fixed with 50 x 2.8mm fibre cement nail to stud <b>Cavity Fix:</b> Face fixed with 75 x 3.15mm fibre cement nail to stud	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

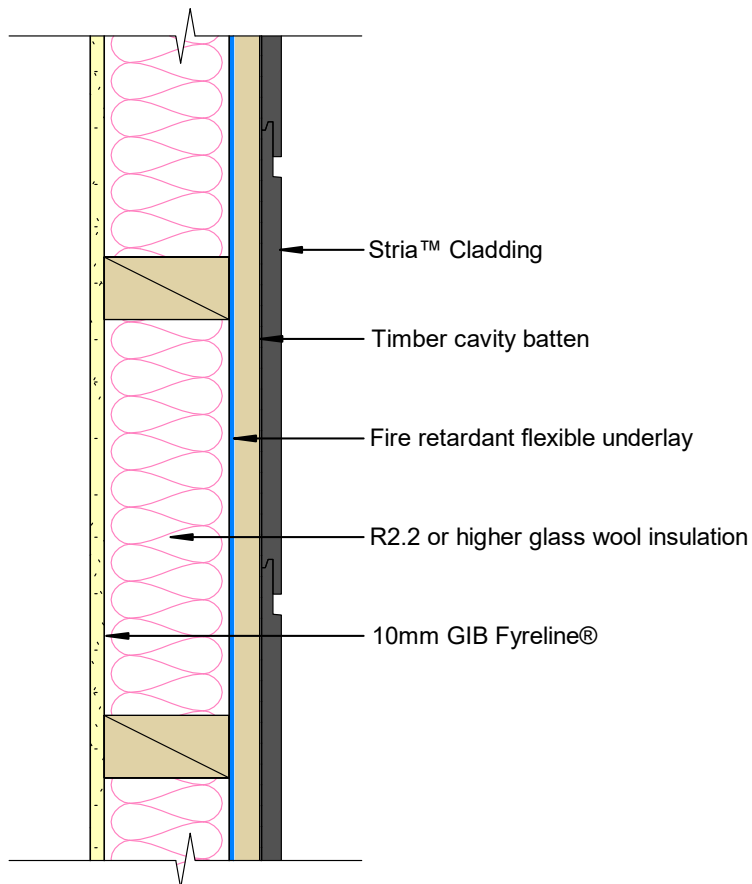
For further information refer to Hardie™ Plank Weatherboard technical specification



**JHETGS30h****Fire Resistance** 30/30/30**STC** 46

<b>Cladding</b>	Stria™ Cladding - Horizontal	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to stud	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

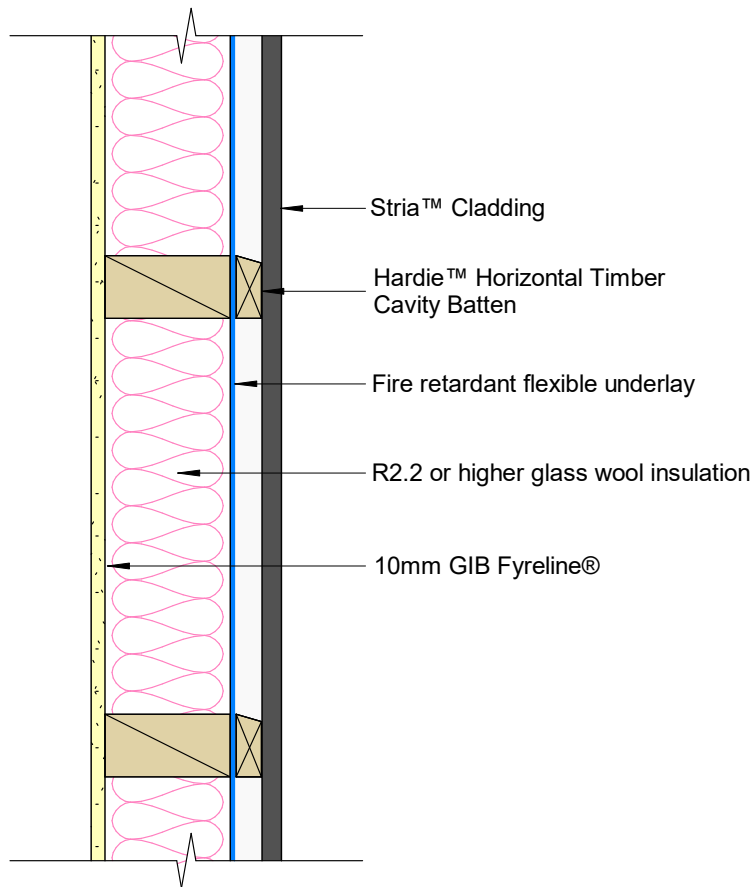
For further information refer to Stria™ Cladding timber cavity batten installation technical specification



**JHETGS30v****Fire Resistance** 30/30/30**STC** 46

<b>Cladding</b>	Stria™ Cladding - Vertical	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to nog	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

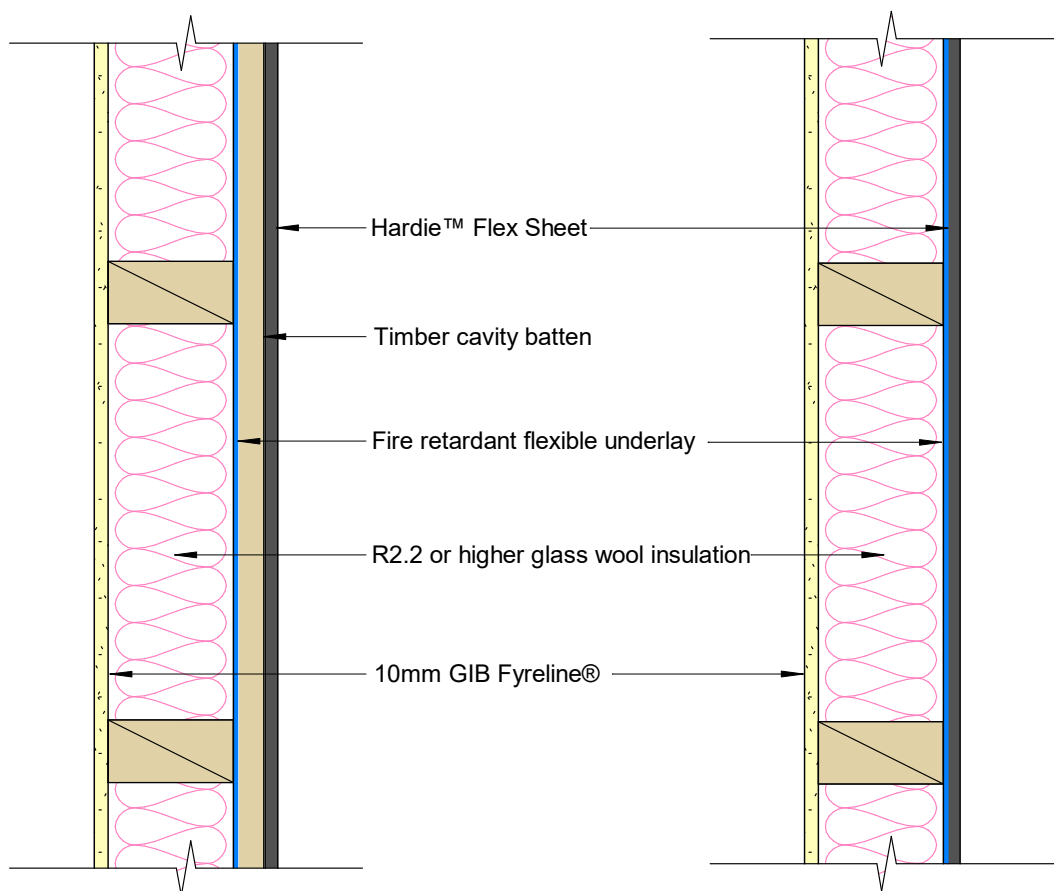
For further information refer to Stria™ Cladding vertical installation technical specification



**JHETGF30****Fire Resistance** 30/30/30**STC** 42

<b>Cladding</b>	Hardie™ Flex Sheet	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 40 x 2.8mm fibre cement nail at 150mm centres to entire frame <b>Cavity Fix:</b> 60 x 3.15mm fibre cement nail at 150mm centres to entire frame	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Hardie™ Flex Sheet technical specification

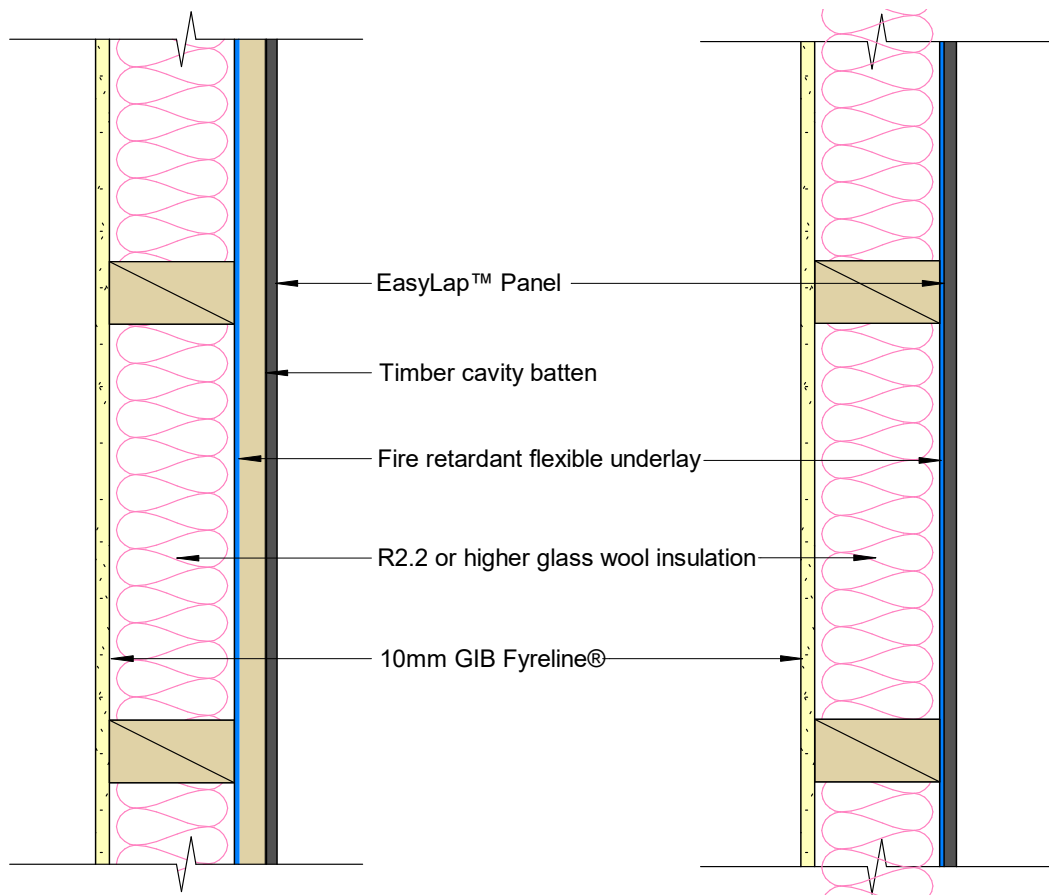




**JHETGE30****Fire Resistance** 30/30/30**STC** 42

<b>Cladding</b>	EasyLap™ Panel	<b>Lining</b>	10mm GIB Fyrelime®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	60 x 3.15mm fibre cement nail at 150mm centres to entire frame	<b>Lining Fixing</b>	Fix GIB Fyrelime® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

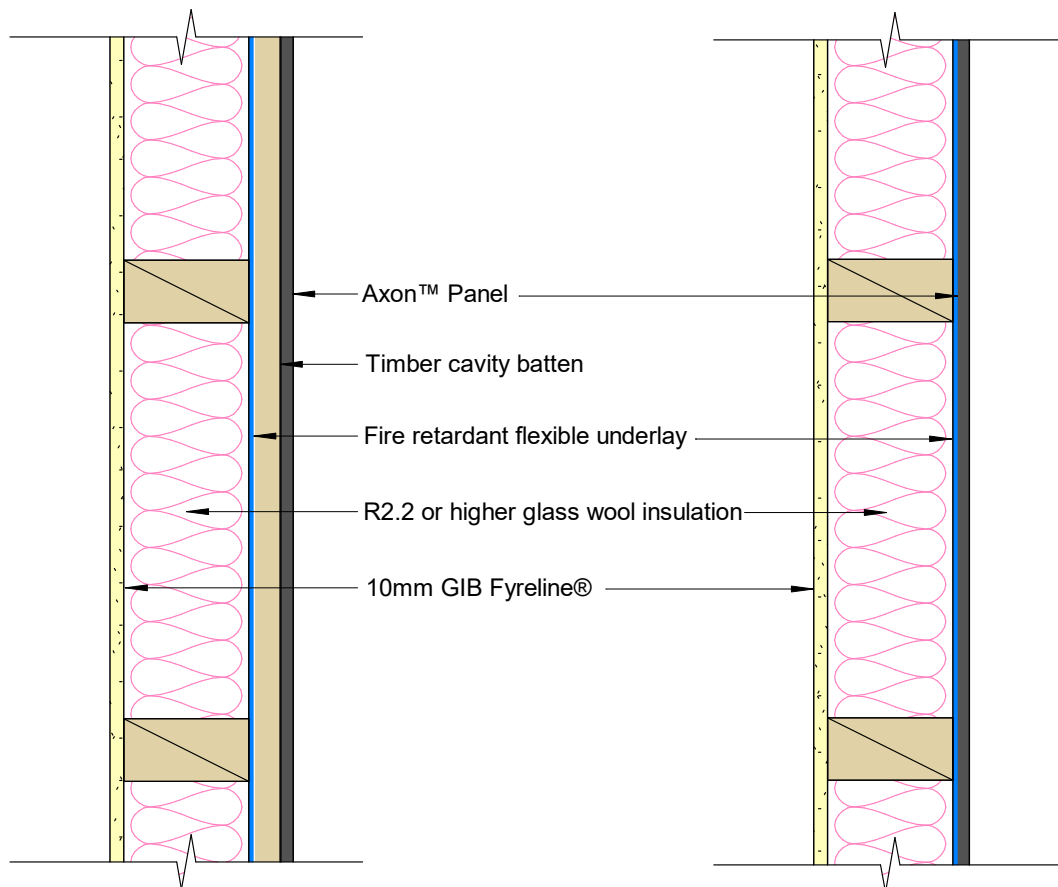
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETGA30****Fire Resistance** 30/30/30**STC** 41

<b>Cladding</b>	Axon™ Panel	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<p><b>Direct Fix:</b> 40 x 2.8mm round head nail at 150mm centres to entire frame</p> <p><b>Cavity Fix:</b> 60 x 3.15mm round head nail at 150mm centres to entire frame</p>	<b>Lining Fixing</b>	<p>Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws</p> <p>300mm centre around the sheet perimeter and intermediate studs</p> <p>Fixing to be 12mm from bound sheet edges and 18mm from sheet ends</p>

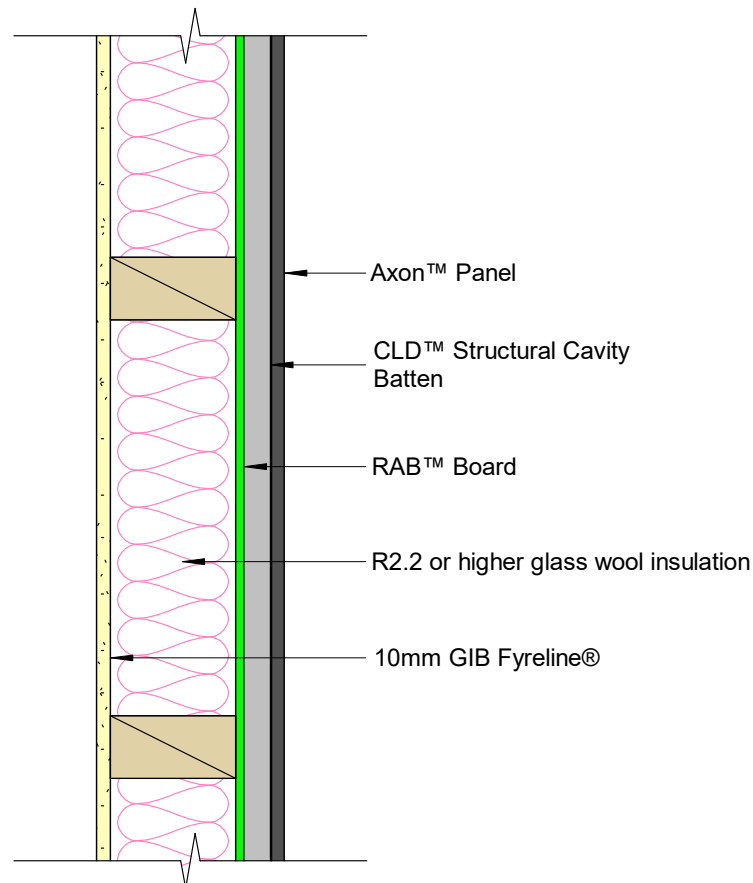
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



<b>Cladding</b>	Axon™ Panel	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Axon™ Panel and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space.

For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



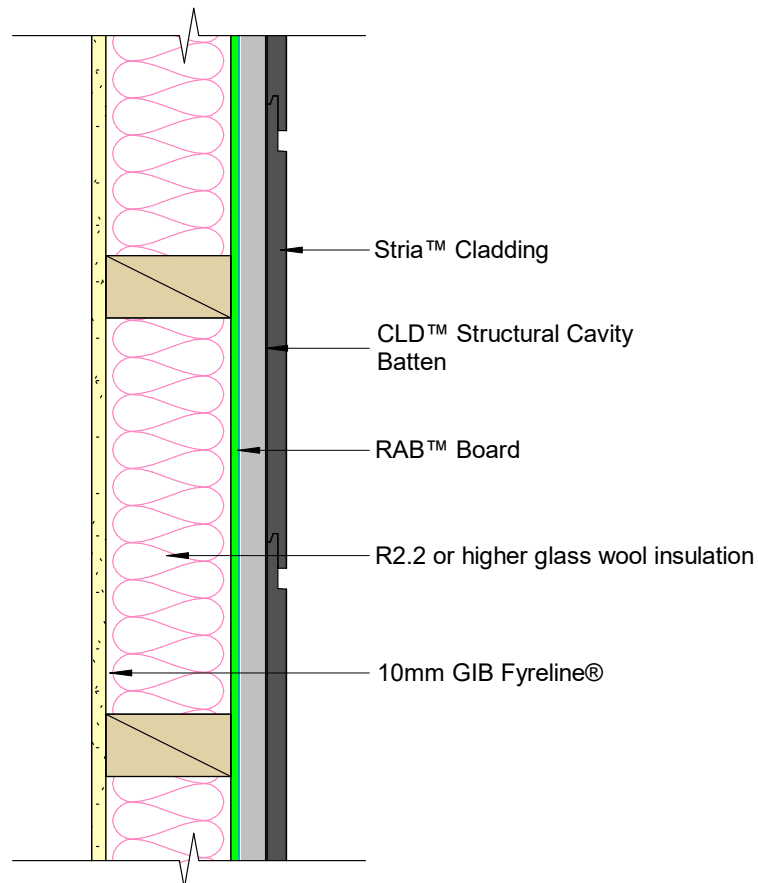
## JHETGR30-S

Fire Resistance 30/30/30

STC 46

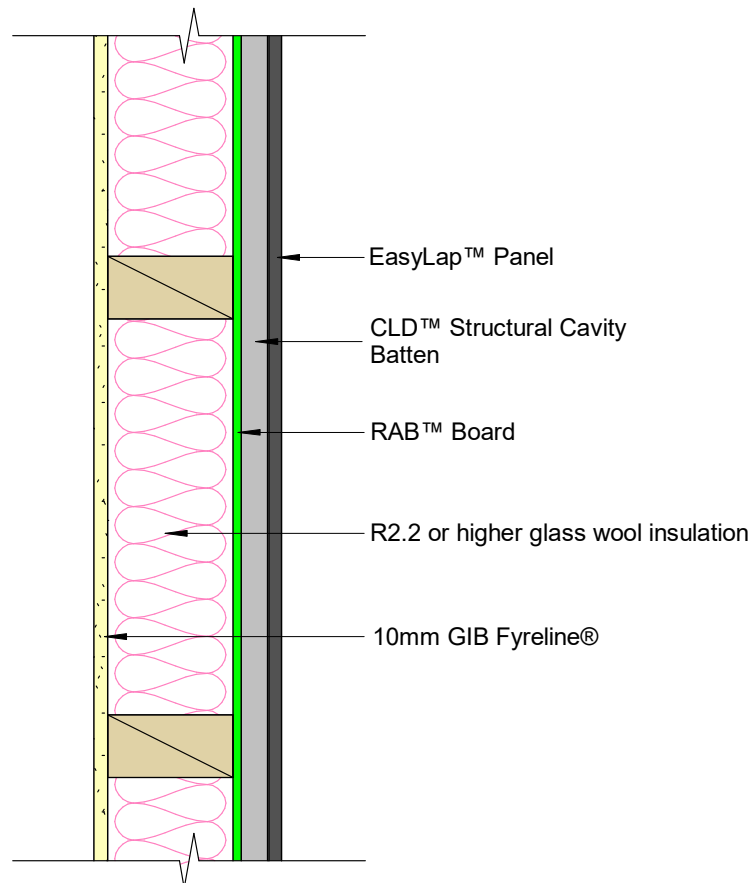
<b>Cladding</b>	Stria™ Cladding	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Stria™ Cladding Hardie™ CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



<b>Cladding</b>	EasyLap™ Panel	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Axon™ Panel and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

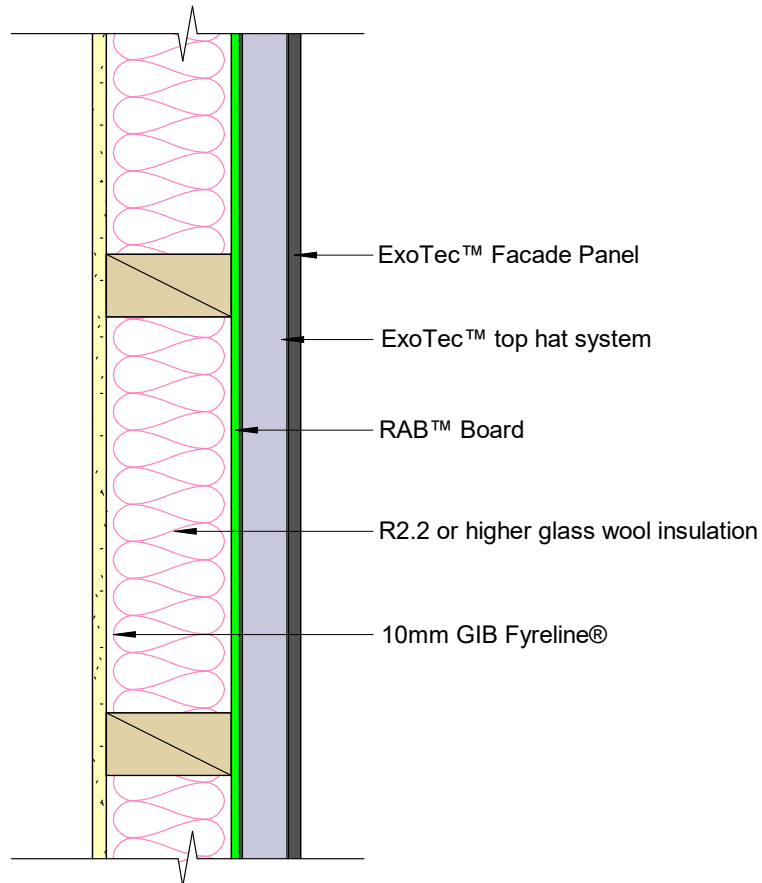
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETGR30-X****Fire Resistance** 30/30/30**STC** 47

<b>Cladding</b>	ExoTec™ Facade Panel	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher
<b>Cavity Batten</b>	ExoTec™ top hat system	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per ExoTec™ Facade Panel top hat technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual





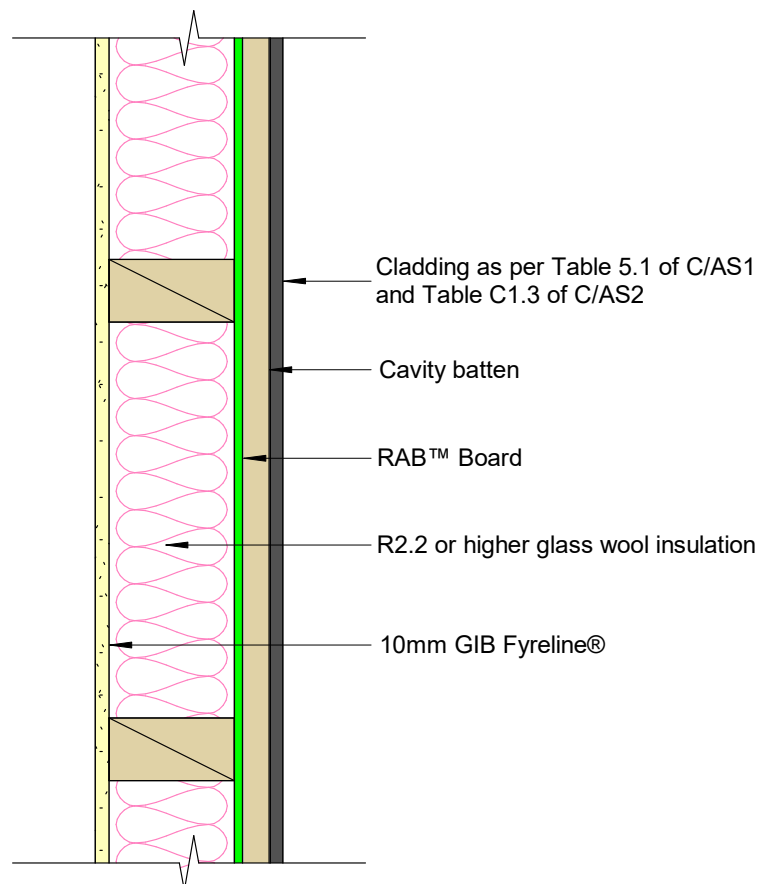
## JHETGR30-N

Fire Resistance 30/30/30

STC 42

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2	<b>Lining</b>	10mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	As per cladding manufacturer technical specification	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

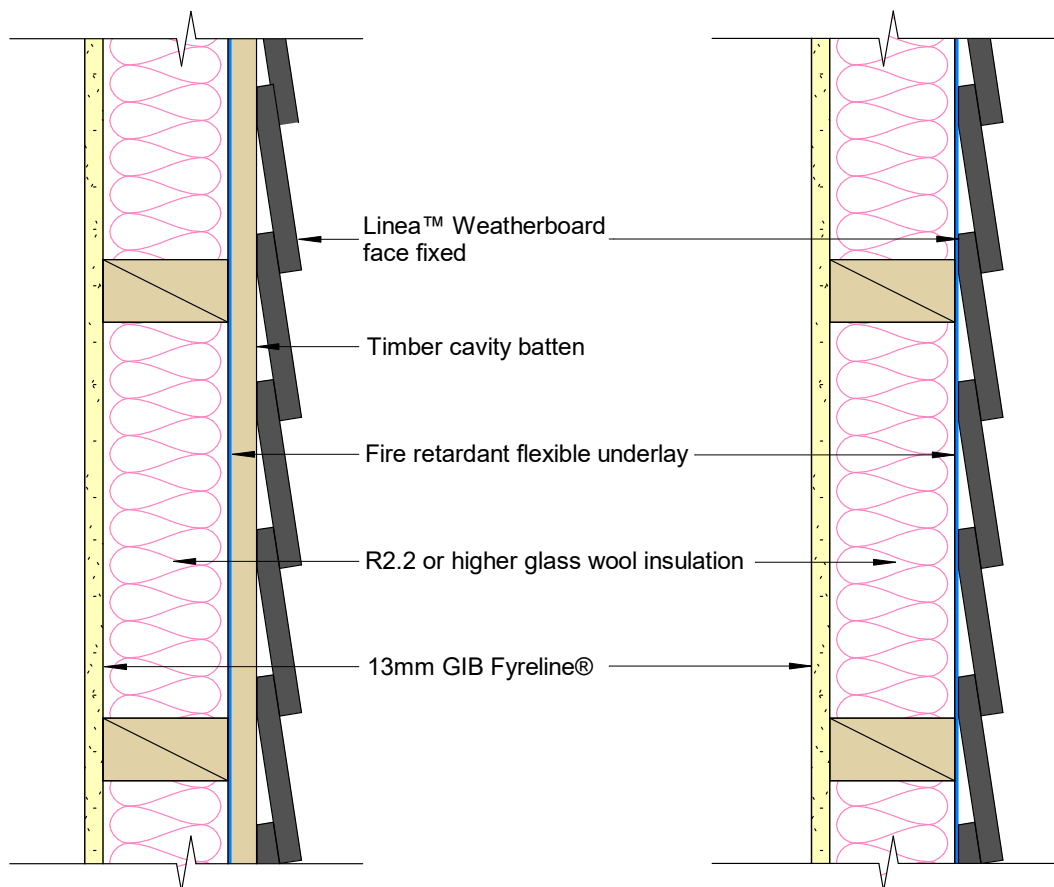
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETGL60****Fire Resistance** 60/60/60**STC** 46**Under 10m**

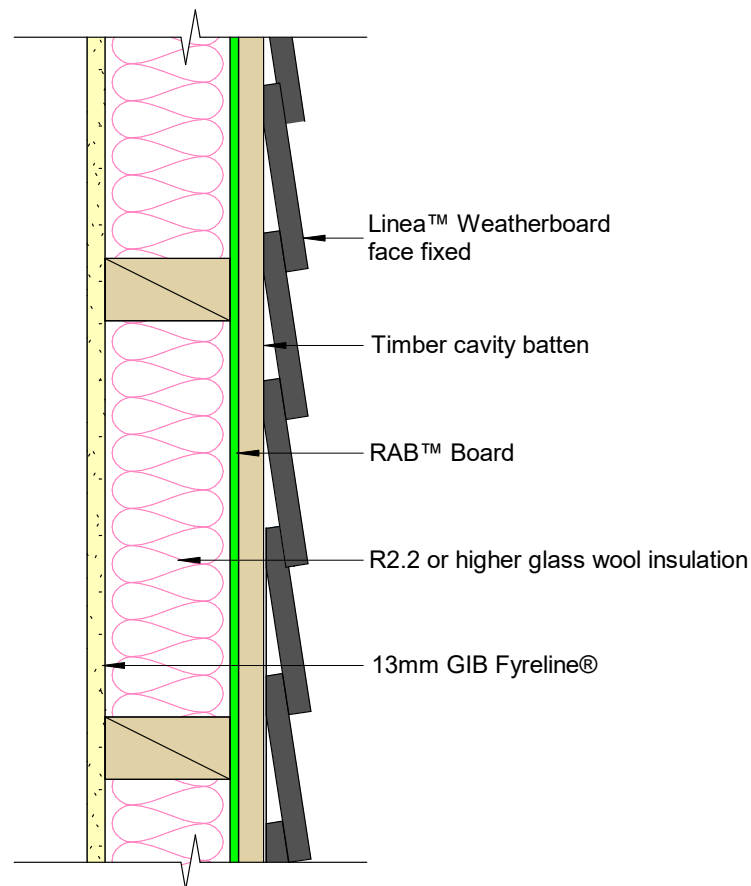
<b>Cladding</b>	Linea™ Weatherboard	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> Face fixed with 60 x 2.87mm jolt head nails to studs <b>Cavity Fix:</b> Face fixed with 75 x 3.15mm jolt head nails to studs	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Linea™ Weatherboard cavity fix or direct fix technical specifications.



<b>JHETGL60</b>		<b>Fire Resistance</b> 60/60/60	<b>STC</b> 47	<b>Over 10m or EH Wind Zone</b>
<b>Cladding</b>	Linea™ Weatherboard		<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum		<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm		<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	Face fixed with 90 x 3.55mm jolt head nails to studs		<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges			

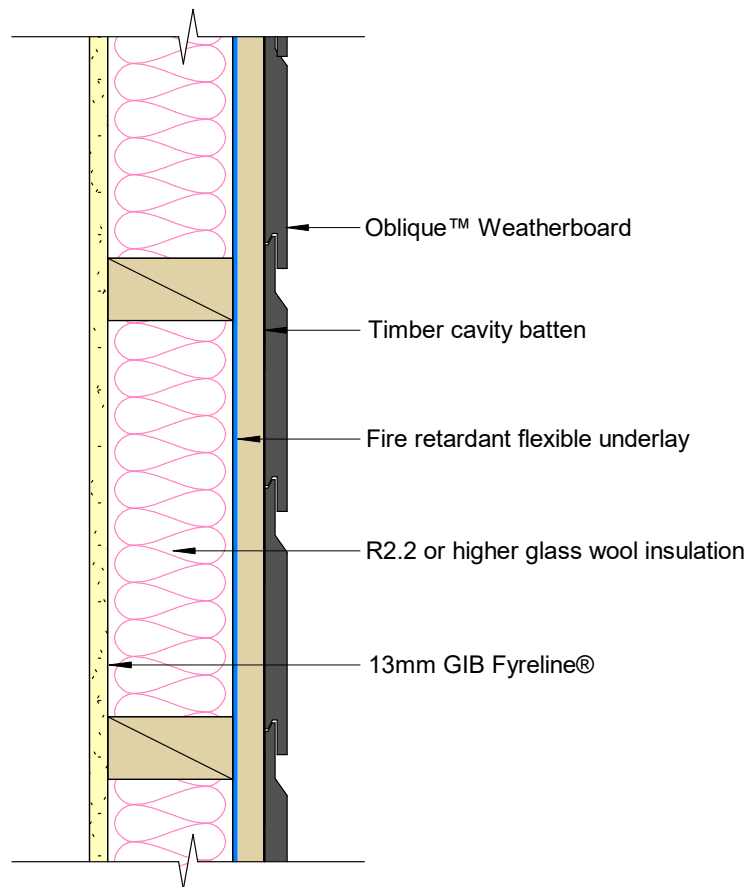
For further information refer to Linea™ Weatherboard cavity fix or direct fix technical specification.



**JHETGO60h****Fire Resistance** 60/60/60**STC** 46**Under 10m**

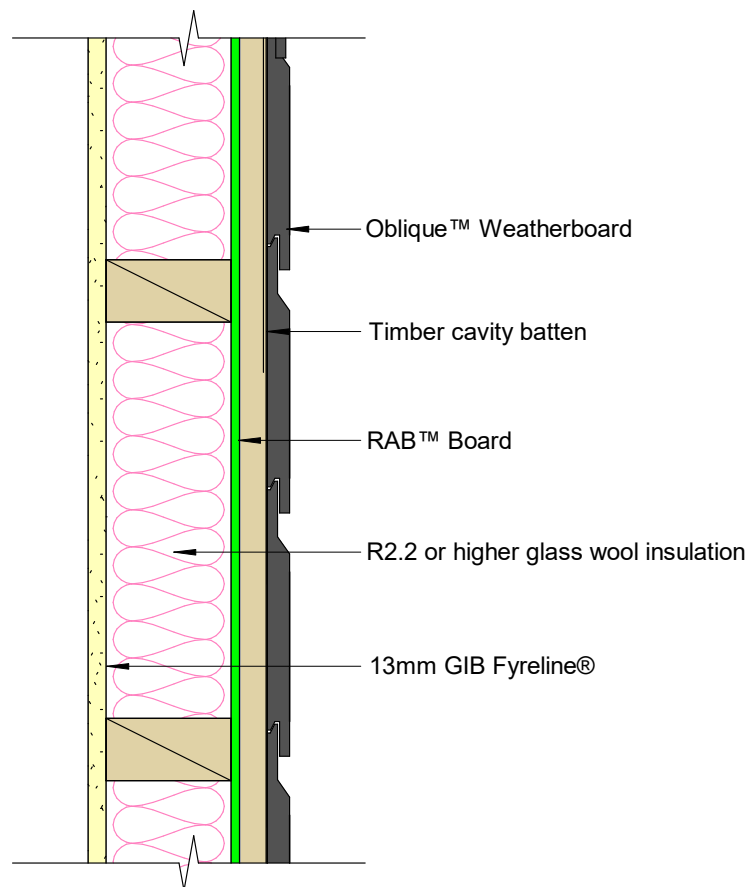
<b>Cladding</b>	Oblique™ Weatherboard - Horizontal	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>200mm wide weatherboard:</b> 65 x 2.87mm D-Head or round head nail to stud <b>300mm wide weatherboard:</b> Two nails per stud, 65 x 2.87mm D-Head or round head nail	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Oblique™ Weatherboard horizontal installation technical specification



**JHETGO60h****Fire Resistance** 60/60/60**STC** 47**Over 10m or EH Wind Zone****Cladding** Oblique™ Weatherboard - Horizontal**Lining** 13mm GIB Fyrelite®**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum**Insulation** Glass wool insulation 90mm thick, R2.2 or higher.**Cavity Batten** Timber cavity batten nominal 20mm**Underlay** RAB™ Board**Cladding Fixing**  
**200mm wide weatherboard:**  
75 x 3.06mm D-Head or round head nail to stud  
**300mm wide weatherboard:**  
Two nails per stud, 75 x 3.06mm D-Head or round head nail**Lining Fixing**  
Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws  
300mm centre around the sheet perimeter and intermediate studs  
Fixing to be 12mm from bound sheet edges and 18mm from sheet ends**RAB™ Board Fixing**  
RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing  
RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing  
Fixing to be 12mm from sheet edges

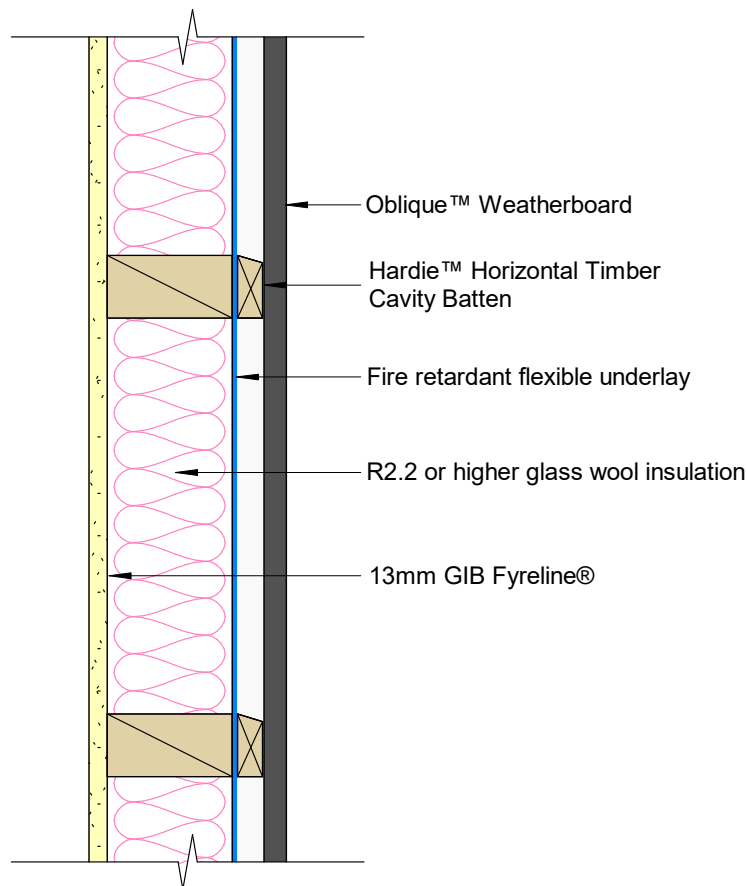
Oblique™ Weatherboard on Hardie™ 40mm horizontal cavity batten can also be used in this fire rated system.  
For further information refer to Oblique™ Weatherboard horizontal installation technical specification



**JHETGO60v****Fire Resistance** 60/60/60**STC** 46**Under 10m**

<b>Cladding</b>	Oblique™ Weatherboard - Vertical	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>200mm wide weatherboard:</b> 65 x 2.87mm D-Head or round head nail to nog <b>300mm wide weatherboard:</b> Two nails per nog, 65 x 2.87mm D-Head or round head nail	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

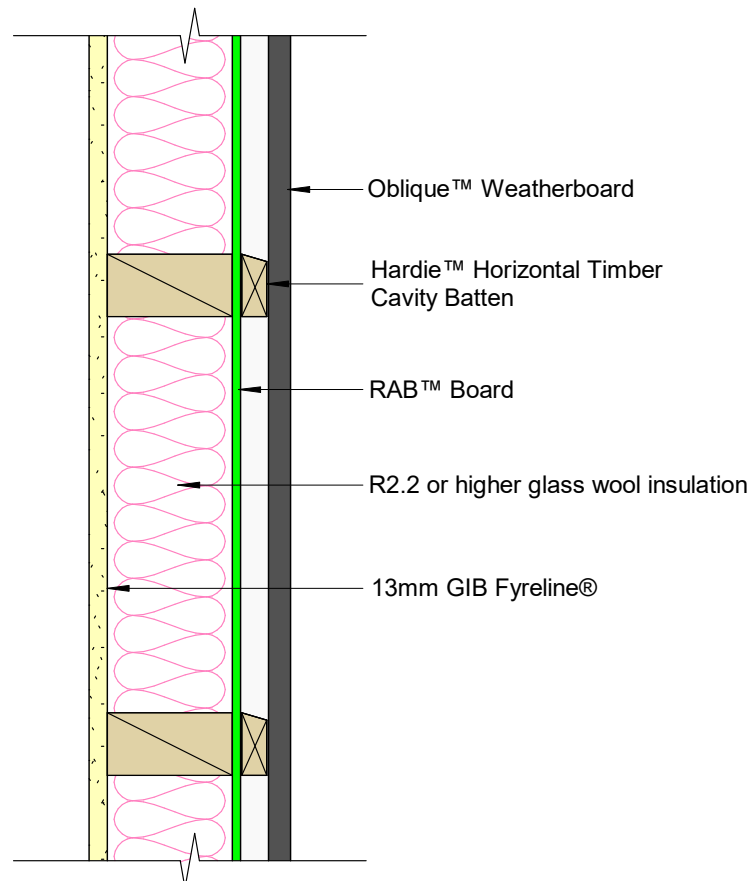
For further information refer to Oblique™ Weatherboard vertical installation technical specification





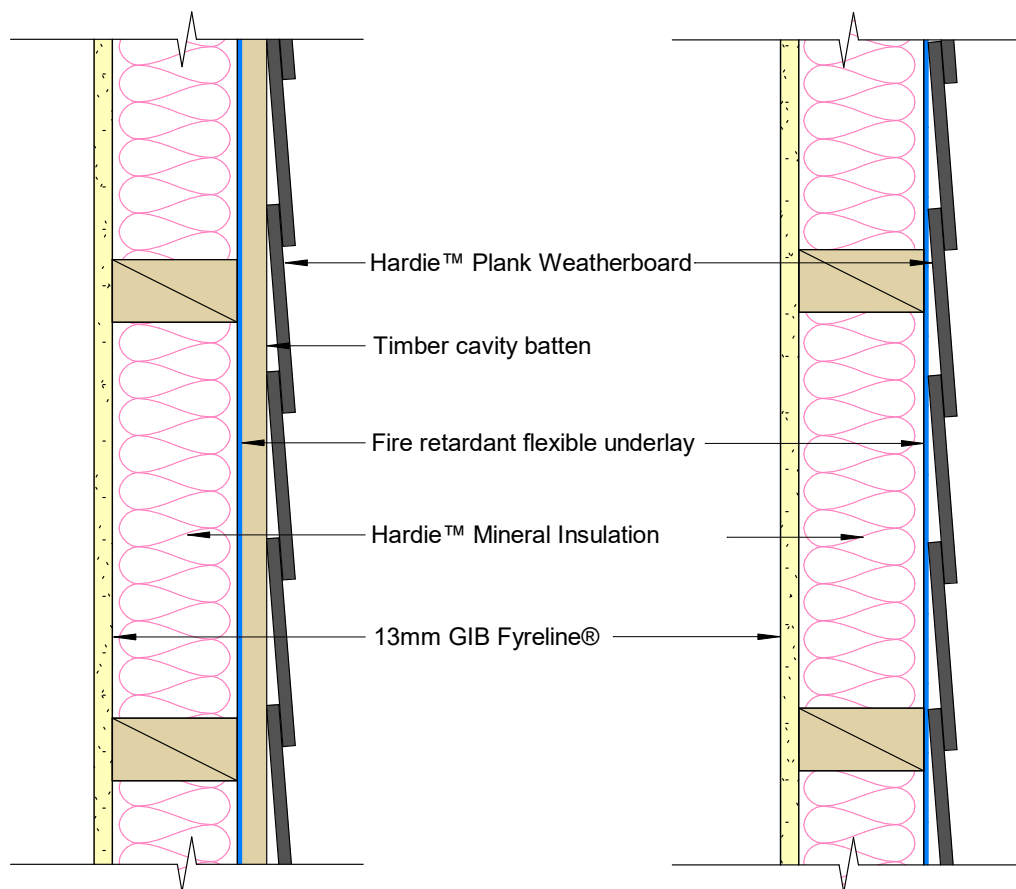
<b>Cladding</b>	Oblique™ Weatherboard - Vertical	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	<b>200mm wide weatherboard:</b> 75 x 3.06mm D-Head or round head nail to nog <b>300mm wide weatherboard:</b> Two nails per nog, 75 x 3.06mm D-Head or round head nail	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

Oblique™ Weatherboard on Hardie™ 40mm horizontal cavity batten can also be used in this fire rated system  
For further information refer to Oblique™ Weatherboard vertical installation technical specification



JHETGW60		Fire Resistance 60/60/60	STC 45	Under 10m
<b>Cladding</b>	Hardie™ Plank Weatherboard		<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum		<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm		<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 50 x 2.8mm fibre cement nail to stud <b>Cavity Fix:</b> Face fixed with 75 x 3.15mm fibre cement nail to stud		<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

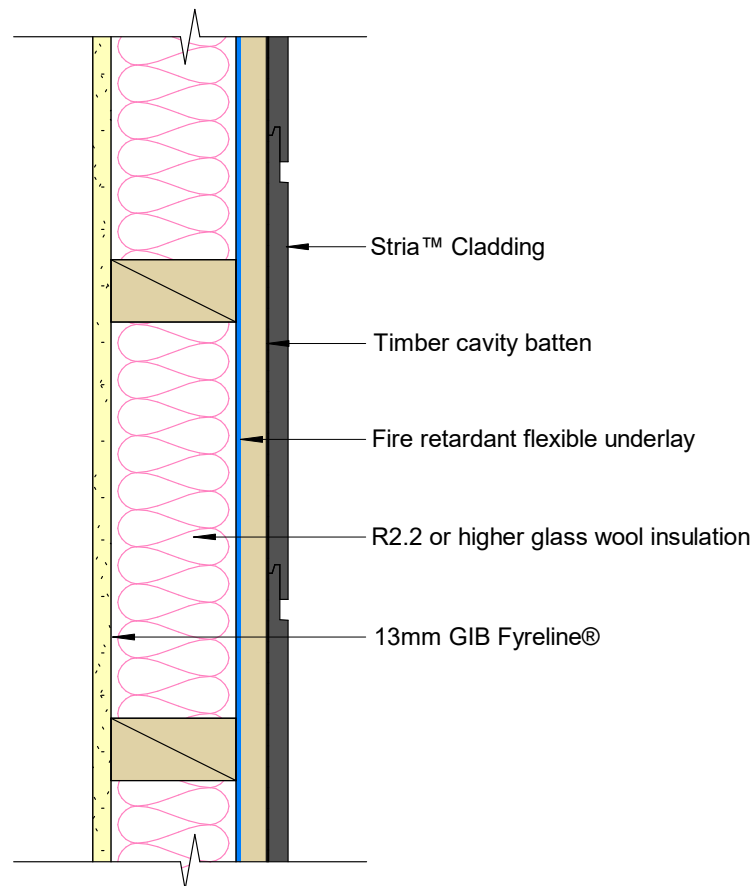
For further information refer to Hardie™ Plank Weatherboard technical specification



**JHETGS60h****Fire Resistance** 60/60/60**STC** 46**Under 10m**

<b>Cladding</b>	Stria™ Cladding - Horizontal	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to stud	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

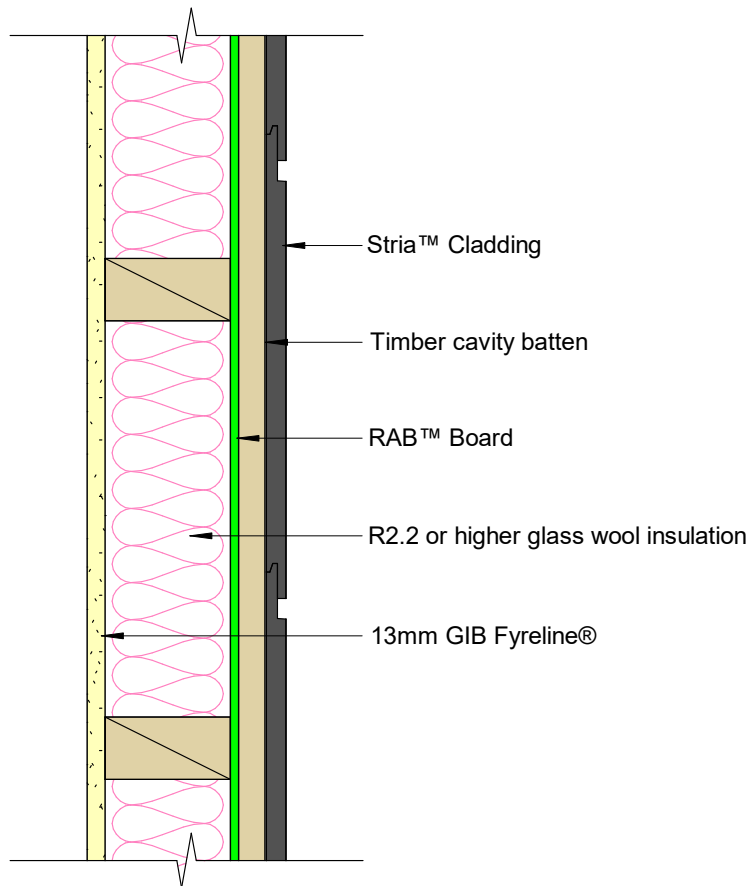
For further information refer to Stria™ Cladding timber cavity batten horizontal installation technical specification



**JHETGS60h****Fire Resistance** 60/60/60**STC** 47**Over 10m or EH Wind Zone**

<b>Cladding</b>	Stria™ Cladding - Horizontal	<b>Lining</b>	13mm GIB Fyrelime®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	75 x 3.06mm D-Head or round head nail to stud	<b>Lining Fixing</b>	Fix GIB Fyrelime® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

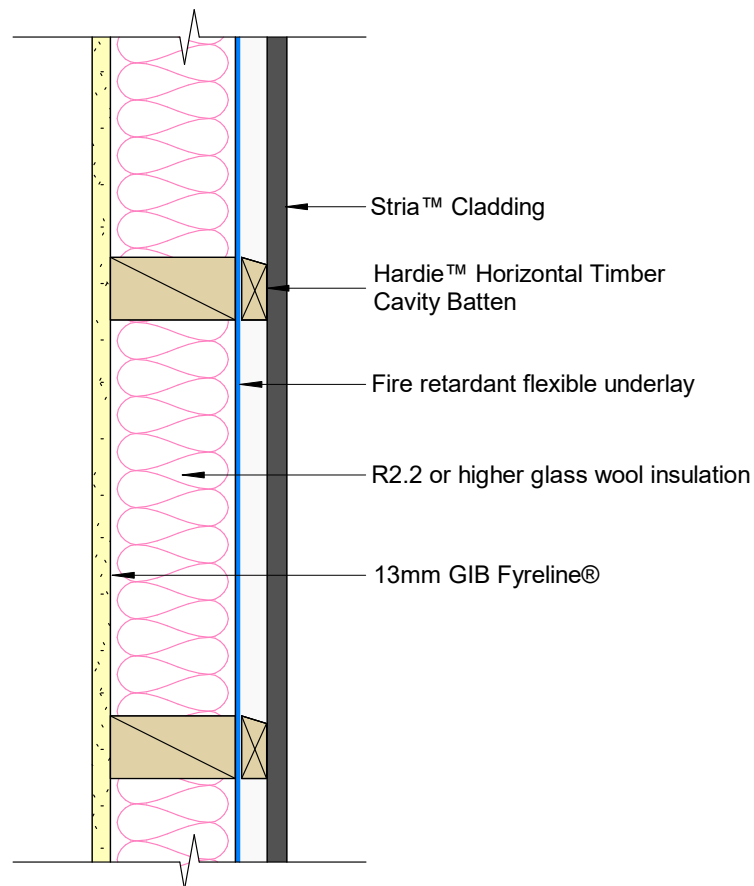
For further information refer to Stria™ Cladding timber cavity batten horizontal installation technical specification



**JHETGS60v****Fire Resistance** 60/60/60**STC** 46**Under 10m**

<b>Cladding</b>	Stria™ Cladding - Vertical	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to nog	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

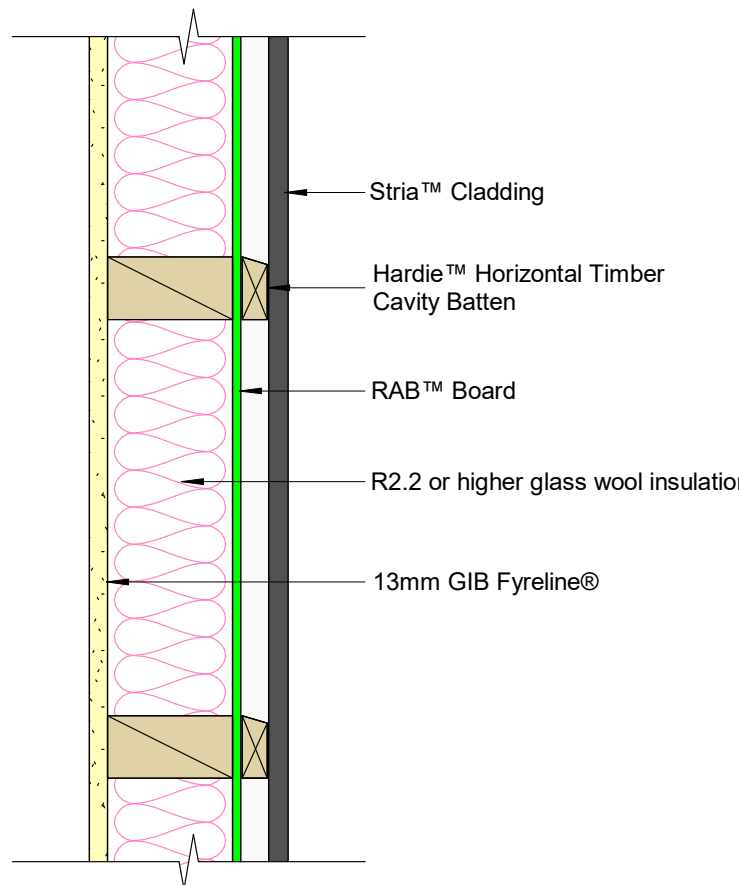
For further information refer to Stria™ Cladding vertical installation technical specification



**JHETGS60v****Fire Resistance** 60/60/60**STC** 47**Over 10m or EH Wind Zone**

<b>Cladding</b>	Stria™ Cladding - Vertical	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Glass wool insulation 90mm thick, R2.2 or higher.
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	75 x 3.06mm D-Head or round head nail to nog	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

For further information refer to Stria™ Cladding vertical installation technical specification

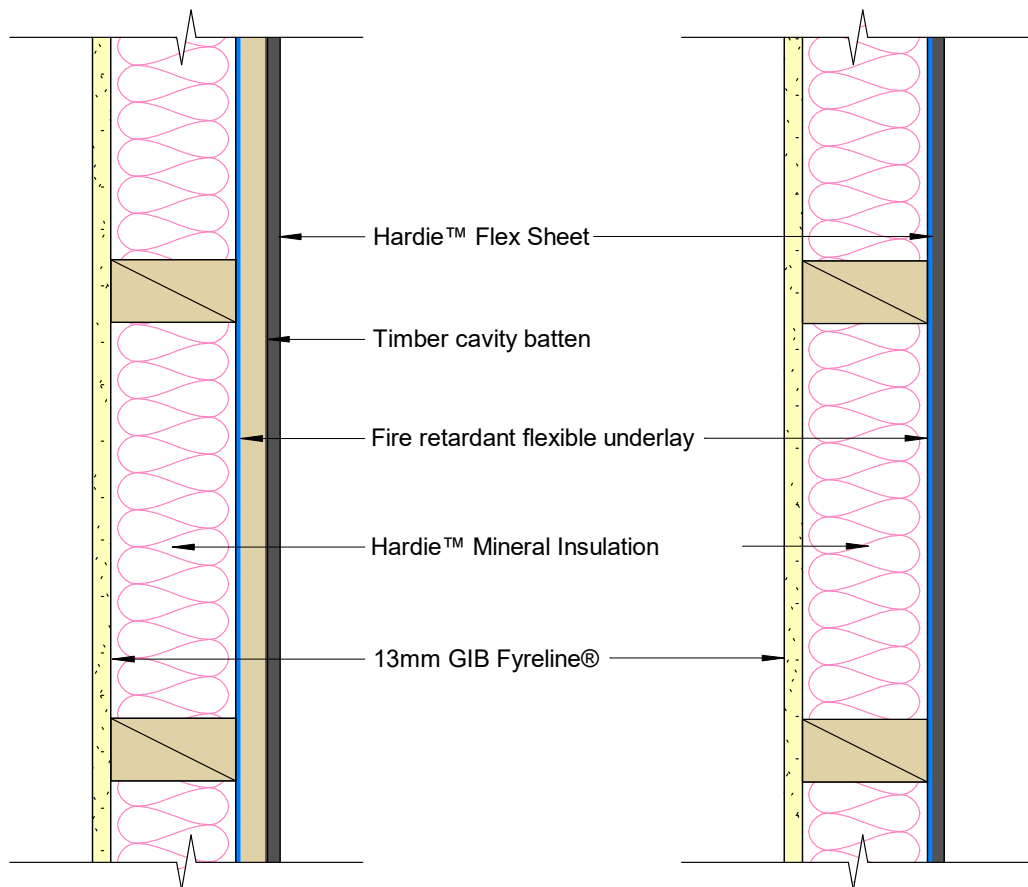




**JHETGF60****Fire Resistance** 60/60/60**STC** 42**Under 10m**

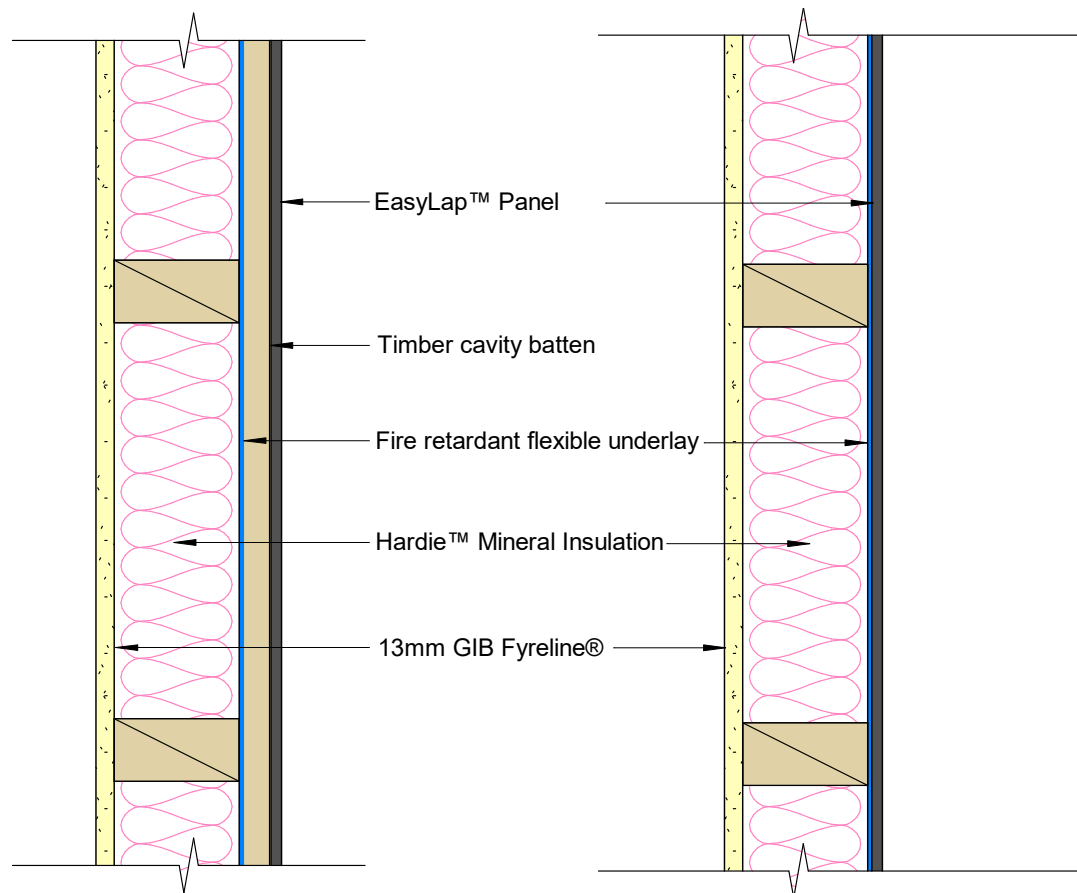
<b>Cladding</b>	Hardie™ Flex Sheet	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 40 x 2.8mm fibre cement nail at 150mm centres to entire frame <b>Cavity Fix:</b> 60 x 3.15mm fibre cement nail at 150mm centres to entire frame	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Hardie™ Flex Sheet technical specification



<b>JHETGE60</b>		<b>Fire Resistance</b> 60/60/60	<b>STC</b> 42	<b>Under 10m</b>
<b>Cladding</b>	EasyLap™ Panel		<b>Lining</b>	13mm GIB Fyreline®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum		<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm		<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	60 x 3.15mm fibre cement nail at 150mm centres to entire frame		<b>Lining Fixing</b>	Fix GIB Fyreline® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



## JHETGE60

Fire Resistance 60/60/60

STC 44

Over 10m or EH Wind Zone

**Cladding** EasyLap™ Panel

**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum

**Cavity Batten** Timber cavity batten nominal 20mm

**Lining** 13mm GIB Fyrelite®

**Insulation** Hardie™ Mineral Insulation

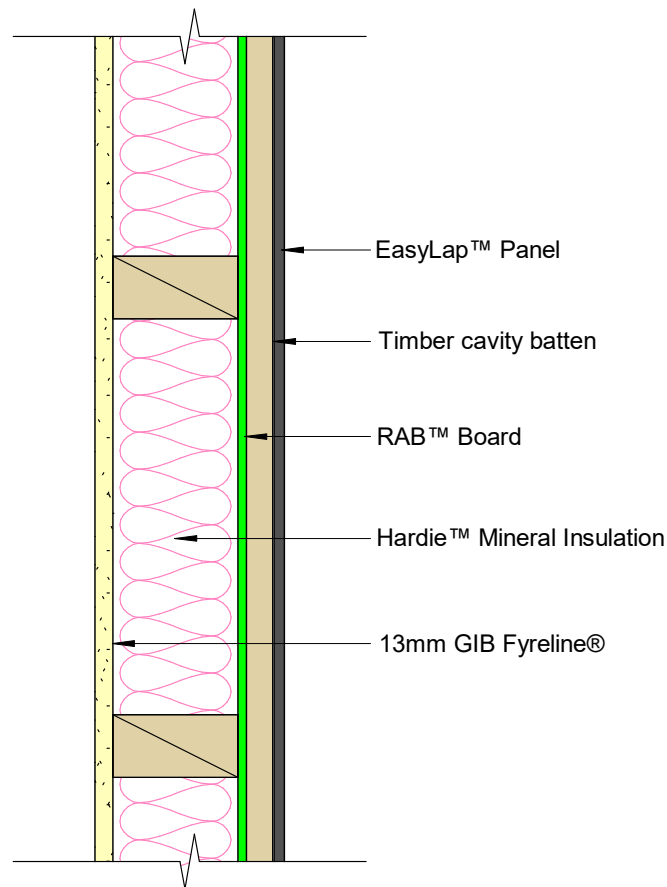
**Underlay** RAB™ Board

**Cladding Fixing** 75 x 3.15mm fibre cement nail at 150mm centres to entire frame

**Lining Fixing** Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws  
300mm centre around the sheet perimeter and intermediate studs  
Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

**RAB™ Board Fixing** RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing  
RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing  
Fixing to be 12mm from sheet edges

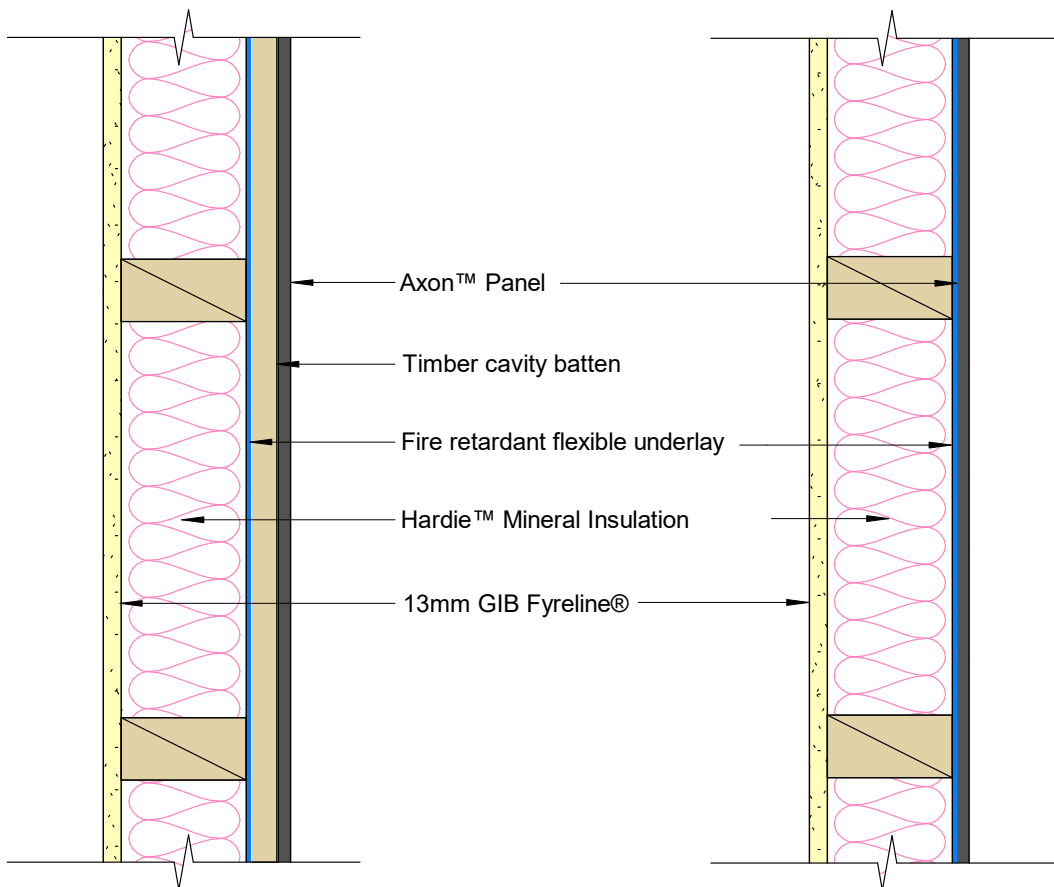
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETGA60****Fire Resistance** 60/60/60**STC** 42**Under 10m**

<b>Cladding</b>	Axon™ Panel	<b>Lining</b>	13mm GIB Fyreline®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 40 x 2.8mm round head nail at 150mm centres to entire frame <b>Cavity Fix:</b> 60 x 3.15mm round head nail at 150mm centres to entire frame	<b>Lining Fixing</b>	Fix GIB Fyreline® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

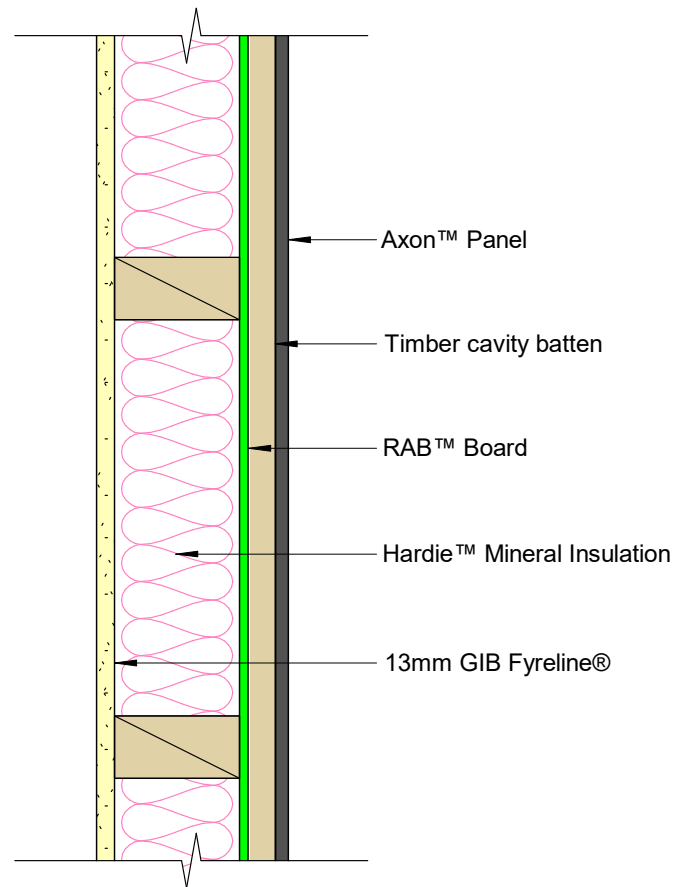
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETGA60****Fire Resistance** 60/60/60**STC** 43**Over 10m or EH Wind Zone**

<b>Cladding</b>	Axon™ Panel	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	75 x 3.06mm round head nail at 150mm centres to entire frame	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

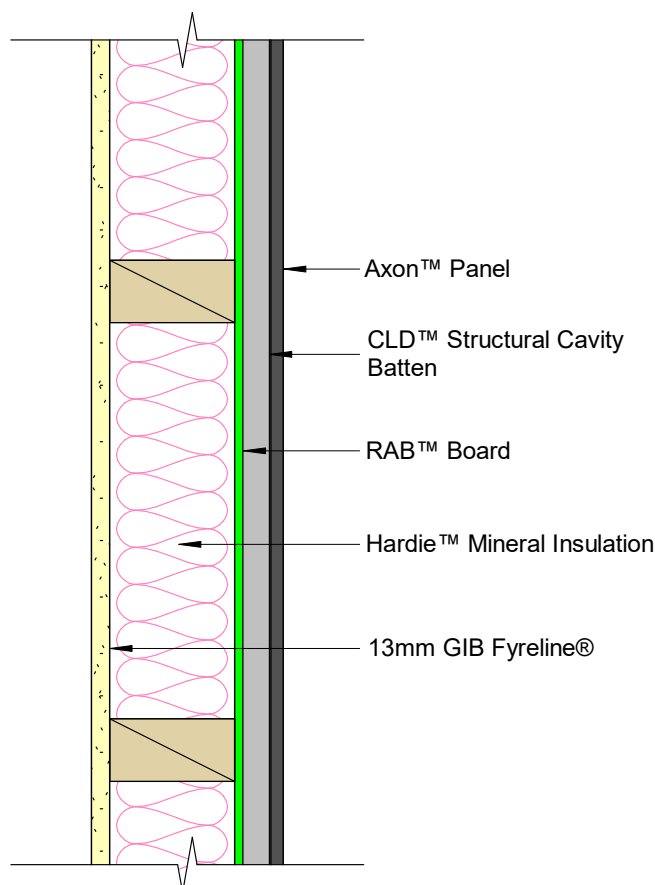
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETGR60-A****Fire Resistance** 60/60/60**STC** 45

<b>Cladding</b>	Axon™ Panel	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Axon™ Panel and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

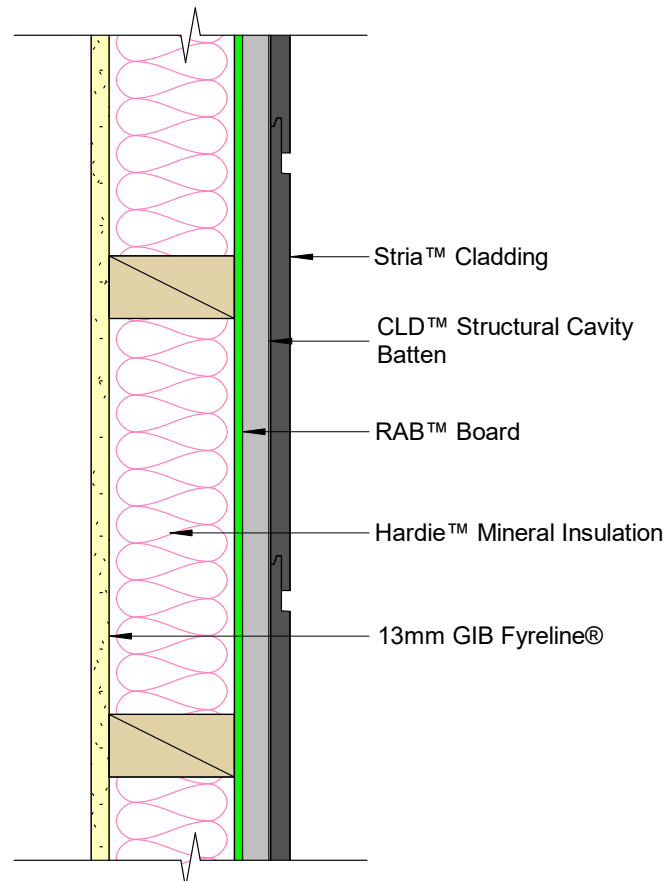
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual





<b>Cladding</b>	Stria™ Cladding	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Stria™ Cladding Hardie™ CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

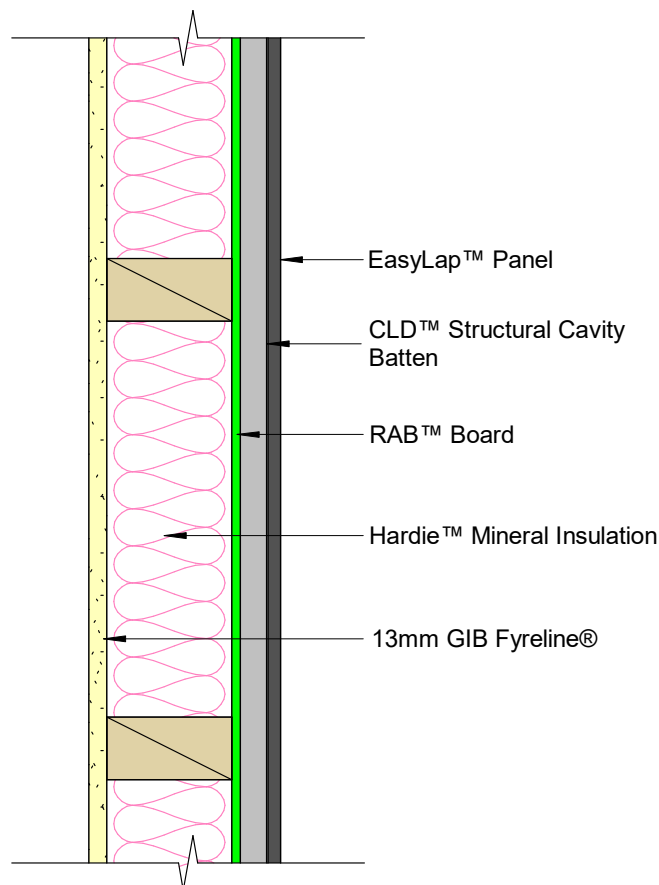
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETGR60-E****Fire Resistance** 60/60/60**STC** 46

<b>Cladding</b>	EasyLap™ Panel	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per Axon Panel™ and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



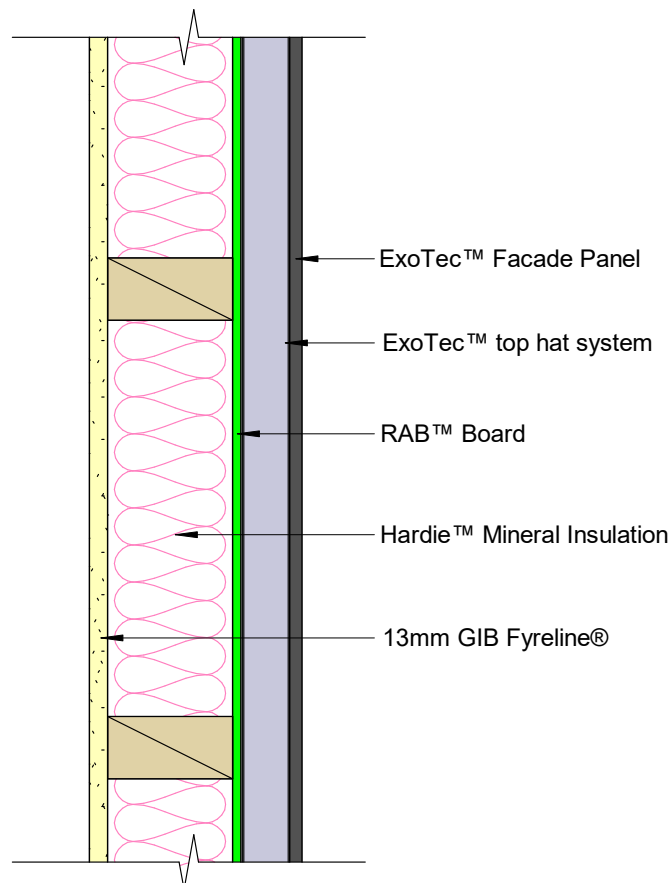
# JHETGR60-X

Fire Resistance 60/60/60

STC 47

<b>Cladding</b>	ExoTec™ Facade Panel	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	ExoTec™ top hat system	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per ExoTec™ Facade Panel top hat technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

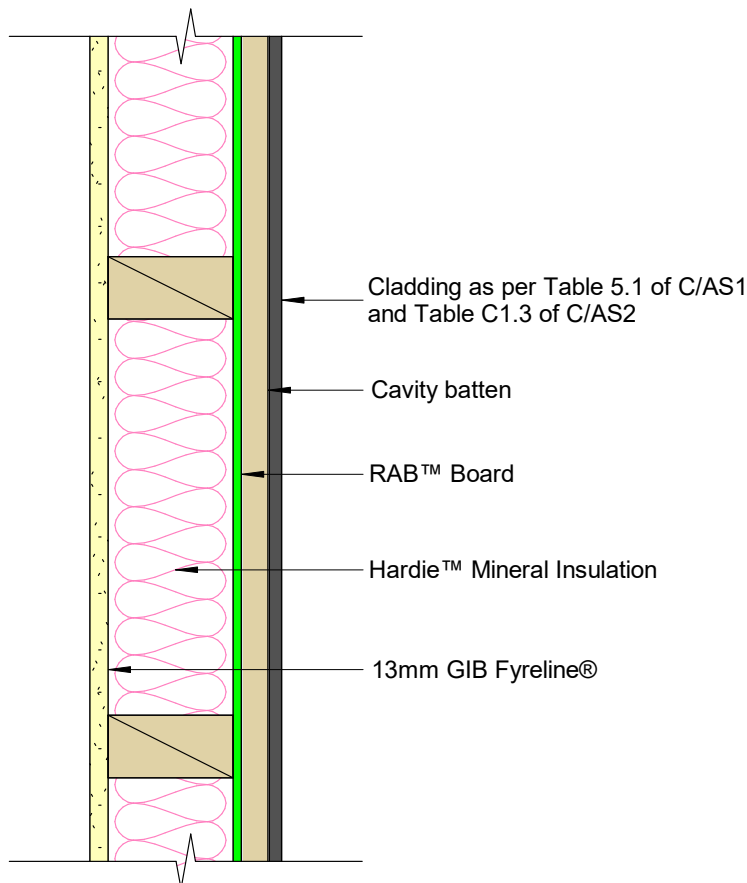
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETGR60-N****Fire Resistance** 60/60/60**STC** 42

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual

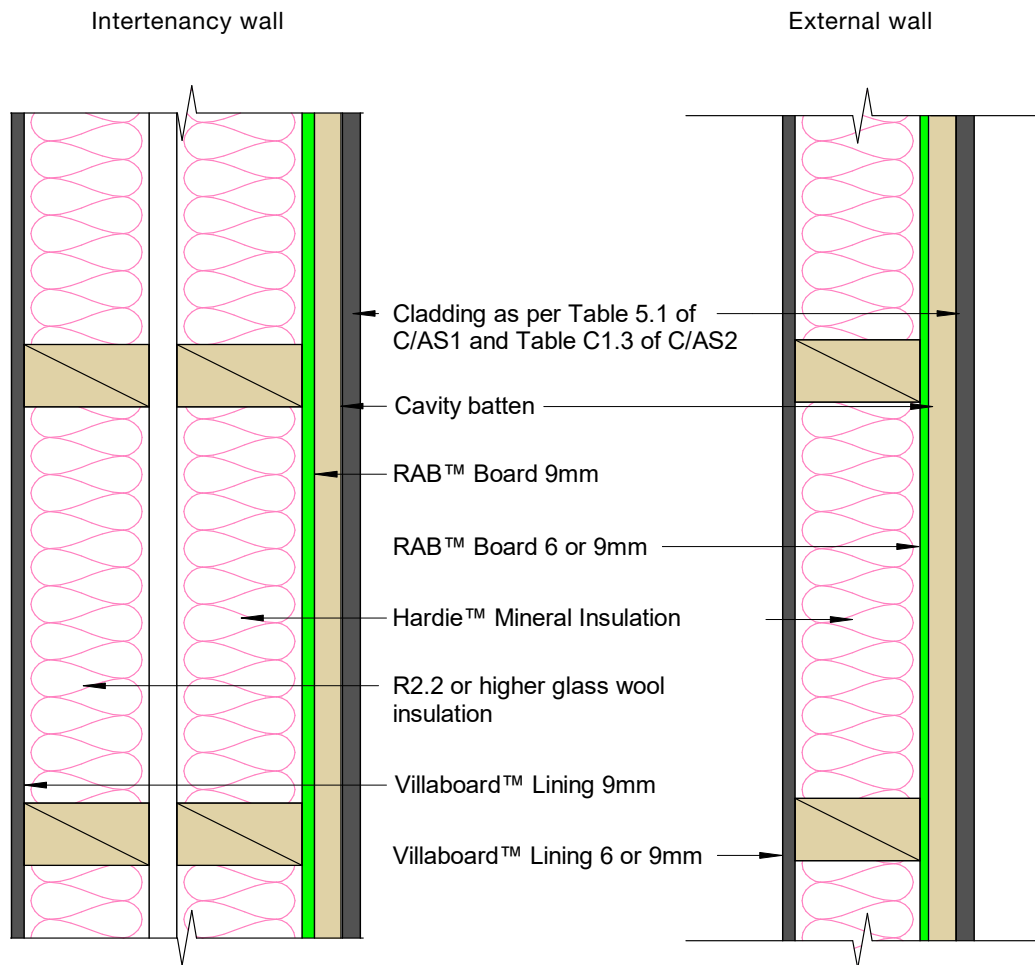


**JHETVR60-N****Fire Resistance** 60/60/60**STC** 55\*

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2	<b>Lining</b>	Villaboard™ Lining
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum. For intertenancy walls double frame with 25mm gap between frames.	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification.	<b>Underlay</b>	RAB™ Board
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	Villaboard™ : 30mm x 6g Villadrive™ screws or 40 x 2.8mm round head nails at 150mm centres
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

\*STC value for IT wall

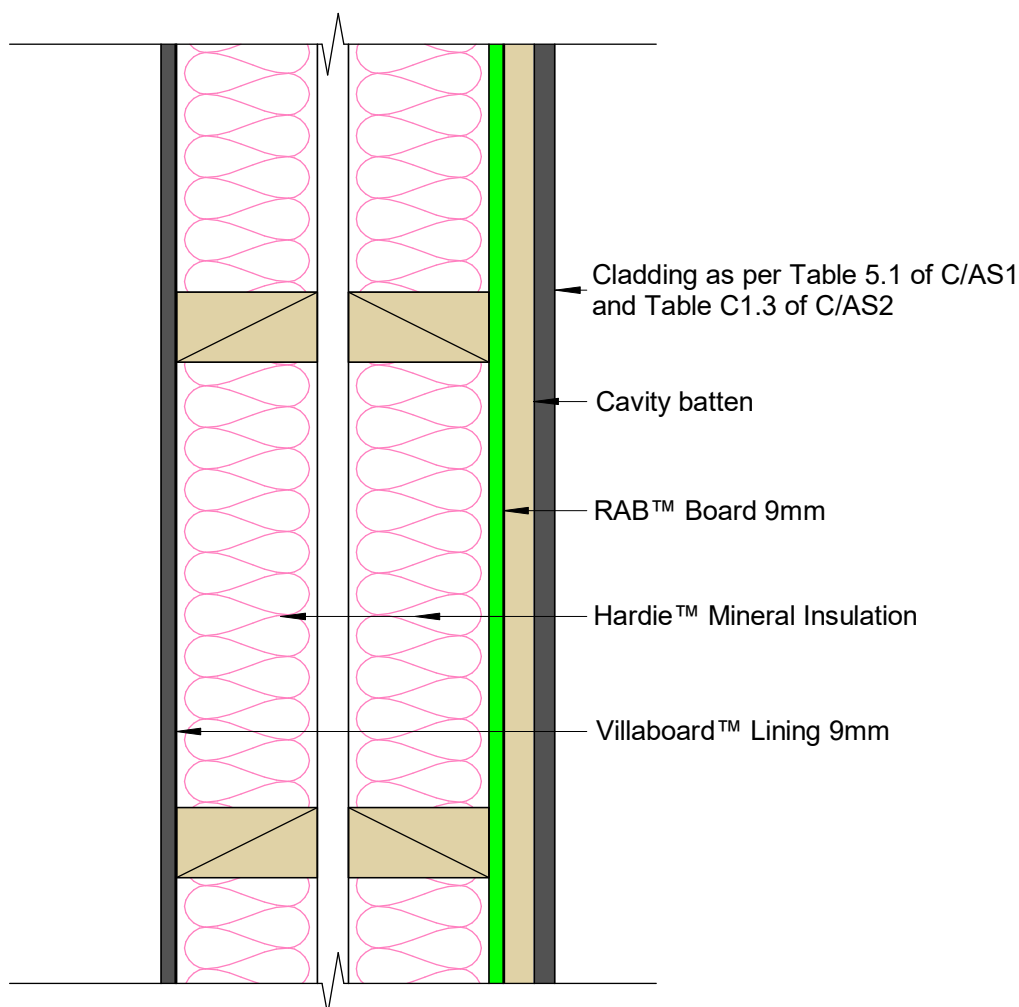
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual.



