



Demand Calculation Sheet

Job Details

Name: TKR Developments (Clark & Allnut)
 Street and Number: 3 Olivia Street
 Lot and DP Number: Lot 43
 City/Town/District: Rolleston
 Designer: M Glynn
 Company: Signature Homes Ltd
 Date: Monday, October 19, 2020

Building Specification

Number of Storeys: 1
 Floor Loading: 2 kPa
 Foundation Type: Slab
 Cladding Weight: **Single** Heavy
 Roof Weight: Light
 Room in Roof Space: No
 Roof Pitch (degrees): 25
 Roof Height above Eaves (m): 3.11
 Building Height to Apex (m): 5.46
 Ground to Lower Floor (m): 0.2
 Average Stud Height (m): 2.4
 Building Length (m): 13.52
 Building Width (m): 11.61
 Building Plan Area (m²): 149.56

Building Location

Wind Zone = High

Wind Region: A
 Lee Zone: No
 Ground Roughness: Open
 Site Exposure: Exposed
 Topography Class: T1

Earthquake Zone 2

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	682	908

Bracing Units required for Earthquake

	Along & Across
Single Level	900

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GIB EzyBrace® Bracing Software



Single Level Along Resistance Sheet

Job Name: TKR Developments (Clark & Allnut)

Wind	EQ
Demand	
682	900
Achieved	

Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1120	1161
A	1	0.60		2.4	EP1 0.6	Ecoply®	57	63	164%	129%
	2	1.20		2.4	EP1 1.2	Ecoply®	144	162		
	3	1.20		2.4	EP1 1.2	Ecoply®	144	162		
	4	0.60		2.4	EP1 0.6	Ecoply®	57	63		
									402 OK	450 OK
B	1	1.80		2.4	GS1-N	GIB®	124	108	373 OK	324 OK
	2	1.80		2.4	GS1-N	GIB®	124	108		
	3	1.80		2.4	GS1-N	GIB®	124	108		
C	1	1.20		2.4	EP1 1.2	Ecoply®	144	162	345 OK	387 OK
	2	0.60		2.4	EP1 0.6	Ecoply®	57	63		
	3	1.20		2.4	EP1 1.2	Ecoply®	144	162		

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GIB EzyBrace® Bracing Software



Single Level Across Resistance Sheet

Job Name: TKR Developments (Clark & Allnut)

Wind	EQ
Demand	
908	900
Achieved	
1054	1051
116%	117%

345 OK		387 OK	
262 OK		228 OK	
248 OK		216 OK	
198 OK		220 OK	

Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)
M	1	1.20		2.4	EP1 1.2	Ecoply®	144	162
	2	1.20		2.4	EP1 1.2	Ecoply®	144	162
	3	0.60		2.4	EP1 0.6	Ecoply®	57	63
N	1	1.20		2.4	GS1-N	GIB®	83	72
	2	1.40		2.4	GS1-N	GIB®	97	84
	3	1.20		2.4	GS1-N	GIB®	83	72
O	1	1.80		2.4	GS1-N	GIB®	124	108
	2	1.80		2.4	GS1-N	GIB®	124	108
P	1	0.60		2.4	EP1 0.6	Ecoply®	57	63
	2	0.60		2.4	EP1 0.6	Ecoply®	57	63
	3	0.40		2.4	BL1-H	GIB®	36	40
	4	0.40		2.4	BLP-H	GIB®	48	54

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Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
Ecoply®	EP1 0.4	0.4	80	95
Ecoply®	EP1 0.6	0.6	95	105
Ecoply®	EP1 1.2	1.2	120	135
NZS3604	masonry 0.75	1.5	42	42
NZS3604	masonry 1.5	1.5	100	100
NZS3604	masonry 3.0	1.5	200	200
NZS3604	masonry 4.5	1.5	300	300

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EzyBrace[®] Systems

Specification and installation manual

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CBI 5113

AUGUST 2016

NATIONAL SUPPORT

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GIB® HELPLINE

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Based on learnings derived from the 2011 Canterbury earthquakes GIB EzyBrace® Systems have been updated to offer improved design flexibility and further simplification of the bracing design and build process.

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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 fasteners¹
- Encourages more even bracing distribution throughout the building.

¹ Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

- Large hole specification updated to use a more conservative methodology.
- Guidance included for fireplace flues and range hoods.

NEW – GIBFIX® FRAMING SYSTEM

- Reduced potential for fastener pop and joint cracking as a result of timber frame movement.
- Reduced potential for on-site call backs.
- Improved thermal performance.
- Reinforced plasterboard junctions.



BRANZ Appraised
Appraisal No.928 [2016]

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GIB EzyBrace® Systems — August 2016

Winstone Wallboards Ltd accepts no liability if GIB EzyBrace® Systems are not designed and installed in strict accordance with instructions contained in this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication at any time. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Check for the current publication at gib.co.nz/library before using this publication. If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442.

GIB EzyBrace® 2011 software and specification literature remains valid until 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.

Specified GIB® plasterboard	Acceptable alternative GIB® plasterboards								
	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. 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.

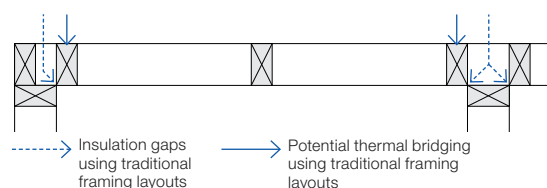
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

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.

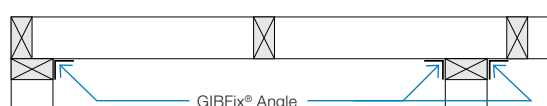
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

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.

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.

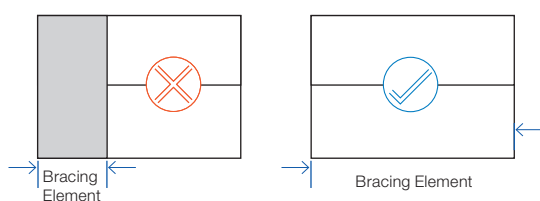


Bracing resistance

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:

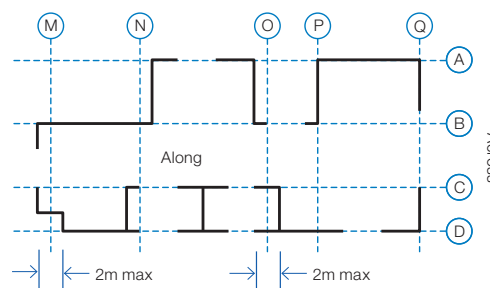
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

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.

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 downloaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

Wind and Earthquake 'Demand' calculates the forces a structure must be able to resist during its 'design life'. The GIB EzyBrace® calculator's Demand sheet determines the number of Bracing Units required depending on building location, building dimensions and materials used. The Demand sheet closely follows the familiar format of our Excel based GIB EzyBrace® calculator, and includes additional features such as a pop-up help facility explaining required input.

Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design life' of a light timber framed residential structure, a 'return period' of 500 years.

Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

A screen shot of the GIB EzyBrace® 2016 Demand Sheet and Help Facility is shown in figure 5.

FIGURE 5: GIB EZYBRACE® 2016 — DEMAND CALCULATION SHEET AND 'POP UP' HELP FACILITY

GIB EzyBrace® Bracing Software

Job Details

Name: A Job
 Street and Number: 100 Job Street
 Lot and DP Number: Lot 321, DP 496
 City/Town/District: Johnson
 Designer: AR Client
 Company: Jobs Limited
 Date: 1/08/15

Building Specification

Number of Storeys: Single
 Floor Loading: 2 kPa
 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

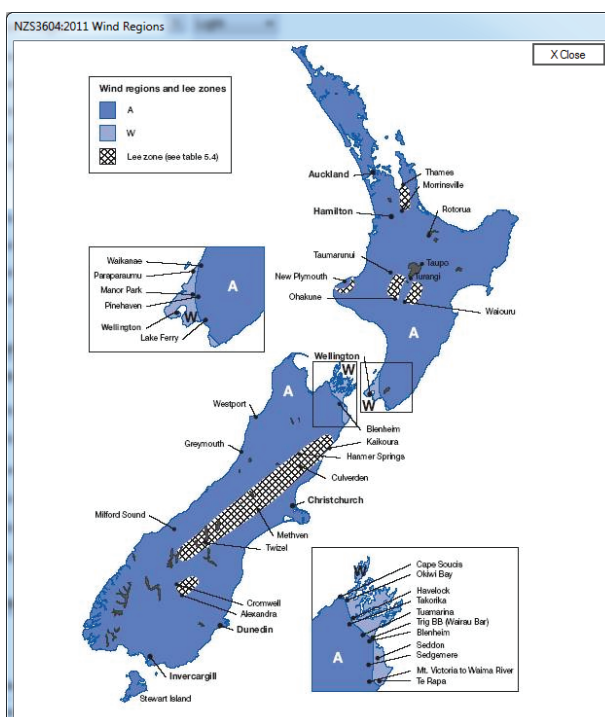
Building Location

Wind Zone or Consent Authority: Not Avail.
 Wind Region: A
 Lee Zone: No
 Ground Roughness: Urban
 Site Exposure: Sheltered
 Topography Class: T1

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		Bracing Units required for Earthquake	
Along	Across	Along and Across	
Single Level	258	222	Single 264

Demand | Single Along | Single Across | Custom



Download GIB EzyBrace® 2016 design software from 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.

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FIGURE 6: GIB EZYBRACE® 2016 — WALL BRACING RESISTANCE CALCULATION SHEET

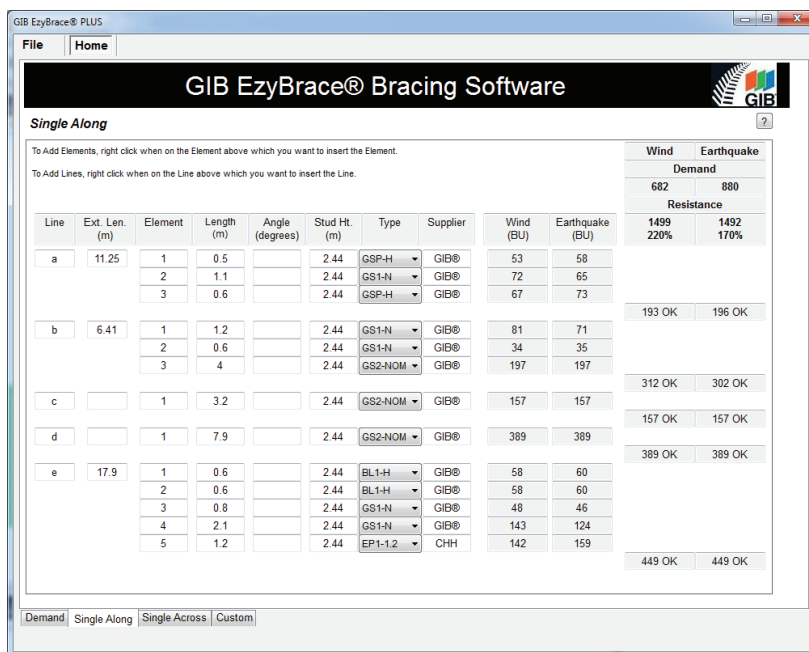
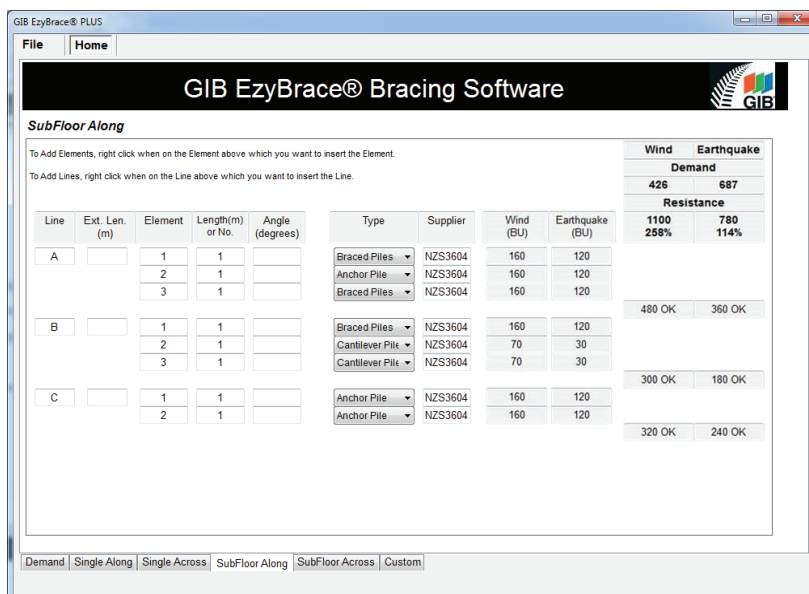


FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET

Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace





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 Depend	Element Foundation Depend
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 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

Bracing Units required for Wind		Bracing Units required for Earthquake	
Along	Across	Along & Across	
Single Level	612	990	Single Level 177



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

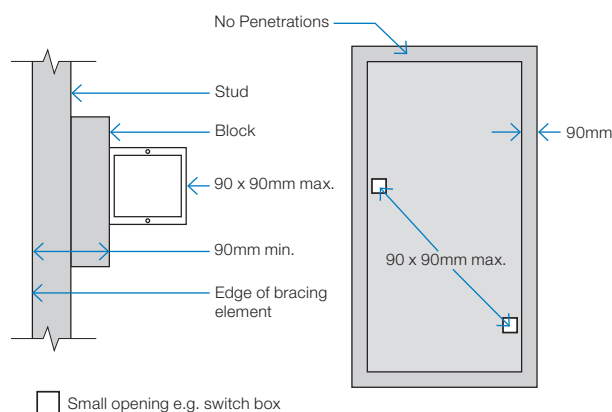
SMALL OPENINGS

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

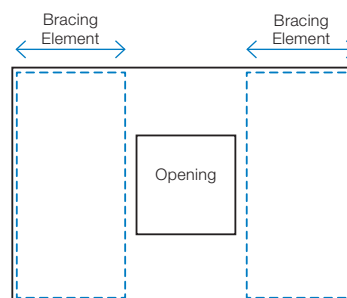
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

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.

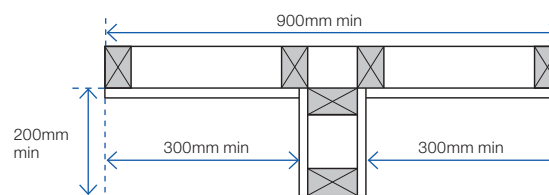
Guidelines for intersection walls

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).

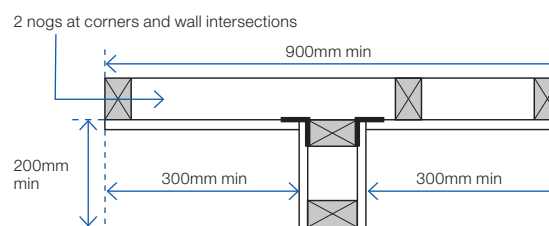
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



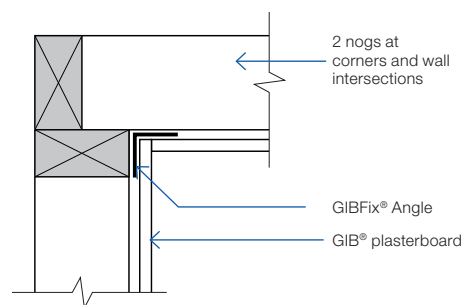
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



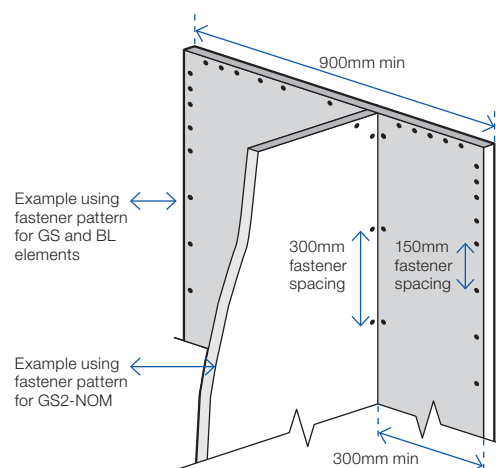
GEB003

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

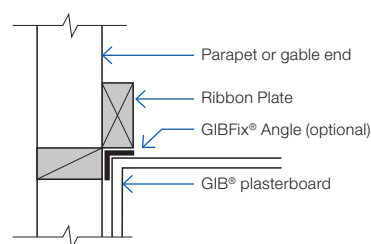
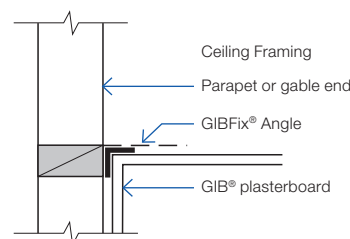


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



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

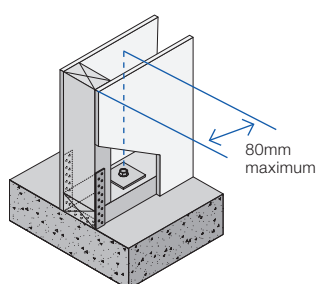
positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor

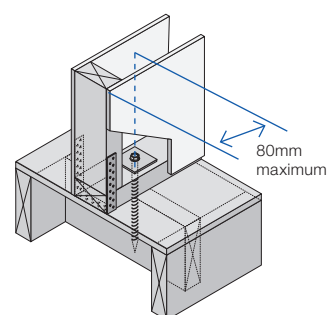
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.

Timber floor

Internal wall

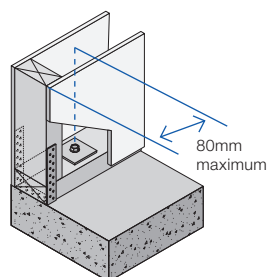


GEB004

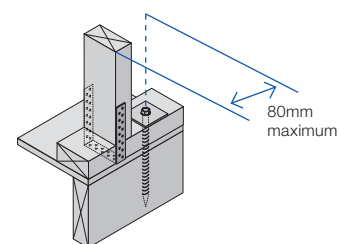


GEB005

External wall



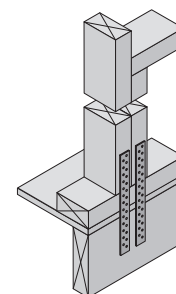
GEB006



GEB007

Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.

2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.



GEB008

Hold-down fastener requirements

Concrete floor

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.

Timber floor

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

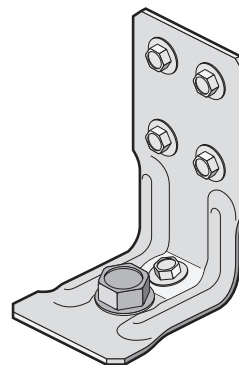


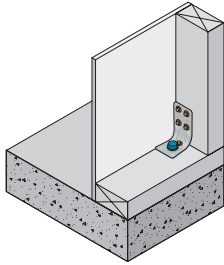
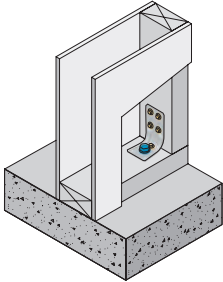
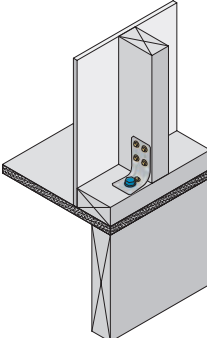
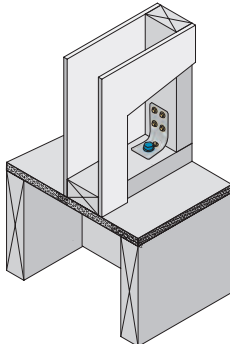
GIB HandiBrac® installation

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>GEB010</p>	 <p>GEB011</p>	 <p>GEB012</p>
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

GIB HandiBrac[®] placement with GIBFix[®] Framing System for concrete floors

Figure 18 shows the preferred positioning of the GIB HandiBrac[®] panel hold-down brackets within the GIBFix[®] Framing System layout and where they are required by bracing systems with an 'H' in the specification code.

Note that, in corners and at wall junctions, a single GIB HandiBrac[®] can serve 'H' type bracing elements in both directions, but additional intermediate concrete anchors may need to be installed to meet the minimum requirements of NZS 3604:2011 for bottom plate fixing.

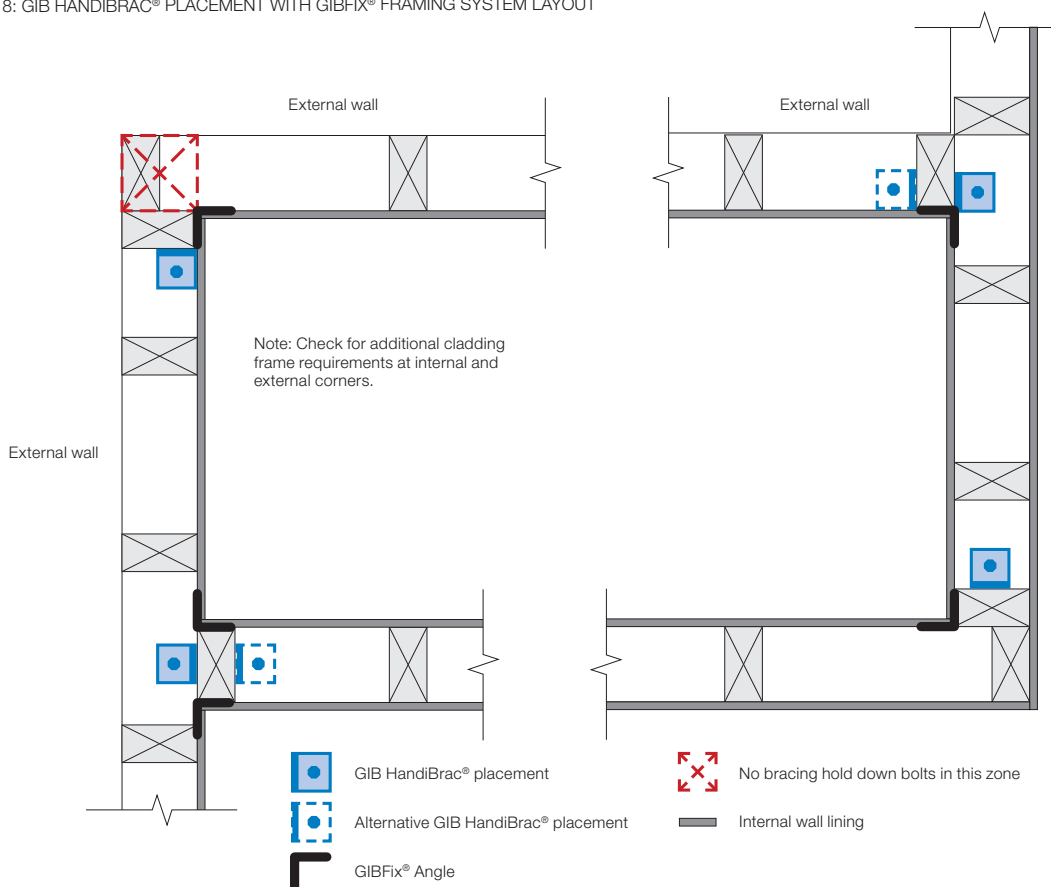
The GIB HandiBrac[®] is fixed to the stud which has the GIBFix[®] Angle.

For bracing elements with sheet material both sides of the wall connect corner studs using 8/90mm gun nails as shown in figure 19.

TIMBER FLOORS

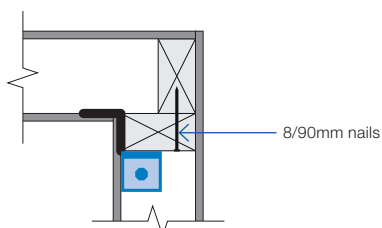
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

FIGURE 18: GIB HANDIBRAC[®] PLACEMENT WITH GIBFIX[®] FRAMING SYSTEM LAYOUT



GEB013

FIGURE 19: STUD CONNECTION FOR 'H' TYPE BRACING ELEMENTS WITH SHEET MATERIAL BOTH SIDES



GEB014

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Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, "GIB® Site Guide". All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see "GIB® Site Guide").
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see "GIB® Site Guide" and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

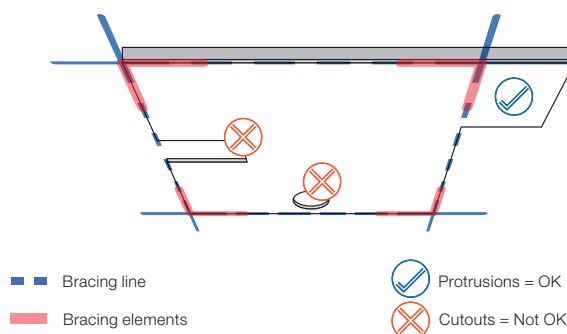


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

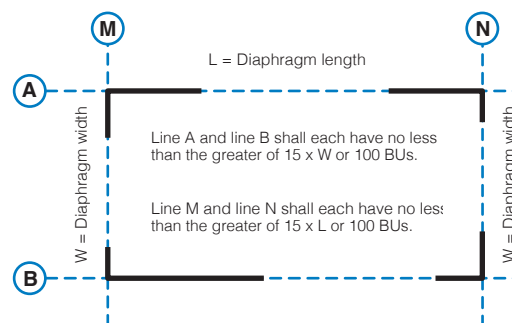
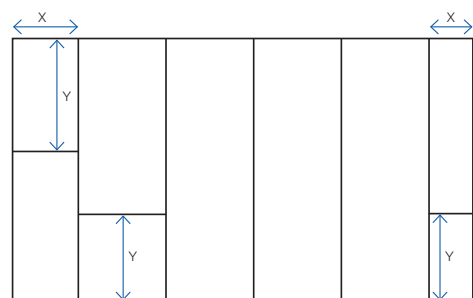
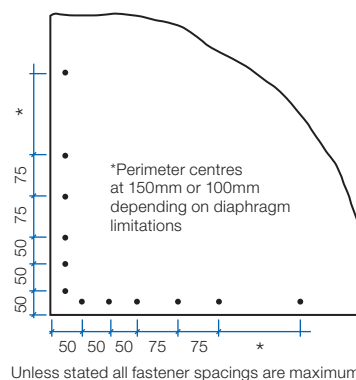


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm Y = 1800mm min sheet lengths min provided all adjacent joints at ends of ceiling diaphragms are back-blocked.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015



Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:

- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

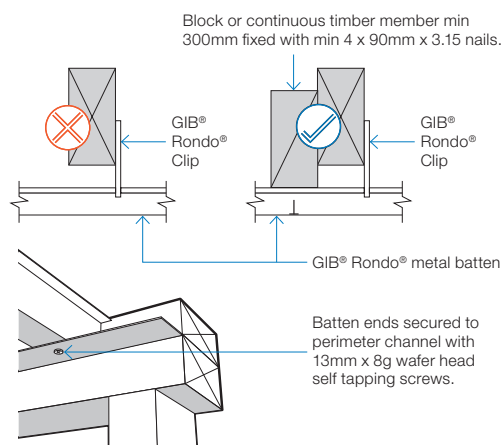
For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:

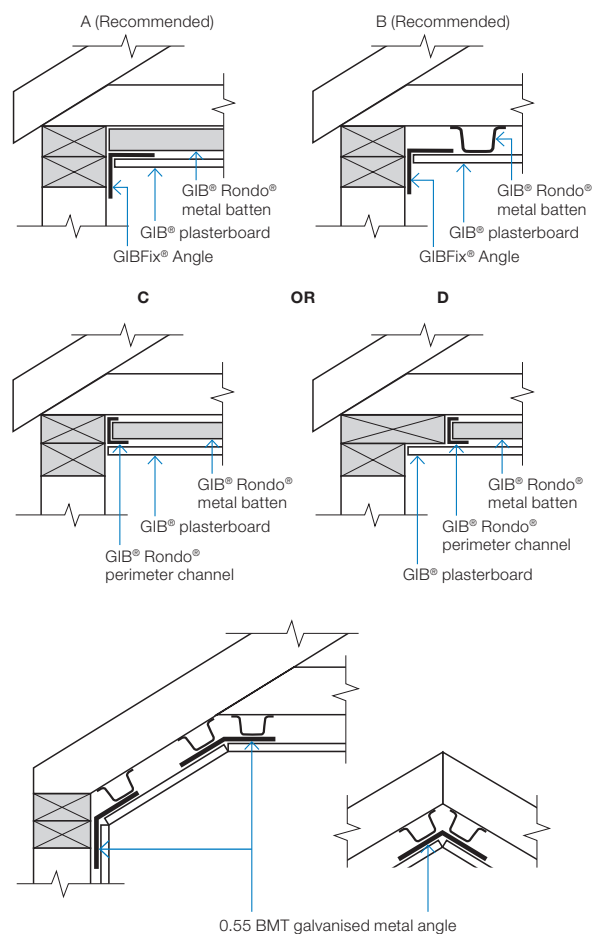
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



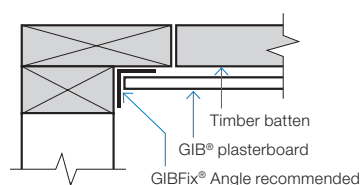
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed within the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvansed metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

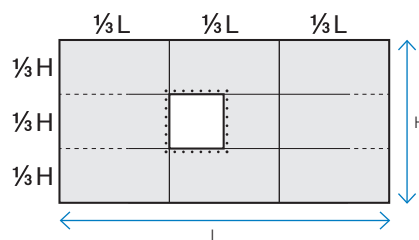
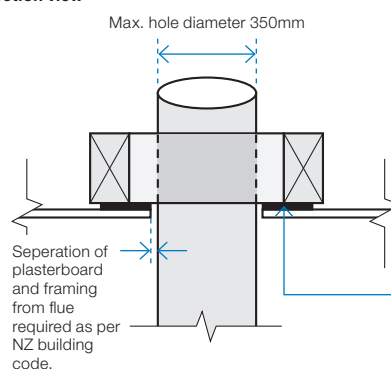


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

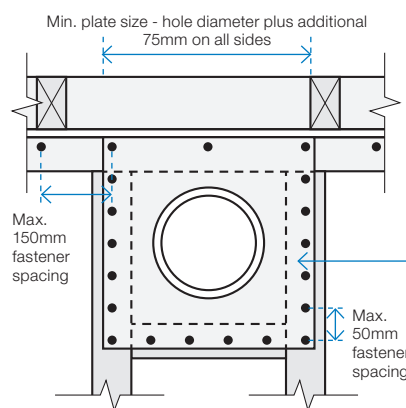
Section view



Steel plate
0.55 BMT
Galvanised sheet
Max. opening
350mm diameter.
Installed prior to
GIB® plasterboard.

Framing
90 x 45mm framing
trimmed to provide
extra fixing.

Plan view



GIB® plasterboard ceiling
Installed over the
steel plate and into
framing using a
minimum of 32mm
x 6g GIB® Grabber
High Thread or
32mm x 7g GIB®
Grabber Dual Thread
screws at 50mm
max centre spacing.

Plasterboard ceiling not shown in plan view



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

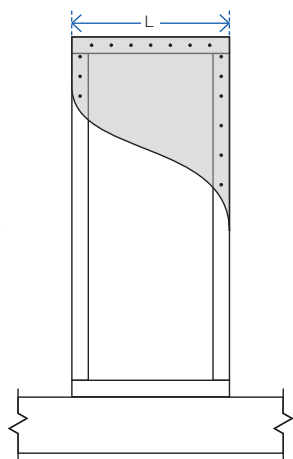
The dimension 'L' shall not be less than 400mm.

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.

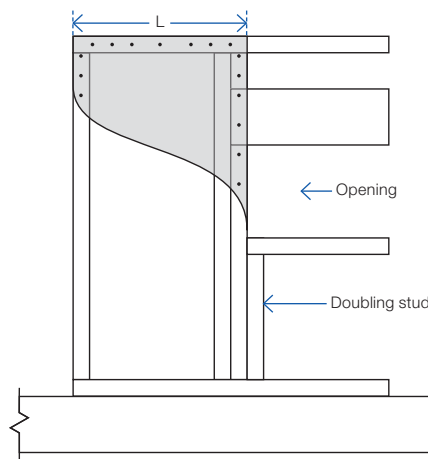
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FIGURE 29: GS BRACING ELEMENTS (OPTION A)



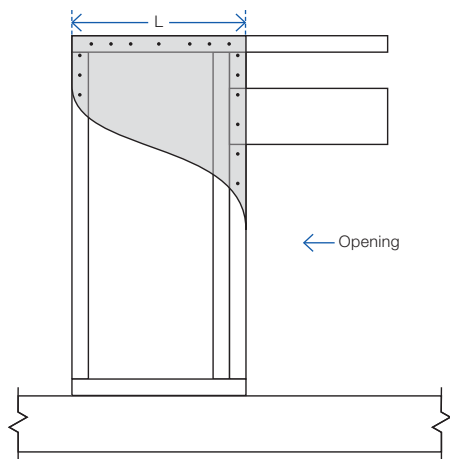
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



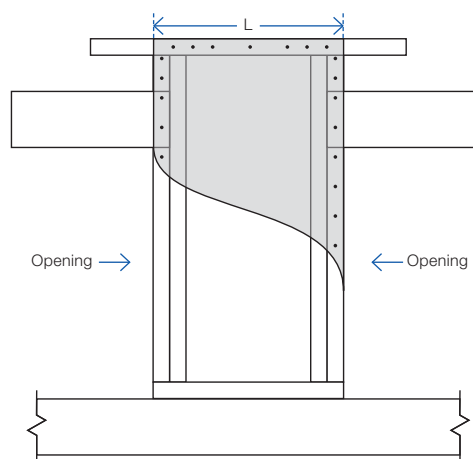
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

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.

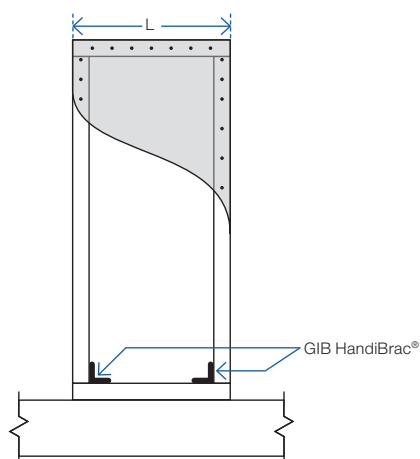
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

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.

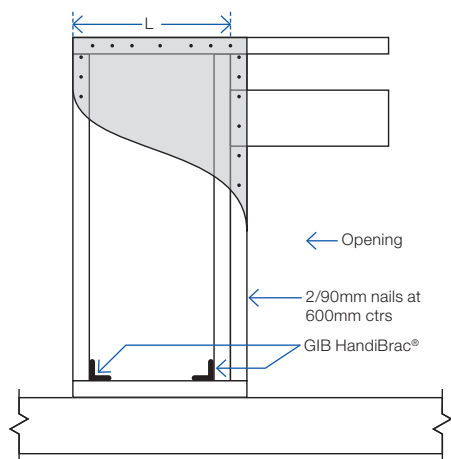
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



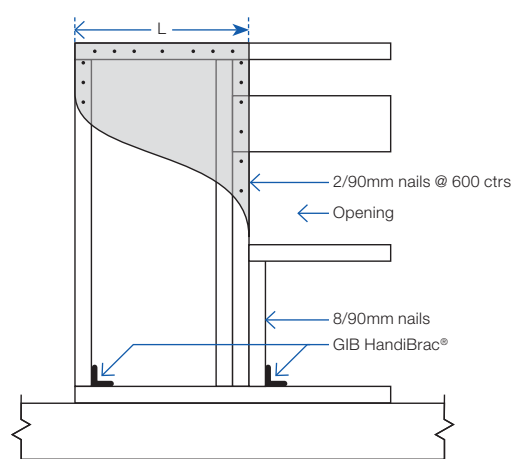
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



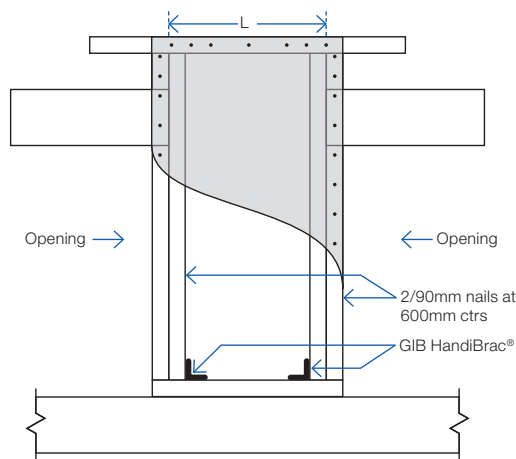
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

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

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GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

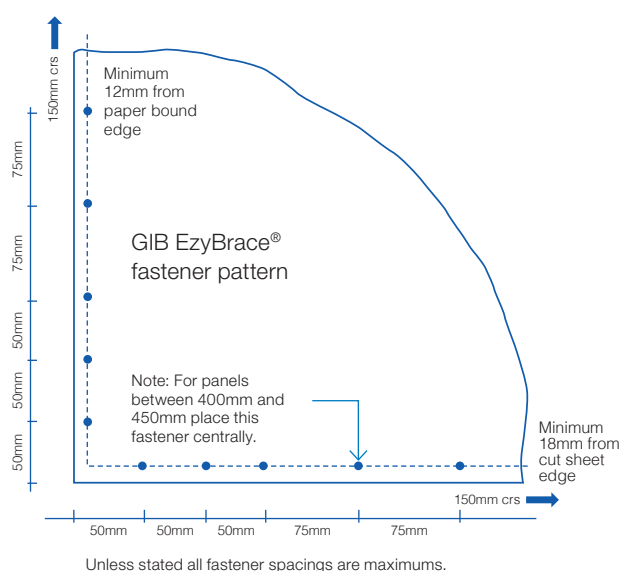
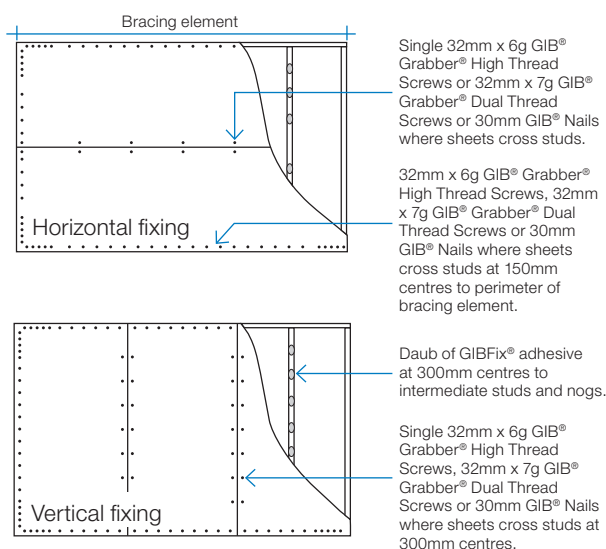
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



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



GIB EzyBrace® Systems specification GS2-NOM

Specification code	Minimum length (m)	Lining requirement
GS2-NOM	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100mm x 3.75mm nails at 600mm centres; or three power driven 90mm x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75mm x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

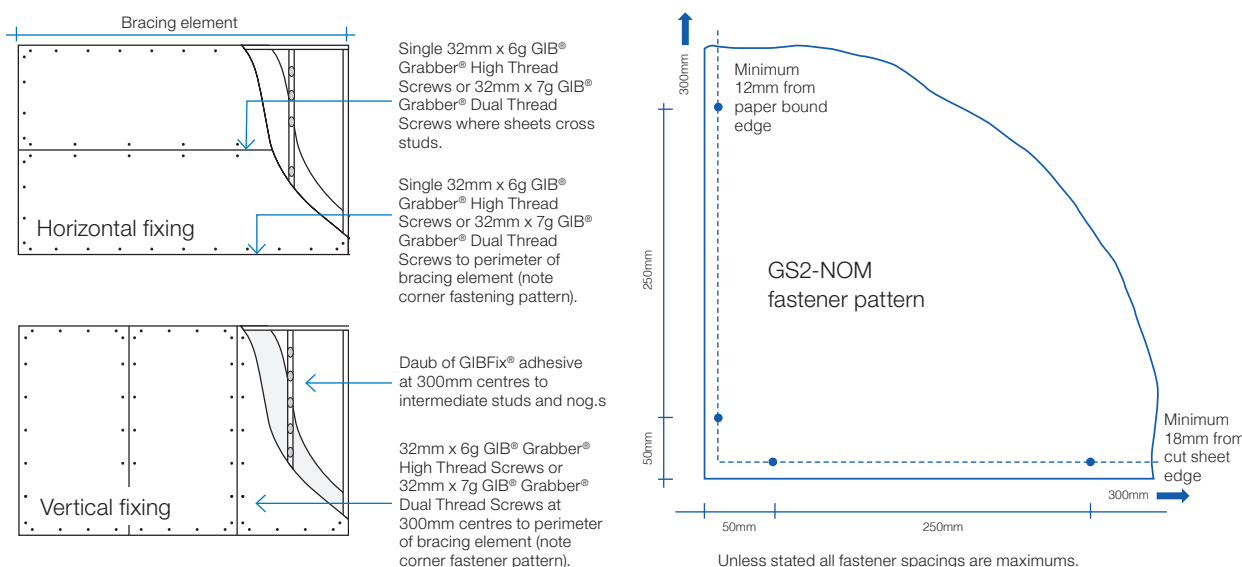
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



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.

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FIGURE 37: SCREW FIX FOR OPENINGS

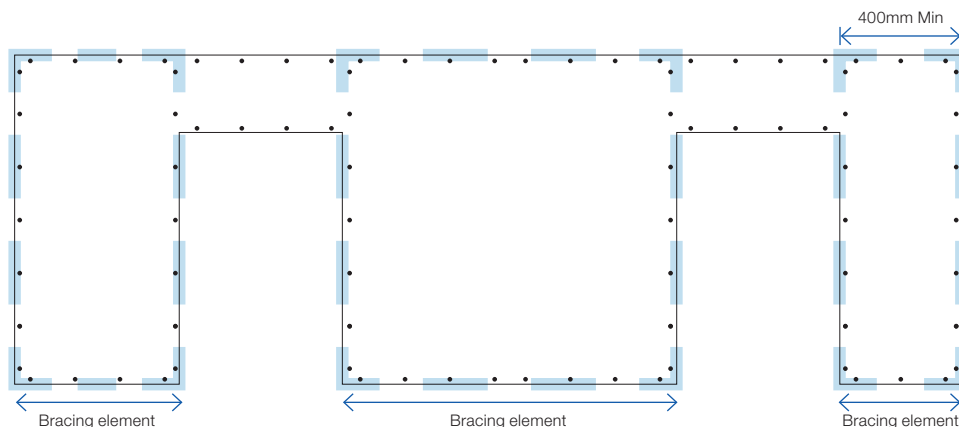
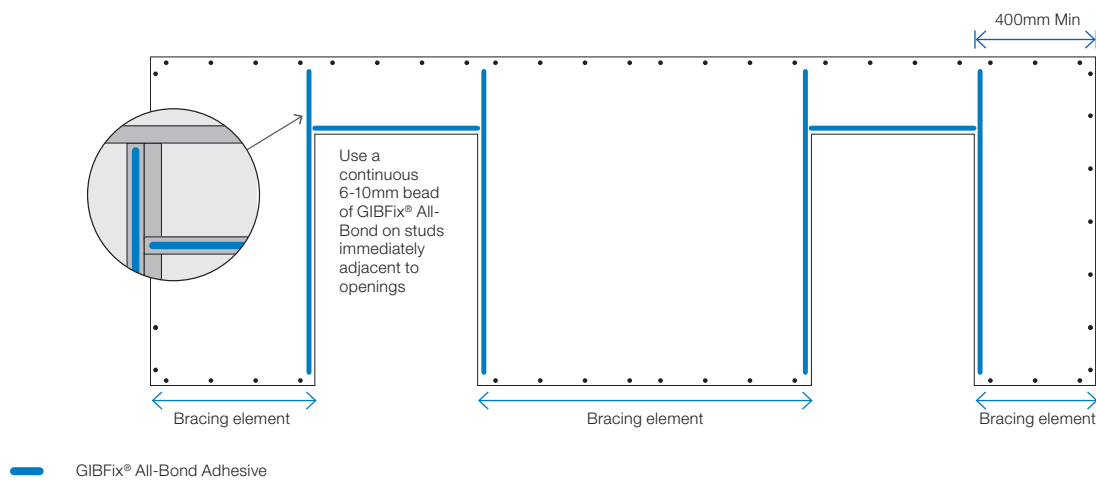
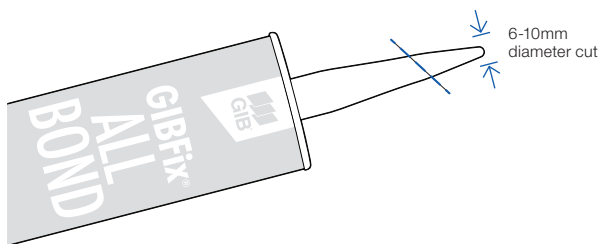


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE





GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

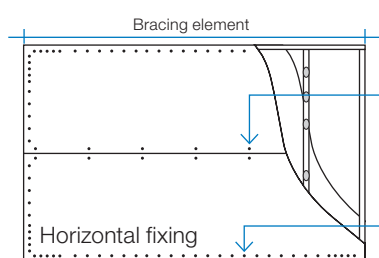
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

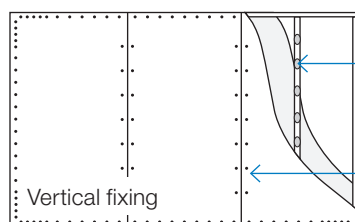
JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



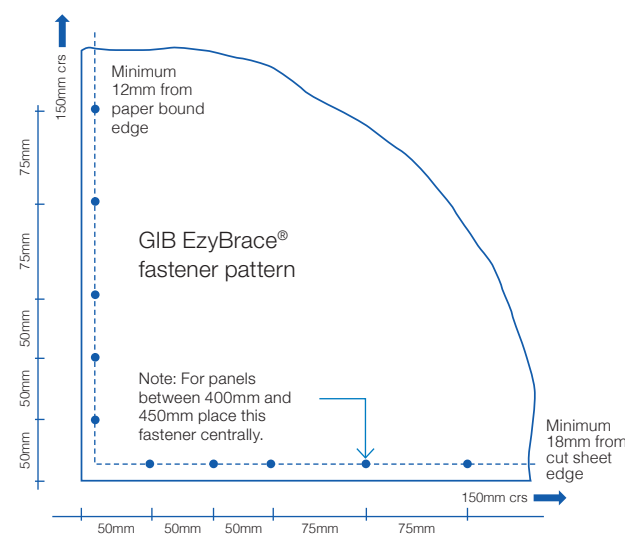
Single 32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails where sheets cross studs.