**JHETVR120-N****Fire Resistance** 120/120/120**STC** 56

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2	<b>Lining</b>	Villaboard™ Lining 9mm
<b>Framing</b>	Timber framing to be in accordance with the NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum Double frame with 25mm gap between frames	<b>Insulation</b>	2 x Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification.	<b>Underlay</b>	RAB™ Board 9mm
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	30mm x 6g Villadribe™ screws at 150mm to entire framing Fixing to be 12mm from sheet edges
<b>RAB™ Board Fixing</b>	50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual





# External Walls Steel Frame

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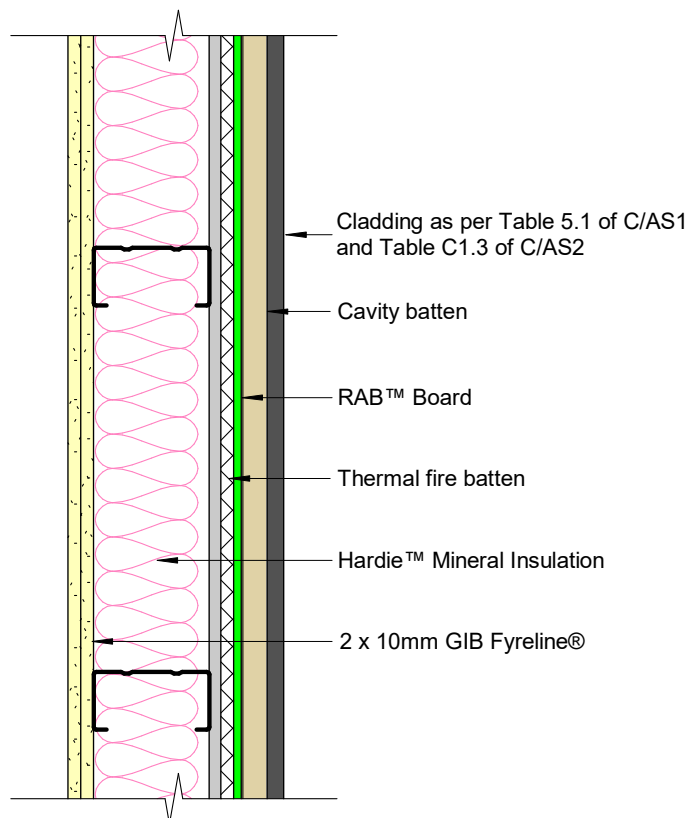
30 Minute Fire Rated System

60 Minute Fire Rated System

**JHESGR30-N****Fire Resistance** 30/30/30**STC** 47

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2 of the NZBC.	<b>Lining</b>	2 x 10mm GIB Fyrelite®
<b>Framing</b>	Steel framing to be in accordance with NASH Standard 'Light Steel Framed Buildings'. Framing size 92 x 35 x 0.75mm. Studs at 400mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification	<b>Underlay</b>	RAB™ Board over thermal fire batten (refer to page 15)
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	Inner layer: 25mm x 6g GIB® Grabber® Drywall Self Tapping Screws Outer layer: 32mm x 6g GIB® Grabber® Drywall Self Tapping Screws Inner layer: 600mm centres up each stud Outer layer: 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 50mm from sheet ends
<b>RAB™ Board Fixing</b>	50mm x 10g steel self embedding steel screws at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

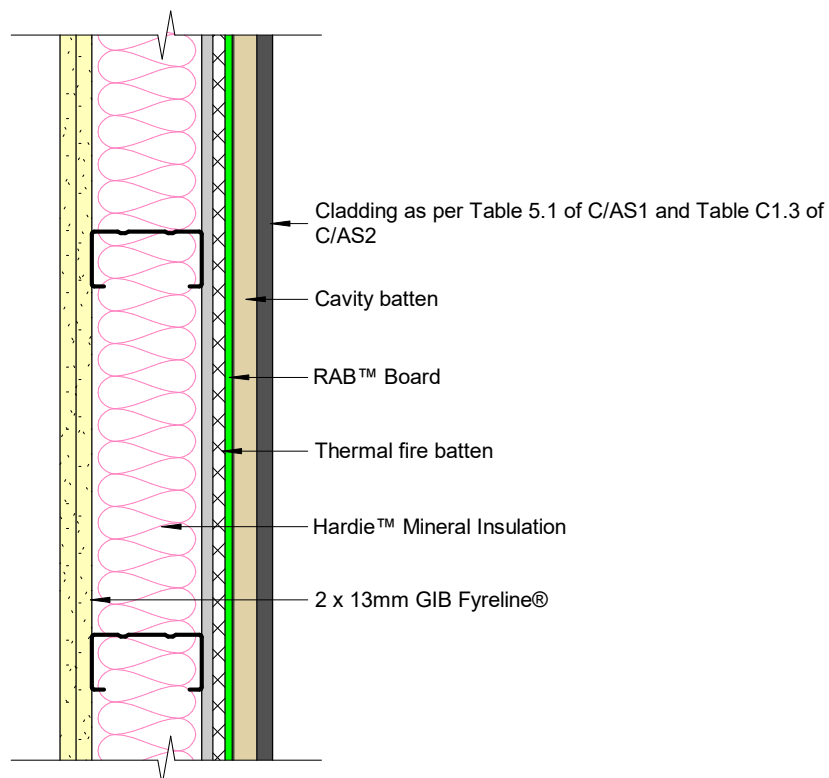
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHESGR60-N****Fire Resistance** 60/60/60**STC** 48

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2 of the NZBC.	<b>Lining</b>	2 x 13mm GIB Fyrelite®
<b>Framing</b>	Steel framing to be in accordance with NASH Standard 'Light Steel Framed Buildings'. Framing size 92 x 35 x 0.75mm. Studs at 400mm centres and nogs at 800mm centres maximum.	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification	<b>Underlay</b>	RAB™ Board over thermal fire batten (refer to page 15)
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	<b>Lining Fixing</b>	Inner layer: 25mm x 6g GIB® Grabber® Drywall Self Tapping Screws Outer layer: 41mm x 6g GIB® Grabber® Drywall Self Tapping Screws Inner layer: 600mm centres up each stud Outer layer: 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 50mm from sheet ends
<b>RAB™ Board Fixing</b>	50mm x 10g steel self embedding steel screws at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



# Parapet & Wing Walls Timber Frame

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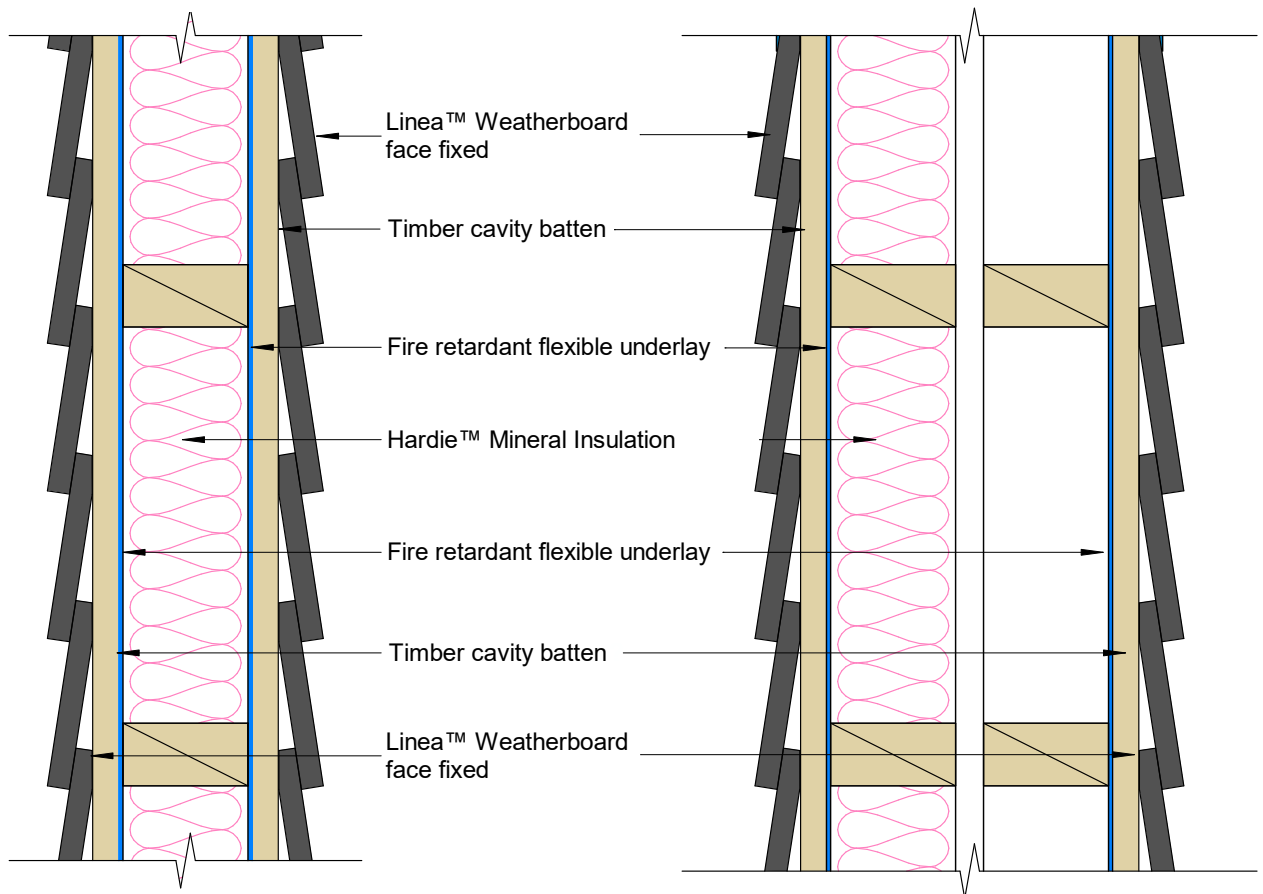
**30 Minute Fire Rated System**

**60 Minute Fire Rated System**

**JHETLL60****Fire Resistance** 60/60/60**Under 10m**

<b>Cladding</b>	Linea™ Weatherboard		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Cavity Fix:</b> Face fixed with 75 x 3.15mm jolt head nails to studs		

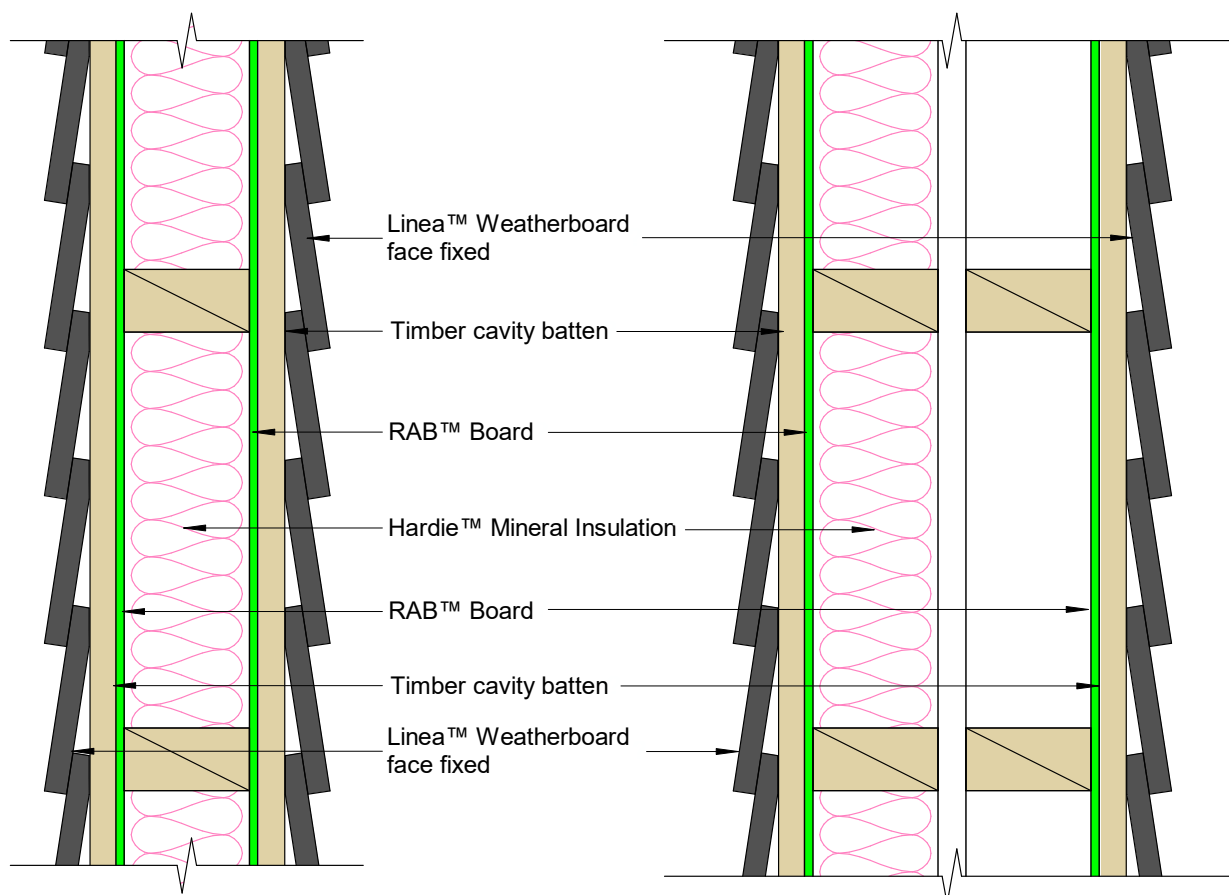
For further information refer to Linea™ Weatherboard cavity fix technical specification



**JHETLL60****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone**

<b>Cladding</b>	Linea™ Weatherboard		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>Cladding Fixing</b>	Face fixed with 90 x 3.55mm jolt head nails to studs		
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to Linea™ Weatherboard cavity fix technical specification

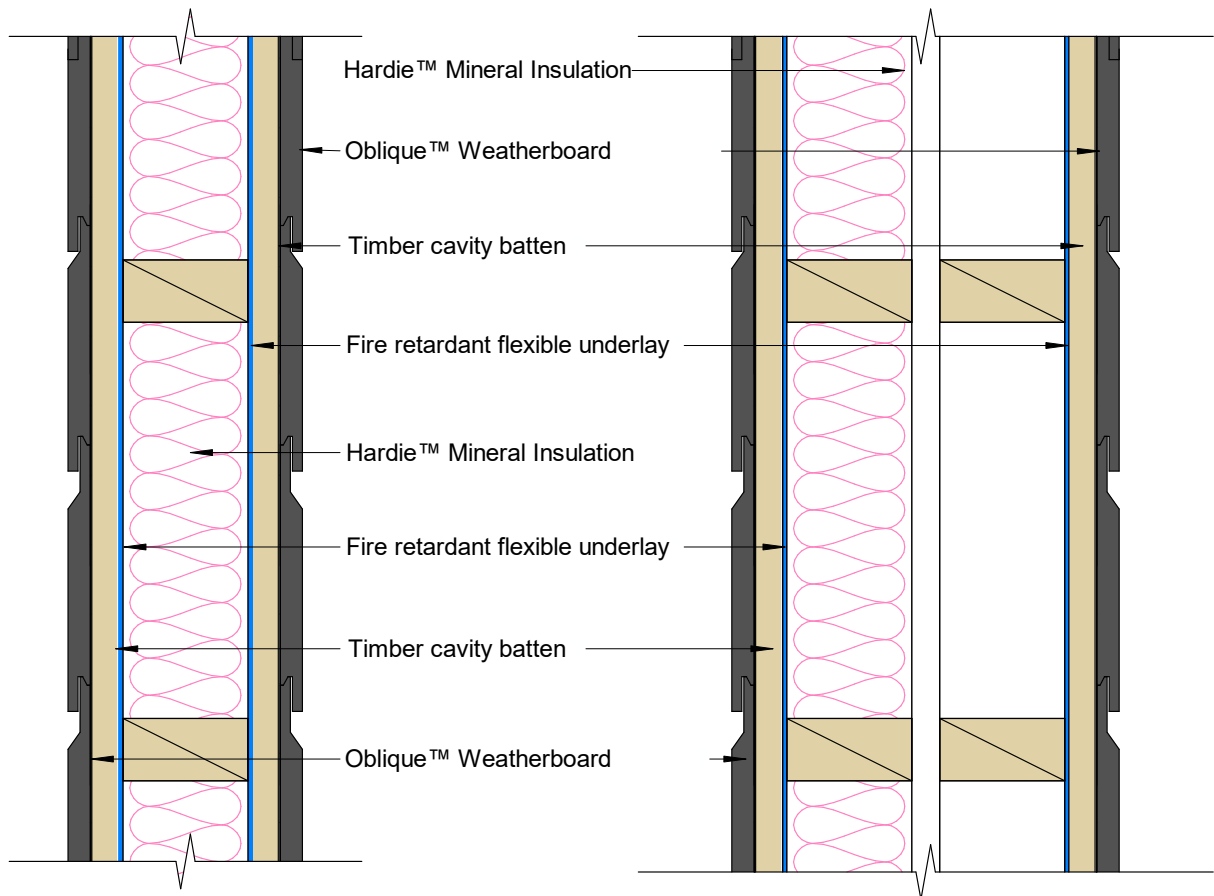


**JHETOO60h****Fire Resistance** 60/60/60**Under 10m****Cladding** Oblique™ Weatherboard - Horizontal**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum**Insulation** Hardie™ Mineral Insulation**Cavity Batten** Timber cavity batten nominal 20mm**Underlay** A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used

**Cladding Fixing** **200mm wide weatherboard:**  
65 x 2.87mm D-Head or round head nail to stud

**300mm wide weatherboard:**  
Two nails per stud, 65 x 2.87mm D-Head or round head nail

For further information refer to Oblique™ Weatherboard horizontal installation technical specification





**JHETOO60h****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone****Cladding** Oblique™ Weatherboard - Horizontal

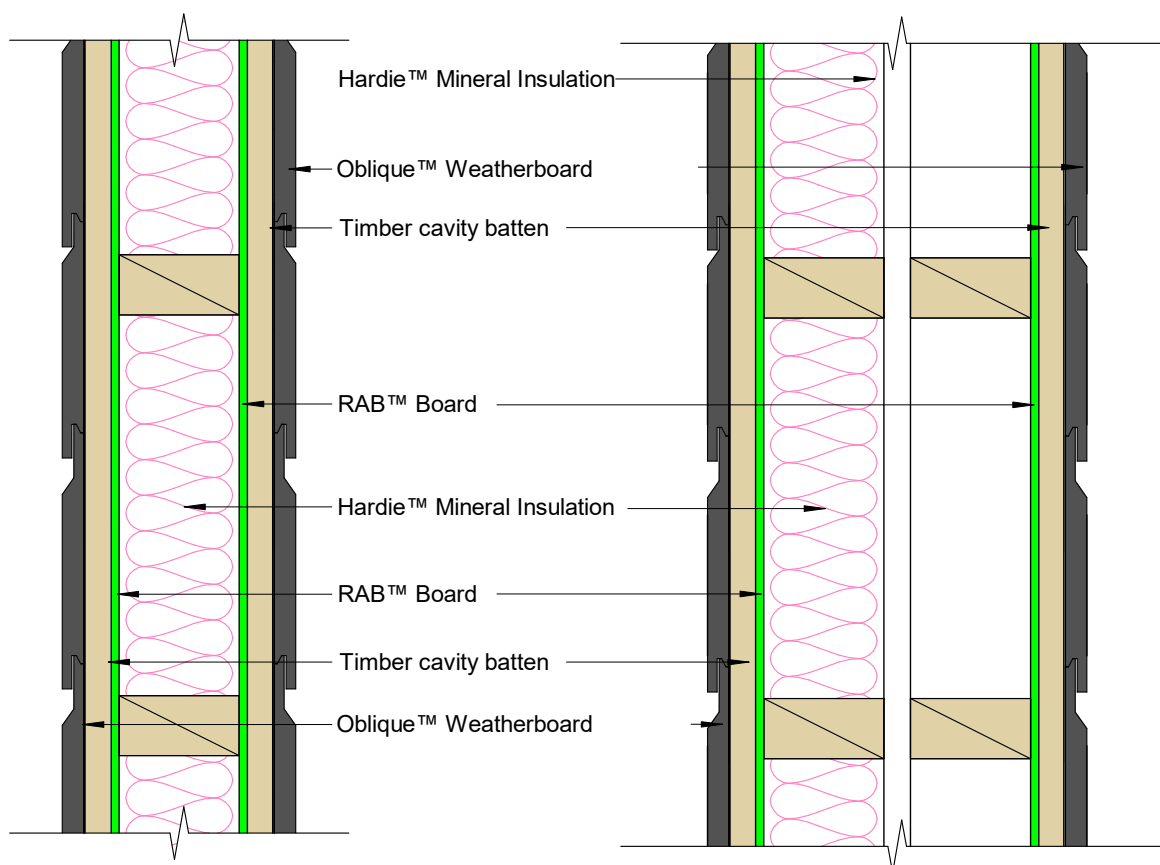
**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum

**Insulation** Hardie™ Mineral Insulation**Cavity Batten** Timber cavity batten nominal 20mm**Underlay** RAB™ Board - Both sides of framing

**Cladding Fixing** **200mm wide weatherboard:**  
75 x 3.06mm D-Head or round head nail to stud  
**300mm wide weatherboard:**  
Two nails per stud, 75 x 3.06mm D-Head or round head nail

**RAB™ Board Fixing** RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing  
RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing  
Fixing to be 12mm from sheet edges

No cladding required for wall applications enclosed within the roof space  
For further information refer to Oblique™ Weatherboard horizontal installation technical specification



## JHETOO60v

Fire Resistance 60/60/60

Under 10m

**Cladding** Oblique™ Weatherboard - Vertical

**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum

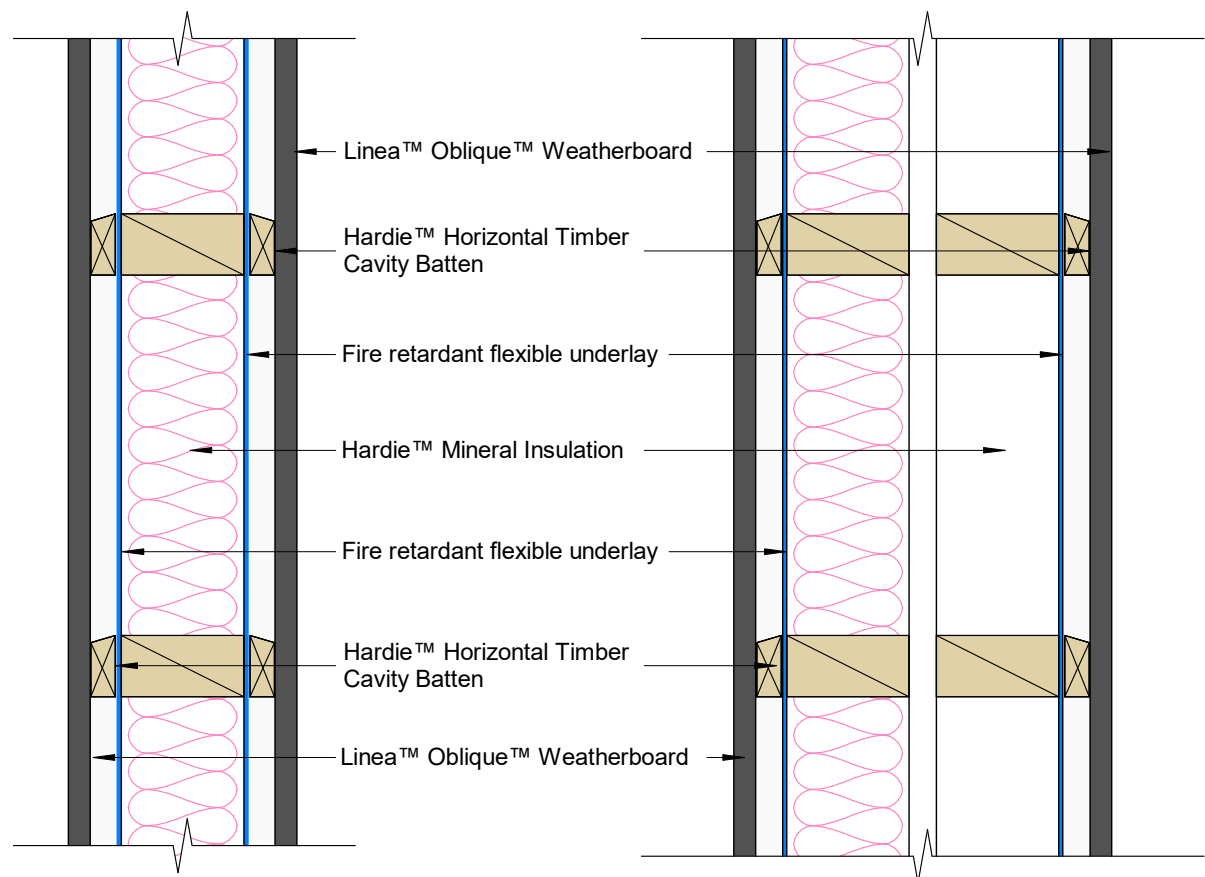
**Insulation** Hardie™ Mineral Insulation

**Cavity Batten** Hardie™ horizontal timber cavity batten 20mm

**Underlay** A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used

**Cladding Fixing** **200mm wide weatherboard:**  
65 x 2.87mm D-Head or round head nail to nog  
**300mm wide weatherboard:**  
Two nails per nog, 65 x 2.87mm D-Head or round head nail

For further information refer to Oblique™ Weatherboard vertical installation technical specification



**JHETOO60v****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone****Cladding** Oblique™ Weatherboard - Vertical

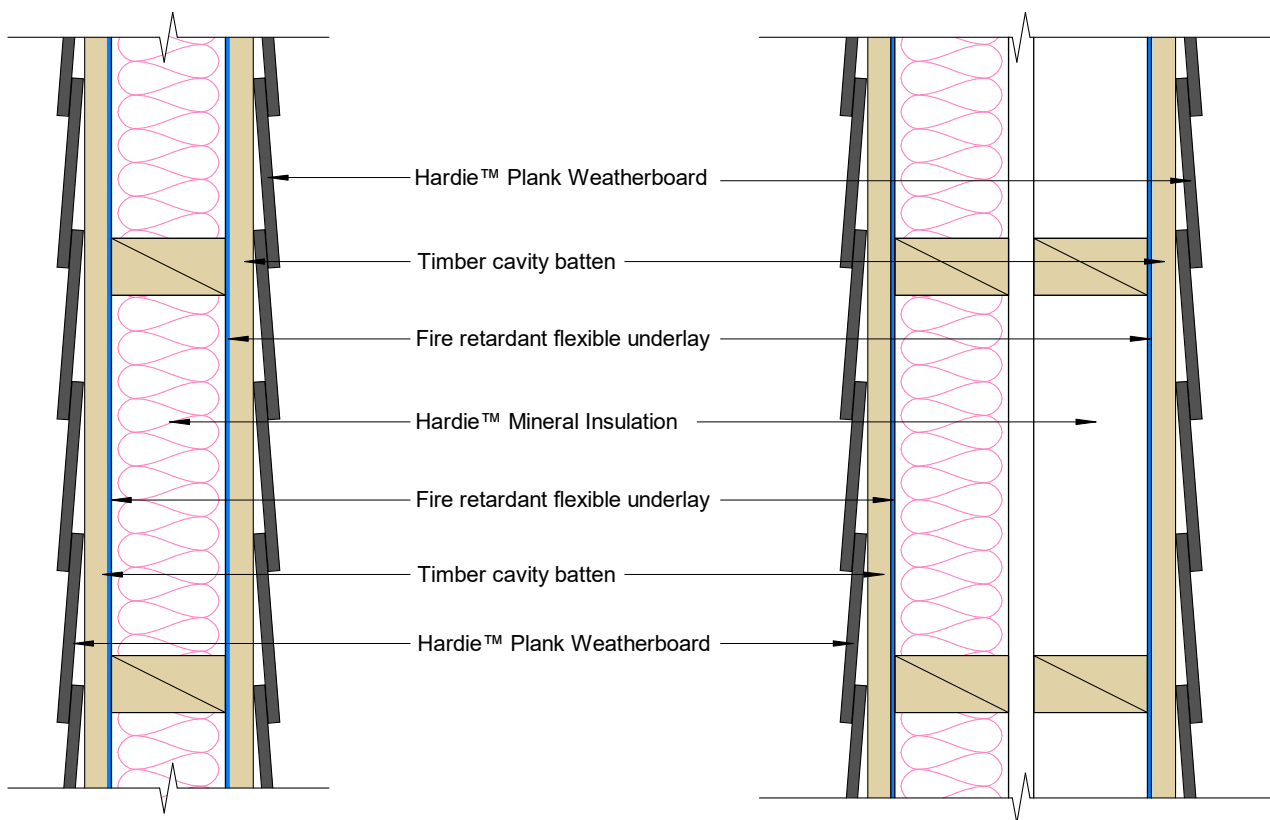
**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum

**Insulation** Hardie™ Mineral Insulation**Cavity Batten** Hardie™ horizontal timber cavity batten 20mm**Underlay** RAB™ Board - Both sides of framing

**Cladding Fixing** **200mm wide weatherboard:**  
75 x 3.06mm D-Head or round head nail to nog  
**300mm wide weatherboard:**  
Two nails per nog, 75 x 3.06mm D-Head or round head nail

**RAB™ Board Fixing** RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing  
RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing  
Fixing to be 12mm from sheet edges

No cladding required for wall applications enclosed within the roof space  
For further information refer to Oblique™ Weatherboard vertical installation technical specification



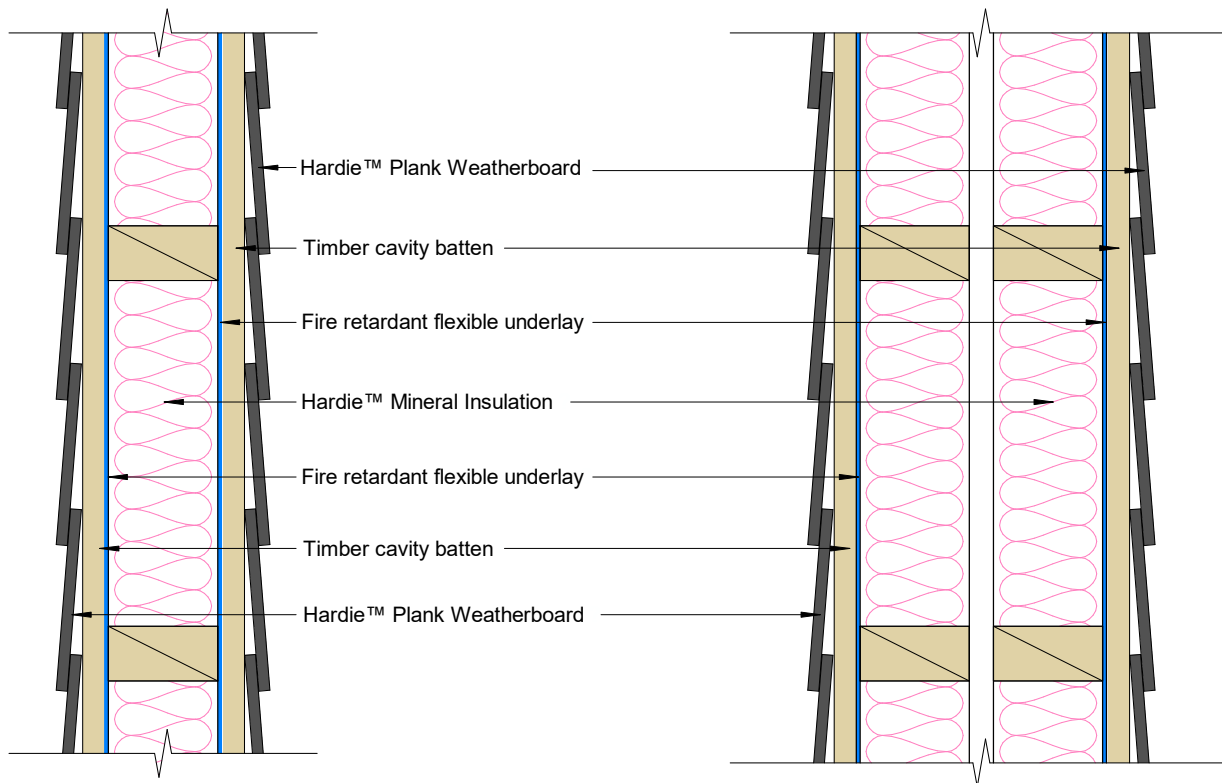
## JHETWW60

Fire Resistance 60/60/60

Under 10m

<b>Cladding</b>	Hardie™ Plank Weatherboard		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Cavity Fix:</b> Face fixed with 75 x 3.15mm fibre cement nail to stud		

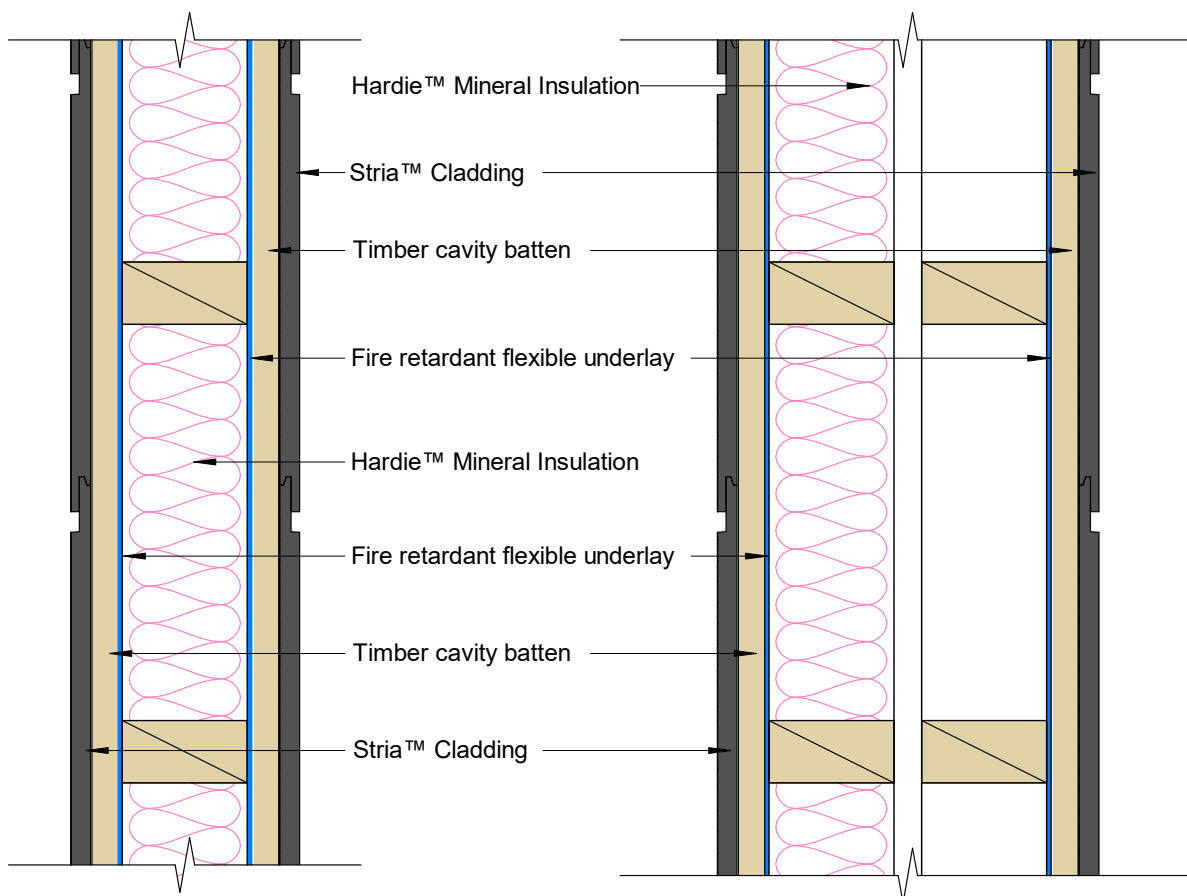
For further information refer to Hardie™ Plank Weatherboard technical specification



**JHETSS60h****Fire Resistance** 60/60/60**Under 10m**

<b>Cladding</b>	Stria™ Cladding - Horizontal		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to stud		

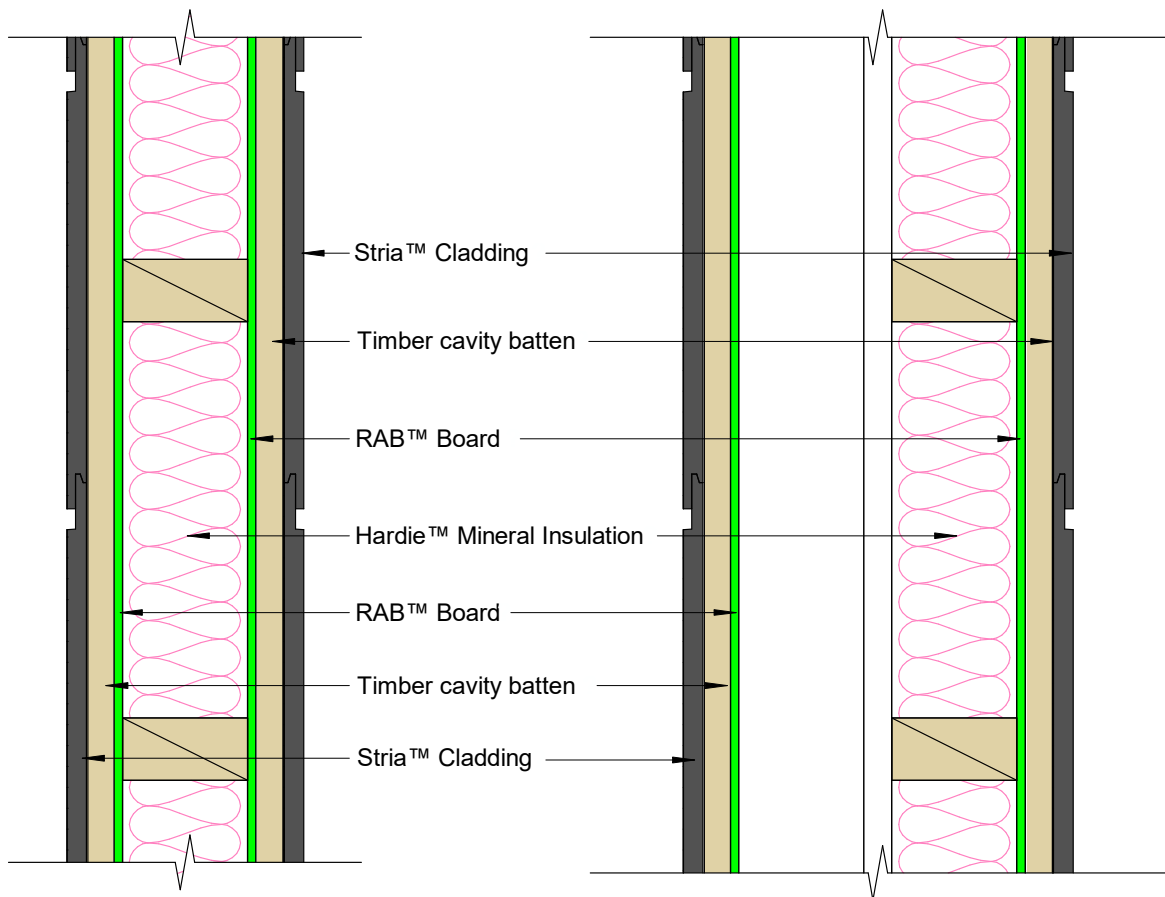
For further information refer to Stria™ Cladding timber cavity batten installation technical specification



**JHETSS60h****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone**

<b>Cladding</b>	Stria™ Cladding - Horizontal	
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b> Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b> RAB™ Board - Both sides of framing
<b>Cladding Fixing</b>	75 x 3.06mm D-Head or round head nail to stud	
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges	

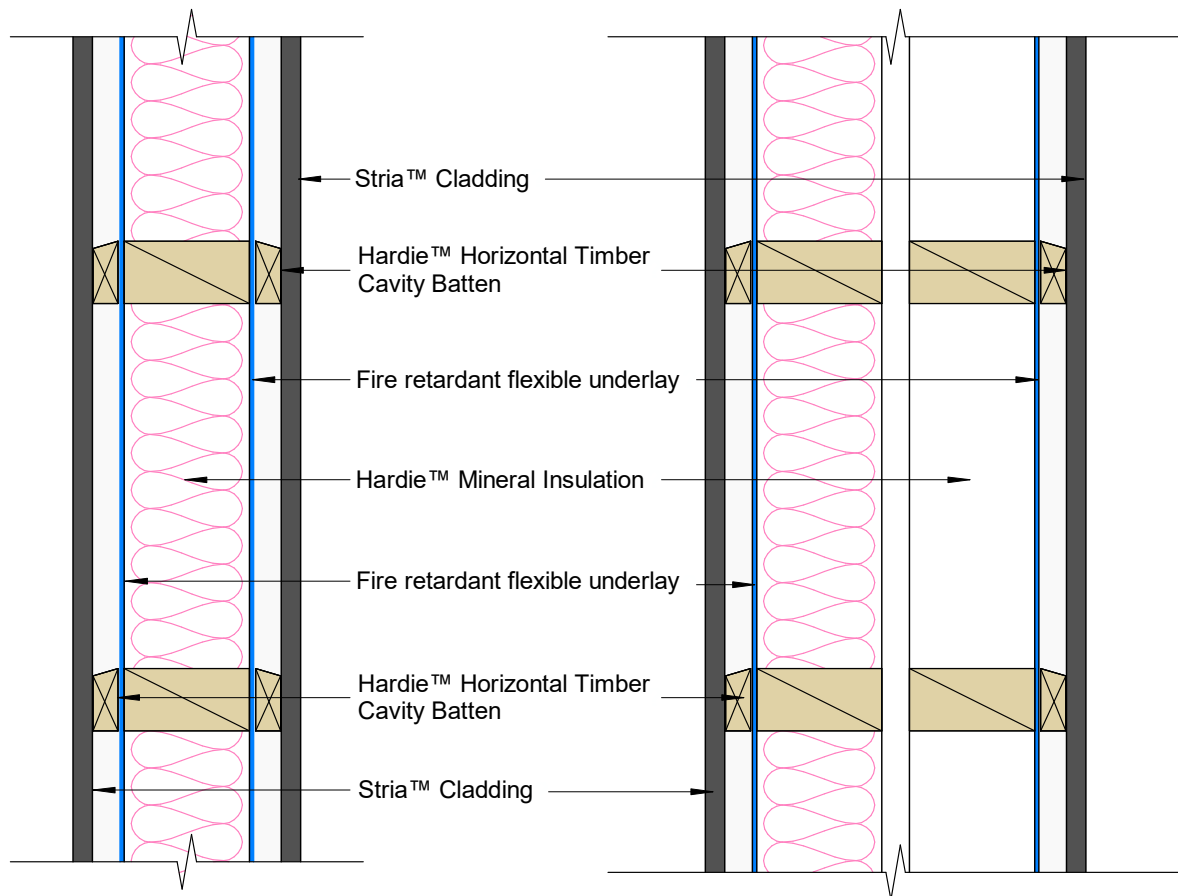
No cladding required for wall applications enclosed within the roof space  
For further information refer to Stria™ Cladding timber cavity batten installation technical specification



**JHETSS60v****Fire Resistance** 60/60/60**Under 10m**

<b>Cladding</b>	Stria™ Cladding - Vertical		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	65 x 2.87mm D-Head or round head nail to nog		

For further information refer to Stria™ Cladding vertical installation technical specification

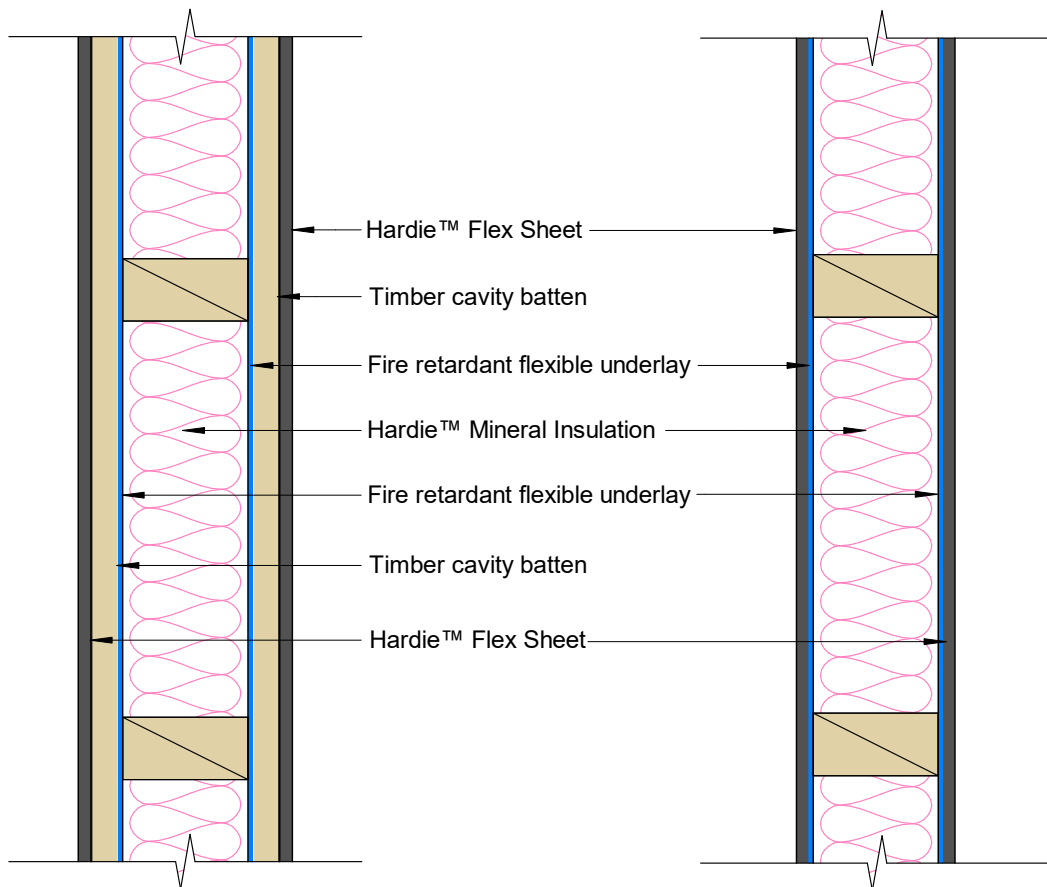




**JHETSS60v****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone**

<b>Cladding</b>	Stria™ Cladding - Vertical		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 600mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Hardie™ horizontal timber cavity batten 20mm	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>Cladding Fixing</b>	75 x 3.06mm D-Head or round head nail to nog		
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

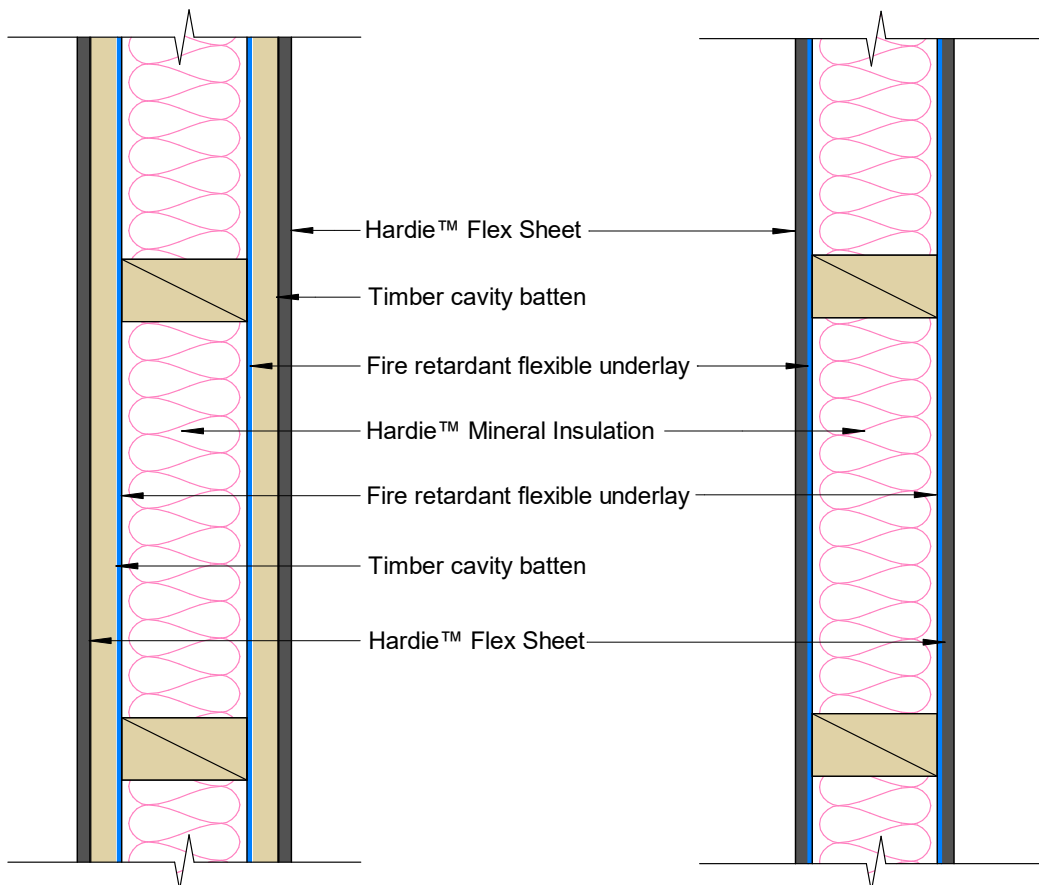
No cladding required for wall applications enclosed within the roof space  
For further information refer to Stria™ Cladding vertical installation technical specification



**JHETFF60****Fire Resistance** 60/60/60**Under 10m**

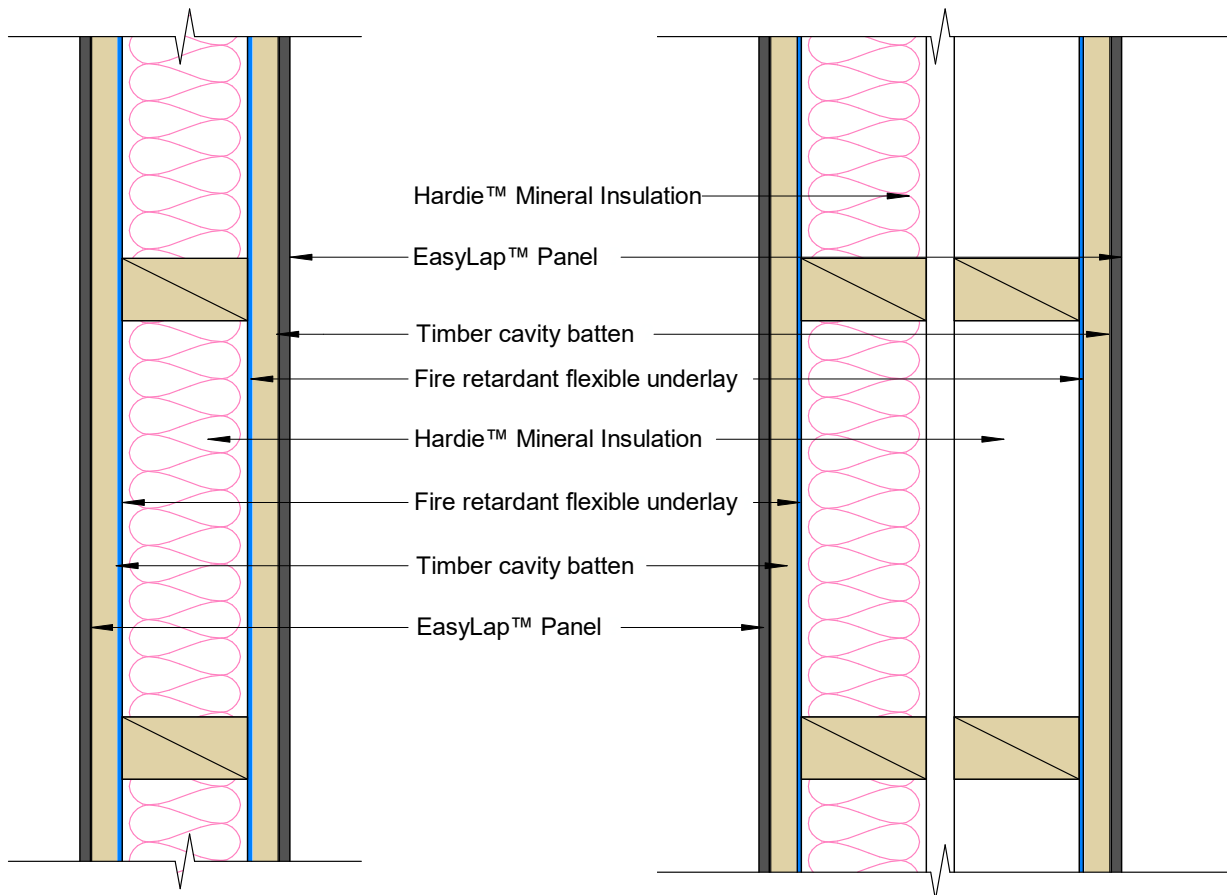
<b>Cladding</b>	Hardie™ Flex Sheet		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 40 x 2.8mm fibre cement nail to stud at 150mm centres to entire frame <b>Cavity Fix:</b> 60 x 2.8mm fibre cement nail to stud at 150mm centres to entire frame		

For further information refer to Hardie™ Flex Sheet technical specification



**JHETEE60****Fire Resistance** 60/60/60**Under 10m****Cladding** EasyLap™ Panel**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum**Cavity Batten** Timber cavity batten nominal 20mm**Insulation** Hardie™ Mineral Insulation**Underlay** A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used**Cladding Fixing** 60 x 2.8mm round head nail at 150mm centres to entire frame

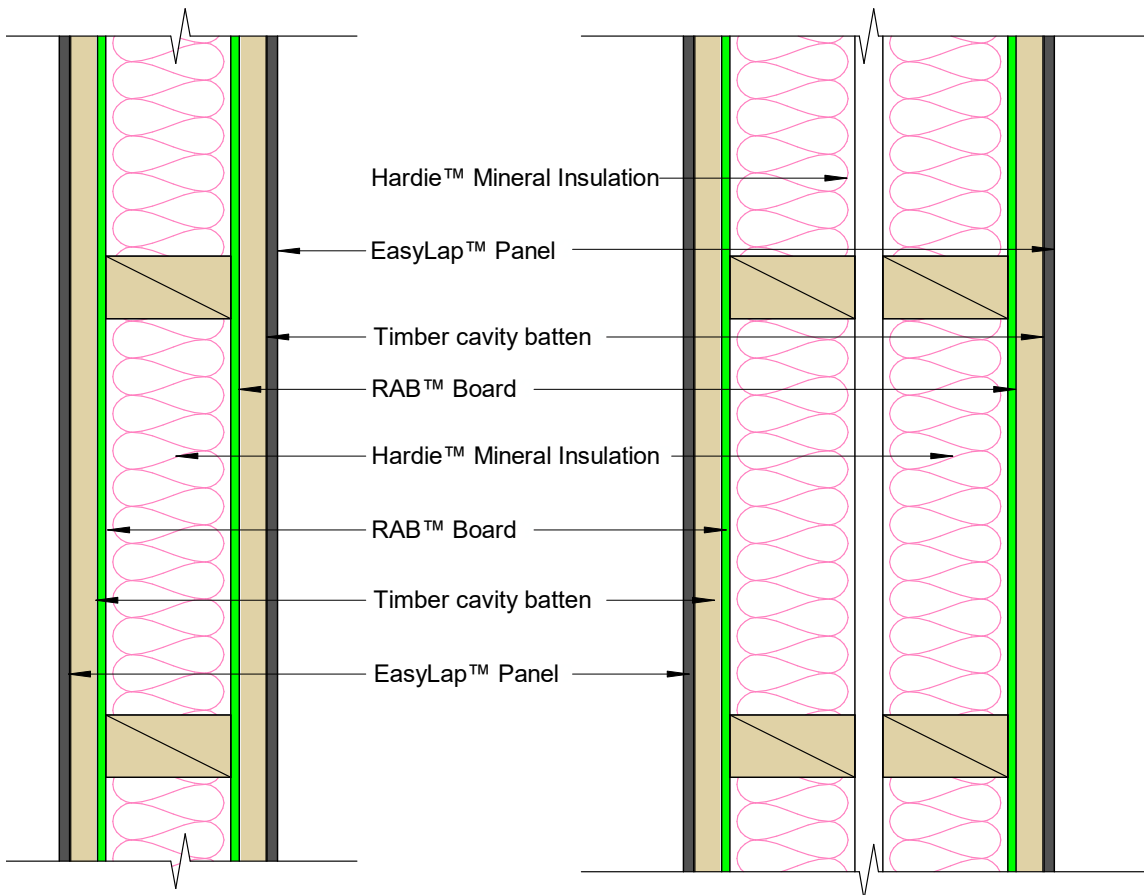
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETEE60****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone**

<b>Cladding</b>	EasyLap™ Panel		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>Cladding Fixing</b>	75 x 3.06mm round head nail at 150mm centres to entire frame		
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

No cladding required for wall applications enclosed within the roof space  
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



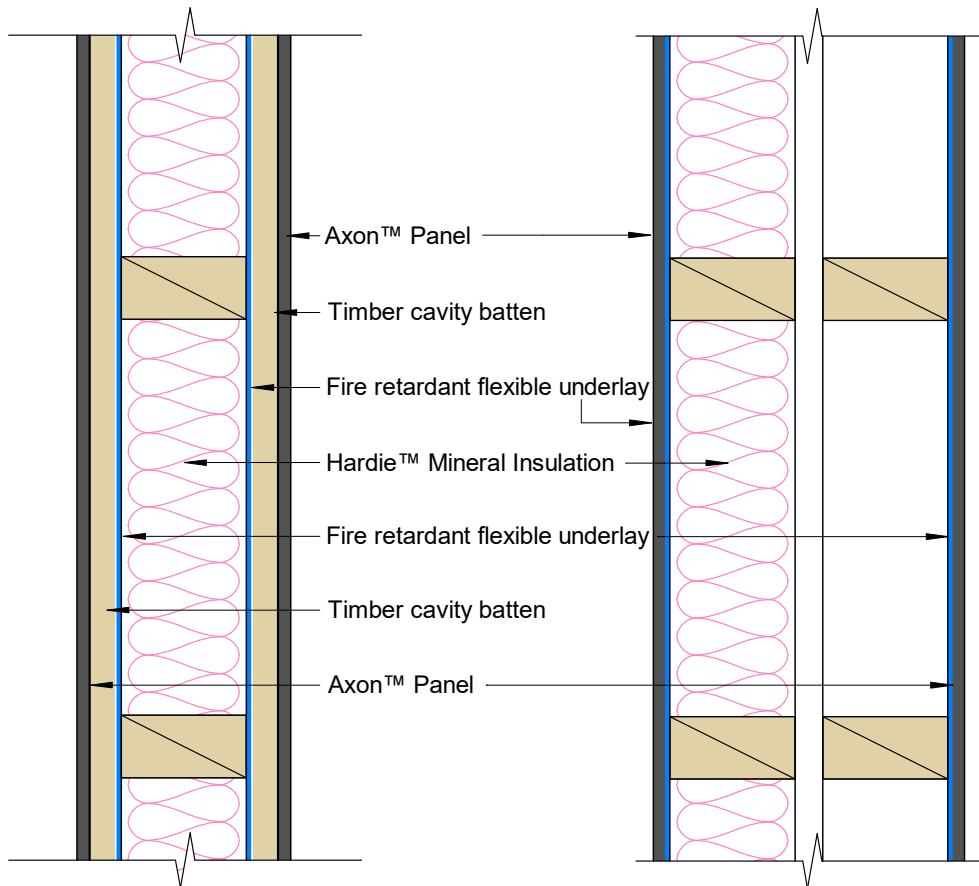
## JHETAA60

Fire Resistance 60/60/60

Under 10m

<b>Cladding</b>	Axon™ Panel		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
<b>Cladding Fixing</b>	<b>Direct Fix:</b> 40 x 2.8mm round head nail at 150mm centres to entire frame <b>Cavity Fix:</b> 60 x 3.15mm round head nail at 150mm centres to entire frame		

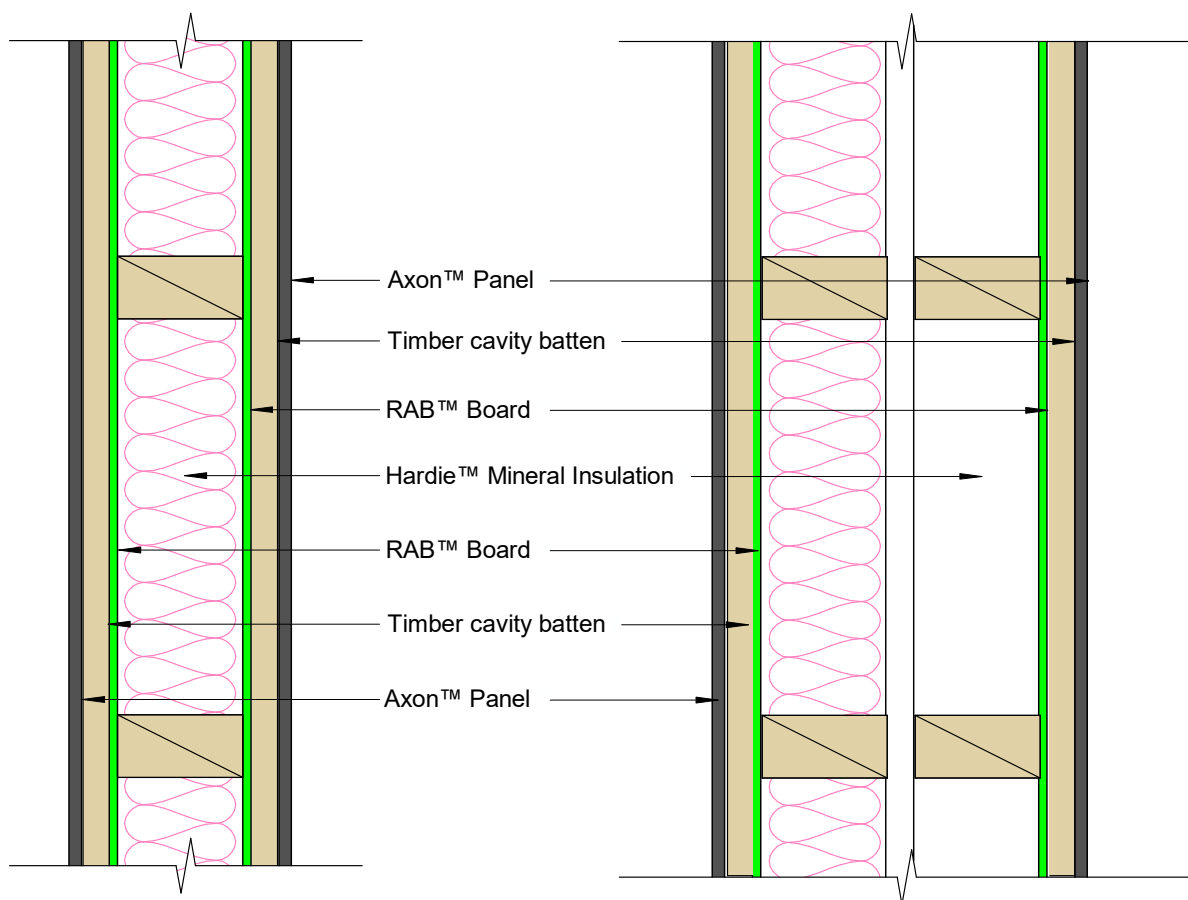
For further information refer to Axon™ Panel and EasyLap™ Panel Timber Cavity Batten technical specification



**JHETAA60****Fire Resistance** 60/60/60**Over 10m or EH Wind Zone**

<b>Cladding</b>	Axon™ Panel		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	Timber cavity batten nominal 20mm	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>Cladding Fixing</b>	5 x 3.06mm round head nail to 150mm centres to entire frame		
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 200mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 200mm centres to entire framing Fixing to be 12mm from sheet edges		

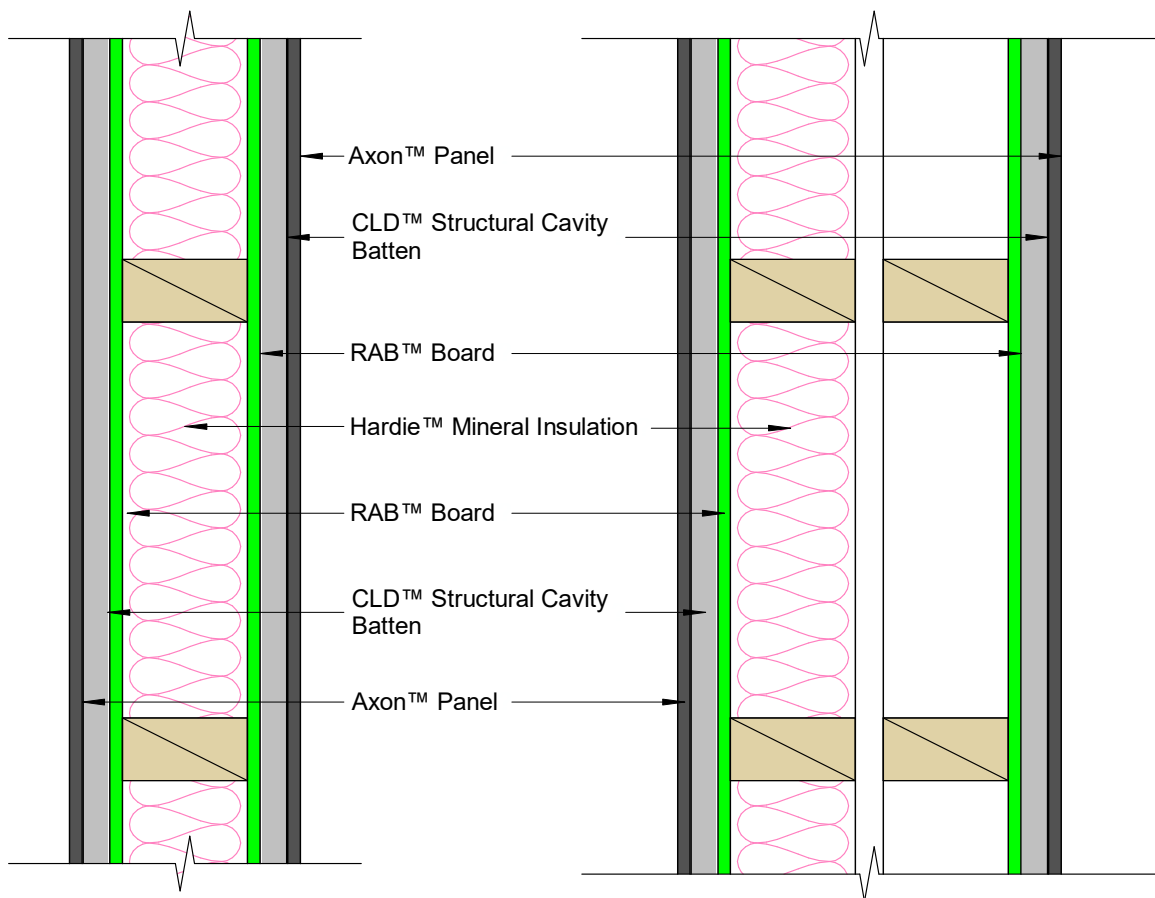
No cladding required for wall applications enclosed within the roof space  
For further information refer to Axon™ Panel and EasyLap Panel™ Timber Cavity Batten technical specification



**JHETRR60-A****Fire Resistance** 60/60/60

<b>Cladding</b>	Axon™ Panel		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		
<b>Cladding Fixing</b>	As per Axon™ Panel and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual

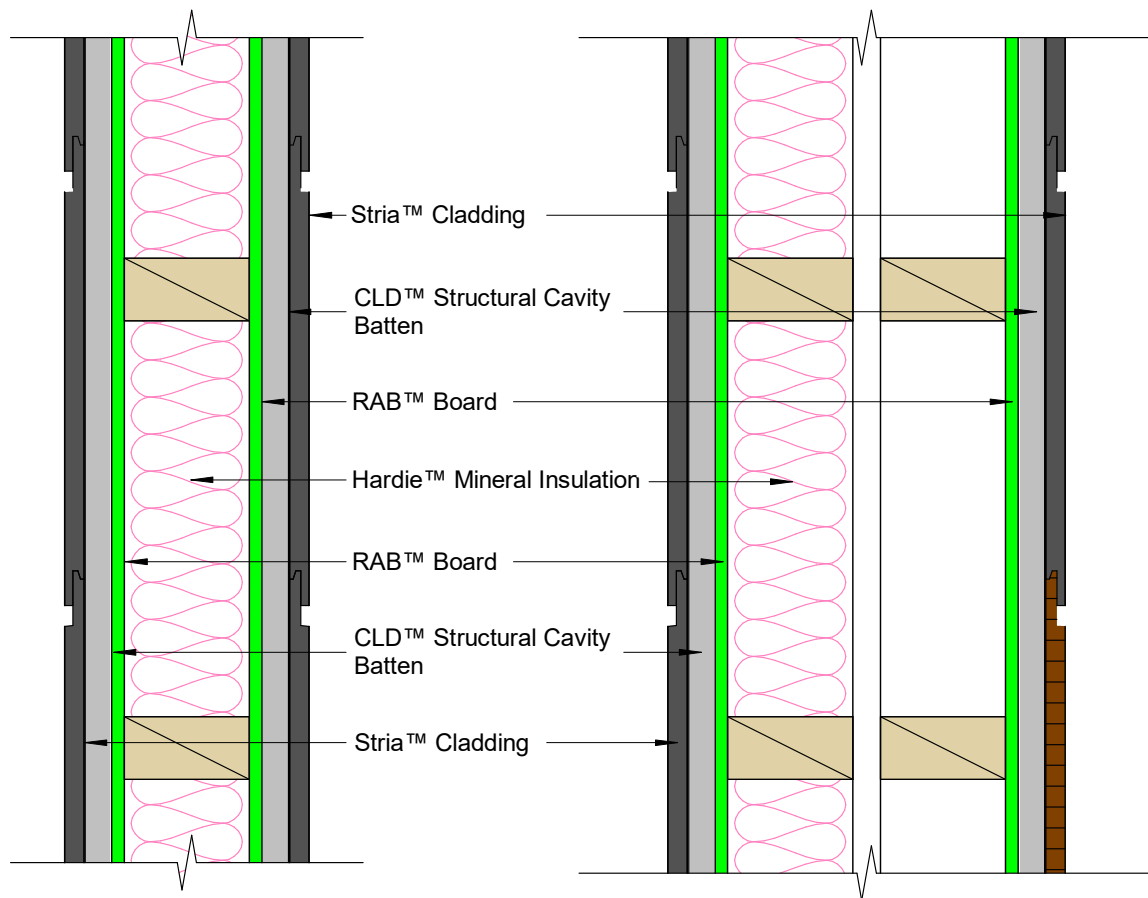




**JHETRR60-S****Fire Resistance** 30/30/30

<b>Cladding</b>	Stria™ Cladding		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Cavity Batten</b>	70 x 19mm Hardie™ CLD™ Structural Cavity Batten	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		
<b>Cladding Fixing</b>	As per Stria™ Cladding Hardie™ CLD™ Structural Cavity Batten technical specification		

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



## JHETRR60-E

Fire Resistance 60/60/60

**Cladding** EasyLap™ Panel

**Framing** Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum

**Insulation** Hardie™ Mineral Insulation

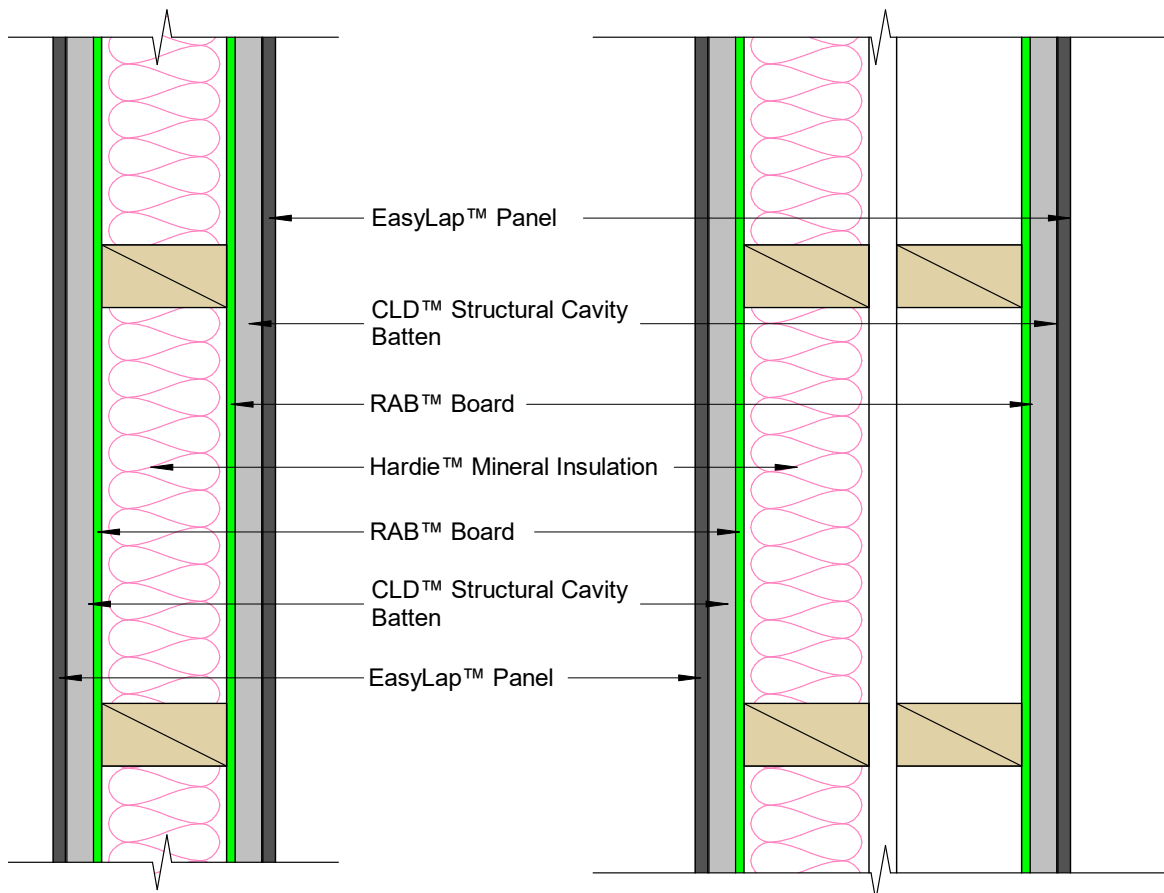
**Cavity Batten** Hardie™ CLD™ Structural Cavity Batten

**Underlay** RAB™ Board - Both sides of framing

**RAB™ Board Fixing** 6mm RAB™ Board: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing  
9mm RAB™ Board: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing  
Fixing to be 12mm from sheet edges

**Cladding Fixing** As per Axon™ Panel and EasyLap™ Panel Direct Fix and Fixed to CLD™ Structural Cavity Batten technical specification

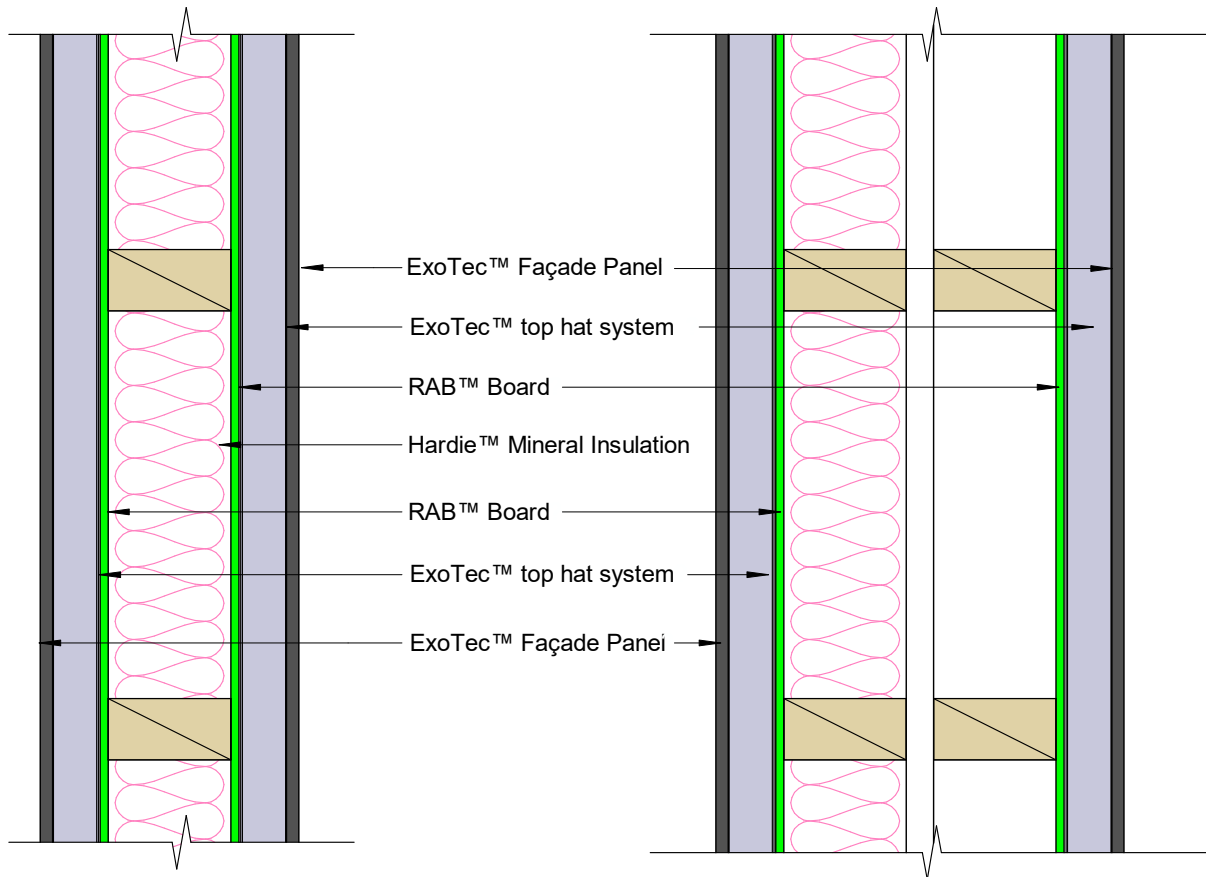
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETRR60-X****Fire Resistance** 60/60/60

<b>Cladding</b>	ExoTec™ Facade Panel - Top hat system		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum		
	<b>Insulation</b>	Hardie™ Mineral Insulation	
<b>Cavity Batten</b>	ExoTec™ top hat system	<b>Underlay</b>	RAB™ Board - Both sides of framing
<b>RAB™ Board Fixing</b>	6mm RAB™ Board: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing 9mm RAB™ Board: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		
<b>Cladding Fixing</b>	As per ExoTec™ Facade Panel top hat technical specification		

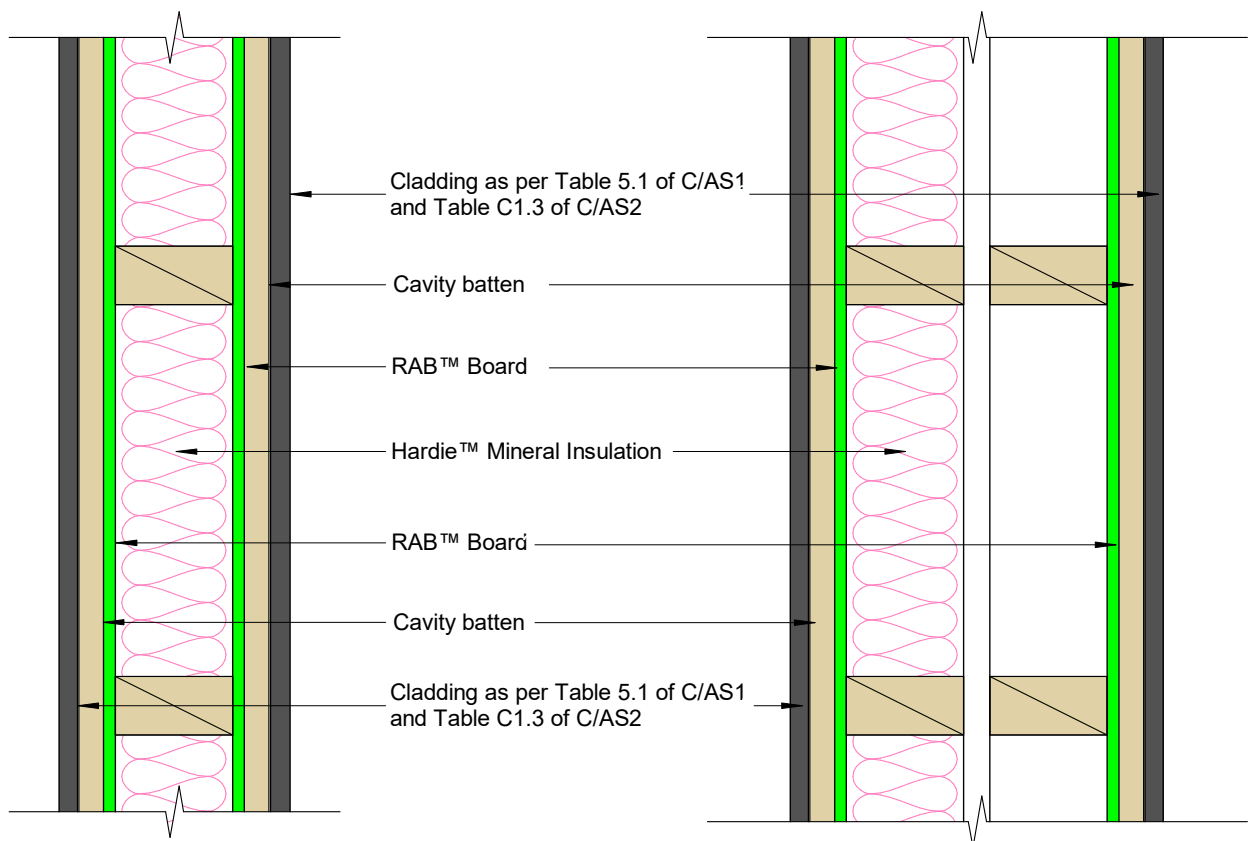
No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



**JHETRR60-N****Fire Resistance** 60/60/60

<b>Cladding</b>	Cladding system as per Table 5.1 of C/AS1 and Table C1.3 of C/AS2	
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b> Hardie™ Mineral Insulation
<b>Cavity Batten</b>	As per cladding manufacturer technical specification	<b>Underlay</b> RAB™ Board - Both sides of framing
<b>RAB™ Board Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges	
<b>Cladding Fixing</b>	As per cladding manufacturer technical specification	

No cladding required for wall applications enclosed within the roof space  
For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual



# Internal Walls Timber Frame

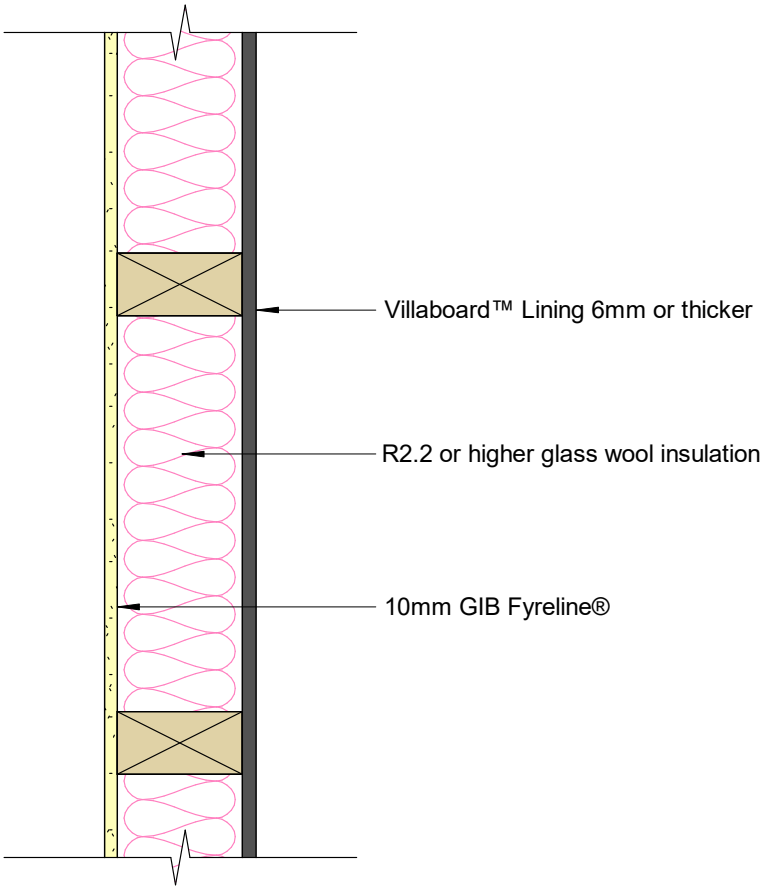
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**30 Minute Fire Rated System**

**60 Minute Fire Rated System**

JHITGV30		Fire Resistance 30/30/30		STC 42	
Lining	Villaboard™ Lining 6 or 9mm			Lining	10mm GIB Fyreline®
Framing	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum			Insulation	Glass wool insulation 90mm thick, R2.2 or higher.
Lining Fixing	Fix Villaboard™ Lining with: 30mm x 6g Villadrive™ screws or 40 x 2.8mm fibre cement nails at 150mm centres			Lining Fixing	Fix GIB Fyreline® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Villaboard™ Lining technical specification



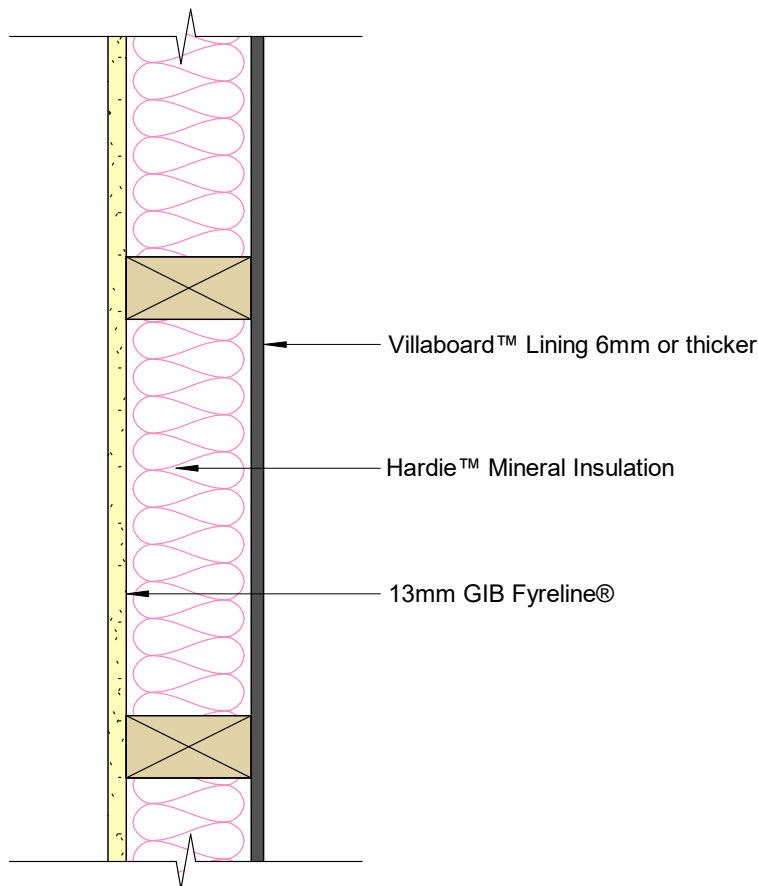
## JHITGV60

**Fire Resistance** 60/60/60

**STC** 42

<b>Lining</b>	Villaboard™ Lining 6 or 9mm	<b>Lining</b>	13mm GIB Fyrelite®
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	<b>Insulation</b>	Hardie™ Mineral Insulation
<b>Lining Fixing</b>	Fix Villaboard™ Lining with: 30mm x 6g Villadribe™ screws or 40 x 2.8mm fibre cement nails at 150mm centres	<b>Lining Fixing</b>	Fix GIB Fyrelite® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to Villaboard™ Lining technical specification



## JHITVV60

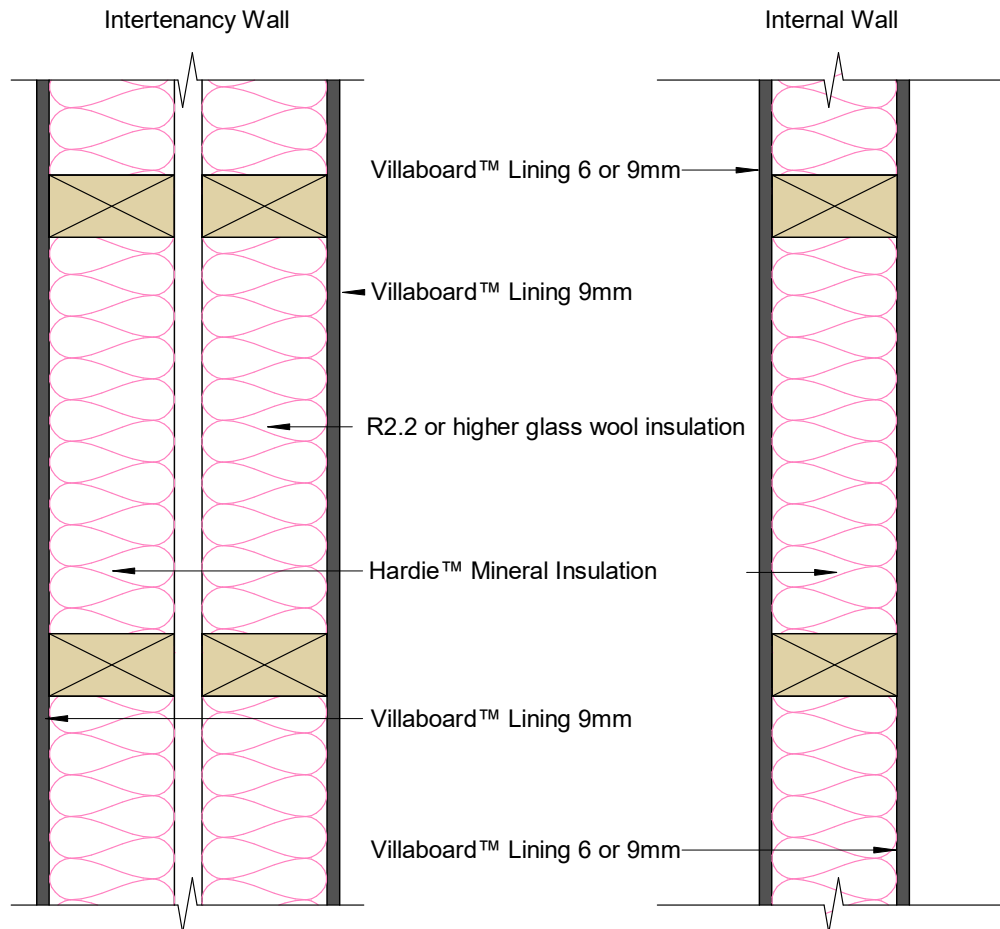
Fire Resistance 60/60/60

STC 55\*

<b>Lining</b>	Villaboard™ Lining 6 and 9mm	
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum. For intertenancy walls double frame with 25mm gap between frames.	<b>Insulation</b> 1 layer of Hardie™ Mineral Insulation 1 layer of Glass wool insulation 90mm thick, R2.2 or higher
<b>Lining Fixing</b>	Fix Villaboard™ Lining with: 30mm x 6g Villadrive™ screws or 40 x 2.8mm fibre cement nails at 150mm centres	

\*STC value for IT wall

For further information refer to Villaboard™ Lining technical specification





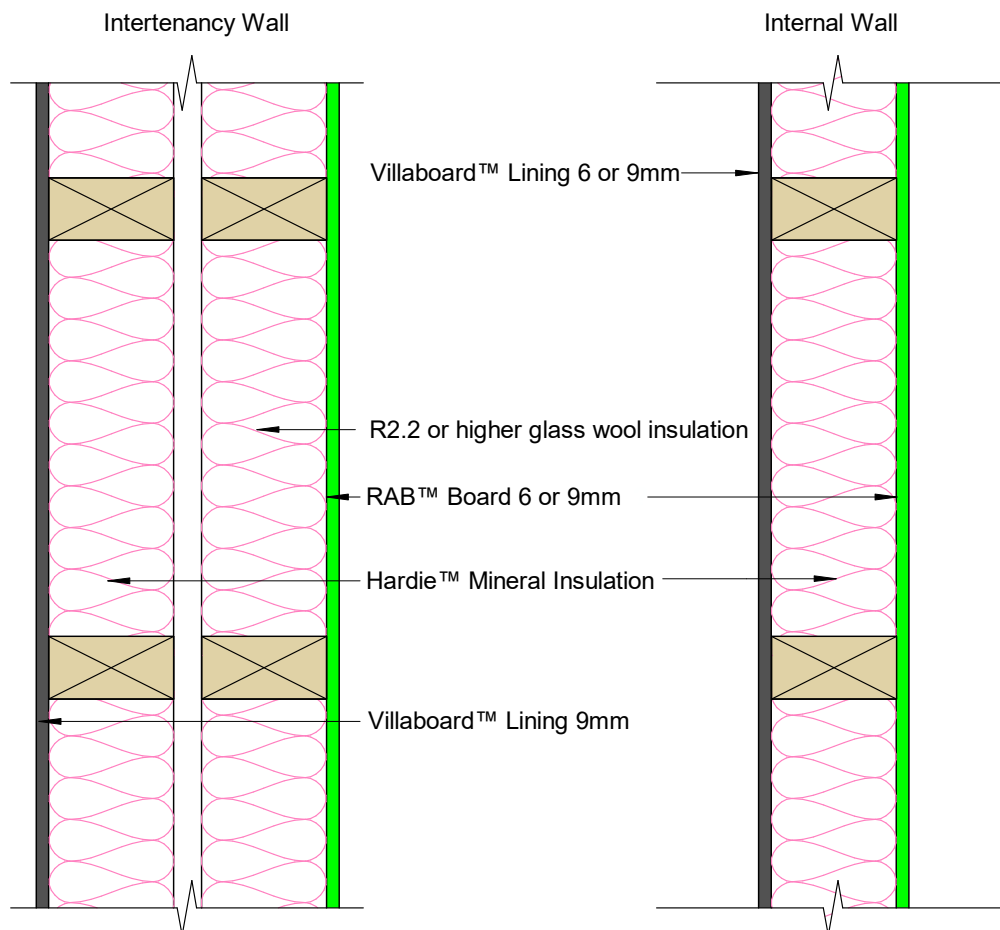
**JHITVR60****Fire Resistance** 60/60/60**STC** 55\*

<b>Lining</b>	Villaboard™ Lining 6 and 9mm		
<b>Framing</b>	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum. For intertenancy walls double frame with 25mm gap between frames.	<b>Underlay</b>	RAB™ Board
<b>Lining Fixing</b>	Villaboard™ : 30mm x 6g Villadrive™ screws or 40 x 2.8mm round head nails at 150mm centres		
<b>RAB™ Fixing</b>	RAB™ Board 6mm: 40 x 2.8mm fibre cement nail at 150mm centres to entire framing RAB™ Board 9mm: 50 x 2.8mm fibre cement nail at 150mm centres to entire framing Fixing to be 12mm from sheet edges		

\*STC value for IT wall

For further information refer to Villaboard™ Lining technical specification

For further information refer to HomeRAB™ Pre-Cladding and RAB™ Board installation manual.



# Internal Floors/Ceilings Timber Frame

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**60 Minute Fire Rated System**

**JHFTGS60****Fire Resistance** 60/60/60**IIC** 33**STC** 46**Ceiling** 16mm GIB Fyrelite®

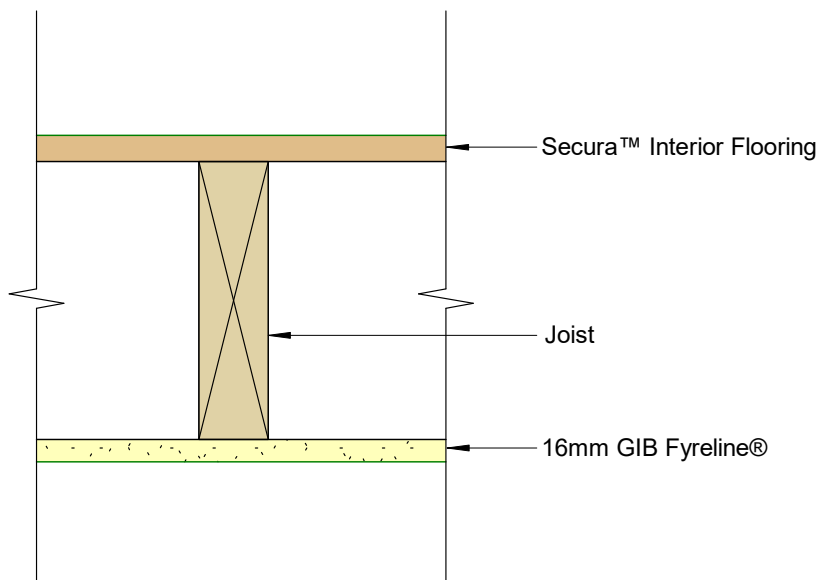
**Joist** Joist to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Joist size 190 x 45mm minimum. Joist spacing 450mm centres maximum. HySPAN and hyJOIST series joists can also be used in accordance with SED, meeting the requirements of AS/NZS 1170.