32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails at 150mm centres to perimeter of bracing element.



Daub of GIBFix® adhesive at 300mm centres to intermediate studs and nogs.

Single 32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails at 300mm centres.



Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems



GIB EzyBrace® Systems specification GSP-H

Specification Code	Minimum length (m)	Lining requirement	Other requirements
GSP-H	0.4	Any 10mm or 13mm GIB® plasterboard lining to one side of framing and minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally, with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails.

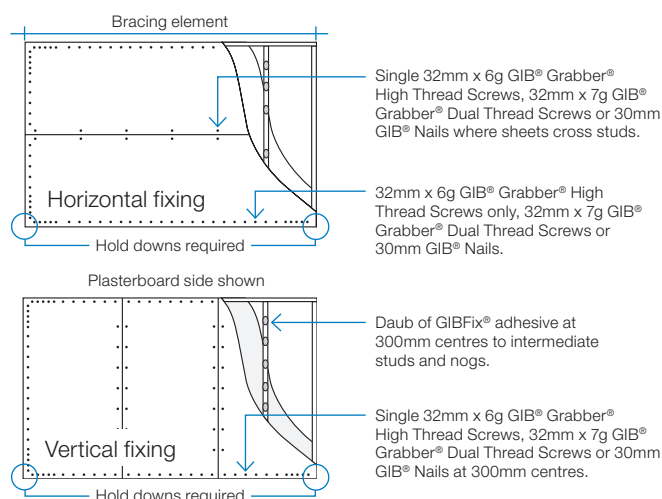
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

Fastener centres

GIB® plasterboard side: 50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



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



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

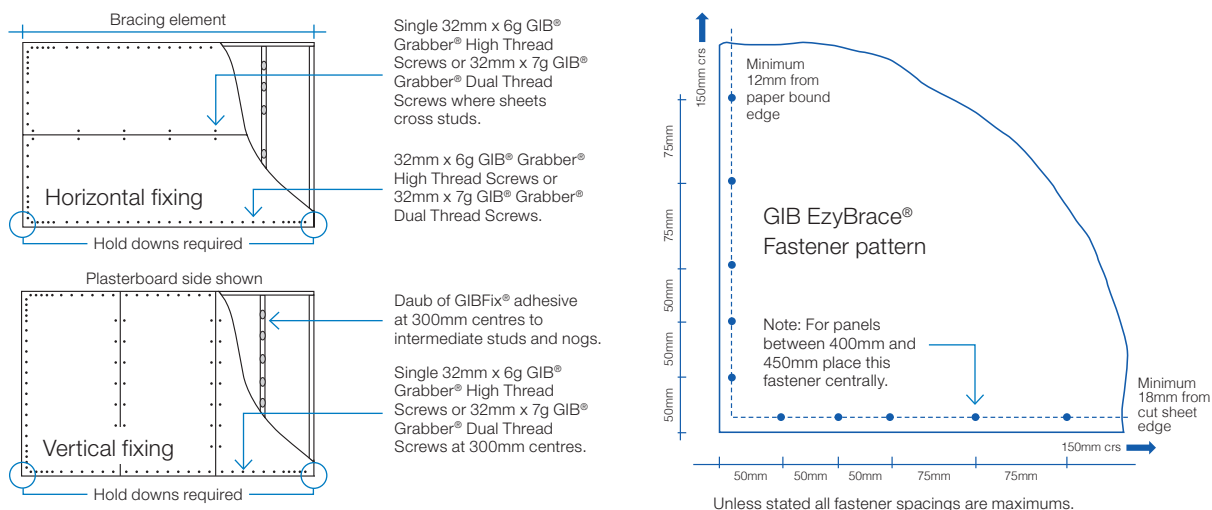
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

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



GIB EzyBrace® Systems specification BLG-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLG-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus any 10mm or 13mm GIB® plasterboard to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems 2011 or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus any 10mm or 13mm GIB® plasterboard lining to the other side.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Other side: 32mm x 6g GIB® Grabber® High Thread Screws, 30mm GIB Nails or 32mm x 7g GIB® Grabber® Dual Thread Screws.

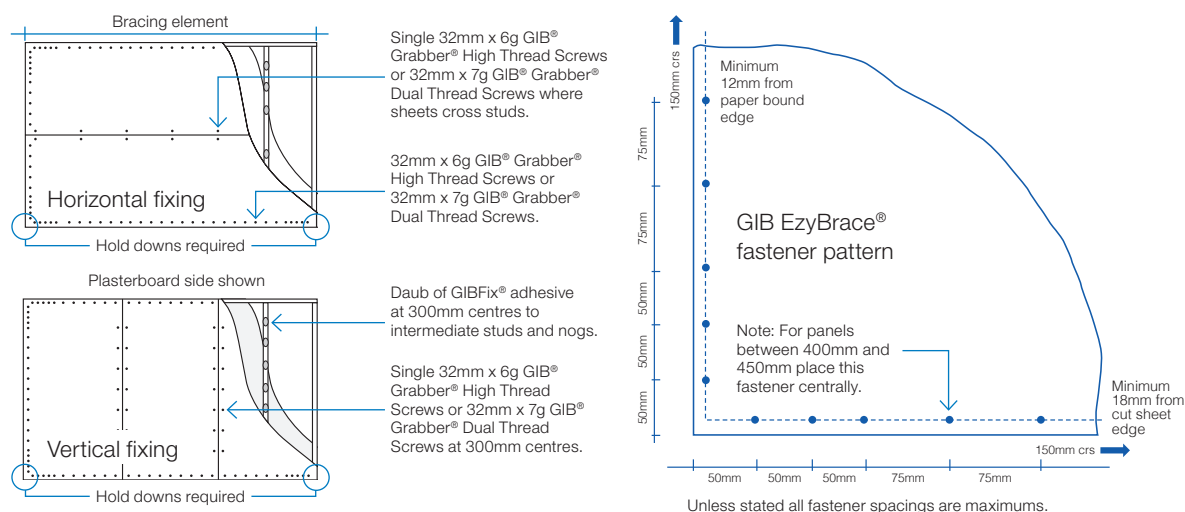
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



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



GIB EzyBrace® Systems specification BLP-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLP-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 – Structure; B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 – Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB® HandiBrac is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of AS/NZ 2269/0 :2012.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZS 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally.
- Plywood is to be fixed vertically with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

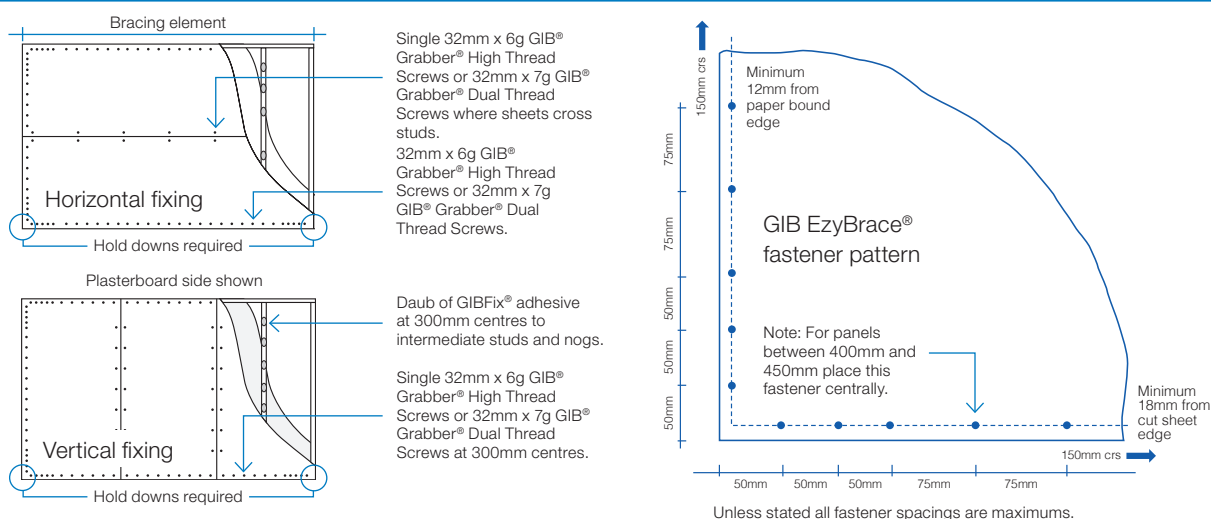
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

GIB® Plasterboard side: 50,100,150, 225, 300mm from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



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^{CERT™}

The Global GreenTag^{Cert™} certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag^{Cert™}.

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

Declare is a database of non-toxic, sustainably sourced building products.

Many GIB® plasterboard products including GIB® Standard, GIB Braceline®, GIB Noiseline® and GIB Aqualine® have achieved Red List Free status in Declare certification.

For more information on Winstone Wallboards sustainability commitments visit gib.co.nz.

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Winstone Wallboards asserts its moral rights and reserves all other intellectual property rights in the materials contained in this brochure and related to GIBFix® Framing System and GIB EzyBrace® Systems.

TRADEMARKS

The names GIB®, GIB Fyrelite®, GIB Ultralite®, 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 Fyrelite®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights.



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FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442



Construction R-value Calculator

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

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

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

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

- Floors
- Walls
- Roofs

Date: 22/10/2020

Element Name (optional)

1.53

m²C/W

Type: Floor: Slab Floor ▼

Slab Floor

view detail

internal surface 0.09

Flooring : none (Example: polished surface of a concrete floor) ▼

R-value: 0.00

Slab Insulation

Slab floor area [m ²]:	143.6			
Perimeter length [m]:	52.10			
External wall thickness [mm]:	100	i		
Soil conductivity [W/m °C]	1.2	i		
Underslab insulation:	none	▼	Insulation :	<input type="text"/>
Piles Footings:	Number:	<input type="text"/>	Penetration Diameter [mm]:	<input type="text"/>
Slab edge insulation:	none	▼	Insulation :	<input type="text"/>

Print Page

Current NZS4218:2009 Schedule Method minimum R-value Targets (non-solid construction) [i](#):

	Zone 1	Zone 2	Zone 3
Roof	R-2.9	R-2.9	R-3.3
Wall	R-1.9	R-1.9	R-2.0
Floor	R-1.3	R-1.3	R-1.3
Glazing (vertical)	R-0.26	R-0.26	R-0.26
Glazing (skylights)	R-0.26	R-0.26	R-0.31

Australian Building Code Targets [i](#):

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	All Zones except NSW	NSW
Roof	R-4.1	R-6.3
Wall	R-2.9	R-3.8



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NZBC H1/AS1 Schedule Method

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Client	TKR Developments (Clark & Allnut)	Designed to:
Address	3 Olivia Street	NZBC H1/AS1
Lot & DP	Lot 43	NZS 4214. Method of Determining the Total Thermal Resistance of Parts of Buildings
Area	Rolleston	NZS 4218. Energy Efficiency - Small Building Envelope
Job #	126231	BRANZ House Insulation Guide
Designer	M Glynn	http://www.designnavigator.co.nz/CRC.php

H1 Schedule: All Walls				West, South & East walls only						North walls only (Recommend 50% max-Best Practice)				
Wall Insulation		R	2.60	Pink Batts	Wall - 90x45 @ 600crs	R	2.23	Refer to Wall openings sheet for Lintel sizes						
Ceiling Insulation		R	3.60	Pink Batts	Ceiling - trusses @ 900 crs	R	3.37	Roof Type (L or H)	Light	(select roof type)				
Glazing Vertical			Double	Standard	Glazing - Standard Double glaze	R	0.26	Wind zone (H or V)	high	(select wind zone)				
Skylights (1.5m max)			0.00	m ²	Skylight	R	0.63	Snow zone	N4	(select snow zone)				
Floor	Total Envelope m ²		102.33	100mm conc	Floor - Standard 100mm Conc + DPM	R	1.43	Lintels are shown	On Truss Design					
Heated Floor		m ²	0.00	100mm conc	Heated Floor	R	1.43	Altitude	50	(height above sea level)				
Downlights	Closed & Abutted type				Closed & Abutted type				Climate Zone	3	(select climate zone)			
<i>Ground Level</i>	Height	Length			Height	Length			Height	Length				
Total wall length	2.40	51.20	122.88	m ²	Total wall length	2.40	38.69	92.86	m ²	Total wall length	2.40	12.51	30.02	m ²
<i>First Floor</i>														
Total wall length	0.00	0.00	0.00	m ²	Total wall length	0.00	0.00	0.00	m ²	Total wall length	0.00	0.00	0.00	m ²
Total wall length	0.00	0.00	0.00	m ²	Total wall length	0.00	0.00	0.00	m ²	Total wall length	0.00	0.00	0.00	m ²
Total Exterior Wall area			122.88	m ²	Total Exterior Wall area			92.86	m ²	Total Exterior Wall area			30.02	m ²
Total opening area			19.25	m ²	Total opening area			10.61	m ²	Total opening area			8.63	m ²
H1 value			15.66%	OK<30%	H1 value			11.43%	OK<30%	H1 value			28.76%	

NZBC H1/AS1 Calculated Method

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Client	TKR Developments (Clark & Allnut)		
Address	3 Olivia Street		
Lot & DP	Lot 43		
Area	Rolleston		
Job #	126231		
Designer	M Glynn		

H1 Reference Building						H1 Proposed Building					
		Plan (R)	Area	Reference	Heat Loss			Plan	Area	Actual	Heat Loss
Roof	Pink Batts	3.6	102.33	3.30	31.01	Roof	Pink Batts	3.6	102.33	3.37	30.36
Wall	Pink Batts	2.6	122.88	2.00	61.44	Wall	Pink Batts	2.6	122.88	2.23	55.10
Floor	100mm conc	1.43	102.33	1.30	78.72	Floor	100mm conc	1.43	102.33	1.43	71.56
	Heated Floor	1.90	0.00	1.90	0.00		Heated Floor	1.90	0.00	1.43	0.00
Glazing < 30%	Aluminium / Double	0.26	36.86	0.26	141.78	Glazing All	Aluminium / Double	0.26	19.25	0.26	74.03
Glazing > 30%	Aluminium / Double	0.34	-17.62	0.34	-51.81						0.00
Skylights	Area	0	0.00	0.34	0.00	Skylights	Area	0.00	0.00	0.63	0.00
Total Loss					261.14	Total Loss					231.06

	Height	Length		
Total wall length	2.40	51.2	122.88	m ²
Total wall length	0.00	0	0.00	m ²
Total wall length	0.00	0	0.00	m ²
Total Exterior Wall area			122.88	m ²
Total Glazing area			19.25	m ²
Glazing <30%			36.86	m ²
Glazing >30%			-17.62	m ²

	Reference	Proposed	Difference
Roof	31.01	30.36	0.64
Wall	61.44	55.10	6.34
Floor	78.72	71.56	7.16
Glazing < 30%	141.78	74.03	67.75
Glazing > 30%	-51.81	0.00	-51.81
Skylights	0.00	0.00	0.00
Total Heat Loss	261.14	231.06	30.08

PASS

NZBC H1/AS1 Opening Sizes / Areas

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Start from the front door - Clockwise														
Wall Openings - ALL				m²	Wall Openings - W,S,E				m²	Wall Openings - North				m²
Ground Level					Ground Level					Ground Level				
	Height	Width		Orientation										
1	2.13	0.93	1.98	Front Door	1	2.13	0.93	1.98	1					
2				Garage	2				2					
3				Garage	3				3					
4	1.00	0.60	0.60		4	1.00	0.60	0.60	4					
5	1.00	0.60	0.60		5	1.00	0.60	0.60	5					
6	1.20	1.80	2.16		6	1.20	1.80	2.16	6					
7	1.20	1.20	1.44		7	1.20	1.20	1.44	7					
8	1.20	1.20	1.44		8	1.20	1.20	1.44	8					
9	1.20	1.60	1.92	North	9				9	1.20	1.60	1.92	North	
10	1.20	1.20	1.44	North	10				10	1.20	1.20	1.44	North	
11	2.13	1.80	3.83	North	11				11	2.13	1.80	3.83	North	
12	1.20	1.20	1.44	North	12				12	1.20	1.20	1.44	North	
13	1.33	1.80	2.39		13	1.33	1.80	2.39	13					
14			0.00		14	0.00	0.00	0.00	14					
15			0.00		15	0.00	0.00	0.00	15					
16			0.00		16	0.00	0.00	0.00	16					
17			0.00		17	0.00	0.00	0.00	17					
18			0.00		18	0.00	0.00	0.00	18					
19			0.00		19	0.00	0.00	0.00	19					
20			0.00		20	0.00	0.00	0.00	20					
21			0.00		21	0.00	0.00	0.00	21					
22			0.00		22	0.00	0.00	0.00	22					
23			0.00		23	0.00	0.00	0.00	23					
24			0.00		24	0.00	0.00	0.00	24					
25			0.00		25	0.00	0.00	0.00	25					
26			0.00		26	0.00	0.00	0.00	26					
27			0.00		27	0.00	0.00	0.00	27					
28			0.00		28	0.00	0.00	0.00	28					
29			0.00		29	0.00	0.00	0.00	29					
30			0.00		30	0.00	0.00	0.00	30					
Sub Total			19.25		Sub Total			10.61		Sub Total			8.63	

NZBC H1/AS1 Opening Sizes / Areas

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Wall Openings - ALL				m ²		Wall Openings - W,S,E				m ²	Wall Openings - North				m ²
First Floor						First Floor					First Floor				
	Height	Width			Orientation										
1			0.00			1	0.00	0.00	0.00		1				
2			0.00			2	0.00	0.00	0.00		2				
3			0.00			3	0.00	0.00	0.00		3				
4			0.00			4	0.00	0.00	0.00		4				
5			0.00			5	0.00	0.00	0.00		5				
6			0.00			6	0.00	0.00	0.00		6				
7			0.00			7	0.00	0.00	0.00		7				
8			0.00			8	0.00	0.00	0.00		8				
9			0.00			9	0.00	0.00	0.00		9				
10			0.00			10	0.00	0.00	0.00		10				
11			0.00			11	0.00	0.00	0.00		11				
12			0.00			12	0.00	0.00	0.00		12				
13			0.00			13	0.00	0.00	0.00		13				
14			0.00			14	0.00	0.00	0.00		14				
15			0.00			15	0.00	0.00	0.00		15				
16			0.00			16	0.00	0.00	0.00		16				
17			0.00			17	0.00	0.00	0.00		17				
18			0.00			18	0.00	0.00	0.00		18				
19			0.00			19	0.00	0.00	0.00		19				
20			0.00			20	0.00	0.00	0.00		20				
21			0.00			21	0.00	0.00	0.00		21				
22			0.00			22	0.00	0.00	0.00		22				
Total Wall Openings				19.25		Total Wall Openings				10.61	Total Wall Openings				8.63

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Cavity Fix

Technical Specification

May 2020 New Zealand



Linea™
WEATHERBOARD



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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™
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 or **Ask James Hardie™ on 0800 808 868.**

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1 Product Overview

1.1 Product Information

Linea™ Weatherboard is an external cladding.

Linea Weatherboard is a 16mm thick, pre-primed bevel back fibre cement weatherboard. The bottom front edge of Linea Weatherboard is chamfered. It has tongue and groove ends for jointing and is classified as lightweight wall cladding for use in residential and light commercial buildings using timber or lightweight steel framed external walls. Linea Weatherboard is available in 135mm, 150mm and 180mm widths.

James Hardie also has available:

- Axent™ Fascia is a 16mm thick, pre-primed fibre cement product available in two widths. It's designed to accommodate James Hardie soffit linings.
- Axent™ Trim is a 16mm thick, pre-primed fibre cement product available in two widths. For use as decorative trims around openings and external corners.

For fixing to a steel frame. Ask James Hardie™ on 0800 808 868 for specific requirements. Or refer to the James Hardie cladding to steel framing technical supplement about the installation of Linea Weatherboard to steel frame.

Table 1

Linea Weatherboard and Axent Trim sizes							Coverage Information		
Product	Code	Length (mm)	Width (mm)	Thickness (mm)	End details	Effective cover (mm)	No. of planks/ metre height (approx.)	Mass kg/lineal m (approx. at EMC)	Mass kg/m ² (approx. at EMC)
Linea Weatherboard 135	401844	4200	135	16	T & G	105	9.5	2.62	25.70
Linea Weatherboard 150	402533	4200	150	16	T & G	120	8.3	3.1	24.93
Linea Weatherboard 180	401847	4200	180	16	T & G	150	6.7	3.57	23.92
Axent Trim 84mm	401943	2600	84	16	Square	N/A	N/A	1.6	N/A
Axent Trim 100mm	401930	2600	100	16	Square	N/A	N/A	1.9	N/A

The effective thickness of finished Linea Weatherboard on the wall at the lap is approximately 33 to 35mm

All dimensions and masses provided are approximate only and are subject to manufacturing tolerances.

Linea Weatherboard is categorised as a Light Weight Wall Cladding as described in the NZS 3604.

1.2 Manufacturing and Classification

The manufacturing process of Linea Weatherboard by James Hardie is ISO 9001 Certified.

Linea Weatherboard is an advanced lightweight cement composite cladding manufactured using a basic composition of Portland cement, ground sand, cellulose fibre and water. The product is easily identified by the name 'Linea' printed on the back.

Axent Trim is an advanced lightweight cement composite cladding manufactured using a basic composition of Portland cement, ground sand, cellulose fibre and water. The product is easily identified by the name 'Axent' printed on the back. The trims are factory sealed and primed.

Linea Weatherboard and Axent Trim products are manufactured to Australian/New Zealand Standard AS/NZS 2908.2 'Cellulose-Cement Products' (ISO 8336 'Fibre-Cement Flat Sheet').

Linea Weatherboard is classified Type A, Category 2 in accordance with AS/NZS 2908.2 "Cellulose-Cement Products".

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz and view them in the technical literature section or Ask James Hardie on **0800 808 868**.

1.3 Components and Accessories

Table 2







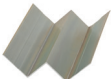

Accessories/tools supplied by James Hardie			
Accessories	Description	Size (mm)	Code
	External corner soaker 90° for Linea Weatherboards 180mm <ul style="list-style-type: none"> Aluminium Copper Stainless Steel 	200 long	301186 301188 301197
	External corner soaker 135° for Linea Weatherboards 180mm <ul style="list-style-type: none"> Aluminium 	200 long	301178
	External corner soaker 90° for Linea Weatherboards 150mm <ul style="list-style-type: none"> Aluminium Stainless Steel 	170 long	302820 302821
	External corner soaker 90° for Linea Weatherboards 135mm <ul style="list-style-type: none"> Aluminium Stainless Steel 	155 long	301185 301196
	External Slimline Box Corner Mould Etched primed aluminium extrusion used to create external corner	2700 long 4000 long	301195 305809
	Linea 35mm Cavity Closer	3000 long	306035
	Internal 'W' Mould 90° Etched primed aluminium extrusion used to create 90° internal corner	2700 long 4000 long	301184 305807
	Internal 'W' Mould 135° Etched primed aluminium extrusion used to create 135° internal corner	2700 long	301183

Table 2 contd.




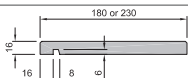





Accessories/tools supplied by James Hardie			
Accessories	Description	Size (mm)	Code
	JH Corner Under Flashing 50 x 50mm PVC moulding used as under fashing for internal and external corners	3000 long	303745
	Axent Trim 84mm	84 x 2600 long	401943
	Axent Trim 100mm	100 x 2600 long	401930
	Axent Fascia - 180mm - 230mm	4200 long	401843 402230
	HardieFlex™ Galvanised nail - 5kg	60 x 3.15mm	302784
	HardieFlex™ Stainless steel nail - 5kg	60 x 3.15mm	302782
	HardieBlade™ Saw Blade Diamond tip fibre cement circular saw blade. Spacers not included	4 tooth - 184mm	300660
	HardieBlade™ Saw Blade Diamond tip fibre cement circular saw blade. Spacers not included	6 tooth - 254mm	303375
	Gecko Gauge This easy to use tool gauges and supports the weatherboard for a one person install.		305941

Table 3

Accessories not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with its Linea Weatherboard and Axent Trim. James Hardie does not supply these products. There may also be some other accessories required depending upon the application. Please contact component manufacturer for information on their warranties and further information on their products.

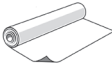










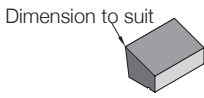
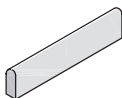



Accessories	Description	Size (mm)	Material/ appearance
	Flexible Underlay To comply with Table 23 of E2/AS1		
	D head or RounDrive Nail Gun nail for concealed fixing Linea Weatherboard.	60 x 2.87	Hot Dip Galvanised/ Stainless Steel
	HardieFlex™ Hot Dip Galv. Nails For concealed fixing by hand nail	60 x 3.15mm 75 x 3.15mm	Hot Dip Galvanised/ Stainless Steel
	Jolt Head Nail for face fixing Linea Weatherboard	75 x 3.15mm 90 x 3.55mm	Hot Dip Galvanised/ Stainless Steel
	Titanium Coated High Speed Drill Bit. For pre-drilling prior to face fixing with jolt head.	3.0mm 3.5mm	
	Brad Nail To tie boards together	32mm	
	Joint sealant Paintable flexible sealants are recommended for filling the joints. Refer to Section 7.2 for information.	Tube	Sika, Bostik or similar Holdfast
	CRC ADOS Builders Fill Two part exterior grade fill to finish over jolt head nails.		
	PEF Rod	Polyethylene foam	Sika or similar
	Flexible tape A flexible self-adhesive tape used in preparation of a window. Refer to the Window installation section in this manual for more information.	Proprietary tape to adhere to flexible underlay	Tyvek, Marshall Innovations or similar
	Flashing Material as per Table 20, 'E2/AS1'		Flashing Fabricator
	Planted Sill		H3.1 minimum Treated Timber Timber Merchant or cut on site

Table 3 contd.

Accessories not supplied by James Hardie			
Accessories	Description	Size (mm)	Material/ appearance
	Timber Scribe To scribe beside window, site cut to suit.	As required	H3.1 minimum Treated Timber Timber Merchant or cut on site
	Fibre Cement Cutting Blade Diamond tip 305mm diameter circular saw blade to fit drop saw.	305mm	Diamond Tipped
	Cavity Closer - aluminium Used in walls taller than 10m for inter-tenancy fire separation.		
	Primers. Dulux 1-Step Prep, Resene Quick Dry etc.		

2 Application and Scope

2.1 Application

This specification includes the installation of Linea Weatherboard cavity construction where risk matrix is 13 or more and must be read in conjunction with the current CodeMark Certificate and BRANZ Appraisal. This installation method can also be used for buildings where the risk matrix score is 0 - 12 if desired.

This document is intended for use by architects, designers, specifiers or builders who are involved in specifying Linea Weatherboard. The document also serves the purpose of an installation manual for this product.

For use of Linea Weatherboard outside this published scope, the architect, designer or engineer must undertake specific design. For advice on designs outside the scope of this specification, Ask James Hardie on 0800 808 868.

Refer to the Linea Weatherboard Direct Fixed Technical Specification when installing Linea Weatherboard without a cavity.

2.2 Scope

Linea Weatherboard cavity construction is suitable for use in timber framed buildings that fall within the scope limitations of the New Zealand Building Code (NZBC) Acceptable Solution E2/AS1, Paragraph 1.1.

Linea Weatherboard cavity construction is also suitable for use in specific engineering design projects (SED) subject to a wind pressure of 2.5kPa (ULS) maximum for building heights upto 25m.

2.3 Limitations

- Linea Weatherboard cladding must not be used on curved wall applications
- Linea Weatherboard cladding must not be installed vertically or angled
- The minimum ground clearances specified must be maintained
- Timber window joinery/recessed openings is subject to an alternative design by the designer
- Maximum SLS inter-story seismic deflections up to span/180 when used in specific design buildings (SED) buildings above 10m height. To accommodate higher inter-story drifts, a deflection should be used.

2.4 Details

Various typical Linea Weatherboard details are provided within this document. In addition to these, the construction details with HomeRAB™ Pre-Cladding/RAB™ Board have also been developed and are available on our website. These details are available in dwg, dxf, jpg and pdf file format and can be downloaded at www.jameshardie.co.nz.

All dimensions shown are in millimetres unless noted otherwise.

3 Compliance

3.1 NZBC Compliance

When installed in accordance with the conditions of CodeMark number GM-CM30018 Linea Weatherboard complies with all relevant requirements of the NZBC.



Please refer to www.building.govt.nz for a copy of the certificate.

Linea Weatherboard cavity fixed cladding also has a BRANZ Appraisal number 447 (2010) available at www.branz.co.nz or www.jameshardie.co.nz.



4 Design

4.1 Responsibility

The specifier or other party responsible for the project must ensure that the information and details in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this technical specification.

All New Zealand Standards referenced in this manual are current edition and must be complied with.

Specifier

If you are a specifier or other responsible party for a project ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

Installer

If you are an installer ensure that you follow the design, moisture management principles, associated figures and material selection provided by the designer and this James Hardie Technical Specification. All the details provided in this document must be read in conjunction with the project specification.

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 their aesthetic expectations before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation. James Hardie will only offer a replacement product if Linea Weatherboard or Axent Trim supplied are found to be out of its manufacturing specification.

4.2 Clearances

The clearance between the bottom edge of cladding and the paved/unpaved ground must comply with section 9.1.3 of E2/AS1. On the roofs and decks the minimum clearance must be 50mm. These clearances must be maintained throughout the life of the building.

Linea Weatherboard must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by the NZBC Acceptable Solution, E2/AS1 Table 18.

The site on which the building is situated must comply with the NZBC Acceptable Solution E1/AS1 'Surface Water'.

Do not install cladding such that it may remain in contact with water or ground, refer to figures in section 9 of this manual.

4.3 Structure

4.3.1 Timber Framing

Timber framing must be in accordance with NZS 3604 (Timber-framed buildings) or designed as for specific engineering design (SED) in accordance with NZS 3603 and AS/NZS 1170 where specific engineering design is required, the framing stiffness must be equivalent to or more than the framing provisions of NZS 3604.

The stud spacing must not exceed 600mm centres maximum for buildings within the scope of NZS 3604 and 400mm centres maximum for wind pressures more than 1.5kPa (ULS).

For timber frame walls longer than 12m, it is best practice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections.

4.3.2 Durability

Timber framing must be treated to a minimum H1.2 treatment requirements and comply with Acceptable Solution B2/AS1 'Durability' of the NZBC. For further timber treatment information refer to the NZS 3602 (Timber and Wood-Based Products for use in Buildings) for minimum timber treatment selection and treatment requirements. Framing must be protected from moisture at sites in accordance with the recommendations of framing manufacturers. Refer to the NZS 3602 for information about the allowable moisture content in timber framing.

4.4 Structural Bracing

Bracing can be achieved by using HomeRAB Pre-Cladding or RAB Board installed direct to framing instead of a flexible underlay or by using Villaboard™ Lining bracing system on the internal face.

4.5 Energy Efficiency

External walls constructed as per this technical specification, using Linea Weatherboard cladding must use suitable bulk insulation to meet the minimum thermal insulation requirements as per Clause H1/AS1 'Energy Efficiency' of the NZBC.

4.6 Fire Rated Walls

External walls with Linea Weatherboard cavity fix construction method can achieve fire ratings up to 60/60/60 when constructed in accordance with the James Hardie Fire and Acoustic Design Manual. Linea Weatherboard must be face fixed for fire rated applications.

Refer to the Fire and Acoustic Design Manual for further information about fire rated systems.

4.7 Control of External Fire Spread

External spread of fire (clause C3.5 and C3.7) apply where:

- Building height is greater than 10m and upper floors have sleeping uses or are different property (C3.5), and
- Where the building is located within 1m of a relevant boundary (C3.7)

Refer to Table 5.1 of Section 5.4 of C/AS1 for group SH or table 5.5 of Section 5.8.1 of C/AS2 for the other risk groups to identify the external fire spread requirement applicable to the external cladding material and surface finish.

For the other situations where 'no requirement' is listed, Linea Weatherboard installed as per the details published in this specification complies.

For buildings that are >10m high and contain tenancies above as per Table 5.5. of C/AS2, Linea Weatherboard installed over timber cavity battens in conjunction with RAB Board with R2.2 fibreglass/James Hardie mineral insulation complies. Refer to Figure 38 and 39 for RAB Board and cavity batten layout. For the complete set of suitable Linea Weatherboard cavity construction details with RAB Board for this application, refer to www.jameshardie.co.nz.

4.8 Alpine regions

In regions subject to freeze/thaw conditions, Linea Weatherboard must not be in direct contact with snow or ice build up for extended periods, e.g. external walls in alpine regions subject to snow drifts over winter.

The Linea Weatherboard has been tested in accordance with AS/NZS 2908.2 Clause 8.2.3.

5 Safe Working Practices

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

James Hardie products contain sand, a source of respirable crystalline silica may cause cancer if dust from product is inhaled. Causes damage to lungs and respiratory system through prolonged or repeated inhalation of dust from product.

Intact fibre cement products are not expected to result in any adverse toxic effects. The hazard associated with fibre cement arises from the respirable crystalline silica present in dust generated by activities such as cutting, rebating, drilling, routing, sawing, crushing, or otherwise abrading fibre cement, and when cleaning up, disposing of or moving dust.

When doing any of these activities in a manner that generates dust, follow James Hardie instructions and best practices to reduce or limit the release of dust.

If using a dust mask or respirator, use an AS/NZS1716 P1 filter and refer to Australian/New Zealand Standard 1715:2009 Selection, Use and Maintenance of Respiratory Protective Equipment for more extensive guidance and more options for selecting respirators for workplaces. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

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

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 and when cleaning up
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

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 or higher vacuum or damp down dust before sweeping up
- ✗ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a 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 – connected to an M Class or higher vacuum

- ✓ Before cutting warn others in the area to avoid dust
- ✓ 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 a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

When cutting

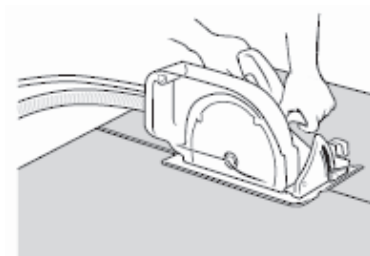
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a HardieBlade Saw Blade (or equivalent) and a dust reducing circular saw connected to a M Class or higher vacuum
- ✓ When sawing, sanding, rebating, drilling or machining fibre cement products, always:
 - Wear your P1 or higher (correctly fitted in accordance with manufacturers' instructions), ask others to do the same.
 - Keep persons on site at least 2 metres and as far as practicable away from the cutting station while the saw is in operation
 - If you are not clean shaven, then use a powered air respirator with a loose fitting head top
 - Wear safety glasses
 - Wear hearing protection
- ✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

Working Instructions

HardieBlade™ Saw Blade

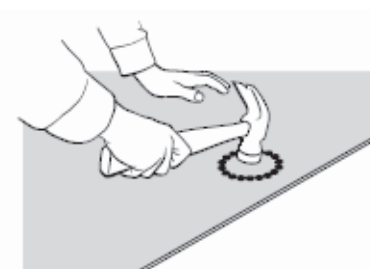
The HardieBlade Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust collector connected to a M Class or higher vacuum. When sawing, clamp a straight edge to the sheet as a guide and run the saw base plate along 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

5.1 Storage and 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.

5.2 Tips for safe and easy handling of weatherboard products

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

6 Installation

The horizontal lap between the two Linea Weatherboard must be 30mm minimum. In certain scenarios you may require to creep up the lap, this must not exceed 33mm.

Linea Weatherboard must be kept dry whilst in storage prior to and during fixing. Site cut ends that are exposed such as slimline box corners, internal corners etc. and any sanded patches on the boards surface must be primed prior to installation. Dust and loose material must be removed before priming.

6.1 Fastener

6.1.1 Fastener – Size and Method

Linea Weatherboard and Axent Trim must be fixed to timber with the types of nails specified in Tables 4 and 5, in accordance with the following requirements:

- Linea Weatherboard can either be face/exposed fixed or concealed fixed
- Linea Weatherboard must be fixed into studs at maximum 600mm centres. Fixing centres to coincide with stud spacing, refer to figures in section 9 of this manual
- All concealed nails must be driven flush with the board surface
- When concealed fixing Linea Weatherboard, nails must be driven under the lap of boards, except at all corners and vertical edges of openings where Linea Weatherboard must be face fixed, refer to figures in section 9 of this manual
- Nails must be fixed 25mm from the end of the board when hand nailing. For gun nailing refer to Section 6.1.2
- When using concealed fixing method, any gaps that may appear under the lap due to site conditions can be minimised by fixing a jolt head nail through the lap as per the exposed nailing method. Refer to figures in section 9 of this manual
- When using concealed fixing method, Linea Weatherboard may be tied together by face fixing through the lap using a 32mm brad nail if desired.
- When face fixing Linea Weatherboard, the upper board must be pre-drilled before fixing with a jolt head nail

Table 4

Wind pressure (kPa)	Underlay	Fixing method	Fixing type	Instructions
Up to 1.5 (up to and including VH Wind Zone)	Flexible underlay	Concealed nailing	60 x 3.15mm HardieFlex™ nail or a 60 x 2.87mm D/round head gun nail	Finish flush with the board surface.
		Face nailing	75 x 3.15mm jolt head nails	Hot-dipped galvanised/stainless steel jolt head nail with pre-drilling through the top weatherboard. Use a 3mm drill bit.
	Rigid air barrier	Concealed nailing	75 x 3.15mm HardieFlex™ nail or a 75 x 3.06mm D/round head gun nail	Finish flush with the board surface.
		Face nailing	90 x 3.55mm jolt head nails	Hot-dipped galvanised/stainless steel jolt head nail with pre-drilling through the top weatherboard. Use a 3.5mm drill bit.
1.5 to 2.5 (EH Wind Zone and SED projects)	RAB Board	Face nailing	90 x 3.55mm jolt head nail	Hot-dipped galvanised/stainless steel jolt head nail with pre-drilling through the top weatherboard. Use a 3.5mm drill bit.

Table 5

Nail requirements for Axent Trim	
Single thickness	60mm jolt head nails. If fixing over Linea Weatherboard use 75 x 3.15mm jolt head nails through a pre-drilled hole, using a 3mm drill bit.
Single thickness plus packer	If fixing over Linea Weatherboard use 75 x 3.15mm jolt head nails through a pre-drilled hole, using a 3mm drill bit. When fixing to timber support use 60mm jolt head nails.

For fire rated wall applications the Linea Weatherboards must be face fixed. For more information Ask James Hardie on 0800 808 868.

6.1.2 Gun Nailing

Linea Weatherboard can be gun nailed with a D-Head or RounDrive nail when concealed fixing method is used.

- Nails must be no closer than 50mm from the ends of boards when gun nailing is used, double studs will be required.
- Be minimum length and nearest gauge as per Table 4.
- Be finished flush with surface of board.

6.1.3 Fastener Durability

Fasteners must meet the minimum durability requirements of the NZBC. Refer to Table 6 for fixing materials requirements to be used in relation to the exposure conditions.

Table 6

Exposure conditions and nail selection prescribed by NZS 3604		
Zone	Application	
D (sea spray) and geothermal hot spots	General	Stainless steel 304/316
	Fire	
*C and B	General	Hot dip galvanised**
	Fire	

* Zone C areas where local knowledge dictates that increased durability is required, appropriate selection shall be made Microclimatic conditions as detailed in NZS 3604, Paragraph 4.2.4 require SED.

**Hot dip galvanised must comply with AS/NZS 4680.

Also refer to the NZBC Acceptable Solution E2/AS1 Table 20 and 21 for information regarding the selection of suitable fixing materials and their compatibility with other materials.

6.2 Framing

Framing to be in accordance with the NZS 3604. The following must be provided for fixing Linea Weatherboard:

- Studs at 600mm centres maximum for all wind speed zones up to and including very high (VH)
- Studs at 400mm centres maximum for wind pressures more than 1.5 kPa (ULS)
- Double studs are required at internal corners
- Extra packers may be required at external corners
- Extra studs are required for aluminium internal corner sections

6.2.1 Specific Engineering Design (SED)

For EH wind zone and specific engineering design projects the timber framing is required to be designed in accordance with NZS 3603 and AS/NZS 1170. The minimum framing sizes and layout must comply with this specification:

- Stud spacing 400mm centres maximum
- Nog spacing 1200mm centres maximum
- Double studs are required at internal corners
- Extra packers may be required at external corners
- Extra studs are required for aluminium internal corner sections

6.2.2 Gable Ends

In case of gable end trusses sitting on top plates of the external wall frame, the frame size must be in accordance with truss design and specification supplied by the frame and truss manufacturer/supplier supported by independent design producer statement.

6.2.3 Tolerances

In order to achieve an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with the requirements of NZS 3604 and the manufacturer's specifications. All framing must be made flush. The visual aspects of the finished cladding can differ between two different sites or the builders installing the product. It is recommended that you also refer to a building guidance document published by MBIE to understand an acceptable level of tolerances allowed in building materials and workmanship. www.building.govt.nz Guide to tolerances, materials and workmanship in new residential construction 2015

6.3 Flexible Underlay or HomeRAB Pre-Cladding

Flexible underlay or HomeRAB Pre-Cladding must be provided to comply with the requirements of E2/AS1 up to and including very high wind zone.

Walls which are not lined on the inside face (e.g. garage walls or gable ends) must include a rigid sheathing or an air barrier behind the cladding. HomeRAB Pre-Cladding is suitable for use as an air barrier and must be installed in accordance with James Hardie Rigid Air Barriers Installation Manual.

6.4 Intermediate Support

Where studs are at 600mm centres an intermediate means of restraining the flexible underlay and insulation from bulging into the cavity must be installed. An acceptable method to achieve this is using one of the following:

- Intermediate cavity batten between the studs; or
- 75mm galvanised mesh; or
- Polypropylene tape at 300mm centres fixed horizontally and drawn taut.

No intermediate supports are required:

- Where studs are at maximum 400mm centres; or,
- When rigid sheathings instead of flexible underlays are used.

6.5 Rigid Air Barrier

In EH wind zone or for specific design wind zone, a rigid air barrier i.e. RAB Board, must be used instead of flexible underlay.

For buildings more than 10m, RAB Board must be used. To achieve the temporary weathertightness using James Hardie rigid air barriers, windows/doors need to be installed with required flashing tapes and seals etc. Refer to James Hardie Rigid Air Barriers Installation Manual for information regarding its installation and to achieve temporary weathertightness.

6.6 Vent Strip

Linea 35mm cavity closer vent strip (uPVC) must be installed at the bottom of all walls constructed using the drained and ventilated for cavity construction method. James Hardie Linea 35mm cavity closer vent strip has an opening area of 1000mm²/m length. It is important that the openings in the vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. Alternate cavity closer can be used ensuring compliance of E2 and may need to be used with a cant strip.

6.7 Cavity Battens

The cavity battens provide airspace between the frame and cladding and are considered a "packer" only in this specification.

The timber battens must be minimum H3.1 treated to comply with the durability requirements of B2/AS1.

Cavity battens must comply with E2/AS1 and:

- Be minimum 18mm thick
- Be minimum 45mm wide
- Until claddings are fixed the battens need only to be tacked to framing with 40 x 2.8mm nails at 800mm centres maximum (batten fixing is required temporarily to keep them straight on the wall during construction)

6.8 Joints

6.8.1 Jointing

The ends of Linea Weatherboard are jointed off-stud by means of a tongue and groove joint. Tongue and groove joints may be located centrally between studs but no closer than 100mm from the edge of a stud. The joints must be staggered by 600mm minimum. Flexible sealant must be applied to the front of tongue before pushing into the groove at the time of installation. From a visual perspective, the joint line will be visible and must not be hard filled.