**Insulation** None**Flooring** Secura™ Interior Flooring

**Secura™ Interior Flooring** 50 x 2.8mm round head nails at 200mm centres  
25mm minimum distance from tongue and groove  
12mm minimum edge distance

**Ceiling** Fix GIB Fyrelite® with 51mm x 7g GIB® Grabber® High Thread Drywall Screws  
150mm centres around the perimeter of each sheet  
200mm centres along each joist and at the centre of each nog  
Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

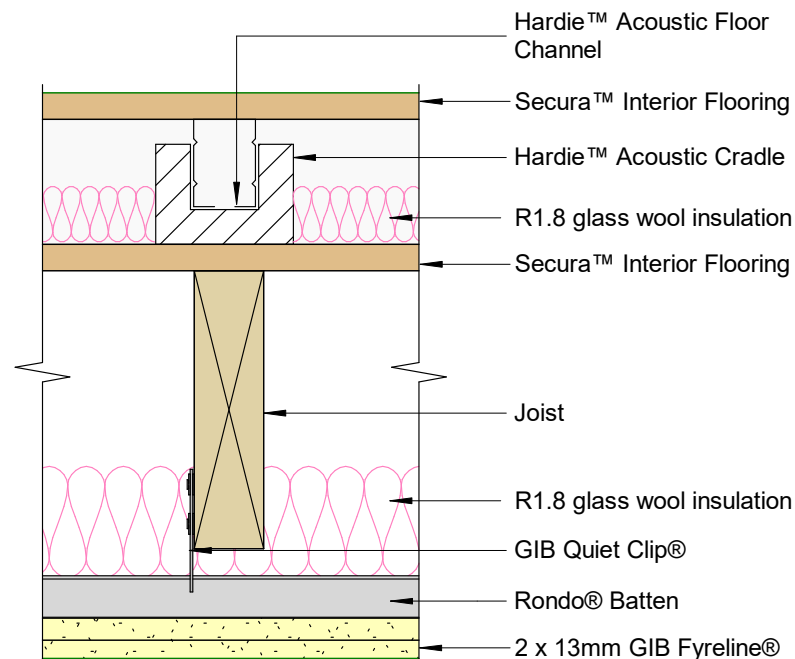
For further information refer to Secura™ Interior Flooring Fire Acoustic Floor System Installation Manual



**JHFTGSS60****Fire Resistance** 60/60/60**IIC** 57**STC** 67

Ceiling	2 x 13mm GIB Fyreline®		
Joist	Joist to be in accordance with NZS 3604 or SED complying with AS/ NZS 1170 and NZS 3603. Joist size 190 x 45mm minimum. Joist spacing 450mm centres maximum. HySPAN and hyJOIST series joists can also be used in accordance with SED, meeting the requirements of AS/NZS 1170.	Insulation	Glass wool insulation 75mm thick minimum
Flooring	Secura™ Interior Flooring		
Secura™ Interior Flooring	<b>First Layer:</b> 50 x 2.8mm round head nails at 200mm centres 25mm minimum distance from tongue and groove 12mm minimum edge distance <b>Second Layer:</b> Hardie™ Acoustic Cradles at 450mm centres. Hardie™ Acoustic Floor Channels at 450mm centres placed over acoustic cradles Second layer of Secura™ Interior Flooring fitted with 40-45mm x 8-10g self embedding steel screws at 200mm centres into Hardie™ Acoustic Floor Channel 25mm minimum distance from tongue and groove 12mm minimum edge distance at short panel edges		
Ceiling	<b>Inner layer:</b> 32mm x 6g GIB® Grabber® Drywall Self Tapping Screws <b>Outer layer:</b> 41mm x 6g GIB® Grabber® Drywall Self Tapping Screws 200mm centres along each batten and at 100mm centres along sheet end butt joints Place fasteners no closer than 12mm to the sheet edges		

For further information refer to Secura™ Interior Flooring Fire Acoustic Floor System Installation Manual



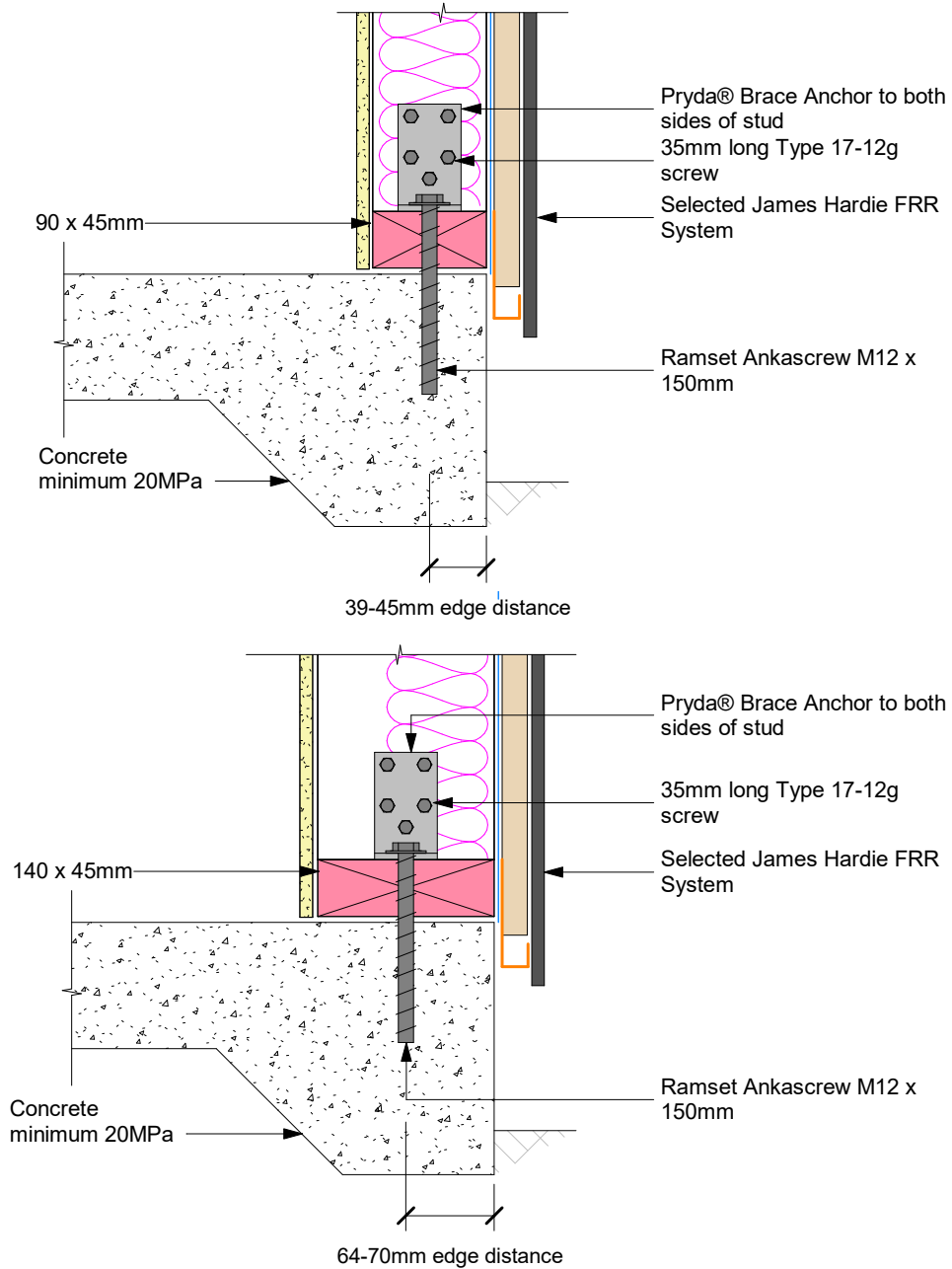
# 6 Construction details

Construction details are available for download at [www.jameshardie.co.nz](http://www.jameshardie.co.nz)

**Table 1**

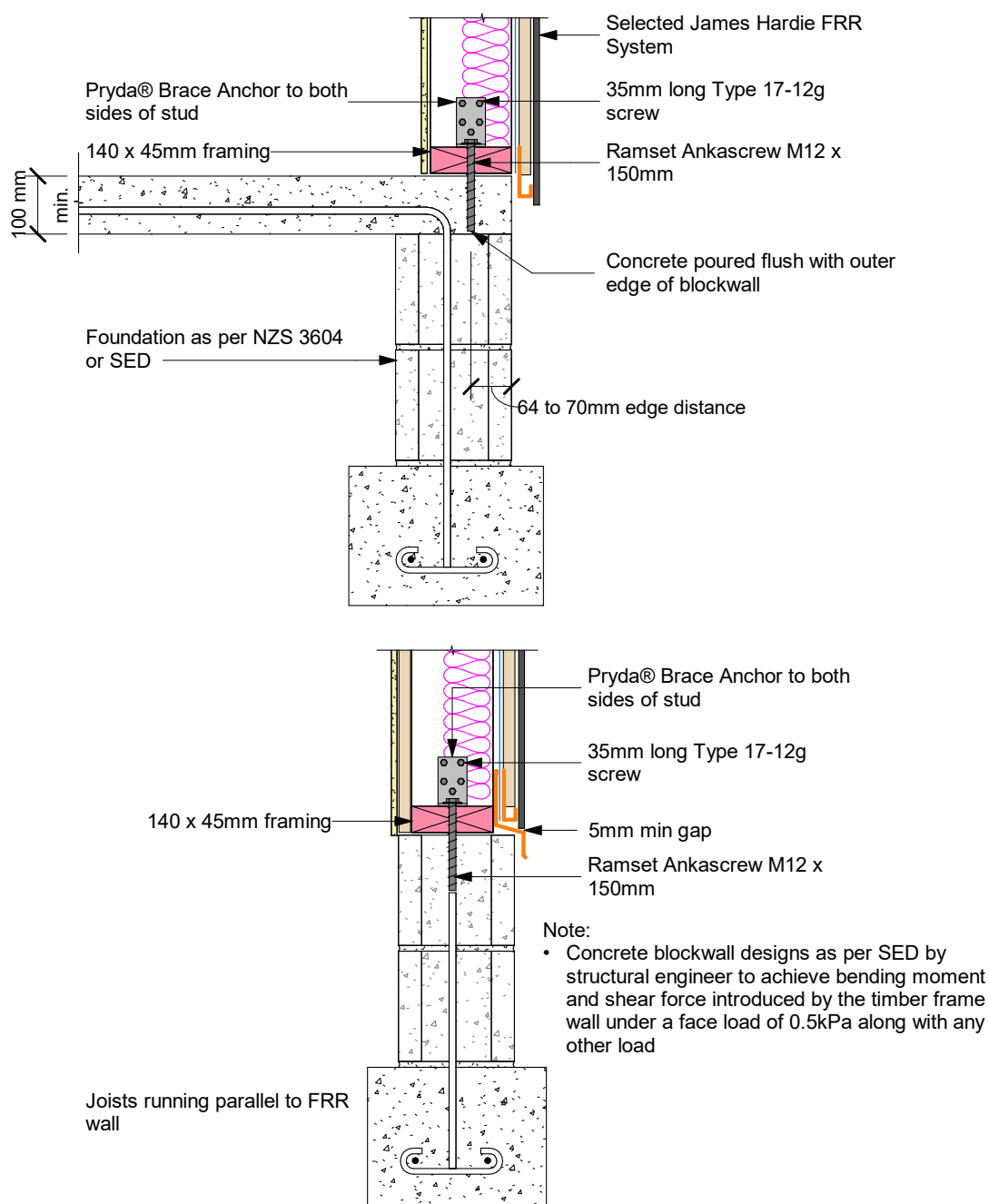
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Figure 1: Post fire stability – Slab on ground foundation



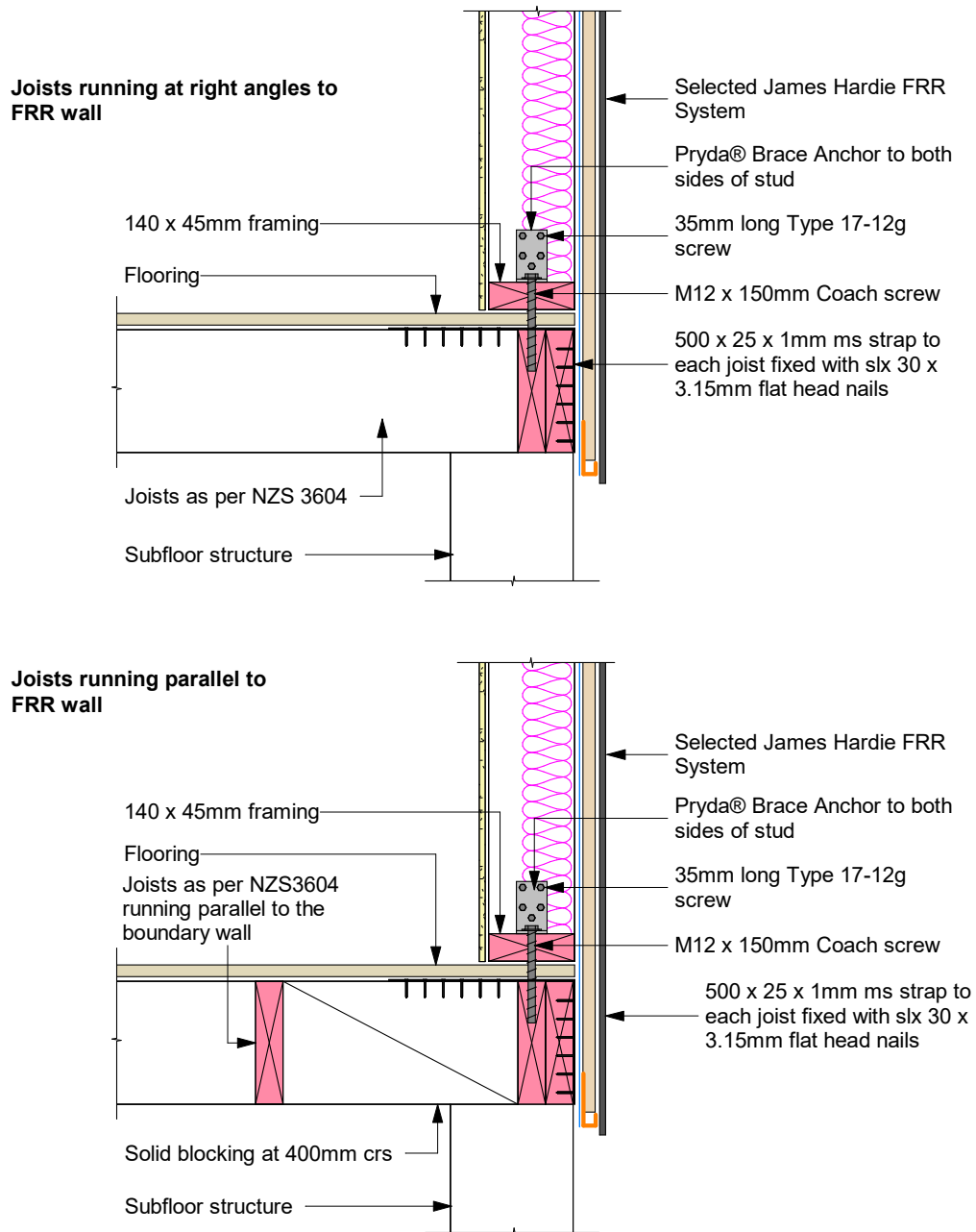
Wall height max (mm)	2400	3000	3000	3700
Stud bottom plate (mm)	90 x 45	90 x 45	140 x 45	140 x 45
Stud spacing max (mm)	400	300	600	400
Nog spacing max (mm)	800	800	800	800
Hold down brackets	Pryda® Brace / GIB Handibrac® Anchor both sides of stud			
For higher stud heights, please refer to James Hardie				

Figure 2: Post fire stability – Blockwall foundation



Wall height max (mm)	3000	3700
Stud bottom plate (mm)	140 x 45	140 x 45
Stud spacing max (mm)	600	400
Nog spacing max (mm)	800	800
Hold down brackets	Pryda® Brace / GIB Handibrac® Anchor both sides of stud	
For higher stud heights, please refer to James Hardie		

Figure 3: Post fire stability – Timber foundation



	Joist parallel to boundary joist	Joist at right angle to boundary joist		
Stud bottom plate size (mm)	140 x 45	140 x 45	140 x 45	140 x 45
Stud spacing max (mm)	600	600	400	300
Nog spacing max (mm)	800	800	800	800
Hold down brackets	Pryda® Brace / GIB Handibrac® Anchor both sides of stud			
Wall height max (mm)	2700	2700	3000	3700
Joist min (mm)	190	190	190	190



Figure 4: Soffit detail

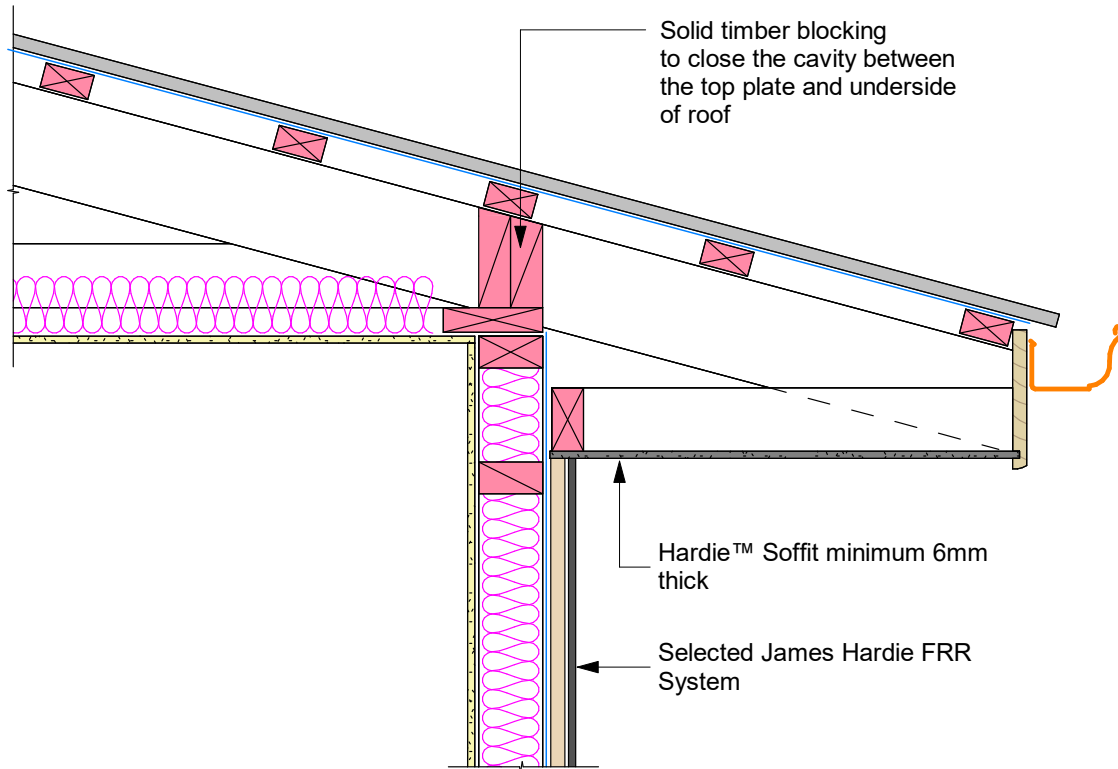


Figure 5: NIL soffit detail

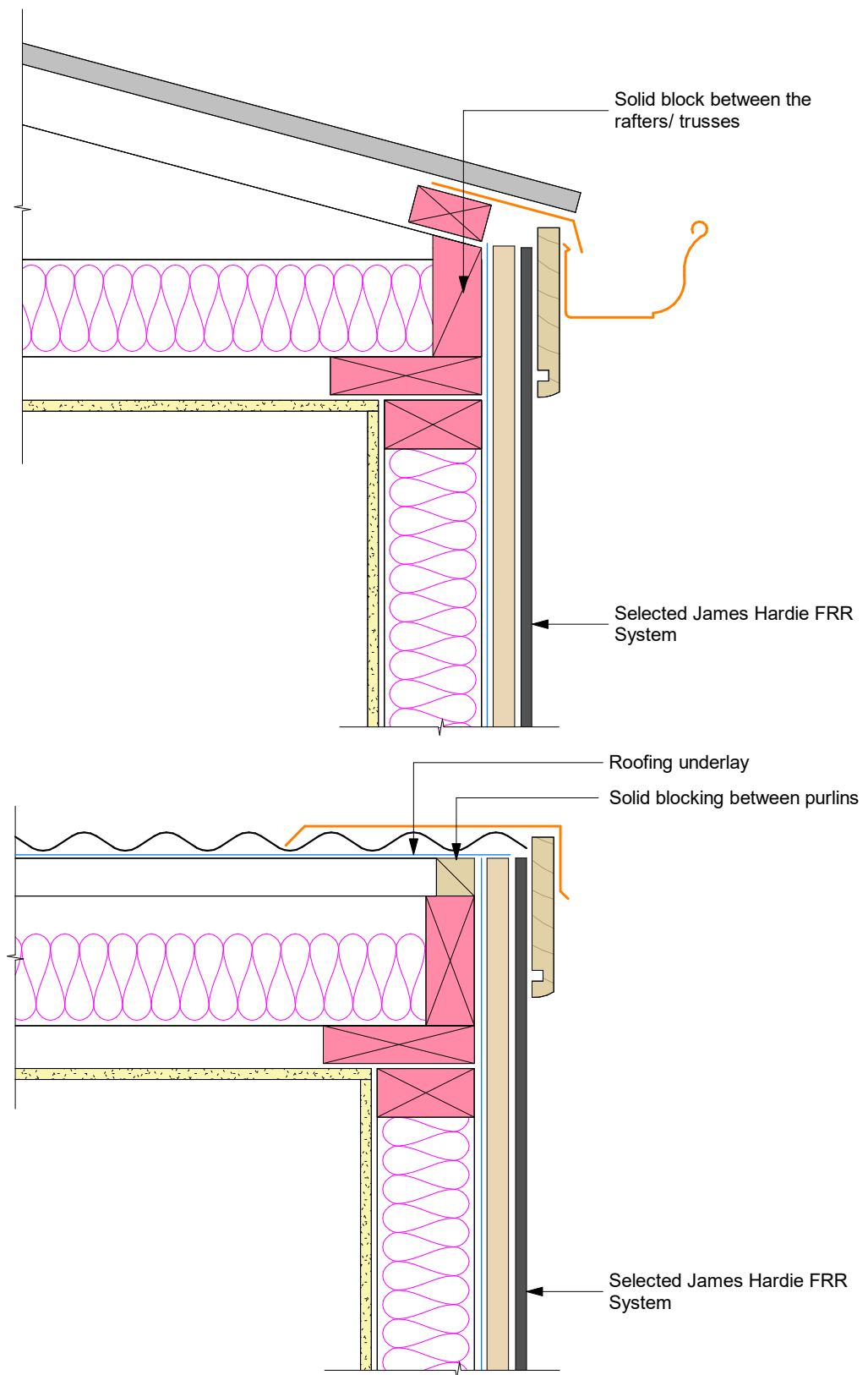


Figure 6: Sub-floor FRR

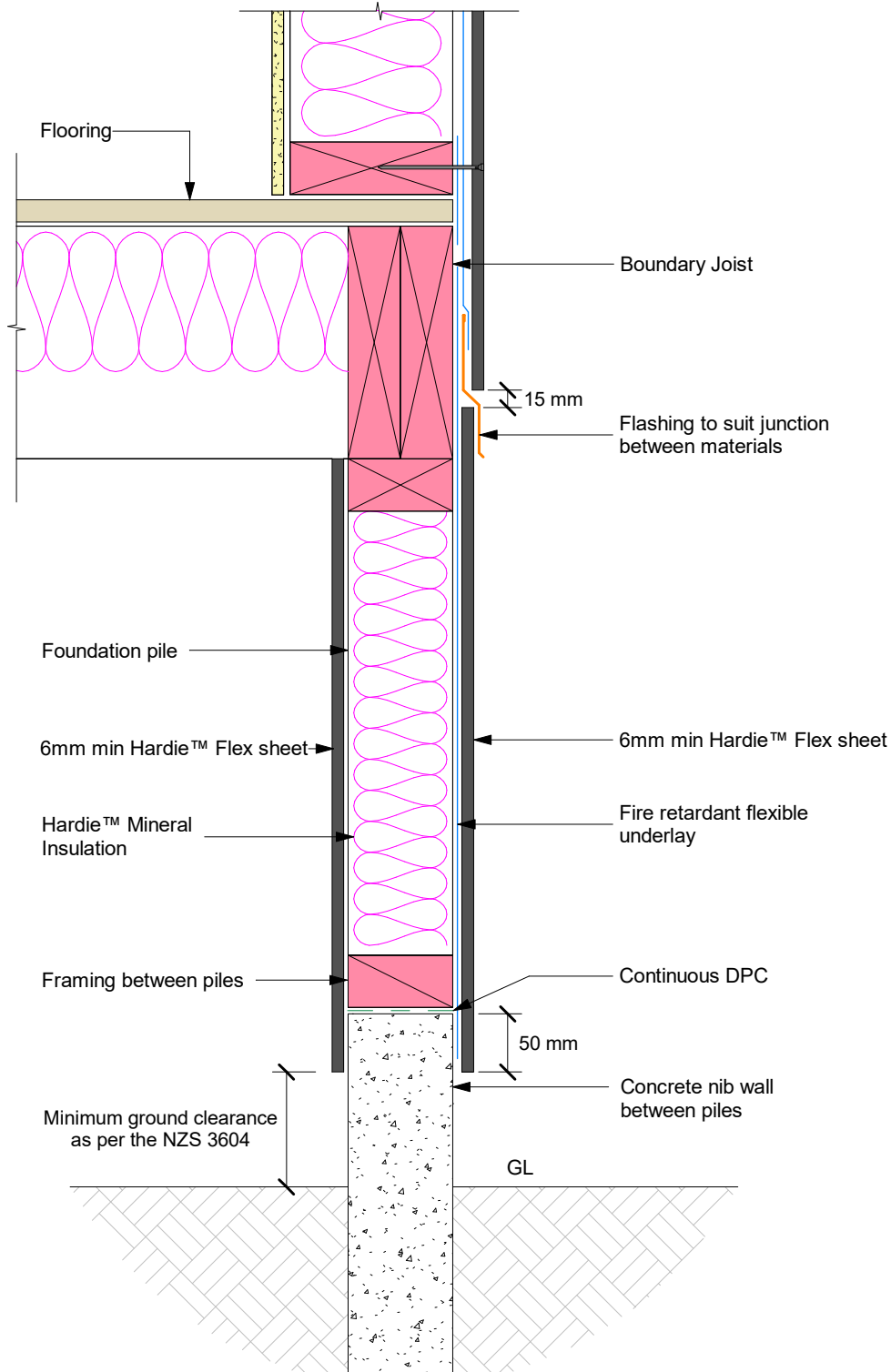


Figure 7: Intertenancy fire separation

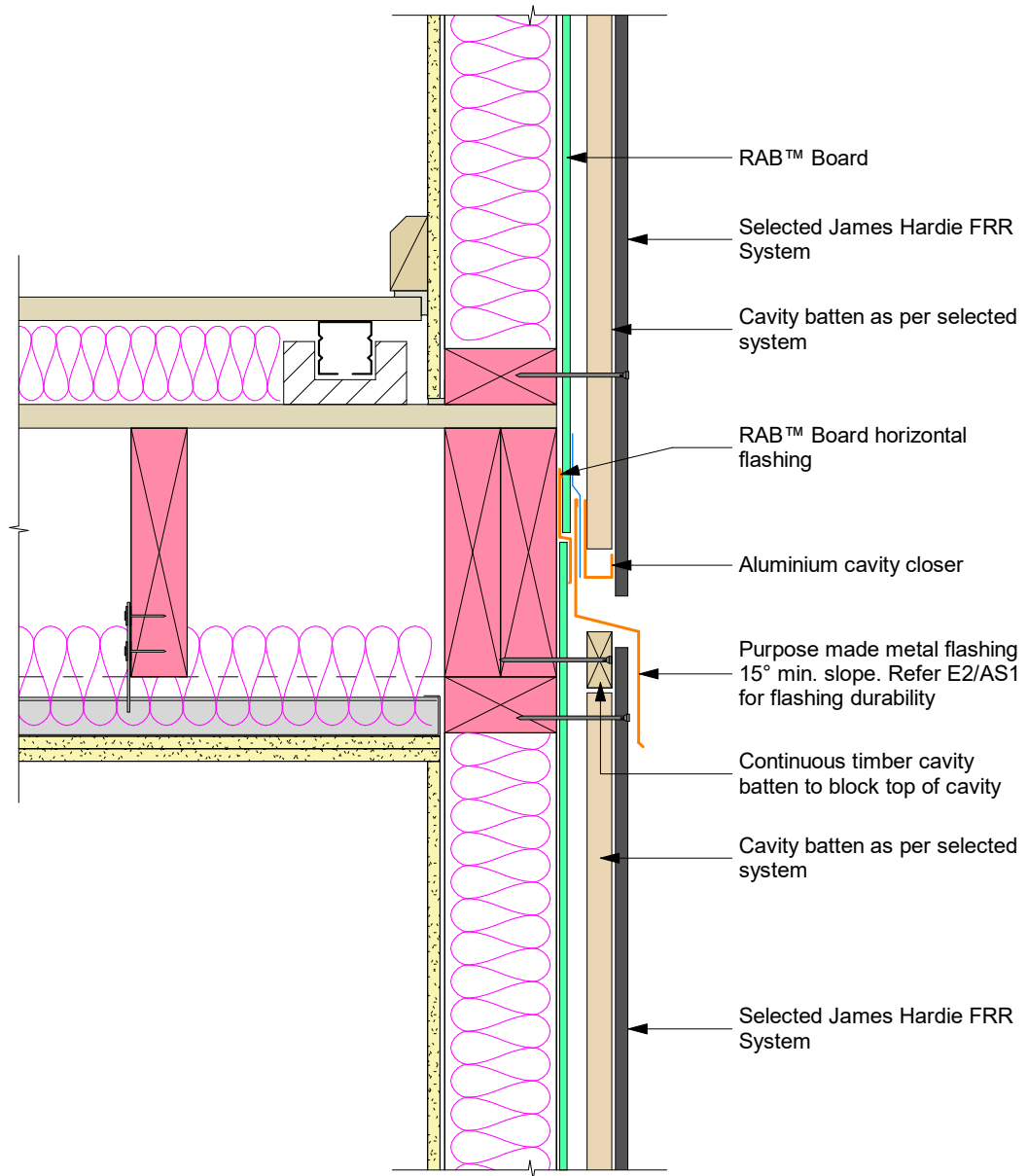


Figure 8: Control joint detail – Linea™ Weatherboard

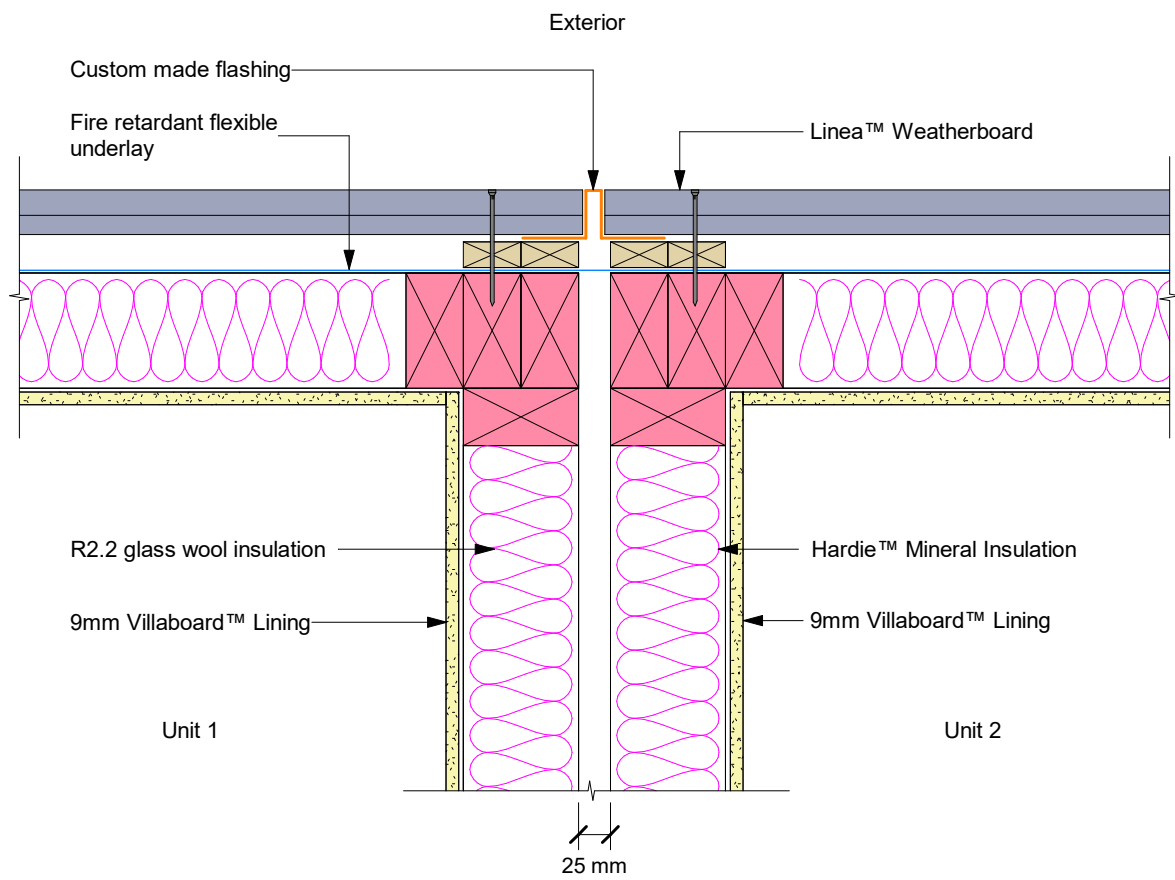


Figure 9: Vertical central joint detail

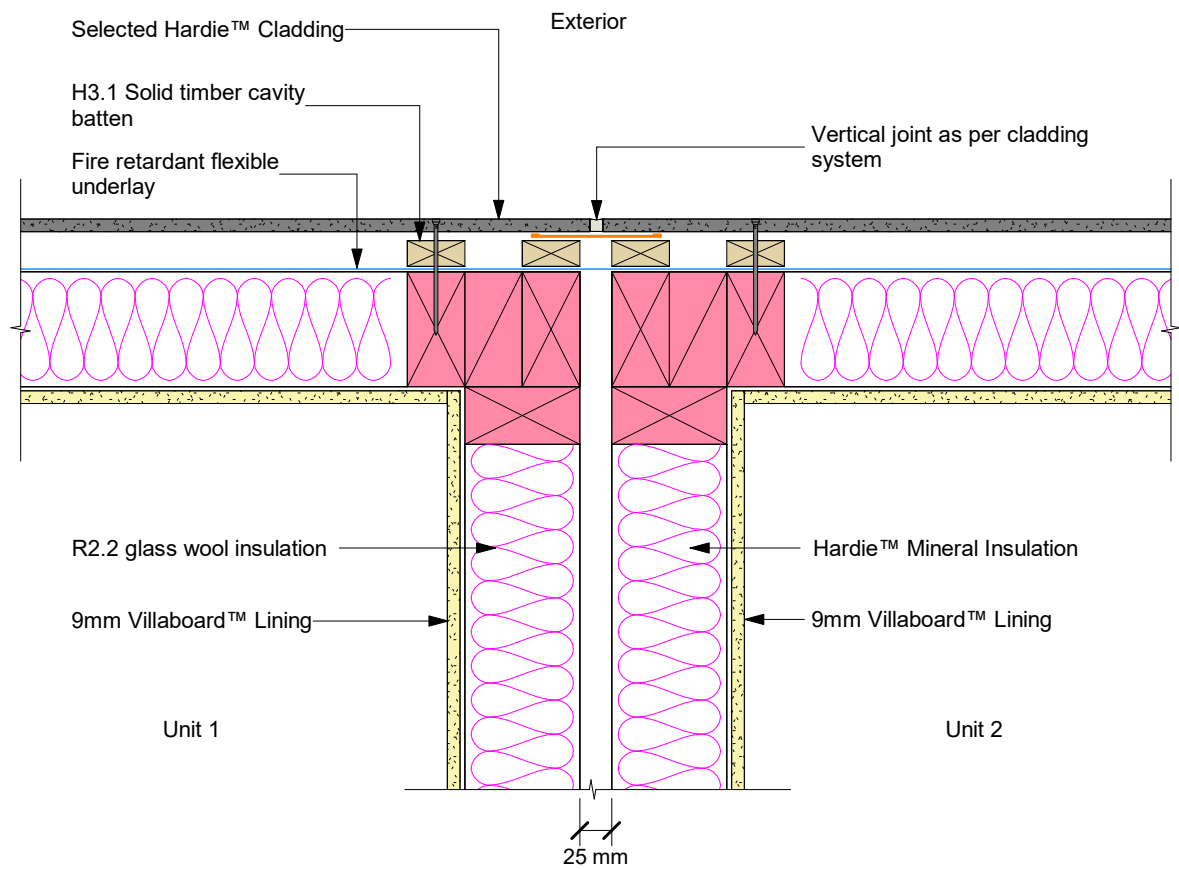


Figure 10: Timber floor to floor intertenancy wall junction

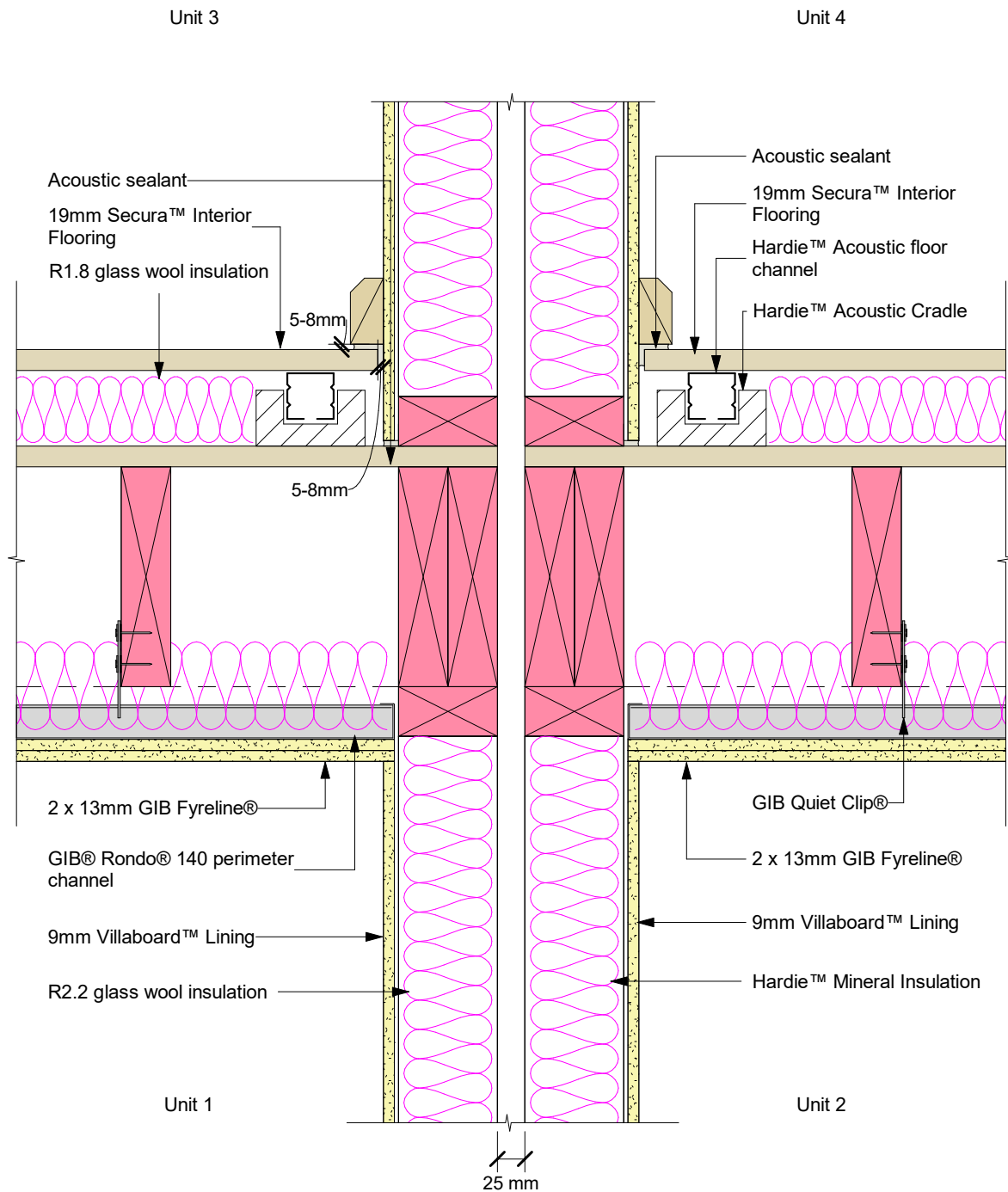


Figure 11: Concrete floor to floor intertenancy wall junction

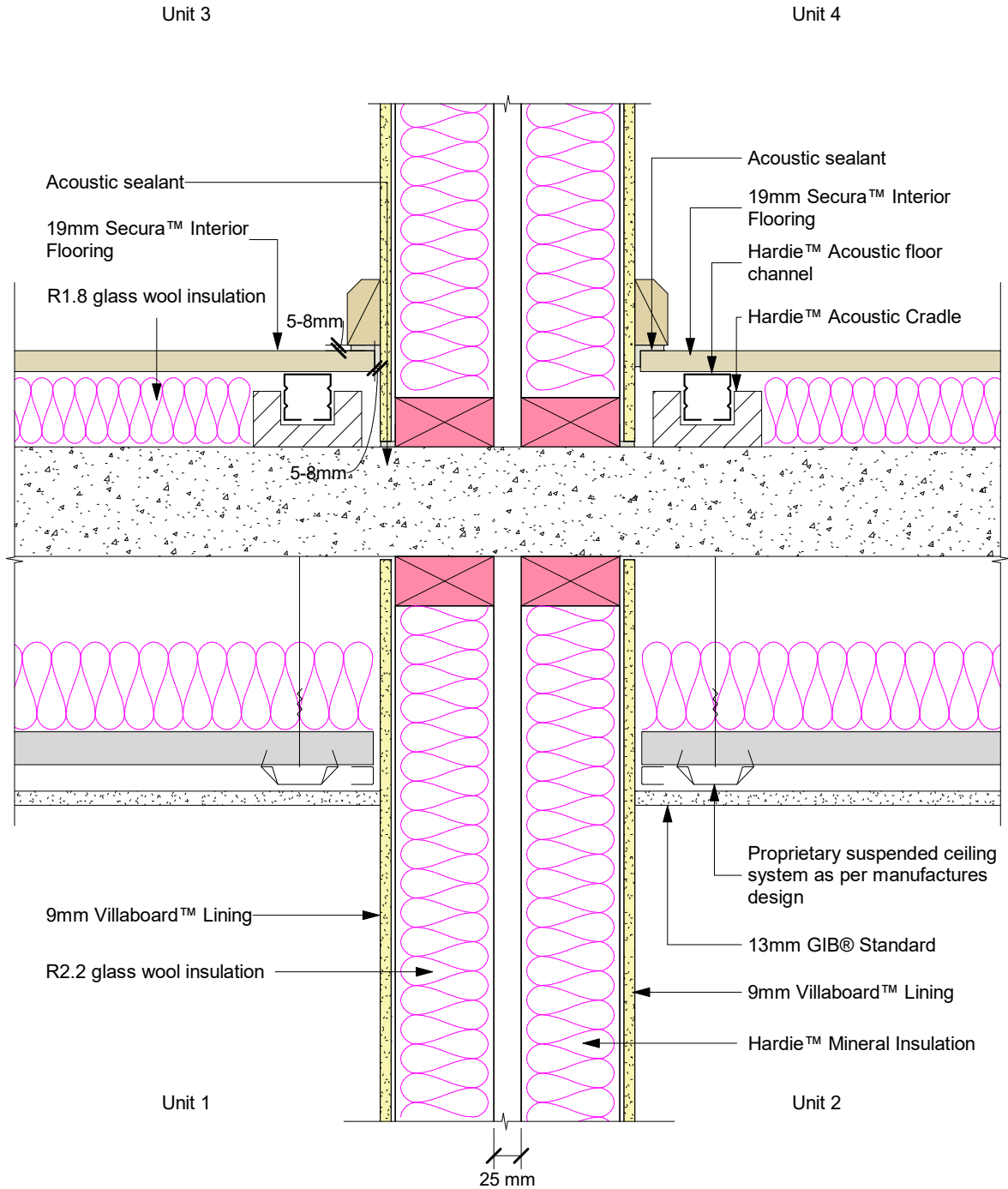




Figure 12: Fire cell extension

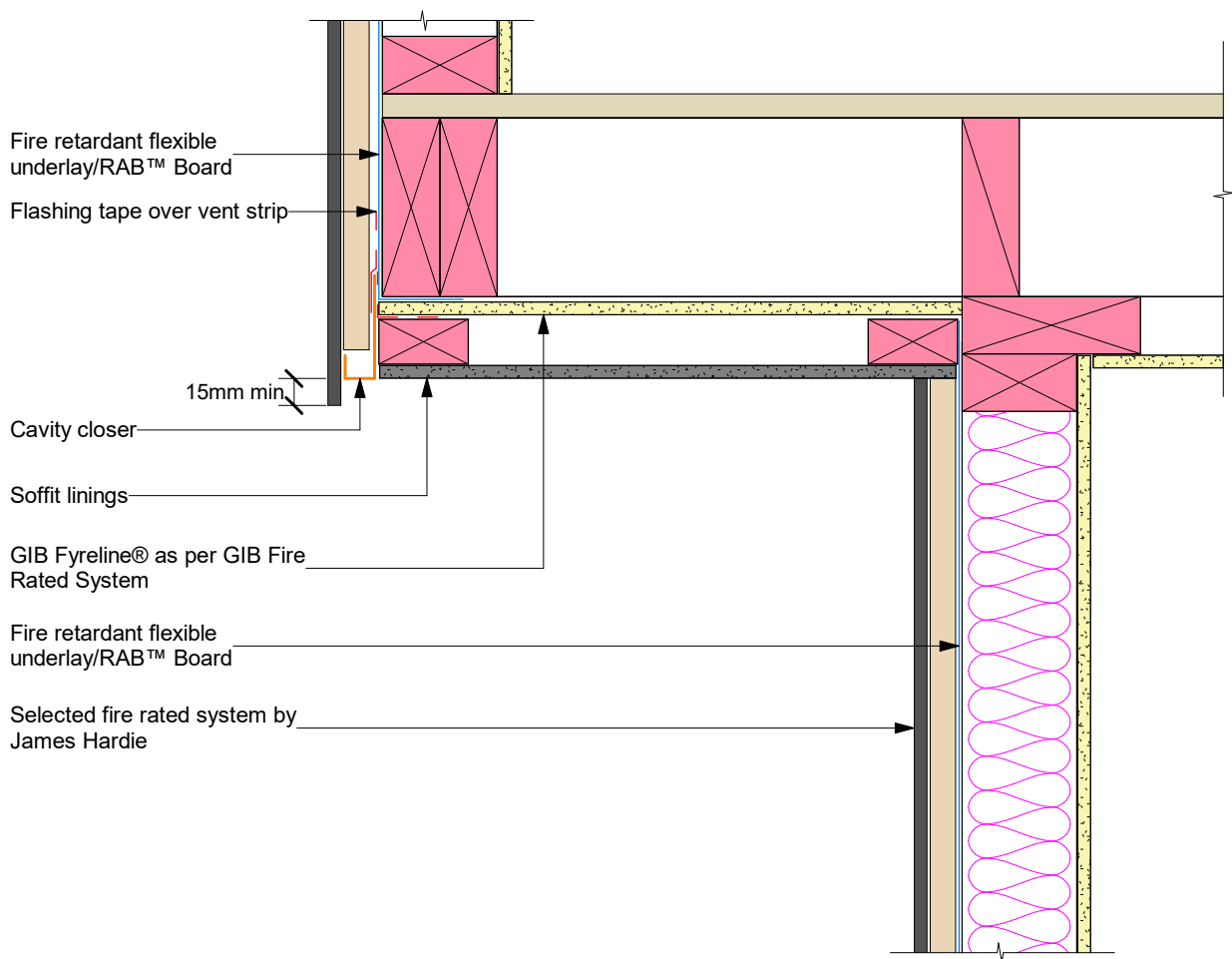


Figure 13: Wing wall – Linea™ Weatherboard

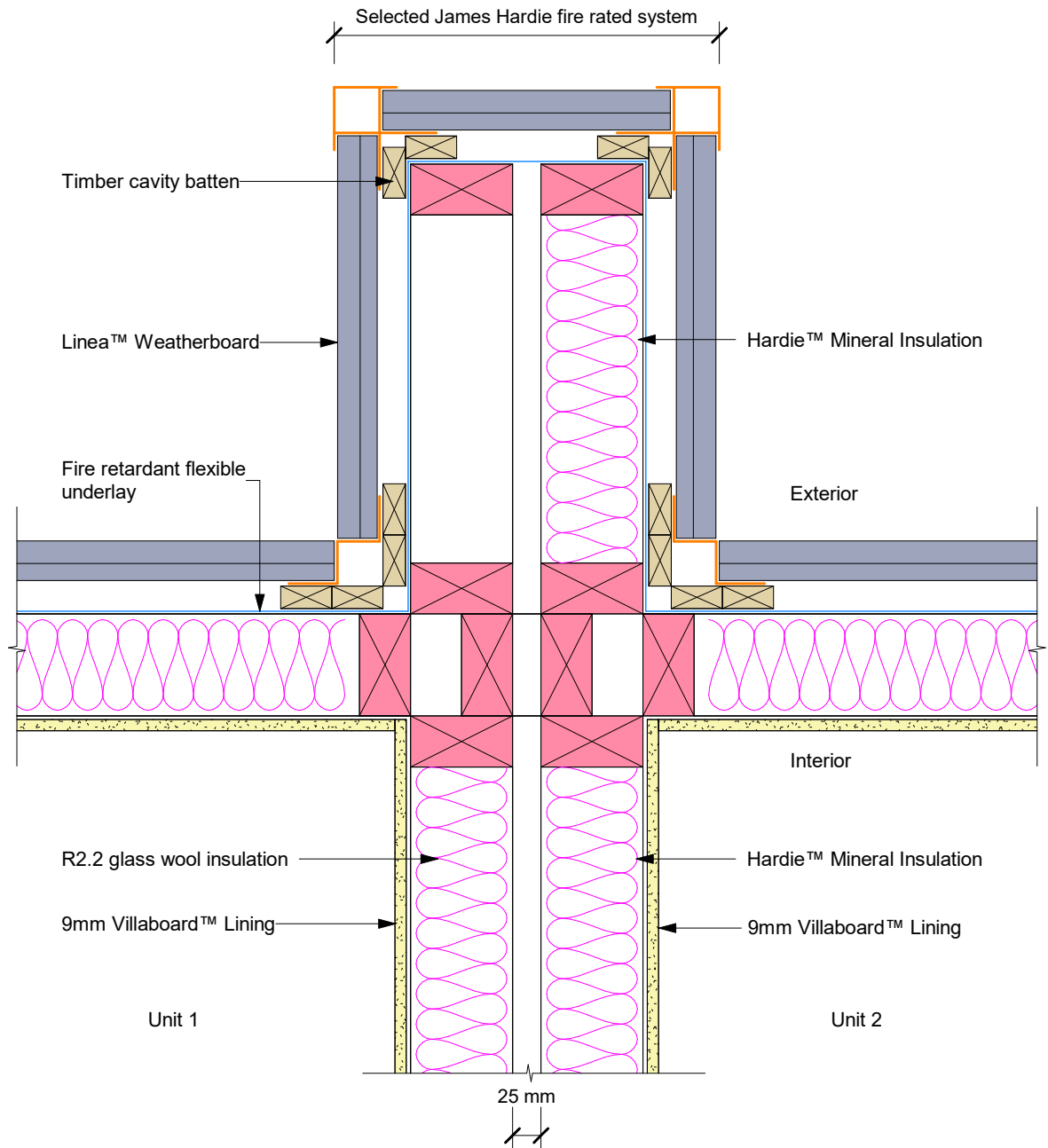
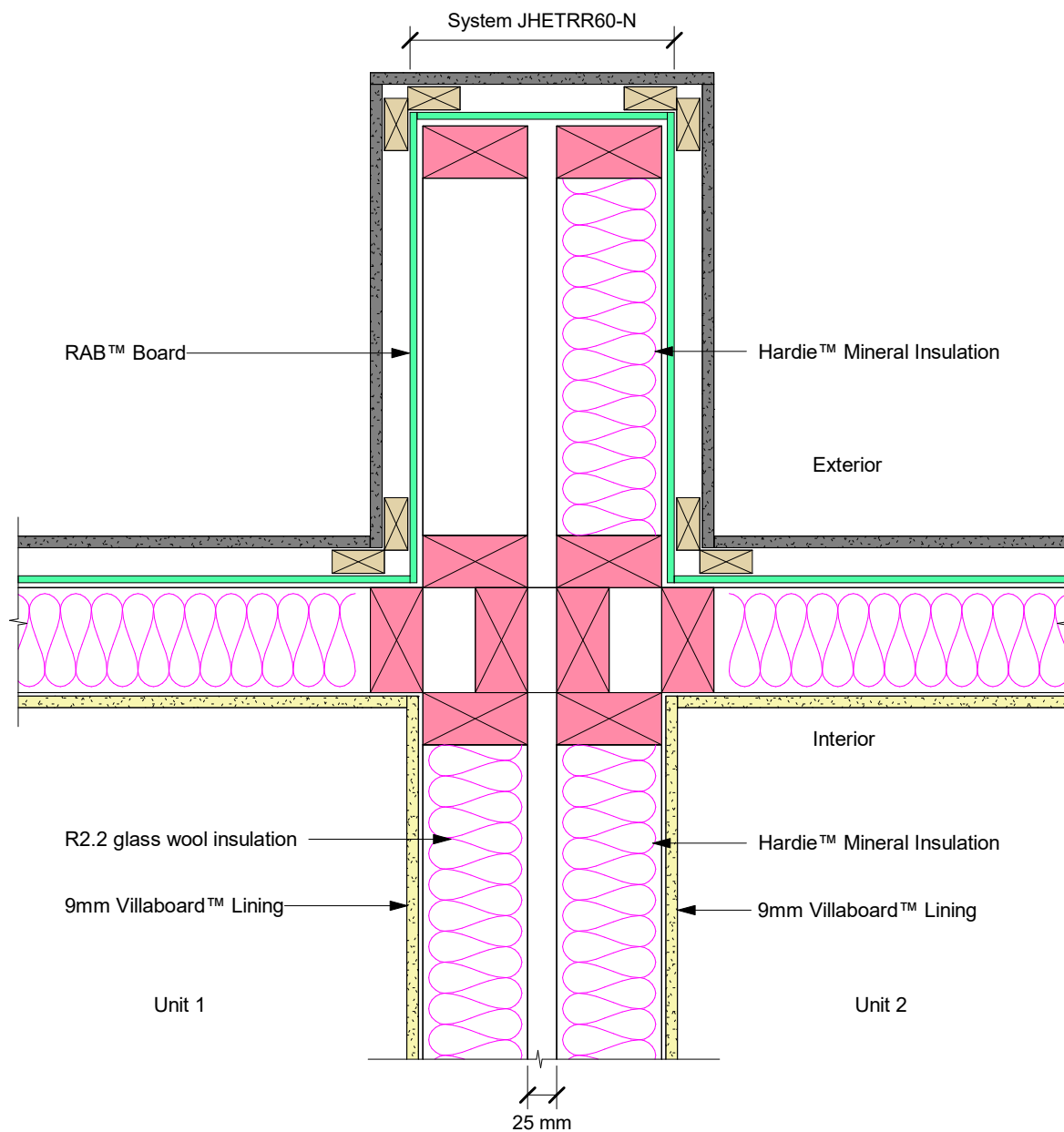


Figure 14: Wing wall – RAB™ Board



## 6.1 Penetrations

Penetrations through fire rated walls must be carefully considered by the designer at the design stage and suitable penetration details shall be selected for construction. Unconsidered or poorly planned penetrations through fire rated walls risk compromising the performance of James Hardie's fire rated systems. It is recommended where possible to centralise the penetrations of cable and piped services into fire-rated 'service ducts' or shafts - thus eliminating the need for a large number of individual penetrations.

Various penetration details published in this design manual such as those given for metallic and non-metallic pipes, cable trays and switch boxes etc. have been developed based on fire testing and assessments completed by BRANZ. These penetrations, when constructed in accordance with the details included in this design manual will not be detrimental to fire performance of 30 or 60 minute James Hardie fire rated walls. A minimum edge distance of 200mm has been tested and must be maintained. Holes/penetrations positioned no closer than 200mm to another penetration, are allowed for services. Maximum of two service penetrations are recommended per sheet.

NZBC Acceptable Solution C/AS2 contains allowances for small unprotected areas within external fire rated walls as outlined in C/AS2 Sections 5.4 and 5.5. The designer must ensure that the total area of penetrations and other allowable openings within James Hardie's external fire rated walls does not exceed these allowances. James Hardie's external fire rated walls that have unprotected areas that exceed the allowances given in C/AS2 are outside the scope of this design manual and shall be specifically designed in all instances.

Figure 15: Penetration detail – Switch box

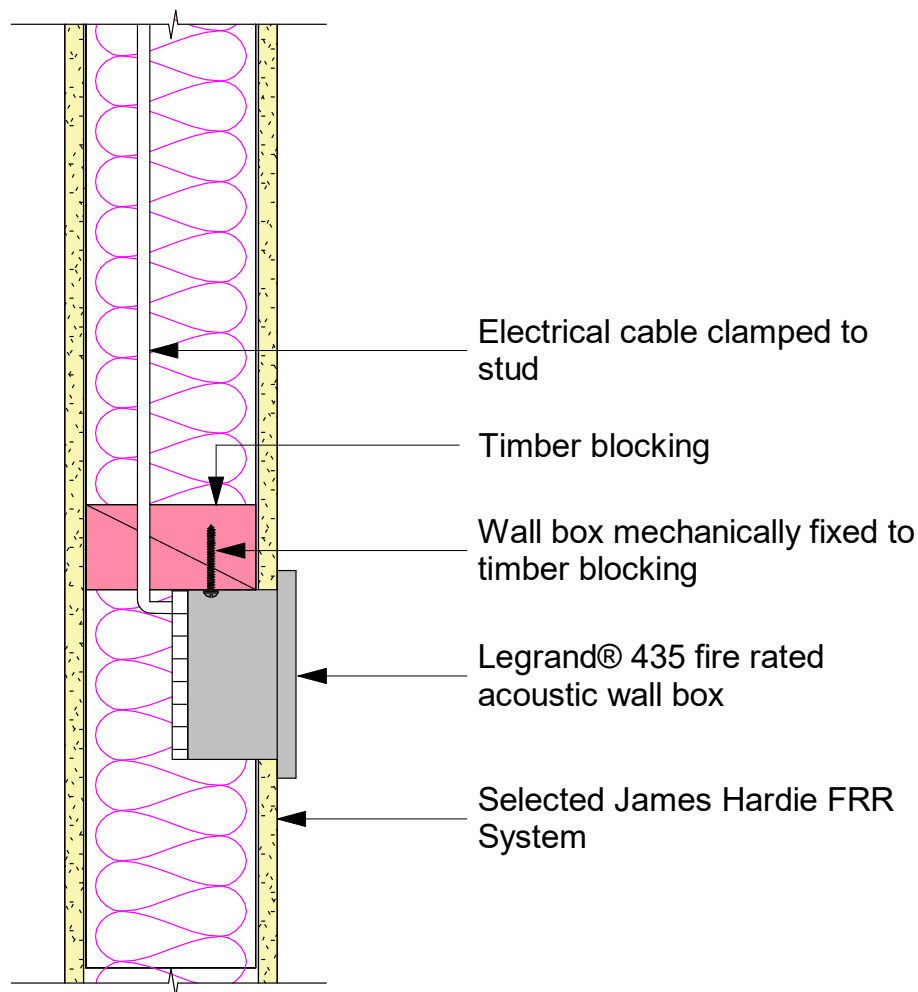


Figure 16: Penetration detail – HDPE/PEX pipe, flexible underlay

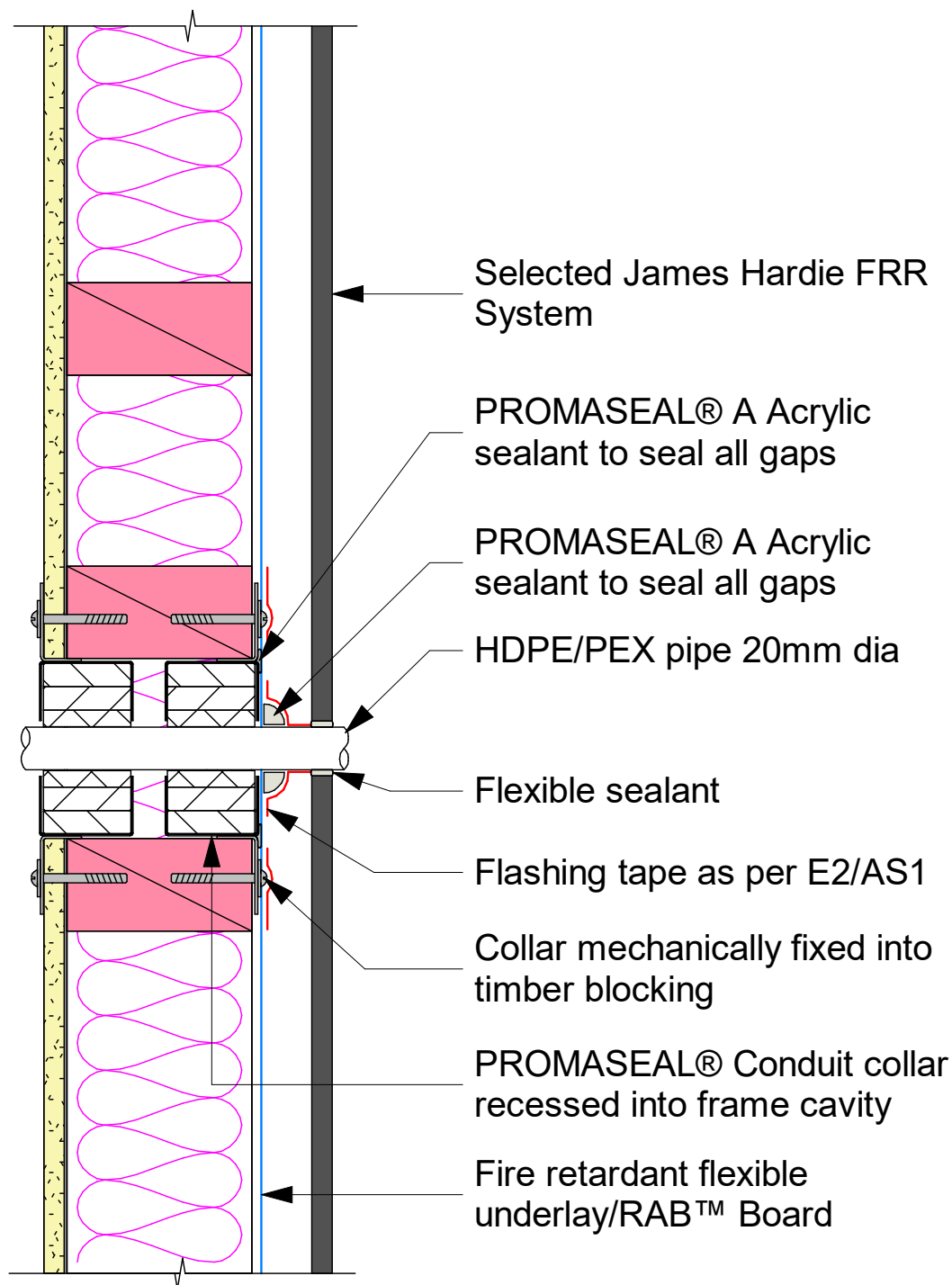


Figure 17: Penetration detail – uPVC pipe, flexible underlay

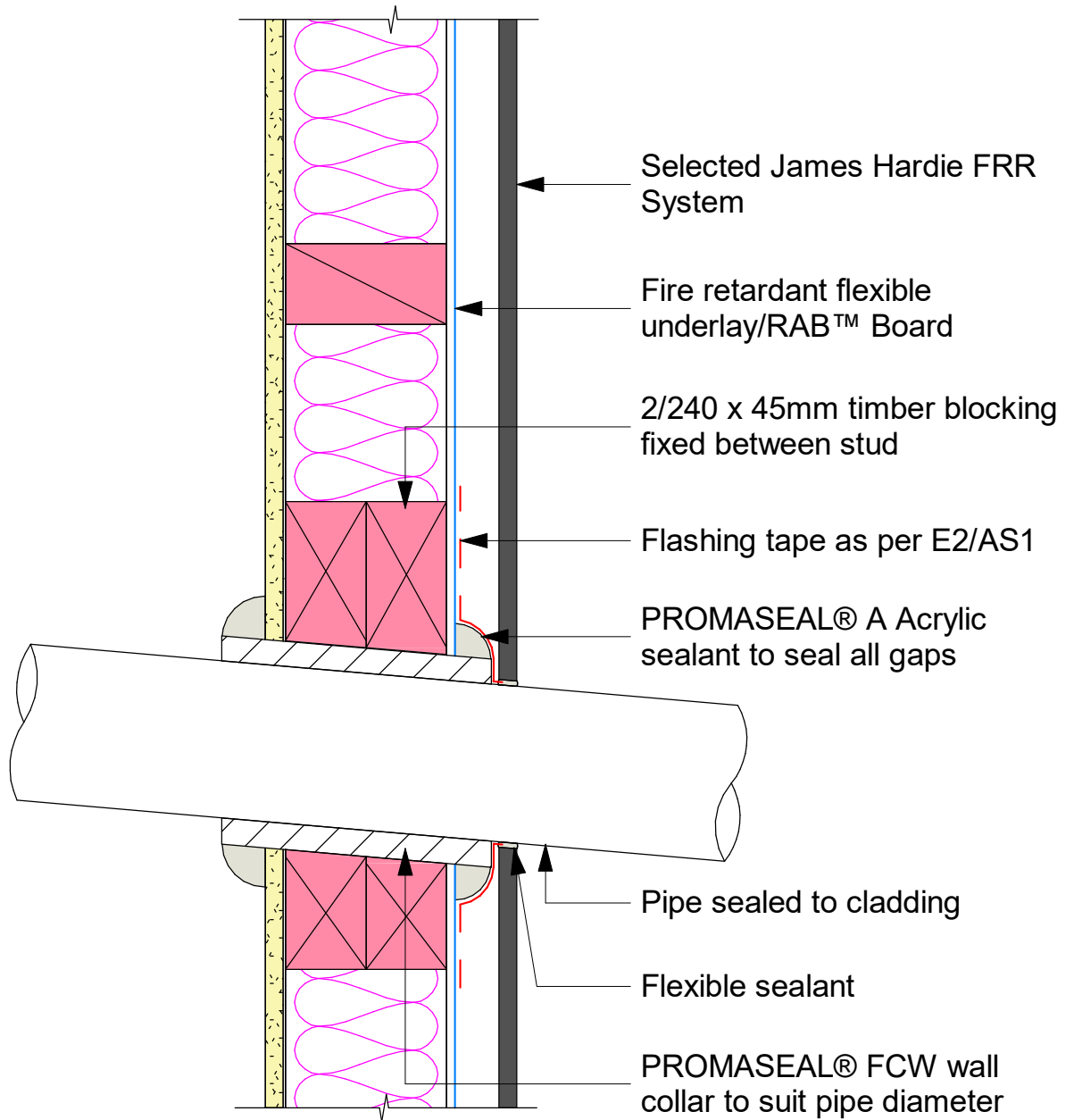


Figure 18: Penetration detail – uPVC pipe, RAB™ Board

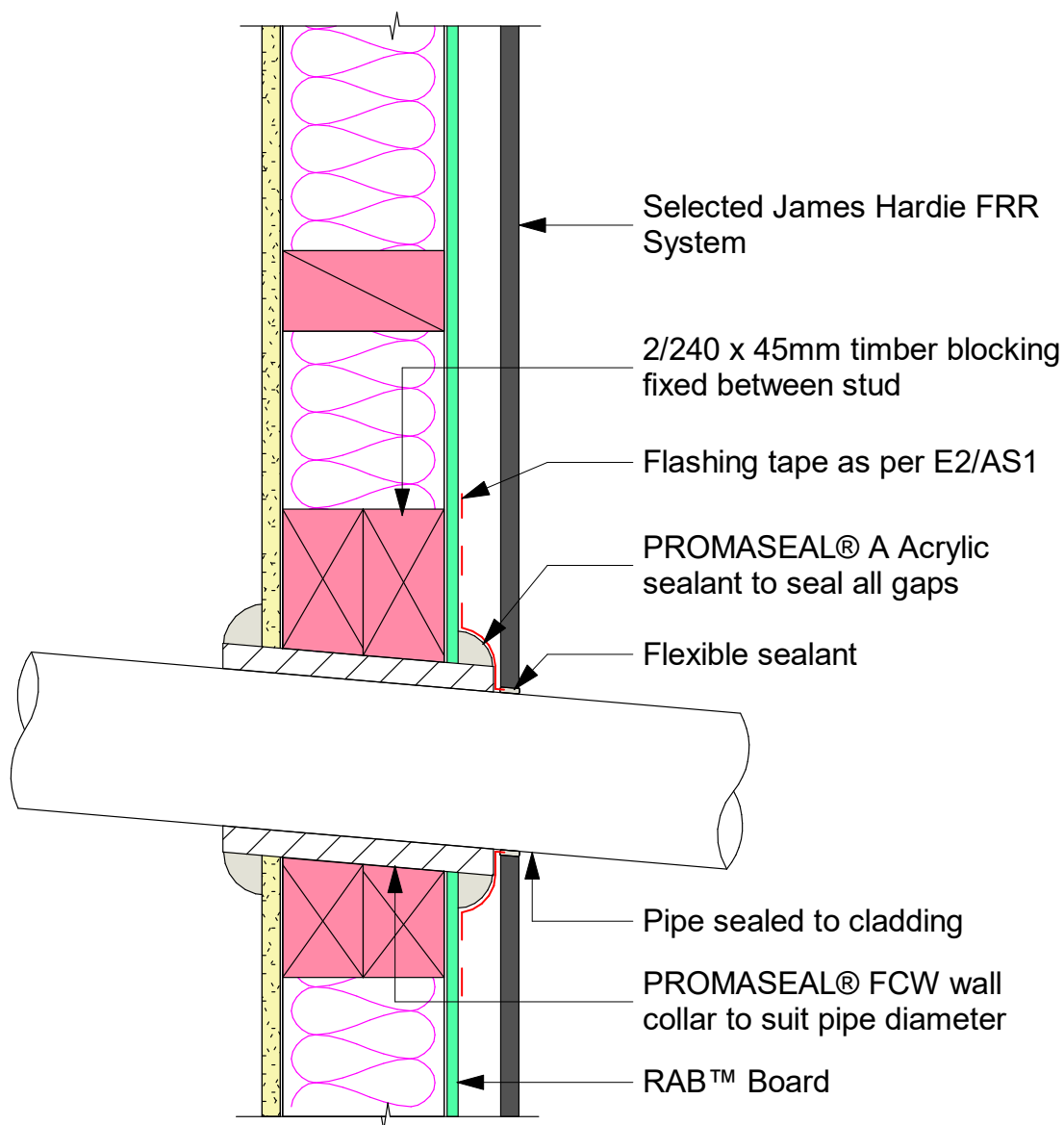


Figure 19: Penetration detail – Electrical cable

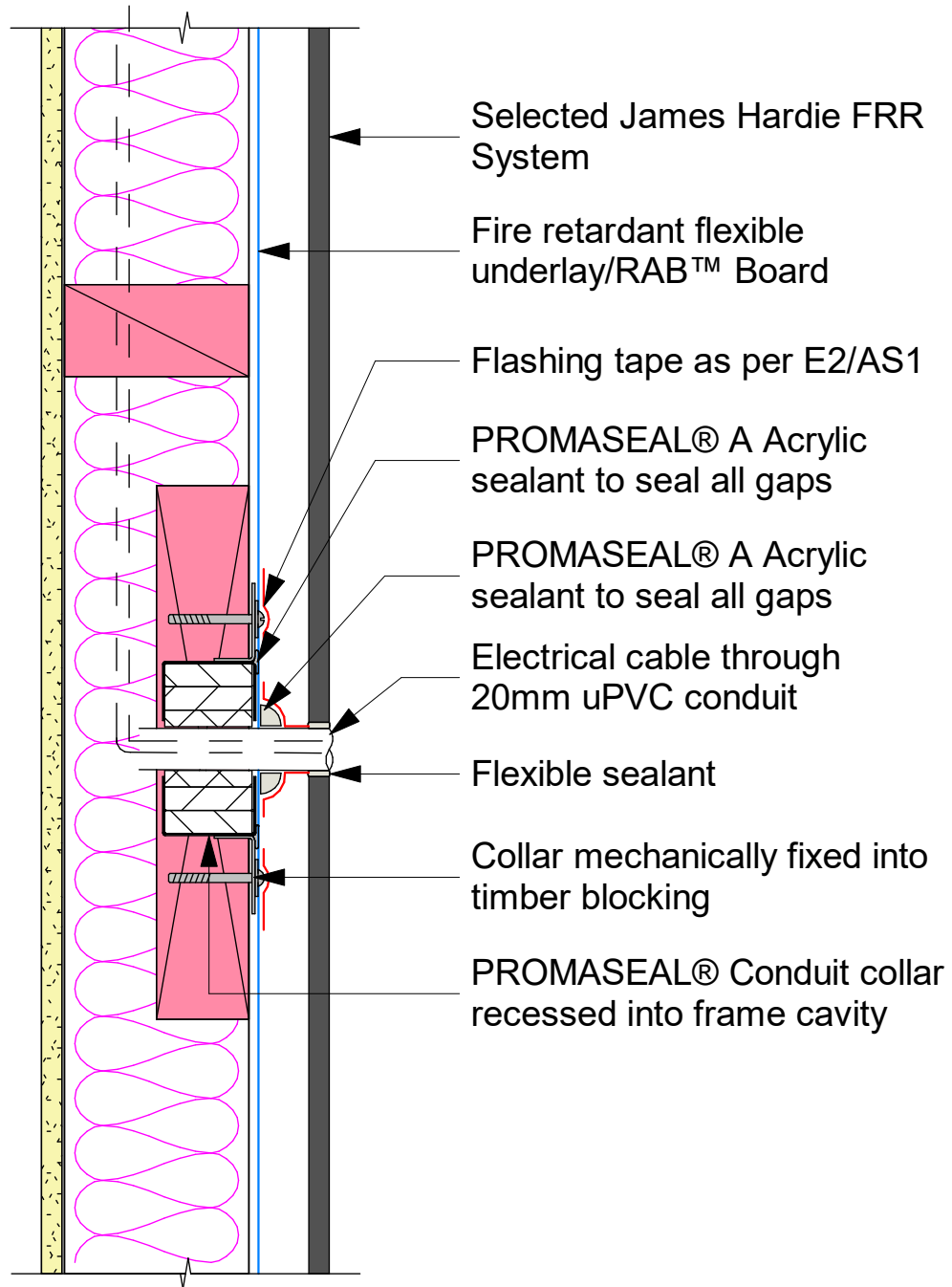
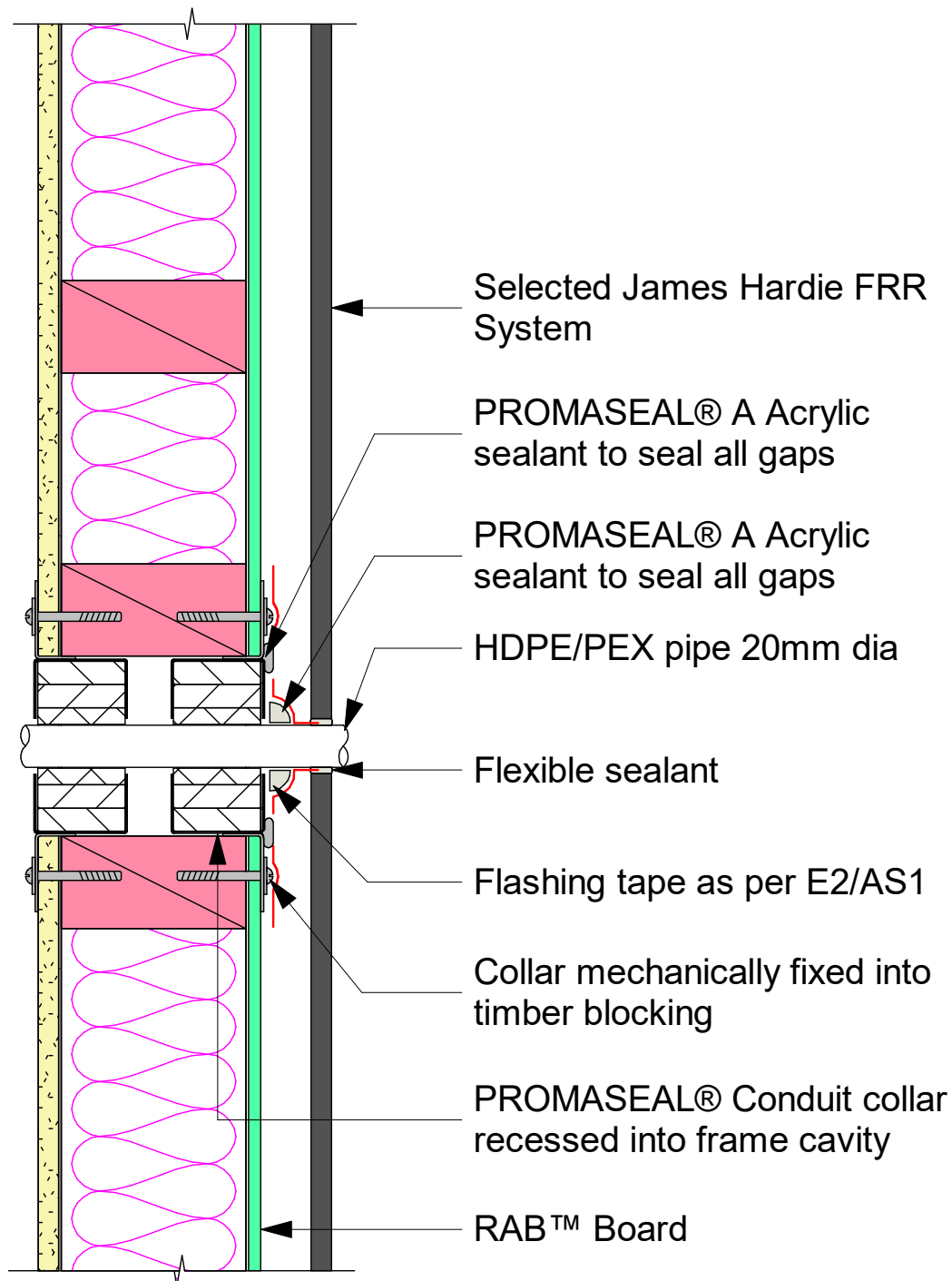




Figure 20: Penetration detail – HDPE/PEX pipe, RAB™ Board



# 7 Hardie™ Mineral Insulation

Hardie™ Mineral Insulation	Quantity/size (approx)
	800 x 600 x 90mm thick 2.4m² per bale 5 pieces per bale <b>Code: 304904</b>

## 7.1 Safe Working Practices

### Storage

Hardie™ Mineral Insulation should be stored in the packaging provided in a clean dry space where it will not get wet, knocked or damaged.

### Handling and safety

Protective clothing must be worn when handling this product.

### Engineering Controls

In industrial situations, it is expected that employee exposure to hazardous substances will be controlled to a level as far below the WES as practicable by applying the hierarchy of control required by the Health and Safety at work Act (2015) and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016. Exposure can be reduced by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. If you believe air borne concentrations of mists, dusts or vapours are high you are advised to modify processes or increase ventilation. Follow the Health and Safety Guidelines for the Selection and Safe Handling of Synthetic Mineral Fibres, published by WorkSafe.

### Personal Protective Equipment

**Eyes:** Avoid contact with eyes. Use safety glasses or goggles if irritant levels of fibres and dusts are present. Protective gloves and clothing should be worn when handling mineral insulation.

**Skin:** To prevent irritation which occurs by contact of the loose fibres with the skin, it is advisable to wear either disposable or single-use overalls or light weight nylon overalls complete with hoods when handling the insulation material. The overalls should be close fitting at the neck, wrists and ankles to prevent problems of skin irritation. When overalls are to be laundered, they should be laundered in separate laundry facilities and not in the home.

**Respiratory:** In general use, a respirator is not likely to be required. A respirator should be used when airborne concentrations approach the WES, if there is airborne dust or fibres. It is recommended to use a half face air purifying respirator with a minimum of a P1 particulate filter. If using a respirator, ensure that the cartridges are correct for the potential air contamination and are in good working order.

### WES Additional Information

Formaldehyde is included in the above information, as traces of formaldehyde may be emitted from the product, especially immediately after removing the plastic packaging. The concentration of formaldehyde emissions have been tested by James Hardie New Zealand Limited and were found to be below the 8 hour workplace exposure standard.

Work Safe New Zealand Health and Safety Guidelines for the Selection and Safe Handling of Synthetic Mineral Fibres requires lightweight nylon overalls, gloves, appropriate eye protection and a respirator with a minimum of a class P1 filter. Handling the product as if it is fragile will greatly reduce the potential dust creation and loose fibres. A SDS is available by visiting [www.jameshardie.co.nz](http://www.jameshardie.co.nz) or Ask James Hardie™ on 0800 808 868.

### Cutting

A straight edge and stiff blade knife or similar will neatly cut this product with the minimum of dust creation. Cut the insulation 50mm over the size of the framing cavity to achieve the tight friction fit.

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## Notes

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Ask James Hardie™ | Call 0800 808 868 | [jameshardie.co.nz](https://jameshardie.co.nz)

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**PRINTED PAPER DOCUMENT STOCK**

The stock used is produced from EFC (Elemental Chlorine Free) pulp sourced from farmed Eucalyptus trees and is manufactured under the strict ISO14001 Environmental Management System





## One way FRR — timber or steel frame

Specification number	Performance	Specifications
<b>GBUW 30a</b>	<b>FRR</b> 30/30/30	<b>Lining</b> 1 layer 16mm GIB Fyrelite® one side <b>LB/NLB</b> Load bearing
<b>GBUW 30b</b>	<b>FRR</b> 30/30/30	<b>Lining</b> 2 layers 10mm GIB Fyrelite® one side <b>LB/NLB</b> Load bearing

### FRAMING AND WALL HEIGHT

Timber or steel frame designed to meet durability and structural criteria for strength and serviceability under dead and live loads.

The width of framing supporting the linings shall be 35mm minimum.

The cavity depth shall be 90mm minimum.

Framing spacing shall be at 600mm centres maximum.

Timber frame height and dimensions as determined by NZS 3604 stud tables or specific design.

### LINING (FIRE SIDE)

GBUW 30a — 1 layer of 16mm GIB Fyrelite® to one side of the frame.

GBUW 30b — 2 layers of 10mm GIB Fyrelite® to one side of the frame.

Vertical or horizontal fixing permitted. For vertical fixing, full height sheets shall be used where possible.

Sheets shall be touch fitted.

All sheet joints must be formed over framing, except for longitudinal joints when the outer layer is fixed horizontally.

Offset sheet joints in double-layered systems.

When sheet end butt joints are unavoidable, they shall be formed over framing.

In steel-framed options, linings are installed hard to floor.

### FASTENING THE LINING

#### Fasteners

System	Timber frame	Steel frame
<b>GBUW 30a</b>	41mm x 6g GIB® Grabber® High Thread Drywall Screws	32mm x 6g GIB® Grabber® Self Tapping Drywall Screws
<b>GBUW 30b Inner layer</b>	32mm x 6g GIB® Grabber® High Thread Drywall Screws	25mm x 6g GIB® Grabber® Self Tapping Drywall Screws
<b>GBUW 30b Outer layer</b>	41mm x 6g GIB® Grabber® High Thread Drywall Screws	32mm x 6g GIB® Grabber® Self Tapping Drywall Screws

#### Fastener centres

Inner layer: 600mm centres up each stud.

Outer or single layer: 300mm centres up each stud.

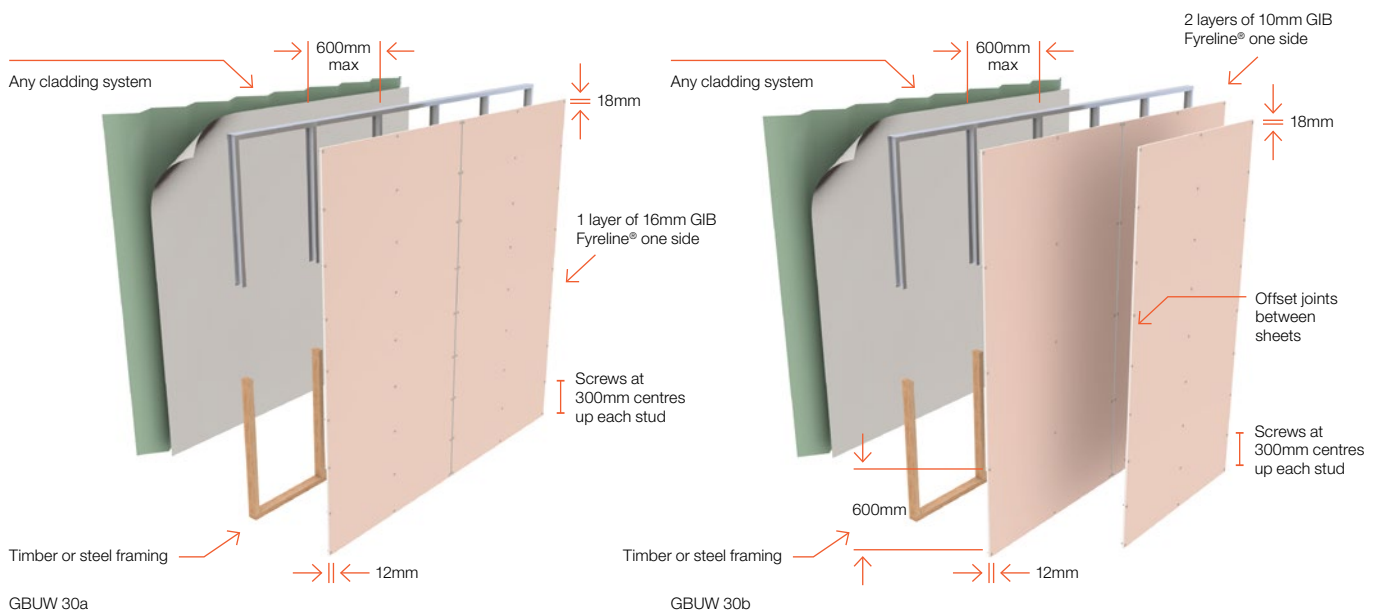
Place fasteners 12mm from longitudinal sheet edges and 18mm from sheet ends.

Place fasteners at 200mm centres along sheet end butt joints.

### JOINTING

Inner layer: Unstopped.

Outer or single layer: All screw heads stopped and all sheet joints tape reinforced and stopped in accordance with the publication entitled "GIB® Site Guide".





CERTIFICATE NO: CM70056 Rev 3

Date of issue: 20 March 2021

## 1 CERTIFICATE HOLDER DETAILS

**Fletcher Concrete and Infrastructure Ltd**

T/A Firth Industries  
810 Great South Road  
Penrose, Auckland 1061

Info@firth.co.nz  
Ph: 0800 800 576  
www.firth.co.nz



## 2 PRODUCT CERTIFICATION BODY

**Bureau Veritas Australia Pty Ltd**

3/435 Williamstown Road  
Port Melbourne VIC 3207  
Australia

Ph: 1800 855 190  
www.bureauveritas.com.au

**Bureau Veritas Australia Pty Ltd**

The complaints process for this certificate  
can be found here:  
www.bureauveritas.com.au/your-feedback

# PRODUCT CERTIFICATE

## Firth Ribraft® Floor System



**BUREAU  
VERITAS**

### KEY INFORMATION

## 3 SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT

The Firth RibRaft® Floor System comprises of polystyrene pods, steel reinforcing rods, plastic spacers and Firth RibRaft® concrete.

*Continuation of description can be found in item 9. Supporting Information about Description of Building Product or Method.*

*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.*

## 4 SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT

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.

*Continuation of intended use can be found in item 8. Supporting Information about Intended use of Building Product or Method.*

## 5 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).

**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:** F2.3.1

**H1 Energy Efficiency:** H1.3.1 (contributes to), H1.3.2E (contributes to)

*How the building method or product complies or contributes can be found in item 12. Basis for Certification. Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.*

This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification accreditation body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004. The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product. The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

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CERTIFICATE V1.3



# PRODUCT CERTIFICATE

## Firth Ribraft® Floor System



### 6 CONDITIONS AND LIMITATIONS OF USE

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 NZ 1170.5:2004) is less than or equal to 0.45 (refer to Figure 6 of the Firth RibRaft® Technical Manual January 2020)
  - b) in any wind zones up to and including Extra High
  - c) in areas with snow loads up to 2.0 kPa
  - d) in all exposure zones (except microclimates)
  - 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 January 2020.
2. The Firth RibRaft® Floor System shall be designed and installed in accordance with the Firth RibRaft® Technical Manual January 2020.

NOTE: Together, items 3, 4, 5 and 6 define scope of use.

### 7 HEALTH AND SAFETY INFORMATION

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 SIGNATURES

Sam Guindi  
Product Certification Manager

For and on behalf of  
Bureau Veritas Australia Pty Ltd

Dene Cook  
Divisional Technical Manager

For and on behalf of  
Firth Industries



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# PRODUCT CERTIFICATE

## Firth Ribraft® Floor System



### SCHEDULE: INFORMATION THAT SUPPORTS KEY INFORMATION

#### 9 SUPPORTING INFORMATION ABOUT DESCRIPTION

The system consists of the following components:

- RibRaft® Polystyrene Pod 1100mm x 1100mm x 220mm. 300mm thick pods are also available for deeper edge beams and internal ribs.
- Firth Pod and Reinforcement spacer (300mm and 100mm)
- Firth Reinforcement chair
- Reinforcement Grade 500E
- Mesh reinforcement
- Firth RibRaft® Concrete 20MPa or 25 MPa
- Sand Blinding
- DPM (250 micron polyethylene sheet)

#### 10 SUPPORTING INFORMATION ABOUT INTENDED USE

Further details regarding the use of the product can be found in Firth RibRaft® Technical Manual, January 2020.

#### 11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

N/A

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# PRODUCT CERTIFICATE

## Firth Ribraft® Floor System



### 12 BASIS FOR CERTIFICATION

- 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 Acceptable Solution H1/AS1
- F2 Hazardous building materials - By comparison with performance Clause F2.3.1

### 13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

1. Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure 1st Edition (Amendment 19), 28 November 2019
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 9), 27 June 2019
4. Structural assessment by Holmes Consulting Firth Ribraft Concrete Floor System, May 2012
5. OPUS Report "Compliance of Firth of Ribraft System with NZBC Clause B2 Durability", 24 May 2010
6. eCubed Building Workshop Report on R value of Ribraft Concrete Floor System, 17 September 2010
7. Firth RibRaft® Technical Manual, January 2020
8. NZS 3604:2011 Timber framed buildings
9. NZS 4214:2006 Methods of determining the total thermal resistance of parts of buildings

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# PRODUCT CERTIFICATE

## Firth Ribraft® Floor System



14

### CONDITIONS RELATING TO NOTIFICATION

- (a) the certificate holder notifies the product certification body (Bureau Veritas) in writing of any intended change to any of the following particulars:
  - (i) the name, address, or contact details of the certificate holder:
  - (ii) any address of a location where a certified product is produced or manufactured:
- (b) the certificate holder notifies the product certification body (Bureau Veritas) in writing of any intended change, modification, or alteration to any of the following:
  - (i) the certified building method or product:
  - (ii) the method of its production or manufacture:
  - (iii) the product quality plan prepared in respect of the certified building method or product:
  - (iv) the application or installation instructions for the certified building method or product:
  - (v) any documentation relating to the use and maintenance of the certified building method or product:
- (c) if the certificate holder has any reason to suspect that the certified building method or product does not comply with the Building Code, the certificate holder notifies the product certification body (Bureau Veritas) in writing of the reason for that suspicion:
- (d) if the certificate holder or the product certification body (Bureau Veritas) finds that a certified building method or product that has been released on the market does not comply with the Building Code, the certificate holder discloses that fact in disclosure statements published in a form that is acceptable to the product certification body and to the chief executive:
- (e) if the certificate is suspended or revoked, the certificate holder—
  - (i) notifies all customers to whom the building method or product is regularly supplied; and
  - (ii) immediately ceases using the certificate, the mark of conformity, and any reference to the number of the certificate.

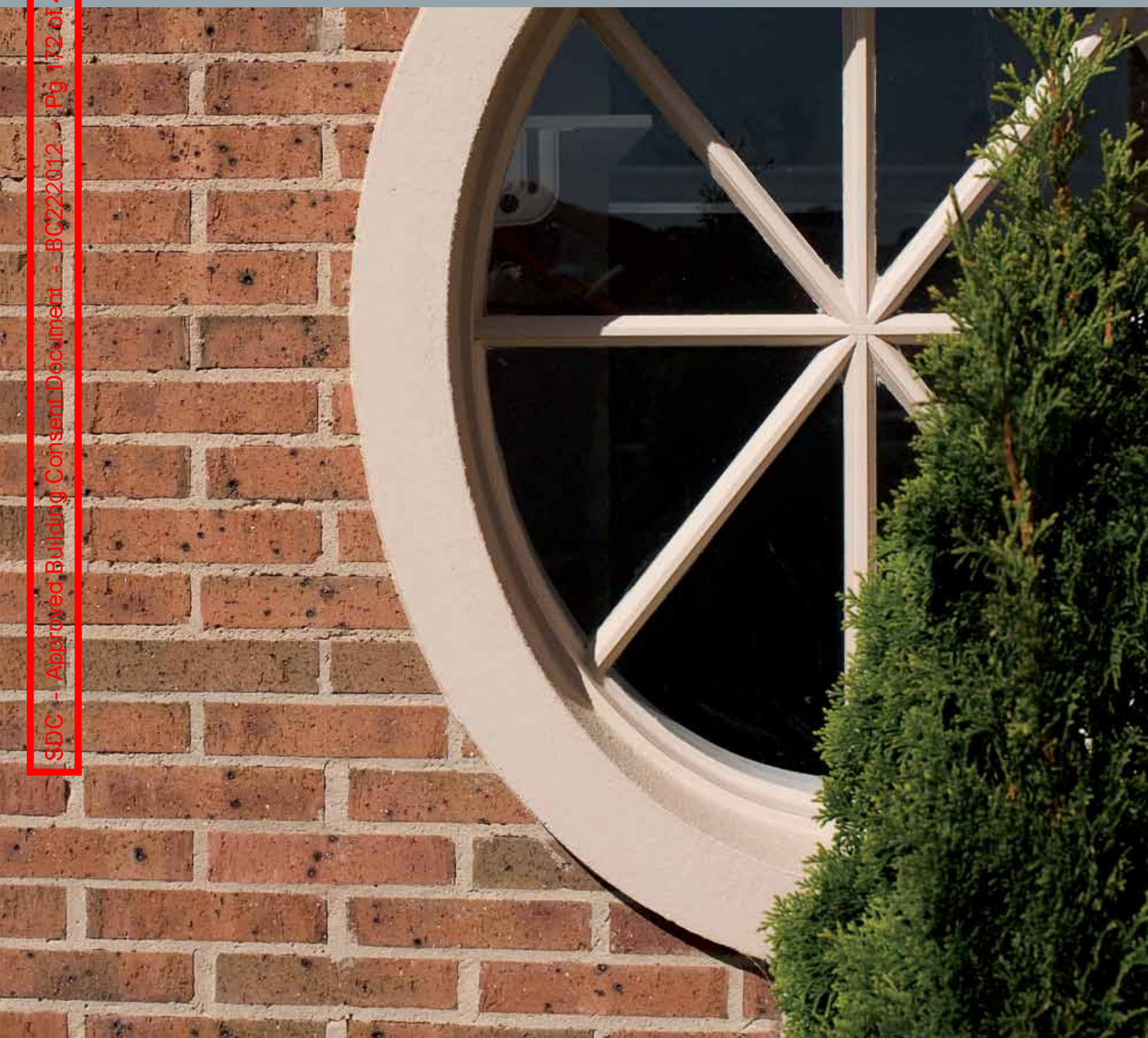
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# FUNDAMENTAL **Brick** Veneer

INFORMATION & DETAILING – PLUS E2/AS1 (DEC.2011)



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N.Z Brick and Stone Ltd (t/a Midland Brick N.Z) has provided this information as a guide only. We accept no liability for the contents of this Guide.

It is important to ensure all specification and detailing comply with the current New Zealand Building code and relevant New Zealand Standard. Where necessary contact your Architect / Designer and BCA prior for formalising details.

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1.0 Design Fundamentals

1.1 The Brick Cavity

It is rare to have any issues in regards to weathertightness in a brick veneer simply because it has always been constructed using a cavity between the bricks, and the timber framing or structural block-work that supports it. Correctly constructed, it is a very robust system.

The cavity performs 4 important functions. It separates the flexible timber structure from the rigid brick structure, allowing movement. It provides a method of securing the brick cladding to the structure. It provides a means of allowing air movement to dry the brick veneer, but without question, it's most important function being to prevent moisture seeping through the bricks and mortar joints, transferring to the timber framing.

The minimum width cavity is 40mm and the maximum 75mm – this measurement is taken from where the brick tie is secured to the framing, which is not necessarily the line of the supporting structure. If for any reason the cavity is less than the 40mm minimum, such as a particular brick detail, it is essential that the timber framing is protected using a water-proof membrane such as polyethylene.

Specifying and installing 'wash-outs' at the base of the brick veneer is standard 'Good trade practice'. This involves laying every 10th brick plus a corner brick on a bed of sand, once the veneer is approximately 800mm high, remove these bricks to facilitate the regular washing out of mortar at the base of the cavity. A clean cavity, one free of mortar bridging the gap, is essential to preventing moisture transference.

The cavity width should be clearly marked on all working drawings. Recommendation: Design to a 50mm cavity. It provides a 10mm tolerance for variations in the framing, slab and accommodates plywood bracing should this be a requirement.

1.2 Vent and Weep Holes

It is important to remember that brick veneer is not waterproof; however, clay brick veneers are an excellent rain shield. A saturated brick veneer weighs approximately 8% more than a dry veneer, reflecting the density of the product. In a clay veneer, a considerable amount of water is required before moisture is likely to flow down the back of the veneer. The requirement for weep holes along the bottom of a clay brick veneer is one 75 x 10mm weep hole every 800mm along the base or alternatively 1000 sqmm's/m of wall. Any weep hole wider than 13mm requires vermin proofing.

The weep hole requirement also applies across the heads of doors, windows and openings.

Brick veneer also requires ventilation at the top of the veneer to ensure good air circulation, allowing air to move through the weep holes at the base, up the cavity and out through the top of the veneer. The requirement is the same as for the base. However, if a 5mm gap is left around the top of the veneer, no vertical vent holes in the perpend joints are required. Note, always install the vent holes in the second brick from the top so as not to weaken the bond of the bricks on the top row.

Vent holes are generally not required under window sills as air can move freely around the frame. However, for window-sills over 2.4m in length, install vent holes evenly spaced at 800mm crs, under the sill. E2/AS1 requires the sill in this situation to be overhung.

Where a brick veneer is to be plastered and painted, the brick veneer exterior cladding is effectively a waterproof system and therefore the need to have air circulation to dry the cavity and the veneer, plus weep holes to drain the veneer, is considerably less important. However, no acknowledgement of this fact is made and allowed for in E2/AS1 so the veneer, unless 'specifically designed' must comply with the weep and vent hole requirements for a face veneer. An 'Alternative Solution' could be weep 50 x 10mm weep holes at 1.0m crs or 500 sqmm's/m length of wall. The elimination of vent holes in water-proof veneers could be included in the submitted 'Alternative Solution'.

1.3 Brick Ties

The brick veneer itself carries a durability requirement of 15 years as a cladding. However, the brick ties that secure the bricks to the structural framing are considered a structural element, and have a 50 year durability requirement.

It is important to check the site location of the brick veneer installation. If it is within 500m of the high water mark or within 100m of a tidal estuary, stainless steel brick ties will be required. If you are unsure, ask your local council before commencing work. All brick ties are screw-fixed using a 35mm x 12g screw. There are 6 standard brick tie lengths available, 85mm, 90mm, 105mm, 110mm, 115mm and 135mm. The length of the brick tie to be used in a particular situation is dependent on two factors; the width of the brick cavity, and the width of the brick being laid. The measurement from the middle of the brick to the point the tie is to be attached to the framing, governs the

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minimum length of tie. The tie must be at least half way across the width of the brick, but also have a minimum cover of 15mm over the end of the tie.

The tie must be installed with a 5° slope down from the frame, and may be laid directly onto the clay brick in most cases.

Brick ties are to be within 300mm of panel side or edge; within 300mm or two courses, whichever is smaller, of the top of the veneer.

The bottom brick tie must be within 300mm of the base of the veneer or two courses, whichever is the smaller. The ties are to be fixed to studs only, at a maximum of 600mm crs horizontally, and 400mm maximum vertically. Ties should also be positioned within 200mm of openings. Refer to Table 18A E2/AS1 for full information on tie installation.

1.4 Mortar Joints

Mortar joints make up between 16% and 20% of the face of the veneer, so they have a considerable impact on the look of the finished wall, and therefore should be given the attention they deserve.

The shape and finish of the joint, the colour of the mortar and the consistency of the joints, all play an important part in the finished appearance of the veneer.

Mortar joints should be 10mm +/-2mm; the minimum joint thickness is 7mm and the maximum 13mm. The bottom mortar joint may be up to 20mm in thickness to accommodate variations in the slab. These requirements apply regardless of the veneer being plastered.

The mortar joint may be raked to a depth of 6mm max. from the face of the brick; not the arris on the edge. It is recommended that the rake be set at 4mm then tooled smooth in order that the 6mm is not exceeded. It should be remembered that modern bricks may only have an external wall thickness of 15mm.

All mortar joints must be fully bedded; perpend joints require special attention to ensure this happens.

1.5 Slab Recess

The cavity system employed in brick veneer construction is extremely robust, and an important part of this system is the recess in the floor slab in order that the brick veneer sits below the level of the finished floor. This allows any moisture reaching the inside face of the bricks to run down the wall and escape out a weep hole without posing any threat to the inside of the dwelling, and in particular the timber framing. The building codes require a minimum 50mm step down,

however, it is strongly recommended that you design and build to a 90 – 100mm step down for added security. In addition, external sealed ground can then be taken virtually to the base of the brick veneer hiding any foundation.

It is ‘Good trade practice’ to put a sloping fillet at the base of the cavity to direct water to the outside, but this is not essential.

It is important to prevent any moisture sitting in the bottom of the cavity from penetrating through the edge of the slab, under the damp proof course of the bottom plate, and entering the dwelling.

The sealing of the slab edge and the bottom of the cavity (does not need to go under the brick) can be done in several different ways. The polythene under the slab can be extended into the cavity and taken up and stapled to the framing, with the building wrap brought down on top of it. Two coats of bitumen emulsion paint can be applied to the slab edge and the base of the cavity. The slab edge and the base of cavity could be sealed using a flexible flashing tape such as ‘Aluband’.

The width of the recess at the base of the veneer upon which the bricks sit, is governed by 3 factors; the desired cavity width, the width of the brick to be used, and the amount, if any, that the brick overhangs the foundation. Often at the design stage the brick product to be used is yet to be decided so it is important to design a ledge width that provides the builder and homeowner with the most flexibility. Recommendation: Design using a 120mm wide ledge and planning to overhang the brick 10mm to provide a drip edge is ‘Good trade practice’.

1.6 Control Joints

Generally there is no need for control joints in clay brick veneers, which are very stable. A fractional expansion can occur soon after manufacture, but this does not present any issues in normal residential construction.

Other materials, such as concrete or natural stone, which can also be used in veneer construction can shrink in size to an extent that control joints are normally required.

- In concrete brick veneers, E2/AS1 calls for vertical control joints to be located :
- (a) Within 600 mm of T joints
  - (b) Withion 600 mm of L shaped corners or by restricting the spacing to the next control joint to 3.2m maximum.
  - (c) At changes in wall height, exceeding 600 mm.
  - (d) At changes in wall thickness.

It is not uncommon to read reports from Geo-Tech Engineers requiring control joints in clay brick veneers due expansive clay soils, but this is not necessary. Where such soil types occur an appropriate foundation should be designed to manage this, and

there is no meaningful evidence that bricks crack under these conditions making control joints necessary.

However, control joints should be considered in clay brick veneer in the following circumstances. If a wall is 10.0m or longer and has no window or door openings, then a control joint should be installed at an intermediate point. Where a small panel of brickwork adjoins a large panel of brickwork, movement within the framing may cause a crack in the brickwork and a control joint should be considered. Alternatively, strengthening the framing, using additional brick ties and in particular, using MASONS 4mm Bricklock joint reinforcing in mortar joints in these areas, may be sufficient.

It is important to remember, that if a crack develops in an otherwise well-constructed brick veneer, it is an aesthetic issue only, and creates no problems as to weathertightness and has minimal effect on the overall integrity of the veneer. A control joint is in effect a controlled crack; and conversely, a crack is an uncontrolled ‘control joint’.

Control joints can be formed as in E2/AS1 using a backing rod and approved sealant. Alternatively, a straight saw cut will achieve the same outcome. If possible position control joints behind down pipes to hide them. Where a control joint is used, it is important to ensure that the framing details provide a stud within 200mm of each side of the joint for the fitting of brick ties.

1.7 Flashings

The brick veneer system has functioned in New Zealand very successfully for many years with minimal flashings being installed; however, in the modern environment, flashings are an essential part of any cladding system.

The most important flashings are around openings such as doors and windows; the head flashing being the critical element.

With the introduction of E2/AS1 in Dec. 2011, this solution does not allow for metal head flashings, which have been promoted by BRANZ over the past 10 – 15 years. The only flashing materials permitted in the solution around window and door openings are: 1.5mm butyl rubber, 2 ply asphaltic pliable waterproofing membrane or 0.5mm pliable polyethylene – no width is specified.

An ‘Alternative Solution’ is a metal head flashing fixed to the framing. Ensure it is kept 5mm short at each end, and the ends of the flashing turned up. This will allow for any movement in the framing without interfering with the bricks. Any moisture that may enter the cavity at each end of the opening, between the brick and the head flashing, will be minor and captured by the jamb flashing. A 5 – 10mm gap between the underside of the lintel bar and the flashing, allows for both drainage and ventilation eliminating the need for weep holes in the bricks across the head of the opening.

Jamb flashings are simple and inexpensive. Use a 200mm wide Supercourse 500 polyethylene flashing, tucked into the joinery flange. The open end of the flashing is to be held off the building wrap using a kick-out batten or protruding clouts. The junction between the bricks and the joinery does not need to be sealed. Note: the current E2/AS1 solution does not show a kick-out batten.

The sill flashing is equally important; any moisture driven up the sill brick needs to be stopped from reaching the timber framing and directed into the bottom of the cavity . Extend flashings 200mm past the sides of any openings where practical to do so.

1.8 Veneer Heights

The maximum height for single storey veneers adjacent to supporting timber framing, is 4.0m from the foundation. At the gable area you may go to a maximum of 5.5m to the apex.

To build to heights that exceed the above limitations, obtain a copy of Design Note TB1 Two Storey Clay Brick Veneer Construction – Made Easy.

If the veneer is supported by a masonry structure, NZS4229 permits a veneer height of 6.0m for wall and up to 10.0m to the top of any gable.

2.0 Bricklaying Requirements

2.1 General

It is important to remember that any issues regarding the quality, texture or colour of the bricks must be addressed with the brick supplier prior to the laying of the bricks. A brick laid is a brick accepted. Thoroughly check all pallets upon delivery.

Clay bricks marketed in New Zealand must meet the requirements of NZS4455, the manufacturing standard. This standard mainly refers to the size and compressive strength of the product. It does not mention, chipping, cracks, bowing or colour, all issues to do with whether a brick is considred a ‘First Grade ‘ product or a ‘Common’. This will vary depending on the texture and type of brick product, check with your brick supplier. Clay bricks are transported great distances and may be handled many times prior to delivery to site. Minor edge chipping in some bricks can occur, especially smooth faced bricks; this is to be expected and managed by the bricklayer in the laying process. Generally, a First Grade brick should have a face and one end free of surface defects; however the nature of the brick product being laid must always be a factor in this regard.

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Brochures, websites, and display panels provide an indication of the brick product at the time they were created, which may be two years old. Clay bricks are a natural product that may change depending on where the clay is sourced and how it is fired at the time of manufacture – check with your brick supplier for recent product samples.

## 2.2 Blending

Brick is a finishing product and therefore it is essential that the bricklayer thoroughly blends the bricks in order that an even spread of colour is achieved over the face of the wall. Depending upon where the bricks were positioned in the kiln, will have a bearing on the colour of the brick, which is why it is important for the bricklayer to select bricks from at least 3 pallets to get as good a colour mix as he can. Step away from the wall and check regularly. Obvious pockets of colour on a brick wall are unacceptable and devalue the dwelling or building.

## 2.3 Keeping Bricks Dry

It is important to prevent bricks becoming saturated in the construction process, particularly during the winter months. Saturated brickwork can aggravate any salts that may be present, resulting in white deposits on the surface, which can be long-term. Therefore, keep the top of all pallets covered with plastic, and where bricks may be stacked around the site, cover with plastic.

Freshly laid veneers, (less than 6 hours) must be protected from rain to prevent a possible change in the mortar colour. The top row of all unfinished brickwork must be covered in plastic, if rain is imminent.

## 2.4 Brick Bonding

New Zealand Standards require for running or stretcher bond, which means that the units of each course overlap the units of the preceding course by between 25% and 75% of the length of the units. If you wish to ‘stack bond’ it must to done to a ‘Specific Design’ which will invariably involve such things as studs at 400mm crs, the use of MASONS 4.0mm Bricklock joint reinforcement and more brick ties.

A 70mm brick may be laid to a third bond (metric bond) however, it is recommended that bricks always be laid to a half-bond in the traditional manner. This can be easily achieved by cutting all (70mm Series) corner bricks to 190mm in length.

## 2.5 Brick Sills

With the introduction of E2/AS1, all sills including door sills are

required to have a minimum slope of 15 °. They do not need to overhang unless there are vent holes under the sill which is only required on sills over 2.4m long. Slope and overhang should be consistent for all sills. It is traditional to overhang the sill 30 – 50mm. Bricks must be evenly spread and of equal thickness of brick across the width of the sill. This applies to the heads of the windows as well.

## 2.6 Lintel Bars

There are two methods of installing ‘Lintel Bars’ – As required under E2/AS1, the traditional method, where the bar spans the brick from one side to the other, kept completely free of the structure and apply the angle sizes in Table 18E, E2/AS1 or the table below which is a simpler version covered by Specific Design in Design Note TB2. The lintel bar should sit 20mm back from the face of the veneer. The second method, an ‘Alternative Solution’, is to attach the angle to the structure. In this case, keep the angle 5mm short of the opening at each end to accommodate any movement in the frame. Check durability requirement.

Lintel bars supporting veneer over opening	
Max. Span (mm)	Size of Angle
3000mm	80 x 80 x 6
3500mm	100 x 100 x 6 or 125 x 75 x 6
4500mm	125 x 75 x 8
4800mm	125 x 75 x 10

## 2.7 Mortar

Good quality mortar ensures a veneer that will perform well not only throughout the life of the cladding, but in the event of an earthquake. Mixing mortar by volume is essential, 4 buckets of sand to 1 bucket of cement is the normal mix ratio. The volume of water, additives, and mixing time, all need to be consistent to achieve a quality mortar of an even colour. The mortar should be as wet as practically possible to help achieve a good bond strength.

It is very important that ‘hydration’ takes place. If the mortar shows signs of powdering, it is possible that ‘hydration’ has not occurred and the veneer may need to be pulled down. The most common cause of this is rapid loss of moisture when the bricks are first laid. If the temperature exceeds 27°C, ensure the bricks are kept damp for the first 24 hours.

Discard mortar which is over an hour old and avoid re-tempering mortar with water. The correct time to tool a mortar joint is when a clear thumb print can be made on the surface.