6.8.2 Drainage Joint

After every two floors a horizontal drainage joint flashing is required, refer to figures Figure 29 in section 9 of this manual.

6.8.3 External Corner Joint

There are a number of options to select from when detailing external corners:

- 90° corner soaker in aluminium, copper or stainless steel
- 135° corner soaker 180mm aluminium
- Aluminium boxed corners
- Box corners using Axent Trim
- Mitred corners to weatherboards

Refer to figures in section 9 of this manual.

6.8.4 Internal Corner Joint

There are a number of options to select from when detailing internal corners:

- 90° or 135° Aluminium W-mould
- Scribed corner

Refer to figures in section 9 of this manual.

6.9 Junctions and Penetrations

All windows and doors must be detailed as per the requirements of this specification. James Hardie has developed the window details for Linea Weatherboard which meet the performance requirements of E2 'External Moisture', an approved document of the NZBC, refer to figures in section 9 of this manual.

7 Finishes

Protective coating of Linea Weatherboard and Axent Trim is required in order to meet the durability requirements of the NZBC.

7.1 Preparation and Priming

The Linea Weatherboard and Axent Trim must be dry before painting. Punch and fill all exposed nails a maximum of 2mm below the surface. Fill the hole with an exterior grade 2 part builders fill, eg CRC ADOS Builders Fill, allow to cure and using 60 grit sand paper smooth ready for painting. Prime any sanded patch on board surface or the site cut edges that will be exposed.

It is not recommended to seal gap under the lap of weatherboards as it helps in circulation of air behind the weatherboard cladding. However if sealing of the gap is undertaken, the product warranty still applies.

7.2 Sealants

All sealants must demonstrate the ability to meet the relevant requirements of the NZBC. Application and use of sealants must comply with manufacturer's instructions. Sealants, if coated, must be compatible with the paint system.

7.3 Painting

All Linea Weatherboards are pre-primed on their face and bottom edge with a factory applied acrylic base coat.

Linea Weatherboard and Axent Trim must be painted within 90 days of installation. Dark coloured paints can be used, i.e. there is no restriction on the Light Reflectance Value (LRV) of paint to be applied. All exposed faces, including the top edges under the sills and bottom edges of Linea Weatherboard, Axent Trim and accessories must be finished with an exterior paint system.

For best aesthetic results a low sheen paint is recommended.

The dark colours in certain environments may fade over a period of time. Special paints/coatings are required in certain harsh environments.

Stainless steel soakers are generally left natural. For painting over stainless steel soakers, refer to paint manufacturer as special preparation and paints are required.

Paint selection and the preparation required is dependent on paint chosen. Refer to the paint manufacturer for information before starting painting.

8 Care and Maintenance

The extent and nature of maintenance will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to comply with the NZBC Acceptable Solution B2/AS1. 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* using low pressure water and a brush, and every 3-4 months in extreme coastal conditions or sea spray zones
- Re-coating exterior protective finishes. Always refer to your paint manufacturer for re-coating requirements
- Maintaining the exterior envelope and connections including junctions, penetrations, flashings and sealants
- Cleaning out gutters, blocked pipes and overflow pipes as required
- Pruning back vegetation close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained especially where gardens are concerned
- The clearances between the bottom edge of Linea Weatherboard and the finished/unfinished ground must always be maintained
- Stainless steel soakers used in extreme coastal conditions or in sea spray zones may show some signs of 'tea staining'. It is an aesthetic issue and to minimise staining soaker must be washed/polished frequently

*Do not use a water blaster to wash down the cladding. Refer to your paint manufacturer for washing down requirements.

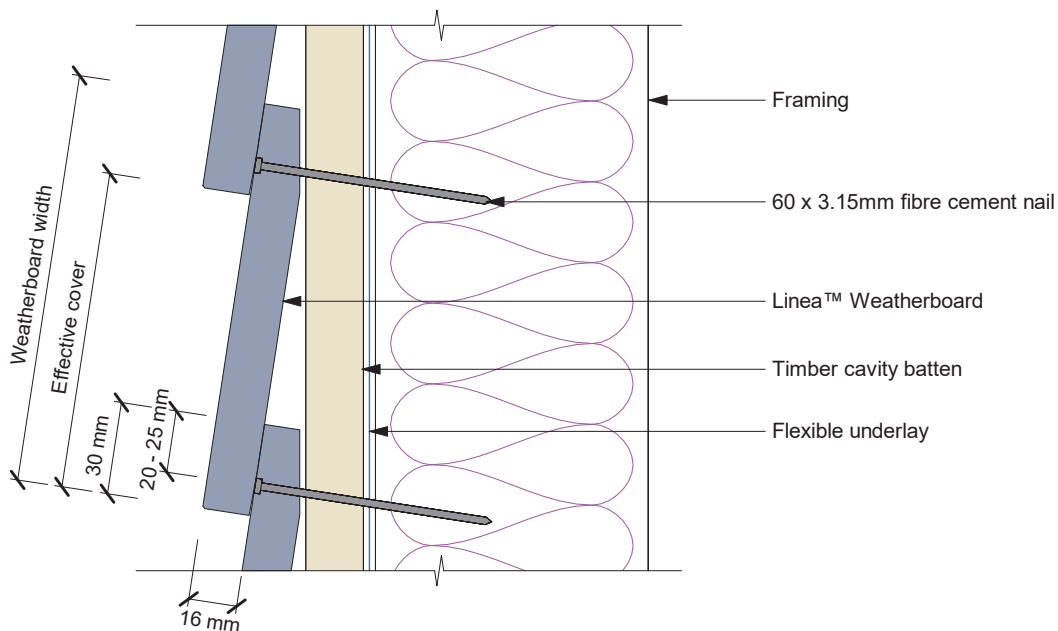
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Figure 38: Framing setout building height over 10m	46
Figure 39: Intertenancy vertical fire separation	47

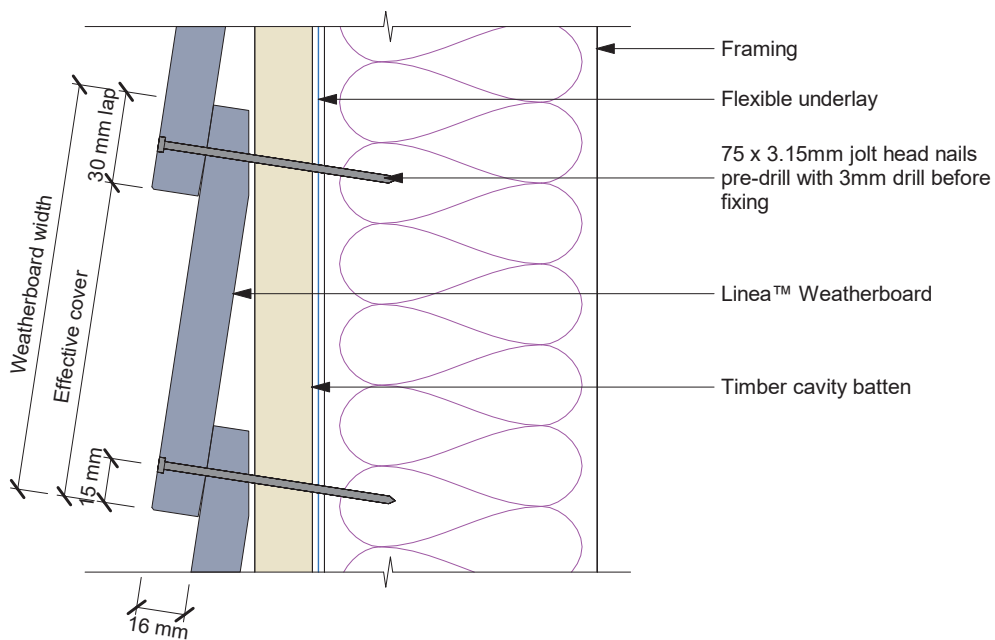
For all meter box details please visit our website at www.jameshardie.co.nz or Ask James Hardie on **0800 808 868**.

Figure 1: Weatherboard fixing



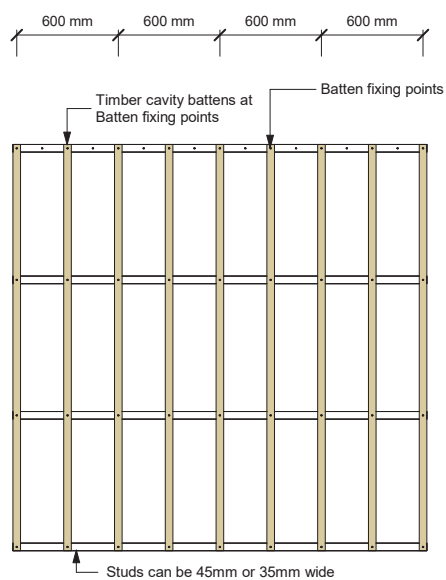
Concealed Nailing

Linea™ Weatherboards to be face fixed at corners and down window and door openings using jolt head nails at 90° to face, punch 2mm below surface and fill. Refer to fixing table 4



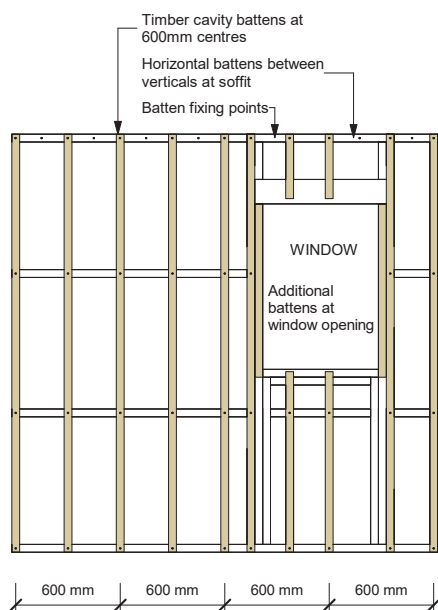
Exposed Nailing

Figure 2: Batten fixing



The intermediate support for insulation between the studs could be a timber cavity batten, polypropylene tape or 75 mm galvanised wire mesh. Refer to E2/AS1 Paragraph 9.1.8.5 Polypropylene tape must be fixed horizontally and drawn taut at 300 mm centres.

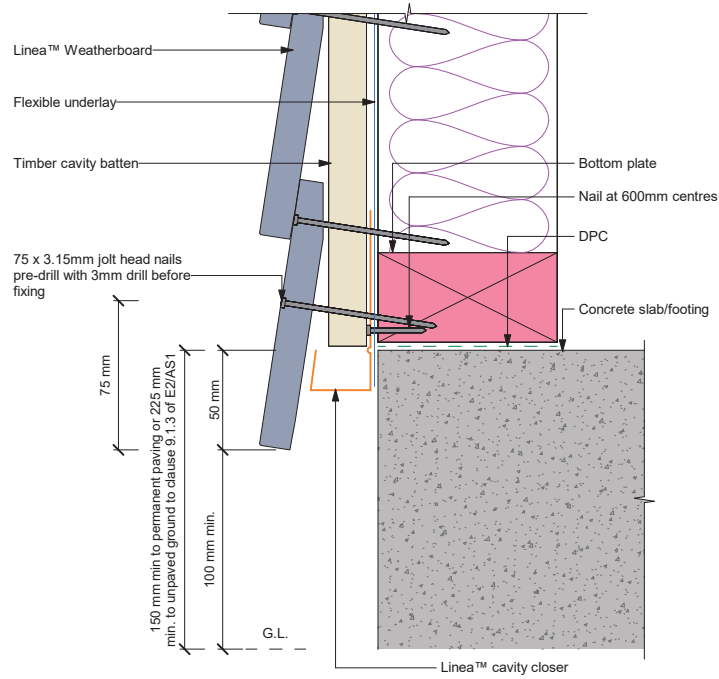
Figure 3: Batten layout at window opening



- Studs can be 45mm or 35mm wide

-The intermediate support for insulation between the studs could be a timber cavity batten, polypropylene tape or 75 mm galvanised wire mesh. Refer to E2/AS1 Paragraph 9.1.8.5 Polypropylene tape must be fixed horizontally and drawn taut at 300 mm centres.

Figure 4: Foundation detail



Note:
Drain holes in James Hardie uPVC vent strip are sufficient to achieve ventilation openings of 1000mm² per lineal metre

Figure 5: Enclosed Deck

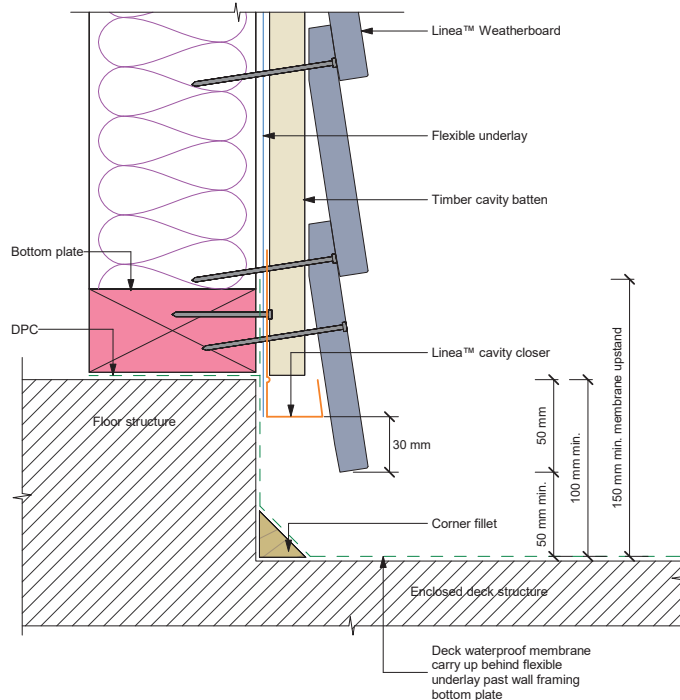


Figure 6: Jointing off stud

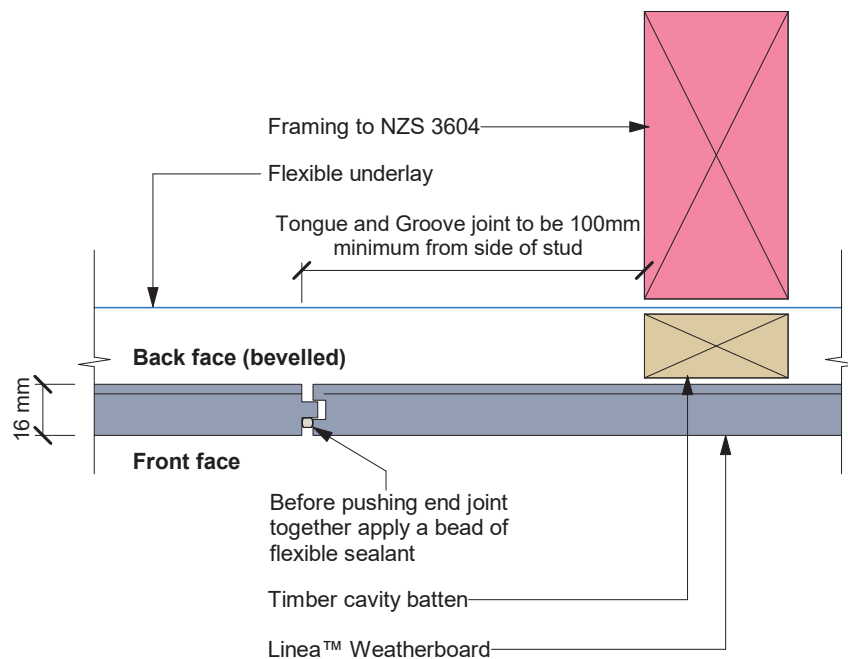
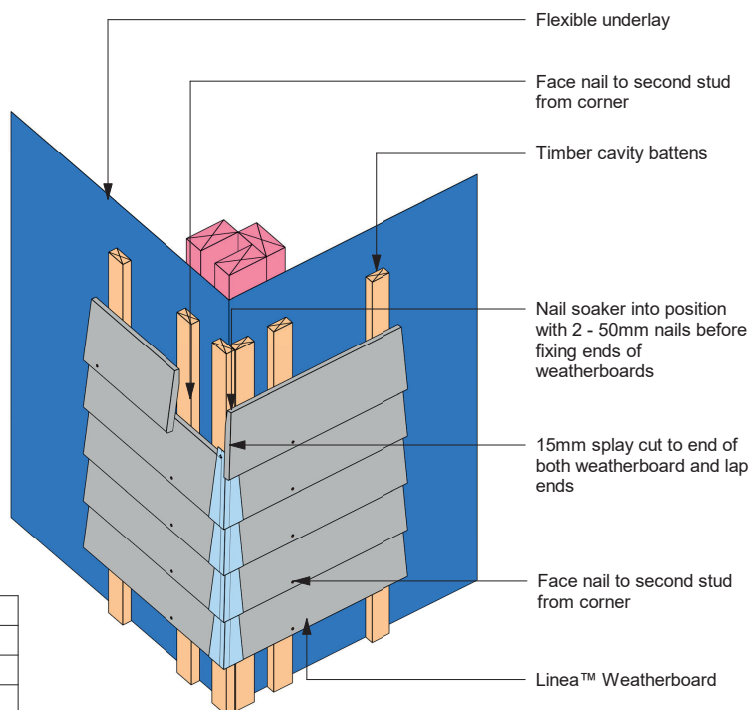
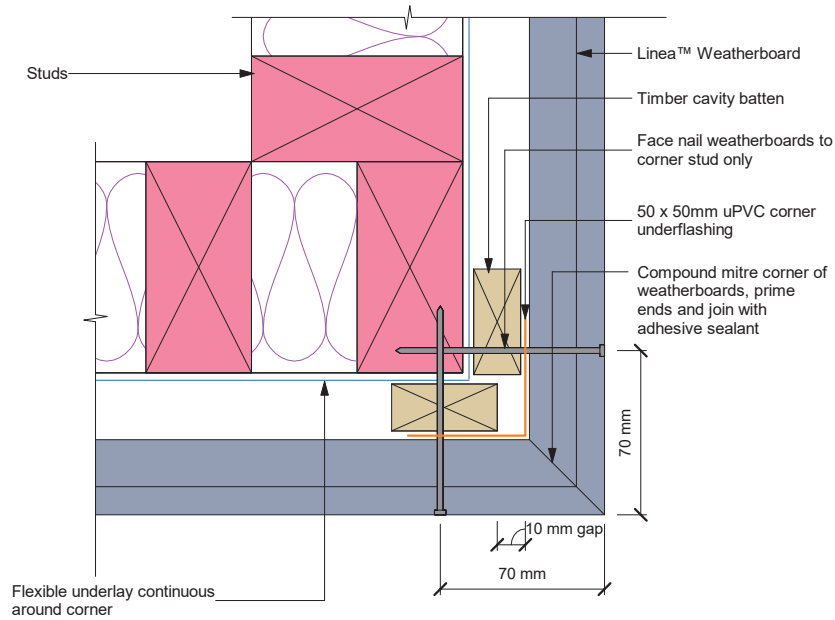


Figure 7: External corner soaker



Soaker material	Nail material
Copper	Copper or phosphor bronze
Aluminium	Hot dip galvanised
Stainless steel	Stainless steel

Figure 10: Mitre corner



Note: Adhesive sealant must be used on the full end face of both weatherboards. Push lightly together

Figure 11: Internal 90 ° aluminium 'W' mould corner

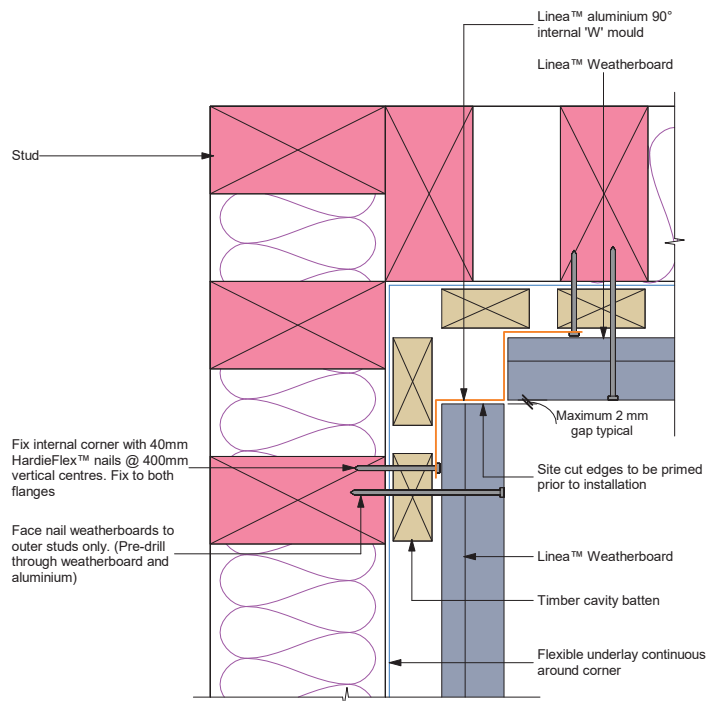


Figure 12: Internal 135 ° aluminium 'W' mould corner

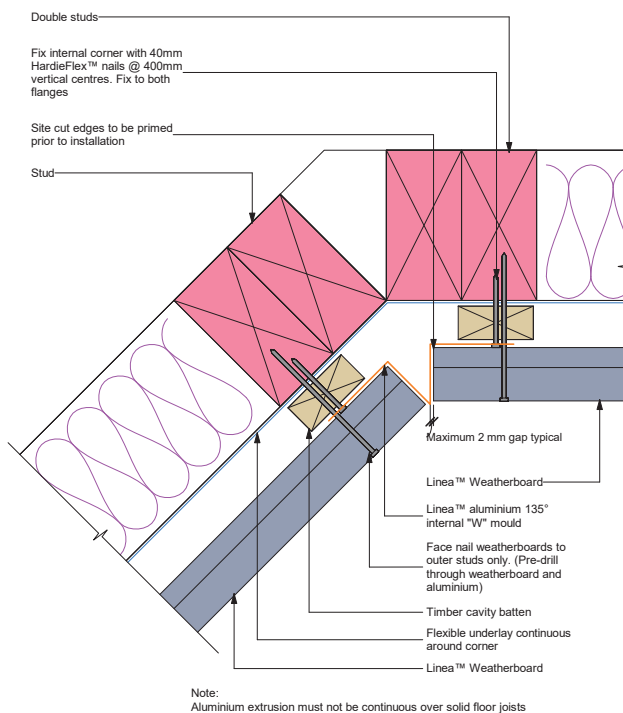


Figure 13: Internal corner joint flashing

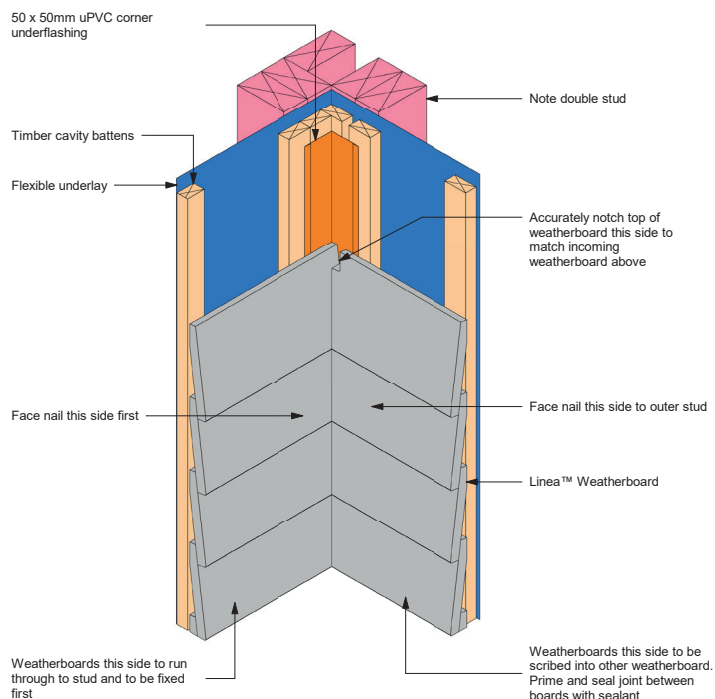


Figure 14: Wall to soffit junction 'X'

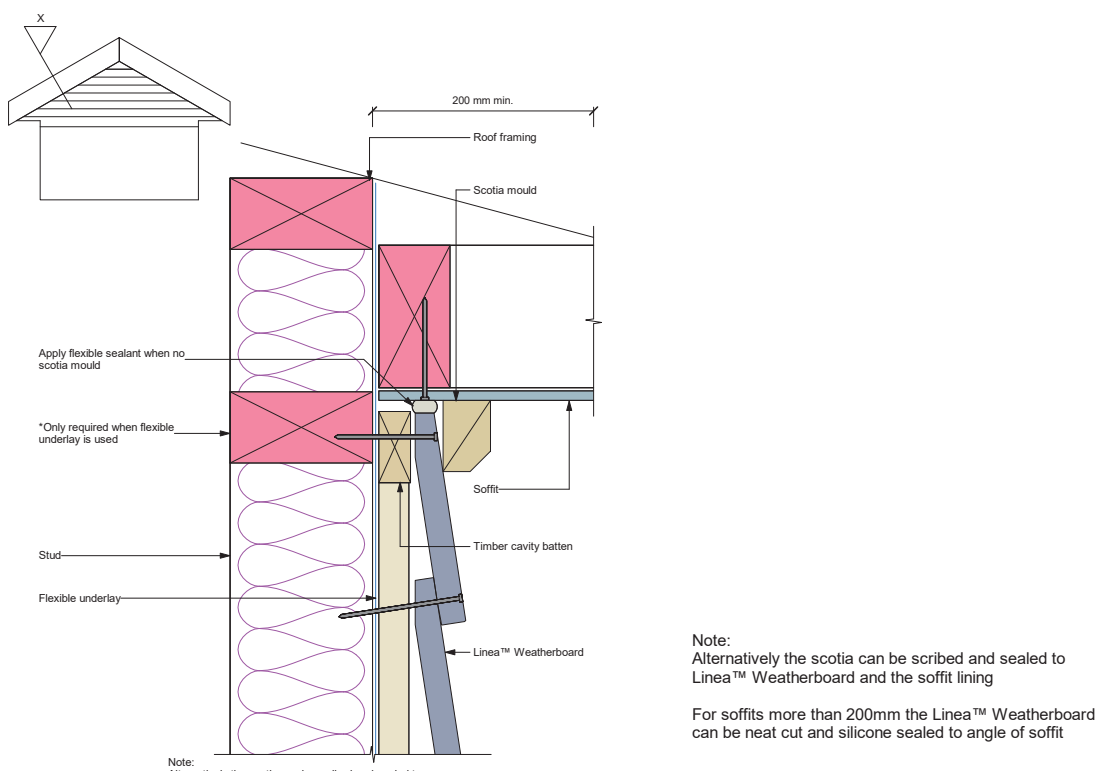


Figure 15: Nil soffit detail

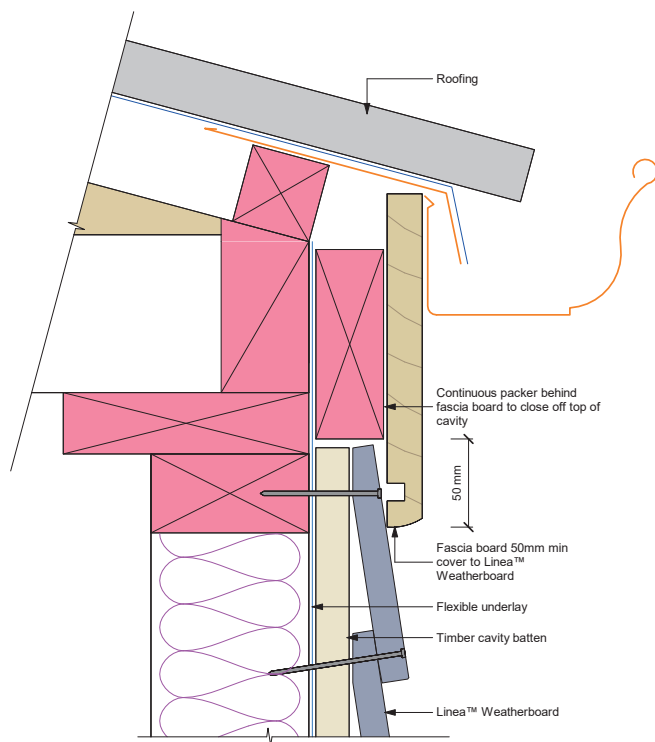
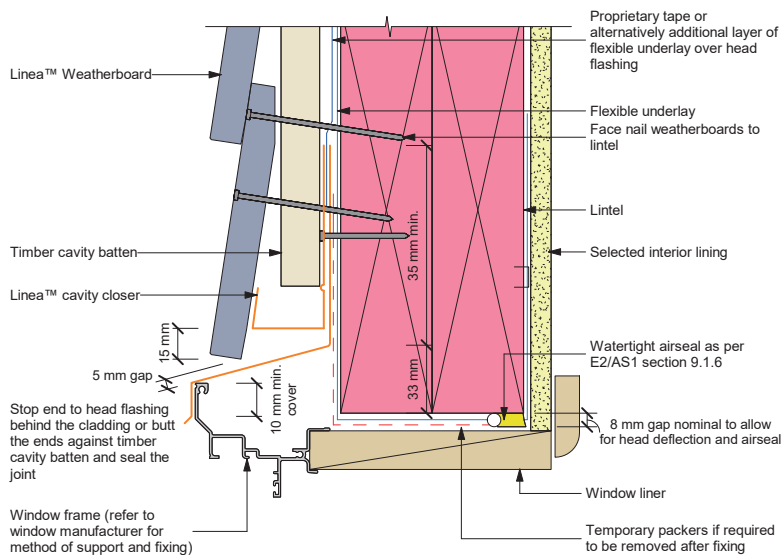


Figure 18: Window head



- Note:
- Sealant must be installed between head flashing and window flange in VH and EH wind zones and SED pressures
 - Alternatively, the head flashings can be formed with stop ends as per E2/AS1
 - Refer to Figure 22 for sealing end battens to head flashing
 - Site cut edges to be primed

Figure 19: Window jamb

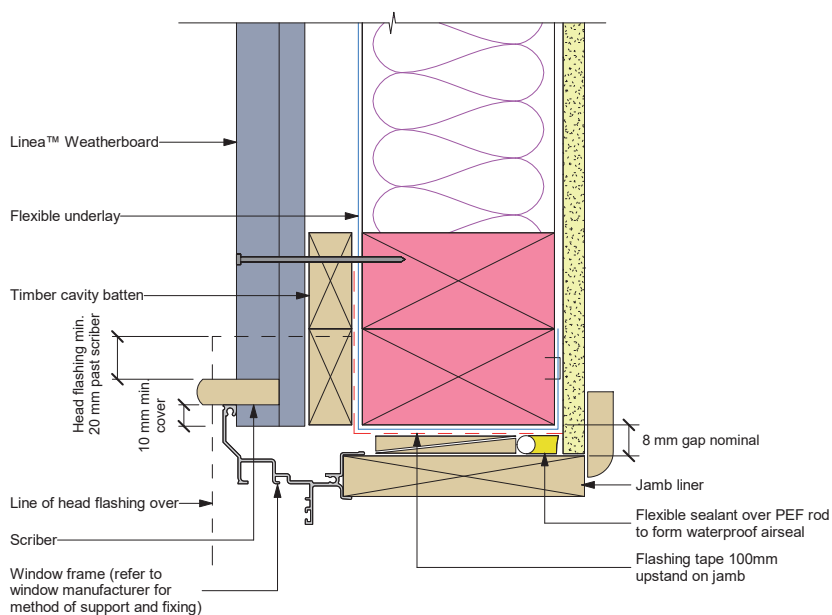
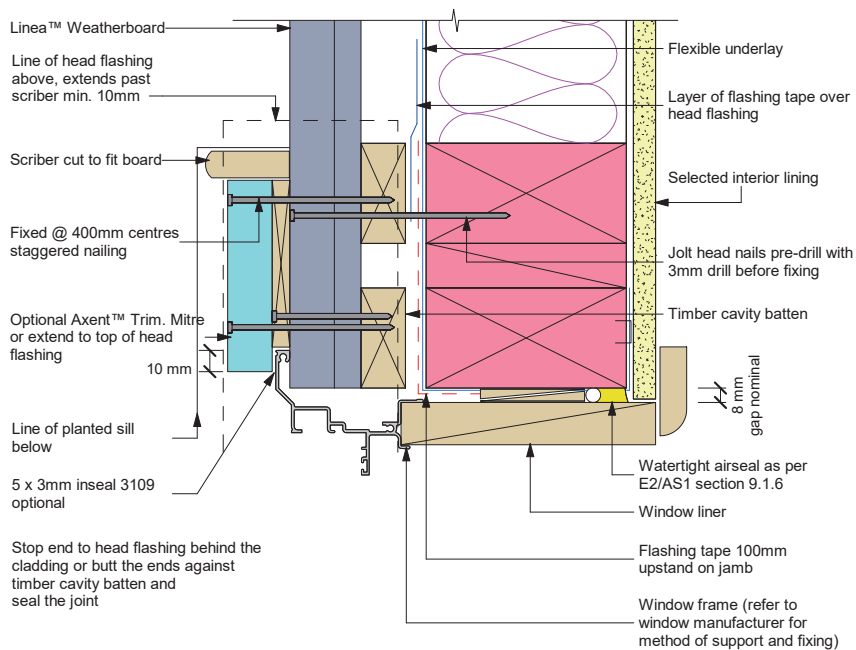
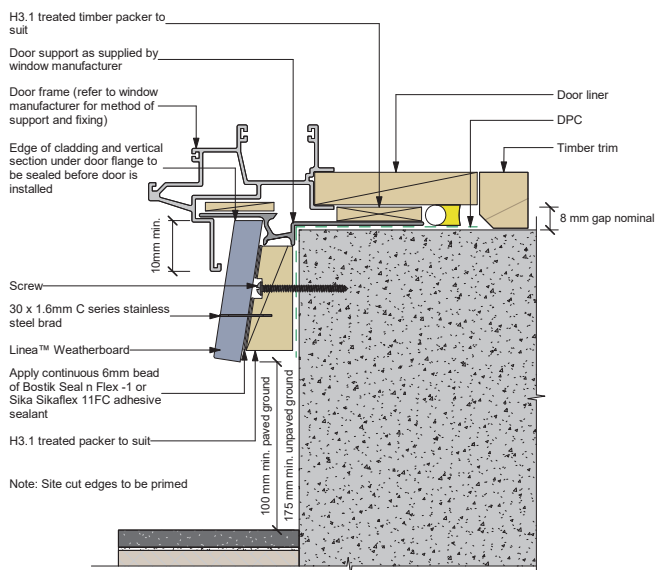


Figure 23: Window jamb with facings



Note:
 • Site cut edges to be primed

Figure 24: Door sill support detail



Note: Site cut edges to be primed

Refer to the manufacturer or supplier for technical information for these materials

- General notes for materials selection
1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of the NZBC E2/AS1
 2. Flexible underlay must comply with acceptable solution E2/AS1
 3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact
 4. Linea™ Weatherboard to have sealed butt joint over batten at each corner of opening



Product Warranty

James Hardie New Zealand Limited (“James Hardie”) warrants for a period of 25 years from the date of purchase that the Linea™ Weatherboard (the “Product”), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie’s relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the Axent™ Trim and accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

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

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

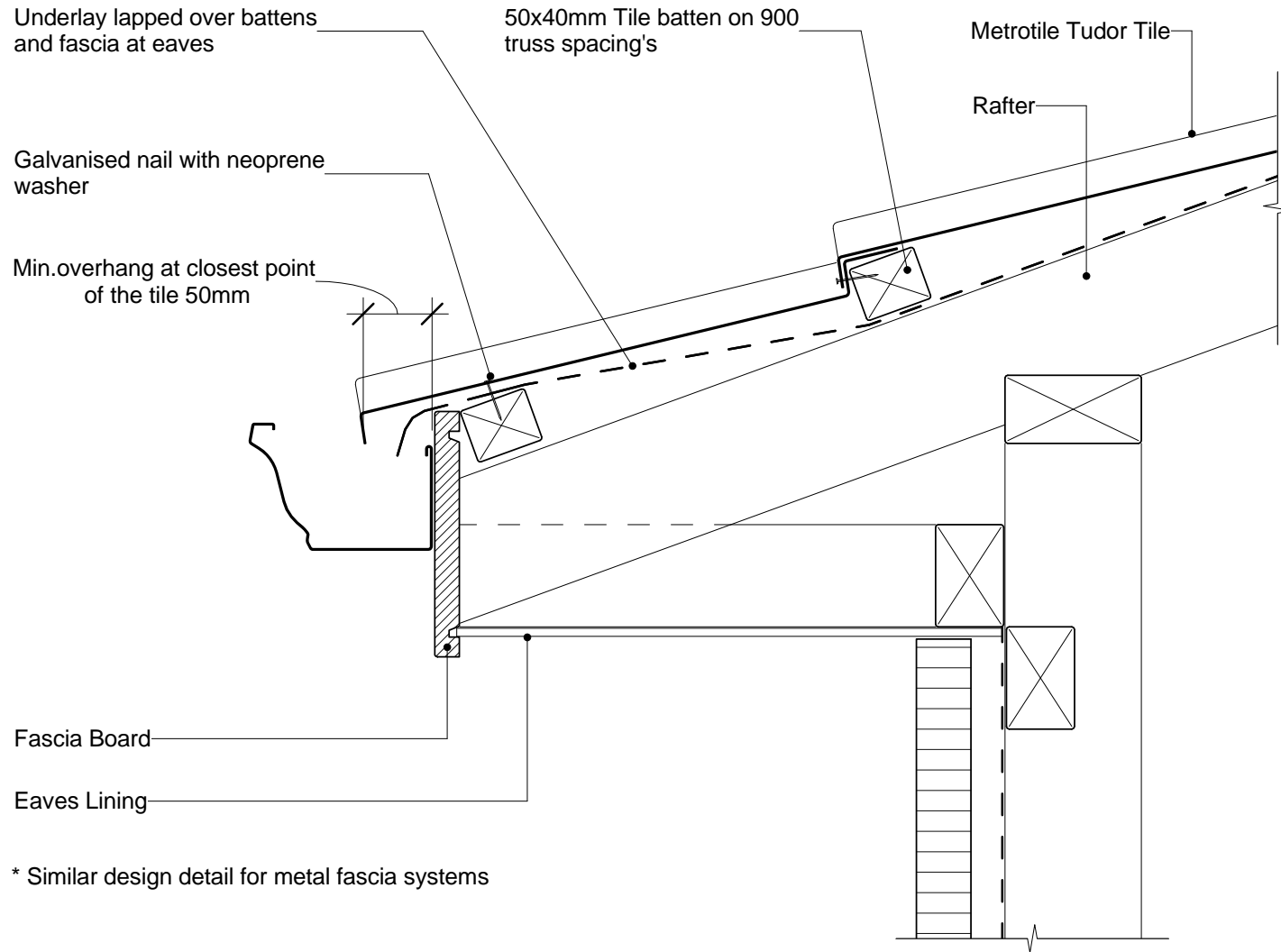
- a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.
- b) This warranty is not transferable.
- c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer’s instructions and good trade practice.
- d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code (“The NZBC”), regulations and standards.
- e) The claimant’s sole remedy for breach of warranty is (at James Hardie’s option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.
- f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).
- g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.
- h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

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

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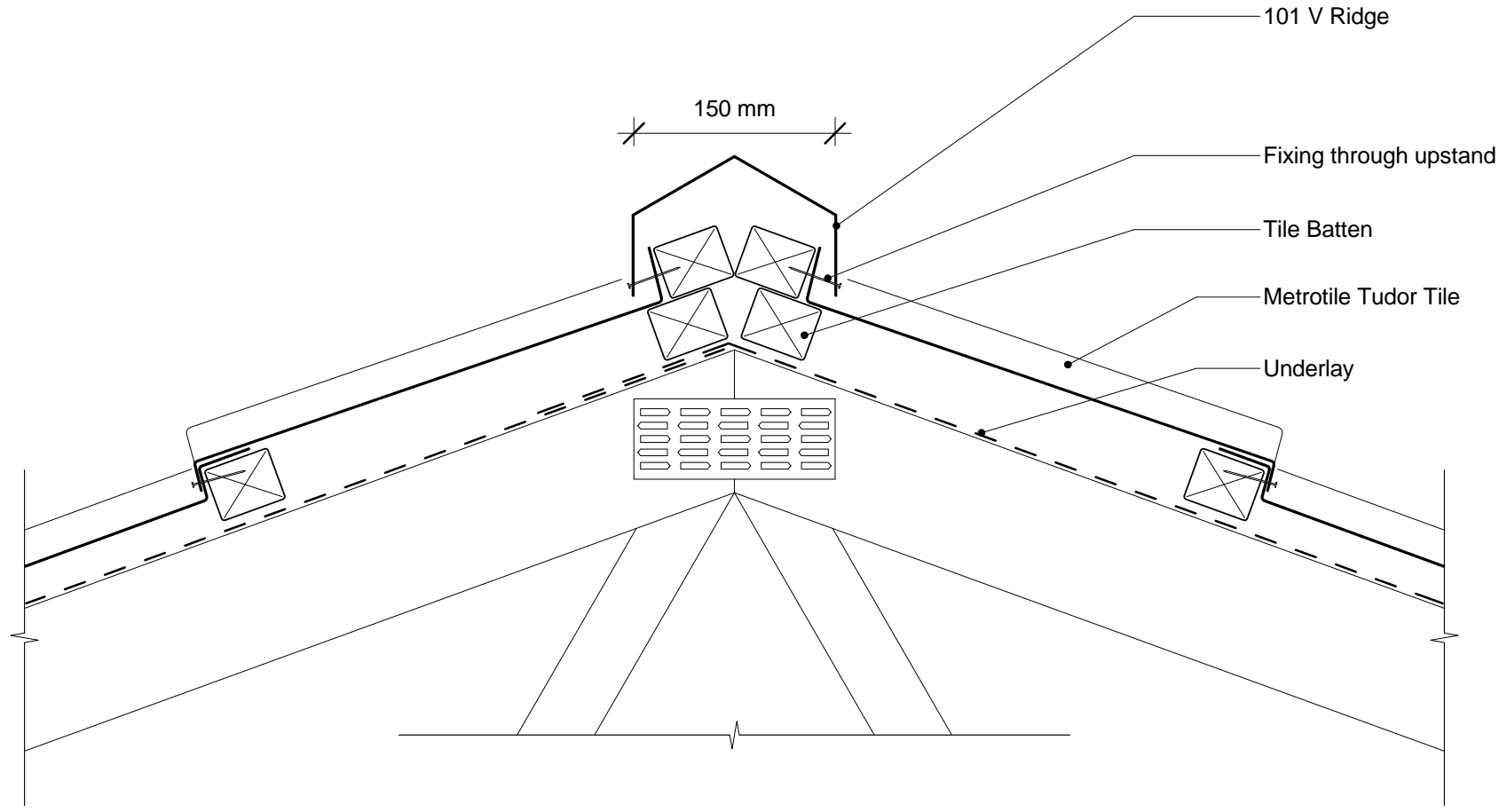
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Metrotile Tudor
 ROOFING SYSTEMS Gable-Barge Detail
 Fascia Detail

File: metrotile tu130 - fascia detail	
Revision: 00	Source: metrotile.rvt
Scale: 1 : 5	Reference
Date: 21 May 2015	TU130

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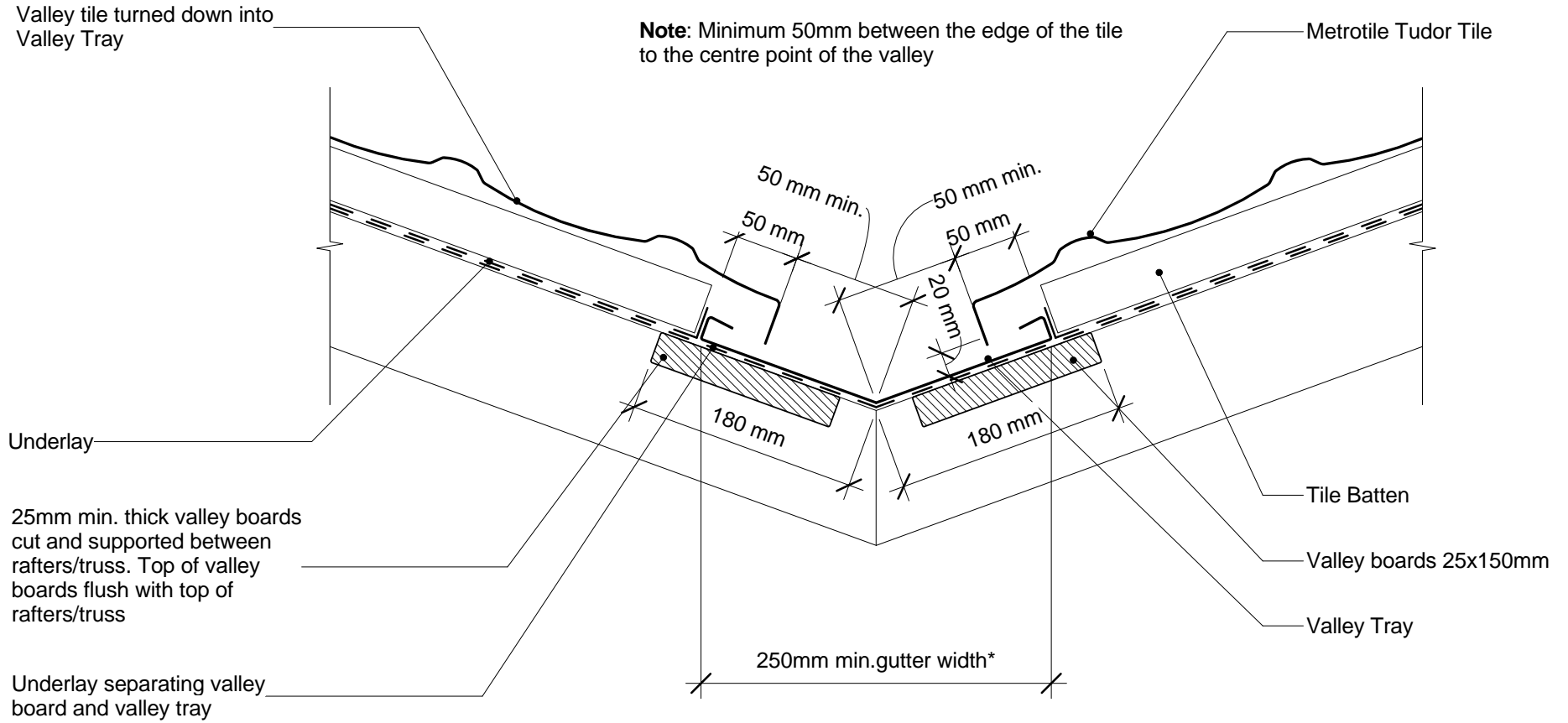
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Metrotile Tudor
 ROOFING SYSTEMS Ridge Detail
 V Ridge-Hip

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Revision: 00	Source: metrotile.rvt
Scale: 1 : 5	Reference
Date: 21 May 2015	TU143

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Note:*Minimum width of valley tray may reduce to 160mm providing roof catchment area is 16m² or less

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File: metrotile tu120 - cross section	
Revision: 00	Source: metrotile.rvt
Scale: 1 : 5	Reference
Date: 21 May 2015	TU120

Metrotile

ROOFING SYSTEMS



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TUDOR SATIN

The elegance and style of Tudor

The Metrotile Tudor satin-finish tile exudes a traditional, European style reminiscent of the Tudors of a by-gone age. Its elegant and undulating form is well suited to both modern and traditional homes. Tudor is also available in a textured finish.