## 2.8 Tolerances

Item	Tolerance
Deviation from vertical within a storey	10 mm per 3 m of height
Deviation from vertical in total height of building	20 mm
Relative vertical displacement between masonry courses	2 mm on nominated fair face (1 side) 5 mm on structural face
Deviation from line in plan: (a) In any length up to 10 m (b) In any length over 10 m	5 mm 10 mm total
Average thickness of bed joint, cross joint or perpend joint	+/- 3 mm on thickness specified

## 2.9 Cleaning

The brick veneer must be cleaned as the job progresses using clean sponges and clean water.

It is important to protect the brick veneer from becoming stained or marked, particularly by other trades during the construction period. Cover the brickwork around the water tap and ensure the hose is connected and away from the veneer.

Under no circumstances is the brickwork to be water-blasted using a high pressure system. If the bricks require a light acid wash, Corium 93 is specifically designed for this task; however, check with your brick company prior to applying any acid products to the bricks.

## 2.10 Flashings

It is the bricklayer’s responsibility to ensure that all flashings have been correctly installed prior to the bricks being laid. Refer to the figures in this brochure for the correct installation requirements.

## 2.11 Inspections

In house construction it is normal for the brick veneer to be inspected by the council building inspector once the bricks reach half the height of the finished wall. The items being checked at this stage include how clean the cavity is, correct installation of the brick ties, cavity width, mortar quality, and joints, and the installation of flashings. It is the bricklayer’s responsibility to ensure these inspections have been carried out and approved prior to continuing.

# 3.0 Brick Issues

## 3.1 Using Hydrochloric Acid

Check with your brick supplier prior to using hydrochloric acid to clean their bricks. When using hydrochloric acid it is important to adhere to the following procedures.

- Thoroughly pre-wet the wall before applying the acid.
- Do not exceed a mix strength of 1 part acid to 10 parts water.
- Allow the acid solution 3 – 6 minutes to do the job required.
- Manage a maximum of approximately 5m² at a time and wash down thoroughly with clean water on completion.

*Note: Iron Oxide stains (rust) can be the result of using hydrochloric acid on clay bricks. This may be removed by applying a solution of 1 part phosphoric acid to 4 parts water; allow up to 24 hours to work.*

## 3.2 Vanadium Stains

Vanadium is a naturally occurring salt in many types of clays, that may appear on the finished brick product, normally within the first 6 weeks of the bricks being laid. The stain is quite vivid and comes in many colours from dark green, lime green, yellow, and reddish-brown; more obvious on light coloured bricks. It will wash off over time, but an application of 4% Sodium Hypochlorite (Janola) or alternatively, a solution of Sodium Bicarbonate, 60gms/litre of water; applied on the stains will assist in their removal.

## 3.3 Efflorescence

The deposit of white salts on the surface of brickwork is common, and referred to as ‘efflorescence’. For efflorescence to occur, three conditions must exist. There must be salts present. There must be water entering the masonry, and the masonry must be able to dry out. The white salts must first be brushed off the surface using a stiff dry brush and the deposits collected where possible. The wall can then be wiped over with a damp cloth to remove some of the remaining deposits. This process may need repeating several times until all salts have been removed from the bricks. Do not hose off. Good laying practices help prevent efflorescence occurring.

## 3.4 Manganese Stains

This stain occurs characteristically along the edges of grey or brown bricks that have been produced using manganese to achieve the colour. It appears as a dark-blue brown discolouration. If you suspect that manganese staining has occurred, contact your brick company for them to inspect and advise on a resolution.



3.5 Copper and Bronze Stains

Often brick veneer has cap flashings or is in close proximity to metals such as copper or bronze. Water washing over these metal surfaces can result in a bluish-green stain appearing on the surface of the bricks. These stains may be removed using a solution of 1 part by volume of acetic acid (80% or stronger); 1 part hydrogen peroxide (30% - 35% strength); 6 parts water.

3.6 Smoke stains

Common around domestic fireplaces, but can also be an issue with fire damaged buildings. Minor stains can be removed readily with sugar of soap, which is highly alkaline mixture. Mix approximately 500 gms into 2 litres of hot water and apply liberally by brush. After the stains disappear scrub with a mixture of detergent and household scouring powder containing sodium hypochlorite (Janola).

3.7 Graffiti

These are difficult stains to remove, particularly if they have aged. In the case of fresh aerosol paint a proprietary paint remover can be used, and a water rinsible type is recommended. Commercial paint removers, applicable to a particular type of paint, can be used satisfactorily. To remove dried paint, the stained area is flooded for a few minutes with a paint remover of the methylene dichloride type, scrubbed to loosen the paint film and then flushed with water to wash away the loosened paint. Final scrubbing is done with a scouring powder until the stain is removed.

For specialist advice or assistance contact a commercial company such as Graffiti Solutions Ltd, www.graffitisolutions.co.nz

3.8 Water-proofing Veneers

Clay brick veneers correctly installed do not need to be waterproofed as they manage water very well. However, situations do arise where water-proofing the brick veneer is a good solution to what may be a difficult problem. Nanotechnology products are safe and have little effect on appearance of the finished brick veneer. Contact your sales person for options.

SurfaPore R is such a product. Refer www.brickconsultant.co.nz

4.0 Stack-bonding of bricks

The 'Stack bonding' of clay brick veneers, provides the architect/designer with the ability to create a brick cladding that presents both vertical and horizontal lines and patterns that add new

dimensions to the architectural appeal of a structure. This type of bonding is not permitted under E2/AS1, NZS4210, NZS3604 and NZS4229, but it is permitted under NZS4230 using specific engineering design. The CB&PMA engaged BRANZ's structural engineers to provide a methodology by which stack bonding would be acceptable based on their historic testing and engineering considerations. BRANZ have provided the following specification and limitations for its use.

- Studs are to be positioned at a maximum 400mm centres.
- Screw fixed brick ties are to be installed at maximum 400mm centres horizontally and 400mm centres vertically (every 4th course commencing at two courses above the base or equivalent in the case of a double height brick).
- '4.0mm Bricklock' joint reinforcement, marketed by MASONS, is to be installed every 4th course (or maximum of 400mm) alternating with the rows of brick ties.
- The maximum permitted height is 4.0 m unless Specific Engineering Design has been undertaken to cover the additional required height specified.

5.0 Brick Walls

Fundamental rules for brick walls

- Avoid filling columns with reinforced concrete. Always support fences and brick columns using timber or galvanised metal posts upon which the bricks can be tied.
- The foundation needs to be 150 – 200mm deep and a minimum of 50mm wider on each side of the brick line. It should contain a minimum of 2/D12 rods. Check for tree roots and either remove or bridge the roots using a flat galvanised steel plate.
- On a single skinned wall, keep the columns approximately 2.0m apart and the H4 posts at least 800mm into the ground.
- Use Bricklock STR joint reinforcement every 4th course extending it through and tying it to the posts.
- On columns, use Bricklock CNR every 4th course through the height of the column. Tie the bricks in the column to the post, also every 4th course opposite each other, alternating around the column.
- Double skinned walls need to be tied together using rectangular box ties every 4th course at 600mm crs. Incorporate 100 x 75 H4 posts and rails in the cavity to also tie the bricks.
- Check with your council on height limits and building consents.

FIG.1 SOFFIT DETAIL

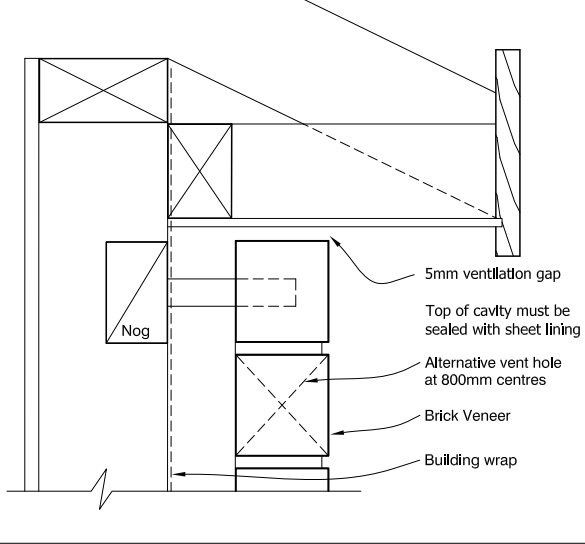


FIG.2 WINDOW HEAD - Aluminium ALTERNATIVE SOLUTION

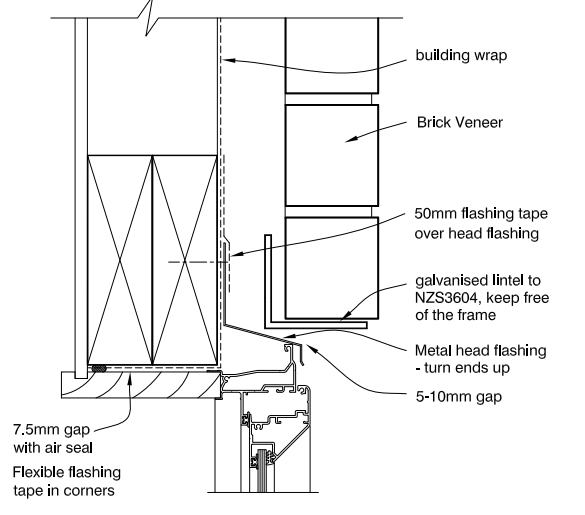


FIG.3 WINDOW JAMB - Aluminium

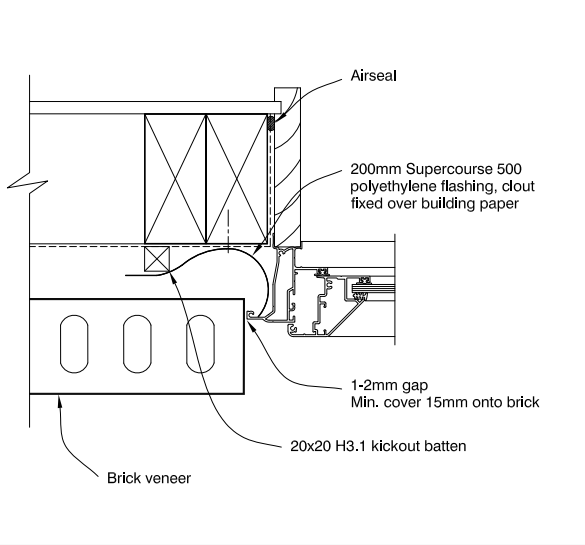


FIG.4 WINDOW SILL - Aluminium ALTERNATIVE SOLUTION

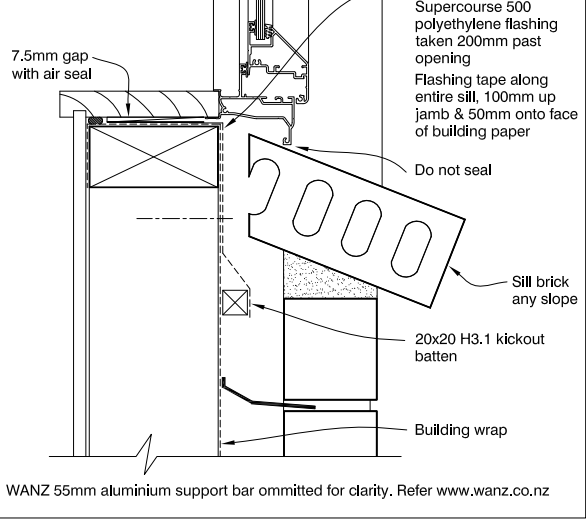


FIG.5 DOOR SILL - Aluminium ALTERNATIVE SOLUTION

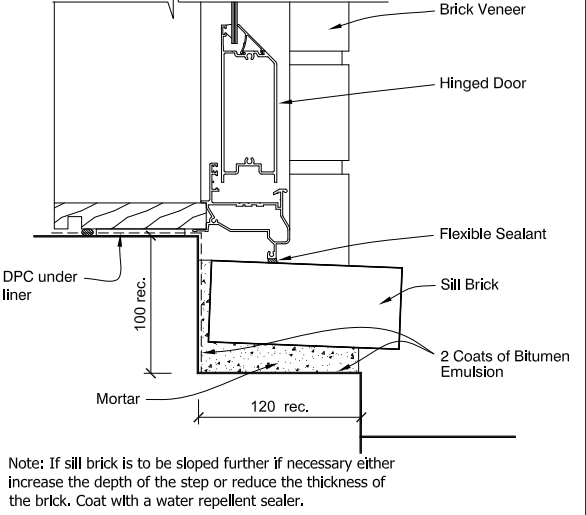


FIG.6 CONCRETE SLAB & FOUNDATION Min. Required for 1 & 2 Storey

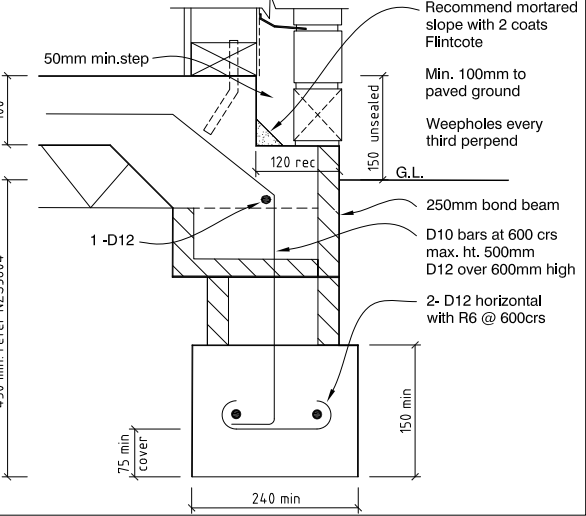




FIG.7 INTERNAL CORNER

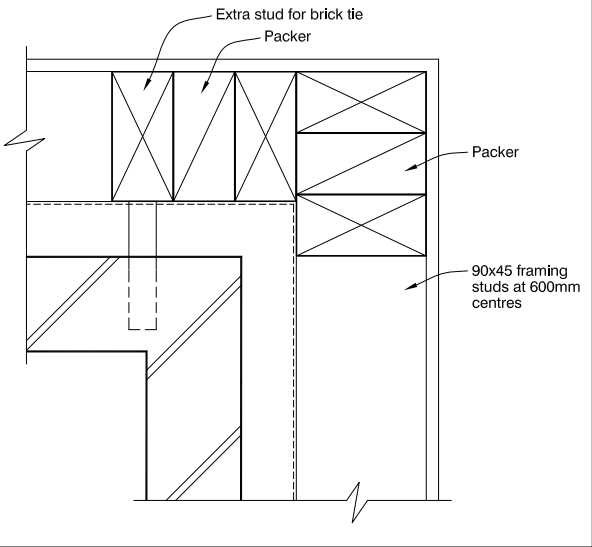


FIG.8 CONTROL JOINTS

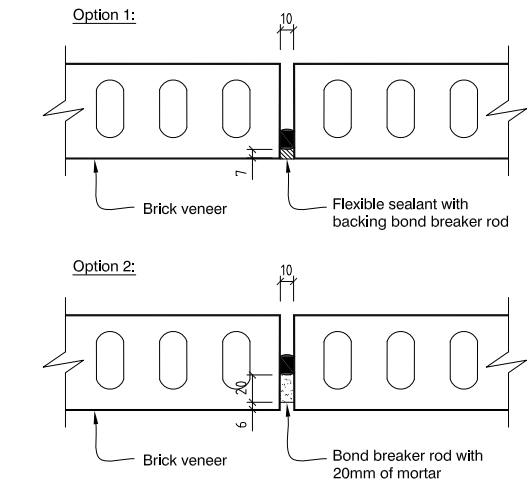


FIG.9 LINTEL BAR - TRADITIONAL

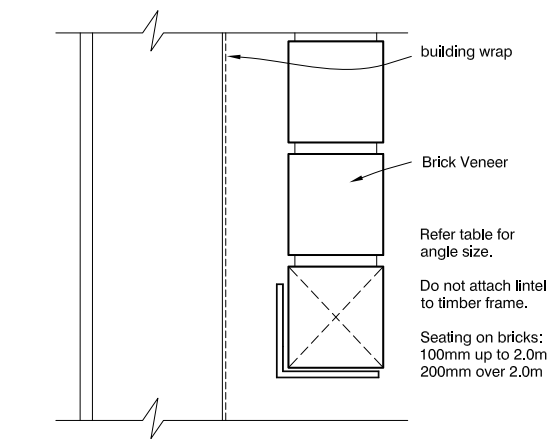


FIG.10 LINTEL BAR - FIXED TO FRAME  
ALTERNATIVE SOLUTION

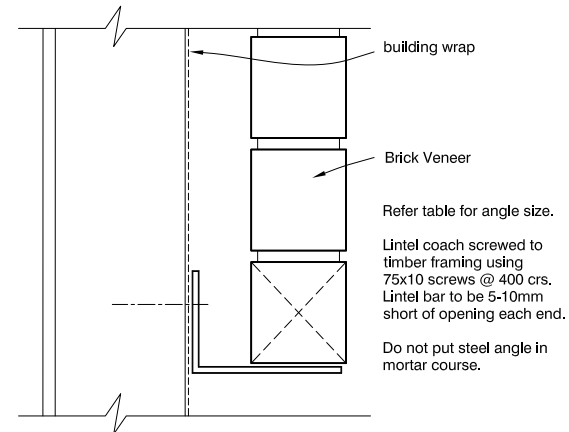


FIG.11 METER BOX

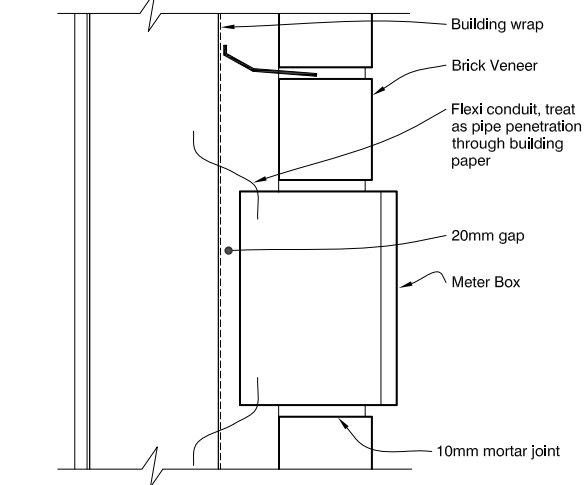
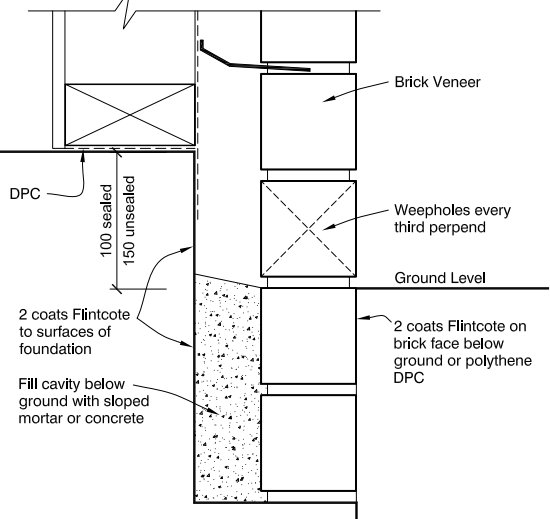


FIG.12 BRICK VENEER BELOW GROUND  
ALTERNATIVE SOLUTION



# External Moisture – Acceptable Solution 1 E2/AS1 Masonry (Dec. 2011)

## Comment & Details

### How to build compliant brick veneers

Brick veneer has been in the New Zealand market, and an acceptable method of cladding a dwelling or building, since at least NZS1900, introduced in 1964.

Brick veneer until recent times, has always been associated with the light timber framing standards, and in particular NZS3604. However, with the revision of NZS3604 in 2011, it was decided to remove the brick veneer from this document and represent it in the Building Code along with other claddings under External Moisture (E2) in the form of an ‘Acceptable Solution’ for Masonry Veneers, known as E2/AS1 Masonry. It should be noted that the ‘Acceptable Solution’ incorporates the Materials and Workmanship standard NZS4210:2001.

If you design and build exactly to the specification provided in any ‘Acceptable Solution’, it will be approved as compliant by the Building Consent Authority (BCA) in whose area the masonry veneer is being constructed. A Licenced Building Practitioner (LBP), which can be the bricklayer or the builder, can then sign the Record of Works (RoW) as being compliant with E2/AS1

When you have a detailed descriptive solution such as E2/AS1 Masonry, to acknowledge compliance with the Building Code, it must be followed to the letter, which may be extremely difficult to achieve just from a practical building perspective alone. A simple example would be; mortar joints **must be** between 7 and 13mm in thickness. If a joint was found to be 6mm or 14mm you could not sign the veneer off as being compliant with E2/AS1, there is no such thing as it ‘nearly complies!’

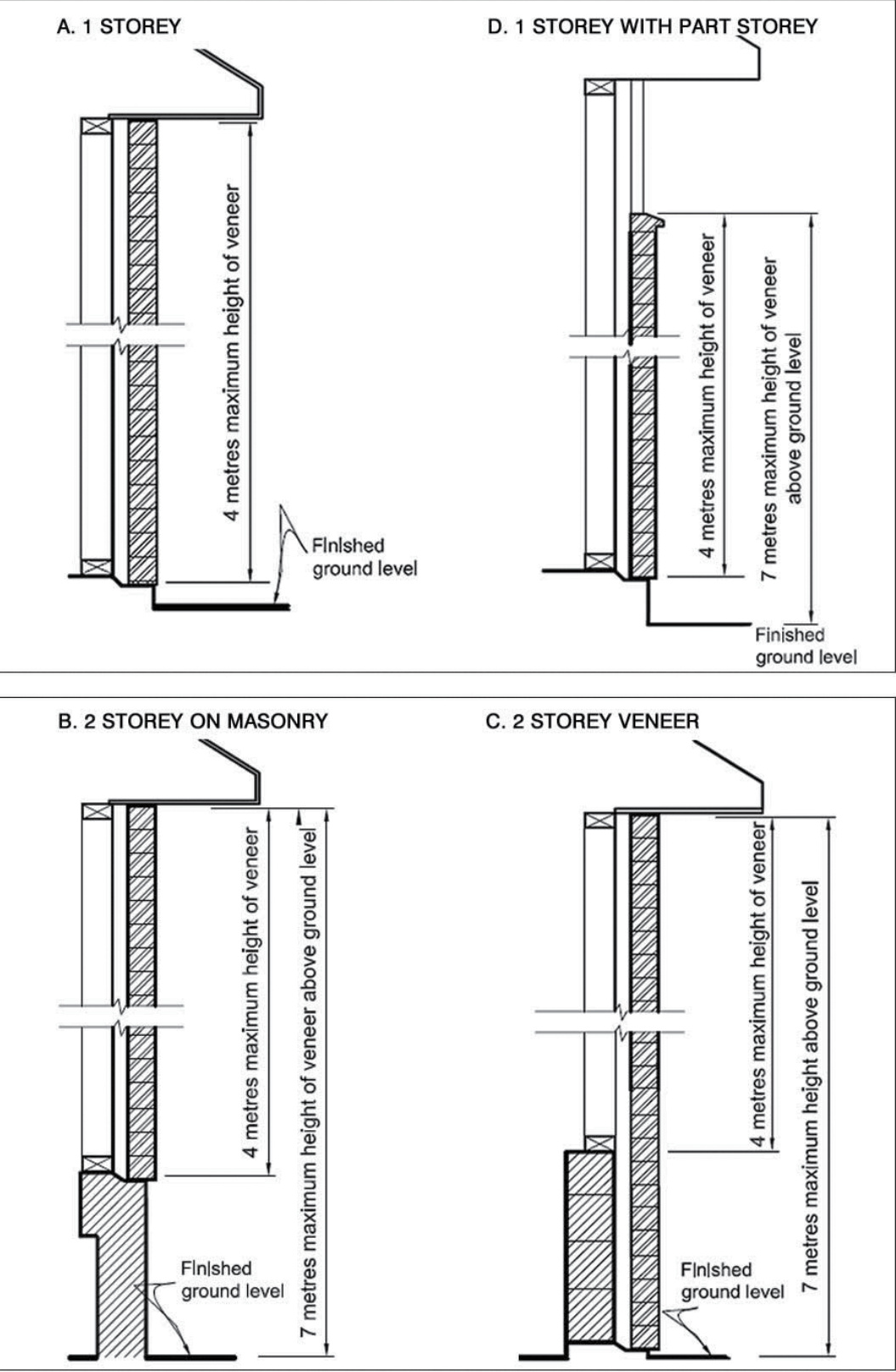
If you are building to E2/AS1 Masonry, and for **whatever** reason, an item, detail or aspect of the veneer will not or does not meet the requirements of the ‘Acceptable Solution’, this does not mean to say that the veneer does not comply with the Building Code, and in particular, sections B1, B2, E2; it just means it does not meet the conditions presented in the ‘Acceptable Solution’ for masonry veneers.

What happens now? If the project has been designed and built using a ‘Specific Design’ supplied by an appropriately qualified and or experienced person, acceptable to the BCA, then that is one approach in seeking compliance. If one is designing and building to E2/AS1 Masonry, and there is an item or items that do not comply with the ‘Acceptable Solution’, but would still meet the Building Code or its intent, one can submit to the BCA in writing an ‘Alternative Solution’ to the method prescribed in E2/AS1 Masonry. This may be done by way of a letter, a Producer Statement, or a Design Certificate from a suitably qualified or experienced person who is registered with the BCA; and depending on what the change is a revised Certificate of Works, (CoW) may also be required. The Ministry of Business Innovation and Employment (MBIE) have on their website a set criteria for documenting alternative solutions. What is **important** however is that you receive acceptance of this solution **in writing** from the BCA, verbal approval is unacceptable and readily forgotten! Note: When the BCA approve ‘Alternative Solutions’ they should be and invariable are, site specific and relative only to the building consent involved.

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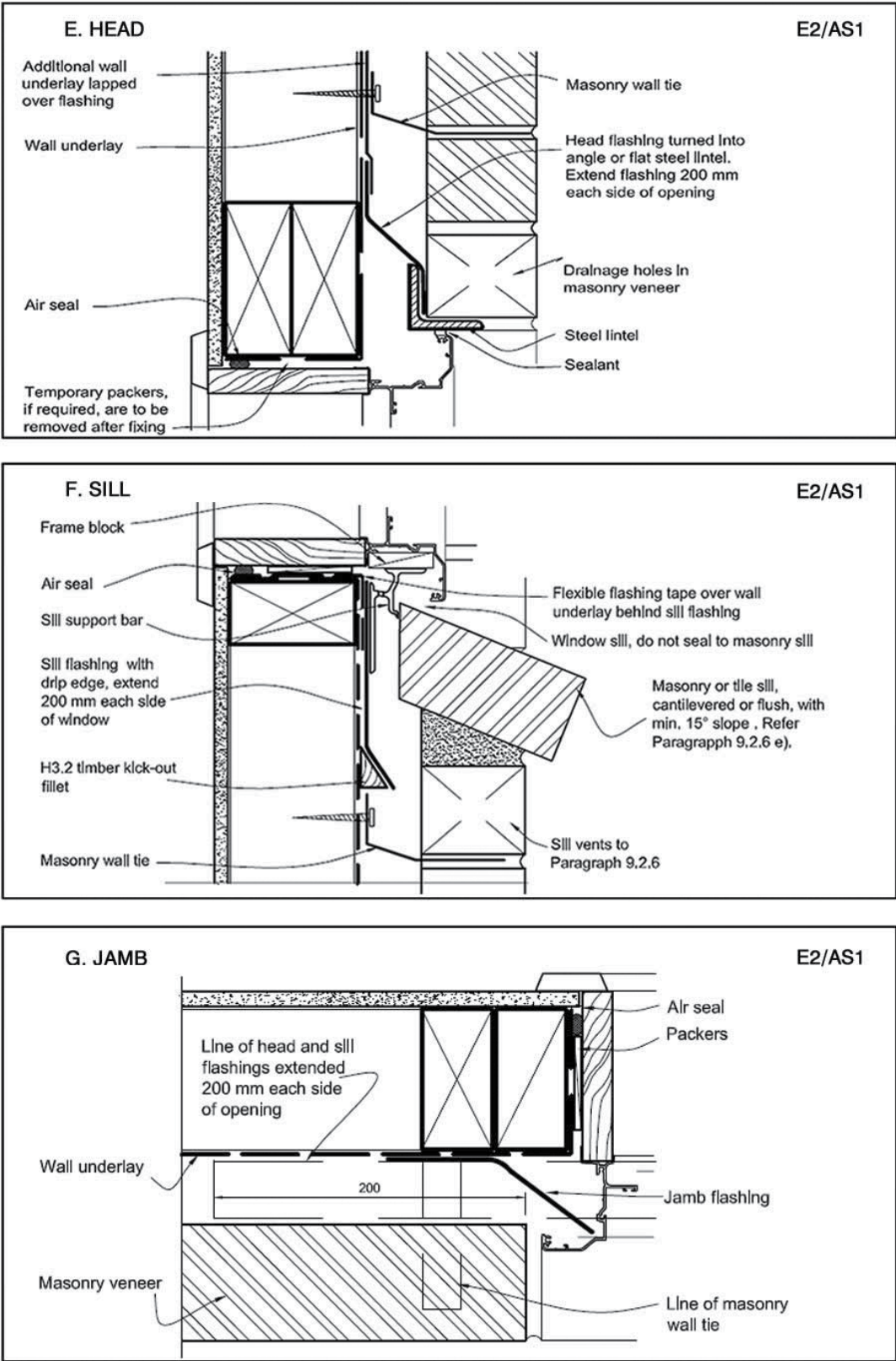
EXTERNAL MOISTURE - ACCEPTABLE SOLUTION 1 (E2/AS1)  
MASONRY (DEC. 2011)

HEIGHT LIMITS - CONSTRUCTION OPTIONS



EXTERNAL MOISTURE - ACCEPTABLE SOLUTION 1 (E2/AS1)  
MASONRY (DEC. 2011)

MASONRY VENEER WINDOW AND DOOR INSTALLATION

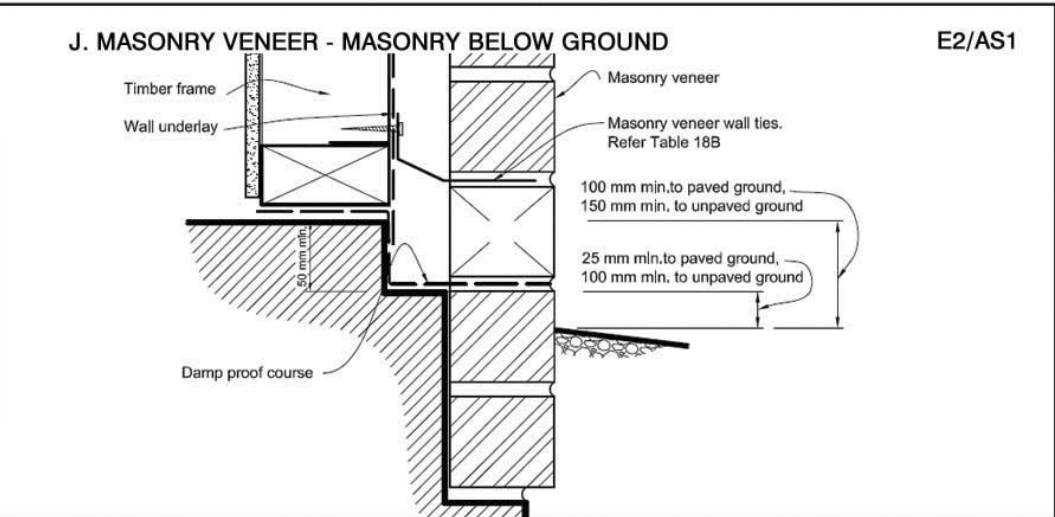
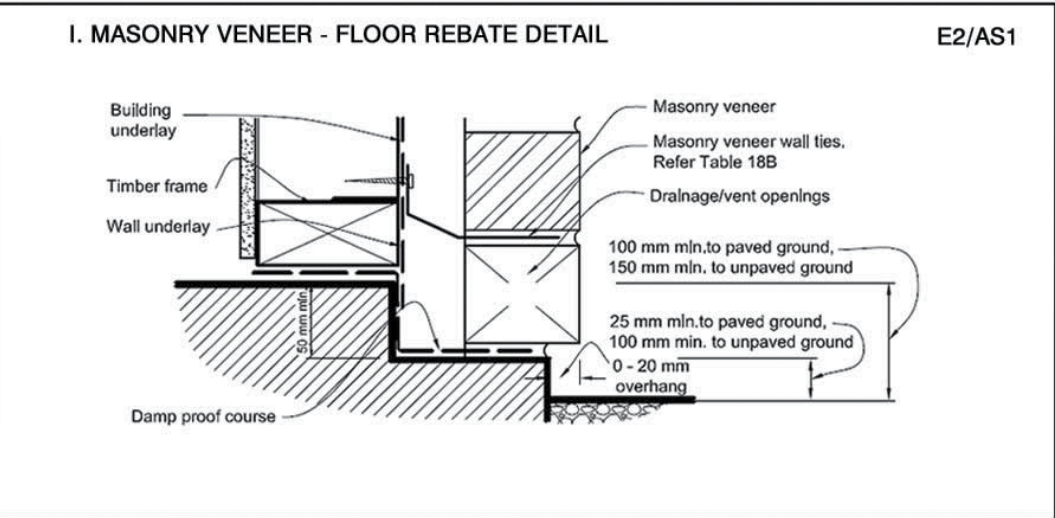
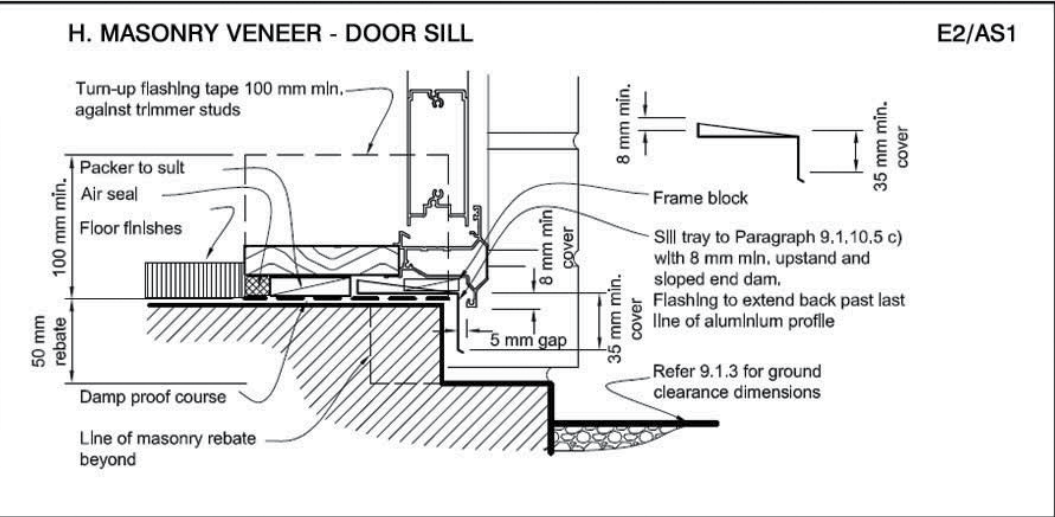




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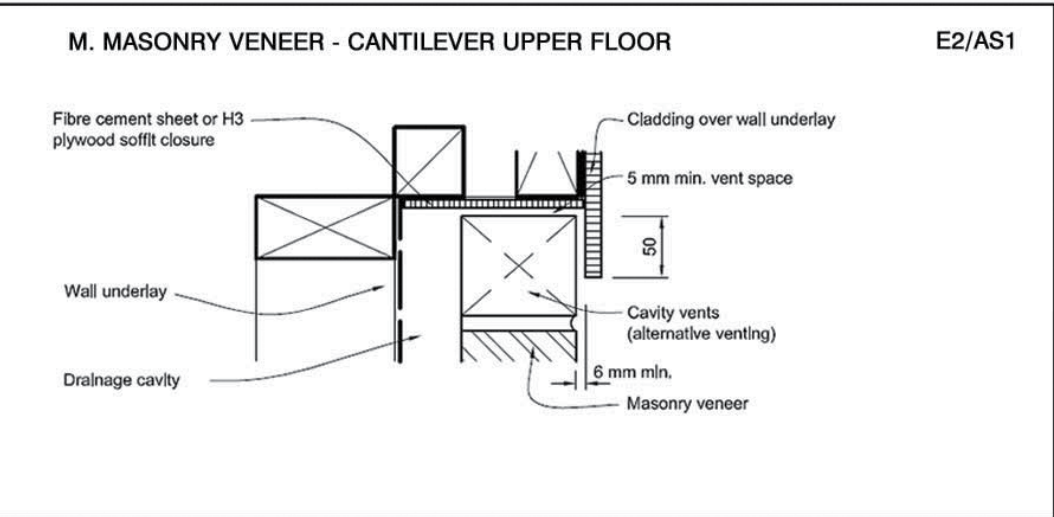
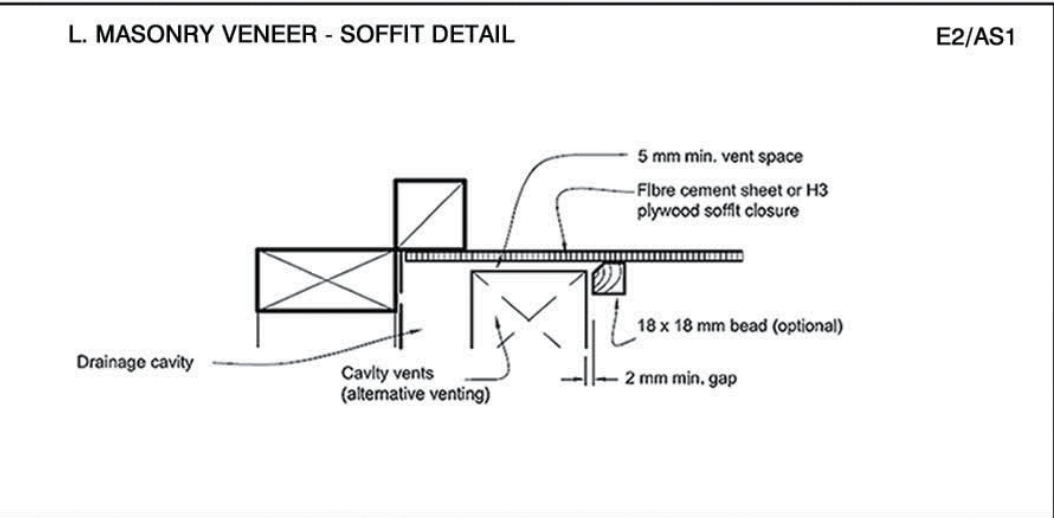
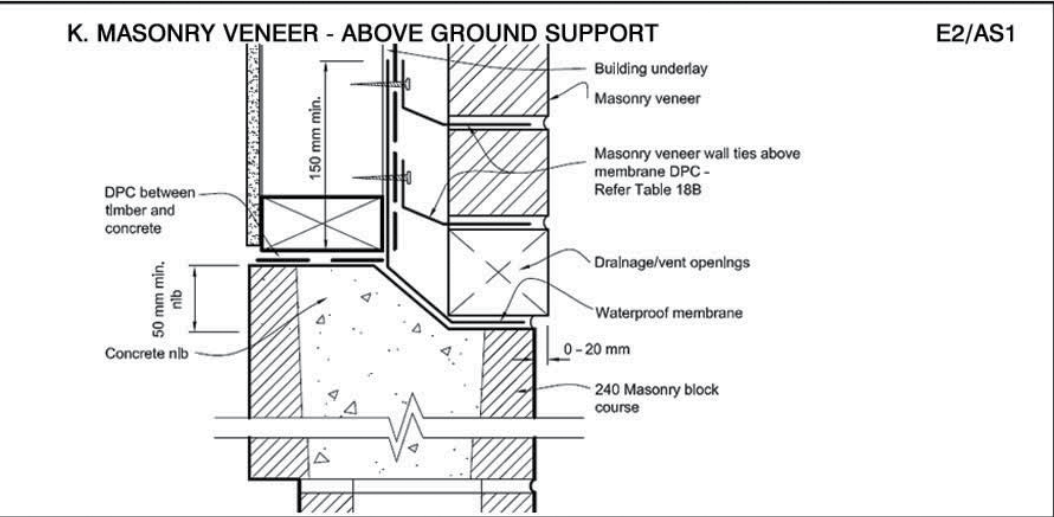
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MASONRY (DEC. 2011)

MASONRY VENEER DETAILS



EXTERNAL MOISTURE - ACCEPTABLE SOLUTION 1 (E2/AS1)  
MASONRY (DEC. 2011)

MASONRY VENEER DETAILS





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or visit our website at [www.midlandbrick.co.nz](http://www.midlandbrick.co.nz)

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Christchurch, New Zealand  
Ph: 03 343 6620  
Fax: 03 343 6629

PRODUCT TECHNICAL STATEMENT

# CUSTOM ORB®

## ✦ Profiled Metal Roofing and Cladding

### NOMINAL DIMENSIONS



### DESCRIPTION

**Custom Orb®** is a premium quality corrugated profile manufactured under licence to BHP.

### APPLICATIONS

- Residential Roofing & Cladding
- Industrial/Commercial Roofing & Cladding
- Curving
- Specialty Cladding
- Ceilings and Linings

### FEATURES

Corrugated steel is a timeless classic. **Custom Orb** is manufactured to controlled tolerances, allowing it to be used with confidence in a great variety of applications.

**Custom Orb** can be roll curved (bullnosed) to 400mm radius, or spring curved to radii greater than 9 metres depending on grade, thickness and material used (see *Spring Curved Custom Orb Design Guide* for details). It is also popular in perforated patterns for decorative or sound control situations. Matching translucent sheeting is available in G.R.P. (fibreglass) and Polycarbonate.

### MATERIALS

Available in metallic coated and pre-painted steel in .40mm and .55mm B.M.T. (base metal thickness), aluminium plain and prepainted in .70mm and .90mm, and other non-ferrous metals.

### FASTENERS

Typically: Steelfix 12g x 45mm, Timberfix 12g x 55mm, Class 4 minimum, of material compatible with that being fastened and durability no less than the sheet material. Class 5 or non-ferrous fasteners are recommended for severe or very severe marine environments.

### DURABILITY

All material selections must be compatible with prevailing environmental conditions and adjacent materials, see *Roofing Solutions Product Guide* or *Specifiers Guide* for details. Areas not exposed to rain washing will require programmed maintenance.

### WARRANTY PLUS

Steel & Tube **WarrantyPlus** is the most comprehensive warranty available in the industry. **WarrantyPlus** covers an extended range of performance criteria, is supported back-to-back by our suppliers, includes site-specific maintenance requirements and is transferable to subsequent owners.

## PERFORMANCE DATA

### MASS (KG/M<sup>2</sup>)

.40mm B.M.T.	4.08	.55mm B.M.T.	5.54
--------------	------	--------------	------

### MAXIMUM SPANS

Base Metal Thickness (mm)	Maximum Spans (mm)	
	Roof	Walls
0.40	1200	1800
0.55	1600	2400

### FASTENING REQUIREMENTS

Base Metal Thickness (mm)	Fixings per sheet per support	Roof Span (mm)		
		900	1200	1500
0.40	3	•	•	N/R
	4	•	•	N/R
	5	•	•	N/R
0.55	3	••	•	•
	4	••	•	•
	5	••	•	•

\* Suitable for Controlled Traffic \*\* Suitable for Heavy Traffic N/R Not Recommended

Wind Zone	High	Very High	Extra High	SED
Design Wind Speed (m/s)	<44m/s	<50 m/s	<55 m/s	<60m/s
Load ULS (kPa)	2.32	3.00	3.63	4.32

#### Notes:

- End spans should be not more than 2/3 of maximum internal spans.
- Sheet ends should be fastened through every second crest.
- To correlate Wind Zone figures to kPa a local pressure factor of 2 has been applied to the entire roof. Specific design is required for roofs designed in accordance with NZS1170 where a local pressure factor of 3 occurs over areas greater than one sheet width or end purlin spacing.
- The above tables are governed by serviceability load factors applicable to normal buildings (importance level 2) for all geographic areas.

## MINIMUM PITCH

In accordance with Acceptable Solution E2, the minimum pitch for **Custom Orb** for roofing dwellings is 8°. Roof runs in excess of 12 metres should be checked for water runoff capacity.

## FOOT TRAFFIC

Foot traffic up the roof must take place with load spread equally across two crests, or over purlin lines. Traffic across the roof must take place along purlin lines.

## SPECIFICATIONS

Recommended specifications are available in the branded sections of MasterSpec *BASIC* or MasterSpec *STANDARD*, or from your local Steel & Tube branch or visit [www.steelandtube.co.nz](http://www.steelandtube.co.nz).

## DESIGN DETAILS

Design details covering many applications are available on our website in CAD and PDF under each product section. Visit [www.steelandtube.co.nz](http://www.steelandtube.co.nz).

## IMPORTANT PUBLICATIONS

For your installation to perform to its potential, it is essential that it is designed, installed and maintained in accordance with good trade practice. Please refer to:

- Steel & Tube: Roofing Solutions Product Guide
- Steel & Tube Roofing Products: Spring Curved Custom Orb Design Guide
- New Zealand Steel: Installation Guide
- New Zealand Steel: Builders and Specifiers Guide
- BRANZ: Good Profiled Metal Roofing Practice
- MRM: New Zealand Metal Roofing and Wall Cladding Code of Practice
- E2/AS1

## INSTALLERS

A list of local installers for your area and contract type is available from your local Steel & Tube branch or visit [www.steelandtube.co.nz](http://www.steelandtube.co.nz).

#### Trademark Note:

Masterspec is a registered trademark of Construction Information Limited.  
CUSTOM ORB is a registered trademark of BlueScope Steel Limited.



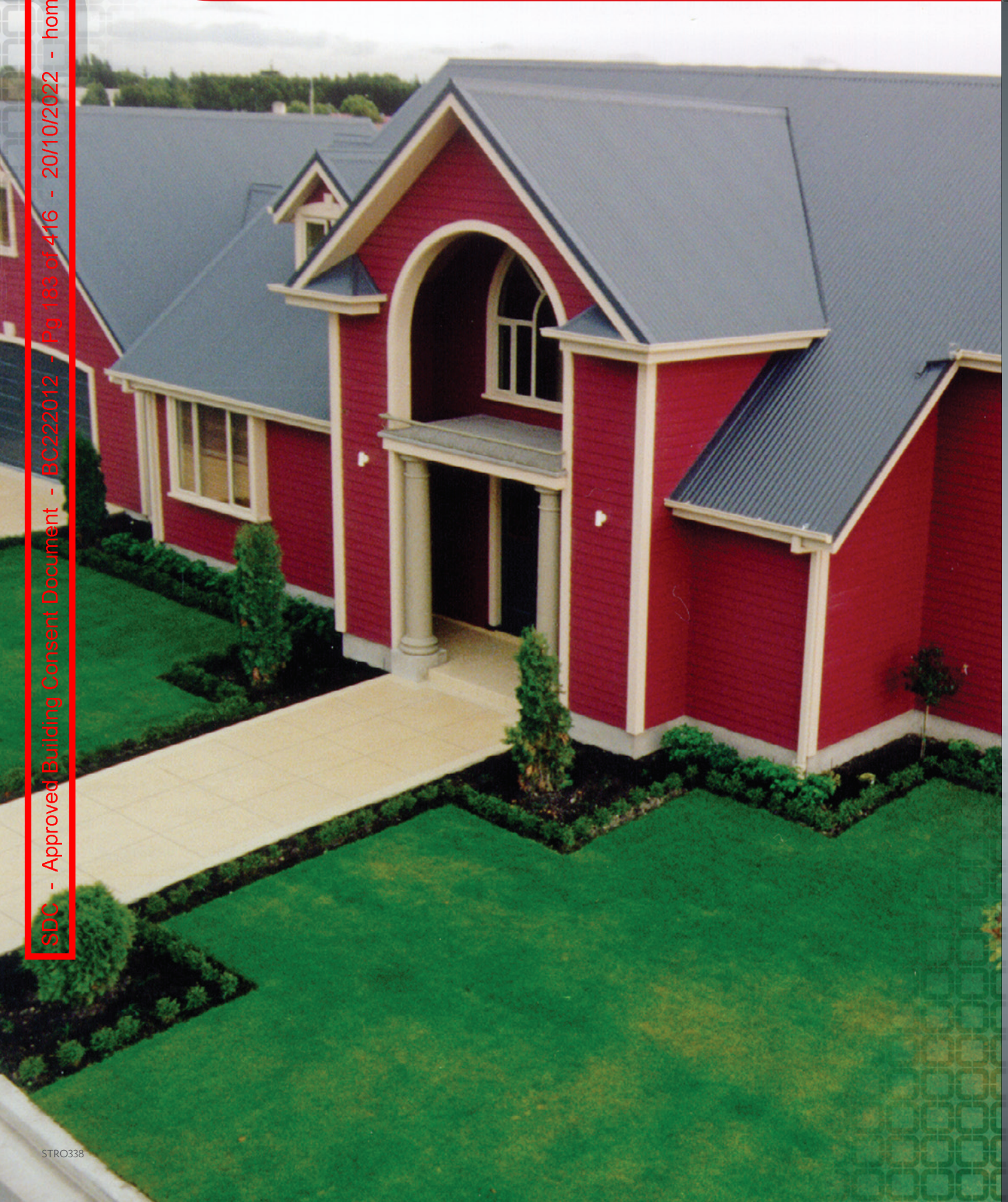
SOUTH ISLAND GUIDE

# RAINWATER SYSTEMS

SPOUTING & FASCIA

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SOUTH ISLAND GUIDE › RAINWATER SYSTEMS





## RAINWATER SYSTEMS: SPOUTING & FASCIA

### THE NATURAL CHOICE FOR STYLE AND STRENGTH IN RAINWATER SYSTEMS

As a long-time innovator in rainwater systems, Steel & Tube has a range of products to enhance any building. For any style of home, rural and industrial building, there are proven systems that are strong, practical, affordable and very attractive.

### FEATURES

#### STYLE AT HOME

With a range of spouting profiles to complement conventional and contemporary styled homes, or the option of a concealed fascia gutter system, you are certain to find a look you'll love. Our range of residential spoutings are suited to any roof type or pitch, and can be attached to the Multiline External metal fascia system using our patented bracket system. Alternatively, they can be fastened directly to a timber fascia using concealed brackets. Make your choice from a wide range of modern and traditional colours, or unpainted Zinalume for economy and the latest style statements. Selected products are also available in copper for a timeless alternative.

#### READY FOR THE BIG JOBS

With a range of standard industrial spoutings, or custom design and manufacture for larger projects, designers have peace of mind when selecting products for commercial and industrial applications.

#### IT'S EASY TO LOOK GOOD

To make it easy to get a great looking finish, selected products feature accessories such as ready-made stop-ends and corners, and optional Flush-Fit end laps.

#### DURABILITY

Products selected and maintained in accordance with Steel & Tube Roofing Products' recommendations on environmental categories, will meet the performance expectations in regard to durability as expressed in the New Zealand Building Code.

#### DRINKING WATER

All pre-painted and metallic coated products supplied by Steel & Tube are guaranteed as being suitable for the collection of drinking water.

#### QUALITY

Steel & Tube's operations are all certified to a minimum standard of ISO 9002 for the manufacturing, marketing and delivery of metal roofing and rainwater products.

### MATERIALS

New Zealand is exposed to a wide range of environmental conditions, from harsh West Coast beaches through moderate inland locations to industrial and geothermal sites. All rainwater systems are available in a range of finishes to suit any environment. Prior to selecting a product from this guide discuss the particular site conditions with your preferred supplier to ensure the profile and finish will perform to your expectations.

#### PROTECTIVE FILM

To ensure the surface is not damaged during transport and handling, prepainted materials have a protective strippable film. This should be removed during installation, and before prolonged exposure to sunlight.

#### COMPATIBILITY

Contact with or water run off from dissimilar metals such as lead, copper or stainless steel should be avoided with any Colorsteel or Zinalume product. In particular avoid discharging copper spouting or downpipes from upper storeys onto lower roof sections. Monel rivets should not be used.

#### COLOUR MATCHED PAINT

The use of colour matched paint for the touching up of scratches is not recommended, as the paint has different weathering characteristics to pre-painted materials. Accessories should be colour matched before installation.

### MAINTENANCE AND WARRANTIES

#### MAINTENANCE

Few products are absolutely maintenance-free and all are subject to the cumulative effects of weather, dust, salt and other airborne deposits – some of which are extremely aggressive. In order to ensure the maximum service life from the chosen coating system, the property owner should note: Normal rainwashing will remove some atmospheric debris, but manual washing is required for areas that do not receive adequate rainwashing, specifically the underside of spouting, and the fascia surface, which is sheltered by the spouting attached to it.

**As high-risk areas, these require regular manual washing as a condition of the warranty:**

Environment	Very Severe	Severe	Moderate
Washing Required	Monthly	Every three months	Every six months

Surfaces may be washed with water and a soft bristled brush. For hard to access areas, waterblasting at pressures up to 20mPa may be more appropriate. In all cases spouting should be cleaned out at least every six months; more frequently in marine areas or where fallout from leaves etc, is severe. Refer to New Zealand Steel's *Specifiers & Builders Guide* for more information.

#### WARRANTIES

Depending on material and environment, products may be eligible for a **WarrantyPlus** of up to 10 years covering paint surfaces, up to 10 years against perforation of spouting as a result of corrosion, and up to 15 years against perforation of fascia as a result of corrosion. Note that selecting a suitably durable material is important – refer to your preferred supplier, Steel & Tube, or New Zealand Steel's *Specifiers & Builders Guide* for further information.



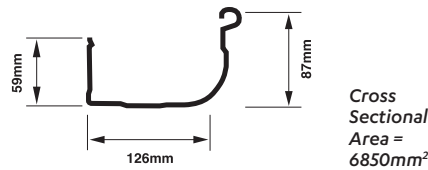


## RAINWATER SYSTEMS

### TRADITIONAL

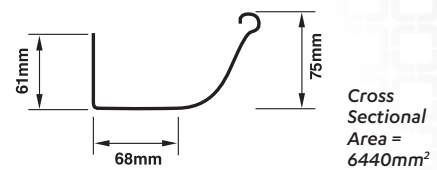


#### MULTILINE QUAD



- **Multiline Quad** captures the colonial look with its gentle radius front and strong swaging, blending traditional design with the styles of today.
- **Multiline Quad** has an optional slotted overflow system.
- **Multiline Quad** is fitted using fully concealed brackets.

#### 125 QUARTER ROUND

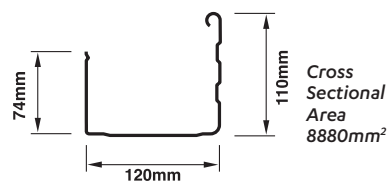


- **125 Quarter Round** is a classic quarter round with a smooth, uncluttered appearance to suit either traditional or modern aesthetics.
- **125 Quarter Round** can be fitted with concealed brackets to enhance the clean, smooth lines or with external brackets for a timeless look.

### CONTEMPORARY

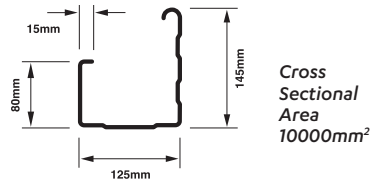


#### MULTILINE SQUARE



- **Multiline Square** is ideal for use where modern square lines are required, and has a high face to better cover the end view of domestic roofing systems.
- **Multiline Square** has an optional slotted overflow system.
- **Multiline Square** is fixed using concealed clips to maintain a clean, uncluttered appearance.

#### PLUMBLINE

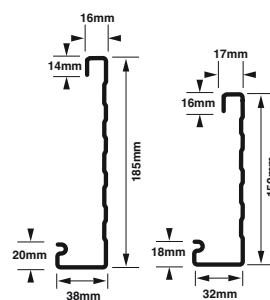


- **Plumblin** provides a large capacity domestic spouting which is also at home on smaller commercial work.
- **Plumblin** has a strong profile with a double swaged face and swaged base.
- **Plumblin** is fixed using concealed clips for emphasis of its bold lines.

### FASCIA SYSTEMS



#### MULTILINE FASCIA – EXTERNAL

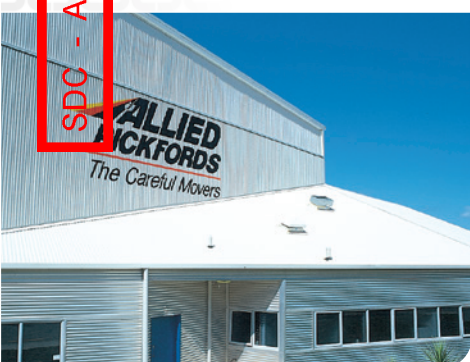


- An attractive and economical advance over timber fascias, **Multiline Fascia** can be fitted with a range of spoutings for contemporary or traditional appearances.

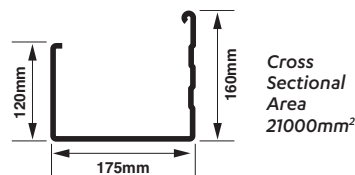
- **Multiline Fascia** uses a uniquely designed rafter bracket to prevent denting and damage in metal fascias due to differential movement of trusses and rafters.

Steel & Tube's fascia systems are available exclusively through recommended installers.

### COMMERCIAL GUTTERS

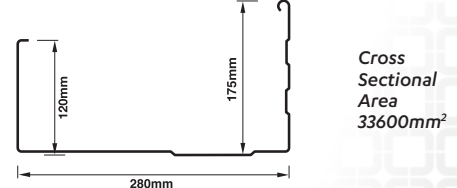


#### 175 GUTTER



- The most commonly specified commercial gutters are 175mm and 300mm however as each are specifically folded the dimensions can be varied greatly to suit any application provided appropriate fixing brackets are sourced.
- Standard pressed internal brackets are available for the 175 gutter, however for extra strength specially fabricated steel external brackets are recommended (colour matched if required).

#### 300 GUTTER



- Steel & Tube provide details regarding industrial gutter bracket design and placement, as part of the Steel & Tube's roofing and cladding solutions information, visit your local branch or [www.steelandtube.co.nz](http://www.steelandtube.co.nz).

**Note: All profile dimensions are nominal**

## DESIGN

### DRAINAGE REQUIREMENTS

As the primary function of a spouting or guttering system is the dispersal of rainfall from a roof area into a stormwater drain, it is important to have adequate sizing and placement of downpipes. The drainage requirements are influenced by a wide range of factors, including regional rainfall intensity and roof pitch. Note that while most urban areas in New Zealand are subject to 100mm/hr rainfall intensity, some are not – your Territorial Authority can confirm. Designers should refer to Acceptable Solution E1/AS1 of the New Zealand Building Code for further information.

Typical maximum areas for residential spoutings and popular downpipe sizes are summarised in the table below. For example:

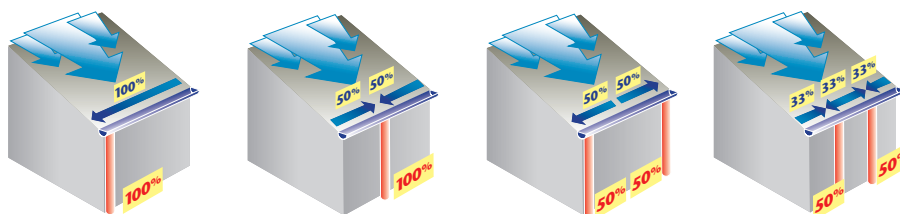
- Select spouting = Multiline Quad
- Select rainfall = 100mm/hr
- Select roof pitch = 30°

Therefore, outlets should take a maximum of 54m<sup>2</sup> of roof area each.

Roof Pitch	Typical Maximum Roof Area (m <sup>2</sup> ) per outlet													
	Spouting									Downpipes				
	Multiline Quad, 125 Quarter Round			Multiline Square			Plumblin			Round (mmø)			Rectangular (mmxmm)	
	Regional Rainfall Intensity mm/hr			Regional Rainfall Intensity mm/hr			Regional Rainfall Intensity mm/hr							
	100	150	200	100	150	200	100	150	200	65	75	100	100 x 50	75 x 50
<10°	65	43	33	89	59	44	100	67	50	60	85	155	100	73
10-24°	59	39	30	81	54	40	91	61	45	60	85	155	100	73
25-34°	54	36	27	74	50	37	83	56	42	50	70	130	80	61
35-44°	50	33	25	68	45	34	77	51	38	40	60	10	70	50
45-55°	46	31	23	63	43	32	71	48	36	35	50	90	60	43

### DOWNPIPE PLACEMENT

Downpipe placement can have a substantial impact on the effective roof area being served by a downpipe or section of spouting.



Proportion Of Roof Area Drained By	A: One Downpipe At End Of Run	B: One Downpipe At Centre Of Run	C: Two Downpipes At Ends Of Run	D: Two Downpipes At Third Points
Each spouting section drains	100%	50%	50%	33%
Each downpipe drains	100%	100%	50%	50%

### FALL

To perform satisfactorily spoutings should have a consistent fall towards the nearest outlet to promote drainage and avoid ponding. The recommended minimum fall for external spoutings is 1:500, or 2mm fall for every metre of run.

## HANDLING, STORAGE AND INSTALLATION

### HANDLING AND STORAGE

Care must be taken to avoid damage by handling and storage. The product should be handled with care to preserve the quality of the finish and stored clear of the ground on site. Do not drag any other building materials or roof sheeting over the fascia or spouting. Due care must be taken when lifting long lengths.

#### Note:

Trademarks apply to the following products presented in this publication: Multiline, Plumblin, Colorsteel, Zinalume.

### INSTALLATION

- Cutting must be done by shear using tin snips, or by hacksaw.
- Fasteners must be compatible with the materials used.
- The use of abrasive disc cutters or grinders above or adjacent to the products by roofers or other trades, is against trade practice and must be avoided, otherwise swarf staining will result.
- Do not use black lead pencils for marking products.
- During fixing, the spouting must be cleaned of all loose debris.
- At all times, contact with wet concrete, lime, mortar acids and treated timber must be avoided.
- On completion, the whole area can be cleaned by hosing and soft brushing.
- Residential spoutings should have brackets spaced at a maximum of 900mm under normal conditions.

# Installers Guide

August 2021







## INTRODUCTION

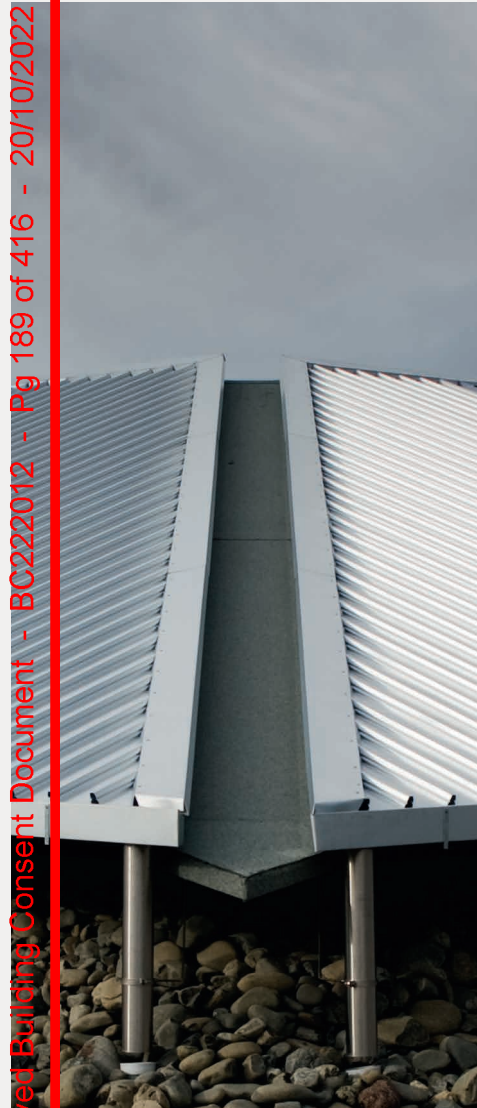
New Zealand Steel takes a great deal of pride in manufacturing top quality products and knows that the final appearance is influenced by the skills and care taken with the material. This guide provides recommendations on the correct installation of COLORSTEEL®, Zinalume® steel and Galvsteel® material. To obtain optimum durability of these products, handling and fixing procedures appropriate to the material, application and environment must be used.



# MATERIALS

A variety of steel coating systems are offered:

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## ZINCALUME®

Steel with an alloy coating consisting of 55% aluminium, 45% zinc by weight which offers superior corrosion resistance compared to galvanised steel in most environments (particularly coastal environments).



## GALVSTEEL®

Traditional galvanised steel is offered under the trade name of Galvsteel®. This material is coated in 99% pure zinc.



## COLORSTEEL®

COLORSTEEL® describes those steel building materials which have an oven-cured paint system applied to a flat galvanised or Zincalume® base on a continuous 'coil to coil' operation at the New Zealand Steel Glenbrook works. The pre-painting process improves both the looks and the durability of the finished product.

**The brand name COLORSTEEL® is unique to materials manufactured by New Zealand Steel and must not be applied generically to other pre-painted products.**



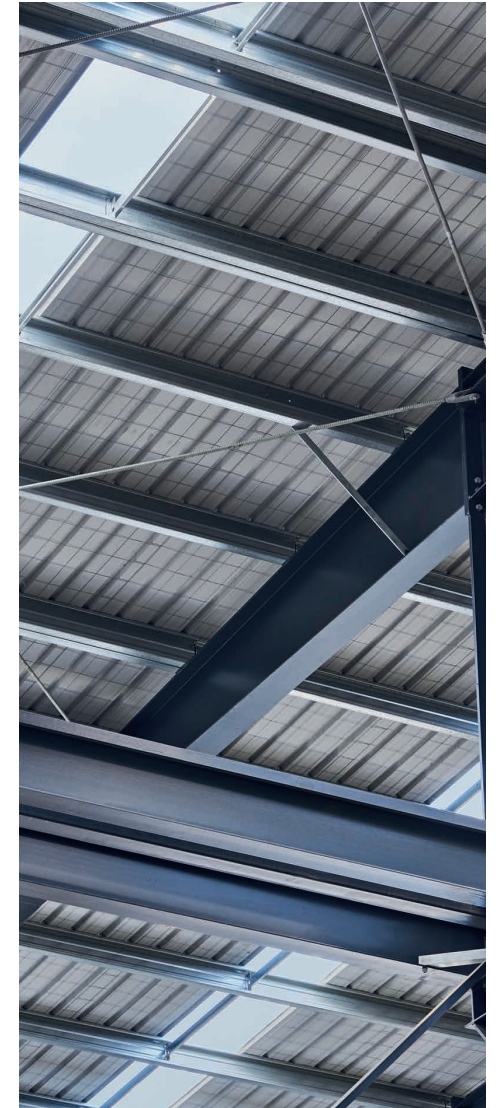
## COLORSTEEL ENDURA®

Has a Zincalume® substrate with an AZ150 coating class, (i.e. 150 g/m<sup>2</sup> of aluminium/zinc alloy). It is suitable for most moderate to severe marine applications.



## COLORSTEEL MAXX®

Has a Zincalume® substrate with an AZ200 coating class, (i.e. 200 g/ m<sup>2</sup> of aluminium/zinc alloy), to give enhanced performance in very severe marine environments.



## COLORSTEEL DRIDEX®

Have an absorptive layer of fleece on the underside, negating the need for separate roofing underlay. These products must be installed by an accredited COLORSTEEL DRIDEX® installer. (Contact New Zealand Steel for details on how to become accredited).



# PRODUCT SELECTION

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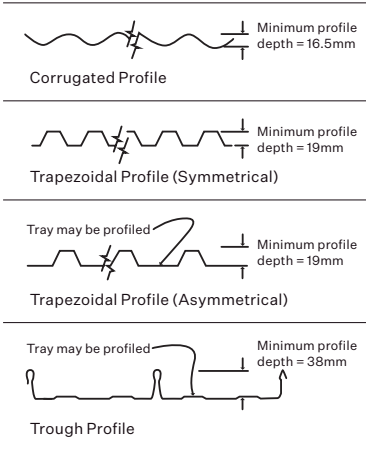


## Appearance

**Colour**  
COLORSTEEL® comes in an extensive palette of colours. Refer to your supplier or the New Zealand Steel brochure Choosing COLORSTEEL® for details. New microwrinkle technology has led to the development of COLORSTEEL® Matte colours, in a limited colour range. COLORSTEEL® Matte requires special care during installation, refer to the COLORSTEEL® Matte installation guide bulletin.

**Glare**  
In some areas, colour choice may be limited by Council regulations, and this should be checked where applicable. Glare off light coloured roofs can sometimes be an annoyance to neighbours and if this is to be considered, refer to the COLORSTEEL® Glare Bulletin.

**Profile**  
Profiles may be described as Corrugated, Trapezoidal (rib) or Secret Fix (Trough, Tray, Standing Seam, Decking).



## Performance

**Strength**  
Different profiles and profile heights will have different strength characteristics. Generally, the higher the profile height the stronger it will be. Refer to roof manufacturer for specific information.

**Environment**  
The boundaries of different corrosion zones are difficult to define because many factors determine the corrosivity of a particular location. Issues such as difficulty of replacement, and access for maintenance should also be considered when making material choices. The designer should choose the appropriate materials for the location, which meet the minimum durability requirements of the NZBC and satisfy customer expectations.

For information on environments, warranties and maintenance see Environmental Categories, Warranty and Product Maintenance Recommendations brochure.

**Compatibility**  
When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. This is known as galvanic or bi-metallic corrosion. A similar problem commonly occurs with water flowing over dissimilar metals.

**Copper**  
Copper is not compatible with Galvsteel®, Zinalume® or COLORSTEEL® products, especially where the two materials are in contact in the presence of water or where water can flow from copper to the coated product. Every effort must be made to prevent the overflow of water from copper pipes on to the roofing and guttering material.


**Lead**  
Lead is not compatible with Zinalume® products. Corrosion will result from contact between the two products, or from water run-off from lead to Zinalume® or COLORSTEEL®.

**Stainless Steel**  
Stainless steel must not be in contact with Zinalume® or COLORSTEEL® products, but run off from stainless steel onto these products is acceptable.

**Galvanised Steel**  
Galvanised steel is compatible in contact with Zinalume®, COLORSTEEL®, aluminium or zinc but these materials must not discharge onto unpainted galvanised steel, as they are inert. Other inert surfaces include any painted surface, glass, PVC and glazed clay tiles.

**Minimum Pitch**  
Different profiles have different minimum pitch limitations.

Profile	Rib Height	Minimum Pitch
Trapezoidal asymmetrical	20 – 25 mm	4°
Trapezoidal asymmetrical	25 – 35 mm	3°
Trapezoidal asymmetrical and symmetrical	36 – 60 mm	3°
Trapezoidal symmetrical	20 – 35 mm	4°
Secret-Fix	>30 mm	3°
Secret-Fix	<30 mm	8°
Standing seam fully supported flat sheet metal	>30 mm	3°
All other types of fully supported flat sheet metal		5°
Corrugated and other profiled sheeting	16.5 – 20 mm	8°
Corrugated and other profiled sheeting	21 – 35 mm	4°

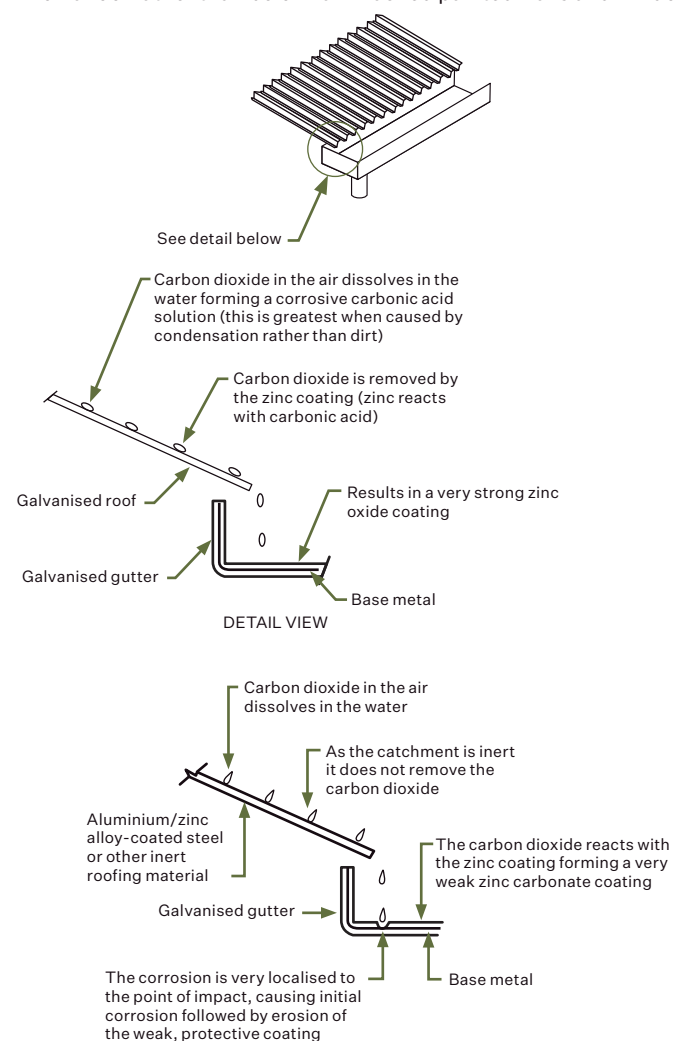
Zinc / Zinalume® / Aluminium	MORE ACTIVE MATERIALS		MORE NOBLE METALS
Steel			
Lead			
Copper and Brass			
Stainless Steel			
This chart lists commonly used metals in a 'Galvanic series'. If any two of these metals are in damp contact or a run-off situation, the metal higher on the table will sacrifice itself to protect the metal lower on the scale. Therefore the simple rule is to remember that you can run water down but not uphill. For example zinc to copper is alright but copper to zinc is not.			

### Inert Catchment

Run-off from inert surfaces such as glazed tiles, aluminium and aluminium-dominant metallic coatings, fibreglass, pre-coated metals, glass or any painted surface can cause corrosion of unpainted galvanised steel and other zinc-dominant metallic coatings. This is known as 'drip-spot corrosion' or inert catchment corrosion.

Water sitting on a surface absorbs carbon dioxide forming carbonic acid, which is reactive with zinc. On a galvanised surface, the carbonic acid reacts with the zinc and becomes neutral. On an inert surface discharging into an unprotected zinc surface, the carbonic acid is not neutralised, and reaction will be concentrated on the drip points of the inert surface onto the zinc surface.

As the formation of carbonic acid takes time to occur, inert catchment corrosion is normally seen at specific drip points of dew off a roof rather than below rain washed painted walls and windows.



### Flashings

Flashings and ridge capping should be manufactured from the same coating system as used for the main roof area, i.e. all COLORSTEEL® products. Higher performance flashings can be used with the main roof i.e. COLORSTEEL® Maxx® flashings with a COLORSTEEL® Endura® main roof, but not the other way around, i.e. COLORSTEEL® Endura® flashings with a COLORSTEEL® Maxx® main roof. Where greater durability is required for flashings behind cladding or other building elements, colour matched alternative metals may be used. It is likely that these flashings will weather at a different rate than the COLORSTEEL®, and differential appearance may occur.

## TAKING DELIVERY

### Checking

Check the delivery to make sure you have the right product, delivered in prime condition. Verify that it is genuine COLORSTEEL®, Zinalume® or Galvsteel® material. Where different brands of pre-painted material are used on the same building, differences in colour, gloss and weathering performance may appear obvious within a short period of time. This will be due to the different paint formulations used by different manufacturers. New Zealand Steel Limited will not accept liability for problems caused by the mixing of brands.

Ensure that the order is complete including all fasteners, accessories etc required to commence installation.

### Unloading

Set out flat area and supporting dunnage to ensure sheets will not be damaged by site debris. When unloading by crane, ensure lifting boom has a spreader bar and that tightening stops do not damage sheet laps. If unloading by hand lift each sheet off the stack without sliding over under sheets, as that may cause damage to the paint.

### Storage

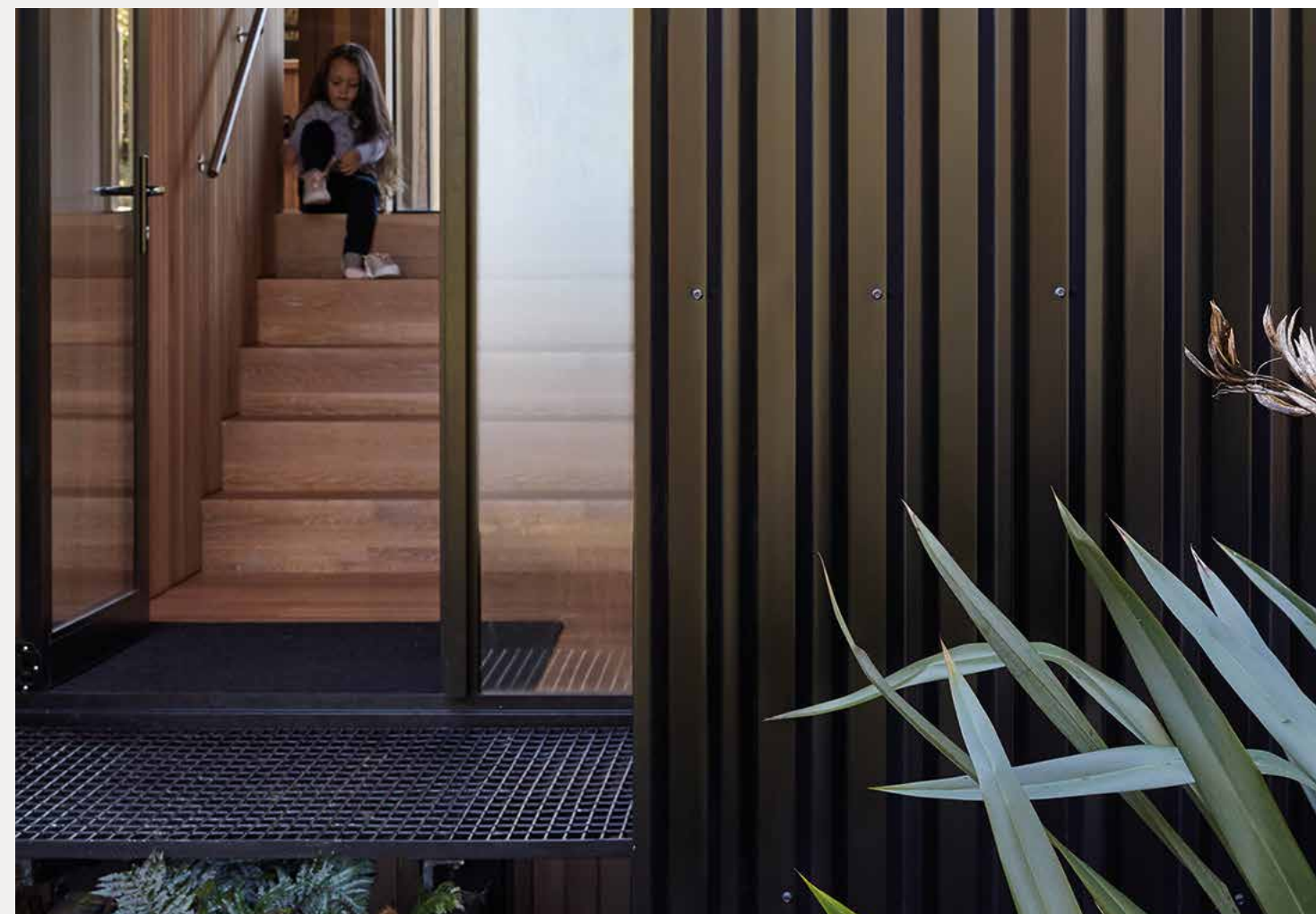
Close stacked sheets may deteriorate rapidly if water enters the pack. Sheets that are delivered wet or become wet in storage must be used immediately or dried. Drying can be done by filleting sheets or cross stacking them on a slope to allow water to drain and air to circulate between the sheets.

Long term storage may only be done in a dry, well ventilated environment.

Protect from contamination from corrosive and damaging substances such as acid, cement, swarf etc.

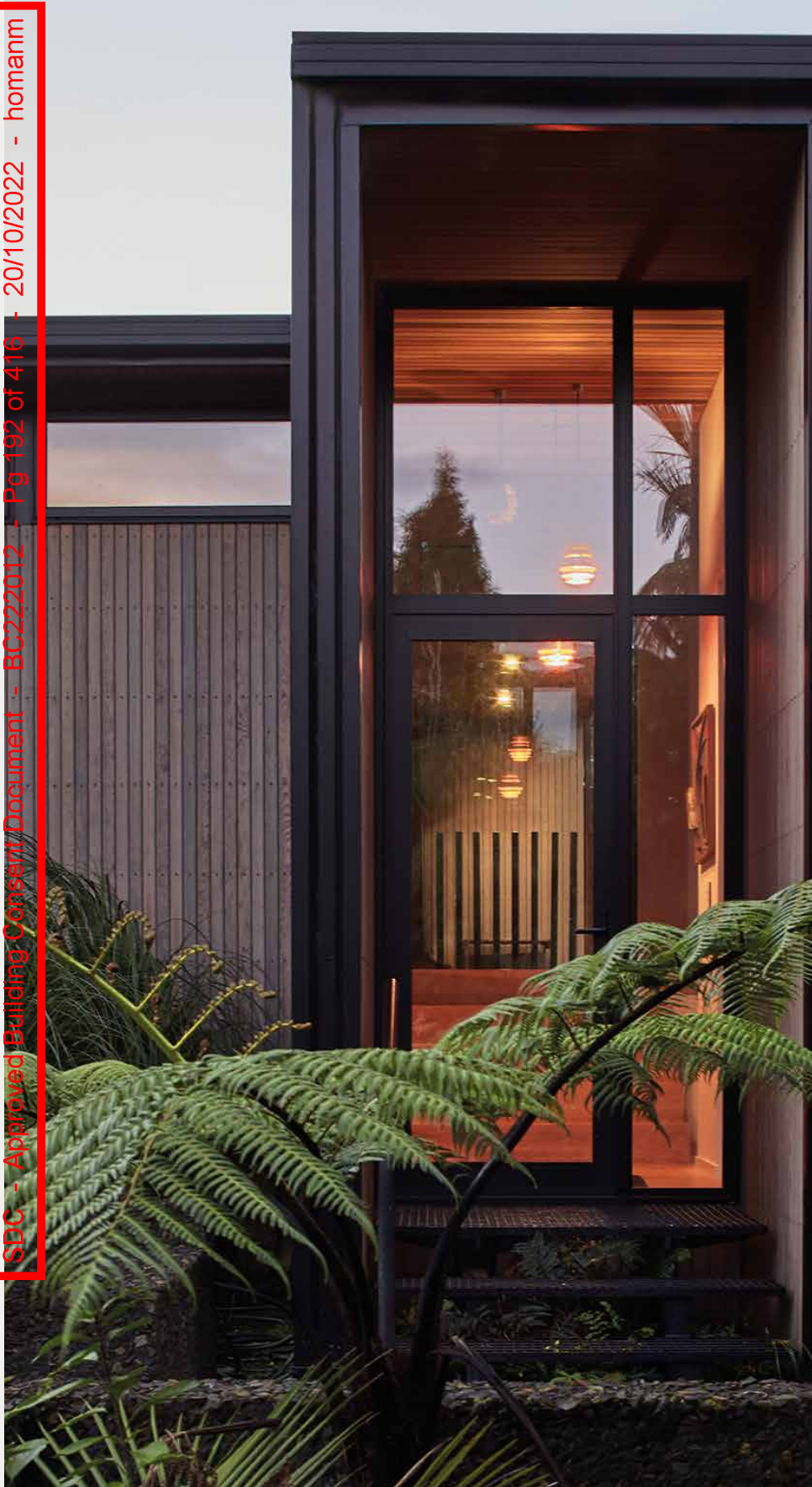
### Wet Storage Damage

Failure to follow these handling and storage precautions could result in spoiling the surface appearance of the products and severely reducing their service life. On Galvsteel® material this will appear as a white corrosion product (white rust), whereas on Zinalume® the corrosion product is black. This should not be confused with fretting. On COLORSTEEL®, the result of wet storage damage could be a bubbling of the paint surface. Damage resulting from such failure invalidates the warranty and is not recoverable from New Zealand Steel Limited.





# INSTALLATION



## Safety

Installing roofs involves many hazards including laceration, electrocution, puncture and falling from height. Prudent PPE and installation practices must be employed, and the guidelines of MBIE “Best Practices for Safe Working at Height” must be strictly adhered to.

## Handling

New Zealand Steel products are of high quality and perform best when handled correctly.

- Don’t handle them roughly or carelessly.
- Don’t drag or slide new sheets over other sheets or rough surfaces.
- All equipment and materials taken on to the roof should be clean and care taken to prevent damaging the surface.

## Footware

- Anyone walking on the roof should wear clean flat rubber-soled footwear to prevent marking.
- Put an old mat or piece of carpet at the base of the ladder so that shoes can be cleaned before going up on the roof, or dirty shoes should be removed and replaced at base of ladder
- Care should be taken walking on roofs as they may be slippery at times.

## Strippable protective film

Strippable film is a clear pressure sensitive polyethylene plastic film that is applied to some COLORSTEEL® products in the New Zealand Steel paint line to assist in protecting the COLORSTEEL® surface from damage and scratching during forming, transportation, handling, storage and erection.

Strippable film is designed to provide some protection to the COLORSTEEL® product prior to and during installation on the building. It is not designed to protect against corrosion, humidity or chemicals.

## Storage

COLORSTEEL® product with film applied must be stored at temperatures less than 50°C and out of direct sunlight to avoid prolonged UV exposure. The product needs to be kept dry to prevent moisture ingress between the film and the painted surface. In the longer term this may cause issues to the COLORSTEEL® and in the shorter term cause the film adhesive to whiten and breakdown leaving residue on the painted surface when the film is removed.

## Usage

Storage requirements for formed products on building sites are as above. The film is intended to protect the painted product up to and during installation, it must be removed directly before or immediately after installation. Failure to do so may result in the film adhesive leaving a residue on the painted surface.

On removal of the film the painted surface must be inspected and any adhesive residue cleaned off. Mild household cleaners be may be used, check that the cleaning product manufacturer recommends the product as being suitable for use with painted surfaces and all of the recommended safety precautions are followed. Ensure the cleaning product is washed off the COLORSTEEL® surface with fresh water after use.

## Marking

Black lead pencils must never be used for marking COLORSTEEL®, Zinalume® or Galvsteel® products. The carbon in the pencil promotes corrosion which will etch the surface of the material, leaving a permanent mark. Use a pencil of any colour other than black, a marker pen, chalk or crayon.

## Cutting

Cut COLORSTEEL® with care to avoid marring the high-quality finish. Cut by shear only, using nibblers or hand shears. Friction blades and high-speed saw blades must not be used. These blades will damage both the metallic coating and the COLORSTEEL® surface by creating excessive heat, and generate large amounts of hot swarf which may embed into the coating surface.

All debris must be swept off the job at the end of each day. Prevention of swarf damage is far easier than its cure. See Swarf Staining Bulletin for more information.

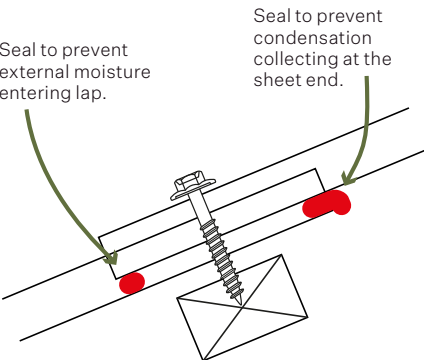
## Sealing and joining

### Sealing

Soldering should not be used on COLORSTEEL® or Zinalume®, use only neutral cure silicone rubber or MS polymer sealants. Pre-align the pieces to be joined and pre-drill if possible. Thoroughly clean off surplus sealant and swarf using a dry, lint-free cloth or plastic scraper. Apply two beads of sealant close to each edge of the joint. Align pieces together and fasten with sealed rivets at 50mm centres.

### End Laps

End laps in profiled metal roofing should be avoided where possible. When unavoidable, the end laps should be sealed with a double bead of sealant as in the illustration below.



## Fastening

The selection of the appropriate form of fastener is important. Fastener durability should equal or exceed that of the material being fastened. Fasteners used on COLORSTEEL® products should be factory colour matched prior to installation.

### Screw fasteners

Screw fasteners of a length sufficient to give adequate penetration into supporting structure are to be used. Refer to manufacturer for specific recommendations. Fasteners should be a minimum of Class 4 for severe environments, and Class 5 for very severe. They should be manufactured and coated in materials compatible with the material being fastened, and be fitted with a low carbon, non-conducting sealing washer.

### Rivets

Rivets should be minimum 4mm diameter aluminium. Sealed rivets are preferred over unsealed as they do not require the addition of a dab of sealant on the face to achieve weatherproofing.

### Spacing

Fasteners should be of grade and type suitable for the application, installed at spacings required by design loads and manufacturer’s recommendations. On buildings constructed to NZS 3604 a consistent fixing pattern should be used on all fastener rows, for other buildings, greater fastener density may be required around the periphery. All purlins must be fastened so that they each contribute to resisting uplift forces.

Rivets on flashings should be placed at 50mm centres.

### Setting

Fasteners should be seated snugly to give a good seal, without distorting the roofing profile. Overdriving, over-tightening or using too many fasteners can cause purlin marking and other damage, and can contribute to roof noise.

### Driving

Impact screw guns can cause damage to the heads of screws and cause damage to protective coatings, as can worn driving sockets. Use only drivers recommended by the fastener supplier, and snug fitting drive sockets.

### Allowance for expansion

All roofing and cladding is subject to expansion and contraction due to temperature extremes. This is particularly evident with darker colours and long spans where the expansion may be as much as 8.0mm for a 10.0 metre sheet. Screws fitted with profiled washers for the purposes of allowing thermal expansion must be installed centrally through a 9mm diameter pre-drilled hole in the roof sheeting.

## Flashings

For transverse flashings, aluminium soft edging may be used, or flashings may be notched into rib and secret fixed profiles. Where penetration flashings are required, proprietary EPDM boot flashings may be used, or bespoke flashings may be fabricated in accordance with the Profiled Metal Roofing Code of Practice.

Flashings should not have edges that impinge on adjacent coated surfaces, and longitudinal edges such as barge downturns must have a small gap between downturn edge and neighbouring pan.

## Sheet ends

The pans at the top end of sheets must be turned up to form a stop end. On roof pitches below 8°, ensure that the gutter end of profiled sheets is turned down.



# PREVENTING PROBLEMS

## Water ponding

### Roofs

Ponding will create prolonged time of wetness, and increase the build-up of debris. Ponding will detract from coated steel product life and will invalidate the product warranty.

Where the roof pitch is low, changes in structure alignment or damage to the roof sheets may result in a negative pitch and consequently lead to water ponding. The following conditions commonly cause water ponding:

- Over-spaced purlins
- Deformation of timber purlins
- Placement of external loads such as air conditioning units
- Careless roof foot traffic
- Excessive canning of the profile pans
- Incorrectly installed penetrations

### Gutters

Gutters must be installed with adequate fall to ensure all water is transported to appropriately located downpipes. The installation and downpipe construction should allow the gutter to drain completely. Regular gutter cleaning and maintenance is required to remove leaves and other debris that may restrict water flow to downpipes. Particular care should be taken at the entrance to downpipes and corners, to avoid blockages leading to water ponding.

A gutter protection system (or any other product) that entraps debris and/or water between itself and any steel product surfaces, restricting the coated steel's ability to dry, is not recommended and is an exclusion in the product warranty.

## Foot traffic

1. Use purlin spacing guidelines for Heavy Traffic if roofs are to be accessed by maintenance personnel.
2. Consider the use of walkways to prevent damage where the roof may be subject to heavy foot traffic.
3. Do not use the roof surface as staging for work on adjacent building facets.

## Colour match paint

Colour match paint is designed for matching accessories to the COLORSTEEL® material. Colour match paint is not designed for repairing marks or blemishes. Fasteners and accessories requiring colour matching should be painted prior to installation.

### Minor scratches

Air-dried paints used to disguise marks will weather at a rate different from that of COLORSTEEL®, sometimes dramatically so, and will often become more apparent than the mark they are intended to disguise. Minor scratches are best left alone, they will not affect the performance of the COLORSTEEL® product due to the self-healing qualities of the primer and metallic coating, and become less evident as the coating weathers.

Minor scratches may be described as scratches that do not extend to the metallic coating, are less than 3mm in width, and are not visually noticeable from a distance of 3 metres. This definition will however vary with the concentration of the scratches, and the visibility of the area affected.

Widespread coating damage to any COLORSTEEL® product can only be rectified by replacement of the affected sheets.

## Lichen

Temperature, dust and rainfall can create a good environment for lichens to establish and flourish, and this can occur on almost any surface. For more information on Lichen treatment refer to Removal of Lichen bulletin.

## Sunscreen

Sunscreen containing titanium dioxide or zinc oxide can accelerate the degradation of organic materials including auto finishes and COLORSTEEL® surfaces. This damage is irreparable so prevention of its occurrence is the only defence. See Sunscreen bulletin for more information.



# FIELD PAINTING

Zincalume® and Galvsteel® are readily paintable using good quality primers and topcoats. Metallic coated roofs can be painted immediately after installation. Dirt, grease and any loose materials must be cleaned off so the surface is clean and dry prior to the first coat being applied. A popular solution is to apply a good quality galvanised iron primer and two topcoats, following the manufacturer's recommendations.

COLORSTEEL® can be painted after exposure to weather. Normally 12-18 months exposure is required to achieve surface modification of the surface to allow the new coating to adhere.

Side laps of unpainted Zincalume® steel do not require lap priming.

# MAINTENANCE

Regular maintenance will increase the life of your COLORSTEEL®, Zincalume® or Galvsteel® roof. Rain washing will keep most exposed roofs clean and free of contaminants, but regular inspections should be conducted and any localised build-up of debris removed. Unwashed roof areas and wall cladding may require regular manual washing in accordance with New Zealand Steel guide: *Maintenance Recommendations*.

# WARRANTIES

Warranties specific to each contract are issued through the Rollformer by New Zealand Steel Limited. In order to ensure the appropriate product is specified for the intended service life in any given environment, New Zealand Steel Limited recommends that they be consulted as early as possible in the design stage to ensure correct material selection and backing by an appropriate warranty. For information on environments, warranties and maintenance see Environmental Categories, Warranty and Product Maintenance Recommendations brochure.



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This Installers Guide is intended as a general guideline only and does not constitute professional advice. All buildings and roofs are unique and extra specific professional advice on installation may be required. New Zealand Steel accepts no liability in relation to the installation of steel roofing.

Buyers and users of New Zealand Steel products and services must make their own assessment of the products for their own conditions. All queries regarding product specification, purpose or application should be directed to New Zealand Steel, phone 0800 697 833. New Zealand Steel reserves the right to modify products, techniques, equipment and statements to reflect improvements in the manufacture and application of its products. The information contained in this brochure is supplied without prejudice to New Zealand Steel's standard terms and conditions of sale. In the event there is conflict between this information and the standard terms and conditions, the standard terms and conditions prevail. Galvsteel®, COLORSTEEL®, COLORSTEEL Maxx®, Endura® and Dridex® are registered trademarks of New Zealand Steel Limited. Zinalume® is a registered trademark of BlueScope Steel Limited. This edition of the New Zealand Steel Installers Guide supersedes all previous editions.

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# EzyBrace<sup>®</sup> Systems

Specification and installation manual

SDC - Approved Building Consent Document - BC2222012 - Pg 196 of 416 - 20/10/2022 - homanm

CBI 5113

AUGUST 2016



## **NATIONAL SUPPORT**

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## **GIB® HELPLINE**

0800 100 442

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<sup>1</sup>
- Encourages more even bracing distribution throughout the building.

<sup>1</sup> 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.



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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](http://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 further 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 Ultraliner®	GIB Braceline/ Noiseline®	GIB Aqualiner®	GIB Toughliner®	GIB Fyreliner®			
						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.

## 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](http://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.

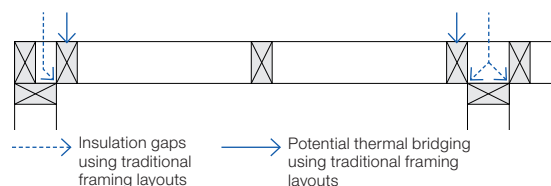
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

The GIBFix® Framing System can be used in conjunction with GIB EzyBrace® Systems.

Bracing resistance is not affected by the GIBFix® Framing System if the use of this alternative timber framing layout is preferred. Refer to the GIBFix® Framing System literature for more information.

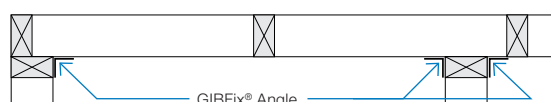
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

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!
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

## 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](http://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.

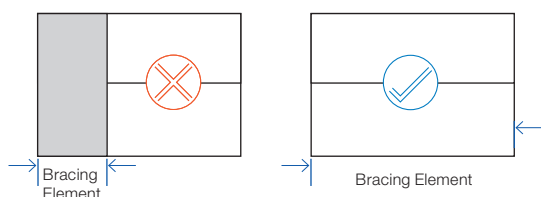
It is of prime importance to comply with the details of design, construction and workmanship in this document.

## 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:

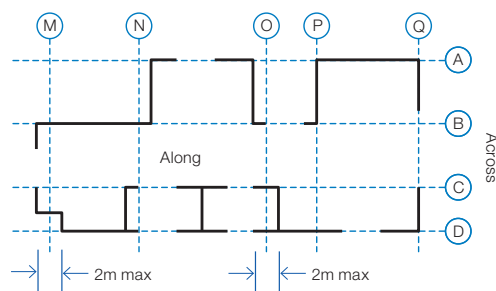
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

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](http://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.