With Metrotile Tudor you can enjoy this look combined with all the benefits of steel, exceptional weather and fire resistance, and long life. Metrotile Tudor satin-finish tiles are available in a wide selection of colours to enhance any exterior colour scheme.

Extensive research and development in the design process ensures every Metrotile product is manufactured to the highest quality with exceptional durability and strength. The tile profiles and roofing accessories are engineered to interlock and overlap to resist wind lifting and keep out the harsh elements. At less than 5kg/m², a Metrotile roof is a 'Lightweight Roofing System', so considerable cost savings can be achieved during construction. The perfect replacement for your old existing roof, a Metrotile roof lets you improve the look and value of your home in a matter of days.

All of Metrotile's roofing products are fabricated from Zinalume[®]-protected steel.

Metrotile's satin-finish enjoys added protection thanks to an acrylic topcoat that is up to two times thicker than colour-coated steel. This extremely durable UV-resistant coating enables Metrotile roofing products to withstand the harshest environments around the world. The satin-finish system uses only the best quality pigments to ensure excellent colour retention and corrosion resistance.

Metrotile is ISO 9001 accredited. International tests reports, appraisals and field results confirm our products are 100% waterproof, earthquake safe, fire resistant and able to withstand hurricane-force winds of up to 190kph (120mph). A Metrotile roof will not only safeguard your investment but will also give you complete peace of mind because it's backed by a Metrotile warranty.

You will not find a more durable, versatile and attractive roofing product on the world market that will surpass Metrotile's quality.

Minimum roof pitch: 12.5 degrees



50 Years Weather Security Warranty*



Interlocking System Earthquake Resistant



Marine Environments Weatherproof Warranty*



Non Combustible Class A Fire Rating



Environmentally Sustainable



UV Protection Permanent Beauty



Lightweight Easy Installation



Hail Resistant Freeze/Thaw Resistant



High Wind Zones Hurricane Resistant

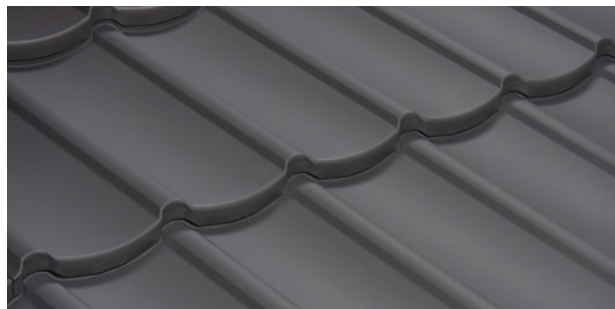
* Warranties may vary depending on climatic conditions.

TUDOR SATIN

Colour Options



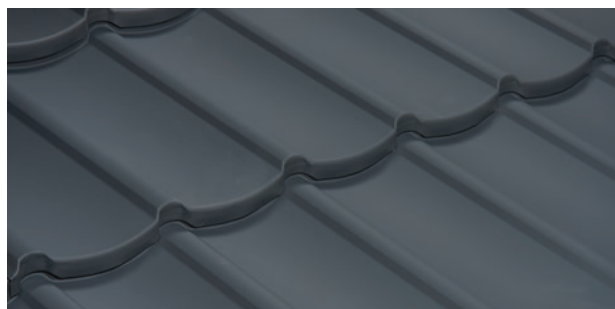
Ebony



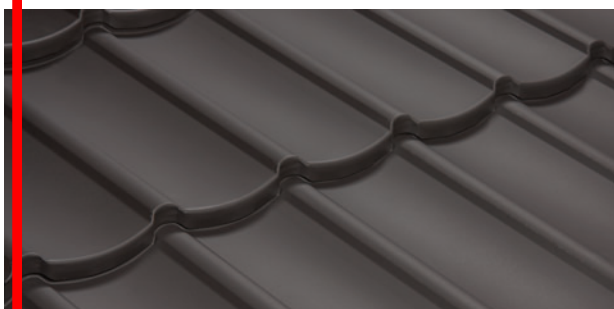
Grey Friars



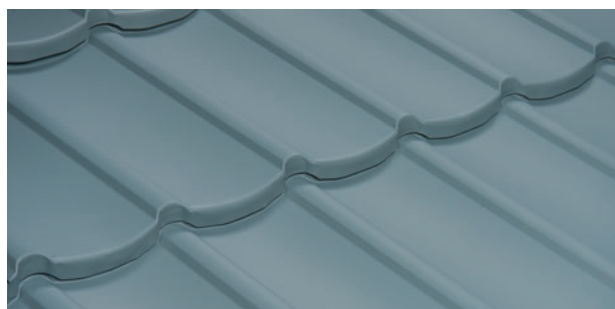
Terracotta



New Denim Blue



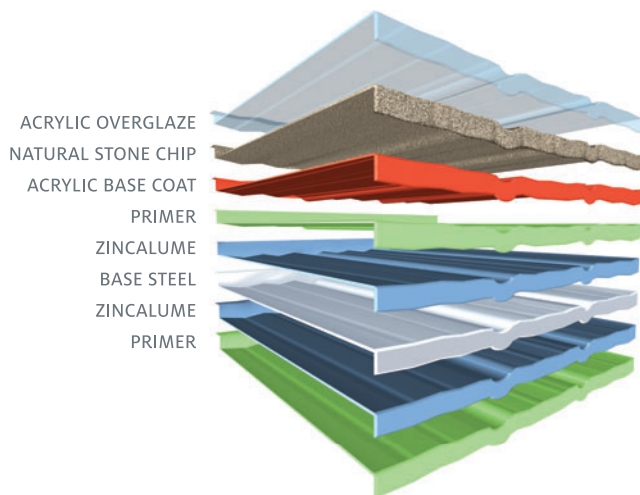
Ironsand



Wizard

Colours in this brochure are as close to the original as modern printing process will allow.

TUDOR SATIN SPECIFICATIONS	
Length of Cover	1265mm
Width of Cover	368mm
Tiles / m ²	2.15 / m ²
Weight / Tile	2.00 kg
Weight / m ²	4.30 kg
Minimum Roof Pitch	12.5°



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proudly made in New Zealand

Ross Roof Group

P +64 9 299 9498 F +64 9 298 4114, E info@metrotile.com, 1c Inlet Road, Papakura 2112, PO Box 72062, Papakura 2244, New Zealand. www.metrotile.com

TUDOR Tile (Figure 6)

[All Dimensions Nominal]

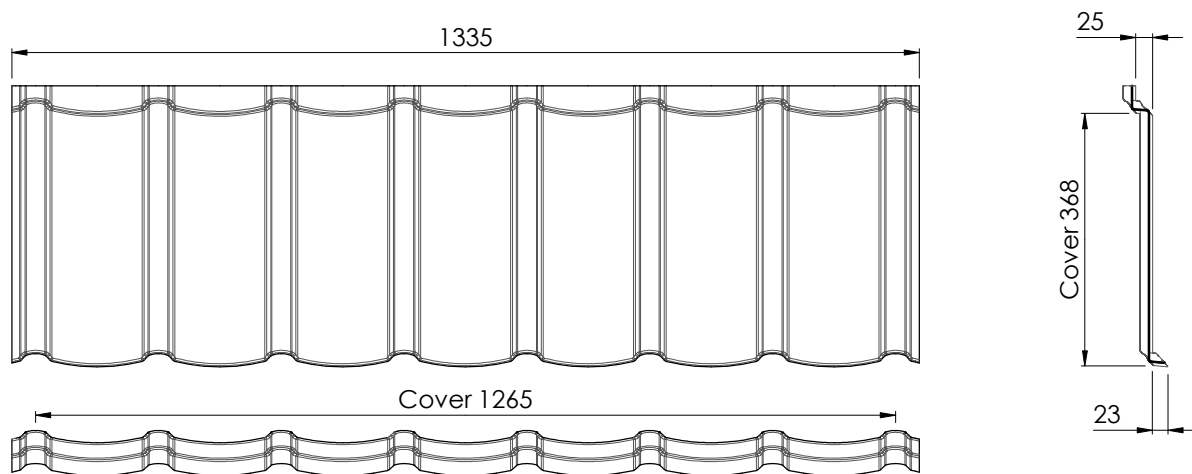


Figure 6.1 Tile Dimensions

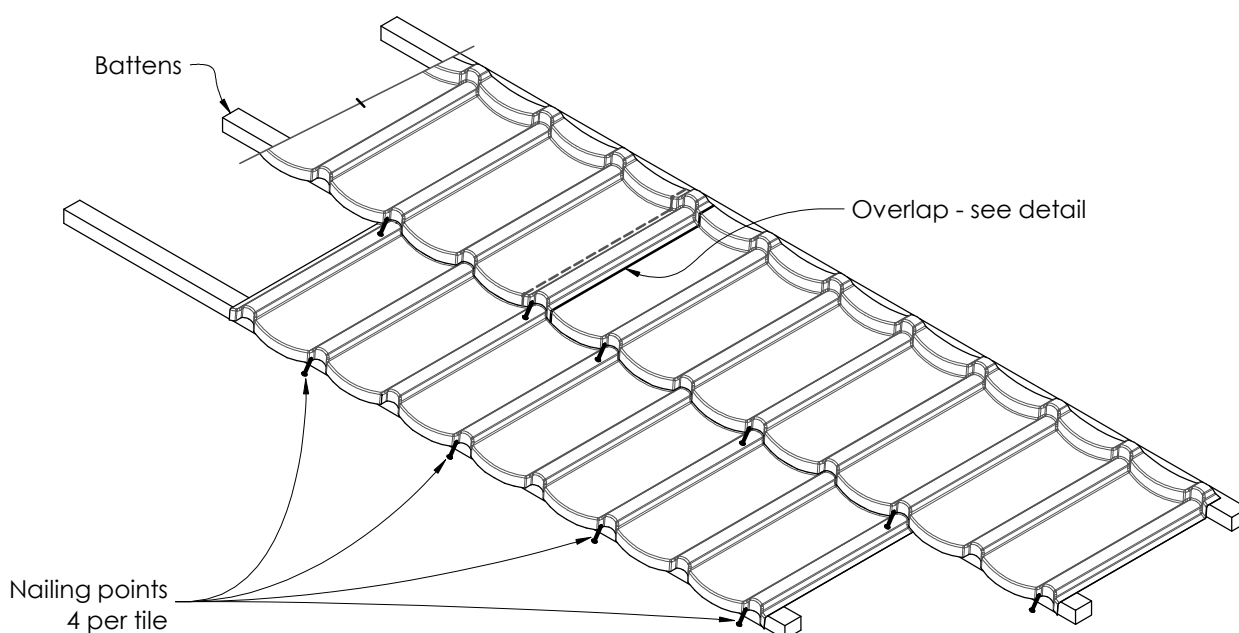


Figure 6.2 Nailing Detail

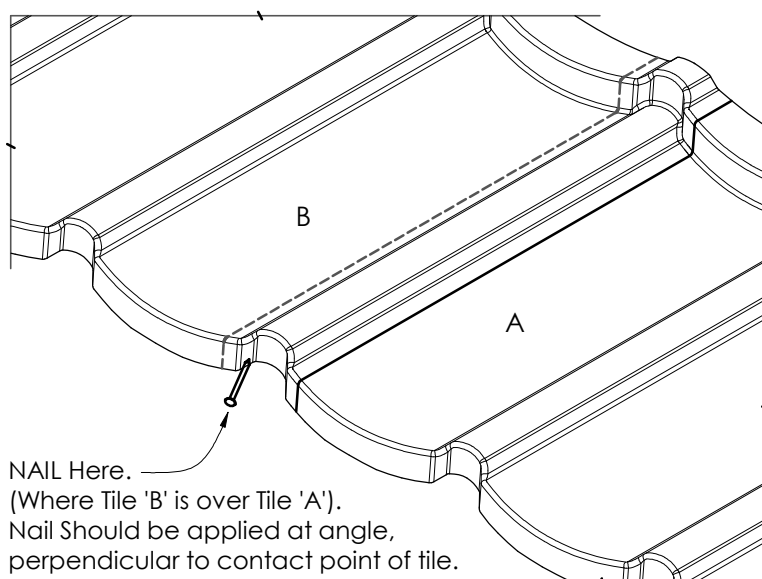


Figure 6.3 Overlap Detail

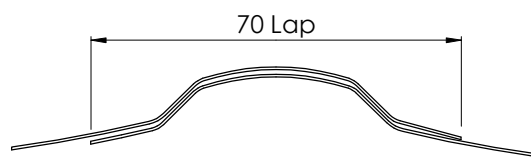
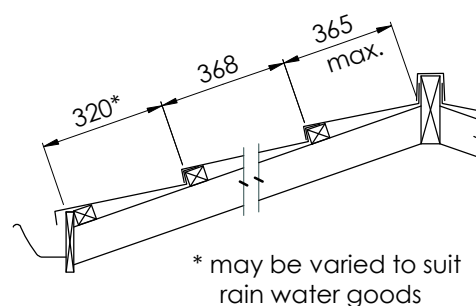


Figure 6.4 Lap Section



* may be varied to suit rain water goods

Figure 6.5 Batten Layout

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INTERNAL LOAD BEARING ON CONCRETE FLOOR SLABS



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7. FLOOR

- ★ Covers floor thickening and supporting stud requirements.
- ★ Covers floor slabs on buildings complying with NZS 3604:2011.
- ★ All concrete slabs to be constructed as per NZS 3604:2011.
- ★ Thickening requirements apply to reinforced floor slabs.
- ★ Provides solutions for stud requirements where point loads exceed 10 kN.
- ★ All slabs assumed to be supported on soils that have Ultimate Bearing Capacity of 300 kPa ($\phi_b=0.50$).



Establishing Thickening & Stud Requirements

1. Establish the type of load applied to the floor as being either a UDL (uniformly distributed load) or a concentrated load. Girder trusses will always give concentrated loads and a run of two or more trusses with the same loads will give a UDL.
2. Establish the maximum load value via the MiTek 20/20® Truss Design Software by using the Truss Bearings Exceeding 10 kN Report (see example below). Choose the maximum DOWN value in kN.
3. Go to the Slab Thickening & Stud Requirement Table on page 3 and choose from the appropriate section; either no change for up to 10 kN, FP1 and FS1 for up to 20 kN, or FP2 and FS2 for up to 30 kN.
4. Choose from the selection of stud options (height, centres and grade).
5. Apply the relevant slab and stud requirements as specified and detailed on page 3.
6. Where the maximum positive bearing reaction exceeds 10 kN (uplift), refer to MiTek for Special Design.

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7. FLOOR

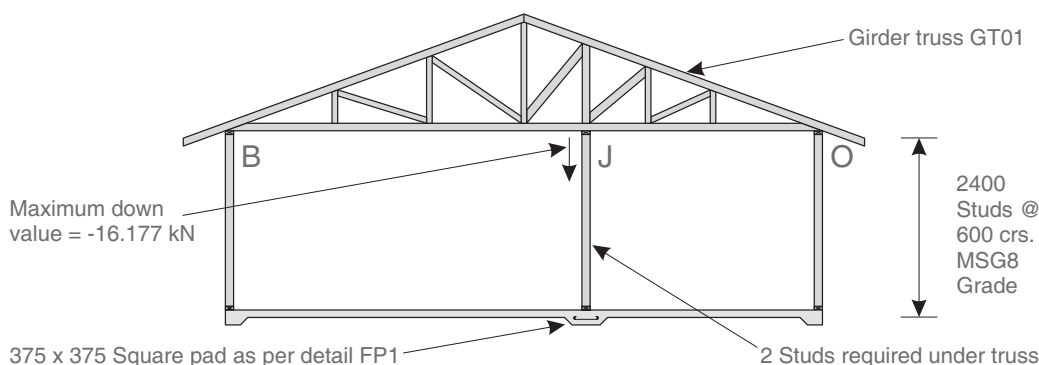
MiTek 20/20® Example Selection

TRUSS BEARINGS EXCEEDING 10 kN REPORT

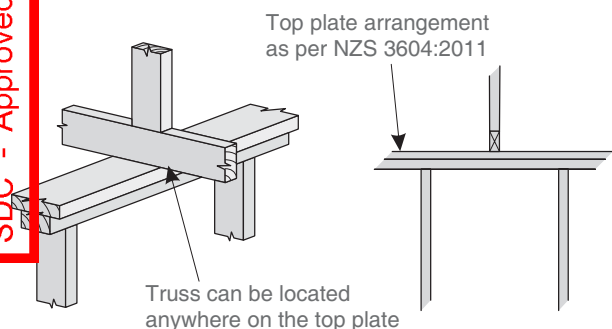
Truss List

Legend: ? = input only, ~~FX~~ = failed design, Unmarked trusses = designed successfully

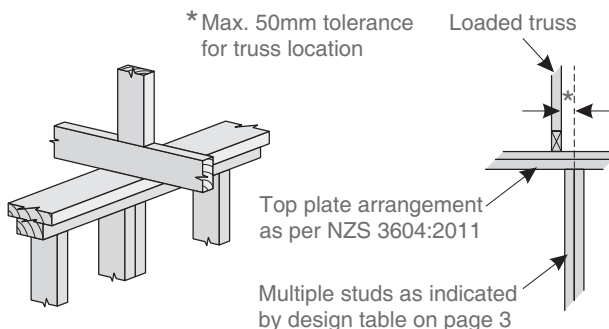
Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN)	
				Down	Uplift
GT01	1	8000	J	16.177	7.292



SINGLE STUD OPTION



MULTIPLE STUD OPTION



Slab Thickening & Stud Requirement Table

CONSTRUCTION SPECIFICATIONS

Max. truss crs. @ 1200mm, Min. truss crs. @ 600mm.
 Assume walls are fully lined on at least one face.
 Assume full bearing on top plate (i.e. no eccentric loading).

TRUSS BEARING REACTION	SLAB THICKENING DETAIL		STUD REQUIREMENTS UNIFORM DIST. LOADS OR CONCENTRATED LOADS		
	CONCENTRATED LOAD	UNIFORM DIST. LOAD	STUD HEIGHT	STUD REQUIREMENTS	
Bearing reaction up to & including 10 kN	STANDARD reinforced slab floor as per NZS 3604:2011	STANDARD reinforced slab floor as per NZS 3604:2011	2400	Refer to NZS 3604:2011	
			2700		
			3000		
			STUD HEIGHT	NO. OF STUD UNDER TRUSS	MIN. TIMBER SIZE
Bearing reaction up to & including 20 kN	TYPE FP1 375 x 375 PAD	TYPE FS1 300 STRIP THICKENING	2400	2	90 x 35
			2700	2	90 x 45
			3000	3	90 x 45
			STUD HEIGHT	NO. OF STUD UNDER TRUSS	MIN. TIMBER SIZE
Bearing reaction up to & including 30 kN	TYPE FP2 450 x 450 PAD	TYPE FS2 450 STRIP THICKENING	2400	3	90 x 45
			2700	3	90 x 45
			3000	4	90 x 45

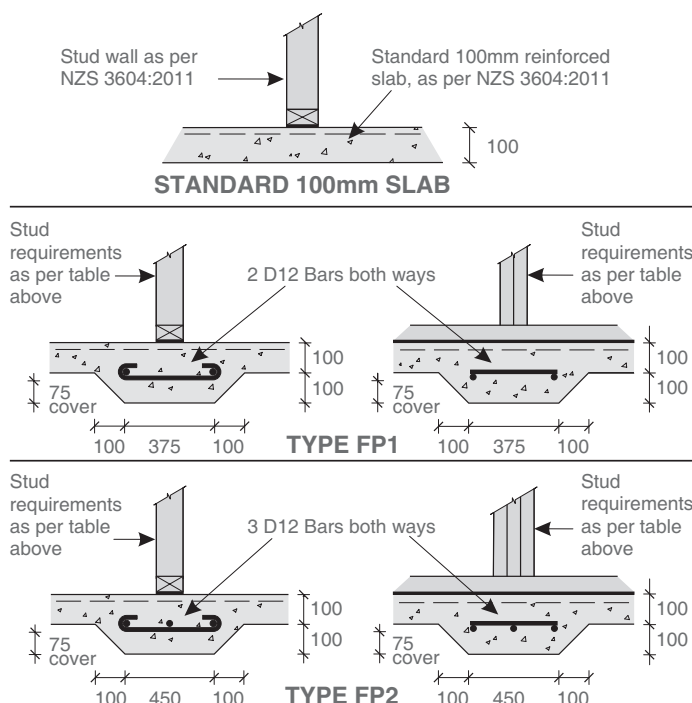
TIMBER SPECIFICATIONS

Timber properties based on NZS 3603:1993 Amendment No.4 March 2005.
 Minimum grade specified is SG8 unless otherwise noted.
 For SG6 use the studs for the next highest category.
 i.e. - For loads up to 10 kN select studs from the 20 kN table.
 - For loads up to 20 kN select studs from the 30 kN table.
 - For loads above 20 kN Special Design is required.