## 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](http://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

**GIB EzyBrace® Bracing Software**

**Job Details**

Name: A Job  
 Street and Number: 100 Job Street  
 Lot and DP Number: Lot 321, DP 456  
 City/Town/District: Johnson  
 Designer: AR Client  
 Company: John Limited  
 Date: 1/08/15

**Building Specification**

Number of Storeys: Single  
 Floor Loading: 2 MPa  
 Foundation Type: Slab

**Single**

Cladding Weight: Light  
 Roof Weight: Light  
 Room in Roof Space: No  
 Roof Pitch: 25  
 Roof Height above Eaves (m): 1.5  
 Building Height to Apex (m): 4.5  
 Ground to Lower Floor (m): 0.2  
 Stud Height (m): 2.4  
 Building Length (m): 10  
 Building Width (m): 10  
 Building Area (m²): 100

**Building Location**

Wind Zone ~ Low  
 Wind Zone or Consent Authority: Not Available  
 Wind Region: A  
 Lee Zone: No  
 Ground Roughness: Urban  
 Site Exposure: Sheltered  
 Topography Class: 11

Earthquake Zone: 1  
 Soil Type: D & E (Deep to Very Soft)  
 Annual Prob. of Exceedance: 1 in 500 (NZS3604:2011 Default)

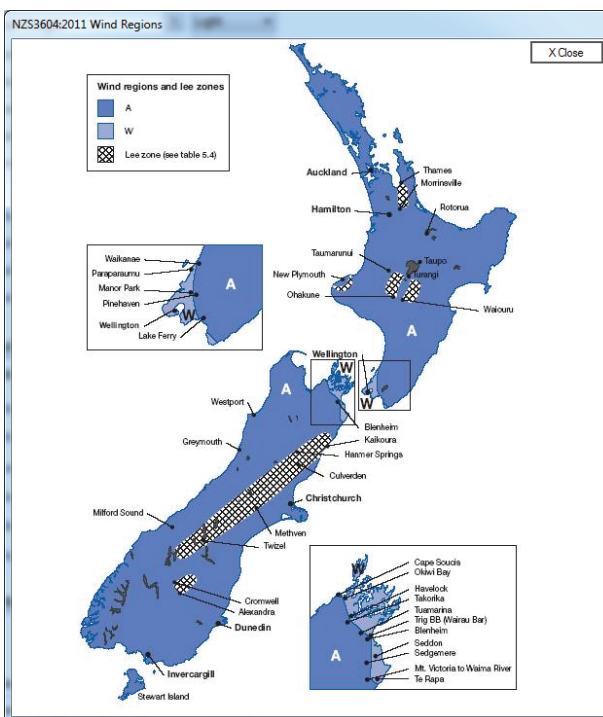
**Bracing Units required for Wind**

	Along	Across
Single Level	258	222

**Bracing Units required for Earthquake**

	Along and Across
Single	264

Demand | Single Along | Single Across | Custom



Download GIB EzyBrace® 2016 design software from [gib.co.nz/ezybrace](http://gib.co.nz/ezybrace)



## 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

Line	Ext. Len. (m)	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BU)	Earthquake (BU)
a	11.25	1	0.5		2.44	GSP-H	GIB®	53	58
		2	1.1		2.44	GS1-N	GIB®	72	65
		3	0.6		2.44	GSP-H	GIB®	67	73
b	6.41	1	1.2		2.44	GS1-N	GIB®	81	71
		2	0.6		2.44	GS1-N	GIB®	34	35
		3	4		2.44	GS2-NOM	GIB®	197	197
c		1	3.2		2.44	GS2-NOM	GIB®	157	157
d		1	7.9		2.44	GS2-NOM	GIB®	389	389
e	17.9	1	0.6		2.44	BL1-H	GIB®	58	60
		2	0.6		2.44	BL1-H	GIB®	58	60
		3	0.8		2.44	GS1-N	GIB®	48	46
		4	2.1		2.44	GS1-N	GIB®	143	124
		5	1.2		2.44	EP1-1.2	CHH	142	159

Demand		Resistance	
Wind	Earthquake	Wind	Earthquake
682	880	1499	1492
220%	170%		

193 OK    196 OK

312 OK    302 OK

157 OK    157 OK

389 OK    389 OK

449 OK    449 OK

FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET

Download GIB EzyBrace® 2016 design software from [gib.co.nz/ezybrace](http://gib.co.nz/ezybrace)

Line	Ext. Len. (m)	Element	Length(m) or No.	Angle (degrees)	Type	Supplier	Wind (BU)	Earthquake (BU)
A		1	1		Braced Piles	NZS3604	160	120
		2	1		Anchor Pile	NZS3604	160	120
		3	1		Braced Piles	NZS3604	160	120
B		1	1		Braced Piles	NZS3604	160	120
		2	1		Cantilever Pile	NZS3604	70	30
		3	1		Cantilever Pile	NZS3604	70	30
C		1	1		Anchor Pile	NZS3604	160	120
		2	1		Anchor Pile	NZS3604	160	120

Demand		Resistance	
Wind	Earthquake	Wind	Earthquake
426	687	1100	780
258%	114%		

480 OK    360 OK

300 OK    180 OK

320 OK    240 OK

## 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

Supplier	System	Min. Length m	Wind BU/s/m	EQ BU/s/m	Element Height Dependant	Element Foundation Dependant
Custom1	CU1.0.4	0.4	80	95	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom1	CU1.0.6	0.6	95	105	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom1	CU1.1.2	1.2	120	135	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.0.4	0.4	90	98	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.0.6	0.6	127	136	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.1.2	1.2	164	135	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Engineer	Portal	1	300	300	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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](http://gib.co.nz/ezybrace)

**GIB EzyBrace® PLUS**

**File Home**

New, Save, Save As, Open, Recent, Print, Exit

**GIB EzyBrace® Bracing Software**

**Demand Calculation Sheet**

**Job Details**

Name: Example  
House and Number: 100 Job Street  
Lot and DP Number: Lot 123 DP 101  
City/Town District: Selwyn District  
Designer: A.R. Architect  
Company: JKL Limited  
Date: 11/6/15

**Building Specification**

Number of Storeys: 1  
Floor Loading: 2 kPa  
Foundation Type: Raft

Cladding Weight: Single  
Roof Weight: Light  
Roof to Roof Space: No  
Roof Pitch: 20  
Roof Height above Eaves (m): 2.5  
Building Height to Apex (m): 5  
Ground to Lower Floor (m): 0.3  
Average Stud Height (m): 2.44  
Building Length (m): 17.8  
Building Width (m): 15.8  
Building Plot Area (m²): 100

**Building Location**

Wind Zone: High  
Earthquake Zone 1  
Soil Type: C (Shallow)  
Annual Prob. of Exceedance: 1 in 500 (NZS3104:2011 Default)

**Bracing Units required for Wind**

	Along	Across
Single Level	682	960

**Bracing Units required for Earthquake**

	Along & Across
Single Level	177

Preview Page: 1 of 4  
Magnification: 100%

## 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 further 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

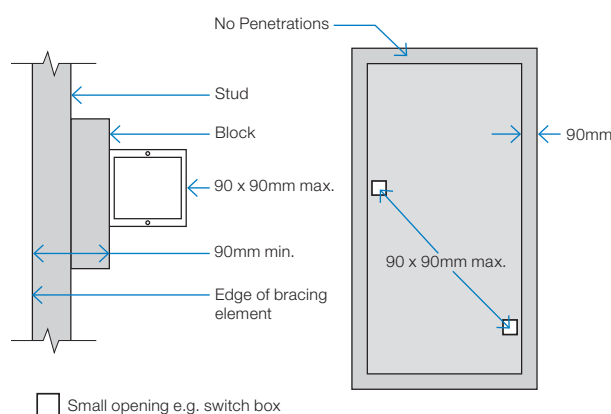
## SMALL OPENINGS

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

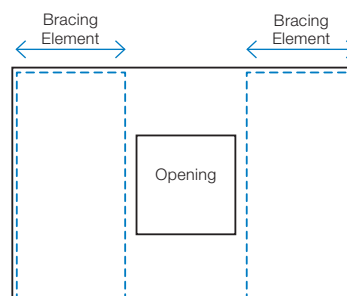
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GFB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



## 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](http://gib.co.nz/gibfix).

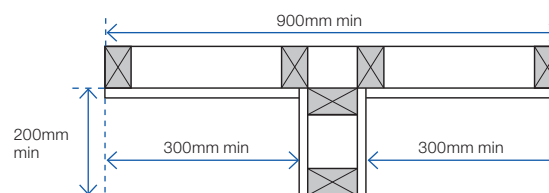
## Guidelines for intersection walls

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).

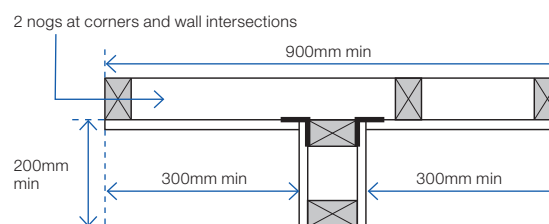
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



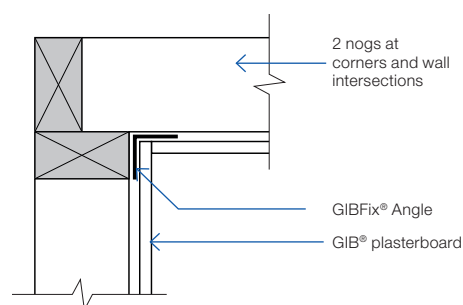
GEB002

FIGURE 13: WALL INTERSECTION (GIBFix® FRAMING SYSTEM)



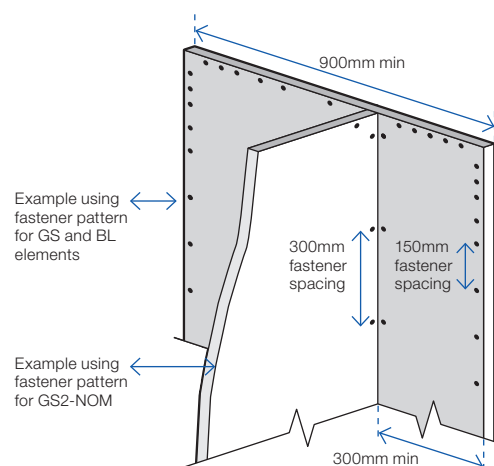
GEB003

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.

## 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

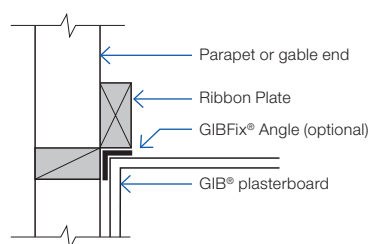
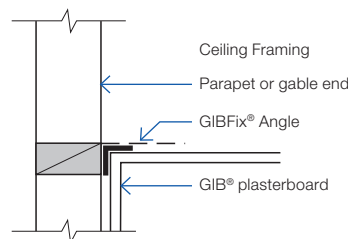


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

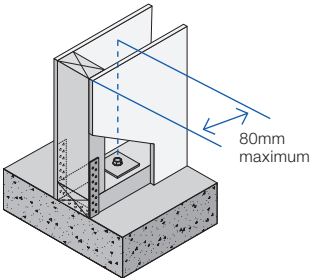
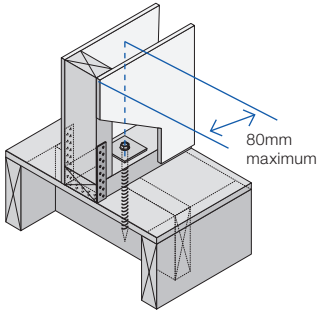
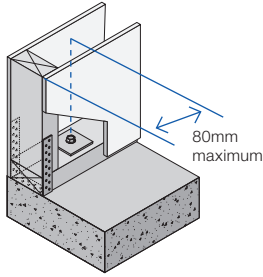
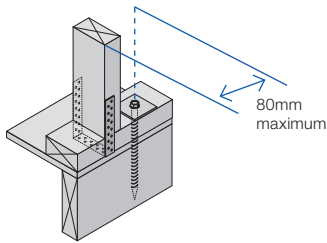
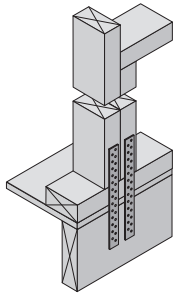
### BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

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.	

## 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	
<p>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.</p>			
Internal wall			
			
GEB004	GEB005		
External wall			
			
GEB006	GEB007		
<p>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 <a href="http://gib.co.nz/library">gib.co.nz/library</a>.</p>		<p>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.</p>	
			
		GEB008	
Hold-down fastener requirements			
Concrete floor		Timber floor	
<p>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.</p>		<p>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</p>	

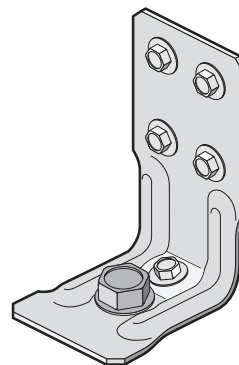


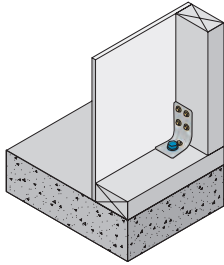
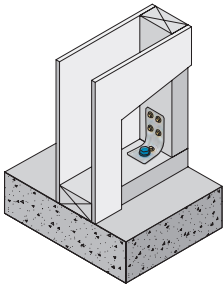
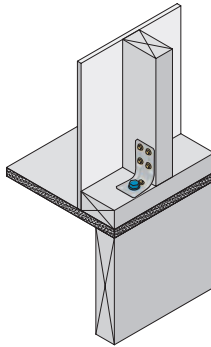
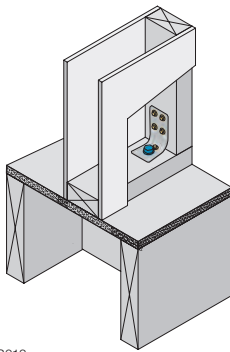
## GIB HandiBrac® installation

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
 <p>GEB009</p> <p>Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.</p>	 <p>GEB010</p> <p>Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.</p>	 <p>GEB011</p> <p>Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.</p>	 <p>GEB012</p> <p>Position GIB HandiBrac® in the centre of floor joist or full depth solid block.</p>
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.	

## 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.

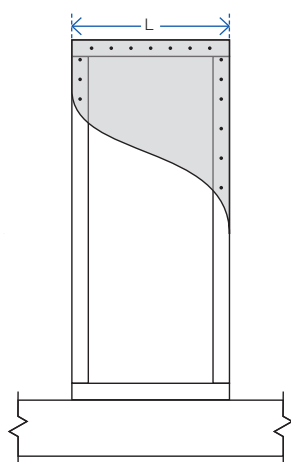
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

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.

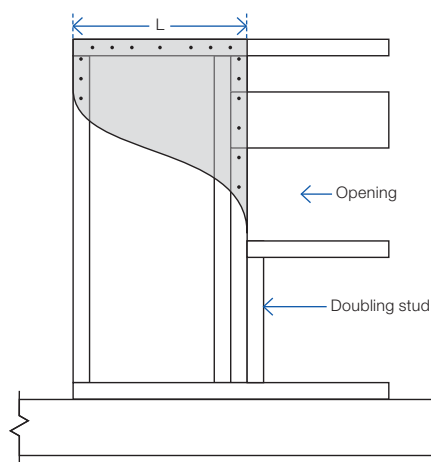
Fastener spacings and diagram scales shown in Figures 29-32 are indicative only. Refer to p.23-30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



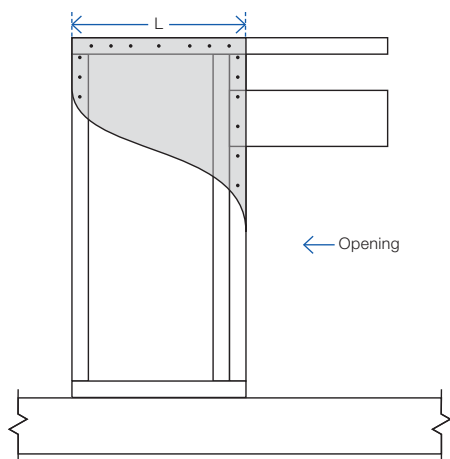
GS1-N, GS2-N elements  
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



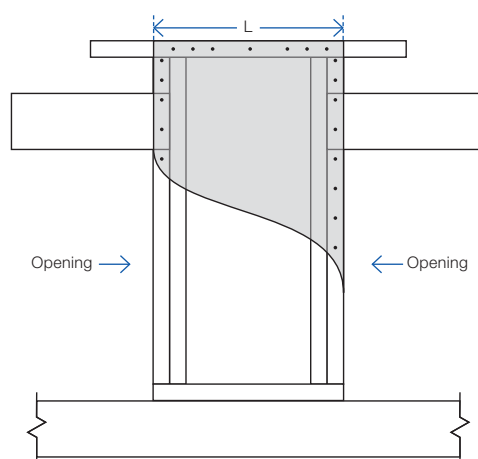
GS1-N, GS2-N elements  
'L' indicates the length of the bracing element

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

## 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.

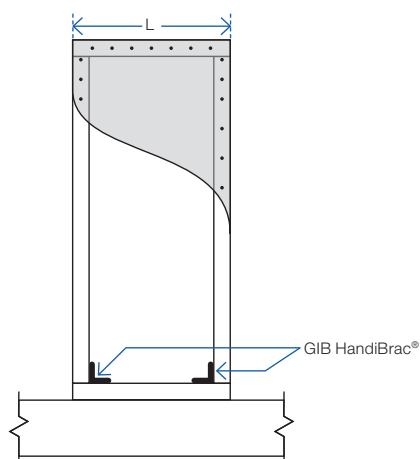
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

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.

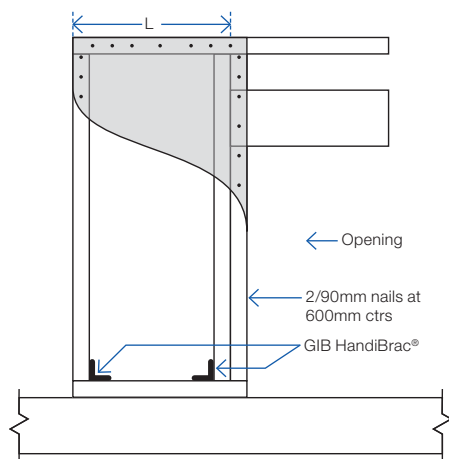
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



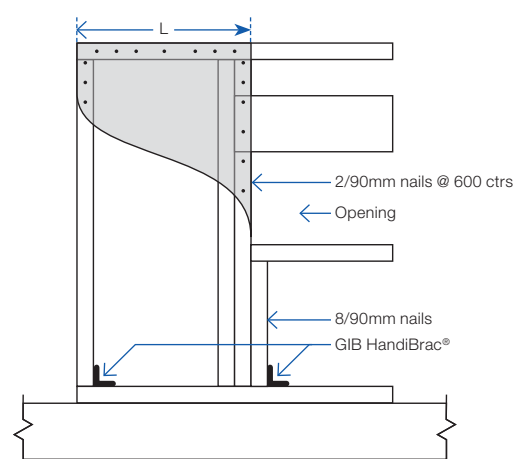
'H' type elements with specific hold downs  
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



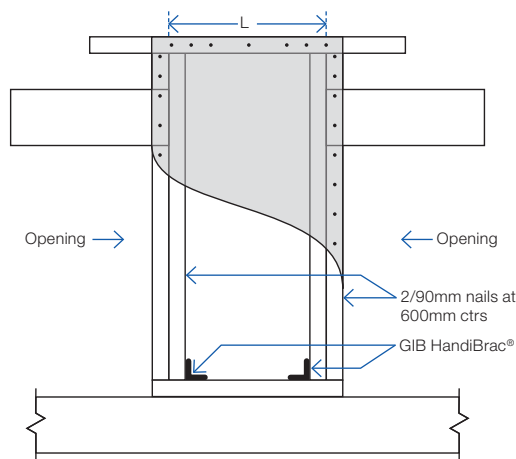
'H' type elements with specific hold downs  
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



'H' type elements with specific hold downs  
'L' indicates the length of the bracing element

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



'H' type elements with specific hold downs  
'L' indicates the length of the bracing element

# 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

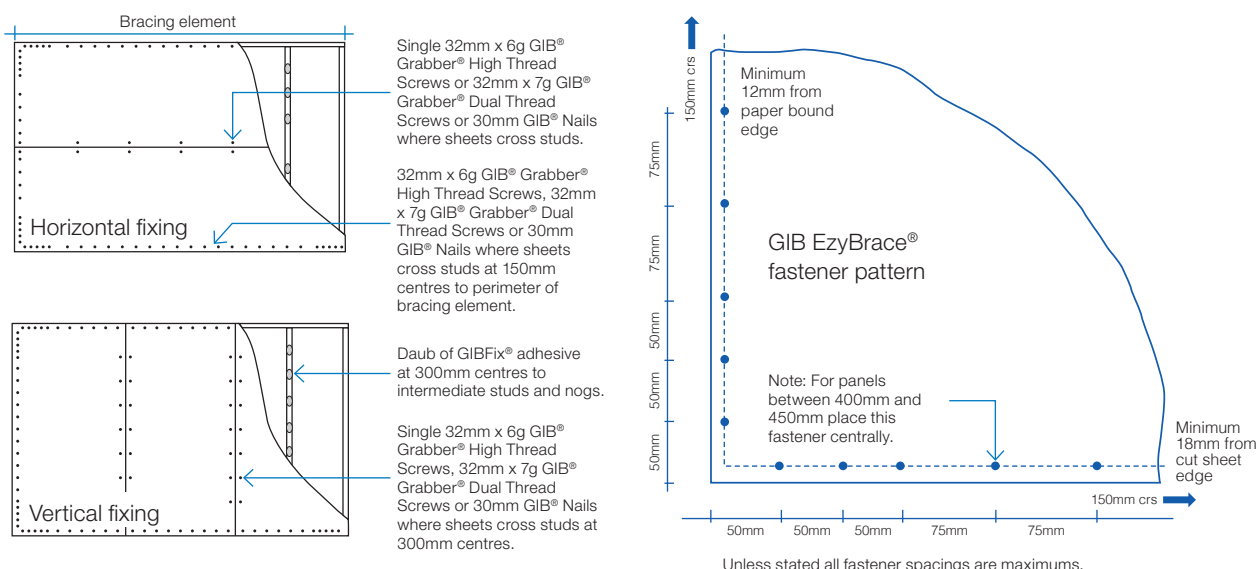
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

### 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.



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

### 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

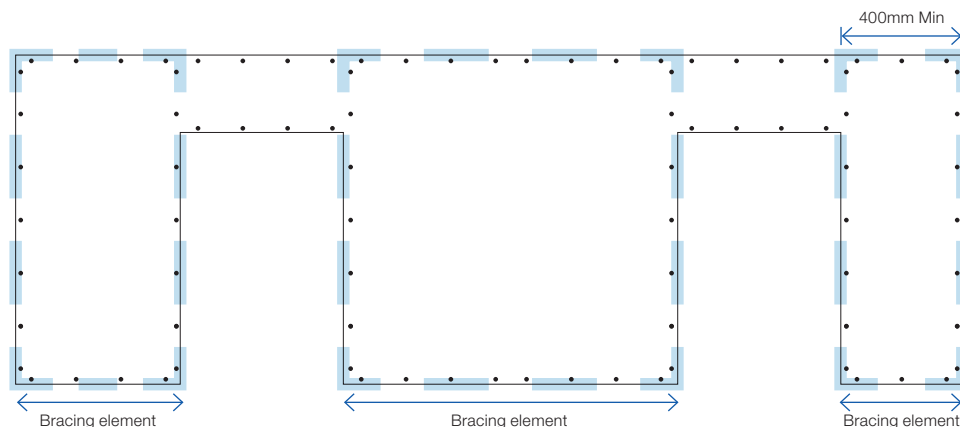
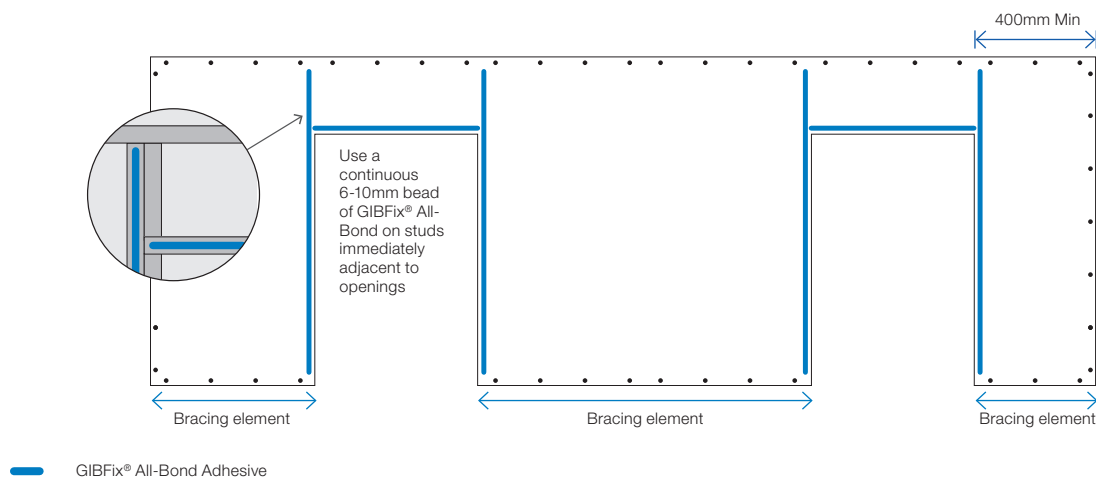
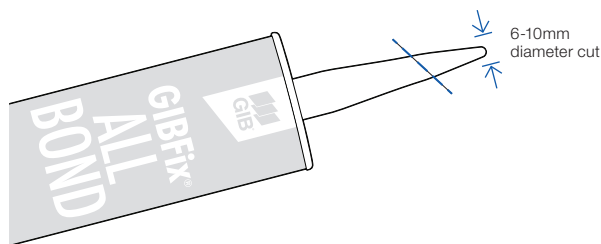


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



### ADHESIVE NOZZLE APERTURE



# 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

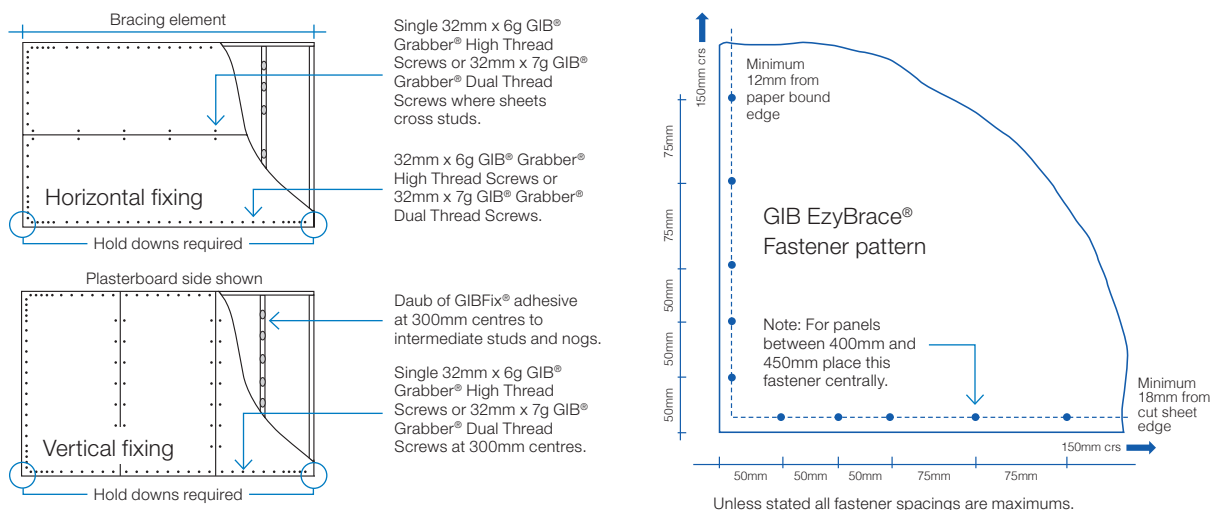
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

### 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.



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





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<sup>CERT</sup>™

The Global GreenTag<sup>Cert</sup>™ certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag<sup>Cert</sup>™

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](http://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 Fyrelime®, 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 Fyrelime®, 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](http://gib.co.nz)

**OR CALL THE GIB® HELPLINE**

0800 100 442



## 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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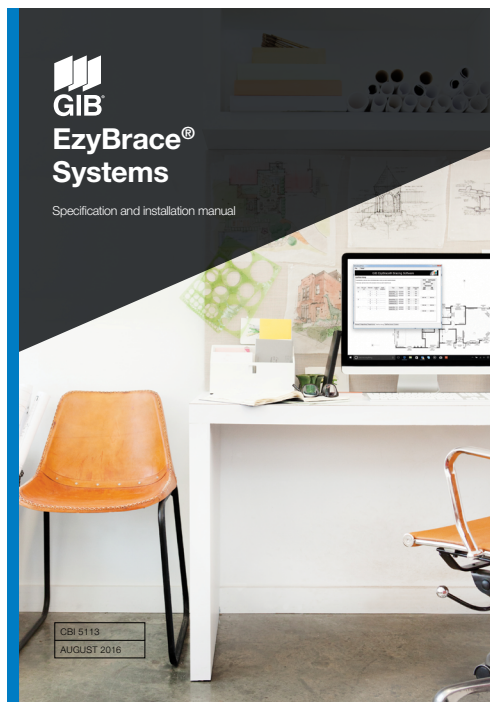
P.O. Box 50 908

Porirua 5240,

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## 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.



## 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/m<sup>2</sup> for 10 mm thick sheets and 8.5 kg/m<sup>2</sup> 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/m<sup>2</sup> for 10 mm thick sheets and 12.5 kg/m<sup>2</sup> 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 Fyrelime®, 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.]

- **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.

### 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 Ultraliner®	GIB Braceline/ Noiseline®	GIB Aqualiner®	GIB Toughliner®	GIB Fyreliner®			
						10 mm	13 mm	16 mm	19 mm
GIB® Standard	N/A	✓	✓	✓	✓	✓ <i>Note 1</i>	✓ <i>Notes 1 and 3</i>		
GIB Braceline®	X	X	N/A	✓ <i>Note 2</i>	✓	X	✓ <i>Notes 1, 2 and 3</i>		

- 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.



## 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.

## 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.

- 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 Fyrelime®, 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 Fyrelime® 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.

### 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.

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

# ECOPLY<sup>®</sup> SPECIFICATION & INSTALLATION GUIDE

SEPTEMBER 2015





# ECOPLY® SPECIFICATION & INSTALLATION GUIDE

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## 1.0 ECOPLY® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey Woodproducts, the Ecoply® portfolio represents a range of structurally rated plywood products.

Ecoply is manufactured under a third party audited quality control programme to monitor compliance with AS/NZS 2269 Plywood Structural. All Ecoply products carry Engineered Wood Products Association of Australasia (EWPA) Joint Accreditation System - Australia and New Zealand (JAS-ANZ) certification.

For information relating to Shadowclad® panels and plywood used as an exterior cladding, refer to the current Shadowclad Specification & Installation Guide for Cavity Construction. For information relating to Ecoply Barrier used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide. Both of these documents can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz).

Ecoply products must be competently installed in accordance with good building practices and sound design principles to satisfy the requirements of the Building Act 2004, the New Zealand Building Code (NZBC), and applicable New Zealand Standards. This is the responsibility of building owners and the design professionals and builders that they engage. This document contains information, limitations, and cautions regarding the properties, handling, installation, usage, and the maintenance of Ecoply products. However, to the maximum extent permitted by law, Carter Holt Harvey Woodproducts assumes no legal liability to you in relation to this information.

### 1.1 TECHNICAL INFORMATION AND CAD DETAILS

When specifying or installing any Ecoply® plywood products visit [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

*The information contained in this document is current as at September 2015. It is your responsibility to ensure you have the most up to date information available.*

*The information contained in this publication relates specifically to Ecoply structural plywood products manufactured by Carter Holt Harvey Woodproducts and must not be used with any other plywood manufacturer's product no matter how similar they may appear.*

*Alternative plywood products can differ in a number of ways which may not be immediately obvious and substituting them for Ecoply structural plywood products is not appropriate, and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the NZBC.*

## 1.2 PRODUCT DESCRIPTION AND RANGE

Ecoply structural plywood panels are manufactured from radiata pine wood veneers. The veneers are placed at right angles to each other for maximum strength and stability then bonded together with synthetic phenolic (PF) resin to form a strong and permanent Type A bond.

The strength of Ecoply plywood is optimised for maximum performance parallel to the face grain with cross plies providing enhanced stability across the grain.

The Ecoply plywood range can be specified for:

- Surface grade (e.g. CD) - where the first letter describes the face veneer appearance and the second letter describes the back veneer of the Ecoply sheet. Surface grades are defined in AS/NZS 2269 and summarised in Tables 2A & 2B
- Stress grade - utilises the symbol F and a suffix, for example;
  - F8 as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. F8 is the standard stress grade for Ecoply products
  - Ecoply 19 mm Longspan Flooring and 15 mm Ecoply Roofing are F11<sup>1</sup> stress grade (See Tables 1, 4 and 5). Other Ecoply products are also available in F11<sup>1</sup> upon request
- Thickness - ranging from 7 mm to 25 mm. (Thicknesses above 25 mm subject to availability)
- Length - being 2400 mm and 2700 mm with a standard nominal width of 1200 mm

- Preservative treatment - being untreated, H3.2 CCA or H3.1 LOSP Azole treated
- Edge finish - being square edge or for Ecoply Flooring and Roofing, routed on the long edges of the sheet with a polypropylene plastic tongue inserted into one side for a tongue-in-groove joint

For general installation advice refer to section 2.0: General Installation Guide.

For specification and installation advice for Ecoply used in typical applications refer to the following sections.

Typical Application	Section
Structural bracing and ceiling diaphragms	3.0
Roofs and decks	4.0
Flooring	5.0

**Note: Technical notes referenced in this guide can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) or contact Carter Holt Harvey Woodproducts on 0800 326 759.**

**Table 1: Ecoply® Product Range**

Nominal Thickness (mm)	7		9		12		15		17		19		21		25	
Sheet length (x 1200 mm width)	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700
Ecoply Structural Square Edge	BD		●		●	●	●		●							
	CD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	DD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ecoply Flooring (pt)	CD						●	●	●	●	● LS	● LS	●	●		●
Ecoply Roofing (pt)	DD						●	●	●	●						

- Available untreated only
- Available either untreated or H3.2 CCA
- Available either untreated or H3.1 LOSP

**pt** Machine grooves on both long edges with a plastic polypropylene tongue in one groove, 1200 mm cover

**LS** Ecoply 19 mm F11/F8 Longspan Flooring

- Full range may not always be available ex stock, check with your Ecoply supplier to ensure availability
- Non standard specifications, including thicker sheets may be available to special order in significant quantities
- All products are F8 stress grades
- Ecoply 15 mm/17 mm Roofing and Ecoply 19 mm Longspan Flooring are supplied as standard in F11 stress grade<sup>1</sup>
- Other Ecoply products are also available in F11<sup>1</sup> upon request




<sup>1</sup> Where the stress grade F11 is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

## 1.3 SURFACE GRADES



Table 2A summarises the surface appearance grades in which Ecoply structural plywood is available with some typical applications for each surface grade.

The surface grade specifications are defined in AS/NZS 2269. Table 2B details surface appearance grades for specialty Ecoply plywood and typical applications.

**Table 2A: Ecoply® Structural Square Edge Products**

Face Grade B	Face Grade C	Face Grade D
		
Appearance grade with a solid sanded surface. Suitable for a higher quality finish.	Solid sanded surface with filled holes and splits, with intergrown knots. Suitable for a basic paint finish.	Non appearance grade allowing open imperfections up to 75 mm across the face veneer. Splits and knots allowable
<b>Possible Uses:</b> <ul style="list-style-type: none"> <li>Furniture/Joinery/Signs</li> <li>Interior Linings</li> <li>Sheathing</li> <li>Engineering components where a superior visual finish is required</li> </ul>	<b>Possible Uses:</b> <ul style="list-style-type: none"> <li>Structural gussets</li> <li>Stressed skin panels</li> <li>Bins, boxes, crates</li> <li>Hoardings</li> <li>Membrane substrate</li> </ul>	<b>Possible Uses:</b> <ul style="list-style-type: none"> <li>Non visual bracing</li> <li>Strength critical pallets</li> <li>Structural components</li> <li>Portal frame gussets</li> </ul>

**Table 2B: Speciality Ecoply® Products**

Flooring CD	Roofing DD
	
Solid sanded C grade surface with tongue and groove profile on long edges. Features void free second layer under the face veneer for increased protection against high point loads	Unfilled D grade surface with tongue and groove profile on long edges
<b>Possible Uses:</b> <ul style="list-style-type: none"> <li>Substrate for flooring overlays such as linoleum, tiles and rigid coverings</li> <li>Substrate for membrane roofing and decking where visible appearance is critical</li> </ul>	<b>Possible Uses:</b> <ul style="list-style-type: none"> <li>Substrate for asphalt shingles</li> <li>Substrate for roof systems where a smooth substrate is not required</li> </ul>

Notes: A higher visual grade may be substituted if required. e.g. Ecoply CD can be used anywhere DD is used. Pictures shown above are scaled down versions of typical Ecoply sheets. Grain pattern and colour may vary. If sheet appearance is critical select panels individually.



## I.4 PRESERVATIVE TREATMENT

Ecoply structural plywood is available untreated or treated in accordance with AS/NZS 1604.3. If treated, Ecoply structural plywood is treated with either H3.2 CCA (Copper Chrome Arsenate) or H3.1 LOSP (Azole) clear treatment. H3.1 LOSP is the standard preservative treatment for BD Structural Square Edge products and by special request for other Ecoply plywood products.

H3.2 CCA and H3.1 LOSP treated plywood in accordance with AS/NZS 1604.3 is described as suitable for: "outside, above ground, subject to periodic moderate wetting and leaching."

**Ecoply plywood is envelope preservative treated. Where sheets are cut, cuts must be coated with a brush on timber preservative. Holdfast® Metalex® Concentrated Timber Preservative Clear (Holdfast® Metalex® Clear) is recommended. Failure to do so will affect the long term durability of the panel.**

The characteristics of the treatments are shown in Table 3.

**Table 3: Preservative Treatment**

	Untreated	H3.2 CCA	H3.1 LOSP (Azole)
<b>Preservative carrier</b>	N/A	Water	Light organic oil (white spirits)
<b>Colour</b>	Natural	Green	Clear (i.e. natural)
<b>Fungicide</b>	Heat treated dry wood	Copper	Propiconazole and Tebuconazole
<b>Insecticide</b>	Heat treated dry wood	Arsenate	Permethrin
<b>Other chemicals</b>	N/A	Chrome (to fix preservative in wood)	Butyl Oxitol (co-solvent to assist active stability)
<b>Mouldicide</b>	N/A	Copper (limited efficacy)	IPBC
<b>Notes</b>	Plywood for dry interior use, supplied ex mill at <15% moisture content	Dried after treatment to average 18% moisture content for use in service at higher moisture contents	Solvent does not affect dimensions. Solvent smell disappears over time
<b>Availability</b>	Readily available	Standard treatment except for Ecoply BD	Treated to order for CD, DD, flooring and roofing products. Standard treatment for Ecoply BD
<b>Applications (Refer NZ3602)</b>	Interior dry protected	Exterior/Interior damp (service performance subject to detailing & coatings)	

### H3.2 CCA

Ecoply structural plywood, which is H3.2 CCA treated (waterborne preservative with a green colour), is dried following treatment so that sheets may return to the correct dimensions. The moisture content after treatment with CCA and drying will be higher than the limits placed in AS/NZS 2269 on untreated product. The target is for an average moisture content of approximately 18% to provide a panel closer to the expected equilibrium moisture content for most H3.2 CCA applications.

The fillets used to separate sheets in drying may leave marks on the sheet surface. These will fade over time as the plywood weathers, and can be disguised with paint but may be visible under stain. The process of treating with H3.2 CCA and subsequent drying is likely to increase the face checking of the panel.

For more information on face checking refer to section I.8 General Design Considerations - Aesthetics.

### H3.1 LOSP

H3.1 LOSP treated Ecoply retains the wood colour and does not contain moisture so the plywood remains at the same dimensions and moisture content during treatment. However, the plywood when freshly treated may contain more than 60 litres of organic fluid per cubic metre. When coating H3.1 LOSP treated plywood, traces of residual solvent may be present on the sheet surface from the treatment process. Sheets feeling greasy to touch should be placed in a well ventilated area and allowed to flash off to ensure proper adhesion of paints and stains to the sheet surface.

The H3.1 LOSP solvent smell can be quite strong and venting is recommended until most of the solvent has evaporated. Untreated plywood is recommended for internal applications where NZS 3602 allows the use of untreated plywood

Mechanical fasteners are recommended to fix H3.1 LOSP treated Ecoply to framing. If adhesives are required, thorough venting is recommended and H3.1 LOSP tolerant adhesives should be applied according to the adhesive manufacturer's instructions. See section 2.3 Adhesives.

## 1.5 SECTION PROPERTIES

Table 4A: Section Properties of Ecoply® Structural Plywood

Nominal plywood thickness <sup>2</sup>	ID code <sup>3</sup>	Section properties per mm width						
		Parallel to the face grain			Perpendicular to the face grain			
		Mass	Parallel Moment of Inertia	Section Modulus	Shear Constant	Perpendicular Moment of Inertia	Section Modulus	Shear Constant
(mm)		(kg/m <sup>2</sup> )	(mm <sup>4</sup> )	Z (mm <sup>3</sup> )	I/Q (mm <sup>2</sup> )	I (mm <sup>4</sup> )	Z (mm <sup>3</sup> )	I/Q (mm <sup>2</sup> )
7	7-24-3	4.0	30.0	8.3	5.2	2.0	1.7	2.3
9	9-30-3	5.0	58.6	13.0	6.4	4.0	2.7	2.9
12	12-24-5	6.6	115.0	19.2	9.3	33.4	9.3	5.4
15	15-30-5	8.3	225.0	29.9	11.6	65.2	14.5	6.8
17	17-24-7	9.2	285.0	33.9	12.2	122.0	20.4	9.4
17	17-24-6	9.2	273.0	32.5	12.3	134.0	22.3	9.5
19	19-30-7	10.6	451.0	46.9	13.7	157.0	23.8	10.7
21	21-30-7	11.6	556.0	52.9	15.2	239.0	31.9	11.8
25	25-30-9	13.5	897.0	72.9	17.8	381.0	41.0	13.9

Table 4B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F8 Grade

Nominal plywood thickness <sup>2</sup>	ID code <sup>3</sup>	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F8)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$	Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$
(mm)		(1000 Nmm <sup>2</sup> )	(Nmm)	(N)	(1000 Nmm <sup>2</sup> )	(Nmm)	(N)
12	12-24-5	1046.5	480.0	15.6	303.9	231.7	9.2
15	15-30-5	2047.5	747.5	19.5	593.3	362.5	11.4
17	17-24-7	2593.5	847.5	20.5	1110.2	510.0	15.9
17	17-24-6	2484.3	812.5	20.7	1219.4	557.5	16.0
19	19-30-7	4104.1	1172.5	23.0	1428.7	595.0	18.0
21	21-30-7	5059.6	1322.5	25.5	2174.9	797.5	19.8
25	25-30-9	8162.7	1822.5	29.9	3467.1	1025.0	23.4

Table 4C: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F11 Grade (Including Longspan Flooring)

Nominal plywood thickness <sup>2</sup>	ID code <sup>3</sup>	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F11)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$	Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$
(mm)		(1000 Nmm <sup>2</sup> )	(Nmm)	(N)	(1000 Nmm <sup>2</sup> )	(Nmm)	(N)
12	12-24-5	1207.5	595.2	16.7	303.9	231.7	9.2
15	15-30-5	2362.5	926.9	20.9	593.3	362.5	11.4
17	17-24-7	2992.5	1050.9	22.0	1110.2	510.0	15.9
17	17-24-6	2866.5	1007.5	22.1	1219.4	557.5	16.0
19	19-30-7	4735.5	1453.9	24.7	1428.7	595.0	18.0
21	21-30-7	5838.0	1639.9	27.4	2174.9	797.5	19.8
25	25-30-9	9418.5	2259.9	32.0	3467.1	1025.0	23.4

1 Where the stress grade F11 is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

2 Actual thickness of Ecoply sheets manufactured to thickness tolerances stated in AS/NZS 2269

3 Identification code: panel thickness – outermost veneer thickness x 10 – number of plies

4 I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603

Notes:

- Use Tables 4A & B values for all F8 stress grade Ecoply products
- Use Tables 4A & C values for all F11 stress grade Ecoply (including 19 mm Ecoply Longspan Flooring)
- The section properties in Tables 4A, B & C have been calculated in accordance with AS/NZS 2269
- For section properties for other thicknesses and Shadowclad® products contact CHH Woodproducts on 0800 326 759



## Structural properties of Ecoply® plywood

The majority of Ecoply plywood is F8 grade (exceptions are identified in section 1.2: Product Description & Range) and the

characteristic values may be used in conjunction with both NZS 3603 and AS 1720 for the design of timber components. The characteristic strengths in Table 5 have been used to provide the nominal strengths in Tables 4B and 4C.

**Table 5: Structural Properties of Ecoply® Plywood**

Stress Grade	Characteristic Strength MPa	
	F8	F11
Bending ( $f_{pb}$ )	25.0	31.0
Tension ( $f_{pt}$ )	15.0	18.0
Panel shear ( $f_{ps}$ )	4.2	4.5
Rolling shear ( $f_{pr}$ )	1.7	1.8
Compression in plane of sheet ( $f_{pc}$ )	20.0	22.0
Compression normal to the plane of the sheet ( $f_{pp}$ )	9.7	12.0
Modulus of elasticity (E)	9100	10500
Modulus of rigidity (G)	455	525

Source: AS/NZS 2269

Wood is strongest when stressed parallel to the grain and weakest across the grain, so the lay up or arrangement of veneers in the panel determines the properties. Because of its cross banded construction, plywood possesses significant strength and stiffness both parallel and perpendicular to the direction of the face grain, but is generally strongest and stiffest along the direction of the face grain.

The section properties of structural plywood in Table 4A are calculated in accordance with AS/NZS 2269 to allow for the

reduced contribution of veneers perpendicular to the direction of stress. For engineering design to NZS 3603, the section properties are multiplied by stresses and 'k' and  $\phi$  factors to determine resistances for limit states design.

Resistances and nominal strengths in Tables 4B and 4C assume all 'k' factors are equal to 1.0. Multiply tabled values by the strength reduction factor  $\phi$  and 'k' factors for specific in-service conditions for design to a structural code such as NZS 3603.

**Table 5A: Strength Reduction Factors**

Structural Timber Material	Application of Structural Member		
	Category 1	Category 2	Category 3
	Structural members for houses for which failure would be unlikely to affect an area <sup>1</sup> greater than 25 m <sup>2</sup> ; OR secondary members in structures other than houses	Primary structural members in structures other than houses; OR elements in houses for which failure would be likely to affect an area <sup>1</sup> greater than 25 m <sup>2</sup>	Primary structural members in structures intended to fulfil essential services or post disaster function
	Value of Strength Reduction Factor $\phi$		
Structural Plywood – AS/NZS 2269.0	0.95	0.85	0.75

<sup>1</sup> In this context area should be taken as plan area.

## 1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, Ecoply structural plywood sheets have the following information marked on the back:

- Brand name: e.g. ECOPLY
- Face grade, back grade: e.g. CD
- Intended application: e.g. STRUCTURAL
- Panel construction code: e.g. 19-30-7 (Thickness (mm)-Face veneer thickness (mm x 10)-Number of veneers)
- Glue bond: e.g. A BOND
- Formaldehyde emission class: E0 for A Bond Ecoply
- Australasian Standard: e.g. AS/NZS 2269
- Treatment Standard (if applicable): e.g. AS/NZS 1604.3:2012
- Date and time of manufacture: e.g. 01/12/15 12:23:45
- Stress grade: e.g. F8 (exceptions include Shadowclad® and Grooved Lining which are performance rated)
- The Engineered Wood Products Association of Australasia (EWPPAA) brand and mill number: e.g. 911 (Tokoroa mill)

### Untreated example:

ECOPLY CD FLOORING STRUCTURAL  
19-30-7 A BOND E0 AS/NZS 2269.0:2012  
PAT 01/12/15 12:23:45 F11/F8



### Treated example:

ECOPLY CD STRUCTURAL  
25-30-9 A BOND E0 AS/NZS 2269.0:2012  
AS/NZS 1604.3:2012 046 01 H3 E CCA  
RETREAT CUTS PAT 01/12/15 12:23:45 F8/F8



**Note:** Performance based products like Grooved Lining and Shadowclad may include brand identification instead of visual quality, stress grade, and panel code. These panels, when accompanied with specification literature, are still deemed to comply with AS/NZS 2269

## 1.7 CODE COMPLIANCE

Ecoply plywood manufacture is third-party audited through the product quality control programme of the Engineered Wood Products Association of Australasia (EWPAA) which is itself audited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

CHH Woodproducts is licensed by the EWPAA to stamp plywood with the EWPAA/JAS-ANZ Product Certification Mark. This certifies it has been manufactured under the third party audited Joint Product Certification programme to monitor compliance with joint Australian/New Zealand Standard AS/NZS 2269 Plywood – Structural. Plywood to this standard is referenced in the NZBC Acceptable Solutions and Verification Methods through:

- NZS 3602 The Use of Timber and Wood-based products for Use in Building
- NZS 3603 Timber Structures
- NZS 3604 Timber Framed Buildings
- AS/NZS 1604.3 Specification for Preservative Treatment, Part 3:Plywood
- E2/AS1 External Moisture



**WARNING:** Plywood which is non-certified or is manufactured to standards other than AS/NZS 2269, such as US voluntary standard PSI-95, is not referenced in the NZBC. There can be significant differences between AS/NZS 2269 certified and non certified plywood around bond durability, structural ratings and veneer quality.

### Structure B1

Design to NZS 3603 Timber Structures complies with the NZBC in Verification Method B1/VM1 Clause 6.0 Timber. Plywood is the only sheet material with properties listed in NZS 3603. Ecoply structural plywood is available in F8 stress grade. Some specialty products are available F11 or with specifically designed properties for specialised applications.

## 1.8 GENERAL DESIGN CONSIDERATIONS

### Durability (Clause B2) and exterior moisture (Clause E2)

Ecoply plywood is made from softwood solid radiata pine veneer. Designers should assess the level of exposure to biological, moisture, and other hazards and apply appropriate preservative treatment and detailing to minimise exposure to these hazards.

Information in this manual outlines suggested practices for detailing building components to exclude moisture to comply with the durability requirements of the NZBC.

### Formaldehyde

Ecoply plywood is manufactured using phenol formaldehyde resins which are fully cured in the hot press. Cured resin is thermally and moisture stable and formaldehyde emissions for the glued plywood are similar to background levels for the wood by itself when tested to AS/NZS 2098.11 Determination of formaldehyde emissions for plywood. Accordingly every panel is branded with the lowest emission class (less than 0.5 mg/litre for E<sub>0</sub>).

Actual formaldehyde emissions for Ecoply plywood have been tested and approved as having an actual formaldehyde emission level of less than 0.3 mg/ litre (equivalent to a Super E<sub>0</sub> emission level).

### Moisture content and dimensional change

At the time of leaving the factory, the moisture content of untreated Ecoply plywood should generally be in the range of 8% to 15% as required by AS/NZS 2269. All wood products including plywood respond to changes in ambient humidity so the eventual moisture content of plywood varies according to how dry or how wet the environment is. After manufacture, the moisture content will move to equilibrium with the environment, and the veneers swell or shrink across the grain in response. The total expansion both along and across a 2400 x 1200 mm panel can be in the order of 1.5 mm to 3 mm as the plywood changes from a dry to a saturated state.

Ecoply that is treated with waterborne preservatives (e.g. H3.2 CCA) is expected to be used in applications that have higher humidity than interior dry use, so following treatment it is dried to a higher average moisture content of approximately 18%. This provides for a more stable panel in service than placing a dry (less than 15%) sheet in a higher moisture environment.

Detailing and construction must allow for movement if the plywood will be subject to cycles of moisture change. Seasonal and daily cycles can be significant depending on the end use.

## Temperature

Wood will expand upon heating as do practically all solids. The thermal expansion of plywood is quite small and there is little effect on the structural performance or durability of plywood when used in temperatures below 54°C. The average co-efficient of thermal expansion of plywood is  $4.5 \times 10^{-6}$  mm/mm/°C. At temperatures above 55°C wood begins to deteriorate. Colours of coatings and finishes should be selected to reduce heat gain. For extreme conditions, further technical information is available by calling CHH Woodproducts on 0800 326 759.

The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214 Methods of determining the total thermal resistance of parts of buildings. e.g. Plywood has a Conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance  $R = 0.012/0.13 = 0.09$ .

## Aesthetics

Ecoply plywood products can be selected for decorative or weather protection functions as well as structural performance. Acceptable Solution E2/AS1 - External Moisture allows plywood manufactured to AS/NZS 2269, (minimum CD appearance grade, minimum 12 mm thickness and treated as required by NZS 3602) to be used for exterior cladding. For exterior cladding applications CHH Woodproducts strongly recommends Shadowclad® exterior cladding rather than smooth faced plywood such as Ecoply.

Shadowclad® features a textured (bandsawn) face which reduces the visibility of face checking and other appearance related issues which can occur on smooth faced plywood if not regularly maintained by the homeowner. For more information on plywood used as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction.

## Face checks on plywood exposed to weather

Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture. It is important to realise that these checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way. If you are the specifier, it is important to discuss these issues with your client and consider the length of exterior exposure, climate conditions and protection offered by the surface coating before finalising product choice.

## Durability

The durability of Ecoply structural plywood will depend on the application. Detailing, treatment and installation details need careful consideration to satisfy the requirements of the NZBC.

Normally, 50 year durability can be achieved with untreated Ecoply in dry, interior exposure. For internal environments subject to high humidity or condensation H3.2 CCA treated Ecoply should be used.

For plywood as a rigid air barrier (including rigid air barrier acting as bracing) refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz).

## Fire, spread of flame and smoke development

The following data on early fire hazard properties of uncoated Ecoply plywood are the result of tests carried out by Australian Wool Testing Authority AWTA to test structural plywood manufactured to AS/NZS 2269 in accordance with ISO 5660, reaction to fire tests (heat release, smoke production and mass loss rate). Part 1: Heat Release rate (cone calorimeter method).

Table 6 summarises the test configurations and associated material groups.

For plywood with decorative finish coatings or intumescent coating, performances depend on spread rates of the coating. For advice on specific coating systems and their suitability for use with Ecoply products, always refer to the coating manufacturer.

**Table 6: Early Fire Hazard Properties of Ecoply® Plywood**

Material	Species	Origin	Thickness	Treatment	Material groups
Plywood	Radiata Pine	New Zealand	7mm	CCA Treated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	CCA Treated	Group 3

## 1.9 SUSTAINABILITY

Ecoply is manufactured from radiata pine. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture. The crop is managed on a sustainable basis to yield millable trees.

New Zealand plantations are managed in compliance with the New Zealand Forest Accord.

Ecoply is manufactured in New Zealand at CHH Woodproducts Tokoroa plywood mill.

Ecoply is available Forestry Stewardship Council (FSC) (SCS-COC-001316) certified upon request.

## 1.10 HEALTH & SAFETY

Ecoply should be handled in accordance with the Material Safety Data Sheets (MSDS) for untreated, H3.2 CCA and H3.1 LOSP treated Ecoply, which can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz).

Always wear safety glasses or non-fogging goggles when machining Ecoply panels.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

## 1.11 STORAGE & HANDLING

Ecoply panels must be stored and handled with care to maintain good condition before use and after installation:

- The storage area must be protected from sun, rain and wind that would otherwise bring about rapid changes in temperature and humidity
- Support for the sheets must be provided at both ends and middle to avoid distortion. Ensure bearers in packs above are aligned over bearers below (to avoid inducing curves in sheets)
- The stack must be kept dry and clear of ground contact, and placed so that it will not be exposed to mechanical damage
- The sheets must be stacked flat, NOT on edge
- Store in well-ventilated areas away from sources of heat, flame or spark
- To avoid staining, fading and surface checking, the sheets must not be exposed to the weather while awaiting installation
- Store in well-ventilated areas away from sources of heat, flames or sparks

## 2.0 GENERAL INSTALLATION GUIDE

The following is a general guide to be followed unless otherwise specified. For additional installation instructions for typical applications refer to sections 3, 4 and 5.

### 2.1 FRAMING

Use kiln dried framing e.g. Laserframe® in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. All timber frame sizes and set out must comply with NZS 3604 (or be specifically designed to NZS 3603). The current Laserframe Product Guide can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz). Ecoply may be specified for frame spacing determined by design, or using tables in section 3 for specific product applications such as bracing, flooring and as a substrate for shingle roofs or membrane roofs and decks.

H3.1 LOSP treated framing should be vented before fixing and if construction adhesives are required (for example to screw and glue floor panels) the adhesive must be compatible with H3.1 LOSP. See section 1.4: Preservative Treatment.

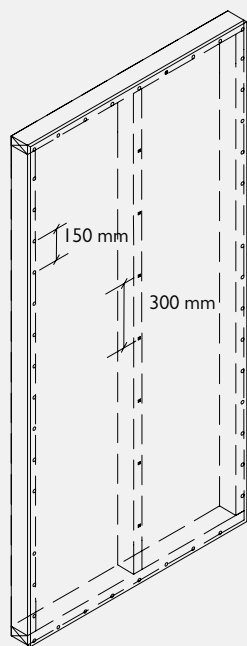
For plywood used as exterior cladding refer to the current Shadowclad® Specification & Installation Guide for Cavity Construction which can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz)

For plywood used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide which can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz)

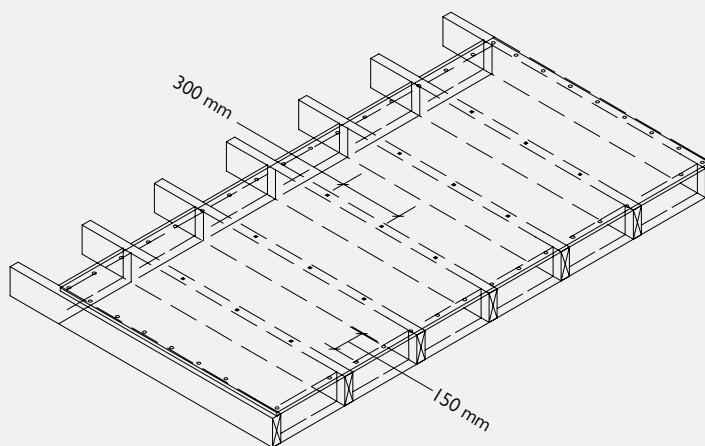
### 2.2 SHEET FASTENERS AND FIXING

- Where there is risk of panel size change due to changes in moisture levels, allow a 2 to 3 mm expansion gap between sheets
- Use only flathead nails or screws, with or without construction adhesives
- Fastener length should penetrate at least 10 nail diameters into the framing or be three times the sheet thickness, whichever is the greater. Longer or ring shank nails may be specified
- Fasteners must be at least 3 fastener diameters or 7 mm from the edge of the sheet
- For tongue and groove products such as flooring and roofing fasten 15 mm from tongue and groove edges
- Standard fixing pattern: unless otherwise specified fasten edges and ends of sheets at 150 mm centres, and within the panel at no more than 300 mm centres (see diagram below)
- Use hot dipped galvanised fasteners or corrosion resistant fasteners (i.e. stainless steel) determined by design for specific hazards
- Where using stainless steel nails, nails must be annular grooved
- Refer to Table 7 for minimum fastener sizes
- Do not overdrive power driven nails

#### EC001: Fastener spacings for Ecoply®



Ecoply® fastened in vertical plane



Ecoply® fastened in horizontal plane

Table 7: Fasteners and Characteristic Shear Loads for Ecoply®

Nominal Thickness (mm)	7mm 9mm	Load <sup>1</sup>	12mm 15 mm	Load <sup>1</sup>	17 mm	Load <sup>1</sup>	19mm 21mm	Load <sup>1</sup>	25 mm	Load <sup>1</sup>
<b>Minimum nail size in timber framing<sup>2</sup></b>	40 x 2.5 mm	570	60 x 2.8 mm	736	60 x 2.8 mm	736	60 x 2.8 mm	736	75 x 3.15 mm	883
<b>Screw size in timber framing<sup>2</sup></b>	8g x 30 mm	1230	8g x 40 mm	1230	10g x 40 mm	1650	10g x 45 mm	1650	10g x 50 mm	1650
<b>1.15 mm steel framing<sup>2</sup></b>	10-24-35 <sup>4</sup>	1300	10-24-40 <sup>4</sup>	2000	10-16-45 <sup>4</sup>	2100	10-16-45 <sup>4</sup>	2100	10-16-45 <sup>4</sup>	2100
<b>Screw size in 2.80 mm steel framing<sup>2</sup></b>	10-24-35 <sup>4</sup>	1200	10-16-40 <sup>4</sup>	1200	14-20-45 <sup>4</sup>	3000	14-20-45 <sup>4</sup>	4000	14-20-45 <sup>4</sup>	5000

1 The load is the characteristic load (N) for one fastener in single shear

2 Characteristic load based on fixing into a timber of J5 joint group or better

3 Self tapping, self countersinking screw

4 Screw Numbers indicate: Gauge – Threads per inch – Length (mm)

#### Notes

- Steel thickness, screw sizes, characteristic loads, refer to assemblies actually tested
- Other screw sizes may be used. Screw properties vary between screw suppliers and the suitability of a particular size should be verified by the designer for performance under changing physical conditions and cyclic loading
- Non-standard nailing may be specifically designed with NZS 3603 or similar

#### Fasteners for H3.2 CCA treated Ecoply®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

#### Notes

H3.2 CCA treated timber should not be fixed in direct contact with light gauge steel products. Refer to the framing manufacturer for advice on fixing and treatments.

## 2.3 ADHESIVES

### Tube applied construction adhesives

Site applied construction adhesives may be used together with nails and screws for non permanent loads, reduced fastener popping, and to lower the risk of squeaking in floors. Available types include polyurethane (e.g. Holdfast® Gorilla Nailpower®) and elastomeric (e.g. Bostik® Wallboard Gold) based adhesives.

Elastomeric adhesives should meet the requirements of APA Performance specification AFG 01 Adhesives for field gluing plywood to wood framing. Other types should have appraisal from an independent authorising body such as BRANZ or equivalent authorities for the specific applications proposed. Follow manufacturer's recommendations. In addition:

- Use a bead or daubs of adhesive as per manufacturer's recommendations
- Apply pressure using fastener patterns outlined in section 2.2: Sheet Fasteners and Fixing
- Work from the middle of the sheet outwards to develop glue line pressure
- Ensure adhesives are compatible with treatment in the framing timber; see section 1.4: Preservative Treatment

### Structural adhesive joints

Structural bonds are generally only achievable in factory controlled conditions using approved structural adhesives in accordance with approved standards for glue lamination, e.g. Resorcinol formaldehyde joints made to AS/NZS 1328 Glued laminated structural timber. Site gluing is not recommended for structural plywood components. Contact CHH Woodproducts on 0800 326 759 for further information.



## 3.0 STRUCTURAL BRACING & CEILING DIAPHRAGMS

The Ecoply bracing system provides bracing resistance for walls and subfloor foundations for light timber framed buildings under wind and earthquake loading, to meet the requirements of the NZBC - BI Structure, and NZS 3604 *Timber Framed Buildings* or specifically designed to NZS 3603 *Timber Structures Standard*.

Any Ecoply structural panel may be used for bracing as long as it is 7 mm, 9 mm or 12 mm thick, has a minimum wall length as described in Table 9, treated for the specific application in accordance with NZS 3602 (summarised in Table 8) and fixed in accordance with Ecoply bracing specifications outlined in this guide.

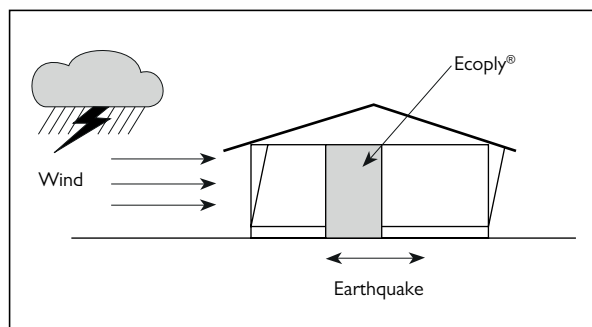
### 3.1 DESIGN TO COMPLY WITH THE NEW ZEALAND BUILDING CODE

#### Structure

Timber framed buildings to NZS 3604 *Timber Framed Buildings* is listed as an Acceptable Solution under Clause 3.0 Timber in Acceptable Solution BI/ASI Structure.

CHH Woodproducts have developed a range of wall bracing elements tested using P21 testing methods referenced in NZS 3604.

#### Specific design



Ecoply structural plywood is manufactured to AS/NZS 2269, and it is suitable for design and use in earthquake and wind bracing systems constructed in accordance with NZS 3603 and AS/NZS 1170.

Structural plywood to AS/NZS 2269 is the only sheet brace material with properties defined in a published New Zealand engineering design code, NZS 3603 *Timber Structures*, and so can be designed in compliance with Verification method BI/VM1 under Clause 6.0 Timber for use in buildings over three storeys in height.

Demand is calculated by following section 5, Bracing Design of NZS 3604 or using the GIB EzyBrace® software, downloadable from [www.gib.co.nz](http://www.gib.co.nz)

EP bracing systems properties can be easily loaded into the EzyBrace software by way of an Excel patch downloadable from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) together with loading instructions.

#### Timber Floors

When carrying out a bracing design for buildings with timber floor structures, the maximum bracing rating that can be accounted for when summing up the bracing units is 120 BUs/m. This does not exclude the installation of bracing elements that are rated higher than 120 BUs/m, however the extra bracing capacity can not be accounted for in the bracing design.

Specific design of floor and sub-floor framing is required for elements rated higher than 120 BUs/m.

#### Durability

Ecoply plywood is manufactured to meet the requirements of NZS 3602 *Timber and Wood based products for use in buildings*. If the product is used, handled and installed in accordance with CHH Woodproducts product literature it will meet the durability Clauses of the NZBC.

Table 8 summarises the applications in which Ecoply can be used as structural bracing together with the required preservative treatment and fastener material.

**Table 8: Ecoply® Suitability for Bracing Applications Including Treatment Type & Fastener Material**

Application	Plywood Treatment	Fastener Material
<b>Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray):</b> E.g. Interior linings	Ecoply Untreated	Hot dipped galvanised or better
<b>Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B &amp; C, as per section 4 of NZS 3604:</b> E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/ without building paper/ wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
<b>Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604:</b> E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/without building paper/ wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
<b>Rigid Air Barrier</b>	Refer to Ecoply® Barrier Specification and Installation Guide	
<b>Bracing on framing exposed to ground atmosphere in exposure zones B &amp; C, as per section 4 of NZS 3604</b>	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
<b>Bracing on framing exposed to ground atmosphere in exposure zones' D</b>	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
<b>Bracing in wet process buildings in all exposure zones, as per section 4 of NZS 3604 (including sea spray)</b>	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

Note: Power driven nails are suitable for use. Do not overdrive, nails must be full round head

#### Rain wetting and construction bracing

Untreated Ecoply will withstand normal exposure conditions during construction for up to 3 months however aesthetically the sheet appearance will deteriorate as the level of exposure increases. Rain and exposure can cause thinner plywood panels to buckle. Plywood stability is related to the number of veneers and thickness of the panel. Where panel stability is critical, consider using thicker panels.

#### Humidity and condensation

In conditions where the moisture content may exceed 18% for prolonged periods, Ecoply must be H3.1 LOSP or H3.2 CCA treated to resist decay or insect hazard.

#### Subfloor sheet bracing

H3.2 CCA treated Ecoply can be used as sheet bracing where dampness does not allow the use of untreated plywood or other sheet materials (section 5 of NZS 3604). Where Ecoply subfloor sheet bracing is exposed to both rain and sun, it must be coated with a three coat, 100% acrylic exterior coating system with a light reflectance value of 50% or greater.

#### Adjustments for wall height

Use section 5 of NZS 3604 to calculate bracing values:

"Adjustment of bracing capacity of walls of different heights and walls with sloping top plates shall be obtained by the following method:

- For wall bracing elements of heights other than 2.4 m, the bracing rating determined by test or from Table 9 should be multiplied by  $2.4 \div \text{element height in metres}$ , except that elements less than 2.4 m high shall be rated as if they are 2.4 m high.
- Walls of varying heights, should have their bracing capacity adjusted in accordance with section 5 of NZS 3604 using the average height."
- Walls with heights < 1.5m, Specific Engineering Design is required.

#### Joining panels for walls higher than maximum sheet length

Ecoply bracing panels must be fixed from top plate to bottom plate. For wall heights over 2.4 m, Ecoply and Shadowclad® is available in 2.7 m sheet lengths. Alternatively, a part sheet can be stacked above a full sheet, butt joined on a single row of nogs with each sheet/part sheet independently nailed off as per the nail spacing in the Ecoply bracing specifications (e.g. 2.4 m x 1.2 m sheet with a 0.3 m x 1.2 m part sheet above it to give a 2.7 m x 1.2 m bracing element).

## Cladding as bracing

12 mm Ecoply (CD face grade or better) can be H3 treated to meet the requirements of Acceptable Solution E2/AS1 and will perform as a structural, durable and weathertight cladding and bracing element when installed in accordance with E2/AS1.

It should be noted smooth faced plywood such as Ecoply may be prone to appearance related issues such as face checking which occurs naturally and is not considered by CHH Woodproducts to be a manufacturing or product fault. For more information refer to section 1.8: General Design Considerations - Face Checks on Plywood Exposed to Weather. H3.2 CCA treated Ecoply may also have a green tinge to the wood surface and may have fillet marks on the face of the sheet.

Plywood for exterior cladding applications where a high visual appearance is desired, CHH Woodproducts recommends the use of Shadowclad as an exterior cladding. Shadowclad has a textured (bandsawn) face which reduces the visibility of face checking and is most commonly H3.1 LOSP treated (clear preservative treatment) which does not leave fillet marks on the panel face.

For further information on Shadowclad as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction which can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz).

## Soil

Ecoply must not be allowed to come in contact with soil. The bottom edge of the plywood sheet must be a minimum of 100 mm above decks or paved ground and a minimum of 175 mm above unprotected ground.

## Service penetrations in bracing elements

Small openings (e.g. power outlets) of 90 x 90 mm or less may be placed no closer than 90 mm to the edge of the braced element, or waste pipe outlets of max. 150 mm diameter placed at no closer than 150 mm to the edge of the braced element.

## 3.2 ECOPLY® BRACING SPECIFICATIONS SUMMARY

CHH Woodproducts has a range of bracing specifications called the EP bracing series. The EP bracing series simplifies the design and construction of bracing elements using plywood, by itself or in conjunction with GIB® Plasterboard and features:

- Single sided and double sided bracing elements High performance bracing element utilising GIB® Standard plasterboard

- A single type, GIB Handibrac®, hold-down for all bracing elements
- Specifications for each bracing element type

**Table 9: Summary P21 Ratings for 2.4m High Ecoply® Wall Elements**

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI	0.4 m		80	95
	0.6 m	Ecoply one side	95	105
	1.2 m		120	135
EPG	0.4 m	Ecoply one side and 10 mm GIB® Standard plasterboard other side	100	115
	1.2 m		150	150

**Note: Bracing and other technical information has been specifically tested using Ecoply branded structural plywood. This information cannot be used with any other plywood brand and bracing data must be sought directly from the specific plywood manufacturer.**

## More information

The following pages provide a full specification of EP bracing elements. Copies of specifications can be downloaded from [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz)

NZS 3604 provides the method of calculating demand on a building. Calculation sheets are available from BRANZ or GIB EzyBrace® software is available as a free download from [www.gib.co.nz](http://www.gib.co.nz). Information is available at [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) which can be placed in the custom elements of GIB EzyBrace® for ease of calculation

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB Handibrac® are registered trade marks of Fletcher Building Holdings Ltd.

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### 3.3 ECOPLY® BRACING SPECIFICATION - EPI

Table 10: Singled Sided Structural Plywood Brace

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI_0.4	0.4 m	Ecoply one side	80	95
EPI_0.6	0.6 m	Ecoply one side	95	105
EPI_1.2	1.2 m	Ecoply one side	120	135

#### Framing

Wall framing must comply with:

- NZBC B1 - Structure: ASI Clause 3 Timber (NZS 3604)
- NZBC B2 - Durability: ASI Clause 3.2 Timber (NZS 3602)

Framing dimensions and height are as determined by the NZS 3604 stud and top plate tables for load bearing and non load bearing walls. Kiln dried verified structural grade timber must be used. Machine stress graded timber, such as Laserframe® of SG8 stress grade minimum, is recommended.

#### Bottom plate fixing

Use GIB Handibrac® hold-down connections at each end of the bracing element. Refer to manufacturer installation instructions supplied with the connectors for correct installation instructions and bolt types to be used for either concrete or timber floors. Within the length of the bracing element, bottom plates are fixed in accordance with the requirements of NZS 3604.

#### Lining

One layer of 7 mm, 9 mm or 12 mm Ecoply plywood fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3 mm expansion gap should be left between sheets.

#### Fastening the Ecoply® panels

Fasten with 50 x 2.8 mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7 mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

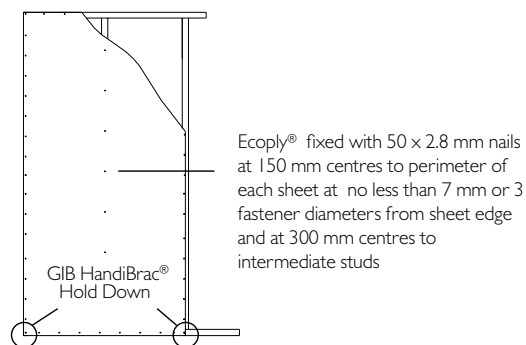
#### Fasteners for H3.2 CCA treated Ecoply® panels

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised.

In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

#### Fastening centres

Fasteners are placed at 150 mm centres around the perimeter of each sheet and 300 mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/ASI Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB Handibrac® are registered trade marks of Fletcher Building Holdings Ltd.

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Table 11: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material\*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

\* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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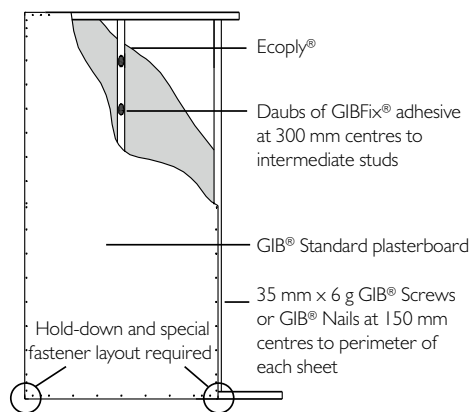
### Fastening the GIB® Plasterboard

32 mm x 6 g GIB® Grabber® Screws or 35 mm GIB® Nails

### Fastening centres

Fasten 50, 100, 150, 225 and 300 mm from each corner and 150 mm thereafter around the perimeter of the bracing element. For vertical fixing place fasteners at 300 mm centres at intermediate sheet joints. For horizontal fixing place single fasteners in the tapered edge where sheets cross studs.

Place fasteners 12 mm from paper bound edges and 18 mm from cut sheet edges. GIB® plasterboard must be treated in every respect in accordance with relevant GIB® literature.



**Table 13: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material\***

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones including sea spray, as per section 4 of NZS3604):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones I B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone I D (sea spray), as per section 4 of NZS3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zone D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

\* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.



### 3.5 GIB HANDIBRAC® – RECOMMENDED INSTALLATION METHOD

Developed in conjunction with MiTek®, the GIB HandiBrac® has been tested for use as the hold-down in all EP bracing elements.

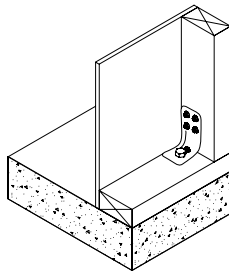
- The GIB HandiBrac® registered design provides for quick and easy installation
- The GIB HandiBrac® provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to

check in the framing as recommended with conventional straps

- The GIB HandiBrac® is suitable for both new and retrofit construction
- The design also allows for installation and inspection at any stage prior to fitting internal linings

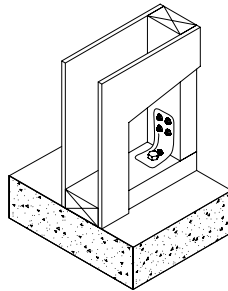
#### Concrete Floor

##### External Walls



Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate

##### Internal Walls



Position GIB HandiBrac® at the stud/plate junction

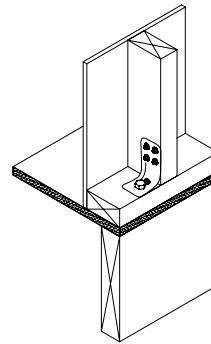
#### Hold-down fastener requirements

A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket

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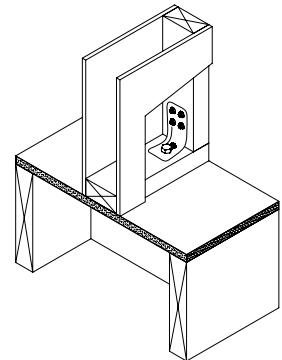
#### Timber Floor

##### External Walls



Position GIB HandiBrac® in the centre of the perimeter joist or bearer

##### Internal Walls



Position GIB HandiBrac® in the centre of the floor joist or full depth solid block

#### Hold-down fastener requirements

M12 x 150 mm galvanised coach screw

### 3.6 STRUCTURAL CEILING DIAPHRAGMS

Diaphragms are used to transfer lateral loads to braced walls and allow for greater spacing between bracing lines. Diaphragms do not have a BU rating themselves.

Plywood diaphragms are an acceptable solution as described in section 13 of NZS 3604 13.5.2 which allows for plywood not less than 6 mm thick and a minimum of three ply for:

- Diaphragms not steeper than 25 degrees to the horizontal and not exceeding 12 metres long under light or heavy roofs and;
- Diaphragms not steeper than 45 degrees to the horizontal and not exceeding 7.5 metres long under light or heavy roofs

Plywood ceiling diaphragms required to comply with NZS 3604 must be constructed as follows:

- The length of diaphragm shall not exceed twice its width measured between supporting walls
- The ceiling lining must consist of plywood over the entire area of the diaphragm
- Complete sheets with a minimum size of 1800 x 900 must be used
- Framing size and spacing must comply with NZS 3604
- Fastener size should comply with Table 7 of this guide. E.g. 40 mm x 2.5 mm flat head nails for 7 mm and 9 mm Ecoly
- Fastening is at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing
- Fixings are no closer than 10 mm from sheet edges
- Perimeter ceiling framing must be connected to wall framing by a perimeter 140 mm x 35 mm ribbon plate nailed to the top of the top plate or alternative such as a 0.55 mm thick steel angle or proprietary steel channel
- Sheets must be laid in a staggered pattern
- The basic shape of a ceiling diaphragm should be rectangular. Protrusions are permitted but cut-outs are not (see Figure 13.4 NZS 3604)

## 6.0 FREQUENTLY ASKED QUESTIONS

**Q:** How much space should be allowed for expansion?

**A:** Allow a 2 - 3mm expansion gap between square edges of Ecoply® sheets. If using Ecoply Flooring, a 5 mm expansion gap is recommended at the perimeter of the floor or deck. Check by calculation for large areas.

**Q:** Can power driven nails be used to fix Ecoply?

**A:** Paslode power driven nails have been tested for fixing Ecoply and Shadowclad® plywood products for particular bracing and cladding applications. For power driven nail specifications refer to the Paslode Special Fixing Applications document available from <http://www.paslode.co.nz/images/fix-app-CHH-woodproducts.pdf>. Use the Paslode Impulse Compact Nailers fitted with a No Mar(k) work contact element to eliminate any contact marks on the plywood. Adjust the work contact element to the flush position and fire the nail at 90° to the work surface. Hammer any nails flush which are left proud. Do not overdrive.

**Q:** How close to sheet edges can I nail?

**A:** Fixings must be at least 3 fastener diameters or 7 mm from the sheet edge.

**Q:** Do I have to use stainless steel nails when using Ecoply for bracing?

**A:** Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

**Q:** What is the weight of Ecoply?

**A:** Refer to Table 4A for weight (kg/m<sup>2</sup>) of different Ecoply thicknesses.

**Q:** What is the R-value of Ecoply?

**A:** The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214. Plywood has a conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance  $R = 0.012/0.13 = 0.09$ .

**Q:** Are there any compatibility issues when using Ecoply with other materials?

**A:** Adhesives for flexible rubber membranes may react with LOSP treatment and should therefore only be applied to H3.2 CCA treated Ecoply unless the membrane supplier advises differently. Check with the membrane manufacturer if in doubt. H3.2 CCA treatment is also corrosive and this must be taken into account when specifying H3.2 CCA treated plywood next to metals. For further guidance, refer to Tables 21 and 22 in Acceptable Solution E2/AS1.

**Q:** Can Ecoply be used as a rigid sheathing (air barrier)?

**A:** CHH has a specific system called Ecoply Barrier. Ecoply Barrier has been developed as a rigid air barrier. Refer to the current Ecoply Barrier Specification & Installation Guide for further information. 7mm H3.2 CCA treated Ecoply can also be used if combined with building underlay in accordance with E2/AS1 for a rigid air barrier system.

**Q:** What is the relevance of AS/NZS 2269?

**A:** Ecoply structural plywood is manufactured to AS/NZS 2269 Plywood Structural. This Standard is referenced by the NZBC Compliance Documents including NZS 3602 Timber and Wood-based Products for Use in Building, NZS 3603 Timber Structures, NZS 3604 Timber Framed Buildings, AS/NZS 1604.3 Specification for Preservative Treatment, Part 3: Plywood and Acceptable Solution E2/AS1 - External Moisture. Plywood not manufactured to AS/NZS 2269 does NOT meet the requirements of these NZBC Compliance Documents.

**Q:** What is the relevance of the PAA stamp?

**A:** Ecoply is manufactured under a third party audited, product quality control programme by the Engineered Wood Products Association of Australasia (EWPAA) to monitor compliance with AS/NZS 2269. Given that compliance with Standards is not actively policed by Standards New Zealand, this third party auditing provides important peace of mind for users and consumers of Ecoply plywood products.

**Q:** What is marine ply?

**A:** Marine plywood manufactured to AS/NZS 2272 Plywood Marine may contain species of low durability (source: BRANZ Good Practice Guide – Timber Cladding). Whilst marine plywood has a Type A glue bond, it is generally specified for its high surface appearance grade and lack of core knots as opposed to structural performance. AS/NZS 2272 limits marine plywood to a number of approved species that pass stringent property requirements for things like moisture permeability. These requirements are different from those in standards from other countries. Marine plywood is rarely treated as it is usually coated with resin, fibreglass, or a paint finish for long term durability.

**Q:** What should a specification for structural plywood include?

**A:** A specification for structural plywood should include:

Specification check list	Example
Quantity/size	20 sheets of 2400 x 1200
Thickness	12 mm
Edge finish	Square edge
Brand name	Ecoply® structural plywood
Reference to Standard	To AS/NZS 2269
Stress grade/layup	F8 (12-24-5)
Surface grade/bond type	CD A-Bond <sup>1</sup>
Accreditation	EWPAA product certified <sup>3</sup>

1 Stress grades may vary between different manufacturers and products.

2 Type A-bonds are suitable for permanent exposed applications and structural applications.

3 The EWPAA JAS-ANZ Product Certification Mark certifies that Ecoply structural plywood products have been manufactured under a third party audited joint product certification programme to monitor compliance with AS/NZS 2269

**Q: What are F-grades?**

**A:** The stress grading system is a ranking system which utilises the symbol F and a suffix 8, 11 etc as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. For plywood of a given thickness, the higher the F-grade, the further it will span. For load bearing applications (e.g. flooring, roofing) the required F-grade as well as the plywood thickness must be specified to achieve the required span. F8 is the most common structural plywood grade found in New Zealand. All Ecoply® structural products are F8. Ecoply 15 mm roofing and Ecoply 19 mm Longspan Flooring are F11/F8. Other Ecoply Flooring products are also available in F11 upon request.

**Q: What are surface/appearance grades (eg CD)?**

**A:** Appearance grades (eg BD, CD, DD) denote the appearance grade of the plywood including the number and size of knot holes as defined in AS/NZS 2269 and summarised in Table 2A & 2B of this guide. The first letter describes the appearance of the face veneer and the second letter describes the back face.

**Q: How long can Ecoply be left exposed to the weather?**

**A:** Untreated Ecoply will typically maintain its structural integrity when exposed to the weather during construction for up to 3 months. The surface colour will start to silver off and face checking will become evident. Where the finished appearance of the Ecoply is important, it should be protected during construction. Ecoply is also available H3 treated to resist decay or insect hazard. When used in accordance with this guide, it can be specified to meet the durability requirements of the NZBC, however appearance issues such as face checking may still occur dependent upon the degree of exposure to weather during construction.

**Q: What treatment levels and types are used for Ecoply?**

**A:** Ecoply is available untreated or preservative treated. Ecoply is treated to the H3 hazard class for above ground use. The standard Ecoply treatment type is H3.2 CCA (Copper Chrome

Arsenate) although H3.1 LOSP Azole (Light Organic Solvent Preservative) may also be specified where a clear treatment is required. LOSP Azole is the standard treatment type for BD, Grooved Lining and Shadowclad®. CCA treatment gives the plywood sheets a green tinge and the drying process after CCA treatment may leave fillet marks on the face of the sheet.

**Q: Does Ecoply have to be treated when used as structural bracing?**

**A:** Ecoply used as bracing must be treated unless it is installed in an interior dry situation. Note, behind exterior cladding and in cavities (even if the Ecoply is covered with building wrap) are not considered to be an interior dry situation.

**Q: Do I have to re-treat cut edges of treated Ecoply?**

**A:** It is important to re-treat any cuts and holes with a brush on remedial treatment such as Holdfast® Metalex® Clear.

**Q: What type of glue is used to manufacture Ecoply?**

**A:** Phenol formaldehyde (PF) resins are used to bond the plywood veneers. This forms a Type A (Marine) bond suitable for structural applications and exterior use. Phenol formaldehyde resins are dark red/brown in colour. Product details printed on the back of Ecoply sheets indicate the 'A Bond'.

**Q: Does Ecoply emit formaldehyde?**

**A:** Formaldehyde occurs naturally in the environment and is emitted by processes such as combustion, decay and naturally by all timber species. Ecoply and Shadowclad meets the lowest formaldehyde emission class (E<sub>0</sub> - less than 0.5 mg/litre). Actual formaldehyde emissions have been tested to be less than 0.3 mg/litre.

**Q: How should Ecoply be installed to maximise its stiffness properties?**

**A:** Structural plywood has greatest stiffness along the long grain of the sheet (i.e. along its length). Therefore, flooring/roofing should be laid across joists/rafters rather than parallel to them.

## 7.0 REFERENCES AND SOURCES OF INFORMATION

- New Zealand Building Code (NZBC)
  - CHH Woodproducts technical notes - downloadable from [www.chhwoodproducts.co.nz/document-library](http://www.chhwoodproducts.co.nz/document-library)
  - NZS 3640:2003 "Chemical Preservation of Round and Sawn Timber"
  - NZS 3602:2003 "Timber and Wood-based products for use in Buildings"
  - NZS 3603:1993 "Timber Structures Standard"
  - NZS 3604:2011 "Timber Framed Buildings"
  - AS/NZS 1170:2011 "Structural design actions"
  - AS/NZS 2269:2012 "Plywood Structural"
  - AS/NZS 1604.3:2010 "Specification for Preservative Treatment, Part 3: Plywood"
  - AS 1684:2010 "Residential Timber Framed Construction"
  - US Product Standard PS1-95
  - Acceptable Solution 'E2/AS1 – External Moisture'
  - Acceptable Solution 'B2/AS1 – Durability'
  - BRANZ Bulletin 345: Flat membrane roofs – design and installation
  - BRANZ Bulletin 346: Flat membrane roofs – materials
  - BRANZ Bulletin 289: Asphalt shingle roofing
  - BRANZ Appraisals 307, 404, 411
  - Shadowclad® Specification & Installation Guide for Cavity Construction
  - Ecoply® Barrier Specification & Installation Guide
  - Material Safety Data Sheets
    - MSDS Azole Treated Plywood, LVL & I-Joists
    - MSDS H3 CCA Treated Plywood & I-Joist
    - MSDS Untreated Plywood
  - APA ([www.buildabetterhome.org](http://www.buildabetterhome.org))
  - EWPA (www.ewp.asn.au)
  - Product Technical Statement for Ecoply available online ([www.chhwoodproducts.co.nz/product-technical-statements](http://www.chhwoodproducts.co.nz/product-technical-statements))
  - EWPA Technical Note - Plywood Roofing and Flooring: Installation and detail factors
- Standards can be purchased online at [www.standards.co.nz](http://www.standards.co.nz)  
Building Code Compliance Documents can be downloaded free of charge at [www.dbh.govt.nz](http://www.dbh.govt.nz)

## 8.0 LIMITATIONS

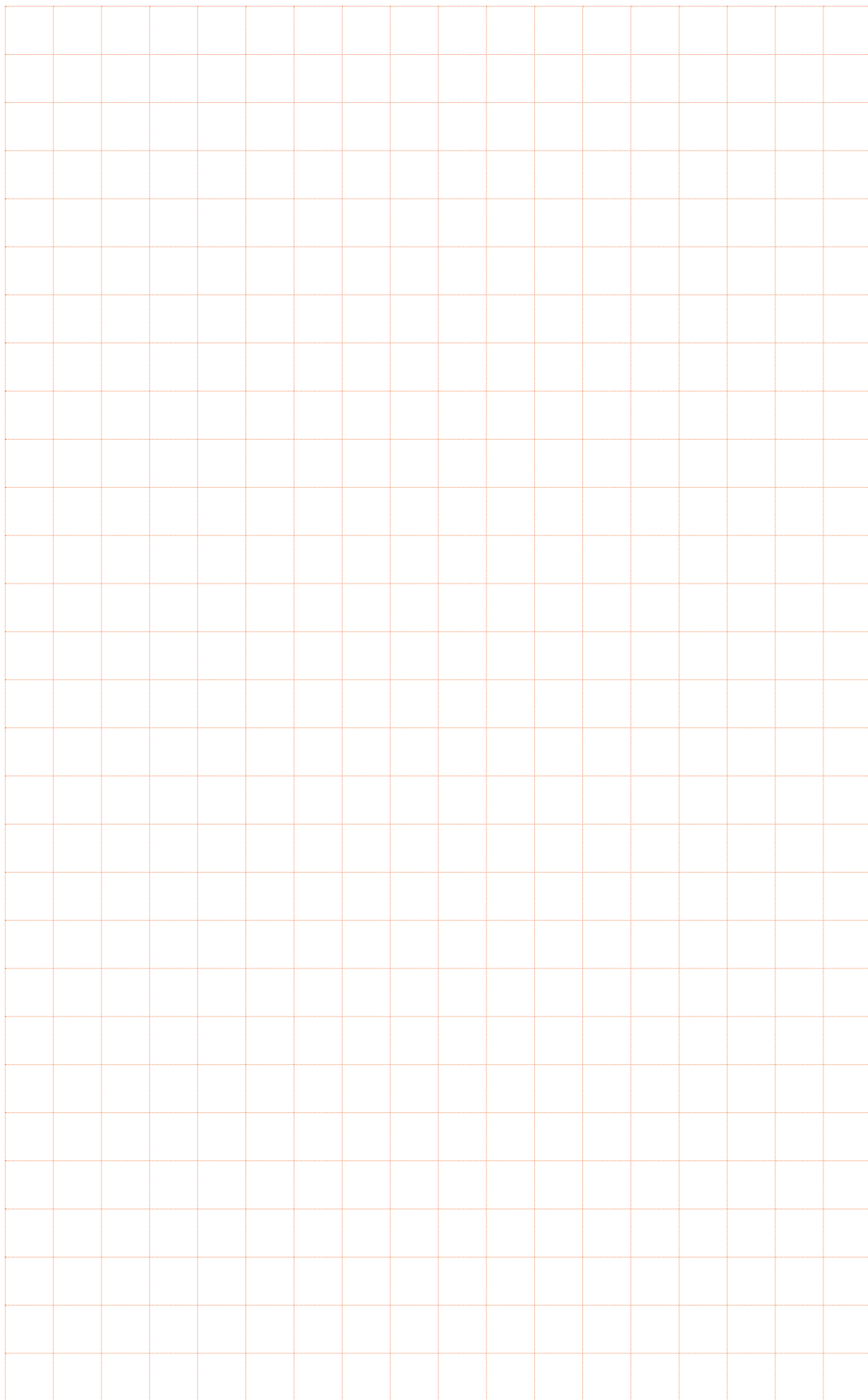
The information contained in this document is current as at September 2015 and is based on data available to CHH Woodproducts at the time of going to print.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of Ecoply products installed in accordance with this document or NZBC compliance documents.

This publication replaces all previous CHH Woodproducts design information and literature relating to Ecoply structural plywood products. CHH Woodproducts reserves the right to change the information contained in this document without prior notice.

It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on 0800 326 759 or visit [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) to obtain current information.

**CHH Woodproducts has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH Woodproducts assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.**



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September 2015





# Installation Manual

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## WE VALUE YOUR FEEDBACK

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

**Ask James Hardie™**

Fax 0800 808 988

[literaturefeedback@jameshardie.co.nz](mailto:literaturefeedback@jameshardie.co.nz)

# 1 Introduction

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

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

Today's high energy costs demand that all avenues be explored to develop cost-efficient ways for keeping our homes cool. One

of these methods — tried and proven — is the use of wide soffits, verandahs and covered outdoor living areas. James Hardie products are resistant to fire and damage from moisture and rotting when installed and maintained as directed.

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



## 1.1



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

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



## 1.2



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

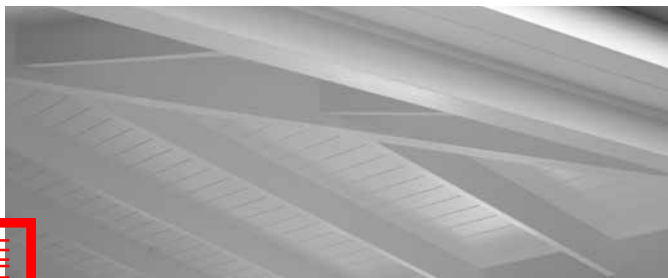
- HardieFlex Eaves Lining has an unsanded finish suitable for semi-gloss acrylics or lightly textured coatings. Smooth high-gloss coatings must be avoided as some surface undulations may be visible in critical light.
- HardieFlex Sheet 6mm, can also be used in eaves application for extra rigidity on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

## 1.3



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

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



## HardieGroove™ | JH™ SOFFIT LINING

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

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

1.5

## Villaboard™ | JH™ SOFFIT LINING

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

- The sheets are fully sanded to give a smoother face surface.
- Two long sheet edges are supplied with a recessed finish and site-cut edges can be readily ground on site. Other combinations are also available. Refer Table 2, page 5.
- Square-edge sheets are also available. These sheets can be used for the alternative expressed, sealant-filled or uPVC joint finish.



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

- HardieFlex Sheet Technical Specification.
- Villaboard Lining Installation Manual.
- HardieGroove Lining Installation Manual.
- Fire and Acoustic Design Manual.

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

### MAKE SURE YOUR INFORMATION IS UP TO DATE

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

## 1.6 PRODUCT DESCRIPTION

Table 1

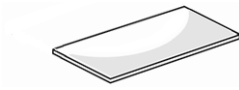
HardieSoffit Lining Sheet Sizes					
Square-cut edge for use with jointers 	Length (mm)	Mass (kg/m <sup>2</sup> )	Width 1200mm		
			450	600	750
	4.5mm thickness	6.5			
	2400		401948	401947	401946

Table 2

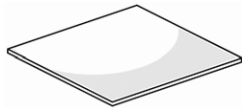
HardieFlex Eaves Lining Sheet Sizes							
Square-cut edge for use with jointers		Width (mm)	Mass (kg/m²)	Length (mm)			
				1800	2400	2700	3000
		4.5mm thickness	6.5				
		900			400194		
		1200		400190	400187	400185	400183

Table 3

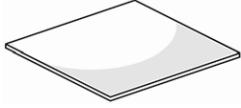
Eclipsa Eaves Lining Sheet Sizes				
Pre-finished square-cut edge sheet for use with jointers 	Length (mm)	Mass (kg/m <sup>2</sup> )	Width (mm)	
	4.5mm thickness	6.6	600	1200
	2400		404807	404808

Table 4

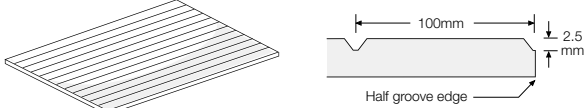
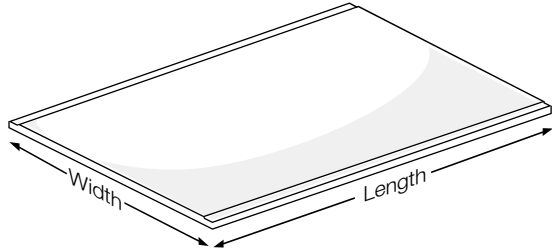
HardieGroove Soffit Lining Sheet Sizes				
Half groove length ways to achieve concealed joints 	Length (mm)	Mass (kg/m <sup>2</sup> )	Width (mm)	
	7.5mm thickness	10.4	1200	
	2400		400246	
	2700		400245	

Table 5

Villaboard Soffit Lining Sheet Sizes

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

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



Length (mm)	Mass (kg/m²)	Width 1200mm		
		Edge Finish		
		4 rec/ edges	2 rec/ edges (long)	Square edges
6mm thickness	8.6			
2400		400432	400429	400444
2700			400428	
3000			400427	400442
9mm thickness	12.4			
2400		400439	400436	400445
2700			400435	
3000			400434	400059

## 1.7 ACCESSORIES

Table 6

HardieFlex™ Eaves Lining And HardieSoffit™ Lining — Accessories / Tools Supplied by James Hardie					
Accessories	Description	Product Code	Accessories	Description	Product Code
	<b>Soffit 4.5mm PVC 2-way Jointer</b> 2400mm long, uPVC / White	300915		<b>Hardiejointer 5mm</b> uPVC / White 2400mm long 750mm long 600mm long 450mm long	300729 300921 300920 300919
	<b>6mm Hardiejointer</b> uPVC/Bone colour 2400mm long 3000mm long	300730 300734		<b>HardieFlex 5mm Capping Mould</b> 2400mm long, uPVC / White	300538
	<b>6mm Capping Mould</b> uPVC/Bone colour 2400mm long 3000mm long	300539 300540		<b>Scotia Mould (base and cap)</b> 2400mm long, uPVC / White	300916
	<b>Fastfix Fasteners</b> 38 x 12mm, Nylon / White	300632		<b>Inseal 3259</b> 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767
	<b>HardieKnife™</b> Scoring tool for easy cutting.	305926			

Table 7









Eclipsa Eaves Lining — Accessories / Tools Supplied by James Hardie					
Accessories	Description	Product Code	Accessories	Description	Product Code
	<b>Hardiejointer 5mm uPVC</b> 2400mm long 750mm long 600mm long 450mm long	300729 300921 300920 300919		<b>Soffit 4.5mm PVC 2-way Jointer</b> 2400mm long, uPVC / White	300915
	<b>Soffit Scotia Mould (base and cap)</b> 2400mm long, uPVC / White	300916		<b>HardieFlex Capping Mould 5mm</b> 2400mm long, uPVC / White	300538
	<b>Fastfix Fasteners</b> 38 x 12mm, Nylon / White	300632		<b>Inseal 3259</b> 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767
	<b>Eclipsa Eaves Lining Touch-up Paint</b> 15ml	Free Ask James Hardie on 0800 808 868		<b>HardieKnife™</b> Scoring tool for easy cutting.	305926



Table 8

HardieGroove Soffit Lining — Accessories / Tools Supplied by James Hardie					
Accessories	Description	Product Code	Accessories	Description	Product Code
	<b>Soffit Scotia Mould (base and cap)</b> 2400mm long, uPVC / white	300916		<b>Inseal 3259</b> 1.5mm thick 50mm wide x 50m long, black compressible foam	300767
	<b>HardieBlade Saw Blade</b> Ø184mm poly crystalline diamond blade, for fast, clean cutting of James Hardie fibre cement.	300660		<b>James Hardie Base Coat</b> Base compound for filling over screws. 4kg Pail 15kg Bag	304490 304491
	<b>HardieDrive Screw s/s 316</b> 30mm x 7g. 100 per jar For fastening to timber frames.	300928		<b>Villadrive Screw 6g x 30mm</b> For fastening to timber frames. 100/jar 5kg Box Collated/ 1000	300992 300993 300994
	<b>HardieKnife™</b> Scoring tool for easy cutting.	305926			









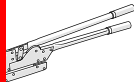
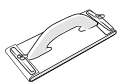


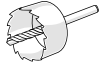

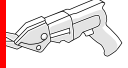
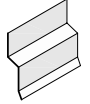








Table 9

Villaboard® Soffit Lining — Accessories / Tools Supplied by James Hardie					
Accessories	Description	Product Code	Accessories	Description	Product Code
	<b>Soffit Scotia Mould (base and cap)</b> 2400mm long, uPVC / White	300916		<b>Inseal 3259</b> 1.5mm thick 50mm wide x 50m long, Black compressible foam	300767
	<b>Hardiejointer 6mm</b> uPVC / Bone colour 2400mm long 3000mm long	300730 300734		<b>9mm Hardiejointer</b> uPVC / Bone colour 3000mm long	300736
	<b>HardieFlex Capping Mould 6mm</b> uPVC / Bone colour 2400mm long 3000mm long	300539 300540		<b>Control Joint</b> 2700mm long, uPVC / White	300978
	<b>Corner Angle</b> uPVC 3000mm long	300669		<b>James Hardie Top Coat</b> Topping compound for flush finished jointing. 3kg Pail 15kg Pail	304492 304493
	<b>James Hardie Base Coat</b> Base compound for flush finished jointing. 4kg Pail 15kg Bag	304490 304491		<b>HardieBlade Saw Blade</b> Ø184mm poly crystalline diamond blade, for fast, clean cutting of James Hardie fibre cement.	300660
	<b>HardieDrive Screw s/s 316</b> 30mm x 7g 100 per jar For fastening to timber frames.	300928		<b>Villadrive Screw 6g x 30mm</b> For fastening to timber frames. 100/jar 5kg Box Collated/1000	300992 300993 300994
	<b>FibreZip® Screws</b> Self drilling rib head screw Box 1000	303840		<b>HardieKnife™</b> Scoring tool for easy cutting.	305926

Table 10

### Components Not Supplied by James Hardie

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

Accessories	Description	Accessories	Description
	<b>HardieFlex Nail</b> 40 x 2.8mm galvanised or stainless steel nails.		<b>Second Coat Trowel 200mm</b> For installing second coats on set joints on Villaboard Lining.
	<b>Rondo P35</b> Control joint used in movement joints.		<b>Finishing Coat Trowel</b> For installing top coats on set joints on Villaboard Lining.
	<b>Perforated Paper Tape</b> Joint reinforcing tape.		<b>Corner Tool</b> For setting of internal corners on Villaboard Lining.
	<b>Level/Straight Edge</b> For checking straightness of frame.		<b>Hawk</b> To assist in the application of finishing compounds especially with the use of trowels.
	<b>Hand Guillotine</b> Guillotine for cutting fibre cement.		<b>Hand Sander</b> For sanding set joints on Villaboard Lining.
	<b>Collated Screw Gun</b>		<b>Notched Trowel</b> For applying tile adhesive to face of Villaboard Lining.
	<b>Hole Saw</b>		<b>Broadknife 150mm</b> For setting of joints on Villaboard Lining.
	<b>Electric shear/Fibreshear</b> For cutting Villaboard Soffit Lining, HardieGroove Soffit Lining, HardieSoffit Lining, HardieFlex Eaves Lining.		<b>Flashing to Table 20 'E2/AS1'</b> Flashing fabricator
	<b>Flashing Tape</b> Proprietary tape to adhere to building wrap. Tyvek, Protecto wrap or similar		<b>Flexible Joint Sealant</b> Tube Sikaflex MS or similar
	<b>Masking Tape</b> 3M Scotch™ Blue 2090 - I8E 70006576972 or Sellotape 5855 Long Life		<b>Paperback Corners</b> 'Goldline' corner moulds
	<b>Polyurethane Tape</b>		<b>Adhesive Sealant</b> Sikaflex-11FC by Sika Seal N Flex-1 by Bostik
	<b>Acrylic Paint</b> Dulux X10 or similar brand		<b>Waterproofing Admixture</b> Multiplast Resin by Plaster Systems. Used in diluted form over Villaboard Lining sheet edges to control moisture suction before flush stopping.

## 2 Safe working practices

### STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALLINE SILICA

#### Crystalline Silica

What is it? Why and when is it a health hazard?

#### Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

#### Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks.
- The most hazardous dust is the dust you cannot see!

#### When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica.
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board).

**FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.**

### AVOID BREATHING IN CRYSTALLINE SILICA DUST!

#### Safe working practices

- 👎 NEVER use a power saw indoors or in a poorly ventilated area
- 👎 NEVER dry sweep
- 👍 ALWAYS use M Class extractor unit as a minimum and always hose down with water/wet wipe for clean up
- 👎 NEVER use grinders
- 👍 ALWAYS use a circular sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance.
- 👍 ALWAYS follow tool manufacturers' safety recommendations
- 👍 ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- 👍 ALWAYS wear an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:

#### BEST

- HardieKnife™
- Hand guillotine
- Fibreshear

#### BETTER

- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

#### GOOD

- Dust reducing circular saw with HardieBlade™ Saw Blade

#### Working outdoors

- 👍 Make sure you work in a well ventilated area
- 👍 Position cutting station so wind will blow dust away from yourself and others in the working area
- 👍 Cut products with either a HardieKnife or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit
- 👍 When sawing, sanding, rebating, drilling or machining fibre cement products, always:
  - Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers' instructions) and when others are close by, ask them to do the same
  - If you are not clean shaven, then use a powered air respirator with a loose fitting head top.
  - Wear safety glasses
  - Wear hearing protection
  - When others are close by, ask them to do the same.

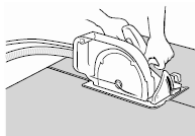
#### Working indoors

- 👎 Never cut using a circular saw indoors
- 👍 Position cutting station in a well ventilated area
- 👍 Cut ONLY using a HardieKnife, hand guillotine or fibreshears (manual, electric or pneumatic)
- 👍 Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

**IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.**

## Working Instructions

- Refer to Recommended Safe Working Practices before starting any cutting or machining of product.



### HardieBlade™ Saw Blade

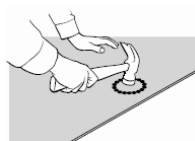
The HardieBlade™ Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base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

### Hole-Forming

#### For smooth clean cut circular holes:

Mark the centre of the hole on the sheet.

Pre-drill a 'pilot' hole.



Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

#### For irregular holes:

Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.

- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.

## STORAGE & DELIVERY

### Keeping products and people safe

#### Off loading

- James Hardie products should be off-loaded carefully by hand or by forklift.

- James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite.

#### Storage

James Hardie products should be stored:

- in their original packaging
- under cover where possible or otherwise protected with a waterproof covering to keep products dry
- off the ground – either on a pallet or adequately supported on timber or other spacers
- flat so as to minimise bending

#### James Hardie products must not be stored:

- directly on the ground
- in the open air exposed to the elements

**JAMES HARDIE IS NOT RESPONSIBLE FOR DAMAGE DUE TO IMPROPER STORAGE AND HANDLING.**

## TIPS FOR SAFE AND EASY HANDLING

### Weatherboard products

- Do not lift planked products flat and in the middle
- Carry the products on the edge
- If only one person is carrying the product, hold it in the middle and spread arms apart to better support the product
- If two people are carrying the plank, hold it near each end and on edge
- Exercise care when handling weatherboard products to avoid damaging the edges/corners

### Sheet products

- Carry with two people
- Hold near each end and on edge
- Exercise care when handling sheet products to avoid damaging the edges/corners

# 3 Framing

## 3.1 TIMBER FRAME

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

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

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

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

## 3.2 STEEL FRAME

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

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

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

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

Screw-fix 6mm or thicker sheets only.

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

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

## 3.3 FRAMING SET-OUT

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

For the framing set-out of 601mm to 1200mm wide soffits refer to Figure 2.

### 3.3.1 Pre-finished steel fascia/gutters

When pre-finished steel fascia/gutters are used the soffit edge must be supported 4mm minimum into fascia recess, similar to Figure 10.

Ribbon board to be continuous for product fixing.

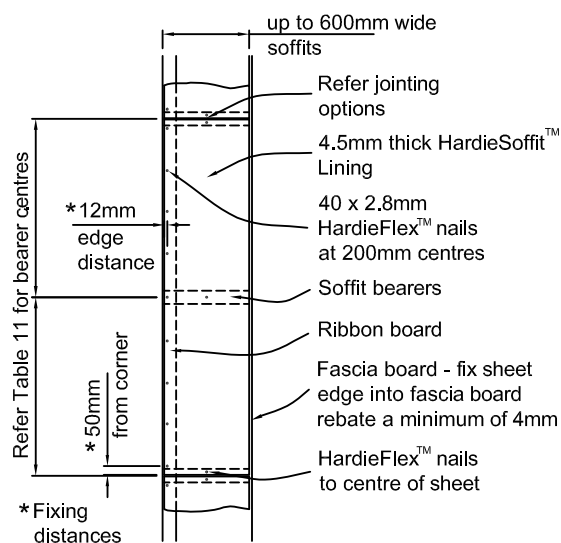
NOTE: Because of the limited fascia groove available with some metal fascias a supporting ribbon board will be required with fixings at 300mm centres maximum. Pre-finished soffits can distort due to surface tension when adequate edge support is not provided.

Table 11

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

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

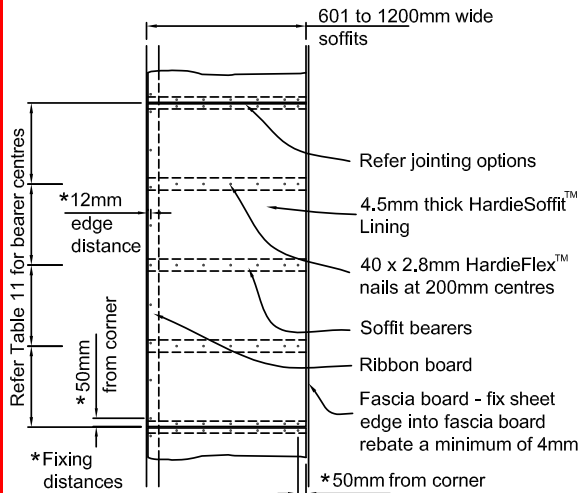
Figure 1: Eaves and soffit up to 600mm



### Notes

- HardieFlex™ nails are the usual fixing method for HardieSoffit™ Lining. The fastfix method can also be used as an alternative.
- When fastfix fastenings are used refer to Table 7 and Figure 8 and 9.

Figure 2: Eaves and soffits 601mm to 1200mm



1. HardieFlex™ nails are the usual fixing method for HardieSoffit™ Lining. The fastfix method can also be used as an alternative.
2. When fastfix fastenings are used refer to Table 7 and Figure 8 and 9.

### 3.4 BATTEN REQUIREMENTS

Battens are required when sheets are fixed over:

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

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

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

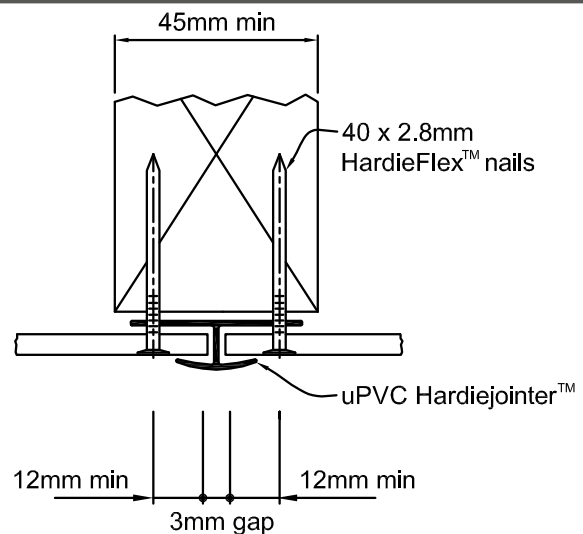
### 3.5 SKILLION ROOF DESIGN

When installing soffit linings direct to the under side of skillion roof framing, ensure that sufficient ventilation has been provided within the roof space. The temperatures within these smaller roof spaces can reach very high levels in certain conditions and this can cause cracking in flush stopped joints due to excessive movement in roof framing. Therefore the framing in skillion soffits and ceilings need a specific engineering design consideration.

General design guide for a narrow strip of flash stopped soffits is to provide a control joint at 4.8m centres.

General design guide for large flash stopped soffits is to provide control joints at 4.8m x 3.6m in either direction when fixing to this type of framing.

Figure 3: uPVC Hardiejointer detail





# 4 Jointing options

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

## HARDIESOFFIT LINING

- Refer to Figure 3 for uPVC Hardiejointer detail
- Refer to Figure 5 for express joint detail
- Refer to Figure 9 for two-way uPVC jointer

## HARDIEFLEX EAVES LINING

- Refer to Figure 3 for uPVC Hardiejointer detail
- Refer to Figure 4 for butt joint detail
- Refer to Figure 5 for express joint detail
- Refer to Figure 9 for two-way uPVC jointer

## ECLIPSA EAVES LINING

- Refer to Figure 3 for uPVC Hardiejointer detail
- Refer to Figure 8 for Fastfix Fasteners fixing detail. Use a 6mm diameter masonry drill bit to drill a hole and fix fasteners
- Refer to Figure 9 for Two-way uPVC Jointer

## HARDIEGROOVE SOFFIT LINING

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

## VILLABOARD SOFFIT LINING

- Refer to Figure 6 for flush joint details. Refer to Section 5.5 for flush jointing
- Refer to Figure 3 for uPVC Hardiejointer detail
- Refer to Figure 4 for butt joint detail
- Refer to Figure 5 for express joint detail
- Refer to Figure 7 for sealant joint detail

Figure 4: Butt joint detail

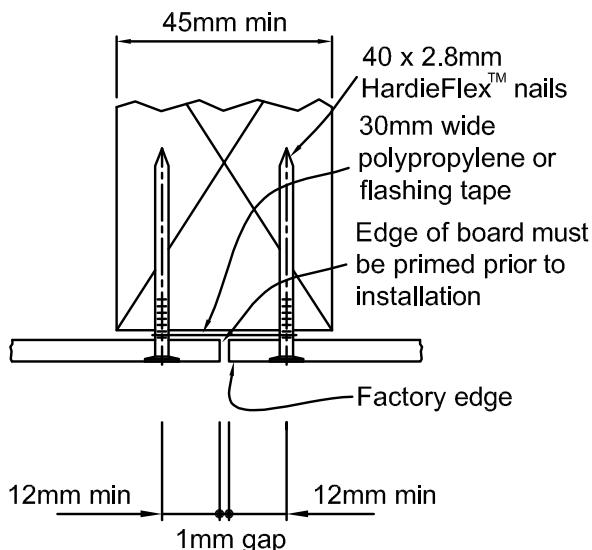


Figure 5: Expressed joint detail

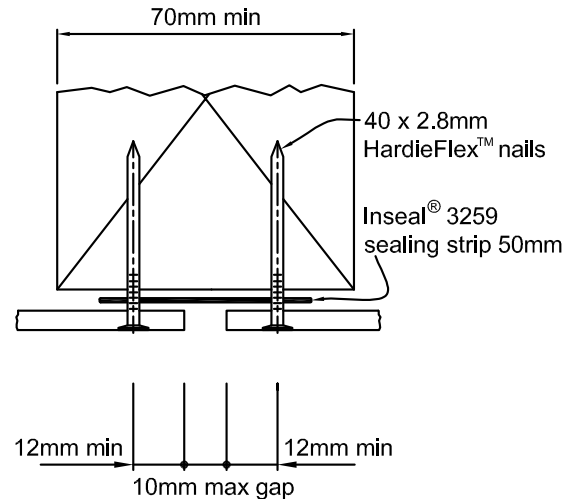


Figure 6: Vertical flush joint setout

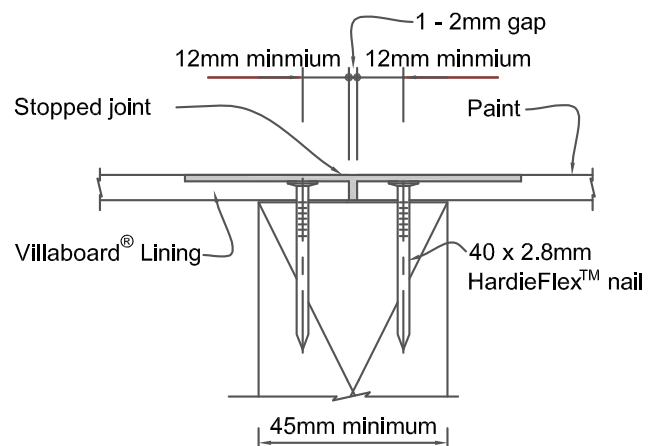


Figure 7: Sealant joint detail

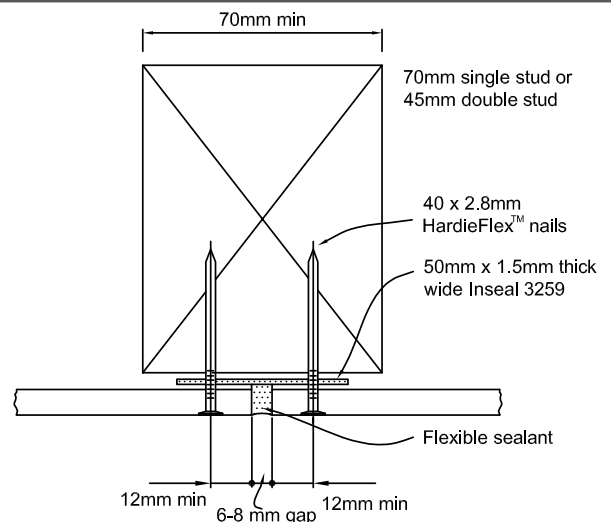
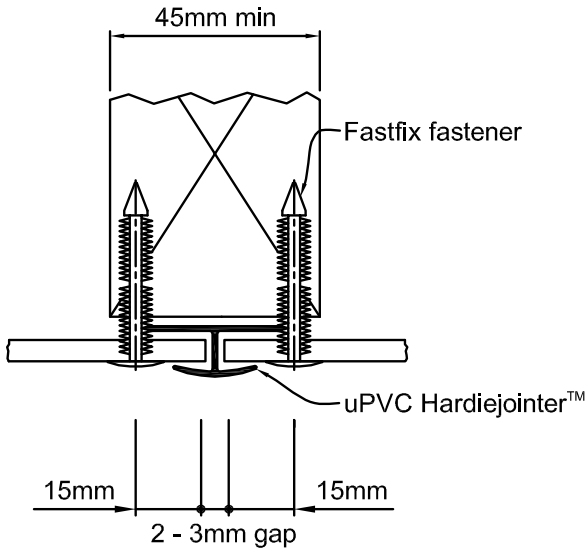


Figure 8: Fastfix fastener fixing detail



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

Figure 10: Cladding detail with scotia mould

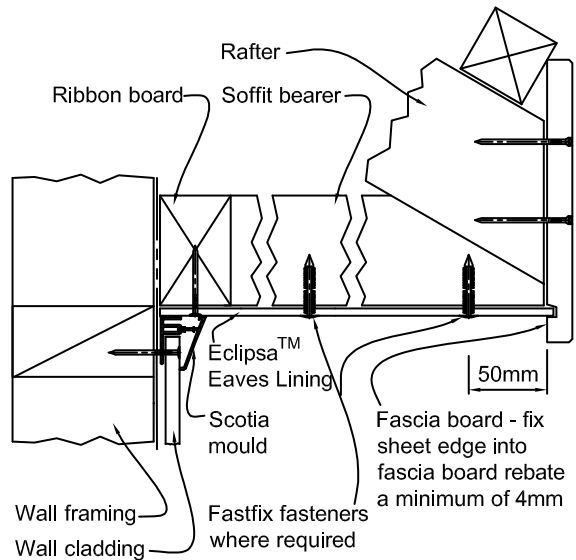
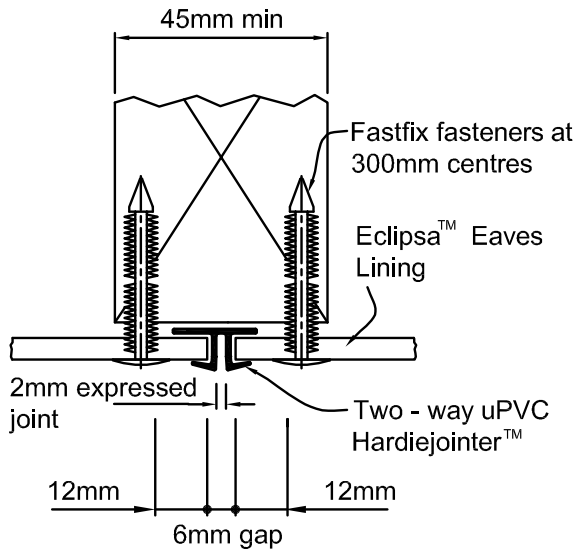
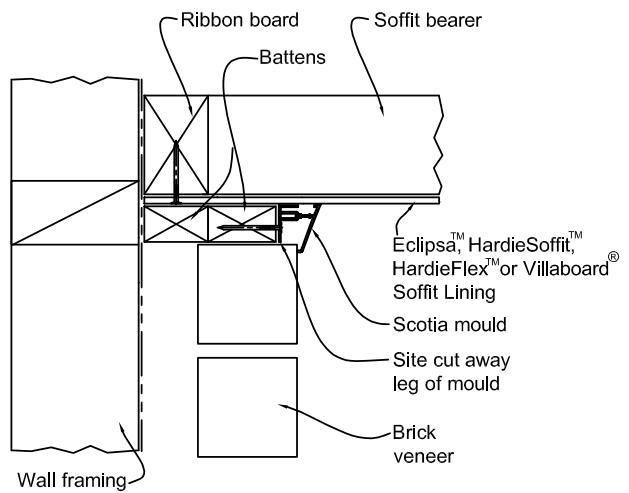


Figure 9: Two-way uPVC jointer



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

Figure 11: Brick veneer detail with scotia mould



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

# 5 Installation

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

## 5.1 GENERAL

Refer to Table 11 and Figure 1 and 2 regarding nail fixing centres, for framing and types of fasteners.

The eaves/soffits must be sealed against claddings to minimise moisture ingress behind the claddings. The roof must have been installed before installing the soffits linings. Where the soffits are sloping upwards away from the wall, a mechanical flashing must be provided in the soffit to wall junction. The flashing is fixed under soffit lining and laps over the face of cladding by 35mm minimum. Refer to Figure 27 - Figure 30.

### 5.1.1 Drip Edge

All soffit linings must either be installed with a grooved fascia, refer Figure 10, or with exterior cladding which forms a drip edge below the soffit lining by 15mm minimum. Soffit linings are generally fitted into the recess formed in fascia board to form the drip edge.

### 5.1.2 Structural Ceiling Diaphragms

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

### 5.1.3 Curved Applications

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

The minimum bending radii are shown below.

Table 12

Curved Soffit/Ceiling Minimum Bending Radii	
	Along length (mm)
9mm Villaboard Lining	3000
6mm Villaboard Lining	1800
HardieFlex Eaves Lining	1800
HardieSoffit Lining	1800

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

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

Table 13

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

### 5.1.4 FIRE RATED SOFFITS

For full details refer to the James Hardie Fire and Acoustic Design Manual or Ask James Hardie on 0800 808 868.

## 5.2 FASTENER DURABILITY

Fasteners used in external applications must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing's material to be used in relation to the exposure conditions and are summarised in Table 14.

Table 14

### Exposure conditions and nail selection prescribed by NZS 3604

Zone / Nail Material		
Zone D*	Zone C outside sea spray zone and Zone B and geothermal hot spots	Bracing — All zones
Grade 316 Stainless	Hot-dipped galvanised or 316 stainless	Grade 316 Stainless

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

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

## 5.3 HARDIESOFFIT LINING

For framing and fixing schedules refer to Section 3.

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

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

### NOTES

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

## 5.4 HARDIEFLEX EAVES LINING

For framing and fixing schedules refer to Section 3.

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

### NOTES

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

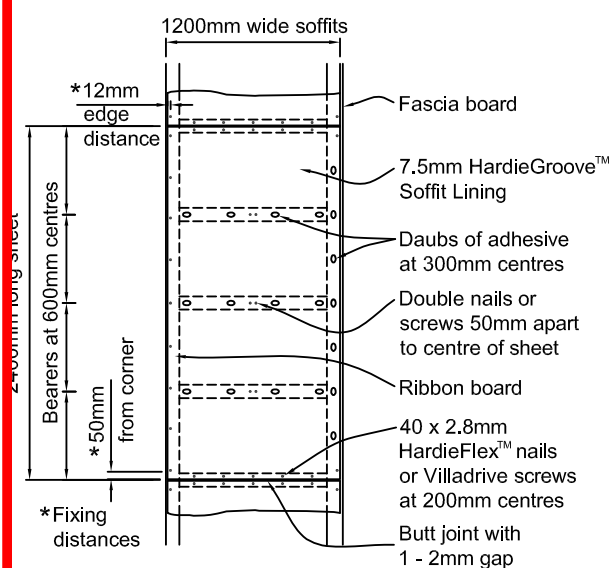
## 5.5 HARDIEGROOVE SOFFIT LINING FIXING METHOD

For framing and fixing schedules refer to Section 3.

The recommended fixing methods are combined nail and adhesive or screw and adhesive. (Refer Figure 12).

To achieve a concealed joint, butt the long edges together (half grooved). (Refer Figure 13).

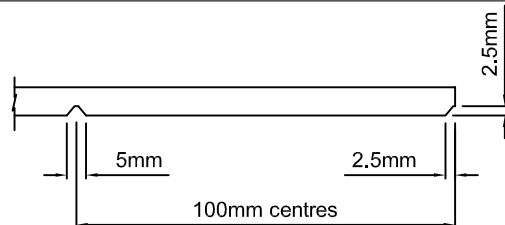
Figure 12: Nail or screw and adhesive fixing



### NOTES

- Do not place nails or screws within 100mm of the adhesive daubs.
- Fix with either HardieFlex nails 40 x 2.8mm (galvanised or 316 stainless steel), Villadrive wood screws or HardieDrive stainless steel 30mm x 7g wood screws.
- Use only stainless steel fixings in sea spray zones.
- When butt jointing short ends of HardieGroove Lining in ceiling/soffit applications, the short edges must be cut square and have a chamfer formed.
- Edges must be finished flush with the sheet surface. Screw heads can be finished 0.5mm below the sheet surface and stopped.
- In steel framing the fasteners should be driven as close as possible to the stud corners to avoid deflection of the stud flange

Figure 13: Sheet edge and groove detail



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

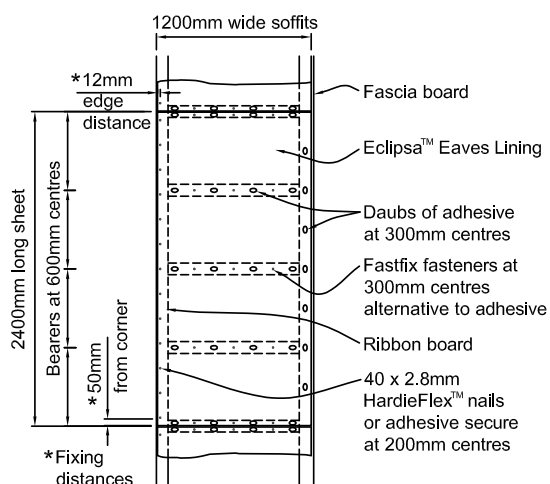
### 5.5.1 Finishing

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

## 5.6 ECLIPSA EAVES LINING

- Eclipsa Eaves Lining are to be supported by bearers and fasteners at the maximum spacings specified for the 4.5mm sheets in Section 3, Table 11 and Figures 3, 8 and 9 of this manual
- To fix larger soffit, ceiling or verandah applications provide a perimeter frame to all sheet edges and intermediate nogging at the centres shown in Table 11.
- Fix the Eclipsa Eaves Lining into the fascia board groove then nail into the ribbon board at 300mm centres with 40 x 2.8mm HardieFlex nails. Ensure nails will be hidden by the scotia mould or timber scotia (refer Figures 10, 11 and 14).
- Use a 6mm-diameter masonry bit to drill holes and fix Fastfix fasteners (refer Figures 8 and 9).
- Eclipsa Eaves Lining up to a maximum 600mm width can be jointed up to a maximum 150mm off the ceiling/soffit batten when using uPVC jointers.

Figure 14: Fastfix fastener and adhesive fixing



### 5.6.1 Fastfix fasteners

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

### 5.6.2 Masking Tape

The recommended masking tape for use with Eclipsa Eaves Lining is 3M Scotch Blue I8E 2090 or Sellotape 5855 longlife. This tape can only be left on the Eclipsa Eaves Lining for maximum 7 days, otherwise tape removal may cause paint loss.

## 5.7 VILLABOARD SOFFIT LINING (SOFFITS UP TO 1200mm)

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

Refer to the framing fixing schedule Section 3 Table 11, Figures 1 and 2, and finishing schedules on Section 6.

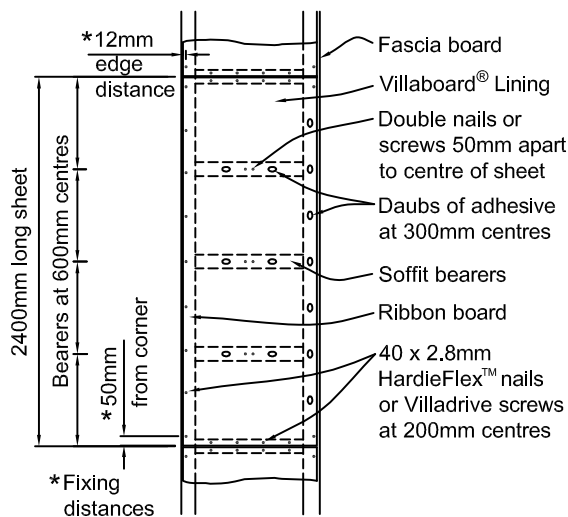
Refer to the flush jointing procedures, Section 6.

Fix with either HardieFlex nails 40 x 2.8mm (galvanised or 316 stainless steel), Villadrive sood screws or HardieDrive stainless steel 30mm x 7g wood screws

Screws finished 0.5mm below surface,

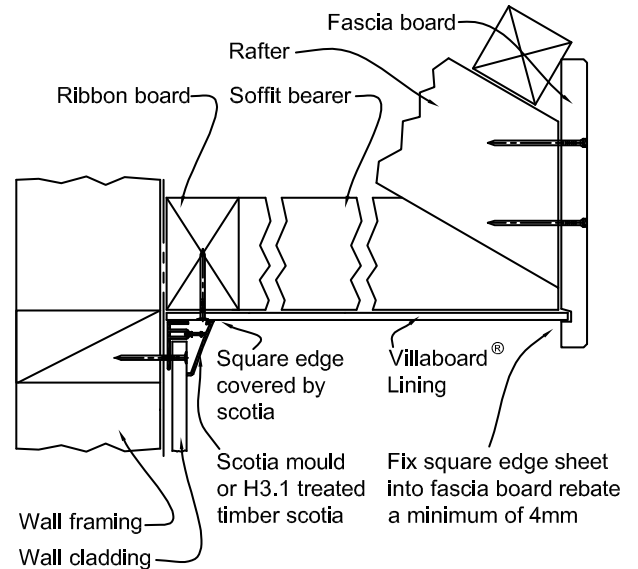
Nails finished flush with surface.

Figure 15: Nail/screw and adhesive fixed soffit



- Alternatively sheets can be fixed with nails / screws only at 200mm centres at sheet edges and 250mm centres at intermediate framing

Figure 16: Soffit cross section



### 5.7.1 Control Joints

Control joints are required in long runs of Villaboard Lining soffits/ceilings to accommodate structural movement. Control joints must also be provided where the soffits change in direction, change in level, where there is a construction joint in framing or where the soffits continue into passage ways etc. See Table 15 for maximum control joint spacing and Figure 17 for a typical control joint detail.

### 5.7.2 Jointing Options

Villaboard Soffit Lining is suitable for:

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

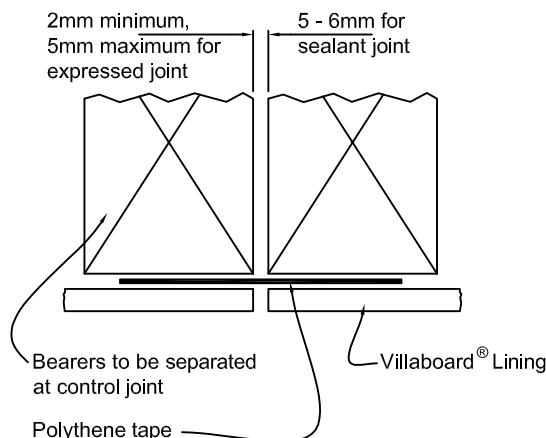
Table 15

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

### 5.7.3 Narrow-Strip Flush-Jointed Soffits And Ceilings

In these applications sheets must be jointed on the framing as shown in Figures 1 and 2. Control joints, as shown in Figure 17, must be located at a distance as specified in Table 15. Sheets must not be fixed to the bottom cord of roof trusses.

Figure 17: Control joint



#### NOTE

Refer Section 5.7.3 for skillion roof design.

### 5.8 VILLABOARD SOFFIT AND CEILING LINING (LARGE AREAS)

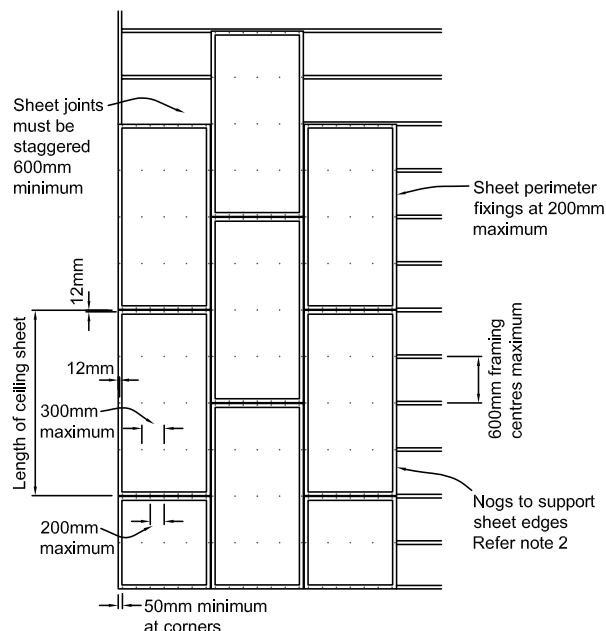
For standard commercial soffits and ceilings, framing must be at 600mm maximum centres and 6mm thick Villaboard Soffit Lining can be used. For high-impact areas, heavy-use commercial areas, and high-wind areas, framing at 600mm maximum centres and 9mm thick Villaboard Soffit Lining should be used. Sheets must not be fixed to the bottom cord of roof trusses. Timber or steel ceiling battens must be fixed to the underside of the roof truss. Sheets must be laid in an offset pattern so that adjacent end joints do not coincide. Timber ceiling battens must comply with the requirements of NZS 3604 or the specific engineering design. Steel ceiling battens must be a minimum of 37mm wide x 23mm deep x 0.55mm thick and have a bearing surface of 37mm minimum. Battens must be galvanised steel (275 g/m<sup>2</sup> zinc coating), have a suitable coating to meet the durability requirements and be fixed to the manufacturer's specifications. Refer to the flush-jointing and finishing procedures on Section 6.

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

#### NOTE

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

Figure 18: Ceiling layout



#### 5.8.1 Control Joints

The ceilings must be divided into bays not exceeding 7.2 x 4.8m. To permit movement, control joints must be formed at the perimeter of each bay (refer Figures 19, 20, 21 and 22) and at the junction of large ceilings with narrow passage strips or where there is a change in direction (also refer Figures 20 and 21). Each bay must be independent of adjacent bays and the surrounding building structure. When the ceilings or soffits contain sloping areas then control joint centres must be reduced to coincide with the slope change lines (refer Figure 22). Framing members (to which the sheet is fixed) must not continue across this control joint. Sheets shall be fixed across the ceiling joists or ceiling battens (refer Figures 24 and 25). Figures 20 and 21 show control joints with the battens running in the same direction as the sheet joint. When these ceilings are wider than one sheet width the sheets can be fixed to the framing provided the control joints are placed to limit the bay size to 7.2m x 4.8m maximum.



Figure 19: Control joint layout

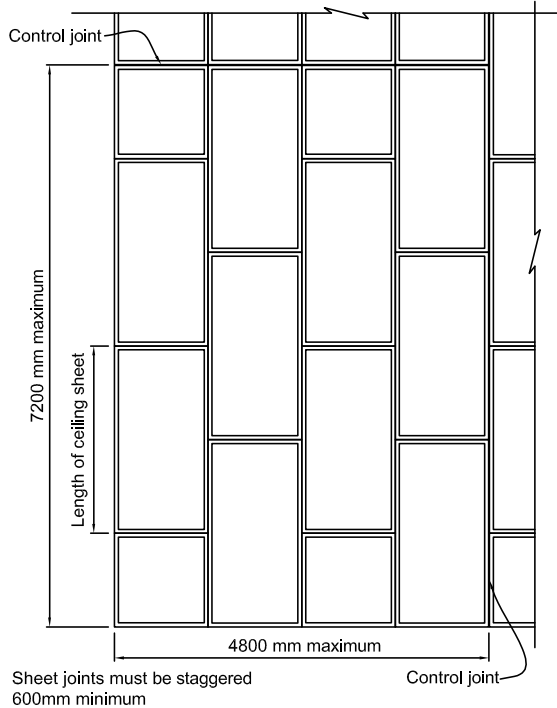


Figure 21: Timber control joint detail

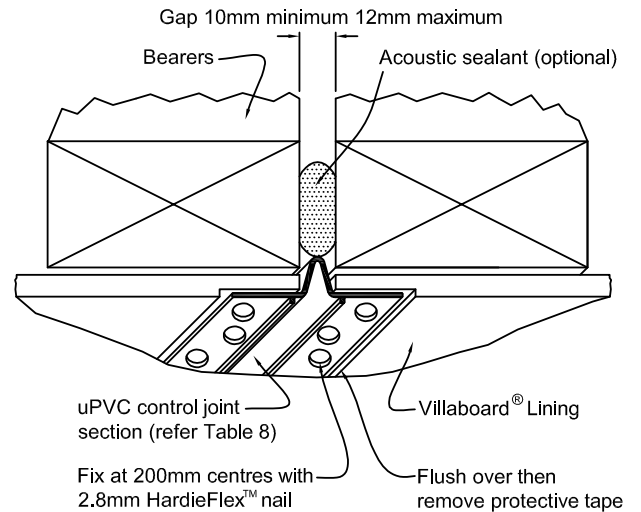


Figure 20: Steel ceiling batten control joint detail

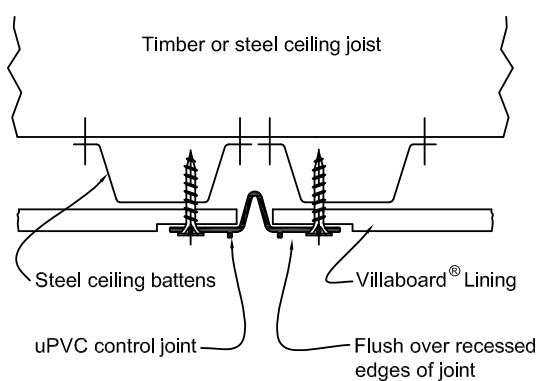
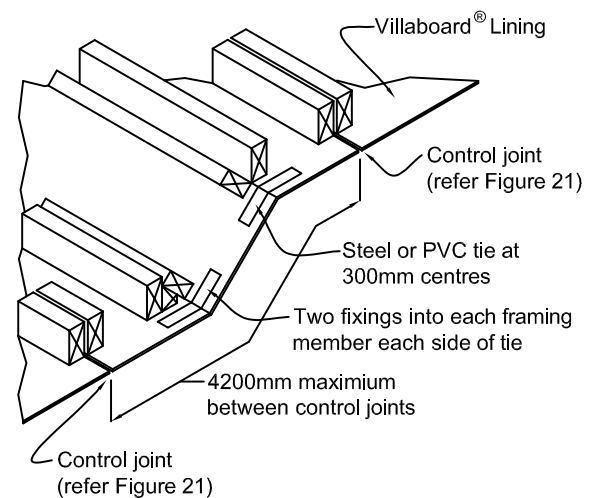
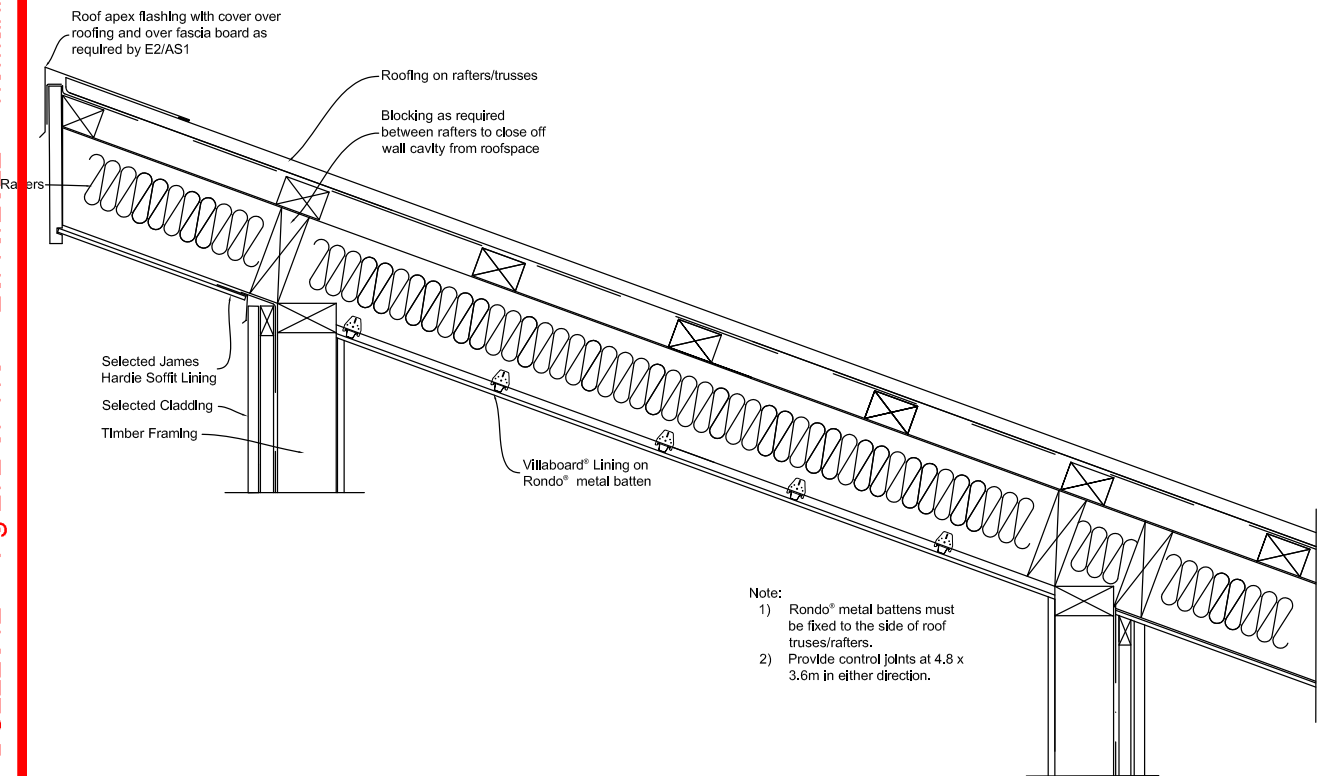


Figure 22: Directional changes to soffits and ceilings — control joint



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

Figure 23: Skillion Roof/Ceiling



### 3.8.2 Skillion Roof Design

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

### 3.8.3 Fixing Option One

A smooth surface finish is obtained by minimising the visible sheet fixings. For painted finishes the combined nail or screw and adhesive method gives this superior finish (refer Figure 24). Fix at 200mm centres down each sheet end with edge fixings in each joist or batten. Double-fix in the centre of each joist or batten. Do not place nails or screws within 100mm of adhesive daubs. Daubs of wallboard adhesive 25mm diameter and 15mm thick must be applied to the intermediate joists or battens at 250mm centres (refer Figure 24). When nogs are not installed for perimeter support, the unsupported edges between ceiling joists or battens must be supported with back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centred between framing.

### NOTES

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

Figure 24: Nail or screw and adhesive fixing

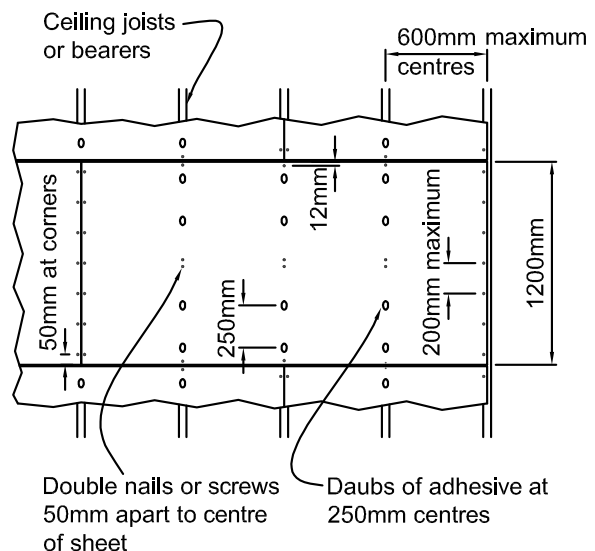
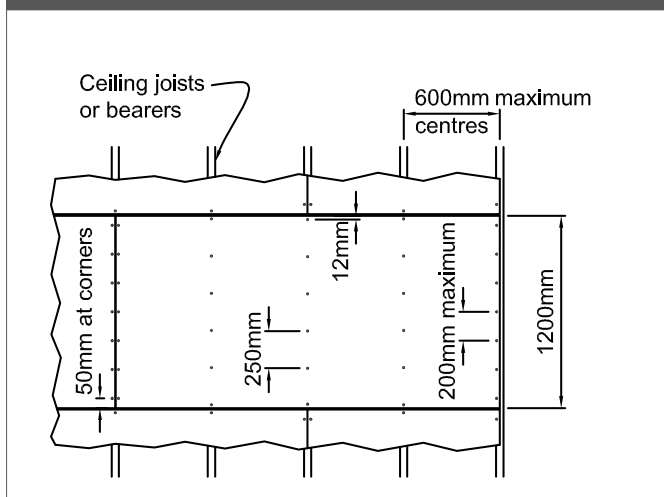


Figure 25: Nail or screw



#### 5.8.4 Fixing Option Two

For an alternative nail or screw-fixing method, fasteners are to be driven along the sheet perimeter at 200mm centres and along intermediate ceiling battens at 250mm centres (refer Figure 25).

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

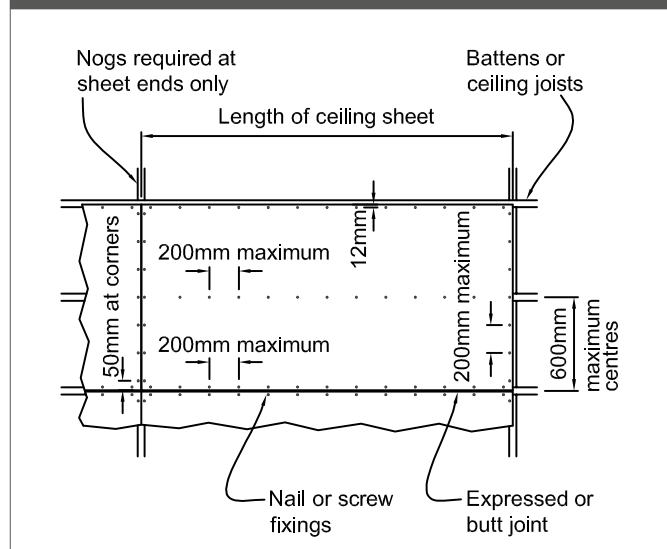
#### 5.8.5 Column Or Wall Abutments

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

#### 5.8.6 Square-Edge Villaboard Lining Ceilings And Soffits

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

Figure 26: Nail or screw along ceiling joist (expressed or butt joints)



### 5.9 TITAN FACADE PANEL

May be used as soffit with expressed joint when installed as per Figure 5 and fixings as per Villaboard Soffit Lining.

### 5.10 INTERNAL SWIMMING POOL APPLICATION

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

- The sheets must be back and edge sealed before installation.
- When fixing Villaboard Lining to the ceiling under a skillion roof, roof ventilation must be considered to minimise thermal movement and sheet joint cracking.
- All Villaboard Lining recessed sheet joints must be stopped.
- Alternatively, when using square edge Villaboard Lining, the sheet joint must be butted over an Inseal 3259 tape with an appropriate flexible sealant in the 1mm joint.
- All HardieGroove Lining joints must have continuous bead of sealant applied to edge of sheet before butting together.

Only stainless steel fasteners must be used.

- Full perimeter fixing required.
- In addition, it is recommended that H3.1 treated timber ceiling battens are used to resist decay due to higher condensation levels present in this area.

## 5.11 SPECIAL DETAILS

Figure 27: Sloping soffit and direct fixed flatsheet cladding

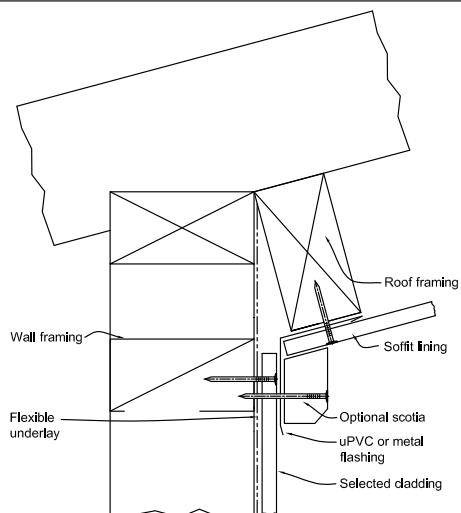


Figure 29: Sloping soffit and direct fixed weatherboard cladding

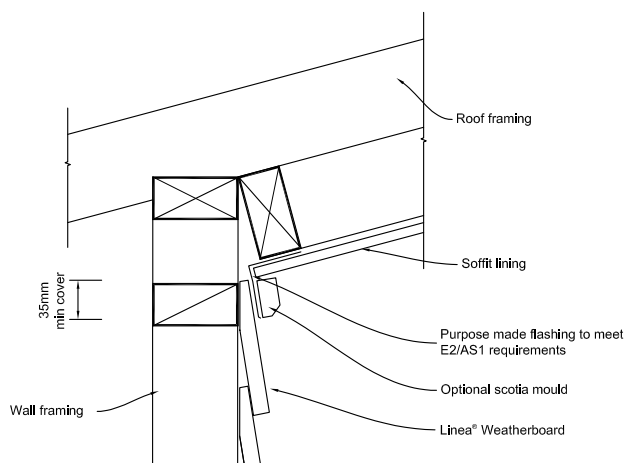


Figure 28: Sloping soffit and cavity fixed flatsheet cladding

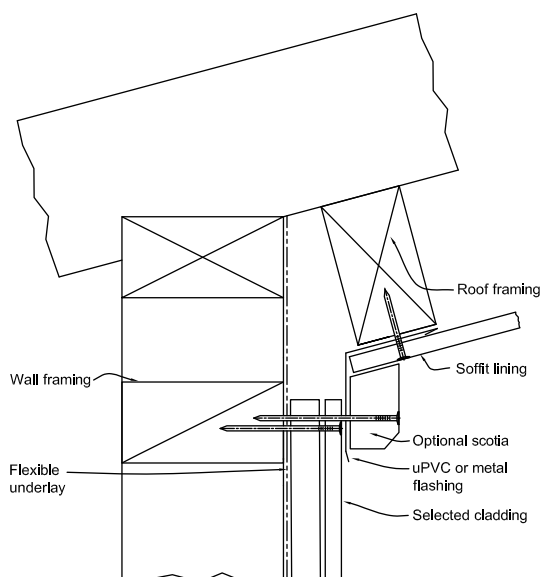
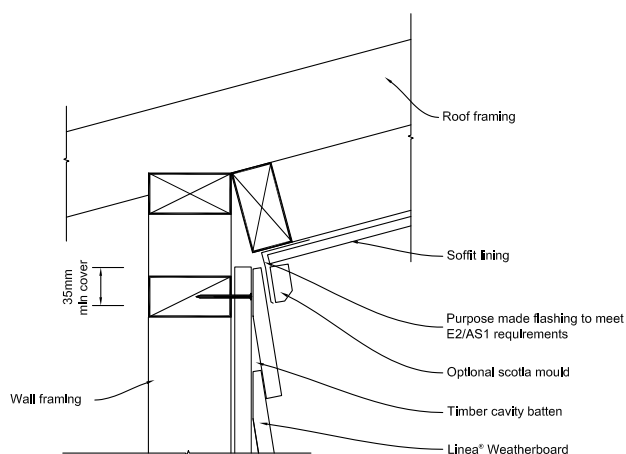


Figure 30: Sloping soffit and cavity fixed weatherboard cladding



# 6 Villaboard Joint Stopping

## FOR VILLABOARD LINING

### 6.1 GENERAL

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

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

### 6.2 GLANCING LIGHT

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

Artificial lighting needs to be considered in relation to soffits.

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

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

### 6.3 LEVEL OF FINISHES

Different levels of finishes are typically specified for different applications. Higher levels of finishes are used to address the glancing light issues with painted Villaboard Soffit Lining referred to above. A description of the various levels of finishes and the jointing/coating requirements can be found in Table 16.

Table 16

Levels of Finishes			
Level of finish	Definition*	Typical jointing/setting	Finish
0	This level of finish may be useful in temporary construction.	No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/nailing sheets in place.	For use in areas where finishing and stopping is not considered necessary.
1	For use in plenum areas above ceilings, in areas where the work would generally be concealed, or in building service corridors and other areas not normally open to public view.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape.	Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.
2	For use in warehouse, storage or other areas where surface appearance is not of primary concern.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	Minor tool marks and ridges are generally acceptable.
3	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall paper coverings are to be applied as the final decoration. This level of finish is not generally suitable where smooth painted surfaces or light to medium wall coverings are specified.	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.	This level of finish must be sufficiently smooth to accept heavy vinyl, tiles or textured coatings without blemishes.
4	This is generally the accepted level of finish for domestic construction. It is used where light textures or wall coverings and smooth textured finishes and satin/flat/low sheen paints are illuminated by noncritical lighting.	Refer to flush jointing recommendations on page 24.  All joints and corner joints will have tape embedded in James Hardie Base Coat applied over all joints, angles, fastener heads and accessories.  This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	For use where light-texture coatings or wallpaper or other lightweight wall coverings are to be applied. For painted finishes in non-critical lighting areas flat and low-sheen textured paints are to be applied. Gloss and semi-gloss paints are not generally suitable over this level of finish as any minor blemish will show under critical light.  The weight, texture and sheen level or wall coverings applied over this level of finish must be carefully evaluated. Joints and fasteners must be adequately concealed if the wall-covering material is lightweight, contains limited pattern, has a gloss finish, or any combination of these features is present. Unbacked vinyl wall coverings are not suitable over this level of finish.
5	This level of finish is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheet paints.	Refer to page 23 steps 1–4 for jointing.  Final James Hardie Base Coat application should be feathered out to approximately 200mm + each side of the joint. Then a full skim coat of James Hardie Top Coat must be applied over entire sheet surface in order to achieve a uniform finish.  This application is applicable to recessed edge sheets only.  The use of square edge sheets will require a high build application and coating finish.	This level of finish is for use where gloss, semigloss, low-sheen or non-textured paints are specified or where critical lighting conditions occur.

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

## 6.4 PAINT FINISHES

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

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

### NOTES

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

## 6.5 VILLABOARD SOFFIT LINING JOINTING AND STOPPING

Villaboard Soffit Lining joints are set with James Hardie jointing compounds reinforced with perforated paper tape. Recessed edge sheet joints require joint setting by using the jointing products outlined. The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanship applied. However, James Hardie considers that the recommendations provided in Table 16 describe best practice to reduce the risk of joint cracking or other problems.

There are various factors that can affect the performance of jointing compounds on edge recessed fibre cement substrates. These factors include the framing, movement, installation quality, vibrations, moisture, humidity, temperature, etc. To achieve satisfactory joint performance these factors need to be carefully considered and understood by the installer and designer when positioning joints and selecting jointing compounds. Furthermore, it is important that the jointing compound used has the physical attributes required to perform considering these factors. James Hardie compounds have been specifically developed for use with Villaboard Soffit Lining.

In addition, provision for movement needs to be made by the installation of control joints. Refer to clause 5.7.1.

### COMPOUND COVERAGE

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

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

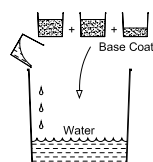
### NOTE

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

## MIXING INSTRUCTIONS

Table 17

### James Hardie Base Coat Mixing Instructions

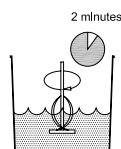
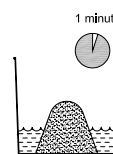


#### Step 1

First, add 1 part of clean water into bucket.

Then add 2½ parts James Hardie Base Coat powder

Allow to soak for 1 minute.

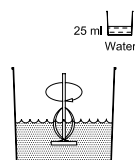


#### Step 2

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

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

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



#### Step 3

The mix at this stage should be consistently smooth.

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

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

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

### Important Notes:

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

### Product Life:

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

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



## 6.6 SET JOINTS

### Step 1 — Preparation

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

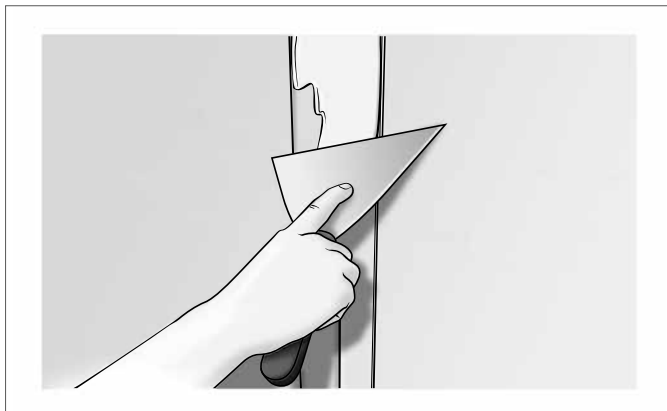


#### NOTE

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

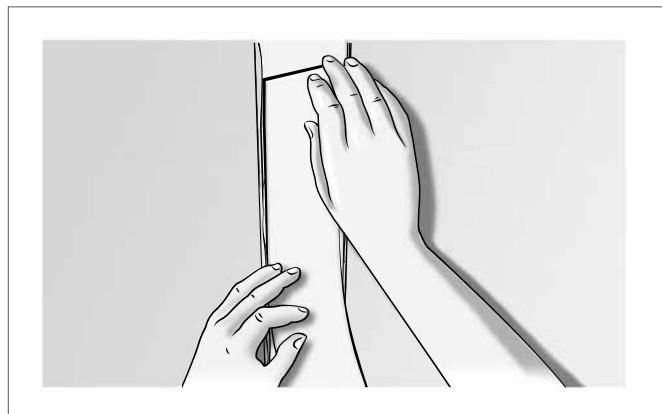
### Step 2 — First Coat

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



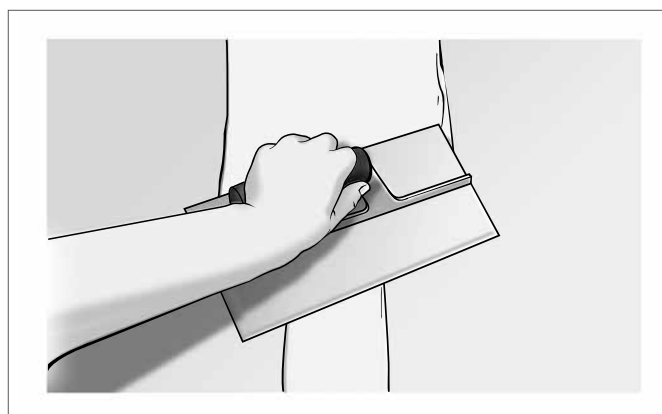
### Step 3 — Embed Tape

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



### Step 4 — Thin Layer

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



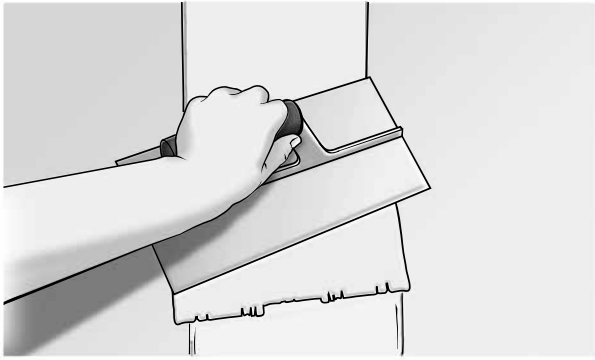
#### NOTE

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

# 7 Finishing

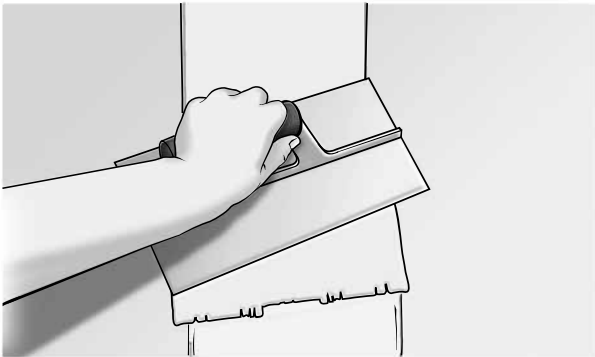
## Step 5 — Second Coat

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



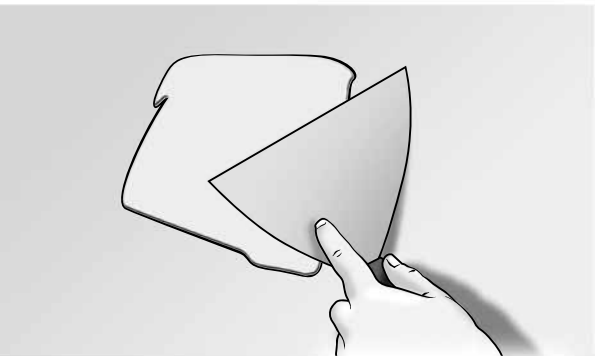
## Step 6 — Finishing Coat

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



## Step 7 — Fastener Heads

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



## 7.1 PAINTING

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

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

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

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

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

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

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

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

## 8 Product information

### 8.1 GENERAL

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

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

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

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

### 8.2 DURABILITY

#### Resistance to moisture/rotting

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

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

### 8.3 FINISHES

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

### 8.4 GROUP NUMBER CLASSIFICATION

HardieGroove Lining and Villaboard Lining have a 'Group Number' classification of 1 – S as per the requirements of Clause C of the NZBC.

## 9 Maintenance

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

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

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

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

# Notes

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# Notes

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# Product Warranty

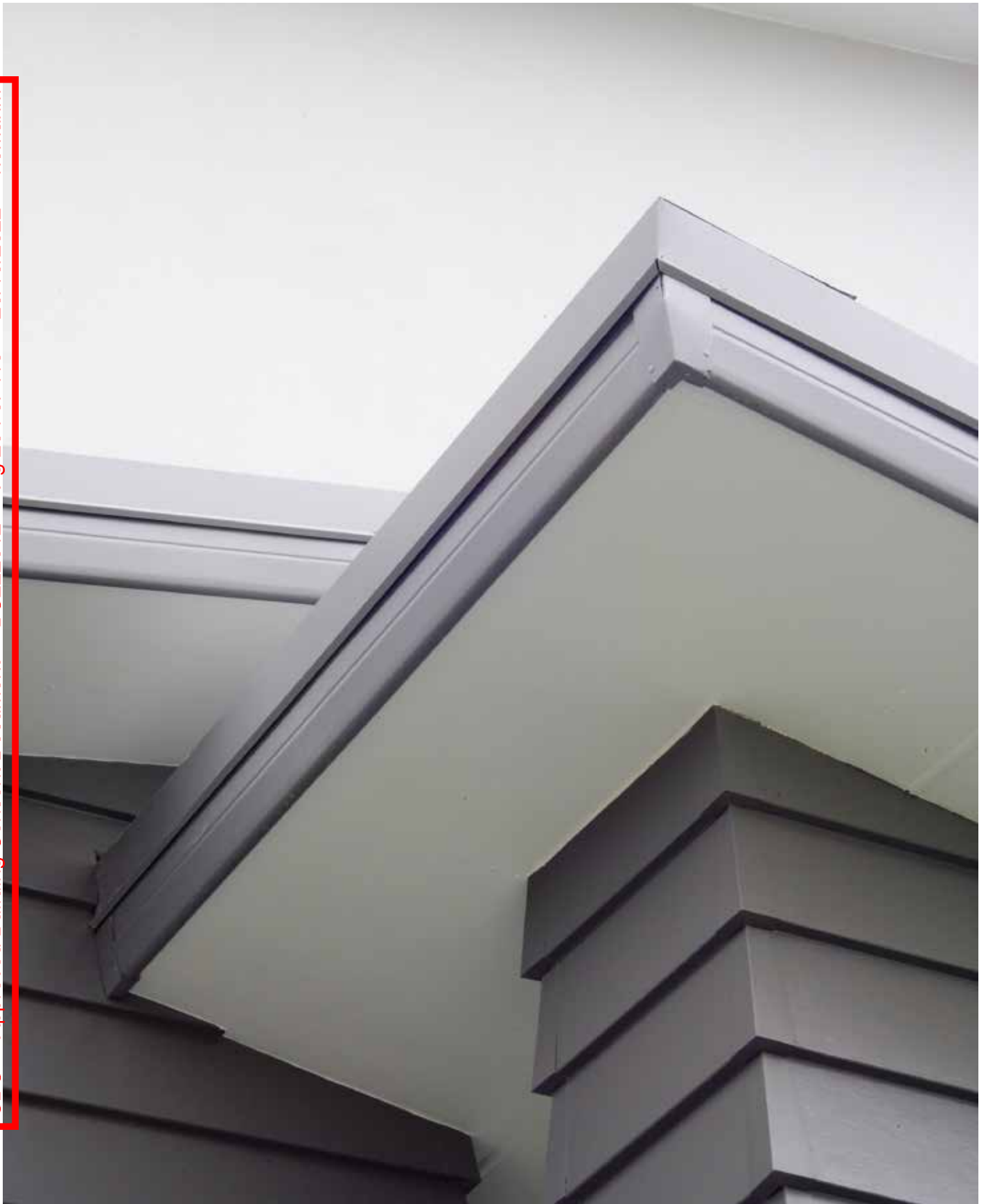
## Eaves & Soffits

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

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

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CBI 5113

AUG 2012

# GIB® RONDO® METAL BATTEN SYSTEMS

SYSTEM AND INSTALLATION MANUAL

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# GIB® Rondo® Metal Batten Systems

## Specification and installation guide

- Suitable for Residential and some commercial applications
- GIB® Rondo® metal battens are the recommended system for use in ceilings in conjunction with 13mm GIB® plasterboard
- Easy to install; achieve a flat and true ceiling
- A stable substrate that reduces the risk of costly call backs

### **GIB® Rondo® Metal batten systems**

Winstone Wallboards accepts no liability if the system is not installed in strict accordance with the instructions contained in this publication.

### **Use only the current specification**

This publication may be superseded by a new publication. Winstone Wallboards accepts no responsibility for reliance on superseded publications. Call 0800 100 442 or visit [www.gib.co.nz](http://www.gib.co.nz) to confirm the currency of the publication.

### **Beware of substitution**

The performance of GIB® Rondo® Metal batten systems is very sensitive to design detailing and specification. It is important that only GIB® Rondo® branded products are used in the systems contained in this publication. No responsibility will be accepted for alternative manufacturers product.

### **Customised design solutions**

The systems detailed in this publication should cover most commonly encountered situation. For projects where specific performance is required please contact our technical support team on 0800 100 442.



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## WHY METAL?

A large proportion of ceiling defects such as peaking or cracked joints and popped fasteners can be attributed to movement in the substrate. Timber ceiling substrates are more prone to temperature or moisture induced movement and shrinkage. These issues tend to impact on the surface of the plasterboard and can result in call-backs. Metal ceiling batten systems provide a stable substrate for plasterboard ceiling linings. Regular users of metal batten systems consistently have fewer call-backs for movement related ceiling defects such as peaking or cracked joints and popped fasteners. Once builders change to GIB® Rondo® metal battens they appreciate the simple installation methodology and enjoy reduced callbacks. Very few, if any, revert back to using timber.

### Benefits of steel battens include;

- **Consistent performance**
  - Less influence from moisture or environmental factors than timber. Unlike timber battens which can vary in grade, species with temperature and humidity, the performance of GIB® Rondo® metal battens is consistent throughout New Zealand
- **Lighter weight**
  - Lower transport costs and easier to handle on site
- **Require less storage space**
  - Storage space is often at a premium on building sites and a house-lot of GIB® Rondo® componentry will occupy substantially less space on site than timber battens
- **Easy to achieve a flat, stable substrate**
  - This results in a trouble free ceiling and reduces the risk of costly call-backs

### Benefits of GIB® Rondo® metal batten systems

- **Versatility**
  - The extensive componentry range provides solutions to a multitude of situations
- **Technical back up**
  - Our well established and highly rated technical team are available to quickly and efficiently handle any enquiries, call us on 0800 100 442
- **Flexibility**
  - GIB® Rondo® metal batten systems can be used on residential and some commercial ceilings. Components are also available for use in wall strapping situations and have been tested and approved for use in GIB® noise control systems

There are two systems to select from;

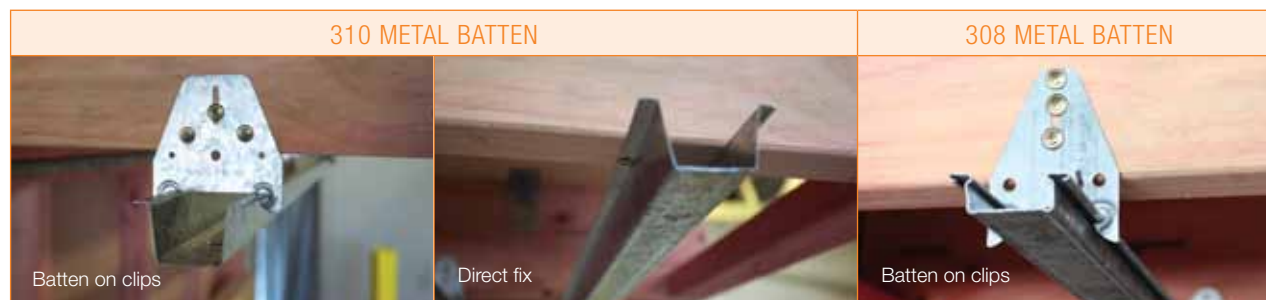
### GIB® Rondo® 310 metal batten system – (35mm battens)

The GIB® Rondo® 310 metal batten system comprises a 35mm deep batten. The recommended method of fixing is to use clips as illustrated below.

This provides a flat substrate for the plasterboard ceiling as it is able to compensate for any deviations in the framing. If the substrate is consistently flat the battens can be attached directly to the underside of the framing.

### GIB® Rondo® 308 metal batten system – (16mm battens)

The GIB® Rondo® 308 ceiling batten is a light weight system based on a 16mm deep batten fixed to a clip attached to the ceiling framing as shown.



### IMPORTANT NOTE:

Manufactured from 0.55BMT steel with a Z275 coating exceeding the NZBC durability requirements for interior use



## GIB® RONDO® 310 CEILING BATTEN SYSTEM

The GIB® Rondo® 310 system forms a strong, stable and flat substrate for ceilings in residential and commercial applications. The 35mm dimension allows it to be directly substituted into ceilings where 35mm timber battens would traditionally have been used. Consult an electrical contractor for any earthing requirements that may need to be incorporated. There are two methods of fixing GIB® Rondo® 310 metal battens.

### Recommended method

Clipped using either;

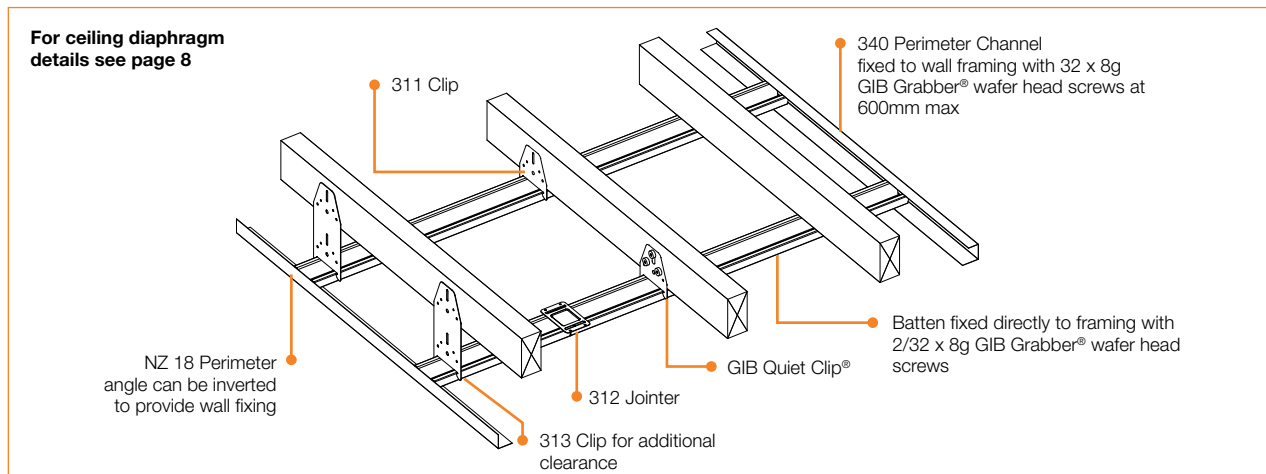
- 311 clip for a drop of 0-30mm
- 313 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten a drop of up to 130 mm can be achieved in order to accommodate services or variations in framing heights
- GIB Quiet Clip® for use in GIB® Noise control systems

### Alternative method

- Directly by fastening with pairs of min GIB Grabber® 32mm x 8g wafer head screws through the flange (consult span tables pg 5)
- Alternatively pairs of min 45mm x 2.8mm FH nails can be used
- For fixing to steel framing a drill tip screw is recommended

311 CLIP	GIB QUIET CLIP®	313 CLIP
<p>Bottom edge of framing</p> <p>Top edge of ceiling batten</p> <p>Back face of ceiling lining</p>	<p>Rubber washer</p> <p>0 - 30mm</p> <p>35mm</p>	<p>Bottom edge of framing</p> <p>0 - 130mm</p> <p>35mm</p>

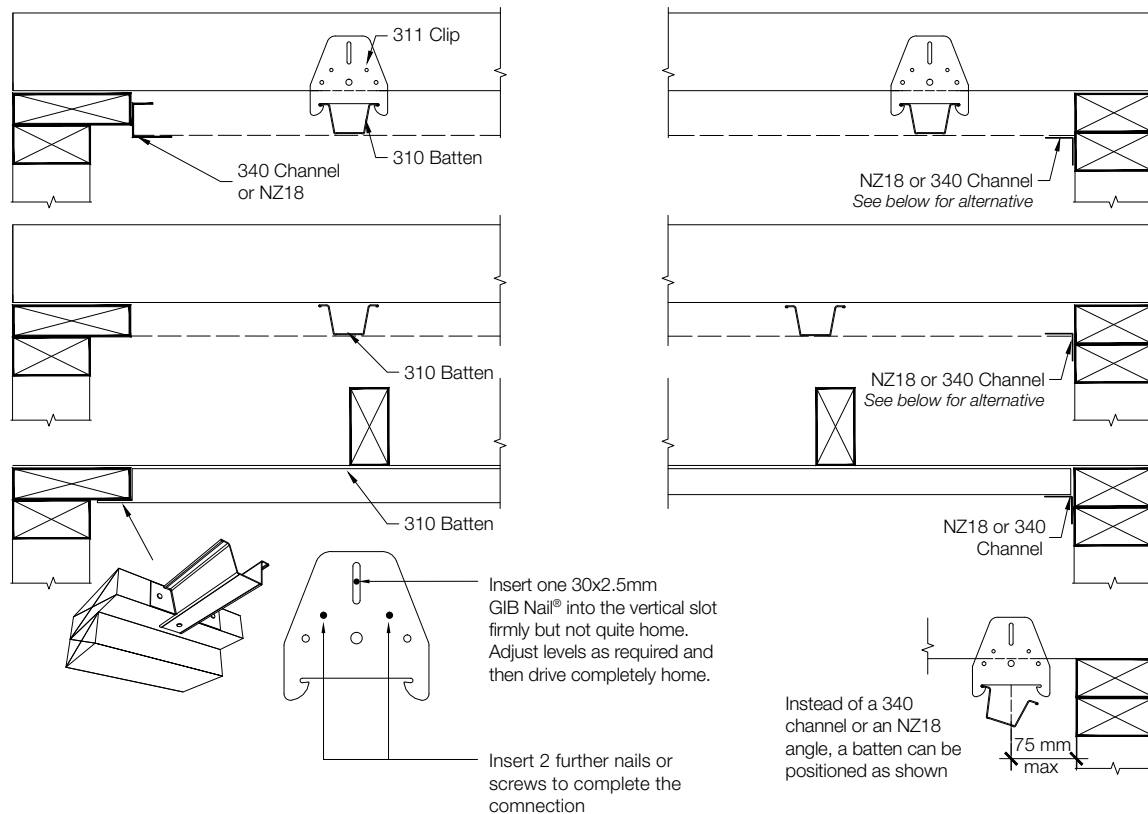
GIB® RONDO® 310 BATTEN	312 JOINTER CLIP	340 PERIMETER CHANNEL	NZ18 PERIMETER ANGLE
<p>35</p>	<p>312</p>	<p>35</p> <p>32</p> <p>340</p>	<p>32</p> <p>NZ18</p>





## GIB® RONDO® METAL BATTEN SYSTEM INSTALLATION INSTRUCTIONS

Consult an electrical contractor for any earthing requirement that may need to be incorporated

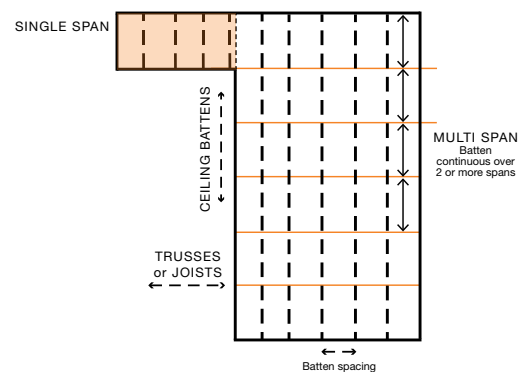


- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm plasterboard) using the string line to establish the correct position
- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Rondo® 310 Batten Span Table for Residential Internal Applications

GIB® Plasterboard thickness Single layer	Maximum batten spacing (mm)	Multi Span (mm)	Single Span and Garages (mm)
10mm	450	1200	900
13mm	600		

For situations not covered by this chart please contact the GIB® Helpline on 0800 100 442





## GIB® RONDO® 308 METAL BATTEN SYSTEM

The GIB® Rondo® 308 system is a light weight yet very strong ceiling batten. In addition to its function as a ceiling batten it can also be used as a wall furring channel and is an integral part of GIB® Noise control systems. See page 9 for details. Consult an electrical contractor for any earthing requirements that may need to be incorporated.

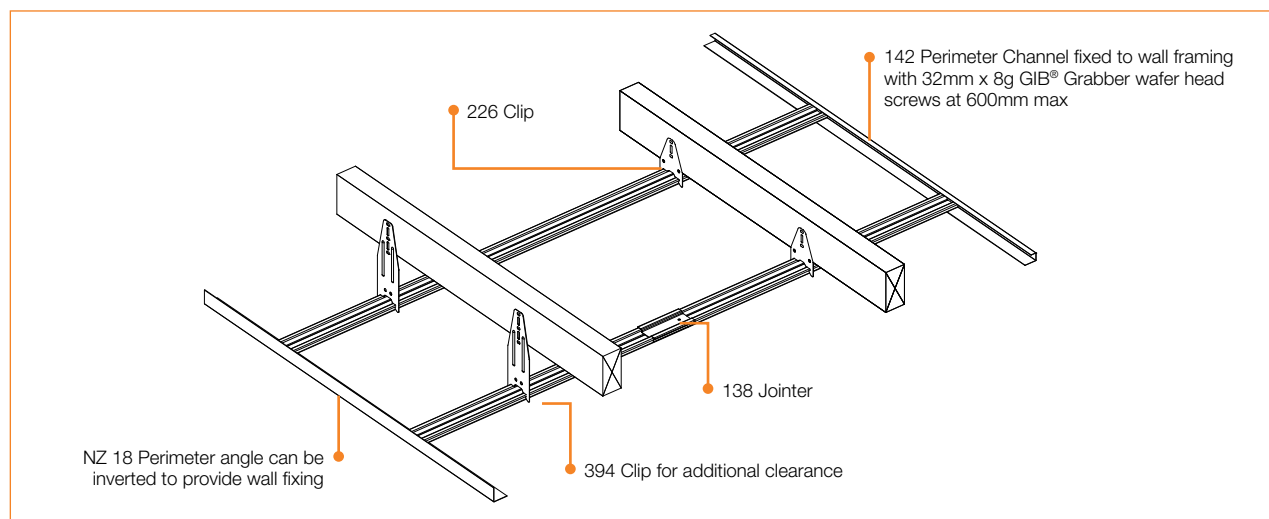
The GIB® Rondo® 308 system is installed using either;

- 226 clip for a drop of 0-30mm
- 394 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten. Up to 130 mm clearance between the bottom of the framing and the back of the batten of can be achieved in order to accommodate services or variations in framing heights

**Note:** If the 308 system is to be used in a ceiling diaphragm, the batten needs to be secured directly to the framing. See page 8 for details.

226 CLIP	394 CLIP
<p>Bottom edge of framing</p> <p>Top edge of ceiling batten</p> <p>Back face of ceiling lining</p> <p>0 - 30mm</p> <p>16mm</p>	<p>Bottom edge of framing</p> <p>0 - 130mm</p> <p>16mm</p>

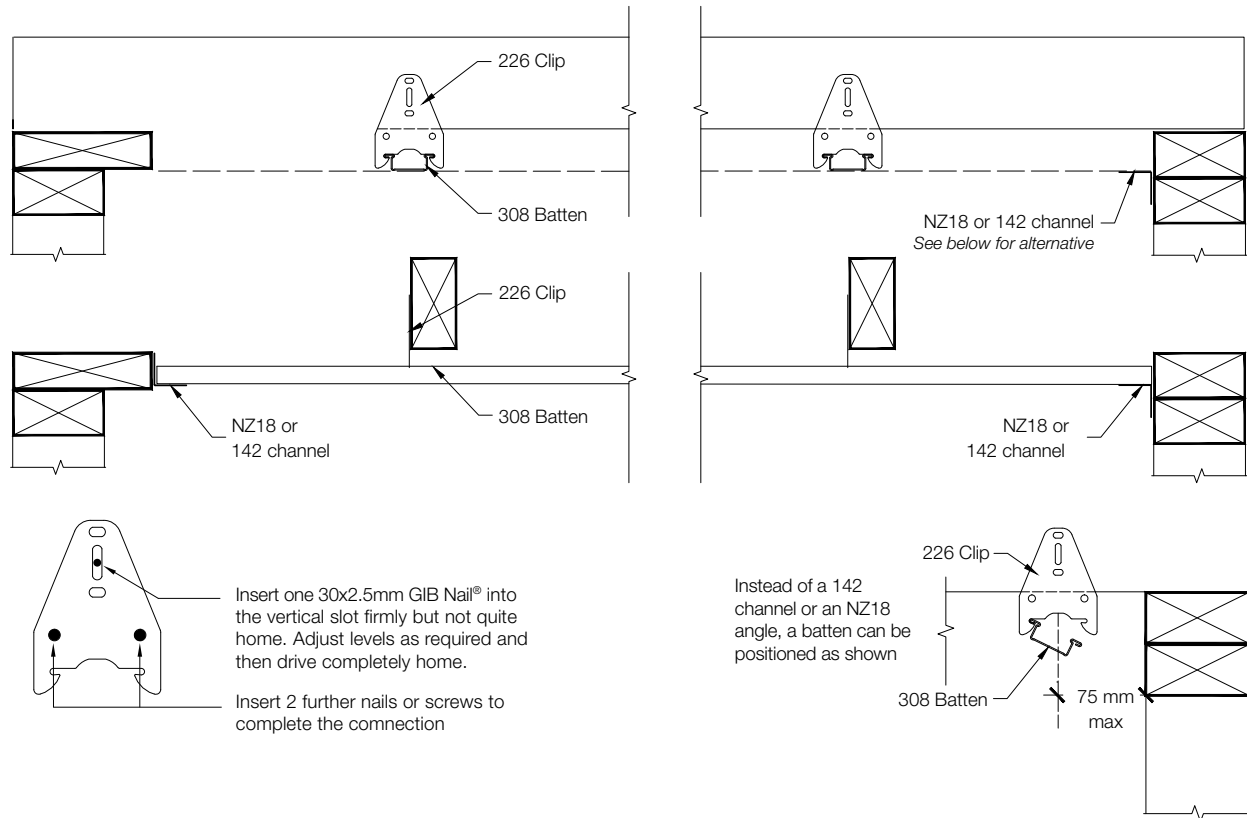
GIB® RONDO® 308 BATTEN	138 JOINTER	142 PERIMETER CHANNEL	NZ 18 PERIMETER ANGLE
	<p>138</p>	<p>142</p>	<p>NZ18</p>





## GIB® RONDO® METAL BATTEN SYSTEM INSTALLATION INSTRUCTIONS

Consult an electrical contractor for any earthing requirement that may need to be incorporated.

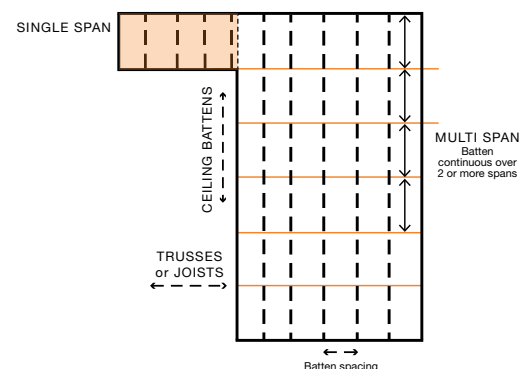


- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm plasterboard) using the string line to establish the correct position
- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Rondo® 308 Batten Span Table for Residential Internal Applications

GIB® Plasterboard thickness Single layer	Maximum batten spacing (mm)	Multi Span (mm)	Single Span and Garages (mm)
10mm	450	1200	900
13mm	600		

For situations not covered by this chart please contact the GIB® Helpline on 0800 100 442



## GIB® RONDO® METAL BATTEN SYSTEM



### GIB® RONDO® COMPONENTS

AUGUST 2012

#### Ceiling Diaphragms using GIB® Rondo® Metal Battens

GIB® Rondo® metal batten systems may be used in ceiling diaphragms as required for GIB Ezybrace® systems provided that;

- The batten is either fixed directly to the underside of the ceiling framing OR
- The batten is fixed to a block or continuous member that has been securely attached to the ceiling framing with 4x90mm nails (minimum)

**NOTE:** It is not acceptable to install a ceiling diaphragm on clips without additional support as shown below:

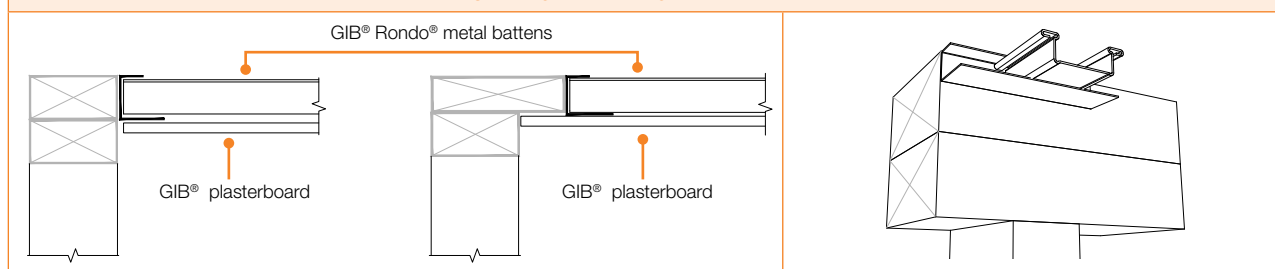


Timber block (min 300mm)  
or continuous member  
alongside framing

GIB® Rondo® batten to be fixed  
with 32mm x 6g GIB® Grabber®  
screw through both flanges.

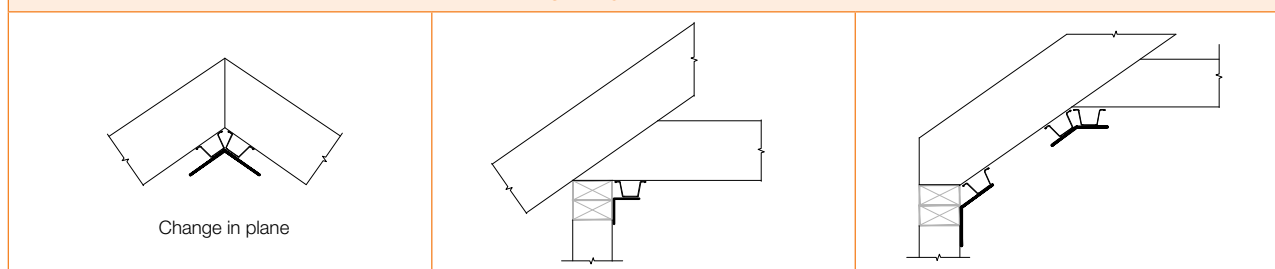


#### CEILING DIAPHRAGM PERIMETER



Perimeter channel, (340, 142 or 140) to be fixed with 32mm x 8g GIB® Grabber® wafer head screws at 300mm centres

#### CHANGE IN PLANE



Changes in plane can be achieved by attaching a folded metal angle to the junction.

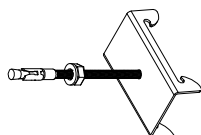
- Minimum 0.55mm BMT
- Fastened on each edge using 2.8mm x 30mm GIB® Nails or 32mm x 8g GIB® Grabber® wafer head screws at 300mm centres
- Plasterboard linings to be fastened to each edge of the folded angle at 150mm centres

#### GIB® Rondo® wall strapping systems

In addition to the ceiling batten function the GIB® Rondo® 308 batten system can be used as a wall strapping channel for masonry or concrete wall construction. The adjustable length masonry anchor allows insulation to be installed if required.

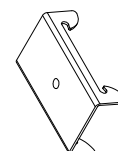
##### A239 CLIP

Threaded hole,  
Masonry anchor included  
(100mm or 180mm)



##### 237 CLIP

Unthreaded hole,  
No masonry anchor included  
Suitable for timber or masonry application





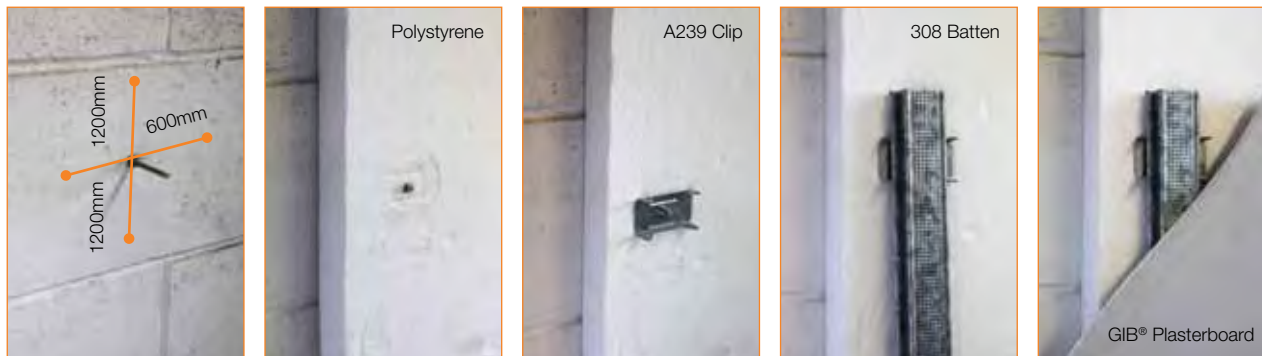
## GIB® RONDO® METAL BATTEN SYSTEM





## GIB® RONDO® COMPONENTS

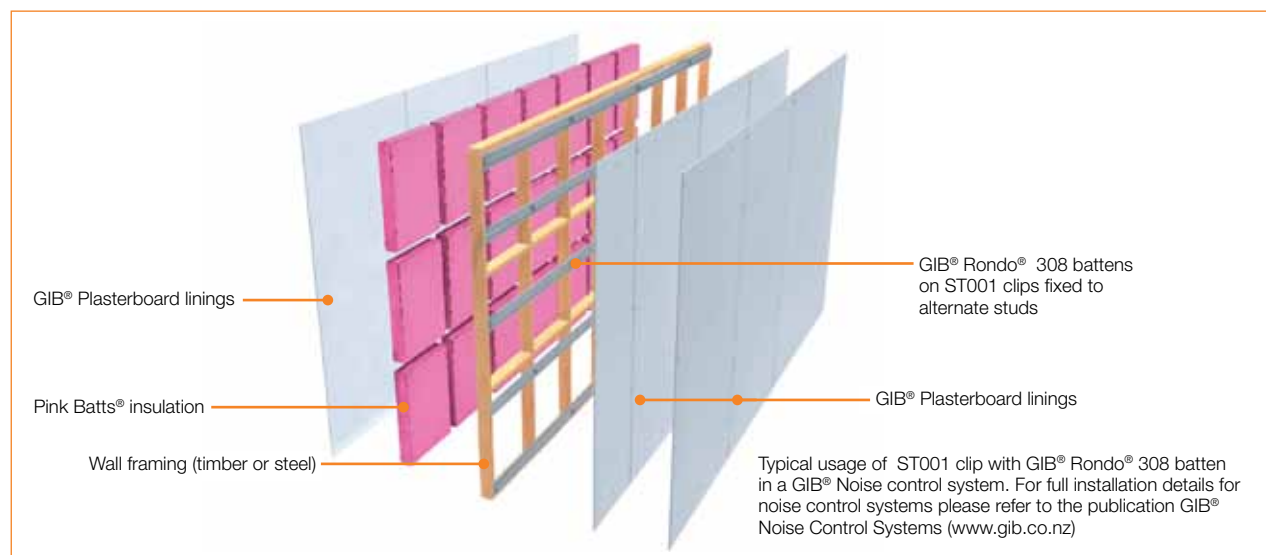
AUGUST 2012

The A239 clip can be used in conjunction with the 308 batten to provide an effective wall strapping solution. If required polystyrene insulation can be fitted over the anchor bolts. A239 clips should be spaced at 1200mm centres vertically (max) and 600mm centres horizontally (max).

**GIB® Rondo® and Noise Control**

GIB® Rondo® metal batten systems play an important part in GIB® Noise control systems.

GIB QUIET CLIP®	ST001 ACOUSTIC MOUNT
 <p>The GIB Quiet Clip® has rubber grommets that provide isolation between the ceiling and the ceiling framing. Installation is the same as for the 311 clip.</p>	 <p>The ST001 clip has a threaded rubber washer to provide isolation from the wall framing. The thread allows the clip to be adjusted to compensate for framing deviations. The clip accepts the GIB® Rondo® 308 batten. This is a high performing noise control system and can deliver STC ratings up to 62.</p>





GIB® RONDO® METAL BATTEN SYSTEM  
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## **GIB Products**

Manufactured by Winstone Wallboards Ltd. Distributed nationwide by authorised distributors.

## **Trademarks**

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## **GIB Helpline - Call Free**

**0800 100 442**

## **Free Facsimile**

**0800 229 222**

## **Website**

**[www.gib.co.nz](http://www.gib.co.nz)**

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P.O Box 12 256 Penrose. Telephone 09 - 633 0100

Facsimile 09 - 633 0101

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Email: [info@gib.co.nz](mailto:info@gib.co.nz)

GIB® Helpline: 0800 100 442  
Facsimile: 0800 229 222



## INSTALLATION INSTRUCTIONS

# Wall

## PINK® BATTs® WALL INSULATION

### 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/](https://pinkbatts.co.nz/installing-pink-batts/)

#### 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.

Retrofitting insulation in external walls without wall underlay/or in poor condition

##### a) Direct Fixed Cladding

- Use insulation that is at least 20mm thinner than the framing width - if the frame is 90mm we recommend to use **Pink® Batts® Classic R2.2 70mm** OR
- Fit inserts of Bitumac® 720 wall underlay.

##### b) Drained Cavity

- The insulation can be the same thickness as the frame. The use of horizontal strapping is recommended , OR
- Fit inserts of Bitumac® 720 wall underlay.

Unlined Walls in Roof Cavities

- **Pink® Batts® Wall** or **Pink® Batts® HandyPack insulation** 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



**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.



## Product Specifications

WALL - Thermal Insulation		PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m²)	APPROX. COVERAGE PER BALE* (m²)	ENVIRONMENTAL CHOICE
<b>Masonry</b>							
R1.0	Pink® Batts® Masonry R1.0	7160110	1220 x 580	40	21.2	-	✓
R1.2	Pink® Batts® Masonry R1.2	7160134	1220 x 580	50	17.0	-	
<b>70mm Wall Range</b>							
R2.2	Pink® Batts® Classic R2.2 70mm Wall	7160248	1140 x 560	70	6.4	7.5	
<b>90mm Wall Range</b>							
R1.8	Pink® Batts® Classic R1.8 Wall	7127118	1140 x 560	90	16.6	19.6	✓
R2.2	Pink® Batts® Classic R2.2 Wall	7127122	1140 x 560	90	13.4	15.8	✓
R2.2	Pink® Batts® Steel R2.2 Wall	7160214	1220 x 610	90	15.6	15.6	✓
R2.2	Pink® Batts® R2.2 Narrow Wall	7160243	1140 x 360	90	9.0	11.2	✓
R2.4	Pink® Batts® Classic R2.4 Wall	7127124	1140 x 560	90	10.2	12.1	✓
R2.6	Pink® Batts® Ultra® R2.6 Wall	7127126	1140 x 560	90	9.6	11.3	✓
R2.6	Pink® Batts® Ultra® Steel R2.6 Wall	7160215	1220 x 610	90	9.7	9.7	✓
R2.6	Pink® Batts® Ultra® R2.6 Narrow Wall	7160244	1140 x 360	90	7.4	9.2	✓
R2.8	Pink® Batts® Ultra® R2.8 Wall	7127128	1140 x 560	90	6.4	7.5	✓
R2.8	Pink® Batts® Ultra® R2.8 Narrow Wall	7160247	1140 x 360	90	4.5	5.6	✓
<b>140mm Wall Range</b>							
R3.2	Pink® Batts® Ultra® R3.2 140mm Wall	7127132	1140 x 560	140	9.6	11.3	✓
R3.2	Pink® Batts® Ultra® R3.2 140mm Narrow Wall	7160245	1140 x 360	140	7.0	8.6	✓
R3.6	Pink® Batts® Ultra® R3.6 140mm Wall	7127136	1140 x 560	140	7.0	8.3	✓
R4.0	Pink® Batts® Ultra® R4.0 140mm Wall	7127140	1140 x 560	140	5.1	6.0	✓
R4.0	Pink® Batts® Ultra® R4.0 140mm Narrow Wall	7160246	1140 x 360	140	4.1	5.0	✓
<b>ROOF and WALL - Thermal Insulation</b>							
R2.4	Pink® Batts® HandyPack R2.4 <sup>^</sup>	7200158	7000 x 580	90	4.06	-	

\*Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.  
 #For full details of the Pink® Batts® Lifetime Warranty visit [pinkbatts.co.nz/lifetime-warranty](http://pinkbatts.co.nz/lifetime-warranty).  
 ^Product does not have the Pink® Batts® Lifetime Warranty or BRANZ Appraised Accreditation.

## Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store under cover 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](http://pinkbatts.co.nz)

## Accreditations/Appraisals/Certifications

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Tasman Insulation New Zealand Ltd  
9-15 Holloway Place, Penrose, Auckland,  
New Zealand

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## INSTALLATION INSTRUCTIONS

# Roof

## PINK® BATTS® CEILING INSULATION

### 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 other 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

- Do not stand on ceiling 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.

Call **0800 746 534** for your local PinkFit® installer

**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
- Leveling 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
- Install to the outer edge of the top plate covering at least 50% of it while ensuring minimal overflow to the eaves
- Maintain a 25mm gap clearance between the Pink® Batts® insulation and any roofing material. If required, to maintain 25mm clearance, trim insulation or use a thinner product around the perimeter
- Insulate access hole cover and secure in place with strapping or glue
- Remove excess material

**Unlined Walls in Roof Cavities**

- **Pink® Batts® Wall** or **Pink® Batts® HandyPack insulation** should be secured in place by using horizontal strapping (max spacing of 300mm)



**Tip:** To verify Building Code Compliance, staple a product label at an easy to find location away from any hot items such as downlights or water cylinders e.g. on truss/rafter above ceiling access hole and hot water cupboard.



**Note:** Pink® Batts® ceiling insulation shall not be installed in a roof space where foil has been installed as a roof underlay.

Refer to NZS 4246:2016 for full details.

## Clearances

Follow the clearances specified by the manufacturer; if they are not known then:

### Recessed Luminaire

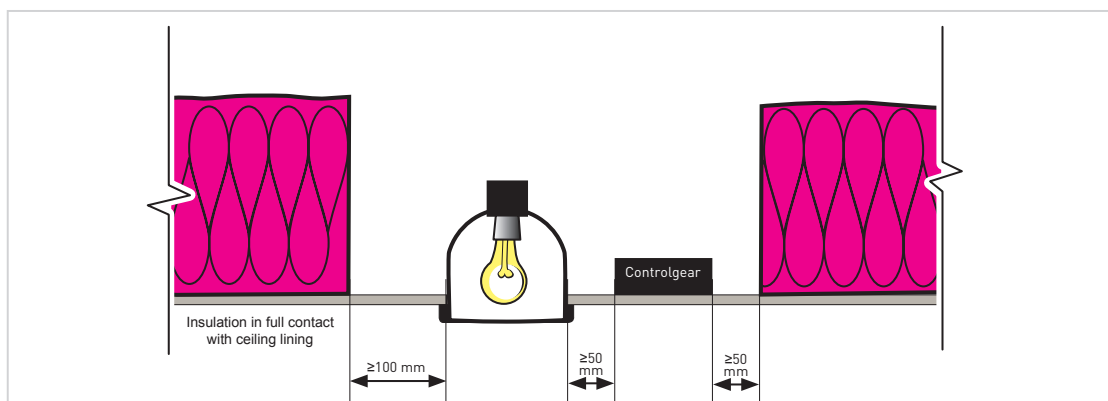
- CA rated recessed luminaires - Nil, however do not install insulation on top of the recessed luminaire
- IC rated recessed luminaires - Nil, insulation can be installed over the top of the recessed luminaire
- Unmarked - Minimum 100mm

**Surface Mounted Luminaire** - Minimum clearance 200mm; however it does not apply if the insulation is permanently shielded.

### Controlgear

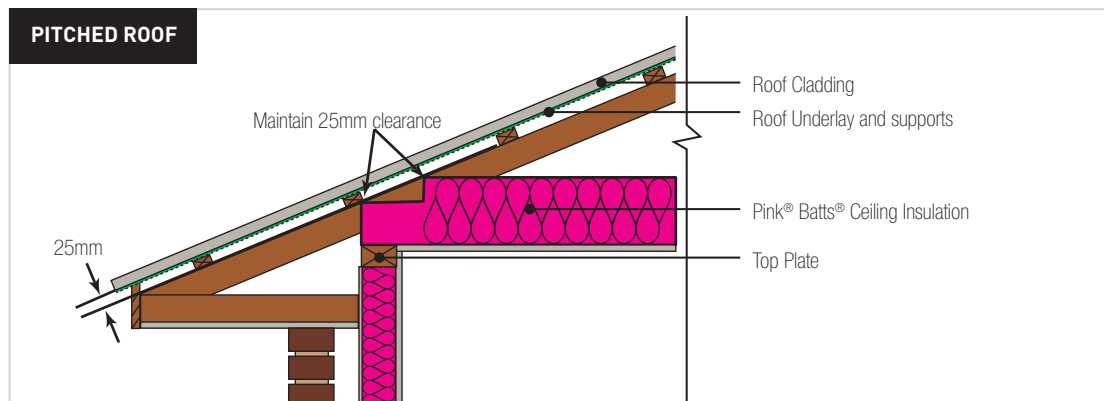
- If possible place it on top of the insulation and leave a minimum clearance of 50mm between controlgear and luminaire
- If not possible to place it on top of the insulation and leave 50mm from the insulation to the controlgear

Controlgear **shall not** sink into the insulation.



Unmarked luminaire and controlgear not placed on top of Pink® Batts® ceiling products.

- 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



**Note:** Pink® Batts® ceiling insulation can be installed from below when the ceiling is to be lined or replaced

**\*Caution:** Electrical cables and equipment partially or completely surrounded with bulk thermal insulation may overheat and fail. This applies to wiring installed prior to 1989.

**pink batts®**

**Always.**



## Product Specifications

## ROOF - Thermal Insulation

		PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m <sup>2</sup> )	APPROX. COVERAGE PER BALE* (m <sup>2</sup> )	ENVIRONMENTAL CHOICE
R1.8	Pink® Batts® Classic R1.8 Ceiling	7110118	1220 x 432	95	13.7	14.4	✓
R2.2	Pink® Batts® Classic R2.2 Ceiling	7110122	1220 x 432	115	12.6	13.3	✓
R2.6	Pink® Batts® Classic R2.6 Ceiling	7110126	1220 x 432	140	10.5	11.1	✓
R3.2	Pink® Batts® Classic R3.2 Ceiling <sup>‡</sup>	7110132	1220 x 432	170	8.4	8.8	✓ <sup>‡</sup>
R3.2	Pink® Batts® Skillion Roof R3.2	7110232	1220 x 432	115 max	3.7	3.9	✓
R3.6	Pink® Batts® Classic R3.6 Ceiling <sup>‡</sup>	7110136	1220 x 432	180	7.4	7.7	✓ <sup>‡</sup>
R3.6	Pink® Batts® Skillion Roof R3.6	7110236	1220 x 432	165 max	6.3	6.6	✓
R4.0	Pink® Batts® Ultra® R4.0 Ceiling	7110140	1220 x 432	195	6.3	6.6	✓
R5.0	Pink® Batts® Ultra® R5.0 Ceiling	7110150	1220 x 432	220	4.2	4.4	✓
R6.0	Pink® Batts® Ultra® R6.0 Ceiling	7110160	1220 x 432	235	3.7	3.9	✓
R6.3	Pink® Batts® Ultra® R6.3 Ceiling	7110163	1220 x 432	250	3.2	3.3	✓
R7.0	Pink® Batts® Ultra® R7.0 Ceiling	7110170	1220 x 432	260	2.6	2.8	✓

## ROOF - Thermal Retrofit Insulation

R2.9	Pink® Batts® R2.9 Retrofit Ceiling	7110129	1220 x 432	150	9.5	10.0	✓
R3.3	Pink® Batts® R3.3 Retrofit Ceiling	7110133	1220 x 432	175	8.4	8.8	✓

## ROOF and WALL - Thermal Insulation

R2.4	Pink® Batts® HandyPack R2.4 <sup>^</sup>	7200158	7000 x 580	90	4.06	-	
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\* Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.

† This product is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made product only.

‡ For full details of the Pink® Batts® Lifetime Warranty visit [pinkbatts.co.nz/lifetime-warranty](http://pinkbatts.co.nz/lifetime-warranty).

^ Product does not have the Pink® Batts® Lifetime Warranty or BRANZ Appraised Accreditation.



## Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store under cover in clean dry conditions. The installed product should remain dry at all times. If the product has become wet or damp, the source of the dampness (e.g. leak in roof) should be repaired immediately and any wet or damp insulation should be removed and replaced with new product 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](http://pinkbatts.co.nz)



## Accreditations/Appraisals/Certifications



‡ R3.6 ceiling product is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made products only.  
# For full details of the Pink® Batts® Lifetime Warranty visit [pinkbatts.co.nz](http://pinkbatts.co.nz)

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New Zealand

This document supersedes all previous versions and may have been superseded; is a guide only and the purchaser should ascertain the suitability of this product for the end-use situation intended and when used in conjunction with other products; and is provided without prejudice to Tasman Insulation New Zealand Ltd (Tasman) standard terms of sale. Tasman retains the right to change specifications without prior notice. Refer to [www.pinkbatts.co.nz](http://www.pinkbatts.co.nz) or consult Tasman for further information. Do not use this product for any application not detailed in this document. All claims about this product are subject to any variation caused by normal manufacturing process and tolerances. The liability of Tasman and its employees and agents for any errors or omissions in this document or otherwise in relation to the product is limited to the fullest extent permitted by law. Except where the consumer acquires the goods for the purposes of a business, any rights a consumer may have under the Consumer Guarantees Act are not affected. The colour PINK and Pink® are registered trademarks of Owens Corning used under license by Tasman Insulation. Batts® is the registered trade mark of Tasman Insulation.

**pink batts®**

**Always.**



## BRANZ Appraised

Appraisal No. 238 [2018]

### PINK® BATTS® INSULATION

Appraisal No. 238 [2018]

This Appraisal replaces BRANZ

Appraisal No. 238 [2012].

Amended 26 November 2018.

#### BRANZ Appraisals

Technical Assessments of  
products for building and  
construction.



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## 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 and will not present a health hazard to people.

**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.



## 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]	Nominal Total Area [m²]	Density [kg/m³]
<b>Roof - Thermal Insulation</b>					
1.8 <sup>1</sup>	1220	432	95	13.7	8.3
2.2 <sup>1</sup>	1220	432	115	12.6	8.2
2.6 <sup>1</sup>	1220	432	140	10.5	7.7
3.2 <sup>1</sup>	1220	432	170	8.4	8.4
3.2 <sup>1</sup>	1220	432	170	8.4	6.9
3.6 <sup>1</sup>	1220	432	180	7.4	7.4
3.6	1220	432	180	7.4	8.8
4.0 <sup>1</sup>	1220	432	195	6.3	8.1
5.0 <sup>1</sup>	1220	432	220	4.2	10.0
6.0 <sup>1</sup>	1220	432	235	3.7	13.0
6.3 <sup>1</sup>	1220	432	250	3.2	12.3
7.0 <sup>1</sup>	1220	432	260	2.6	15.8
<b>Roof - Building Insulation Blanket</b>					
1.2	12,000	1200	50	28.8	12.0
1.8	8000	1200	75	19.2	12.0
2.2	8000	1200	100	19.2	9.1
2.4	8000	1200	100	19.2	11.5
2.6	6000	1200	110	14.4	11.0
3.2	8000	1200	135	9.6	10.9
<b>Roof - Pink® Batts® Retrofit Insulation</b>					
2.9 <sup>1</sup>	1220	432	150	9.5	7.7
3.3 <sup>1</sup>	1220	432	175	8.4	7.1
<b>Wall - Masonry Insulation</b>					
1.0 <sup>1</sup>	1220	580	40	21.2	14.0
1.2	1220	580	50	17.0	12.8
<b>70 mm Wall Range - Thermal Insulation</b>					
2.2	1140	560	70	6.4	30.0
<b>90 mm Wall Range - Thermal Insulation</b>					
1.8 <sup>1</sup>	1140	560	90	16.6	9.0
2.2 <sup>1</sup>	1140	560	90	13.4	11.6
2.4 <sup>1</sup>	1140	560	90	10.2	14.7
2.4 <sup>1</sup>	1140	560	90	10.2	17.4
2.6 <sup>1</sup>	1140	560	90	9.6	19.4
2.8 <sup>1</sup>	1140	560	90	6.4	27.1

**Table 1: Pink® Batts® Insulation product table cont.**

R-value	Length [mm]	Width [mm]	Nominal Thickness [mm]	Nett Area [m²]	Density [kg/m³]
<b>90 mm Narrow Wall Range - Thermal Insulation</b>					
2.2 <sup>1</sup>	1140	360	90	9.0	11.8
2.6 <sup>1</sup>	1140	360	90	7.4	19.4
2.8 <sup>1</sup>	1140	360	90	4.5	27.1
<b>90 mm Steel Wall Range - Thermal Insulation</b>					
2.2 <sup>1</sup>	1220	610	90	15.6	11.8
2.6 <sup>1</sup>	1220	610	90	9.7	19.4
<b>140 mm Wall Range - Thermal Insulation</b>					
3.2 <sup>1</sup>	1140	560	140	9.6	9.6
3.6 <sup>1</sup>	1140	560	140	7.0	14.0
4.0 <sup>1</sup>	1140	560	140	5.1	19.5
<b>140 mm Narrow Wall Range - Thermal Insulation</b>					
3.2 <sup>1</sup>	1140	360	140	7.0	9.6
4.0 <sup>1</sup>	1140	360	140	4.1	19.5

<sup>1</sup> Pink® Batts® Insulation products that have the Environmental Choice license.

- 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 Pink® Batts® Retrofit Ceiling Insulation is pink in colour and is baled in teal polythene bags with labelling in compliance with AS/NZS 4859.1.
- 4.5 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 R-value.

## Technical Literature

- 6.1 Refer to the Appraisal listing on the BRANZ website for details of the current Technical Literature for Pink® Batts® Insulation. 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 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 NZBC Verification Method H1/VM1 or NZBC Acceptable Solution H1/AS1. 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 Pink® Batts® Insulation thermal resistance [R-value] 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. They can also be laid directly on a ceiling lining, over ceiling battens or 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 Where the insulation is installed in exterior walls, the insulation material nominal thickness 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.
- 7.5 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.
- 7.6 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.
- 7.7 Building Insulation Blanket is designed specifically for commercial roof and commercial wall applications. In residential applications, installation must be completed in line with NZS 4246.
- 7.8 To prevent moisture transfer and to provide roof ventilation, a separation of 25 mm minimum is required between the insulation and any rigid substrate or flexible roof underlay. Selecting specifically designed skillion roof insulation products with a controlled nominal thickness can assist with this requirement.
- 7.9 The building envelope must be constructed to ensure the insulation remains dry during installation and throughout the life of the building.
- 7.10 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 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 considered a non-combustible material and need not to be separated from heat sources such as fire places, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 to C/AS6 and NZBC Verification Method C/VM1.

### Downlights

- 10.2 Recessed luminaires shall be of type and be installed in accordance with NZBC Acceptable Solution C/AS1 to C/AS6, Section 7.4.
- 10.3 Insulation materials must maintain a clearance of 100 mm to undefined recessed luminaires in existing buildings.

### Control of Internal Fire and Smoke Spread

- 11.1 Pink® Batts® Insulation has been classified non-combustible when tested to AS 1530.1 and can therefore be assigned a Group Number of 1-S. Unless foamed plastics building materials are also used as part of the wall or ceiling construction, there are no internal surface finish requirements in Risk Group SH in accordance with NZBC Acceptable Solution C/AS1, Paragraph 4.2. When used in an occupied space, Pink® Batts® Insulation does not need to be enclosed in any Risk Group. Refer to NZBC Acceptable Solutions C/AS2 to C/AS6 for the specific internal surface requirements for walls or ceilings in other Risk Groups.

### External Moisture

- 12.1 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.
- 12.2 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.

### Internal Moisture

- 13.1 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.
- 13.2 Roofs and walls of housing complying with the Schedule Method for Compliance with 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

- 14.1 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 Method H1/VM1 or NZBC Acceptable Solution H1/AS1. Refer to Paragraphs 7.1 - 7.8.
- 14.2 Pink® Batts® Insulation R-values have been determined by BRANZ testing to AS/NZS 4859.1 and are given in Table 1.

## Installation Information

### Installation Skill Level Requirements

- 15.1 Installation of Pink® Batts® Insulation must be completed by an installer with an understanding of insulation installation.

### General

- 16.1 Installation of Pink® Batts® Insulation must be in accordance with the Technical Literature, Installation Instructions and this Appraisal. NZS 4246 should be used as a guide for installing insulation in residential buildings.
- 16.2 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.
- 16.3 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.



- 16.4 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.
- 16.5 The clearance requirements for heating appliances and downlights must be followed. Refer also to NZS 4246.

#### **Inspections**

- 16.6 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of Pink® Batts® Insulation installations.

#### **Health and Safety**

- 17.1 Refer to the Technical Literature and NZS 4246 for guidance on health and safety requirements such as personal protective clothing and installation hazard assessment.

### **Basis of Appraisal**

The following is a summary of the technical investigations carried out:

#### **Tests**

- 18.1 BRANZ has carried out thermal resistance testing of Pink® Batts® Insulation in accordance with AS/NZS 4859.1.
- 18.2 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**

- 19.1 An assessment of the durability of Pink® Batts® Insulation has been made by BRANZ technical experts.
- 19.2 The manufacturer's Technical Literature including installation instructions have been reviewed by BRANZ and found to be satisfactory.

#### **Quality**

- 20.1 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.
- 20.2 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 Environmental Choice Specification, Licence No. 2504017 - Thermal [resistive type] Building Insulants. The products that have the Environmental Choice license are noted in Table 1.
- 20.3 Tasman Insulation New Zealand Ltd is responsible for the quality of the product supplied.
- 20.4 Quality of installation of the product on site is the responsibility of the installer.
- 20.5 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: 2002 Materials for the thermal insulation of buildings.
- NZS 4246: 2016 Energy efficiency - Installing bulk thermal insulation in residential buildings.
- BRANZ Bulletin Number 525 Preventing moisture problems in timber-framed skillion roofs.
- BRANZ House Insulation Guide, Fifth Edition 2014.
- Acceptable Solution and Verification Methods for New Zealand Building Code Energy Efficiency Clause H1, Ministry of Business, Innovation and Employment, Fourth Edition, [including Amendment 3, 1 January 2017].
- Ministry of Business, Innovation and Employment record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

## Amendments

### Amendment No. 1, dated 05 September 2018.

This Appraisal has been amended to include the use of Pink® Batts® Insulation when retrofitting external walls without wall underlay with direct-fixed claddings.

### Amendment No. 2, dated 26 November 2018.

This Appraisal has been amended to update Table 1 to include the Roof - Building Insulation Blanket product range.

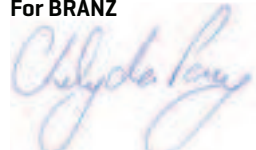
In the opinion of BRANZ, **Pink® Batts® Insulation** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Tasman Insulation New Zealand Ltd**, 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:**
  - 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 **Tasman Insulation 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 **Tasman Insulation New Zealand Ltd** or any third party.

For BRANZ



**Chelydra Percy**

Chief Executive

Date of Issue:

03 August 2018



## Product Data Sheet

# THERMATHENE BLACK

## Damp Proof Membrane (DPM)

Thermathene Black is a concrete underlay that is made from a tear and puncture resistant polyethylene film. It is commonly known as a Damp Proof Membrane (DPM).

Thermathene Black comes in two roll sizes:

Product Code	Width	Length	Coverage
PF250025	4000mm	25m	100m <sup>2</sup> coverage
PF250050	4000mm	50m	200m <sup>2</sup> coverage

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# Thermathene Black

## Damp Proof Membrane (DPM)

### Scope of Use

Thermathene Black intended for use as a damp-proof membrane separating concrete slab from ground soil. The product acts as a vapour barrier to stop ground moisture penetrating the concrete. Thermathene Black must be sealed with Thermakraft White General Purpose tape at the laps joints to form a complete vapour barrier.

### General

- Unaffected by LOSP treated timber. However, LOSP treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.
- 4m x 25m [100m<sup>2</sup>] and 4m x 50m [200m<sup>2</sup>] unfolded size.
- 250 Micron in thickness.

### Limitations

- Maximum weather or UV exposure is 28 days.
- Cannot be used as a roof or wall underlay.

### Compliance

Thermathene Black is an acceptable solution as per the requirements of the NZBC. Thermathene Black meets the requirements of NZBC 3604:2011 Clause 7.5.4.2, NZBC Acceptable Solutions E2/AS1, Table 23 and NZS 4229:2013 Clause 7.4 & 7.6.

When Thermathene Black is used and installed as a damp-proof membrane as per Thermakraft's literature, the product will meet or contribute to meeting the following provisions of the NZBC: Clause B2 Durability: Performance B2.3.1 (a), 50 years, Clause E2 External Moisture: Performance E2.3.3 & Clause F2 Hazardous Materials: Performance F2.3.1.

### Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at [thermakraft.co.nz](http://thermakraft.co.nz) or call **0800 806 595**.

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## Installation Guide

# THERMATHENE BLACK

## Damp Proof Membrane (DPM)

Thermathene Black is a concrete underlay that is made from a tear and puncture resistant polyethylene film. It is commonly known as a Damp Proof Membrane (DPM).

### Product usage

Thermathene Black is used as a concrete underlay and a moisture vapour barrier in areas where protection is required. The product is 250 microns in thickness and is coloured black. Thermathene Black may also be used under suspended subfloors as ground protection from rising damp.

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# Installation Guide

## Application Method

- Thermathene Black should be installed in accordance with the requirements of NZS3604:2011 and must be laid on a properly prepared base as required by NZS3604:2011 Section 7.5.3 to 7.5.6.2.
- Thermathene Black must be laid in a continuous manner with all laps minimum 150mm, and penetrations to be taped with Thermakraft White General Purpose Tape.
- Thermathene Black should be laid in a neat fashion with a smooth surface, with as many of the ripples as possible eliminated.
- Thermathene Black must be inspected for any damage (tears or penetrations) prior to concrete placement. Any damage must be repaired with Thermakraft White General Purpose Tape, for any larger damage a patch of Thermathene Black maintaining a 150mm lap.
- Thermathene Black must not be left exposed for more than 28 days.
- Thermathene must be installed by a licensed building practitioner.
- Thermathene Black may also be used to cover ground areas under suspended timber floors to prevent the rise of dampness. Ensure that the site is clear of rubbish, sharp edges such as rocks or bricks. Slit and patch around jack studs or pipe work. All penetrations and joints must be taped.

## Handling and Storage

Thermathene Black must be handled with care to prevent damage, 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. 329 [2016]

### SUPERCOURSE 500 DAMP-PROOF COURSE AND CONCEALED FLASHING

Appraisal No. 329 [2016]

This Appraisal replaces BRANZ

Appraisal No. 329 [2005]

Amended 09 July 2021



#### BRANZ Appraisals

Technical Assessments of  
products for building and  
construction.

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## Product

- 1.1 Supercourse 500 is a single layer black polyethylene film, embossed on both faces to produce a small diamond pattern. It is for use as a general damp-proof course (DPC), and also as a concealed flashing for masonry veneer cladding.

## Scope

- 2.1 Supercourse 500 has been appraised for use as a DPC for separating timber, wood-based products and metal from concrete, masonry or clay brick in accordance with NZS 3604.
- 2.2 Supercourse 500 has also been appraised for use as a DPC and flashing in masonry veneer walls in accordance with NZBC Acceptable Solution E2/AS1.

## Building Regulations

### New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Supercourse 500 Damp-Proof Course and Concealed Flashing, 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 and B2.3.2. Supercourse 500 meets these requirements. See Paragraph 8.1.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2 and E2.3.3. When used as a flashing as part of a masonry veneer cladding system, Supercourse 500 will contribute to meeting the requirements of E2.3.2. When used as a DPC, Supercourse 500 will meet the requirements of E2.3.3. See Paragraphs 11.1 and 11.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Supercourse 500 meets this requirement.



## Technical Specification

- 4.1 Supercourse 500 is a 0.5 mm thick, extruded polyethylene film. It consists of a single layer of black polyethylene, embossed on both faces to produce a small diamond pattern. The total thickness of the product after embossing is 0.75 mm. Supercourse 500 is supplied in rolls 30 m long and is available in widths of 50, 75, 90, 100, 140, 150, 200, 250, 300 and 1,000 mm. Other widths are available upon request.
- 4.2 Each roll is labelled with the product name, dimensions, standards reference, and manufacturer's information.

## 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 and must be stored under cover, in clean, dry conditions.

## Technical Literature

- 6.1 Refer to the Appraisals listings on the BRANZ website for details of the current Technical Literature for Supercourse 500. 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 Supercourse 500 exceeds the vapour resistance requirements of NZBC Acceptable Solution E2/AS1, Table 23 for DPCs and is a suitable moisture impermeable alternative to bituminous DPCs.
- 7.2 Supercourse 500 is intended for use as a DPC separating timber, wood-based products and metal from concrete or masonry elements, or where required, timber jack studs or bearers from concrete or timber piles, e.g. where required by NZS 3604, Paragraph 2.3.3 and Figure 6.3. When used as a DPC, the roll width selected must enable the Supercourse 500 to extend at least 6 mm beyond each face of the timber in accordance with the requirements of NZS 3604, Paragraph 2.3.3 b).
- 7.3 Supercourse 500 is also intended for use as a flashing material with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.2.4 and also as a DPC in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.2.5.

### Timber Treatment

- 7.4 Supercourse 500, when used as a DPC or flashing, is suitable for use in contact with timber treated with light organic solvent preservative (LOSP) or water-based timber preservatives. The solvent from the timber treatment must be allowed to evaporate (generally at least one week) prior to the installation of Supercourse 500.

### Exposure Zone Fixing Selection

- 7.5 Where Supercourse 500 is used as a flashing behind masonry veneer, fixings shall be hot-dip galvanised clouts in Exposure Zones B and C, and stainless steel clouts in Exposure Zone D.

## Durability

### Serviceable Life

- 8.1 Supercourse 500 is expected to have a serviceable life in excess of 50 years when it is installed in accordance with the requirements of this Appraisal and the Technical Literature, provided it is not exposed to the weather or ultraviolet (UV) light for a total of more than 30 days, and is never exposed to chemicals, or solvents that will degrade polyethylene.

## Control of Internal Fire and Smoke Spread

- 9.1 Damp-proof courses and flashings are exempt from the surface finish requirements of NZBC Acceptable Solutions C/AS1 and C/AS2 by NZBC Acceptable Solution C/AS1, Paragraph 4.3 e), and NZBC Acceptable Solution C/AS2, Paragraph 4.17.6 e).

## Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to Supercourse 500 from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

## External Moisture

- 11.1 Supercourse 500, when installed as a flashing in accordance with the Technical Literature and this Appraisal, will assist in the masonry veneer cladding system meeting the performance requirements of NZBC Clause E2.3.2.
- 11.2 Supercourse 500, when used as a DPC in accordance with this Appraisal, prevents walls, floors and structural elements in contact with the ground from absorbing or transmitting moisture in quantities that could cause undue dampness or damage to building elements to meet the performance requirements of NZBC Clause E2.3.3.

## Installation Information

### Installation Skill Level Requirements

- 12.1 Installation must always be carried out in accordance with the Technical Literature and this Appraisal, by competent tradespersons with an understanding of DPC and flashing installation.

### Supercourse 500 Installation

#### General

- 13.1 Strips of Supercourse 500 may be cut to length with a sharp knife.

#### DPC Installation

- 13.2 The surfaces to be separated must be smooth and flat, free from projections such as small stones or sharp ridges that may puncture the membrane when pressure is applied.
- 13.3 When used to separate timber and wood-based products from concrete or masonry, Supercourse 500 should be temporarily held in place with small hot-dip galvanised clouts or zinc plated staples. The strip of DPC must be wide enough to fully protect the width of the material in contact with the concrete or masonry. Refer also to Paragraph 7.2.
- 13.4 When used under timber plates fixed over concrete floor slabs and foundation walls, a small slit should be made in the material before pushing down over the bolts or fixings. Alternatively, a small hole can be formed by gently tapping the product resting on top of the bolt until a puncture is formed.

#### Flashing Installation

- 13.5 Supercourse 500 must be fixed in place to framing members at maximum 300 mm centres with small hot-dip galvanised clouts.
- 13.6 Horizontal and vertical joints must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the flashing.
- 13.7 At the sill/jamb junction, the jamb flashing must overlap the sill flashing.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

- 14.1 The following tests have been carried out on Supercourse 500: water permeability, thickness, mass per unit area, pigment, impact resistance, and labelling, all in accordance with AS/NZS 2904 and AS/NZS 4347. The test results have been reviewed by BRANZ experts and found to be satisfactory.

### Other Investigations

- 15.1 Durability and weathertightness opinions were given by BRANZ technical experts.  
15.2 The practicability of installation has been assessed by BRANZ and found to be satisfactory.  
15.3 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.

### Quality

- 16.1 The manufacture of Supercourse 500 has not been examined by BRANZ, but details of the quality and composition of the materials used were obtained and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.  
16.2 The quality of supply to the market is the responsibility of Thermakraft Limited.  
16.3 Building designers are responsible for the design of the building, and for the incorporation of Supercourse 500 into their design in accordance with the instructions of Thermakraft Limited.  
16.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Thermakraft Limited.

## Sources of Information

- AS/NZS 2904:1995 Damp-proof courses and flashings.
- AS/NZS 4347:1995 Damp-proof courses and flashings - Methods of test.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4229:2013 Concrete masonry buildings not requiring specific engineering design.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

## Amendments

### Amendment No. 1, dated 23 February 2017

This Appraisal has been amended to update the Appraisal Holder.

### Amendment No. 2, dated 09 July 2021

This Appraisal has been amended to add a roll width of 140 mm.

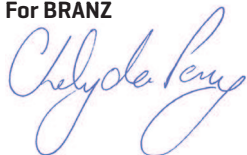
In the opinion of BRANZ, **Supercourse 500 Damp-Proof Course and Concealed Flashing** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Thermakraft 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. **Thermakraft 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 **Thermakraft 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 **Thermakraft Limited** or any third party.

For BRANZ



**Chelydra Percy**  
Chief Executive

Date of Issue:  
22 December 2016





## Product Data Sheet

# SUPERCOURSE 500

## Synthetic Damp Proof Course

Supercourse 500 is a general damp-proof course (DPC) used to prevent moisture transfer between building materials. It is also used as a concealed flashing for masonry veneer cladding.

Manufactured using a single layer of black polyethylene, Supercourse 500 is tough, high-impact and tear resistant. It is a suitable moisture impermeable alternative to bituminous DPC.

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# Supercourse 500

## Synthetic Damp Proof Course

Supercourse 500 comes in eleven roll sizes:

Product Code	Roll Size	Rolls Per Carton
SPC05030	50mm x 30m	42
SPC07530	75mm x 30m	24
SPC09030	90mm x 30m	24
SPC10030	100mm x 30m	18
SPC15030	150mm x 30m	12
SPC20030	200mm x 30m	6
SPC25030	250mm x 30m	6
SPC30030	300mm x 30m	6
SPC40030	400mm x 30m	
SPC50030	500mm x 30m	
SPC100030	1000mm x 30m	

### Scope of Use

- Supercourse 500 intended for use as a damp-proof course separating timber and wood-based products and metal from concrete, masonry elements or clay bricks.
- Can also be used to separate timber jack studs or bearers from concrete or timber piles.
- Supercourse 500 can be used as a concealed flashing in masonry veneer walls.

### 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.
- Available in 11 product width sizes.

### Limitations

- Maximum weather or UV exposure is 30 days.
- Supercourse 500 is NOT a window flashing tape and NOT a thermal break product.

### Compliance

When Supercourse 500 is used and installed as a damp-proof course and/or concealed flashing behind masonry veneer walls, the product 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 B2.3.2.
- Clause E2 External Moisture: Performance E2.3.2 and E2.3.3. When used as a flashing as part of a masonry veneer cladding system, Supercourse 500 will contribute to meeting the requirement of E2.3.2. When used as a damp-proof course, Supercourse 500 will meet the requirements of E2.3.3.
- Clause F2 Hazardous Building Materials: Performance F2.3.1. Supercourse 500 meets this requirement and will not present a health hazard to people.

More details can be found in Supercourse 500 BRANZ Appraisal 329 (2016)

### Durability

Supercourse 500 is expected to have a serviceable life in excess of 50 years when it is:

- Installed in accordance with Thermakraft's literature and BRANZ Appraisal.
- Not over exposed to the weather or UV (not more than 30 days).
- Never exposed to chemicals or solvents that will degrade or affect polyethylene material.

### Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at [thermakraft.co.nz](http://thermakraft.co.nz) or call **0800 806 595**.

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The recommendations contained in Thermakraft'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 Thermakraft (for example quality of workmanship and design), Thermakraft 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 on the website. E&OE.





## Installation Guide

# SUPERCOURSE 500

## Synthetic Damp Proof Course

Supercourse 500 is a general damp-proof course (DPC) used to prevent moisture transfer between building materials. It is also used as a concealed flashing for masonry veneer cladding.

Manufactured using a single layer of black polyethylene, Supercourse 500 is tough, high-impact and tear resistant. It is a suitable moisture impermeable alternative to bituminous DPC.

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# Installation Guide

## Product usage

Thermakraft Supercourse 500 provides a moisture barrier protection and prevent walls, floors and structural elements in contact with the ground absorbing or transmitting moisture. When used as a flashing in masonry walls, the product provides moisture protection around window and door joinery.

## Application Method

### Damp-Proof Course (DPC) Installation

- Strips of Thermakraft Supercourse 500 DPC may be cut to length with a sharp knife.
- Surface must be smooth and flat, free from sharp ridges/projections such as small stones that may puncture membrane.
- The strip of Thermakraft Supercourse 500 DPC must be wide enough to fully protect the width of material in contact with concrete or masonry.
- When used to separate timber and wood-based products from concrete or masonry, Supercourse 500 should be temporarily held in place with small hot-dip galvanised clouts or zinc plated staples.

**Note:** when use as a DPC, the roll width selected must be enable the Supercourse 500 to extend 6mm beyond each face of the timber in accordance with the requirement of the NZ 3604 standard paragraph 2.3.3 (b). See extract image below from NZ 3604:2011.

- A small slit should be made in the material to accommodate the bolts or fixings when used under timber plates or concrete floors or foundation walls. Alternative, a small hole can be formed by gently tapping the product resting on top of the bolt until a puncture is formed.

### Flashing Installation

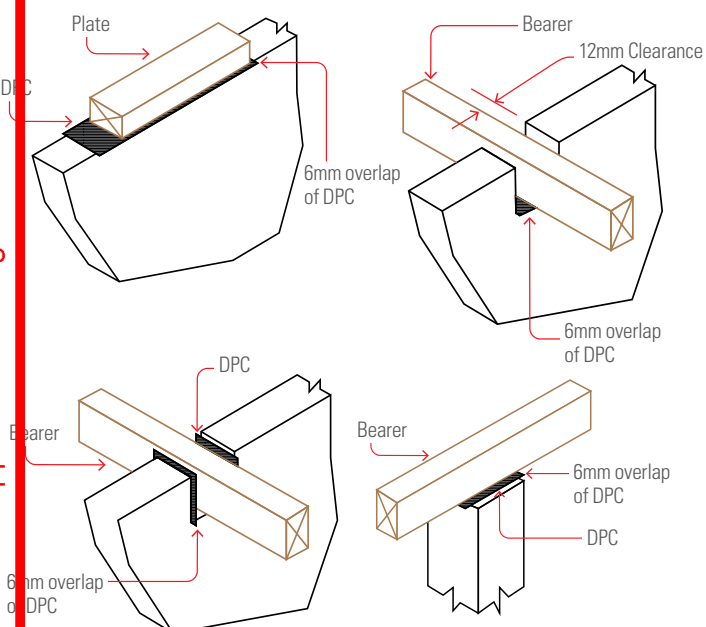
- Thermakraft Supercourse 500 must be fixed in place to framing members at 300mm centres with small hot-dip galvanised clouts.
- Horizontal and vertical joints must be no less than 75mm wide, with the direction of the lap ensuring that water is shed to the outer face of the flashing.
- At the sill/jamb junction, the jamb flashing must overlap the sill flashing.

Supercourse 500 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 chemical to flash off in a well ventilated area. Recommended minimum 7 days.

### Handling and Storage

Supercourse 500 must be handled with care to prevent damage such as tearing and roll deformation.

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.



Note: Timber, unless otherwise stated, to be treated to the levels specified in NZS 3604.

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The recommendations contained in Thermakraft'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 Thermakraft (for example quality of workmanship and design), Thermakraft 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 on the website. E&OE.





## Installation Guide

# 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.

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# Installation Guide

## Application Method (Roofing)

Thermakraft 215 is a bituminous building underlay used on roofs in residential buildings.

- Thermakraft 215 can be used in direct fix or cavity fix 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 MRM 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, Thermakraft recommend using AUSMESH 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 MRM 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 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 NZS 3604.
- Do NOT Run Thermakraft 215 longer than 10m in length.

## Application Method (Wall)

- Fix Thermakraft 215 underlay with 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 MRM Code of Practice.

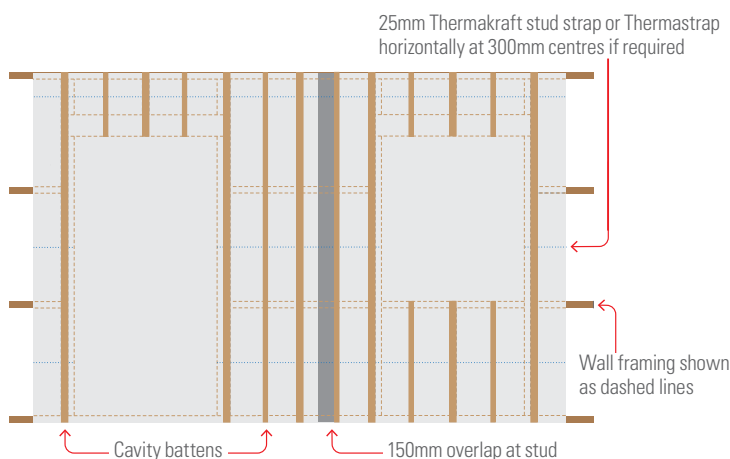


# Installation Guide

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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 28 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.
  - 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.

- For wall cavity systems where stud spacings are greater than 450mm centres, another means of restraint is required on the flexible underlay to prevent insulation bulge (refer to E2/AS1).
- 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.



## Installation Guide

# ALUBAND

### Bituminous adhesive flexible window flashing tape.

Aluband is designed specifically as a premium window flashing tape and forms part of the Thermakraft One Wrap System. Made with a heavy bituminous adhesive, the product provides high strength bond and excellent abrasion resistance.

#### Product usage

Aluband Window Flashing Tape is installed into and around frame joinery opening over the wall underlay and exposed frame to cover both the face and edge of the opening framing as a secondary weather resistant barrier. It can also be installed at joinery heads to seal flashing upstands to the wall underlay.

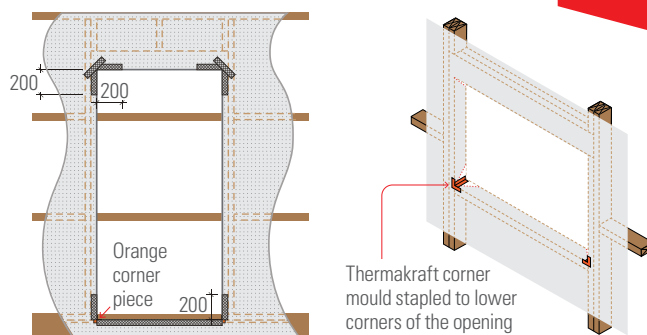
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# Installation Guide

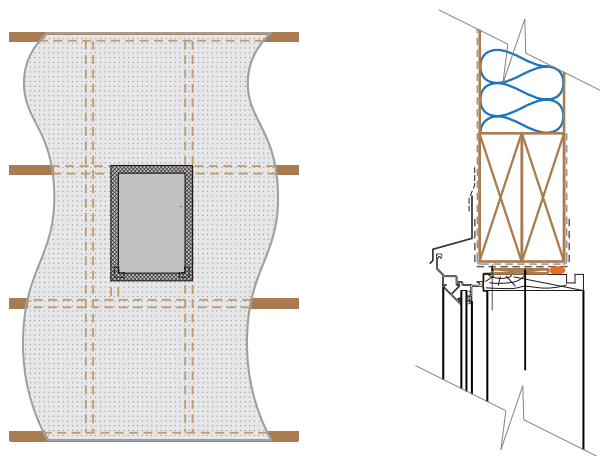
## Application Method

- Cut the wall underlay/air barrier at a 45° angle away from each corner. Fold flaps tightly into the window or door opening and fix with staples on the back faces of the framing.
- Fix the Thermakraft Corner Moulded Piece to the bottom corners by way of staples or clouts to the two jambs. Always ensure that Aluband is applied to surfaces that are clean and free of dust, contaminants, solvents, oils or waxes. Note the following: 150mm wide tape is used for 100mm wide window or door framing, and the 200mm wide tape is used for 140mm to 150mm wide reveals. (With steel framed houses use Double Sided Tape to attach the Thermakraft Aluband Corner Moulded Piece to metal framing).
- Measure 200mm up both jambs, add 400mm to the length of the window sill and cut to suit that measurement.
- First remove the release film from the tape; align the back edge of the tape with the inside edge of the sill.
- Using the Thermakraft Tool, firmly press the tape onto the wall underlay to ensure good adhesion and ensure the tape is fitted tightly into the jamb to sill corners.
- At the sill/jamb corners cut the tape from the external edge of the frame outwards. Fold flaps back onto the wall underlay/air barrier and press tape firmly for good adhesion.
- Proceed to fit the Window Flashing Tape to the top corners of the frame (200mm across lintel x 200mm down jamb).
- For window or door lintel to jamb junction, apply a butterfly using the 75mm wide x 100mm long Aluband. Fix at a 45° angle to the jamb with an overlap at the corner of 3mm.
- Door frames are to be treated similarly to window openings. The sill may be either a timber or a concrete floor.
- Window Flashing Tape is used to seal the up stand of the window head flashing to the building underlay. (Refer to the cladding manufacturer's details).
- Aluband must NOT be left exposed to the weather or UV for more than 42 days.



## Window and door frames

- Staple orange corner piece to the bottom corner sill. Place tape 200mm up the jambs and across the full width of the sill opening. Align tape with the back of the frame opening.
- At the top corner place tape 200mm down the jamb and 200mm across the lintel. Place a strip of 75mm tape across the top corner.



## Application Tips

- Always use the Thermakraft Aluband Window Flashing Tool to apply firm pressure onto the tape during installation. This will ensure proper adhesion of the tape to the building underlay or other substrates.
- Install the Aluband Window Flashing above 5°C.
- 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.

## Important Information

To assist the adhesion of Aluband window flashing tape, Thermakraft suggests the following two options this is particularly relevant in the following conditions:

- In temperatures below 5°C.
- When adhering to difficult to bond substrates such as rough/uneven surfaces.
- When the tape has been lifted or moved after initial application.

# Installation Guide

## Application of Heat:

- Press the window sill tape into position in the usual manner.
- Apply a gentle heat, using a heat gun on low heat to the top of the window sill tape.
- Once the adhesive starts to soften use the Thermakraft tool or a roller to firmly press the tape into the wall underlay ensuring good adhesion.
- Take care not to damage the foil face lining.

## Difficult to Bond Substrates Surface Preparation:

- Always ensure that Aluband is applied to surfaces that are clean and free of dust, contaminants, solvents, oils or waxes.
- Application of Scotch® Super 77™ Spray Adhesive: When installing Aluband Flashing Tapes on difficult to bond substrates, Scotch® Super 77™ Spray Adhesive may be used. Ensure that the substrate is dry and free of dirt before applying the spray adhesive. Apply a light spray/coating of the spray adhesive onto the substrate. Wait for a minute to allow the spray adhesive to become tacky. When tacky to the touch apply the flashing tape in the normal manner.

## Adhesives and Sealants:

- After the installation of Aluband window flashing tape, ensure that the edges do NOT come into contact with solvent based sealants or adhesives. Solvents in these products can adversely affect the adhesion or dissolve the bituminous adhesive and cause it to run.
- If the application of solvent based adhesives or sealants are necessary, cover the edges with Thermakraft joining tape or a true aluminium foil tape to form a barrier. With a true aluminium foil tape, the installer must test the bonding strength.
- The installer must check the compatibility of the Aluband window flashing tape with the sealant or adhesive product to ensure the components are fully compatible.

## Handling and Storage

Aluband window flashing tape must be handled with care to prevent damage such as tearing, excessive puncture and roll deformation.

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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## Product Data Sheet

# ALUBAND

### Bituminous adhesive flexible window flashing tape.

Aluband is designed specifically as a premium window flashing tape and forms part of the Thermakraft One Wrap System. Made with a heavy bituminous adhesive, the product provides high strength bond and excellent abrasion resistance.

Aluband comes in four roll sizes:

Product Code	Roll Size	Rolls Per Carton
ALU075025	75mm x 25m	12
ALU150010	150mm x 10m	6
ALU150025	150mm x 25m	6
ALU200025	200mm x 25m	4

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# Aluband

## Bituminous adhesive flexible window flashing tape.

### Scope of Use

Thermakraft Aluband Window Flashing Tapes can be used within the following scope:

- Installed into and around frame joinery opening over the wall underlay and exposed frame to cover both the face and edge of the opening framing as a secondary weather resistant barrier.
- Installed at joinery heads to seal flashing upstands to the wall underlay.
- To assist the overall weathertightness performance of window and door joinery installations.
- To be used in conjunction with air seals and joinery flashing systems. Installer must check for air seal product compatibility with Aluband Window Flashing Tape.
- Thermakraft Aluband Window Flashing Tape must be used with Thermakraft Corner Moulded Pieces (on windowsill corners).
- Situated in NZS3604 Wind Zones up to, and including 'Extra High'.

### General

- Compatible with all Thermakraft building underlays.
- 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 corner moulds **MUST** be used at flashing corners (see installation guide).

### Limitations

- Must NOT be exposed to the weather/UV for more than 42 days.
- Should be installed when temperatures are above 5°C.
- NOT designed to overcome poor detailing and workmanship of the window or door joinery installation.
- Bitumen may react with window sealants. Always check compatibility before use.

### Compliance:

- Aluband should be used within the product scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1;
- Can be used on buildings constructed with timber and steel framing complying with the NZBC;
- With a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and;
- Can be used with wall cladding systems complying with NZBC Acceptable Solution E2/AS1.

### Durability:

- Thermakraft Aluband Window Flashing Tape will meet 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 Performance and F2 Hazardous Building Materials.
- \* **Note:** When the external cladding is maintained according to the cladding manufacturer's instructions and the cladding remains weather resistant, Thermakraft Aluband Window Flashing Tape is expected to have a serviceable life equal to that of the cladding.
- Thermakraft Aluband Window Flashing Tape has a serviceable life expectancy equal to that of the cladding, when installed in accordance with this technical specification and in accordance to the product installation guide, provided it is not exposed to the weather or ultra-violet (UV) light for more than 42 days, or is not damaged upon installation.
- Thermakraft Aluband Window Flashing Tape is designed to work on all building underlays that meet the requirements of NZBC E2/AS1 Table 23, and on all Thermakraft BRANZ Appraised wall underlays.

### Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at [thermakraft.co.nz](http://thermakraft.co.nz) or call **0800 806 595**.

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Thermakraft  
ONE WRAP  
SYSTEM

10 Products - One system  
One warranty

## Product Data Sheet

# ONESEAL®

### Multi-fit pipe and cable wall penetration seals

OneSeal is a unique multi-fit system providing air and water resistance for pipes and cables. OneSeal is simple to install, extremely airtight and provides high strength adhesion to a wide range of substrates. Remove the guesswork and be sure that you'll always have the right size for the job.

BRANZ appraised, compatible with most building membranes and rigid air barriers. Easy to install – no need for special tools, glue or tapes.



# OneSeal®

## Multi-fit pipe and cable penetration seals

### Product Description

OneSeal Multi-fit Pipe and Cable Penetration Seals are manufactured with a soft and flexible 1.2mm thick EPDM fabric supplied with pre-notched ring markings. The perimeter of the seal is coated with a high-performance adhesive, which is bonded to the wall underlay.

### Scope of Use

For use on timber and steel frame buildings to provide pipes and cables with an airtight solution when passing through wall underlay.

### Limitations

- OneSeal Multi-fit Pipe and Cable Penetration Seals have been tested and appraised for a maximum 180 days weather exposure when used on James Hardie Rigid Air Barriers (RAB).
- OneSeal Multi-fit Pipe and Cable Penetration Seals must NOT be exposed to the weather or ultra violet light for more than 90 days when used on flexible underlays.
- OneSeal Multi-fit Pipe and Cable Penetration Seals must NOT be installed at temperature of less than -10C. Once fitted, OneSeal Multi-fit Pipe and Cable Penetration Seals can withstand temperatures of -40C to +80C.
- The performance of the OneSeal product relies on the correct size being selected for the pipe or cable penetration being sealed, and the seal being fully adhered to the wall underlay.

### Compliance

- OneSeal Multi-fit Pipe and Cable Penetration Seals when used with flexible and rigid wall underlays, provides an alternative solution to the pipe and service penetration detailing specified in the NZBC Acceptable solution E2/AS1, Paragraph 9.1.9.3 and Figure 68.
- OneSeal Multi-fit Pipe and Cable Penetration Seals provide suitable flashing and sealing around pipe and cable penetrations when used in conjunction with BRANZ Appraised wall underlays, and will contribute to the wall cladding meeting code compliance with NZBC Clause E2.3.2.
- Meets the Performance Requirements of NZBC Clauses B2, Durability B2.3.1 (b) 15 years and B2.3.2, E2 External Moisture, and F2 Hazardous Building Materials F2.3.1. Refer to BRANZ Appraisal 942 [2017] for further details.

### Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at [thermakraft.co.nz](http://thermakraft.co.nz) or call **0800 806 595**.

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## BRANZ Appraised

Appraisal No. 942 [2017]

## ONESEAL™ MULTI-FIT PIPE AND CABLE PENETRATION SEALS

Appraisal No. 942 [2017]

Amended 17 December 2020

### BRANZ Appraisals

Technical Assessments of products for building and construction.

## Thermakraft™

### Thermakraft Limited

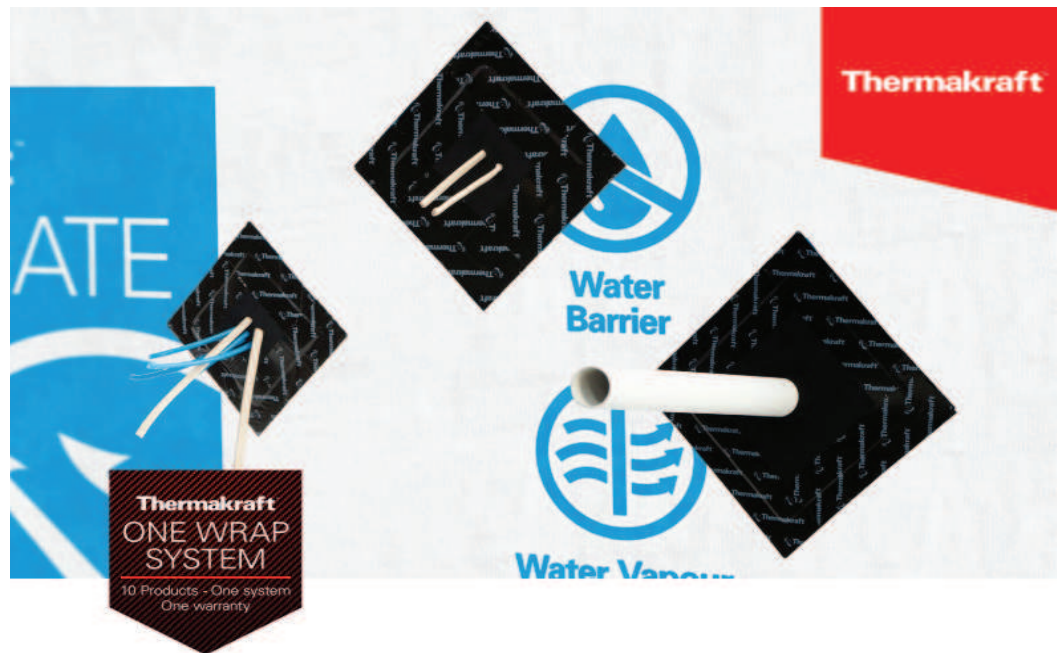
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### BRANZ

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Porirua 5240,  
New Zealand  
Tel: 04 237 1170  
branz.co.nz



## Product

- 1.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals are a range of pipe and service penetration seals consisting of a soft, flexible EPDM membrane with a self-adhesive flange.

## Scope

- 2.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals have been appraised for use as pipe and service penetration seals for use where the penetration passes through the wall underlay on framed 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 a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, Table 2; and,
  - with flexible and rigid wall underlays compatible with the seals and complying with the NZBC; and,
  - situated in NZS 3604 and NASH Standard Part Two Wind Zones up to, and including, Extra High.
- 2.2 OneSeal™ Multi-fit Pipe and Cable Penetration Seals have also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of OneSeal™ Multi-fit Pipe and Cable Penetration Seals into their design in accordance with the declared properties and the instructions of Thermakraft Limited.

## Building Regulations

### New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, OneSeal™ Multi-fit Pipe and Cable Penetration Seals, 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 (b), 15 years and B2.3.2. OneSeal™ Multi-fit Pipe and Cable Penetration Seals meet these requirements. See Paragraphs 8.1 and 8.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. When used as part of the wall cladding system, OneSeal™ Multi-fit Pipe and Cable Penetration Seals will contribute to meeting this requirement. See Paragraphs 7.1-7.4 and 11.1.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. OneSeal™ Multi-fit Pipe and Cable Penetration Seals meet this requirement.

## Technical Specification

- 4.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals are manufactured with a black, soft and flexible 1.2 mm thick EPDM fabric supplied with pre-punched markings. The perimeter of the seal is coated with an acrylic adhesive, which is bonded to the wall underlay. OneSeal™ Multi-fit Pipe and Cable Penetration Seals are available in the sizes below.

### OneSeal™ Multi-Fit Cable Seals:

- 55 mm to 80 mm diameter
- 4 x 7 mm to 10 mm diameter
- 2 x 10 mm to 22 mm diameter

### OneSeal™ Multi-Fit Pipe Seals:

- 15 mm to 25 mm diameter
- 40 mm to 60 mm diameter
- 60 mm to 90 mm diameter
- 90 mm to 110 mm diameter

## Handling and Storage

- 5.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals must be protected from damage and weather. They must be stored under cover in clean, dry conditions away from direct exposure to sunlight, heat or flame. OneSeal™ Multi-fit Pipe and Cable Penetration Seals should not be removed from the packaging until they are ready to use.
- 5.2 Handling and storage of OneSeal™ Multi-fit Pipe and Cable Penetration Seals, whether on-site or off-site, is the responsibility of the installer.

## Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for OneSeal™ Multi-fit Pipe and Cable Penetration Seals. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the scope of this Appraisal and the Technical Literature must be followed.

## Design Information

### General

- 7.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals must not be exposed to the weather or ultraviolet (UV) light for a total of more than 90 days. The maximum exposure period of OneSeal™ Multi-fit Pipe and Cable Penetration Seals may be limited by the maximum exposure period of the wall underlay. *[Note: OneSeal™ Multi-fit Pipe and Cable Penetration Seals have also been appraised for a maximum 180 days exposure when used on James Hardie Rigid Air Barriers. Refer BRANZ Appraisal No. 611. The long-term adhesion of the seals to other rigid wall underlays has not been assessed by BRANZ and is therefore outside the scope of this Appraisal.]*
- 7.2 OneSeal™ Multi-fit Pipe and Cable Penetration Seals when used with flexible and rigid wall underlays, provide an Alternative Solution to the pipe and service penetration detailing specified in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.3 and Figure 68.
- 7.3 OneSeal™ Multi-fit Pipe and Cable Penetration Seals are primarily designed to prevent moisture ingress at pipe and cable penetrations through walls. The performance of OneSeal™ Multi-fit Pipe and Cable Penetration Seals relies on the correct size being selected for the pipe or cable penetration being sealed, and the seal being fully adhered to the wall underlay.
- 7.4 Where a proprietary cladding system is used, all weatherproofing details for the cladding system around the penetration must be carried out in accordance with the systems Technical Literature. Installation details which are outside the scope of the cladding system are the responsibility of the designer for compliance with the NZBC.



## Durability

- 8.1 Assessment of durability to meet the NZBC is based on the difficulty of access and replacement, and the ability to detect failure of the OneSeal™ Multi-fit Pipe and Cable Penetration Seals during both normal use and maintenance of the building.

## Serviceable Life

- 8.2 OneSeal™ Multi-fit Pipe and Cable Penetration Seals are expected to have a serviceable life equal to that of the cladding provided:
- the selected flexible or rigid wall underlay is not exposed to the weather or UV light for longer than stated in the relevant Appraisal, and,
  - the OneSeal™ Multi-fit Pipe and Cable Penetration Seals are not exposed for longer than specified in Paragraph 7.1, and,
  - the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant.

## Maintenance

- 9.1 No maintenance is required for OneSeal™ Multi-fit Pipe and Cable Penetration Seals, however regular checks must be made of the cladding system to ensure it is sound and will not allow moisture penetration.

## Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the OneSeal™ Multi-fit Pipe and Cable Penetration Seals from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1, C/AS2 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

## External Moisture

- 11.1 OneSeal™ Multi-fit Pipe and Cable Penetration Seals provide suitable flashing and sealing around pipe and cable penetrations when used in conjunction with BRANZ appraised wall underlays, and will contribute to the wall cladding meeting code compliance with NZBC Clause E2.3.2.

## Installation Information

### Installation Skill Level Requirements

- 12.1 All design and building work must be carried out in accordance with the OneSeal™ Multi-fit Pipe and Cable Penetration Seals Technical Literature and this Appraisal by competent and experienced tradespersons conversant with penetration seals. 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 License class.

### General

- 13.1 The OneSeal™ Multi-fit Pipe and Cable Penetration Seals must create a tight seal around the pipe or cable penetration. The appropriate OneSeal™ Multi-fit Pipe and Cable Penetration Seals must be used based on the diameter of the pipe or cable penetration.
- 13.2 The flexible and rigid wall underlays must be clean, dust free and dry prior to adhering the OneSeal™ Multi-fit Pipe and Cable Penetration Seals.
- 13.3 The OneSeal™ Multi-fit Pipe and Cable Penetration Seals must be installed in a diamond pattern, which will assist with moisture run-off.
- 13.4 If a OneSeal™ Multi-fit Pipe and Cable Penetration Seal is exposed to the weather or UV light for longer than specified in Paragraph 7.1, then it must be replaced with a new seal.

### Installation Temperature

- 13.5 OneSeal™ Multi-fit Pipe and Cable Penetration Seals must not be installed at temperatures of less than -10°C. OneSeal™ Multi-fit Pipe and Cable Penetration Seals can withstand temperatures of -40°C to +80°C in service.

## Inspections

- 14.1 The Technical Literature must be referred to during the inspection of OneSeal™ Multi-fit Pipe and Cable Penetration Seals installations.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

## Tests

- 15.1 Testing after various forms of accelerated aging has confirmed the adhesion of OneSeal™ Multi-fit Pipe and Cable Penetration Seals to a range of flexible and rigid wall underlays. The results have been reviewed by BRANZ experts and found to be satisfactory.

## Other Investigations

- 16.1 Assessment of the composition of the materials used to make OneSeal™ Multi-fit Pipe and Cable Penetration Seals has been completed and a durability opinion has been provided by BRANZ experts.
- 16.2 The practicability of installation was assessed by BRANZ and found to be satisfactory.
- 16.3 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

## Quality

- 17.1 The manufacture of OneSeal™ Multi-fit Pipe and Cable Penetration Seals has not been examined by BRANZ but details of the quality and composition of the materials used were obtained and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.
- 17.2 The quality of supply to the market is the responsibility of Thermakraft Limited.
- 17.3 The quality of installation on site is the responsibility of the installer.
- 17.4 Designers are responsible for the building design, and building contractors are responsible for the quality of the installation of the framing system, the wall underlay and cladding system.
- 17.5 Building owners are responsible for the maintenance of the cladding system over the OneSeal™ Multi-fit Pipe and Cable Penetration Seals.

## Sources of Information

- NASH Building Envelope Solutions: 2019.
- NASH Standard Part Two: 2019 Light Steel Framed Buildings.
- 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.

## Amendments

### Amendment No.1, 06 August 2019

This Appraisal has been amended to update product name, update code references to NZBC Fire Clauses and update installation skill level requirements.

### Amendment No.2, 17 December 2020

This Appraisal has been amended to update the Scope and to increase the exposure period when the product is used on James Hardie Rigid Air Barriers.



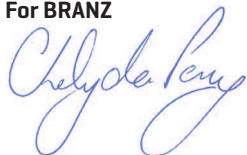
In the opinion of BRANZ, **OneSeal™ Multi-fit Pipe and Cable Penetration Seals** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Thermakraft 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. **Thermakraft 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 **Thermakraft 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 **Thermakraft Limited** or any third party.

For BRANZ



**Chelydra Percy**

Chief Executive

Date of Issue:

29 May 2017

## PRODUCT DATA SHEET

## Sika® PEF Rod

## PACKING RODS FOR JOINTING REQUIREMENTS

## DESCRIPTION

Sika® PEF Rod is manufactured from the highest quality closed cell polyethylene to produce a joint backing material primarily for use in conjunction with elastomeric sealants.

## USES

Sika® PEF Rod is pushed into joint gaps to form a uniform and firm base for controlling the depth of gun applied elastomeric sealants such as Sikaflex. Sika® PEF Rod can be used for forming the base of vertical and horizontal joints in the following applications:

- Joints between precast concrete panels
- Saw cut joints in concrete floors
- Peripheral joints around aluminium and timber windows
- Around penetrations through walls and floors
- Expansion joints between bricks and masonry
- Can also be used for draught-proofing and dust-proofing of joints in situations where no other form of sealing is required

## CHARACTERISTICS / ADVANTAGES

- Weather resistant
- No water absorption, closed cell
- No adhesion to sealants, sealant has unrestricted movement
- Approved for use in food areas (Australia Standard AS2170)
- Easy to install
- Wide range of sizes available
- Non toxic, odourless
- Resistant to most chemicals
- Easily compressible, good expansion
- Very light weight

## PRODUCT INFORMATION

<b>Chemical Base</b>	Closed cell polyethylene foam.	
<b>Packaging</b>	Sika® PEF Rod is available in the following sizes and lengths:	
	<b>Diameter</b>	<b>Length per Roll</b>
	6 mm	20 m & 250 m
	8 mm	20 m, 50 m & 250 m
	10 mm	20 m, 50 m & 250 m
	12 mm	20 m, 50 m & 150 m
	15 mm	20 m, 50 m & 100 m
	20 mm	20 m & 60 m
	25 mm	25 m
	30 mm	25 m
	40 mm	2 m length
	50 mm	2 m length

<b>Appearance / Colour</b>	White
<b>Shelf Life</b>	Indefinite
<b>Storage Conditions</b>	Store in original, unopened packaging in cool, dry conditions.
<b>Density</b>	37 kg/m <sup>3</sup>
<b>Chemical Resistance</b>	Unaffected by oils, petrol, sewage and most industrial chemicals
<b>Thermal Conductivity</b>	0.035 W/m.k.
<b>Service Temperature</b>	-40°C to +70°C

## APPLICATION INSTRUCTIONS

### APPLICATION METHOD / TOOLS

- The Sika® PEF Rod should have a diameter of 25 - 30% greater than the width of the joint to ensure that it remains firmly in place during sealant application.
- When installing the rod it is essential that a blunt instrument is used, to avoid cutting or puncturing the surface. Puncturing can cause bubbles to occur in the uncured sealant.
- The rod must be positioned to achieve a uniform and even, predetermined depth without any twists, bumps or gaps.
- During installation avoid excessive longitudinal stretching of the rod.
- Refer to the "Sikaflex Elastomeric Sealants" guide, for information on joint design and calculation of joint movement.

## BASIS OF PRODUCT DATA

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

## LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

## ECOLOGY HEALTH AND SAFETY

This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. For safe use follow the instructions given in this product data sheet. Based on our current knowledge, this product does not contain SVHC (substances of very high concern) as listed in Annex XIV of the REACH regulation or on the candidate list published by the European Chemicals Agency in concentrations above 0.1 % (w/w)

## LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request. It may be necessary to adapt the above disclaimer to specific local laws and regulations. Any changes to this disclaimer may only be implemented with permission of Sika® Corporate Legal in Baar.

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Environment  
ISO 14001



Quality  
ISO 9001

**Product Data Sheet**  
**Sika® PEF Rod**  
February 2019, Version 01.01  
020516030000000013

SikaPEFRod-en-NZ-(02-2019)-1-1.pdf

## PRODUCT DATA SHEET

## Sikaflex® MS

High performance multi-purpose modified silicone sealant



## DESCRIPTION

Sikaflex® MS is a tough, durable elastomeric joint sealant suitable for use in a wide range of external and internal building applications. It is based upon SMP technology resulting in a unique combination of properties ideally suited to New Zealand climatic conditions. Sikaflex® MS has excellent primerless adhesion to a wide range of common building substrates as indicated below and does not stain concrete, marble and other masonry surfaces.

## USES

Sikaflex® MS has been formulated for sealing joints in and around concrete, brick, masonry, pre-cast panels, stone cladding, windows, doors and fibre cement sheeting. Sikaflex® MS bonds well to:

- Concrete and masonry
- Cement plaster systems
- Aluminium, copper, brass and zinc
- Stainless, mild or galvanised steel
- Glass and ceramic tiles
- Glass reinforced plastics
- Fibre reinforced cement sheetings
- Timber, particleboard, hardboard and plywood (refer to Limitations section)
- Butylclad rubber products - chase sealing

## CHARACTERISTICS / ADVANTAGES

- Good primerless\* adhesion to most common building materials
- Paintable any time after curing, with water-based paints (compatibility testing recommended prior to full application)
- Will not stain masonry, marble or other surfaces
- Very durable - BRANZ appraised
- Neutral cure
- Highly flexible
- Low odour

\* Refer to Priming section.

## APPROVALS / STANDARDS

BRANZ Appraised, Appraisal No.311 [2019]

## PRODUCT INFORMATION

Chemical Base	Moisture curing SMP	
Packaging	300 ml cartridges / 12 per carton 600 ml sausage unipacs / 20 per carton	
Colour	300 ml cartridges	Grey, White, Black, Bronze, Ivory and Titania
	600 ml sausage unipacs	Grey, White

<b>Shelf Life</b>	Twelve (12) months from date of manufacture if stored correctly as stated.
<b>Storage Conditions</b>	Store in original, unopened packaging in cool, dry conditions protected from direct sunlight and at temperatures between +5°C and +25°C.
<b>Density</b>	~ 1.40 kg/l (ISO 1183-1)

## TECHNICAL INFORMATION

<b>Shore A Hardness</b>	~ 20 (after 28 days) (ISO 868)
<b>Movement Capability</b>	± 25 % (ISO 9047)
<b>Chemical Resistance</b>	Good to dilute acids and alkalis
<b>Resistance to Weathering</b>	Excellent UV resistance
<b>Service Temperature</b>	-40°C to +90°C
<b>Joint Design</b>	<p>Sikaflex® MS may be applied to joints between 10 and 35 mm wide. To minimise stresses imposed on the joint sealant, all moving joints should be designed to an optimum width to depth ratio of 2:1. This ratio is subject to these overriding minimum sealant depths:</p> <ul style="list-style-type: none"> <li>▪ 5 mm minimum sealant depth at any point.</li> <li>▪ 5 mm minimum bonding depth against metals, glass and other non-porous surfaces, providing that joint faces are in good condition.</li> <li>▪ 8 mm minimum bonding depth against masonry or other porous surfaces, or any non-porous surfaces where joint faces are in poor condition.</li> <li>▪ Shear joints shall be a minimum joint width to depth ratio of 1:2 up to a maximum of 1:1.</li> </ul>

## APPLICATION INFORMATION

<b>Curing Rate</b>	~3 mm/24 hours (23°C / 50% r.h.) (CQP 049-2)
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## BASIS OF PRODUCT DATA

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

## FURTHER DOCUMENTS

- Safety Data Sheet (SDS)

## LIMITATIONS

- Sikaflex® MS must not be used as follows:
- With polyethylene, polypropylene, polybutylene, polycarbonate and bitumen
  - Where it is subjected to permanent immersion in water
  - With structural glazing or floor joints
  - With pipes or in other applications where it may be subjected to hydrostatic or pneumatic pressures (other than wind pressure)
  - Where continual exposure to aggressive solvents or chemicals will occur
  - Where timber or wood based products have been painted
  - \*Sikaflex® MS will accept waterbased and multi-component coatings. However, as with all elastomeric sealants, coatings may cause undesirable side effects. Movement accommodation ability may be reduced. Dirt pick-up and discolouration may occur in the long term.

## ECOLOGY HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety-related data.



## APPLICATION INSTRUCTIONS

### SUBSTRATE PREPARATION

Joint surfaces must be clean and free from frost and surface water. Remove all dirt, laitance, loose materials and foreign matter.

- Remove all rust, scale and protective lacquers from metal surfaces.
- Non-porous surfaces should be degreased using Sika Thinner C
- In all joints a bond breaker must be used to prevent sealant contact with the back of the joint, and hence allow optimum performance. In shallow joints self adhesive polyethylene tape can be used. Deep joints should incorporate a backing strip such as Sika PEF Rod to support the sealant while also acting as a bond breaker.

### PRIMING

Good adhesion can be gained on concrete, timber, metals, ceramics, brick work and most coating surfaces without the use of primers. However, on some surfaces adhesion may be improved by the use of a primer - refer to Sika for advice.

### APPLICATION METHOD / TOOLS

Application temperature: +5°C to +40°C.

**Cartridge:** Cut the end off threaded stub on cartridge, screw on nozzle and cut nozzle to desired bead size at a 45° angle.

**Sausage:** Fit Sikaflex® MS sausage into Sika barrel sealant gun and using wire cutters cut the sausage below the metal crimp at one end. Place sausage nozzle over open end of gun and screw on end cap to hold in place. Extrude the sealant firmly into joint to ensure complete contact with joint faces. Smooth finish if necessary with a spatula wetted with a dilute detergent solution.

### CLEANING OF TOOLS

Clean tools immediately after use with Sika Thinner C.

### LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

## LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request. It may be necessary to adapt the above disclaimer to specific local laws and regulations. Any changes to this disclaimer may only be implemented with permission of Sika® Corporate Legal in Baar.

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0800 745 269  
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**Product Data Sheet****Sikaflex® MS**

September 2021, Version 03.01  
020511020000000002

SikaflexMS-en-NZ-(09-2021)-3-1.pdf

# FLASHING SYSTEMS

Selection and  
Installation Handbook

ISSUE  
06



Longrun  
Metal Roofs  
Concrete, Slate  
and Tile roofs  
Flues  
Pipes  
Ridges  
Apron Flashings  
Hip Flashings  
Damp Proof  
Course  
Silicone  
Type



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# DLM Flashing Systems

the versatile solution

## Time and money saving answers for every flashing situation

Whatever your building and construction flashing requirements, you will find an innovative, practical answer in the DLM range of flashing systems.

The unique features and high performance of any DLM flashing system symbolises the care and attention to design detail that goes into every DLM product.

From the smallest cable penetration through to roof, window and door flashings or for an emergency repair in a hurry DLM will provide the ultimate weather tight seal.

When you choose from the DLM flashing systems you will discover the advantages of doing it right with better performance and an easier, more cost effective installation.

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# Dektite

## Design features



### Flexible Cone Sleeve

Dektite cone shape eliminates seal breakdown due to vibration or expansion and contraction, while isolation of pipe from sheeting dampens noise levels.

### Stress Isolation Points

Unique to Dektite, two flexible shoulders absorb distortion and stop transfer of stresses from base to cone, as unit is formed over roofing profile.

### Ribbed Aluminium Flange

Corrosion resistant, malleable flange, evenly distributes fastening pressure and allows ease of hand shaping on most sheet profiles.

### Integrity of Flashing Shape

Minimal distortion after installation, maintains natural flashing shape and seal around pipe, while water run-off is improved.

### UV Protection

Dektite products are resistant to ultraviolet light damage and will remain fully flexible under all conditions.

### Easily Identified Sizing

Pipe diameter rings are clearly marked on the cone sleeve (metric and imperial) for cutting to match the appropriate pipe diameter.

### Low Profile Design

Sleek, unobtrusive shape is designed to minimise silhouette on roofline, while managing to provide generous internal clearance for steep, angular installations.

### Improved Waterproofing

Designed to strengthen sealant bond and improve waterproofing, the ribbed base also has a tapered edge to improve runoff and contribute to a superior waterproof seal.

### Perfect for approved flues!

Dektite polymer flashings have been officially tested and conform to all Australian and New Zealand Standards on approved flue systems. EPDM withstands temperatures from -50°C to 115°C and up to 150°C intermittently. Silicone withstands temperatures from -60°C to 200°C and up to 250°C intermittently.

# Dektite Premium

## the versatile solution

Most extensive range of Dektites for flashing penetrations 0 – 510mm, available in black and grey EPDM and silicone red for high temperatures.

Designed to enable practically any pipe flashing operation to be carried out within minutes, simple to install and very effective.

The low profile cone not only looks good but provides a generous internal clearance, so even the steepest roofs are handled with ease.

Suitable for flashing pipes that penetrate wall claddings.

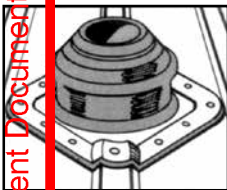
Can also be used to flash square penetrations. Just add 30% to the pipe diameter and trim the cone to suit.

✓ EPDM withstands temperatures from -50°C to 115°C and up to 150°C intermittently.

✓ Silicone withstands temperatures from -60°C to 200°C and up to 250°C intermittently.



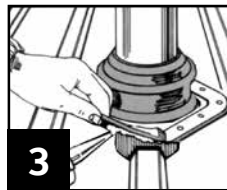
## Installation Instructions:



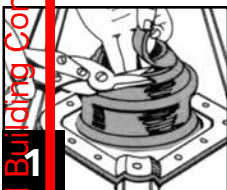
### NOTE:

For more effective drainage, always fit the Dektite on the diamond or bias.

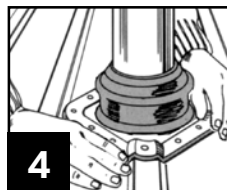
Dektites are suitable for flashing pipes that penetrate wall claddings.



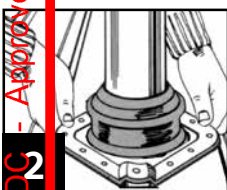
Apply a neutral cure 100% silicone sealant (roof and gutter approved) to the underside of the Dektite by turning back the flexible flange.



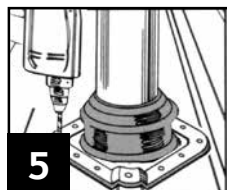
Cut a neat hole in roofing sheet with minimum clearance for pipe and insert pipe through hole. Trim the cone to suit pipe size using sharp tin snips. Where required, support cut sections of sheet with additional framing.



Press base to the roof profile by hand, smooth out any awkward creases. Don't fully extend to allow for vibration.



Slide Dektite flashing down over pipe. Lubricating the pipe with water allows the pipe to slide snugly into position.



Fasten using self-drilling washers or sealed rivets. Fit fasteners progressively outward in opposing pairs to avoid gaps.

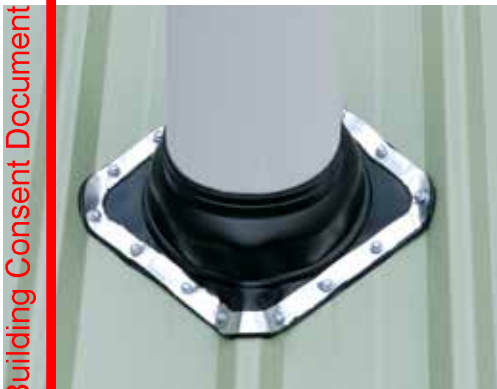


# Dektite Premium

## the versatile solution

CODE: BLACK EPDM	CODE: GREY EPDM	CODE: RED SILICONE	BASE (MM)	PIPE (MM)	ROOF PITCH
DFE100MB			71 x 71	0-20	10-60°
DFE100B	DFE100G		100 x 100	0-35	10-60°
DFE100BS*		DFE200RES	100 x 100	0-35	10-60°
DFE101B	DFE101G		139 x 139	5-55	10-45°
DFE101BS*		DFE201RES	139 x 139	5-55	10-45°
DFE102BA	DFE102GA	DFE202REA	181 x 181	50-70	10-45°
DFE103B	DFE103G	DFE203RE	218 x 218	5-127	10-45°
DFE104B	DFE104G	DFE204RE	279 x 279	75-175	10-45°
DFE105B	DFE105G	DFE205RE	309 x 309	100-200	10-45°
DFE106B	DFE106G	DFE206RE	363 x 363	125-230	10-45°
DFE107B	DFE107G	DFE207RE	456 x 456	150-300	10-45°
DFE108B	DFE108G	DFE208RE	495 x 495	170-355	10-45°
DFE109B	DFE109G	DFE209RE	680 x 680	230-508	10-45°

\*DFE100BS and DFE101BS both have multiple cable nipples





# Wet Area Systems

Specification and installation manual

SDC - Approved Building Consent Document - BC222012 - Pg 356 of 416 - 20/10/2022 - homanm

CBI 5113

FEBRUARY 2021

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## **GIB® HELPLINE**

0800 100 442

# RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS. BATHROOMS, LAUNDRIES, TOILETS AND KITCHENS.

Protection from internal moisture is an important consideration when designing interior lining systems for homes, multi-unit apartments, educational, healthcare and commercial applications.

The New Zealand Building Code sets out minimum standards for wet area spaces in residential dwellings. However, often higher levels of performance and protection from internal moisture is demanded.

The GIB® Wet Areas System specification and installation manual provides internal lining options and details for specifiers, builders and building owners.

## USE ONLY THE CURRENT SPECIFICATION

This manual supersedes the publication GIB Aqualine® Wet Area Systems March 2007. Winstone Wallboards Ltd accepts no liability for reliance upon publications that have been superseded.

If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442 or go to [gib.co.nz](http://gib.co.nz)

## BEWARE OF SUBSTITUTION

The performance of GIB® Wet Area Systems requires accurate design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested, assessed or appraised, to ensure the required level of performance. It is important to use GIB® 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.

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## This publication

This publication is a best practice guide to the design and construction of wall and ceiling linings in wet areas with intermittent water exposure within residential and non-residential buildings, as covered by NZ Building Code Clause E3 Internal Moisture.

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

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

To form a complete wet area system it is important to specify compatible materials and systems, designed to cope with conditions that are common in wet areas, and to ensure correct installation using best practice.

### WET AREAS

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Within wet areas the following requirements apply;

1. NZBC Clause E3.3.4 states that wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.
2. NZBC Clause E3.3.6 states that surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

NZ Building Code Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management. Ongoing maintenance of wet areas is also important to maximise service life.

### GIB AQUALINE®, GIB TOUGHLINE® AQUA AND GIB WEATHERLINE®

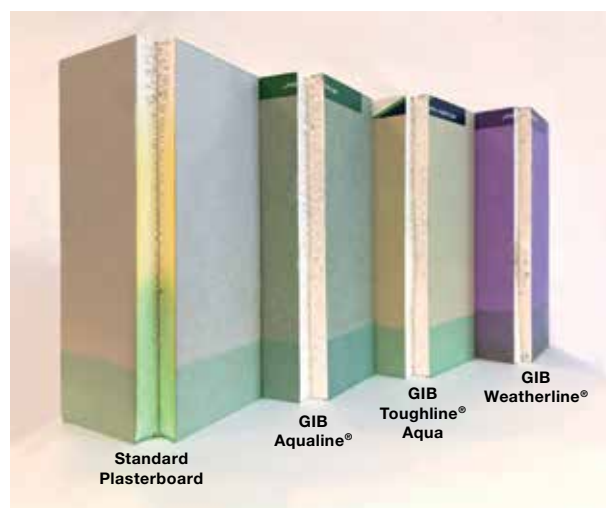
Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or a high moisture environment.

The NZ Building Code does not call for water resistant linings in wet areas but it is desirable to specify lining materials which will maintain their integrity longer when exposed more frequently to moisture, and to one-off events such as leaks or flooding.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® feature a water-resistant polymer impregnated core, designed for wet area applications. These core formulations not only resist penetration of moisture through the lining into the framing behind, but also resist water “wicking” up the core, a common cause of long-term damage where a water-resistant lining has not been used.

### WATER ABSORPTION TEST

The illustrations below show how GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® compare with standard plasterboard after soaking for two-hours in green dye.





## WHERE TO USE GIB® WET AREA LININGS

In order to prolong the life expectancy of the space it is highly desirable to include wet area linings in situations where there is an increased risk of water or moisture damage. Applications include walls and ceilings in bath and shower rooms, and walls in laundries, toilets and kitchens.

## BENEFITS

- Water resistant and durable linings help protect against water damage
- Proven substrate for paint, wallpaper, waterproofing membranes, tiles, sheet vinyl and rigid sheet shower linings
- Suitable for both residential and non-residential applications
- Dimensionally stable and an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains glass fibres and other additives to increase strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB Noise Control® Systems (see Compliance with the NZ Building Code, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details

## HANDLING AND STORAGE

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

## LIMITATIONS

- GIB® wet area linings must not be used for bracing purposes in shower cubicles or above baths. For more information refer to page 9 of this manual
- Do not use GIB® wet area linings where exposed for extended periods to humidity levels above 90% RH, such as in group shower or steam rooms, or where exposed to moisture and chlorine rich environments such as in indoor swimming pools
- GIB® wet area linings used in a bathroom or other high humidity environment must not be directly applied to solid plaster (gypsum or cement), wood-based sheet linings or similar materials, masonry or concrete, without strapping or steel furring channels
- GIB® wet area linings must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® or GIB Toughline® Aqua must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details

**Table 1: GIB® Wet Area linings sheet dimensions and weights**

Product	Sheet face colour	Thickness (mm)	Sheet width (mm)	Edge Type	Sheet length (mm)						Max. Weight (kg/m²)
					2400	2450	2700	3000	3600	4800	
GIB Aqualine®	Green	10	1200	TE/TE							8.0
			1200	TE/SE							
			1350	TE/SE							
		13	1200	TE/TE							11.0
GIB Toughline® Aqua	Mauve	13	1200	TE/TE							11.4
GIB Weatherline®	Purple	10	1200	SE/SE							9.0
		13	1200	SE/SE							11.5

**BOARD SUBSTITUTION OPTIONS**
**Acceptable GIB Aqualine® alternatives**

10mm GIB Aqualine® can be replaced with:	10mm GIB Weatherline® 13mm GIB Toughline® Aqua
13mm GIB Aqualine® can be replaced with:	13mm GIB Weatherline® 13mm GIB Toughline® Aqua

GIB® Wet Area System construction details in this manual refer to the use of GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® sheets may also be used in place of GIB Aqualine®.

**FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS**

- GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® are suitable substrates for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures are presented in this literature, except that the lining gap at the floor is no more than 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles behind internal lining corners is recommended for sheet vinyl applications in showers or shower over bath situations
- The lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph even through a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl

**RIGID SHEET SHOWER LININGS**

- The wall surface must be free of dust before installation of the lining
- Avoid lining joints as much as possible and where necessary flush with plaster to achieve a level surface
- Do not pre-seal or paint areas which are to be covered by the rigid shower linings
- The suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Care must be taken to ensure that rooms are adequately ventilated
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- Consult the supplier of the shower lining for full installation details
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service

**WATERPROOF MEMBRANE SYSTEMS AND TILING**

- A waterproof membrane system must be applied to lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane system over the lining and once penetrations for shower mixers, taps and associated fittings are sealed
- The installation of galvanised steel reinforcing angles behind internal lining corners is required for tiled wall applications in showers or shower over bath situations
- In-situ waterproofing membrane materials manufactured to AS/NZS 4858:2004 “Wet Area Membranes” are recommended and must be applied to manufacturer’s recommendations. Typically, these types of membrane systems are not suitable for paint and wallpaper finishes
- Waterproof membrane systems must be fully cured and dry prior to application of tiling adhesives
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this manual are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane system

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

## PENETRATIONS AND SEALANTS

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

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Ensure shower mixer and tap penetrations are sealed with a proprietary flange system to prevent the passage of moisture into the wall cavity
- Sealants should be of a mould inhibiting type and be paintable. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Apply a bead of sealant to the full depth of the lining in the following locations:
  - Around all tap/pipe bodies
  - The gap between the bath rim and the bottom edge of the wet area lining
  - Between the upstand of preformed shower bases and the bottom edge of the lining
  - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable always use tested and approved proprietary penetration seals

## RENOVATIONS

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

When renovating these rooms it is often easier and more cost-effective to remove the existing linings and replace them. This allows for a new start in the room and offers sound substrates for new surfaces such as tiling and painting, where otherwise flaking paint or damaged plasterboard may compromise good and sound finish or practice. At the very least re-lining will:

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

## MAINTENANCE

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

It is important to regularly inspect and repair any potential problem before it becomes expensive to reinstate. Good maintenance should include:

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

# Compliance with the NZ Building Code

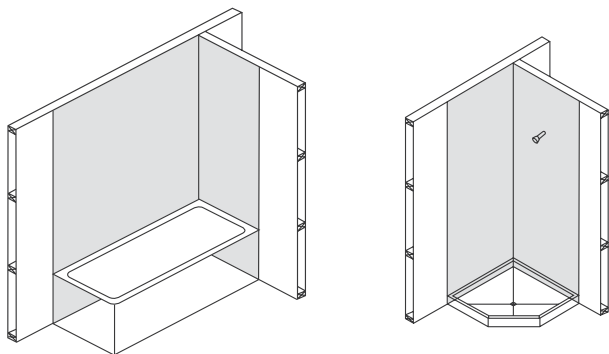
## STRUCTURE – CLAUSE B1

The design and material specification for steel and timber framing used in GIB® Wet Area systems must be in accordance with the performance requirements of NZ Building Code Clause B1 (Structure).

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

Otherwise, GIB® Bracing Systems can be used in water-splash areas, provided these are maintained impervious for the life of the building.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. They can also be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB® Grabber 32mm x 6g screws at 100mm centres, using the GIB Braceline® corner fixing pattern. Refer to the GIB® Bracing System literature.



No bracing in the shaded areas.

## DURABILITY – CLAUSE B2

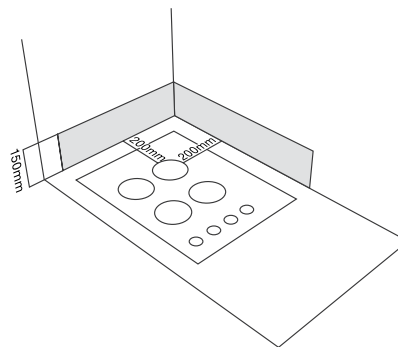
When installed and maintained in accordance with this literature, GIB® Wet Area systems tiled or vinyl covered have a serviceable life of at least 15 years. They comply with the requirements of NZ Building Code Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers,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

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

## FIRE AFFECTING AREAS BEYOND THE SOURCE – CLAUSE C3

GIB® Fire Rated Systems provide passive fire protection in accordance with the requirements of NZ Building Code Clause C3. When GIB Aqualine® or GIB Toughline® Aqua is substituted into fire rated systems in place of the equivalent thickness GIB Fyrelite®, the Fire Resistance Rating (FRR) of that system will be maintained.

The protection of combustible surfaces surrounding gas cooking appliances is covered by the latest version of AS/NZS 5601.1.



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

- 5mm tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the specific requirements of AS/NZS 5601.1

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

### INTERNAL MOISTURE – CLAUSE E3

The New Zealand Building Code Clauses that relate to wall surfaces are;

E3.3.4 - Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

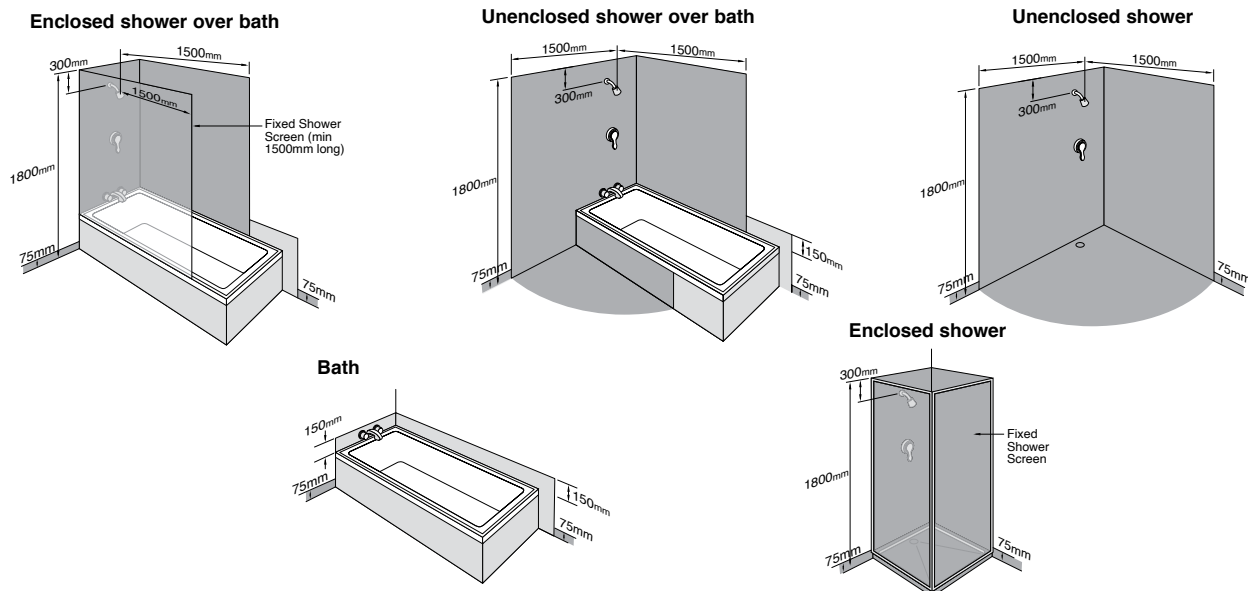
E3.3.5 - Surfaces of the building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned.

E3.3.6 - Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

New Zealand Building Code Acceptable Solution E3/AS2 substantially refers to the Waterproof Membrane Association Incorporated (WMAI) Code of Practice for Internal Wet Area Membrane Systems (IWAM), August 2020.

The IWAM Code of Practice refers to wet area membranes and over-surfaces that are easy to clean and suggests an extent as outlined below for a typical bathroom application. For further details refer to the IWAM Code of Practice which also lists suitable rigid sheet materials and tiling membranes.

Shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.



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**HAZARDOUS BUILDING MATERIALS – CLAUSE F2**

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

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**VENTILATION – CLAUSE G4**

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

---

**AIRBORNE AND IMPACT SOUND – CLAUSE G6**

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



## TIMBER WALL FRAMING

Framing dimensions must comply with the requirements of NZS 3604:2011.

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

## FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread screws.

## FASTENER CENTRES

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs

- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

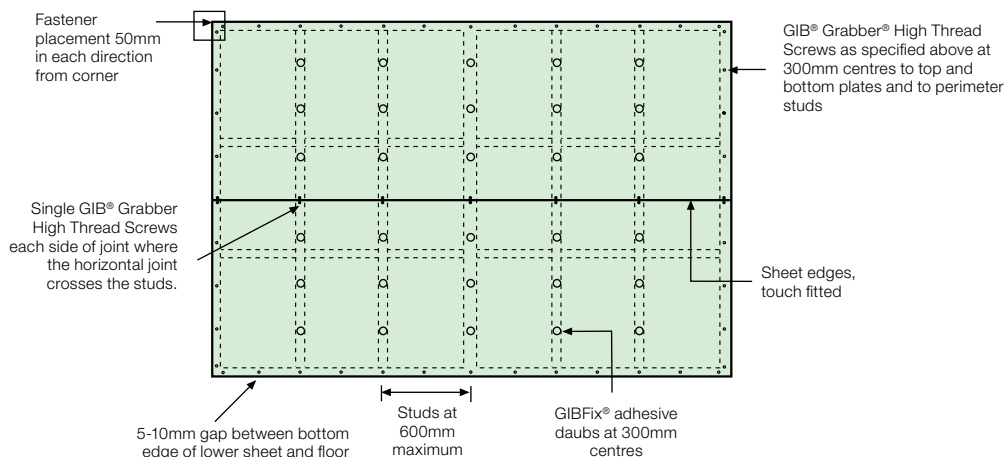
## LINING

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

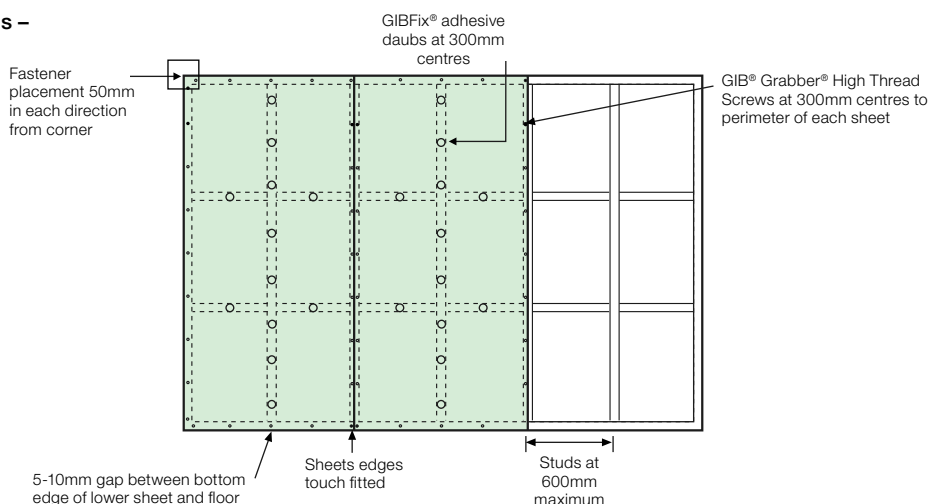
## JOINTING

- Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide.

### Fastening the Linings – Horizontal Fixing Only



### Fastening the Linings – Vertical Fixing Only



## TIMBER WALL FRAMING

Framing dimensions and spacing must be appropriate for the tile weight and comply with the requirements of NZS 3604:2011 Timber Framed Buildings, or relevant specific design Standard.

## NOGS

For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require vertical fixing or the installation of additional noggs. Also provide noggs:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases

## CORNER REINFORCING

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum
- 32 x 32 x 0.55mm NZ18 or 45 x 45 x 0.55mm GIBFix® Angle. Each leg shall be fastened to the framing at 300mm centres

## FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread Screws

## FASTENER CENTRES

- 150mm centres to perimeter of wall and all intermediate studs
- Adhesive is not to be used in place of mechanical fasteners
- Place fasteners 12mm from sheet edges and 18mm from sheet ends

- Single fasteners to each stud where the horizontal joint crosses the studs
- Where relevant, fastener lengths must comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

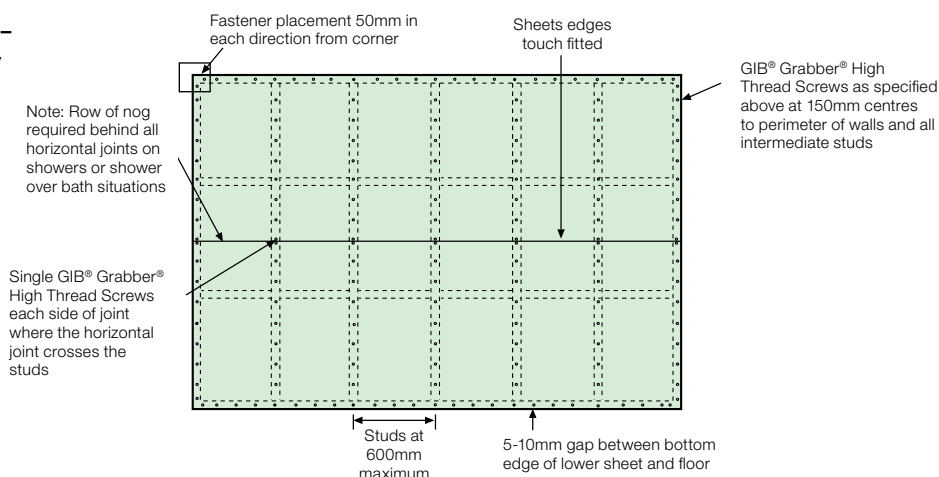
## LINING AND TILE WEIGHTS

- Use minimum 10mm GIB® plasterboard
- For maximum permitted tile weights refer to pg 16 of this manual
- GIB® Wet Area linings may be fixed vertically or horizontally
- Sheets are touch fitted
- Provide a 5-10mm gap at the wall/floor junction and between the bottom edge of the lining and any bath rim or preformed shower base to allow for placement of sealant
- Do not tile on the resilient side of GIB Rail® or STWC Acoustic Clip (ST001) and channel noise control system
- GIB® Wet Area linings are suitable for tiling full height of walls, but if a wall is to be partially tiled (e.g. half high), only the area of wall under the tiles needs to be fixed as required for tiled areas. The remainder of the wall may be fixed as for non-tiled areas

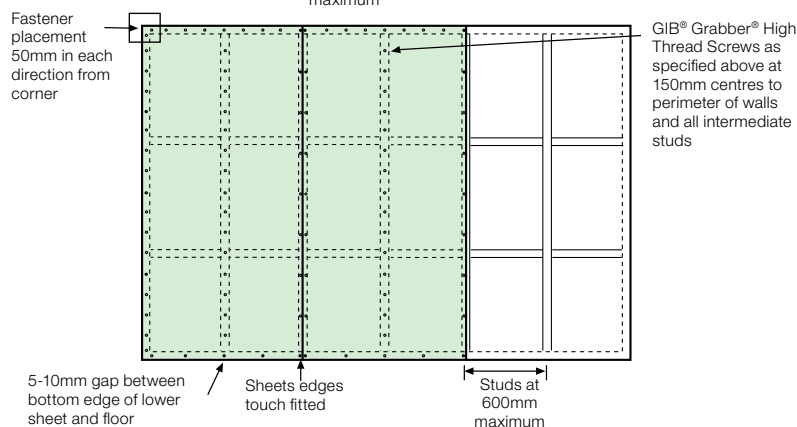
## JOINTING

- Jointing shall be carried out in accordance with the instructions of the GIB® Site Guide

### Fastening the Linings – Horizontal Fixing Only



### Fastening the Linings – Vertical Fixing Only



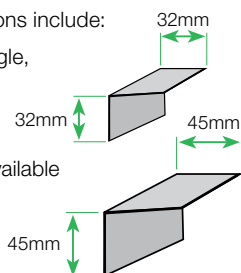
## METAL ANGLES FOR TILED INTERNAL CORNERS

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle.

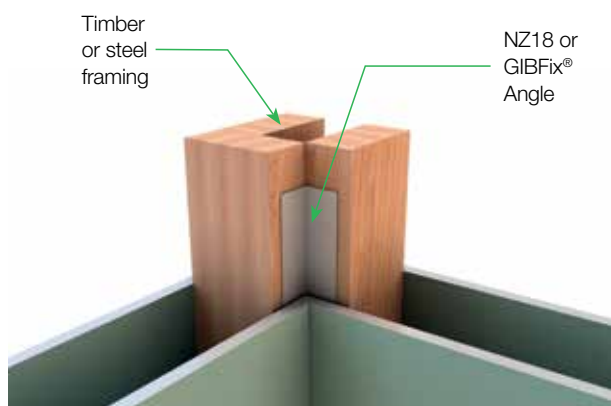
- Suitable GIB® metal angle options include:

- GIB® Rondo® NZ18 metal angle, available length: 3.0m

- GIBFix® Angle metal angle, available lengths: 2.4m and 2.7m



- Each side of the angle is secured to the framing with at 600mm centres
- Minimum height of the metal angle is 1800mm



## WATERPROOF MEMBRANE SYSTEMS

A waterproof membrane system must be applied to all lining materials used as a substrate for ceramic tiles in a shower or shower over a bath application, or any other tiled application exposed to frequent water splash.

For further information see p10.

## TILES AND TILE WEIGHTS

In areas likely to be directly exposed to water, tiles may be ceramic, porcelain or stone must comply with the over-surface finish requirements of the IWAM Code of Practice and be bedded with a suitable tile adhesive on the waterproof membrane system. See page 10 for the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.

Smaller mosaic tiles are often lighter, but the integrity of grout joints might be more prone to impact, whilst heavier tiles are larger and have less and deeper grout and sealant joints. For more information also see AS 3958:2007 Ceramic tiles – Guide to the installation of ceramic tiles.

**Table 2: Recommended maximum tile weights**

Maximum Tile Weights for GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline®			
Stud Centre (maximum)	Fasteners Centre (maximum)	Lining Thickness	Tile Weight
600mm maximum	150mm maximum	10mm	26kg/m <sup>2</sup>
		13mm	40kg/m <sup>2</sup>

## ADHESIVE AND GROUT WEIGHTS

The weight of adhesive and grout can vary depending on the type of tile and the installation process used. The maximum tile weights stated in table 2 are conservative and refer to the tile weight excluding grout and adhesive used. An additional 3kg/m<sup>2</sup> has been factored into tile adhesion testing on top of the above stated tile weights to account for adhesive and grout weight used during the installation of the tile.

## CEILING FRAMING

Framing dimensions and spacing must comply with the requirements of NZS 3604:2011, NASH for steel or relevant NZ Standard.

For noise control or fire rating applications consult the relevant GIB® technical publication.

## FASTENERS

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

## ADHESIVES

- Steel battens - GIBFix® All-Bond
- Timber battens - GIBFix® All-Bond or GIBFix® One

## FASTENERS CENTRES

- Single screws to the edges and centre of the sheets across each batten
- Single screw at 600mm maximum to the perimeter of the ceiling
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw pops

## LINING

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

## BATTEN SPACINGS

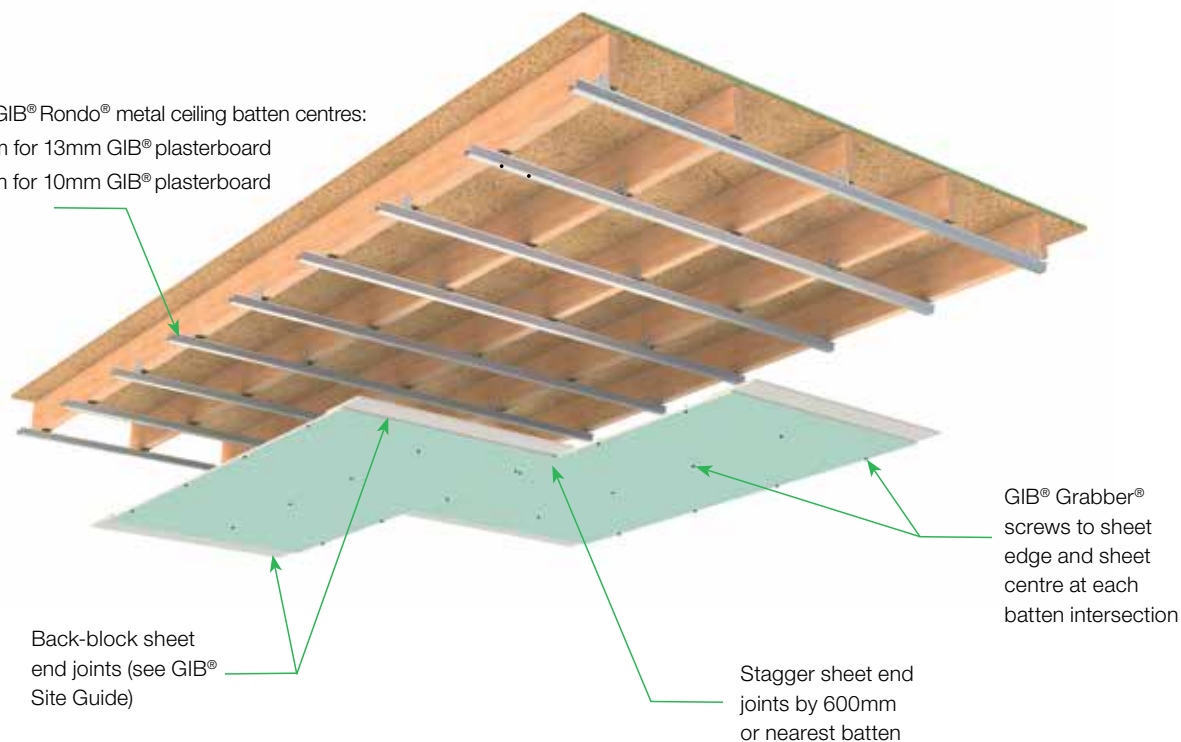
- 13mm GIB® plasterboard – 600mm centres maximum
- 10mm GIB® plasterboard – 450mm centres maximum

## JOINTING

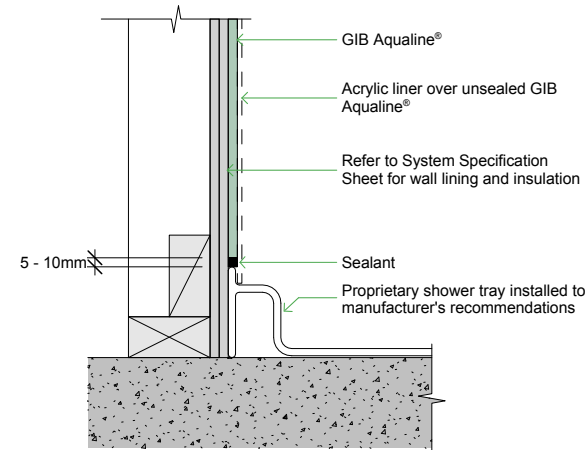
- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the GIB® Site Guide
- Do not fix tiles to GIB® plasterboard ceilings

Maximum GIB® Rondo® metal ceiling batten centres:

- 600mm for 13mm GIB® plasterboard
- 450mm for 10mm GIB® plasterboard

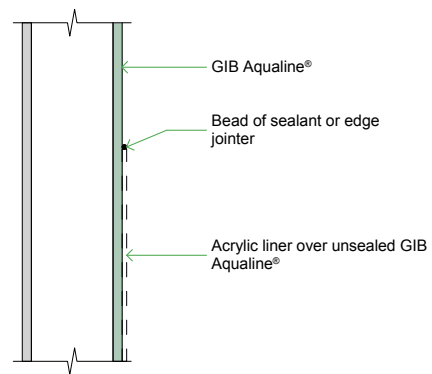


## A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



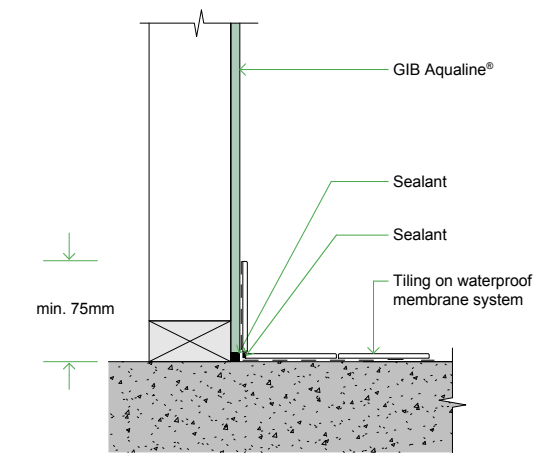
GAL-015

## C: UNSEALED PLASTERBOARD LINING



GAL-028

## B: CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001

## D: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



# GIB® Wet Area Systems, February 2021

## **LIMITATIONS**

Winstone Wallboards Ltd accepts no liability if the GIB® Wet Area Systems and junction details are not installed in strict accordance with instructions contained within this publication.

## **USE ONLY THE CURRENT SPECIFICATION**

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. You should check the GIB® website to ensure you are using the current publication. If you are unsure whether this is the current publication, simply call the GIB® Helpline on 0800 100 442.

## **SUBSTITUTION**

GIB® Wet Area Systems have been specifically designed and tested to achieve the stated performance levels. To maintain the GIB® Product and System Warranty, all system components detailed in this publication must be used when specifying and installing GIB® Wet Area Systems.

## **TRADEMARKS**

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Toughline®, GIB Braceline®, GIB Noiseline®, GIB Aqualine®, GIB Weatherline®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB® Quiet Stud®, GIB Rail®, GIB Barrierline®, GIB X-Block®, GIB Fire Soundseal®, GIB Clip®, the colour mauve for GIB Toughline®, the colour blue for GIB Braceline®, GIB Noiseline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour purple for GIB Weatherline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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**FOR MORE INFORMATION VISIT**

[gib.co.nz](http://gib.co.nz)

**OR CALL THE GIB® HELPLINE**

0800 100 442



## BRANZ Appraised

Appraisal No. 427 [2021]

## GIB® WET AREA SYSTEMS

Appraisal No. 427 [2021]

This Appraisal replaces BRANZ

Appraisal No. 427 [2007]

### BRANZ Appraisals

Technical Assessments of products for building and construction.



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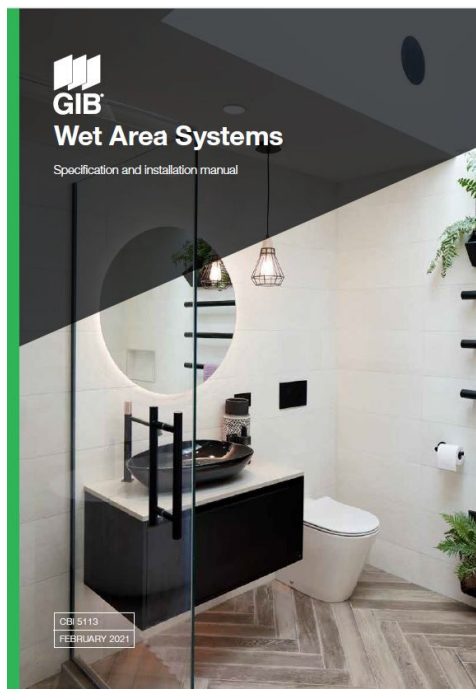
P.O. Private Bag 50 908

Porirua 5240,

New Zealand

Tel: 04 237 1170

branz.co.nz



## Product

- 1.1 GIB® Wet Area Systems are for the interior lining of timber and steel-framed walls and ceilings in wet areas such as bathrooms, laundries, kitchens and toilets where a water-resistant lining material is desirable.

## Scope

- 2.1 GIB® Wet Area Systems have been appraised for use as a wet area wall and ceiling lining in buildings within the following scope:
- on timber-framed walls and ceilings within the scope limitations on NZS 3604; or,
  - on steel-framed walls and ceilings within the scope limitations of NASH Standard Part 2, or,
  - on timber and light gauge steel-framed walls and ceilings subject to specific design.

## Building Regulations

### New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, GIB® Wet Area Systems, 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. GIB® Wet Area Systems meet the requirements for loads arising from self-weight and impact [i.e. B1.3.3 (a) and (j)]. See Paragraphs 8.1-8.3.

**Clause B2 DURABILITY:** Performance B2.3.1 (b) 15 years and B2.3.1 (c) 5 years. GIB® Wet Area Systems meet these requirements. See Paragraphs 9.1-9.5.

**Clause E3 INTERNAL MOISTURE:** Performance E3.3.4 and E3.3.5. GIB® Wet Area Systems meet these requirements. See Paragraphs 12.1-12.3.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. GIB® Wet Area Systems meet this requirement.



## Technical Specification

4.1 The GIB® plasterboards and accessories used in GIB® Wet Area Systems, and supplied by Winstone Wallboards Ltd are as follows:

### GIB® Plasterboards

- **GIB Aqualine®** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in 10 and 13 mm sheet thicknesses. Sheets are available in various edge profiles and lengths from 2,400 mm to 4,800 mm. Refer to Table 1. The nominal sheet weights are 8 kg/m<sup>2</sup> and 11 kg/m<sup>2</sup> for 10 mm and 13 mm thick sheets respectively. GIB Aqualine® face paper is green in colour.
- **GIB Toughline® Aqua** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in a sheet thickness of 13 mm. Sheets are available in various edge profiles and lengths from 2,400 mm to 3,000 mm. Refer to Table 1. The nominal sheet weight is 11.4 kg/m<sup>2</sup>. GIB Toughline® Aqua face paper is mauve in colour.
- **GIB Weatherline®** is an exterior-grade, glass-fibre fleece-wrapped modified-gypsum core sheet material. The product is available in 10 mm and 13 mm thicknesses and a board width of 1,200 mm. Standard sheet lengths are 2,450, 2,700 and 3,000 mm. Custom sheet lengths are also available. The nominal sheet weights are 9 kg/m<sup>2</sup> and 11.5 kg/m<sup>2</sup> for 10 mm and 13 mm thick sheets respectively.

**Table 1: GIB® Wet Area Plasterboard Available Sheet Sizes**

Plasterboard Type	Sheet Thickness [mm]	Sheet Edge Profile	Sheet Width [mm]	Sheet Length [mm]					
				2,400	2,450	2,700	3,000	3,600	4,800
GIB Aqualine®	10	TE/TE	1,200	✓		✓	✓	✓	
		TE/SE	1,200	✓					✓
		TE/SE	1,350	✓				✓	
	13	TE/TE	1,200	✓		✓	✓	✓	
GIB Toughline® Aqua	13	TE/TE	1,200	✓		✓	✓		
GIB Weatherline®	10	SE/SE	1,200		✓	✓	✓		
	13	SE/SE	1,200			✓	✓		

TE = Tapered Edge SE = Square Edge

### Fastenings

- GIB® Grabber® High Thread Drywall screws for fixing to timber: 6 g x 25 mm and 32 mm.
- GIB® Grabber® Self Tapping Drywall screws for fixing to light gauge steel: 6 g x 25 mm and 32 mm.

### Adhesive and Sealants

- GIBFix® One [Acrylic].
- GIBFix® All-Bond [Solvent].

### GIB® Accessories

- Corner Support Angle - GIBFix® Angle or GIB® Rondo® NZ18. Minimum 32 x 32 x 0.55 mm galvanised metal angle.

### GIB® Jointing Compounds

- As specified in the GIB® Wet Area Systems and GIB® Site Guide Technical Literature.

- 4.2 System components and accessories for the GIB® Wet Area Systems, which are supplied by the building contractor are:

#### **Waterproofing**

- A waterproofing system complying with AS/NZS 4858.

#### **Finishes**

- Finishes such as tiling, flexible sheet vinyl, paints and wallpapers have not been assessed and are outside the scope of this Appraisal.

## **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® Wet Area 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 GIB® Wet Area Systems provide a water-resistant lining as a base for finishing systems in wet areas such as bathrooms, toilets, laundries and kitchens. The typical finishes are ceramic tiles and flexible sheet vinyl to walls, and paint and wallpaper to walls and ceilings. *[Note: GIB Weatherline® is a suitable substrate for ceramic tiles and sheet vinyl. For paint or wallpaper finishes use GIB Aqualine® or GIB Toughline® Aqua.]*
- 7.2 GIB® Wet Area Systems must not be used in the following situations:
- For bracing applications in shower areas or adjacent baths [See Paragraphs 7.4 and 8.2].
  - In areas of high humidity (above 90% RH) or continually wet areas such as group showers, steam rooms, or swimming pools.
  - Installed over a vapour barrier.
  - Applied directly to masonry, concrete or solid plaster.
  - Applied over other sheet lining materials.
  - Used externally of the building envelope.
  - Exposed to temperatures of 52°C or greater for prolonged periods. (Refer to appliance and fitting manufacturers for installation details.)
- 7.3 GIB Aqualine® may be substituted for some other GIB® plasterboard products in specific GIB® Bracing Systems, GIB® Fire Rated Systems and GIB® Noise Control Systems. Refer to the relevant systems technical literature for details.

### Wet Areas

- 7.4 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. There are two general categories of wet areas as follows:
- Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
  - Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.
- 7.5 Both the above wet area categories must be finished with surfaces and joints that are impervious and easily cleaned. In addition, shower areas must be waterproofed. This can be achieved using proprietary rigid shower lining systems, flexible vinyl shower wall finishes, or tiling. Tiled shower areas must include a wet area waterproofing membrane system under the tiles.

### Intertenancy Walls – Wet Areas

- 7.6 Intertenancy construction that incorporates fire resistance and noise control must be protected from water splash. In shower areas, GIB® Wet Area plasterboards must not be substituted for other GIB® plasterboards but must be an extra lining layer. Refer to the Technical Literature.

### Tiling

- 7.7 GIB® Wet Area Systems are suitable as a substrate for tiling up to the following weights:
- 10 mm GIB Aqualine® and GIB Weatherline® – up to 26 kg/m<sup>2</sup>.
  - 13 mm GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® – up to 40 kg/m<sup>2</sup>.
- [Note: Most ceramic and porcelain wall tiles weigh less than 20 kg/m<sup>2</sup>. For further information on tiling consult the BRANZ Good Practice Guide – Tiling.]*

### Framing

- 7.8 Supporting framing must comprise one of the following, subject to the minimum sizes, dwang centres and all other frame requirements of GIB® Wet Area Systems Technical Literature:
- Timber framing must be designed and constructed in accordance with NZS 3604, or to a specific design using NZS 3603 and AS/NZS 1170. Refer to Paragraph 15.2 regarding recommended moisture content of timber framing.
  - Steel framing must be designed and constructed in accordance with NASH Standard Part 2, or to a specific design in accordance with AS/NZS 1170.

## Structure

### Bracing

- 8.1 GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in GIB EzyBrace® Systems. Refer to BRANZ Appraisals Nos. 928 [2016] and 1048 [2019].
- 8.2 GIB Wet Area Systems must not be used for bracing in shower areas or behind baths.

### Impact Resistance

- 8.3 GIB® plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications. GIB Toughline® Aqua is recommended by Winstone Wallboards Ltd where higher impact resistance is desired.

## Durability

### Serviceable Life

- 9.1 GIB® Wet Area Systems have a serviceable life of at least 15 years as a fully protected shower or water splash lining. As a general wall and ceiling lining, GIB® Wet Area Systems will have a serviceable life in excess of 50 years. The ability of GIB® plasterboards to remain durable is dependent on being protected and remaining dry in service, and being maintained in accordance with this Appraisal.

### Maintenance

- 9.2 The building must be maintained weathertight and all lining systems protected from internal and external moisture.
- 9.3 Finishes to water splash and shower areas, including tiles, grout, waterproof membranes, sealants and flexible sheet vinyl must be checked to ensure the integrity of the system is maintained. They must be repaired or replaced if necessary. When repairing or replacing finishes, the GIB® plasterboard substrate must be checked for defects and repaired or replaced, as required.
- 9.4 For flexible sheet vinyl, particular attention must be paid to joints, especially at corners. Checks should be made to ensure the vinyl has not been punctured. Where damage has occurred, repairs must be made immediately.
- 9.5 Impact damage to GIB® plasterboard, resulting in small holes and cracks, may be patched, stopped and finished. For larger areas of damage, expert advice on repair must be sought from Winstone Wallboards Ltd.

## Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the GIB® Wet Area Systems from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

## Fire Affecting Areas Beyond the Fire Source

### Control of Internal Fire and Smoke Spread

- 11.1 The gypsum plasterboard used in GIB® Wet Area Systems without an applied paint or wallpaper finish has been tested in accordance with ISO 5660 and achieved a Material Group Number of 1-S.
- 11.2 The gypsum plasterboard used in GIB® Wet Area Systems with an untested applied finish of a waterborne or solvent borne paint coating ≤ 0.4mm thick achieves a Material Group Number of G2-S in accordance with Table A1 of NZBC Verification Method C/VM2.
- 11.3 A lower Material Group Number may be achieved when used with a tested finishing system. The Material Group Number for the complete lining system must be obtained from the supplier of the finish product or system.

### Fire Resistance Ratings (FRRs)

- 11.4 GIB® Wet Area plasterboards, when used as part of GIB® Fire Rated Systems, can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2. Refer to BRANZ Appraisal No. 289 [2018] and relevant technical literature.

## Internal Moisture

- 12.1 When installed in accordance with this Appraisal, GIB® Wet Area Systems will provide wall surfaces adjacent to sanitary fixtures and sanitary appliances that are impervious and easily cleaned.
- 12.2 The construction methods in the Technical Literature meet with the internal moisture requirements of the NZBC Acceptable Solution E3/AS1.
- 12.3 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.



## Airborne and Impact Sound

- 13.1 GIB® Wet Area plasterboards, when used as part of GIB® Noise Control systems, can be used to provide acoustic ratings as required by NZBC Acceptable Solution G6/AS1. Refer to BRANZ Appraisal No. 394 [2017] and relevant technical literature.

## Installation Information

### Installation Skill Level Requirement

- 14.1 Installation of GIB® Wet Area 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

- 15.1 GIB® Wet Area Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

### Framing

- 15.2 To achieve an acceptable decorative finish, the walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommend a moisture content of 8–12% where buildings are to be air conditioned or centrally heated.

### Cutting

- 15.3 GIB® Wet Area plasterboards are 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.

## Fixing Sheets

### Non-Tiled Areas

- 16.1 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 300 mm centres around the perimeter of the sheet, and with GIBFix® adhesive on all intermediate studs and dwangs. Adhesive must not be used under fasteners. A 5–10 mm gap must be left between the floor and the bottom of the sheet.

### Tiled Areas

- 16.2 Control joints must be provided at maximum 4 m centres.
- 16.3 Internal corners in shower areas must be reinforced with a minimum 32 x 32 x 0.55 mm galvanised metal angle [i.e. GIBFix® Angle or GIB® Rondo® NZ18] prior to lining the walls.
- 16.4 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 150 mm centres to the perimeter of wall and to all intermediate studs. Adhesive must not be used in place of screws.

### Ceilings

- 16.5 Supports of timber or steel battens or ceiling joists must be 450 mm centres for 10 mm GIB Aqualine®, or 600 mm centres for 13 mm GIB Aqualine® or GIB Toughline® Aqua.
- 16.6 GIB Aqualine® and GIB Toughline® Aqua sheets must be fixed with GIB® Grabber® screws at 600 mm centres around the perimeter of the ceiling and at 200 mm centre along supports. Alternatively, sheets are screw fixed at 600 mm centres along the supports and GIBFix® adhesive placed at 200 mm centres between the screws.

### Penetrations and Sealants

- 17.1 All cut-outs for pipe penetrations must be made neatly using a hole saw. Cut-outs should be made approximately 12 mm diameter greater than the pipe.
- 17.2 A bead of sealant must be placed to the full thickness of the plasterboard sheet around all pipe penetrations, at bath rims and preformed shower bases and where an impervious junction is required at the floor/wall line.
- 17.3 In tiled areas, a bead of sealant 6 mm wide must also be placed to the full thickness of the tiles where the above situation occurs. The sealant manufacturer's technical literature must be followed for installation.

### Jointing and Finishing

- 18.1 Jointing must be carried out in accordance with GIB® Site Guide Technical Literature.
- 18.2 Tiled shower areas must incorporate a waterproofing membrane over GIB® Wet Area Systems. Waterproofing membranes are outside the scope of this Appraisal and must otherwise be specified and approved.

### Health and Safety

- 19.1 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

- 20.1 Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, edge hardness, water resistance, hard and soft body impact tests and humidified deflection.
- 20.2 Cone calorimeter tests to ISO 5660 have been carried out by BRANZ.

### Other Investigations

- 21.1 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 21.2 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 21.3 The GIB® Wet Area Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

### Quality

- 22.1 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.
- 22.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001: 2015, Registration No. 581.
- 22.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.
- 22.4 The quality of the application and finish on site is the responsibility of the installation, stopping and finishing contractors.
- 22.5 Designers are responsible for the design of buildings.
- 22.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

## Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- AS/NZS 2588: 2018 Gypsum plasterboard.
- BRANZ Good Practice Guide: Tiling [3rd edition], April 2015.
- ISO 5660-1:2002 Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate [cone calorimeter method].
- NZS 3603: 1993 Timber Structures Standard.
- 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.

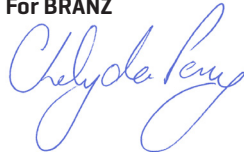
In the opinion of BRANZ, **GIB® Wet Area Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

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:

15 February 2021



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# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part)

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Rapid drying time

Two component undertile waterproofing membrane

Advanced acrylic – will not re-emulsify

Fibre reinforced – eliminates the need for reinforcing mat

Meets class III category for AS 4858 Wet Area Membranes

Low VOC content – meets Green Building Council of Australia  
Green Star IEQ-13 requirements

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# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

### DESCRIPTION

ARDEX WPM 002 (Superflex Bathroom and Balcony Two Part) is a tough, fast drying two component waterproofing membrane specifically designed for use under tiles. The product has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. ARDEX WPM 002 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification.

ARDEX WPM 002 is flexible, low in odour, and is fully compatible with polymer modified tile adhesives. ARDEX WPM 002 is one of the fastest drying acrylic membranes on the market – normally ready to tile in 16–24 hours @ 23°C. ARDEX WPM 002 meets the Green Building Council of Australia Green Star IEQ-13 requirements for Architectural Sealant when tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

### FEATURES/BENEFITS

- Fast drying ARDEX WPM 002 can be tiled over in 16–24 hours, or 4 hours @ 23°C / 50% RH in non critical areas\*.
- Fibre reinforced: Excellent strength, eliminates need for reinforcing mat.
- Flexible: Accommodates normal building movement.
- Advanced acrylic: Will not re-emulsify.
- Designed for tiling: Fully compatible with ARDEX tile system adhesives.
- Water based, low odour and easy cleaning for undertile waterproofing in shower recesses.
- Conforms to the requirements of AS/NZ 4858:2004 Wet Area Membranes.

\*Critical areas include areas where the membrane is applied over impermeable substances such as bond breakers or incorporating reinforcement. Longer drying times are necessary in these areas.

### APPLICATION RANGE

#### Performance levels

Commercial and residential.

#### Location

Internal and external wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic.

#### Surfaces

Walls and floors.

#### Substrates

##### Concrete

Cured for min. 28 days or sealed when set with one coat ARDEX HydrEpoxy WPM 300 at a coverage rate of 3.0m<sup>2</sup> per litre and allowed to cure overnight.

Wet concrete should be allowed to dry thoroughly or sealed with one coat of ARDEX HydrEpoxy WPM 300 as above.

#### Renders and screeds

Cured for min. 7 days or sealed when set with one coat ARDEX HydrEpoxy WPM 300 at a coverage rate of 3.0m<sup>2</sup> per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of ARDEX HydrEpoxy WPM 300 as above.

#### Fibre cement

Wet area grade only.

#### Plasterboard

Wet area grade only.

#### Plywood

Structural plywood (PAA branded) or marine grade or other wet area grade only. Not recommended for external use (refer ARDEX).

#### Particleboard

Wet area grade, internal use only (special preparation is required – contact ARDEX). Not recommended for external use (refer ARDEX).

#### Permanent Immersion

It is recommended that ARDEX WPM 002 must be covered with tiles for permanent immersion applications. Contact ARDEX for use over existing membranes, covering materials, and any other substrates not listed.

### SPECIFICATION CLAUSE

#### ARDEX WPM 002

The waterproofing membrane shall be ARDEX WPM 002, a two component cementitious acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

#### PACKAGING

Two component: 20kg (approx 20 litres) liquid pail and 1x 20kg bag.

#### SHELF LIFE

12 months when stored in the original unopened packaging, in a dry place at 23°C. Do not store in direct sunlight. Replace lid tightly after use. Protect from frost. Use remaining contents from part used containers within 3 months.

#### MIXING

The mixing ratio of ARDEX WPM 002 is 1 part liquid (by weight) to 1 part powder (by weight). The unit is broken into equal components for accurate measurement. Stir the ARDEX WPM 002 liquid thoroughly and pour the accurate measure into a suitable clean plastic container. Add ARDEX WPM 002 powder to the liquid whilst stirring. Stir until a homogenous, lump free paste is achieved.

#### COVERAGE

Two coats are recommended for an effective waterproof membrane. Coverage will vary depending on the porosity of the surface. One 40kg kit will cover approximately 16–24m<sup>2</sup> (based on two coats) depending on area requirements



# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

between wall and floor surfaces to be treated.

**Table 1**

	Thickness per coat		Total dry film thickness (2 coats)	Theoretical Coverage		Per Unit
	Dry film	Wet film		Per coat	For 2 coats	
Floors	0.6mm	0.9mm	1.2mm	32m <sup>2</sup>	16m <sup>2</sup>	40kg kit
Walls	0.4mm	0.6mm	0.8mm	48m <sup>2</sup>	24m <sup>2</sup>	40kg kit

### DRYING TIMES

Curing time will vary depending on temperature and humidity.

### Recoat time

1–2 hours (23°C / 50% RH) between first and second coats. Alternatively, if a woven cloth reinforcement mat is used in corners between coats then the second coat can be applied whilst the first coat is still wet.

### Dry through

The slowest drying areas are those where the membrane has been applied over a silicone bond breaker, eg. wall and floor junctions. The membrane cannot be tiled over until these critical areas are completely dry.

ARDEX WPM 002 membrane is totally dry in 16 hours at 23°C / 50% RH but can take up to 24 hours at 10°C / 50% RH in corners or for thick films. In areas where bond breakers or additional reinforcement are not used, ARDEX WPM 002 can be tiled over after 4 hours at 23°C / 50% RH.

### Fully cured

The shower should not be used until the membrane has reached its full strength. Normally ARDEX WPM 002 membranes are fully cured after 3 days at 23°C, or after 5 days at 10°C. Drying times will vary depending on humidity, surface temperature and surface porosity. Do not apply on substrates where the surface temperature is below 10°C or above 35°C.

### CLEANING

Wash hands, brushes, rollers, etc, with water while the membrane is still fresh. Remove cured material with mineral turpentine.

### APPLICATION

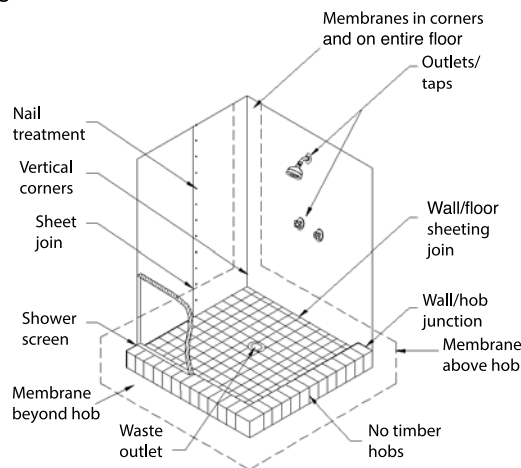
Apply ARDEX WPM 002 by brush or roller. A medium nap (12–15mm pile) paint roller is recommended. New rollers should be dampened with water before being used for the first time. For best results with a paint brush use a good quality, 50mm long bristle variety.

To achieve the required dry film thickness per coat application must consist of laying the product onto the surface and light finish the surface. Do not try to apply in the same manner as a building paint. A conventional building paint is normally applied at 25–40 micrometers wet film thickness while ARDEX WPM 002 needs to be applied at between 0.6 and 0.9mm per coat depending on product and application (Refer to Table 1).

### Critical areas:

#### INTERNAL WET AREAS

**Fig.1 – Shower recess – Critical areas**



1. Construction should be at a minimum in accordance with AS 3740-2004 which is pictured above. ARDEX however recommends waterproofing the entire walls to at least 80 mm above the shower rose.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall and floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber), and that the top of the hob does not slope outwards.
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2m) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cure silicone sealant spread approximately 8mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls.
11. Waste outlets shall incorporate a leak control flange or similar in accordance with AS 3740 and the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the leak control flange and the screed/floor.

# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 100mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Plastic (eg. PVC) fittings should be primed with a solvent based plumbers primer. Prime metal surfaces with a suitable metal primer.
14. Apply the membrane minimum 1800mm up the walls or 80mm above the height of the shower rose within the shower recess. In circumstances where the shower rose is positioned on the ceiling, ARDEX recommends the WPM 002 membrane be installed to the ceiling height.
15. Install the shower screen to inside edge of the hob.
10. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
11. Apply the membrane down into outlets and drains, ensuring excess material is removed.
12. Ensure all weep holes are above the membrane application area.

### APPLICATION NOTES

#### Surface preparation

Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.

- Falls to outlets of at least 1:60 or approx. 30mm in 2m (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired, levelled and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.
- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

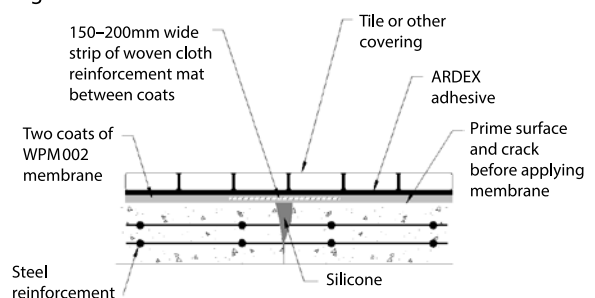
#### Priming

The primer is a critical part of the waterproofing system. Apply one coat of ARDEX WPM 265 water based primer by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to be completely dry prior to the application of the ARDEX WPM 002 membrane. This will take around 20–30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m<sup>2</sup> per litre. Plastic (e.g. PVC) pipes should be primed with a solvent based plumbers pink primer. Prime metal surfaces with a suitable metal primer such as epoxy polyamide primer.

### GENERAL APPLICATION

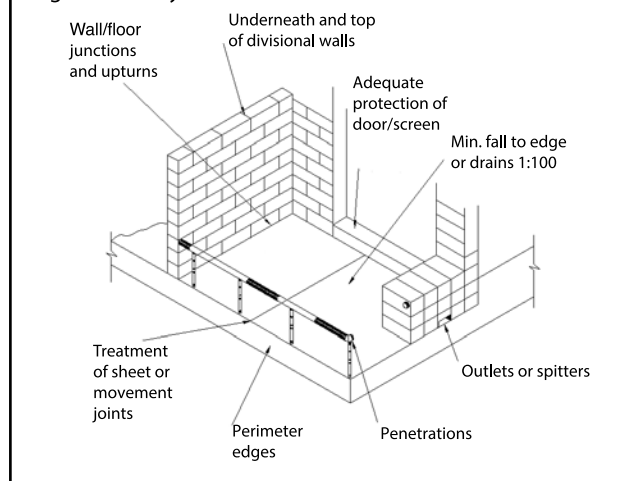
#### Crack preparation

Fig.3 – Crack treatments



### BALCONIES AND DECKS

Fig.2 – Balcony – Critical areas



1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2m) or else achieve the fall with a sand/cement screed.
2. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/sliding door.
3. Treat any sheet joints with a neutral cure silicone prior to waterproofing.
4. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
5. Apply the membrane as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
6. Where possible, apply the membrane prior to building divisional walls.
7. Apply the membrane to the entire balcony floor and at least 100mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
8. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
9. Apply the membrane down over the front edge of the balcony onto the drip rail.

# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

### Cracks <2mm:

Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with ARDEX WPM 265 water based primer and allow to dry before applying two coats of ARDEX WPM 002 membrane, in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

### Cracks 2–6mm:

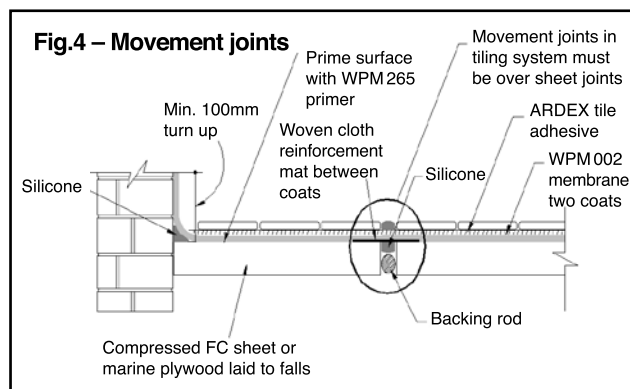
(Refer to Fig.3) prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 6mm either side. Apply a 300mm wide band of ARDEX WPM 002 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of ARDEX Deckweb woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

### Cracks >6mm:

Contact ARDEX Technical Services for specifics with this.

### Movement/construction joints

#### Movement joints (<6mm)



Clean and prime the joint before filling it with a bead of neutral cure silicone and extending it 6mm each side of joint. Apply a 300mm wide band of ARDEX WPM 002 (Superflex Two Part) equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of ARDEX Deckweb woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

#### Construction joints (>6mm)

Use the same procedure as above, but replace the reinforcing mat with 120mm of ARDEX Coving Bandage. Note: if tiling, movement joints should be taken to the surface of the tiles. Fill the joints between the tiles immediately above the movement joints with an appropriate joint sealant. (Refer to Fig.4).

### Corners and coving areas

After priming with ARDEX WPM 265 water based primer and allowing it to dry, apply a generous bead (16mm) of neutral cure silicone sealant in coving areas and corners. Smooth over the silicone so that it extends 8mm up the wall and 8mm over the floor and allow to touch dry. Apply a first coat of ARDEX WPM 002 to the area and allow the membrane to dry. Apply a second coat ensuring that excess product is removed

from the junction (the final dry film thickness should be around 1.2mm) Alternatively, if a woven cloth reinforcement mat is used between coats then the second coat can be applied as soon as the mat is fully bedded into the first coat.

### WALL/FLOOR JUNCTION

After priming with ARDEX WPM 265 water based primer and allowing to dry, apply a generous bead (16mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 8mm up the wall and 8mm over the floor and allow to touch dry. Place a 190mm wide band of ARDEX Deckweb woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The ARDEX WPM 002 should be applied to at least 150mm up the wall surfaces as per the recommendations for the application of ARDEX WPM 002 to floors.

### Walls

Two coats of ARDEX WPM 002 are required to achieve a minimum total dry film thickness of 0.8mm. After priming with ARDEX WPM 265 water based primer and allowing to dry, apply two coats of ARDEX WPM 002 (to achieve a minimum dry film thickness of 0.8mm) in two opposite directions. Wall sheet joints should be treated with a neutral cure silicone, PVC duct tape or base jointing compound. In balcony situations take the membrane up underneath any existing cover flashing or install appropriate flashing. Allow the first coat to dry before applying the second coat.

### Floors

Two coats of ARDEX WPM 002 are required to achieve a minimum total dry film thickness of 1.2mm. The membrane should be extended at least 100mm up all perimeter walls.

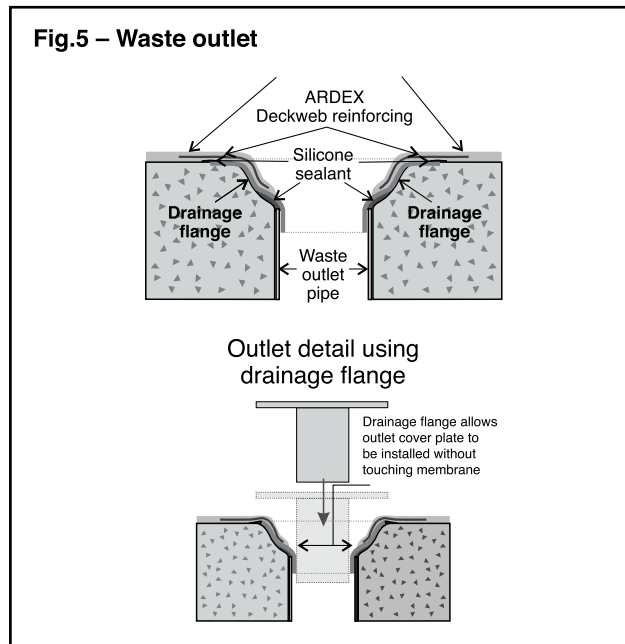
Prime the surface with ARDEX WPM 265 water based primer and allow to dry. Apply the first coat over the primed surface and allow it to dry (1–2 hours at 23°C, 50% RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible rebate the flange into the floor. Seal the perimeter of the flange with neutral cure silicone sealant. If a flange is not installed the membrane must be applied down into the pipe. (Refer to Fig.5). Allow the membrane to dry completely before tiling.

# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

### Waste outlet

Fig.5 – Waste outlet

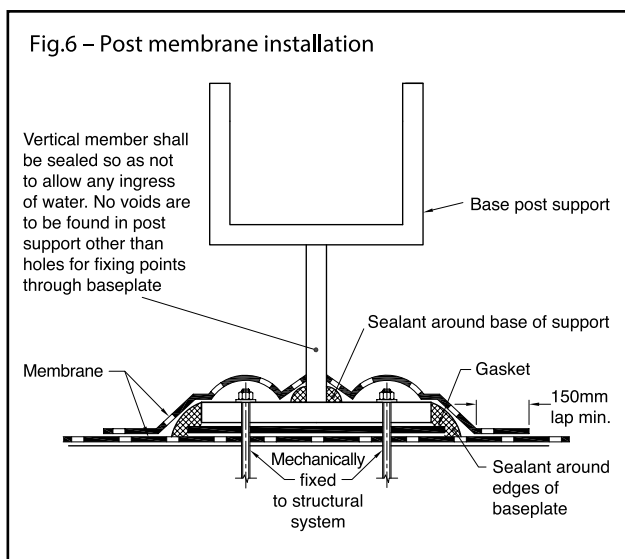


Prime the surface with ARDEX WPM 265 water based primer and allow to dry. Surfaces of outlet flange must be primed with an appropriate primer.

Apply ARDEX WPM 002 over the adjacent floor surface extending down into the waste outlet pipe overlapping the pipe surfaces by at least 30mm. Place ARDEX Deckweb woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer to Fig.5).

### Balcony penetrations (Refer Fig.6)

Fig.6 – Post membrane installation



All upstands are to be mechanically fixed through the membrane, which must be fabricated with a base plate flange.

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 10mm bead of neutral cure silicone around the perimeter of the penetration.

Apply the first coat of ARDEX WPM 002 on the substrate and the flanged metal.

Allow first coat to dry before applying a second coat ensuring a finished dry film thickness of no less than 1.2mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.

### ARDEX WPM 002 & STB TAPE INSTALLATION

1. Ensure area is free from contaminants and clean making sure to remove all dust and prime fibre cement sheet with an approved primer (listed in the primers section). Apply the tape and use a roller to ensure that a secure bond is made between the tape and substrate and carefully moulded into the corners.
2. Apply a first coat of ARDEX WPM 002 to the entire area to be waterproofed using a brush or roller, a medium nap (8–12mm pile) or 50mm long bristle paint brush is recommended. This first coat should be applied at 0.6mm (wet film thickness). Allow to dry. Dry time is approximately 1-2 hours.
3. Apply a second coat of the ARDEX WPM 002 membrane at a thickness of 0.6mm (wet film thickness). This will provide a total dry film thickness of 0.8mm over the ARDEX STB Tape. Care should be taken to ensure excessive build up of membrane is avoided over the ARDEX STB Tape. It is crucial that the dry film thickness at the edge of the tape of the ARDEX WPM 002 is at least 1.2mm so that stress and movements at this point are accommodated. The increase in film thickness is likely to slow down drying and curing in this area relative to the rest of the membrane areas. Final dry film thickness over floor and wall areas not covered by ARDEX STB Tape should be 1.2mm for floors and 0.8mm for walls.

### Tiling systems

It is advisable to conduct a flood test of the waterproofed areas once the membrane has cured (after a minimum of 48 hours), and before the tiling commences. A broad range of ARDEX tile adhesives can be used over ARDEX Superflex membranes. Contact ARDEX or your nearest ARDEX stockist for advice on the most suitable system.

### QUALITY PRODUCT

ARDEX WPM 002 is manufactured and tested to ARDEX procedures which are maintained in accordance with Quality System Standard ISO 9001.

### PAY ATTENTION TO THE FOLLOWING

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with ARDEX HydrEpoxy WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of ARDEX HydrEpoxy WPM 300 at a coverage rate of 3.0m<sup>2</sup> per litre and allowed to cure overnight.
- Where rain is imminent.
- Where the membrane will be left exposed and subjected to regular foot traffic.
- On glazed, glass or other totally impervious surfaces (eg. areas pre-treated with water repellants).



# ARDEX WPM 002

## (Superflex Bathroom and Balcony Two Part) Two Component Undertile Waterproofing Membrane

- Where substrates have ponding water or fail to meet the required falls in the applicable standards. It is recommended a corrective screed be installed or falls be created, prior to the application of ARDEX WPM 002.

For substrates or situations other than those listed contact ARDEX Technical Services.

Before any substrate preparation, installation or finishing methods relating to ARDEX product are undertaken, please be aware of any potential risks and use appropriate PPE (personal protective equipment). This may involve contacting substrate manufacturers for Safety Data Sheets.

### SAFETY DATA

#### ARDEX WPM 002 Part A Liquid

This product may cause irritation and an allergic reaction to the skin. Avoid contact with skin and eyes. In case of contact with the eyes rinse with running water until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. If irritation continues, seek medical attention. Wear protective gloves, clothing, face and eye protection. Avoid inhaling dust/fumes/gas/mist/vapours/spray. This product is harmful to aquatic life with long lasting effects. Ensure adequate ventilation during mixing and application.

#### ARDEX WPM 002 Part B Powder

This product may cause irritation and an allergic reaction to the skin. It may cause serious eye injury and irritation to the respiratory system. May cause cancer. May cause damage to organs through prolonged or repeated exposure. In case of contact with the eyes rinse with running water until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Wear protective gloves, clothing, eye and face protection. Avoid inhaling dust/fumes/gas/mist/vapours/spray. Ensure adequate ventilation during mixing and application. Store locked up. Check with your local Council regarding the disposal of contents. Keep out of the reach of children. Call the Poisons Information Centre on 131 126 (AUS) and 0800 764 766 (NZ) or call a doctor if you feel unwell. At times updates can occur to data. For additional information and to ensure you have the most current technical and safety information please consult the latest Safety Data Sheet (SDS) and Technical Data Sheet found on the product page at [www.ardexaustralia.com](http://www.ardexaustralia.com).

### TECHNICAL DATA

#### CHARACTERISTICS OF COMPONENTS

##### Form and colour

<b>Liquid</b>	White, medium viscosity
<b>Powder</b>	Off White

#### CHARACTERISTICS OF MIXED PRODUCT

<b>Mixing ratio</b>	1:1 by weight
<b>SG of mixed product</b>	1.4kg/litre
<b>Colour</b>	Light Grey/Green

#### CHARACTERISTICS OF CURED MEMBRANE

##### Shore A hardness ASTM D2240

<b>Dry film</b>	85 – 90
<b>Wet film</b>	75 – 80

##### Tensile strength

<b>7 days dry AS 1145</b>	1.7 MPa
<b>Full cure 28 days</b>	2.9 MPa
<b>Elongation at break</b>	
<b>7 days dry AS1145</b>	>300%
<b>VOC content</b>	25g/L

NOTE: Most of the tests have been carried out in the ARDEX laboratory under standard conditions (23±2°C, 50±5% RH).

### DISCLAIMER

The technical details, recommendations and other information contained in this datasheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is your responsibility to ensure that our products are used and handled correctly and in accordance with any applicable Australian Standards. Our instructions and recommendations are only for the uses they are intended. Users are advised to confirm that this product is suitable for their application and conforms with the specifications of the system. We also reserve the right to update information without prior notice to you to reflect our ongoing research and development program. Country specific recommendations, depending on local standards, codes of practice, building regulations or industry guidelines, may affect specific installation recommendations. The supply of our products and services is also subject to certain terms, warranties and exclusions, which may have already been disclosed to you in prior dealings or are otherwise available to you on request. You should make yourself familiar with them.

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This datasheet was issued in February 2021 and is valid for 3 years, in some instances a newer version may be published. Always refer to [www.ardexaustralia.com](http://www.ardexaustralia.com) for the latest technical data from ARDEX Australia Pty Ltd.



## BRANZ Appraised

Appraisal No. 472 [2017]

### ARDEX UNDERTILE INTERNAL LIQUID WATERPROOFING MEMBRANES

Appraisal No. 472 [2017]

- This Appraisal replaces BRANZ Appraisal No. 472 [2011]

#### BRANZ Appraisals

Technical Assessments of products for building and construction.



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BRANZ

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## Product

- 1.1 ARDEX Undertile Liquid Membranes are premixed and two-part liquid-applied waterproofing membranes for use under ceramic or stone tile finishes in internal wet areas.

## Scope

- 2.1 ARDEX Undertile Liquid 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 particleboard, plywood, compressed fibre cement 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 ceramic or stone tile finishes; and,
  - where floors are designed and constructed such that deflections do not exceed  $1/360^{\text{th}}$  of the span.
- 2.2 The use of ARDEX Undertile Liquid Membranes on concrete slabs where hydrostatic or vapour pressure is present from below is outside the scope of this Appraisal.
- 2.3 Movement and control joints in the substrate must be carried through the membrane and tile 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 ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membranes must be installed by trained installers, approved by ARDEX New Zealand Limited.

## Building Regulations

### New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, ARDEX Undertile Liquid 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. ARDEX Undertile Liquid Membranes meet these requirements. See Paragraph 9.1.

**Clause E3 INTERNAL MOISTURE:** Performance E3.3.6. Internal wet area floors and walls incorporating ARDEX Undertile Liquid Membranes meet this requirement. See Paragraphs 11.1-11.6.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. ARDEX Undertile Liquid Membranes meet this requirement and will not present a health hazard to people.



## Technical Specification

4.1 Materials supplied by ARDEX New Zealand Limited are as follows:

- **ARDEX WPM 001** is a one part, polymer-based, ready-to-use, liquid-applied membrane containing micro-fibres. It is supplied as a light blue thixotropic paste 20 kg [approximately 15 litres] pails.
- **ARDEX WPM 002** is a fast drying, two part, flexible, cementitious-based, liquid applied membrane containing micro-fibres. It is supplied as ARDEX WPM 002 Part A Liquid in 20 kg pails and ARDEX WPM 002 Part B Powder in 10 kg multi-wall bags. When dry, the membrane is light grey in colour.
- **ARDEX WPM 155 Rapid** is a one part, water-based polyurethane-acrylic, ready-to-use, liquid applied, rapid setting membrane. It is supplied as blue/grey colour in 4 and 15 litre pails.
- **ARDEX STB Tape** is an uncured butyl tape with a fleece layer that is used in the ARDEX WPM 155 Rapid under tile waterproofing system.
- **ARDEX Multiprime** is a water-based primer used to seal substrates and enhance the adhesion of the membranes. It is supplied as a red coloured liquid in 1, 4 and 20 litre plastic containers.

## Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and freezing conditions. The membrane products have a shelf life of 12 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the ARDEX Undertile Liquid Membranes. 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 ARDEX Undertile Liquid 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 ARDEX WPM 002 and ARDEX WPM 155 Rapid are designed to be used where a quicker curing time is required, such as in cool or humid conditions.
- 7.3 The membrane must be protected from physical damage by the application of ceramic or stone tile finishes.
- 7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ Good Practice Guide - Tiling.
- 7.5 Timber framing systems 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  $1/360^{\text{th}}$  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 the sanded C face upwards and treated to H3 [CCA treated]. LOSP treated plywood must not be used.
- 8.2 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 centres 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 membrane substrate. Installation must be carried out 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.

### 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 ARDEX Undertile Liquid 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 ceramic or stone tile finishes with a design serviceable life of 15-25 years.

## Maintenance

- 10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.
- 10.3 Drainage outlets must be maintained to operate effectively, and tile finishes must be kept clean.

### Internal Moisture

- 11.1 ARDEX Undertile Liquid Membranes are impervious to water, and when appropriately designed and installed will prevent water from penetrating behind linings or entering concealed spaces.
- 11.2 Surfaces must be finished with ceramic or stone tiles. 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 1500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.
- 11.4 ARDEX Undertile Liquid 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, Section 2.
- 11.5 The waterproofing membranes must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, BRANZ Good Practice Guide - Tiling, and the flooring and wall lining manufacturers.
- 11.6 Where water resistant wall finishes such as prefinished sheet materials are used, they must overlap the membrane a minimum of 30 mm.

### Installation Information

#### Installation Skill Level Requirement

- 12.1 Installation of the membranes must be completed by trained installers, approved by ARDEX New Zealand Limited.
- 12.2 Installation of substrates must be completed by, or under the supervision of, licensed Building Practitioners with the relevant Licence Class, in accordance with instructions given within the ARDEX New Zealand Limited Technical Literature and this Appraisal.

#### Preparation of Substrates

- 13.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be even 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 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 reinforcements installed as set out in the Technical Literature.
- 13.4 Substrates must be primed with ARDEX Primer and allowed to dry fully before the membrane is installed.

## Membrane Installation

- 14.1 Installation must not be undertaken where the substrate surface temperature is below 10°C or above 35°C.
- 14.2 ARDEX WPM 002 liquid and dry components must be mixed and left to stand for 5 minutes before re-mixing, then applying. ARDEX WPM 001 and ARDEX WPM 155 Rapid 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 to give a total finished thickness of 1.0 - 1.5 mm. Subsequent coats must be applied at an opposite direction to the previous coat.
- 14.4 Application can be made by roller (medium/long nap), brush (long bristle), or a flat steel trowel.
- 14.5 Reinforcement fabric is bedded into the wet layer between coats to provide movement protection at wall/wall and wall/floor junctions, and at any other areas such as joints in the flooring substrate, floor cracks or around penetrations in the membrane. ARDEX STB Tape must be used with ARDEX WPM 155 to take advantage of the rapid/fast drying features.
- 14.6 Clean up may be undertaken with water.

## Tiling

- 15.1 The membrane must be fully cured before tiling. The cured membrane 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 ARDEX New Zealand Limited.

## Inspections

- 16.1 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 supplier's instructions, particularly installation to the correct thickness and use of reinforcement.
  - Membrane curing and integrity prior to the installation of tiles including protection from mechanical damage during curing and prior to tile installation.

## Health and Safety

- 17.1 Safe use and handling procedures for the membrane 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 of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by ARDEX Australia Pty Ltd research and development laboratory: water vapour transmission; water absorption; tensile strength and elongation before and after UV exposure, immersion in bleach, immersion in industrial detergent and immersion in water. Test methods and results were reviewed by BRANZ and found to be satisfactory.
- 18.2 The following testing of ARDEX WPM 001 was undertaken by the Commonwealth Scientific Industrial Research Organisation [CSIRO] Australia:
  - In accordance with ANSI A118.10 for ICBO Evaluation Service - dimensional stability; waterproofness; shear strength to ceramic tile and cement mortar; and fungal and micro-organism resistance.
  - In accordance with AS 1145 - behaviour under cyclic strain.
- 18.3 Testing of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by BRANZ for low temperature flexibility and peel adhesion after heat/humidity aging.
- 18.4 The following testing of ARDEX WPM 155 Rapid was undertaken by various organisations:
  - Durability testing to AS/NZS 4858 Appendix A including effect of heat aging, bleach, detergent and water on tensile strength and elongation.
  - Cyclic movement resistance requirements of AS/NZS 4858:2004 Appendix B.
  - Water Vapour Transmission using both wet and dry cup methods from ASTM E96.
  - Water transmission behaviour following the procedures of AS/NZS 4858 Appendix C.
- 18.5 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

### Other Investigations

- 19.1 An assessment was made of the durability of the ARDEX Undertile Liquid Membranes by BRANZ technical experts.
- 19.2 Site inspections have been carried out by BRANZ to examine the practicability of installation.
- 19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

### Quality

- 20.1 The manufacture of the membrane has been examined by BRANZ, and 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 membrane's 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 ARDEX New Zealand Ltd.
- 20.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrate.
- 20.5 Quality on site is the responsibility of the trained installers, approved by ARDEX New Zealand Ltd.
- 20.6 Building owners are responsible for the maintenance of the ceramic or stone tiles in accordance with the instructions of ARDEX New Zealand Ltd.

### Sources of Information

- AS 3740 – 2010 Waterproofing of wet areas within residential buildings.
- AS 3958.1: 2007 Ceramic Tiles – 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 4858 – 2004 Wet area membranes.
- AS/NZS 2269: 2012 Plywood – Structural.
- Good Practice Guide – Tiling, BRANZ, April 2015.
- NZS 3101: 2006 Concrete Structures Standard.
- 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.
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



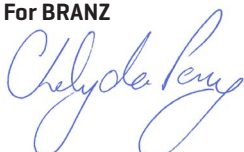
In the opinion of BRANZ, **ARDEX Undertile Internal Liquid Waterproofing Membranes** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **ARDEX New Zealand 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. **ARDEX New Zealand 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 **ARDEX New Zealand 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 **ARDEX New Zealand Limited** or any third party.

For BRANZ



**Chelydra Percy**

Chief Executive

Date of Issue:

17 January 2018

# MANROSE PRO-SERIES INLINE MOUNTED FAN KITS

## SFLP SHOWER FAN MODELS

Duct Size	Model	Switching	Fan Type	Performance	Order Code
125mm	SFLP125S	Standard	Ctr'fgl	39 l/s, 140m³/hr	FAN0616
125mm	SFLP125T	Timer	Ctr'fgl	39 l/s, 140m³/hr	FAN0617
150mm	SFLP150S	Standard	Hyper150	109 l/s, 394m³/hr	FAN0618
150mm	SFLP150T	Timer	Hyper150	109 l/s, 394m³/hr	FAN0619



SFLP150

- These high efficiency inline fans are designed to provide higher levels of extraction for today's larger bathrooms.
- Supported by a 5 year warranty.

### GENERAL INFORMATION

Model	Grille Cut-Out	Interior Grille	Exterior Grille	Duct Type	Length of duct included
SFLP125	140mm	White Low Profile options	Weatherproof Cowl or Fixed insert option	Flexible PVC	4m supplied (can be extended up to 6m)
SFLP150	160mm	White Low Profile options	Weatherproof Cowl or Fixed insert option	Flexible PVC	5m supplied (can be extended up to 6m)

Please note: Grille cut out size is a nominal diameter for a circular cut-out.

#### Switching Options

1. Standard - Operates from remote switch (not supplied).
2. Timer - Fan operates from a switch and continues to run for a preset time after switching off. The 100 and 125mm models are adjustable

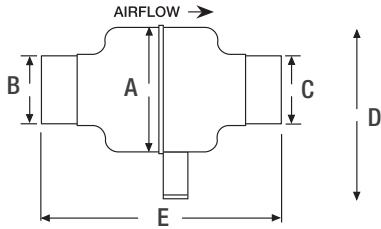
between 1-20 minutes, whereas the 150mm models include a fixed 7 minute timer. Both require: permanent phase and switched phase.

**NOTE: All fan flow rates quoted are free air delivery.**

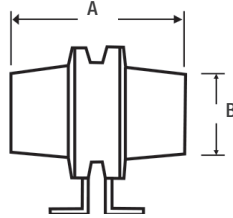
**Performance will be affected by the length of ducting used.**

## DIMENSION INFORMATION (MM)

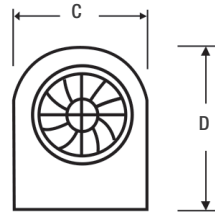
Model	A	B	C	D	E
SFLP125	155	125	125	195	258
SFLP150	200	143	170	185	-



Dimensions - SFLP125

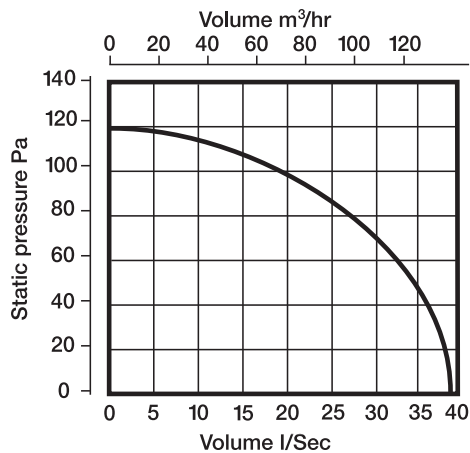


Dimensions - SFLP150

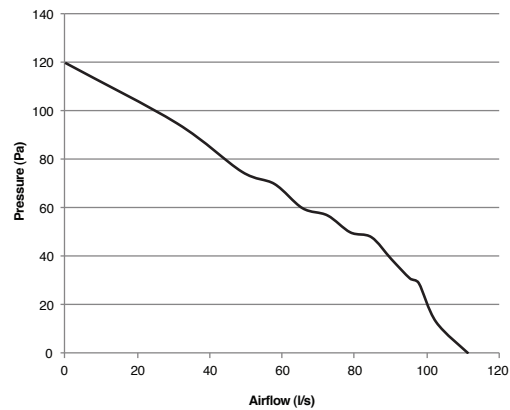


## TECHNICAL SPECIFICATION & PERFORMANCE DATA

Model	SFLP125	SFLP150
Fan	CFD225	Hyper150
Power	220 - 240V	220 - 240V
Fan Performance	39 l/s, 140m³/hr	109 l/s, 394m³/hr
Fan Wattage	20W	27W
Maximum Pressure	120 Pa	120 Pa
Fan Speed	1400 RPM	2650 RPM
Sound Level	45 dB(A)	38 dB(A)
Max. Operating Temp	50°C	70°C
IP Rating	IPX4	IPX2



Performance - SFLP125



Performance - SFLP150

# MANROSE RANGEHOOD DUCTING KITS

- There are three ducting options available, for the kitchen rangehood. Through an adjacent wall, through the soffit (under the eave) or up through the roof.
- Semi-Rigid ducting is used in our top of the range systems to reduce the rangehood system noise and increase air flow performance.
- Fully complies to AS/NZS 60335.2.80.

## THRU WALL RANGEHOOD DUCTING KITS

Duct Size (mm)	Description	Order Code
125	Rear Vent - Gravity Grille	DCT1162
150	Top & Rear Vent - Weatherproof Cowl	DCT2592

- For added weather protection use the weatherproof cowl as included in DCT2592.

## SOFFIT RANGEHOOD DUCTING KITS

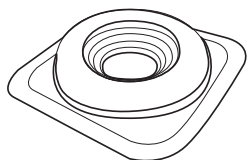
Duct Size (mm)	Description	Order Code
150	Thru Soffit	DCT1161
150	Thru Soffit - Galv Tube	DCT1259
150	Thru Soffit - Semi Rigid	DCT2323

- All systems include 3 metres of Aluminium Duct.
- Galv Tube system also includes 900mm of Solid Tube.

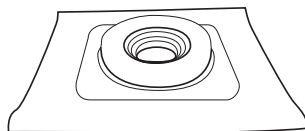
## THRU ROOF RANGEHOOD DUCTING KITS

Duct Size (mm)	Description	Order Code
150	Thru Roof - Iron	DCT2324
150	Thru Roof - Tiled	DCT2325

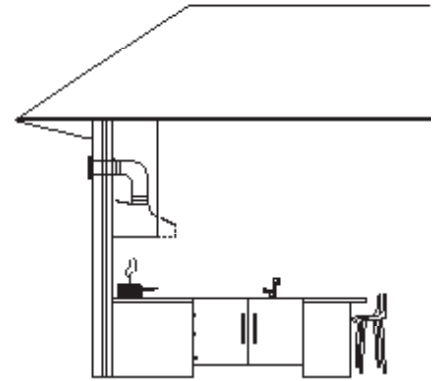
## FLASHING



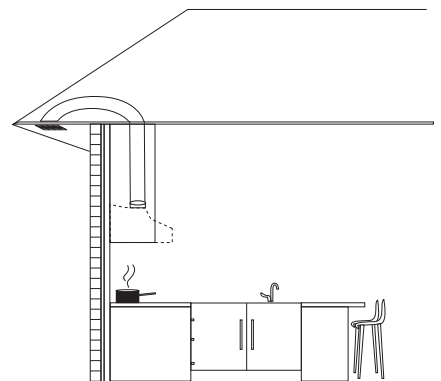
Iron Roof



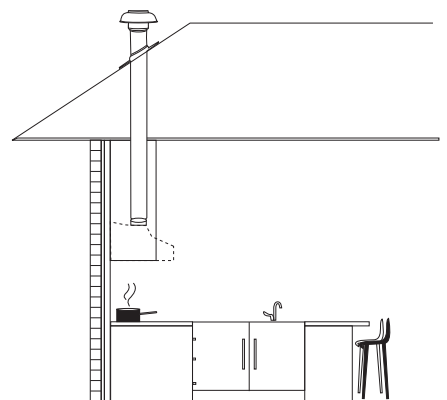
Tiled Roof



Thru Wall Rangehood Ducting Kits



Soffit Rangehood Ducting Kits



Thru Roof Rangehood Ducting Kits

**Rinnai**

# Installation guide

## Rinnai INFINITY A-Series continuous flow water heaters

REU-A2626WG-ZK



REU-A2426WG-ZK



REU-A2024WG-ZK



REU-A1620WG-ZK



**The Rinnai INFINITY A-Series models are not suitable for commercial or solar applications**

## Important

This appliance must be installed in accordance with:

- Manufacturer's installation instructions
- Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 and G12/AS1

For use with Natural Gas or Universal LPG as indicated on the appliance.

Not suitable as a spa or swimming pool heater.

Not suitable for commercial or solar applications.

Appliance must be installed, commissioned and serviced by an authorised person, being in New Zealand a licensed gasfitter, in accordance with these instructions and all applicable local rules and regulations.

## Warning

Improper installation, adjustment, alteration, service and maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624).

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# Before installation

- **Check for damage:** Unpack the appliance and check for damage. DO NOT install any damaged items.
- **Check components and gas type:** Check all components have been supplied and that you have the correct gas type.
- **Read these instructions:** Get an overview of the steps required before starting the installation. Failure to follow these instructions could cause a malfunction of the appliance. This could result in serious injury and property damage.
- **Applicable models:** These instructions apply only to the Rinnai A-Series continuous flow water heater models listed on the cover page of this guide.

## Appliance location

This appliance is designed for outdoor installations only. It MUST BE located above ground in open air with natural ventilation, without stagnant areas, where gas leakage and products of combustion can be rapidly dispersed by wind and natural convection.

The appliance MUST BE mounted on a vertical structure with the water and gas connections on the underside pointing downwards.

Location of the flue terminal MUST BE in accordance with Section 6 and Figure 6.2 of the AS/NZS 5601.

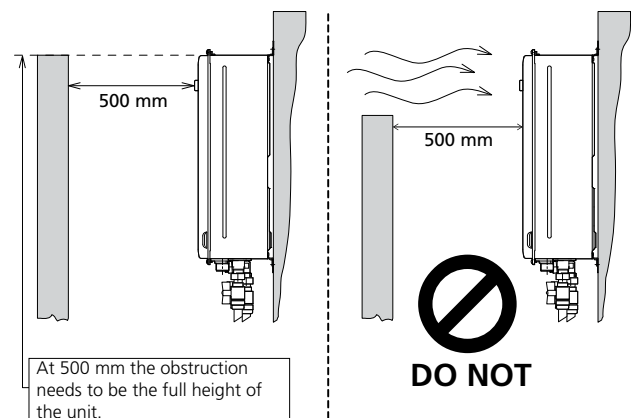
The appliance MUST BE placed **as close as practicable to the most frequently used hot water outlet** or outlets to reduce the delay time for hot water delivery<sup>1</sup>. For installations where the distance between the water heater and the outlets is considerable, a flow and return system can be used to minimise the waiting time for hot water delivery. Alternatively multiple appliances can be strategically placed to serve outlets with minimal delay time.

An AC 230 V, 10 A earthed power point must be provided adjacent<sup>2</sup> to the appliance. This power point must be weatherproof. It must be clear of the gas and water connections to the appliance and also the flue exhaust and water pressure relief valve. The power cord of the appliance is 1.5 m long.

All appliances MUST BE installed to ensure access can be gained without hazard or undue difficulty for maintenance and servicing. Sufficient clearances shall allow access and removal of all serviceable components. Appliances should not be mounted more than 2.5 m above the ground or floor level unless the customer can arrange permanent and safe access, or can provide another means of safe access.

### Horizontal obstructions

AS/NZS 5601 states a minimum horizontal clearance of 500 mm between a building structure and obstruction facing the terminal. At 500 mm the obstruction needs to be the full height of the unit (as shown), and not a partial obstruction. A partial obstruction of less than 1 m could result in wind pushing the flue gases back into the flue terminal.



<sup>1</sup> Rinnai recommend a maximum pipe run of 10 m.

<sup>2</sup> Power point can be within the pipe cover if a pipe cover is installed—must comply with AS/NZS Wiring rules

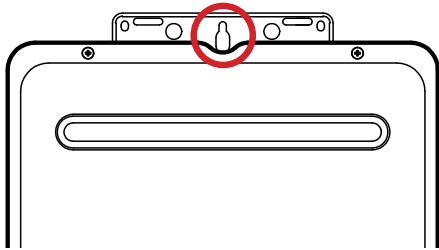
# General installation information

## Securing the Rinnai INFINITY

The wall or structure on which the units are mounted **MUST BE** capable of supporting the weight of the appliance and associated pipe work. Refer p. 7 for the specific model weight.

Ensure that suitable fixing screws or bolts are used to secure the unit to the wall, in accordance with AS/NZS 5601 section 6. Wooden plugs shall not be used.

The top bracket has a keyhole slot so that the appliance can be positioned by hanging it on one screw, once in position the appliance can then be secured with appropriate fittings.



The appliance can be mounted directly against the wall or structure. There is no need to use non-combustible sheeting between the appliance back panel and the wall or structure for the purposes of meeting the temperature hazard requirements of AS/NZS 5601.

## Pipe sizing

If the gas pipe sizing is insufficient the appliance won't perform properly. Gas pipe sizing must consider the gas input into this appliance as well as other gas appliances in the premises. The gas meter and regulator must be specified for this gas rate.

An approved sizing chart such as the one in AS/NZS 5601 should be used. Refer p. 7 for model specific gas consumption details.

Water pipe sizing and layout should be performed in accordance with AS/NZS 3500. All hot water pipe work should be insulated to optimise performance and energy efficiency.

## Water supply

The appliance is intended to be permanently connected to the water mains.

Refer p. 7 for model specific operational water pressure limitations. Approved pressure limiting valves may be required if the maximum rated water supply pressures are exceeded. To achieve the rated flow, the minimum water supply pressures must be met.

The A-Series water heaters will operate at lower pressures than the specifications, but will not achieve the rated flow. Contact Rinnai for gravity fed or low pressure installations.

Water chemistry and impurity limits are detailed in the operation guide within the warranty section. Most metropolitan water supplies fall within the requirements.

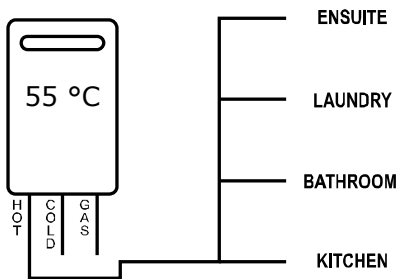
If you are unsure about your local water quality, contact your water authority. If sludge or foreign matter is present in the water supply, a suitable filter or strainer should be incorporated in the water supply to the Rinnai INFINITY.

# Water delivery temperature

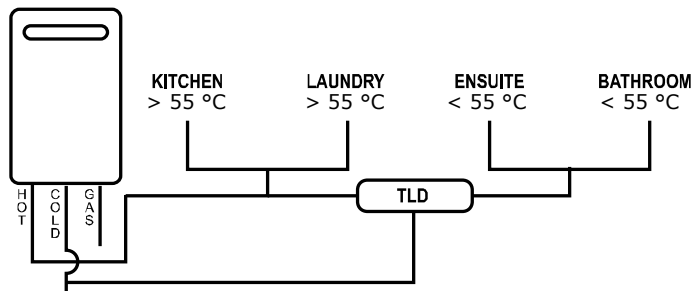
Requirements of AS/NZS 3500 MUST BE considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene. The temperature of these areas may be limited to 55 °C or less.

If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, school, nursing home or similar facility as defined in AS/NZS 3500.4, a Temperature Limiting Device (TLD), such as a tempering valve may be required, even if the appliance is set to 55 °C or less. For these types of applications contact Rinnai.

## Requirements for Rinnai INFINITY units installed without controllers



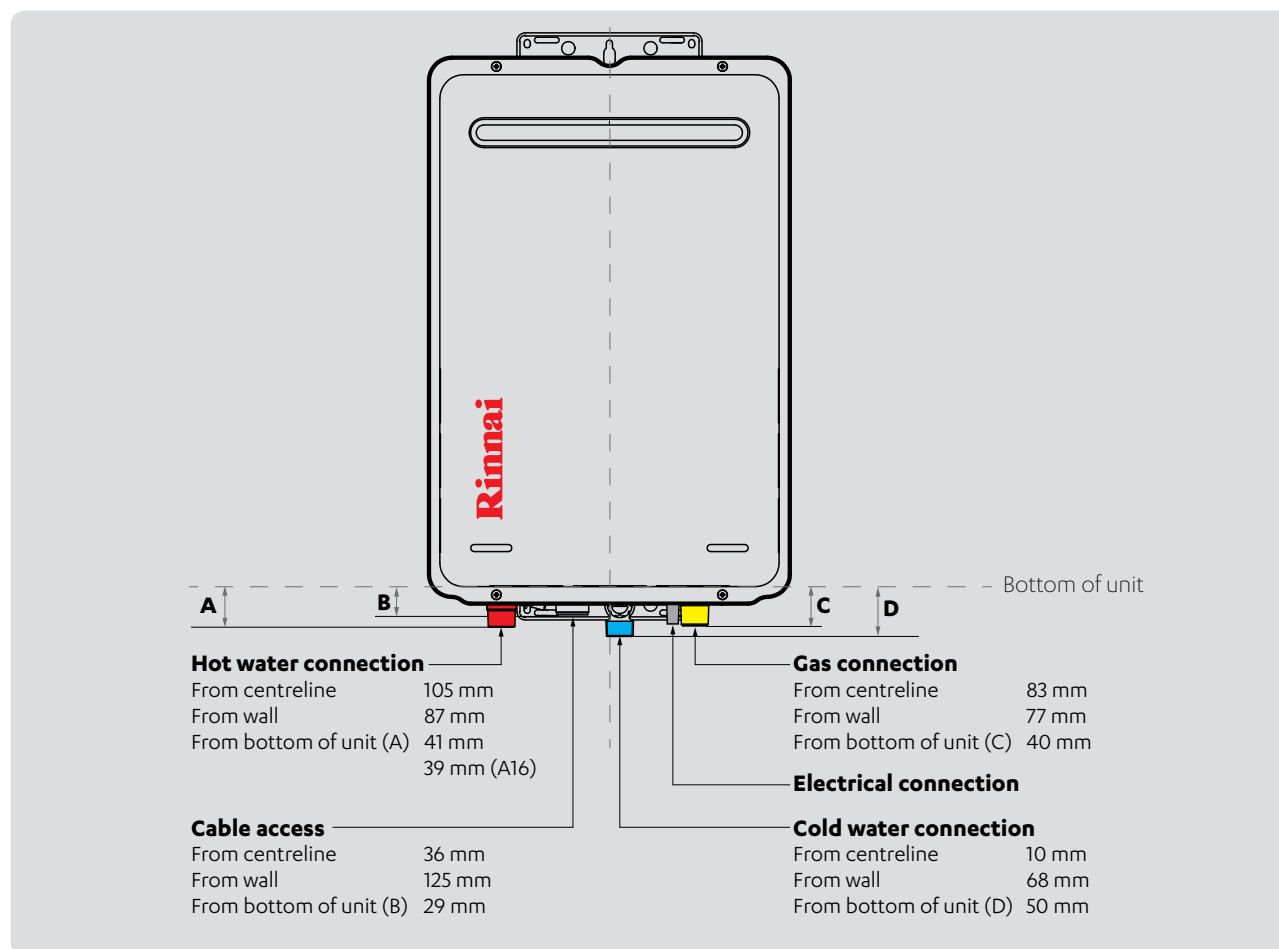
**Diagram 1 - 55 °C Appliance**



**Diagram 2 - Not a 55 °C Appliance**  
(TLD = Temperature Limiting Device)

When the Rinnai INFINITY is set to deliver water at a temperature higher than 55 °C, it will be necessary to fit a Temperature Limiting Device for delivery to areas used for the purposes of personal hygiene.

# Connections and fittings



Model	Gas consumption MJ/h	Water Supply kPa		Weight kg	Fittings		
		Min.	Max.		Hot	Cold	Gas
A16 external REU-A1620WG-ZK	16.3-124	120	1000	13	R $\frac{1}{2}$ (15 mm)	R $\frac{1}{2}$ (15 mm)	R $\frac{3}{4}$ (20 mm)
A20 external REU-A2024WG-ZK	19.9-156	160	1000	14	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)
A24 external REU-A2426WG-ZK	16.3-184	200	1000	15	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)
A26 external REU-A2626WG-ZK	16.3-199	200	1000	15	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)

## Service connection points

An approved full flow isolation valve and disconnection union **MUST BE** fitted to the cold water inlet. A non-return valve is not required unless required by local regulations.

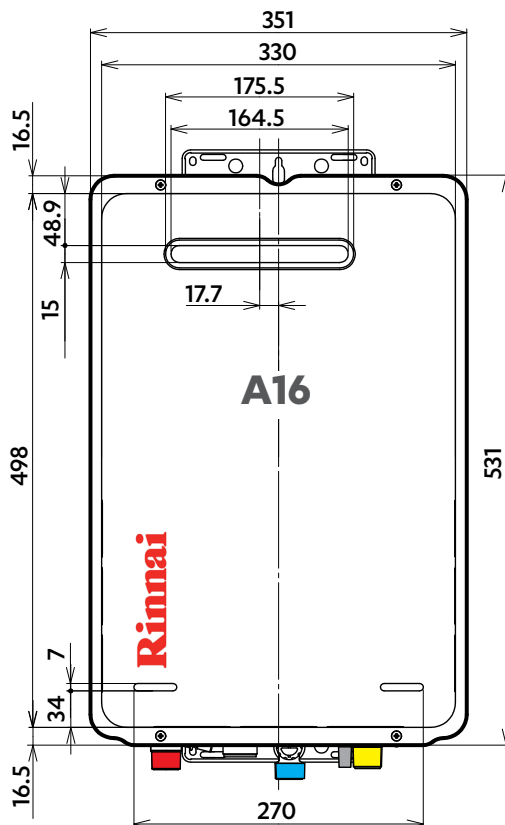
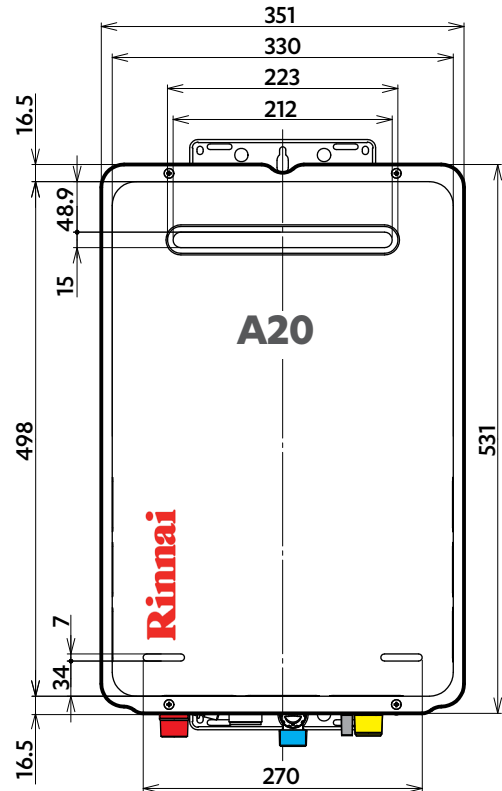
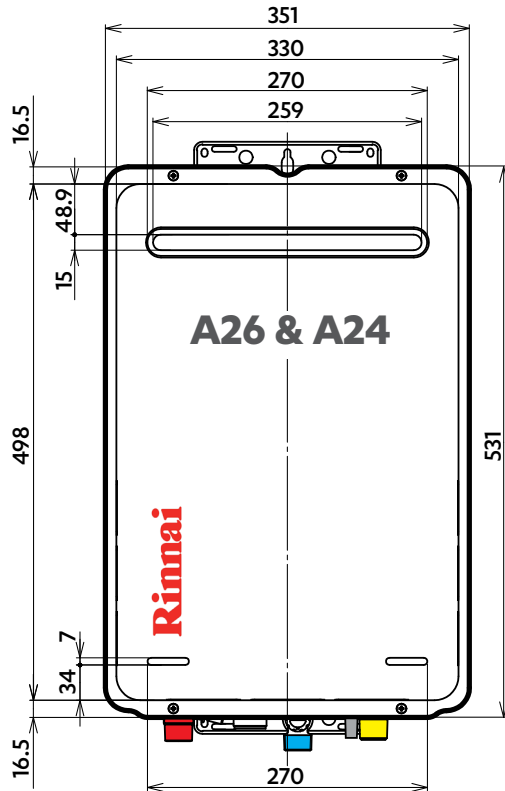
Isolation valves **MUST NOT** be fitted directly to the appliance.

It may be necessary to fit a temperature limiting device for delivery to areas used primarily for the purposes of personal hygiene, refer previous page for 'Water delivery temperature' information.

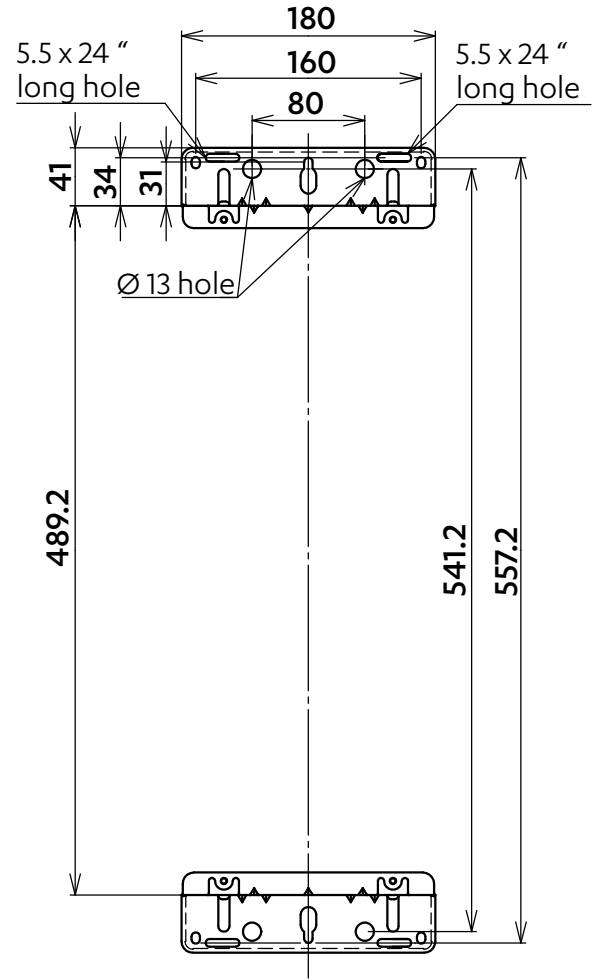
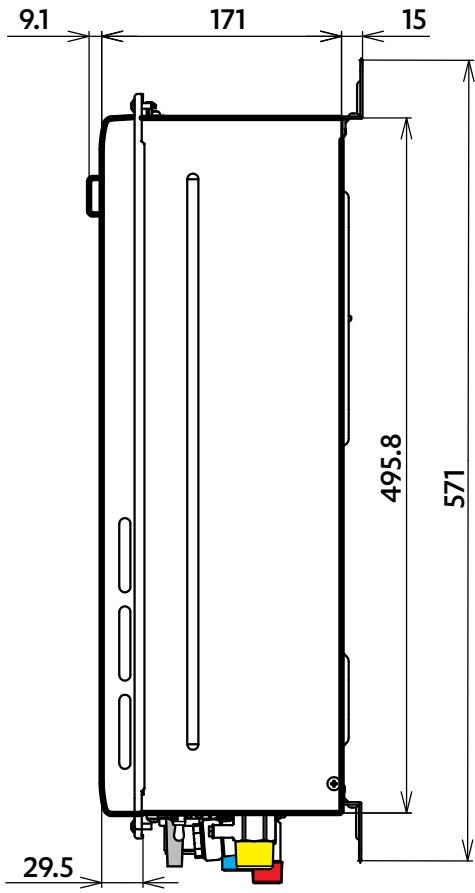
Purge gas and cold water supply lines to remove air and swarf before final connection. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.

## Dimensions (mm)

The basic dimensions, (height, width, and depth) are the same. The difference between the models are the dimensions and position of the flue outlet.







# Commissioning

AS/NZS 5601.1, clauses 2.6.8 and 6.11.2, states that every part of a gas installation shall be commissioned prior to initial use. It is the installer's responsibility to ensure all current AS/NZS 5601 requirements are met. The URL's provided are links to short videos on how key steps are performed.



The appliance operation must be tested after installation. Ensure the building occupants do not have access to the hot water outlets during this procedure.

## Please note

The Rinnai INFINITY A-Series comes with a factory preset outlet temperature of 55 °C. The high and low gas operating pressures are also factory preset. Under normal circumstances the operating pressures do not require adjustment during installation. Make adjustments ONLY if the unit is not operating correctly and all other possible causes for incorrect operation have been eliminated.

Inlet supply pressure to the appliance **MUST BE** checked and set within the operating parameters of the appliance in all instances.

If the appliance can not be adjusted to perform correctly call 0800 RINNAI (0800 746 624) for assistance.

## Steps to commissioning a Rinnai INFINITY A-Series model

1

### Flush water pipes, and gas line

Before final connection of the water heater flush the gas, hot and cold water supply lines. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.

2

### Connect gas line

3

### Purge the gas line of air

4

### Final connection test

5

### Check supply pressure

Operate ALL other gas appliances at their maximum gas rate. With all gas appliances on maximum the supply pressure must read between 1.13-3.0 kPa on Natural Gas. On LPG the pressure must be 2.75-3.0 kPa.

If the pressure is lower, the gas supply is inadequate and the appliance will not operate to specification. It is the installer's responsibility to check the gas meter, service regulator and pipe work for correct operation and sizing, and rectify as required.

## 6 **PCB and/or dip switch settings checked.**

Refer p.12-14.

PCB settings checked if the factory default temperature has been changed.

Dip switch settings checked if a flue diverter is fitted.



Short video: <http://rinnai.co.nz/007>

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## 7 **Operate and test for gas leaks**

Replace the appliance front cover otherwise the unit won't operate correctly, and operate and test for gas leaks using an electronic leak detector.

---

## 8 **Operational test—water flow and temperature at the hot water outlets**

Confirm the hot water delivery temperatures using a thermometer.

If water controllers are fitted, it is necessary to test their operation through the complete range of functions, refer separate instructions provided with the water controllers.

---

## 9 **Check cold water inlet filter**

Inspect and clean the water inlet filter. This may need to be repeated to ensure the filter remains clear, especially on new installations.



Short video: <http://rinnai.co.nz/006>

If you feel the customer is capable of doing this check it would be beneficial to show them how to inspect and clean the filter as well.

---

## 10 **Customer handover**

After testing is completed, explain to the customer the functions and operation of the water heater and water controllers (if fitted).

Also talk to them about the gas, power, and water connections, how frost protection works, the procedure for draining the water heater, where to find the data plate, maintenance and servicing. If the customer is not there try and contact them by phone to relay the important points.

Ensure the installer details section is completed in the operation guide, the commissioning checklist has been completed and signed, and that guide and checklist are left with the customer.

---

# PCB interface and dip switch settings

The PCB interface and dip switch settings must only be changed by a licensed gasfitter. They have been provided as there may be a requirement to change the temperature of the water delivered from the water heater or change the dip switch settings if fitting a flue diverter.



Care must be taken when changing the temperature or dip switch settings as they can be easily switched or bumped into the wrong position. Fully check the operation of the water heater before leaving including the temperature of the water delivered.

The cover of the water heater will need to be removed to carry out this operation. As this will expose live mains voltage wiring **please disconnect the power supply before removing the front cover.**

We wish to draw your attention to the requirements of the New Zealand Building Code and compliance document G12. This requires that water delivered to sanitary fixtures be no more than 55 °C. Increasing the water heater set temperature will require that you protect all sanitary fixtures to which the appliance is plumbed with suitable tempering valves or something similar.

Rinnai will accept no liability for issues arising out of the use of this information.

If you have any doubts about the performance of the water heater, please contact Rinnai by phoning 0800 RINNAI (0800 746 624).

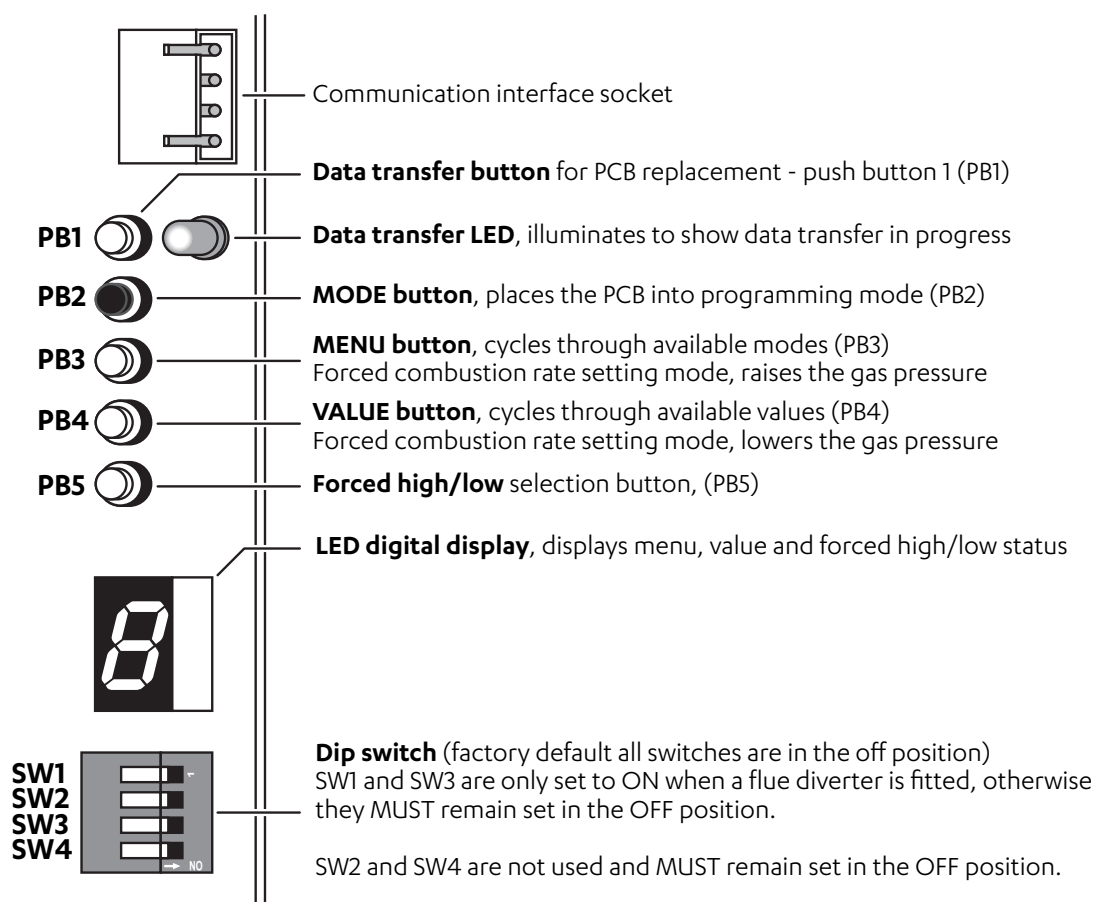
The following information details settings for the Rinnai INFINITY A-Series models only. They are not applicable for other models.

## Basic operation of the PCB interface

- To place the PCB into programming mode press PB2 until the LED digital display shows 1, noting that the current set value will be displayed shortly afterwards.
- To alter a value press PB4, each press of the button will select the next available value.
- To change to another menu, press PB3, each press of the button will select the next available menu.
- To exit the programming mode and save the selected settings press PB2 until the LED display goes blank.

## Note:

- If no buttons are pressed the PCB will automatically exit programming mode after 10 mins.
- Exiting programming mode sets the value last viewed as the current value.



Menu	Menu description	Value							
		A	b	C	d	E	F	H	J
1	Gas type	ULPG	NG	N/A	N/A	N/A	N/A	N/A	N/A
2*	Model	2626	2426	2024	1620	N/A	N/A	N/A	N/A
3	Fixed / Max. temp	55 °C <sup>1</sup>	65 °C	60 °C	50 °C	42 °C	40 °C	N/A	N/A
4	OFF water flow rate	+ 3 °C <sup>2</sup>	+ 6 °C	N/A	N/A	N/A	N/A	N/A	N/A
5	50 °C delivery adjustment temp.	Min Step 0	Increase Step 1	Increase Step 2	Increase Step 3	Increase Step 4	Increase Step 5	Increase Step 6	Increase Max

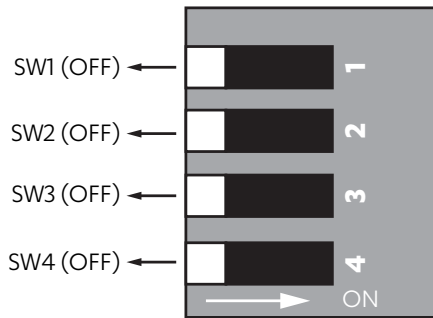
The temperature of outgoing hot water is constantly monitored by a built-in sensor. If the temperature of the outgoing hot water rises to more than 3 °C (6 °C #) above the selected temperature shown on the digital monitor or the preset limit when water controllers are fitted, the burner will automatically go out.

- \* Values in menu 2 cannot be adjusted.
- 1 Factory default
- 2 OFF water flow rate (+3 °C, factory default)

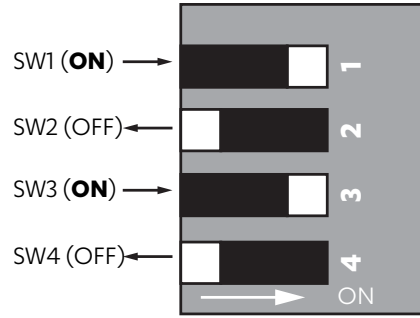
## Flue diverter dip switch changes

When delivered ex-factory, by default SW1, SW2, SW3, and SW4 of the DipSW are set to the OFF position.

If a flue diverter is installed onto the water heater, SW1 and SW3 of the DipSW must be set to the ON position.



Default dip switch settings as they are ex-factory.



Dip switch settings required for flue diverter installation.

The dip switch change for flue diverters is required to increase the combustion fan speed, which helps overcome the friction losses from have a flue diverter installed on the water heater.



# Appendix 1:

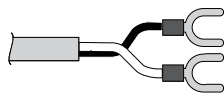
## Water controller communication cables

Wired water controllers operate at an extra low voltage (12 V DC) which is supplied from the water heater, a 10 m long communication cable is supplied for connection to the water heater. Only Rinnai supplied communication cables may be used.

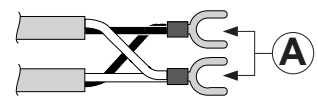
The water heater end of the cables is fitted with spade terminals. Only two pairs of cables (four spade connectors in total) may be terminated. When attaching three or four cables it is necessary to join the cable terminators as shown below.

For each pair cut off the existing spade connectors and re-terminate each pair into a new spade connector (A). Spade connectors are available from your local electrical component retailer

Single cables can be used when terminating up to two communication cables.



Paired cables are to be used when terminating three or four communication cables.

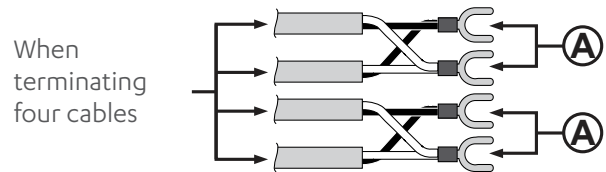
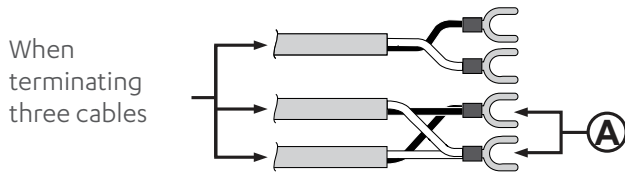


### Connecting one or two communication cables

Follow steps one through five below to terminate the cables to the water heater.

### Connecting three or four communication cables

To connect three or four cables, separate all the cables to be fitted into pairs.

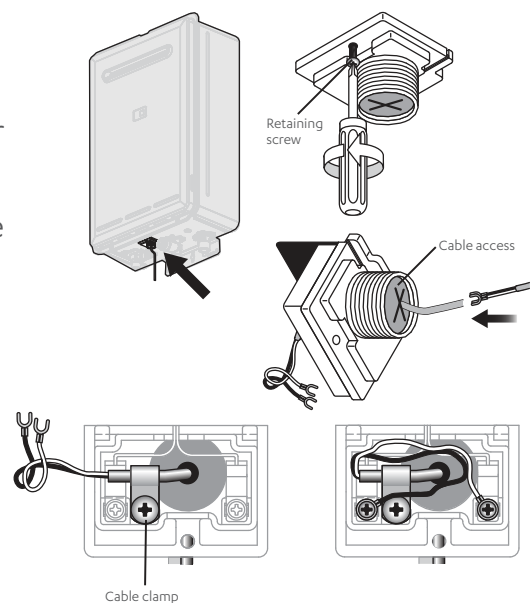


Follow steps one through five below to terminate the joined cable pairs to the water heater.

1. Isolate the power supply by switching the power point off and removing the power plug of the water heater from the electric power socket.
2. Removing the retaining screw of the cable connector at the base of the unit.
3. Swing the cable connector door open and thread the cable through the weather seal of the cable access hole, allowing sufficient cable length so that the sheath of the cable can be secured with the cable clamp supplied with the transceiver.
4. Loosen the screw terminals and connect the cable spade connectors to these terminals and re-tighten.

Polarity is not important, either wire colour can be connected to either terminal.

5. Return the cable connector to the original position, taking care not to damage the cable wires in the process, and replace the retaining screw.



a touch  
of magic



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<http://www.youtube.com/rinnainz>

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