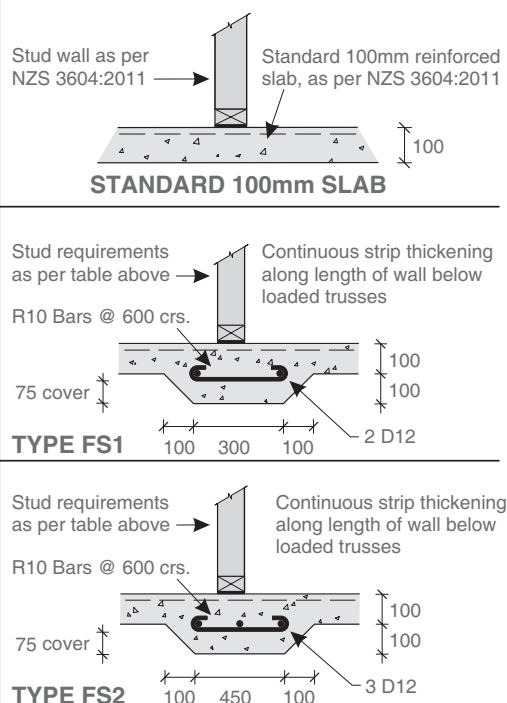
* Note: The stud requirement for 20 kN & 30 kN bearing reactions can be applied to external walls as well.

Slab Thickening Details

CONCRETE PAD OPTIONS (for concentrated loads)



CONTINUOUS CONCRETE THICKENING OPTIONS (for uniformly distributed loads)



NOTE: FP = Foundation Pad FS = Foundation Strip

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7. FLOOR

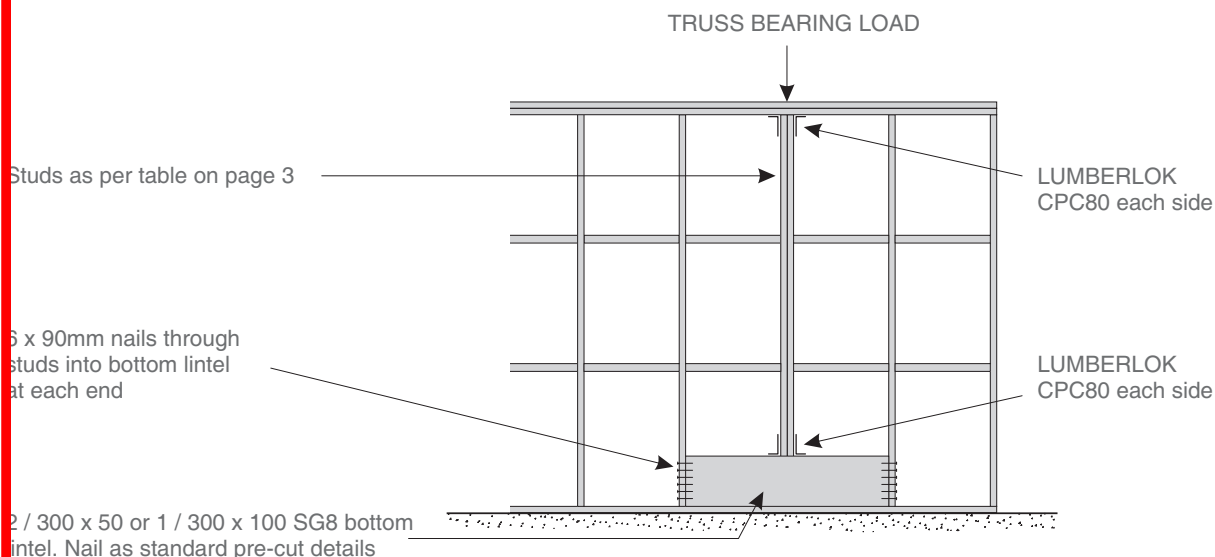
Retro Fitted Load Bearing Option

Note:

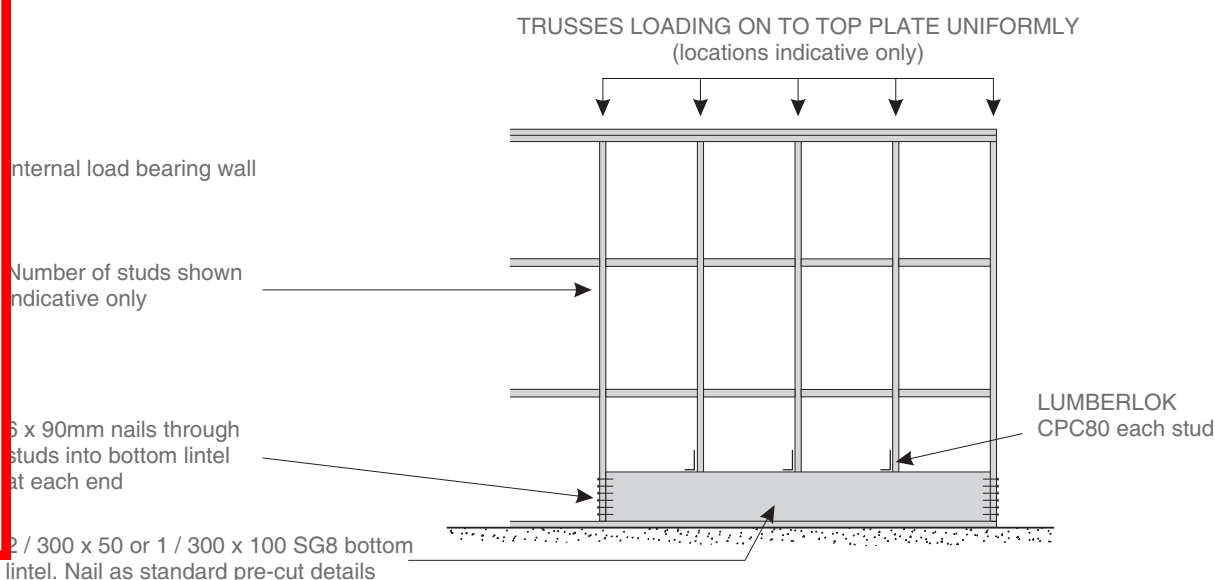
- Covers slab details where no thickening has been built into the foundation.
- For loads exceeding 10 kN install bottom lintel (300 x 100) between two adjacent studs as detailed below. For loads 30 kN or more, special design is required.
- Ensure the studs comply with requirements on page 3 and are located directly under concentrated loads. This may require on-site installation of these studs.

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Concentrated Load



Uniformly Distributed Loads





ECOPLY® BRACING SPECIFICATIONS: EPI



SINGLE 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		95	105
EPI_1.2	1.2 m		120	135

FRAMING

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604:2011)
- NZBC B2 - Durability: AS1 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 or over cavity battens. 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®

Fasteners

Fasten with 50 x 2.8 mm galvanised or stainless steel flat head nails for direct fix, or 60 x 2.8 mm over cavity battens. Place fasteners no less than 7 mm 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

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.

CarterHoltHarvey
Woodproducts New Zealand

Information contained in this document is specific to the CHH Woodproducts range of plywood products and cannot be used with any other plywood products no matter how similar they may appear.

For further information contact customer services or visit www.chhwoodproducts.co.nz

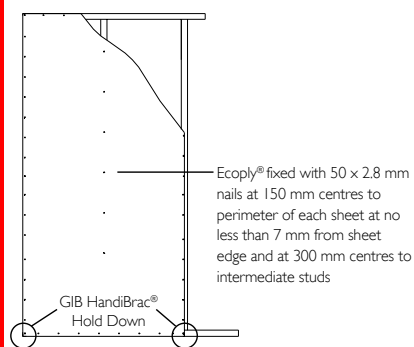
0800 326 759
www.chhwoodproducts.co.nz

Ecoply® Bracing Systems are designed to meet the requirements of the New Zealand Building Code 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.

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® 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 ¹ 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 ¹ B & C:	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 ¹ D (sea spray):	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Cladding	Refer to Shadowclad® Specification & Installation Guide	
Rigid Air Barrier	Refer to Ecoply Barrier® Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones ¹ B & C	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones ¹ D	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones ¹ (including sea spray)	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

¹ Exposure zones as per section 4 of NZS 3604

* Refer to Table 8, page 15 of Ecoply Specification & Installation Guide.

Ecoply® Bracing Systems are designed to meet the requirements of the New Zealand Building Code 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.

MARCH 2014

CBI 5113

March 2007

GIB Aqualine[®] Wet Area Systems

SDC - Approved Building Consent Document - BC:202424 - Pg 115 of 170 - 8/12/2020 - lillej



GIB AQUALINE® WET AREA SYSTEMS



Introduction

MARCH 2007

THIS PUBLICATION

This publication is not intended as the definitive guide on wet area construction and wet area systems, but rather as a helpful guide to best practice around areas where there is intermittent water exposure and splash zones within residential and non-residential buildings – in particular, areas covered by the New Zealand Building Code (NZBC), Clause E3 Internal Moisture. The information herein is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZBC and the end user.

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

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

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

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

(GAW)	(D)	(030)
GIB Aqualine® Wet Area System	Detail	Drawing Number

WHAT IS A WET AREA?

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

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

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

GIB AQUALINE®

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

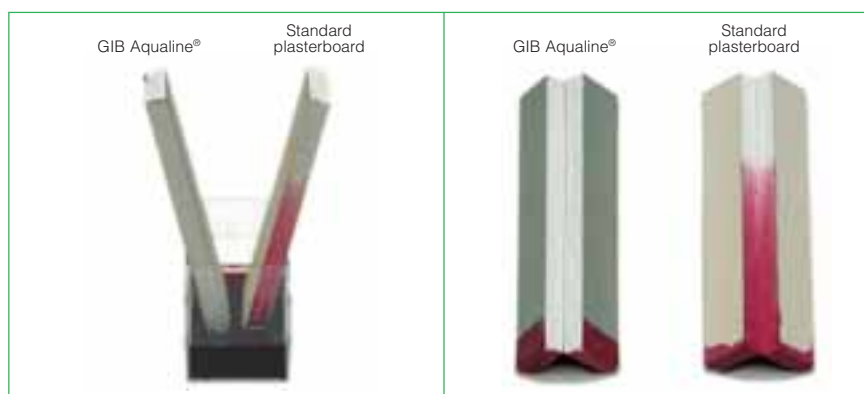
The NZBC does not call for water resistant linings in wet areas but it is highly desirable to incorporate lining materials which will maintain their integrity longer when exposed more frequently to water or steam and particularly to one-off events such as leakages or flooding of a room.

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

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

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

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



GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Introduction/Design Considerations

GIB AQUALINE® *continued*

Where to Use GIB Aqualine®

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

They include:

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

Benefits

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

Sheet Dimensions and Weights

SHEET DIMENSIONS (ALL SHEETS 1200mm WIDE AND TE/TE)		MAXIMUM WEIGHT/m ²
Thickness (mm)	Length (mm)	
10	2400, 2700, 3000, 3600	7.8kg
13	2400, 2700, 3000, 3600	10.2kg

Handling and Storage

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

APPRAISAL

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

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

Structure – Clause B1

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

Durability – Clause B2

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

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

Spread of Fire – Clause C3

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

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

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

Internal Moisture – Clause E3

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

Hazardous Building Materials – Clause F2

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

Ventilation – Clause G4

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

Airborne and Impact Sound – Clause G6

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

LIMITATIONS

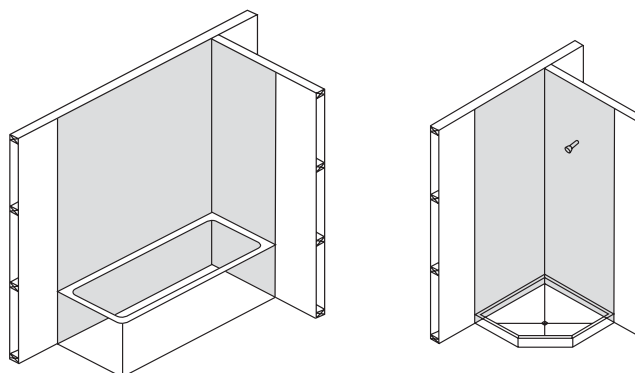
- GIB Aqualine® must not be used for bracing purposes in shower cubicles or above baths (see Bracing in Wet Areas below)
- Do not use GIB Aqualine® where it may be exposed for extended periods to humidities of 90% RH and above. Such areas include group shower or steam rooms as well as moisture and chlorine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

BRACING IN WET AREAS

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

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

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



No bracing in the shaded areas.

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

NEW ZEALAND BUILDING CODE

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

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

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

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

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

WALL SURFACES IN AREAS LIKELY TO BE SPLASHED

Suitable linings include:

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

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

SURFACES IN SHOWERS AND AROUND BATHS

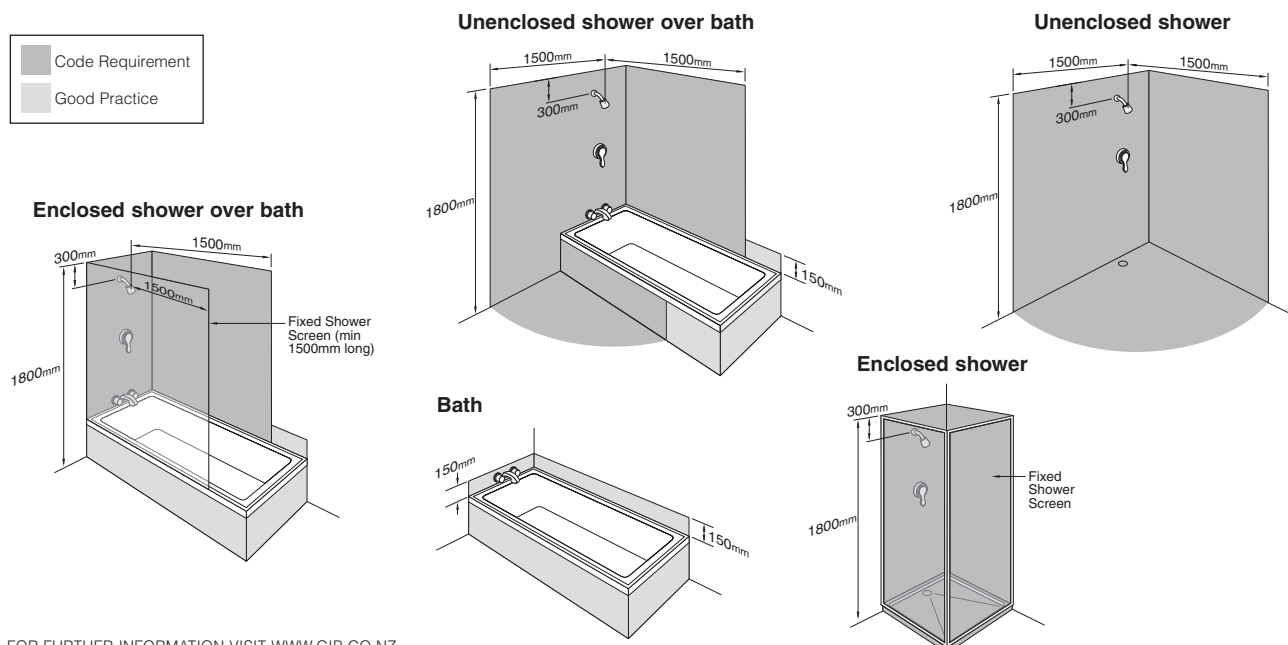
Suitable linings include all of the above, but **NOT including items (d) and (f) from the above list.**

Note that a waterproof membrane complying with AS/NZS 4858: 2004 **MUST** be applied to all lining materials used under ceramic tiles in these areas.

The waterproof membrane must extend to a 1500mm horizontal radius from a shower rose unless the shower is contained within a fixed enclosure. A shower curtain does not constitute a fixed enclosure.

Particleboard manufacturers recommend that in wet areas, panels should be protected with a suitable wet area membrane or an integrally waterproof sheet material. Some local authorities call for this treatment on all timber based floors. Local requirements should be checked before proceeding.

Dark grey shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membranes prior to tiling. Light grey shaded areas represent good practice.



GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

WALL SURFACES SURROUNDING COOKTOPS

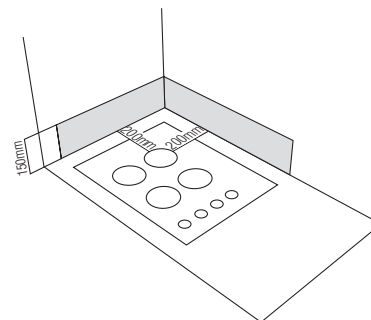
The protection of combustible surfaces surrounding gas cooking appliances is covered by NZS 5261. Consult the current version of this standard to ensure compliance.

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

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

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

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



PENETRATIONS AND SEALANTS

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

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

WATERPROOF MEMBRANES

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

TILING

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

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

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

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

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

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

RIGID SHEET SHOWER LININGS

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

RENOVATIONS

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

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

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

MAINTENANCE

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

It is important to regularly inspect and repair any potential problem before it becomes a major problem and expensive to reinstate. Good maintenance should include:

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

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Non-residential and Apartments

MARCH 2007

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

HIGH-RISE APARTMENTS AND INTERTENANCY

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

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

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

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

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

Refer to typical details on page 25.

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

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

OFFICE, WORKPLACE AND SCHOOLS

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

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

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

HEALTHCARE AND HOSPITALS

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

PUBLIC AMENITIES AND SPORTS CLUBS

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

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

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

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

GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Non-tiled Walls – Timber Framing

MARCH 2007

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

Wall Framing

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

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

Fasteners

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

Fastener Centres

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

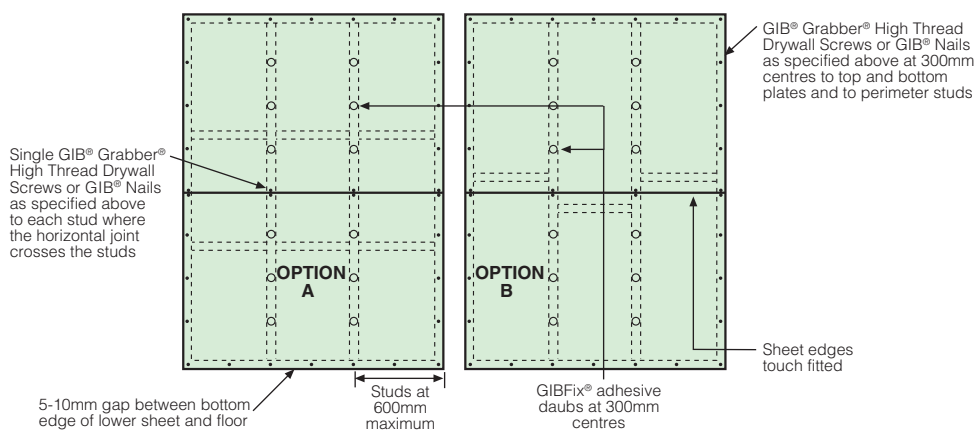
Lining

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

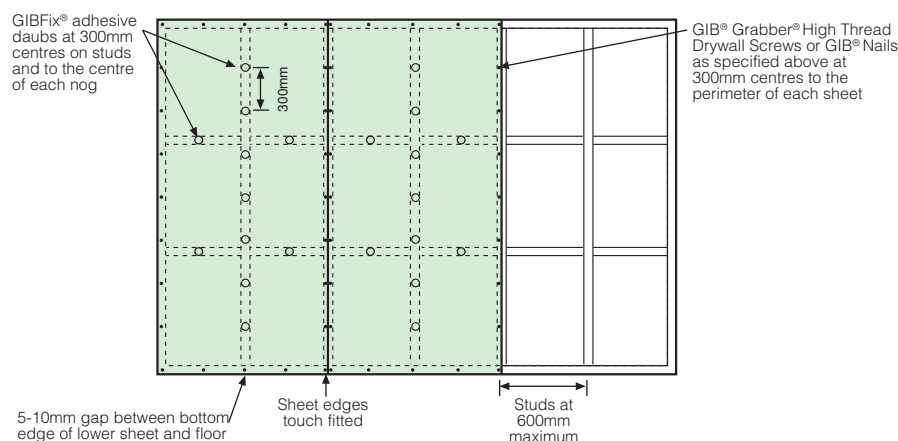
Jointing

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

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Non-tiled Walls – Steel Framing

MARCH 2007

The minimum sheet thickness for fixing on light gauge steel framing is 13mm GIB® plasterboard.

Steel framing for residential construction is by specific design.

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

Wall Framing

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

Fasteners

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

Fastener Centres

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

Lining

- Lay the sheets, leaving a 5-10mm gap at the floor line.

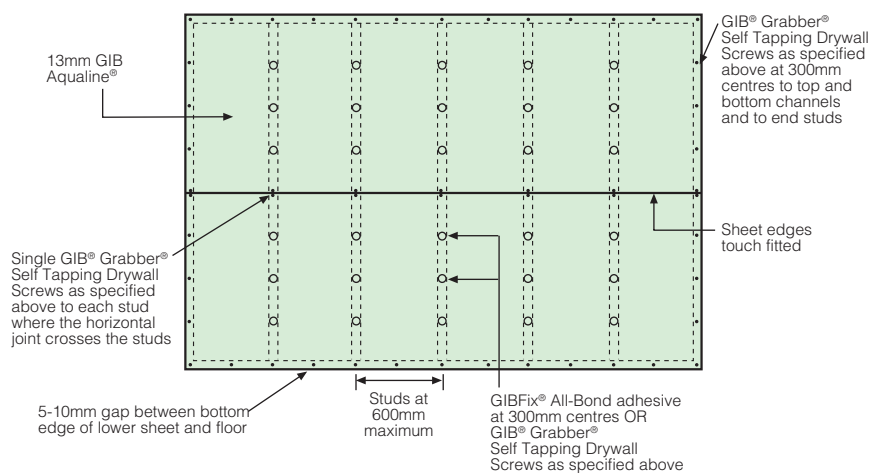
Note: If friction fitted steel studs have been used, sheets must be fitted hard to the floor. Ensure floor is cured and dry

- Sheets to be touch fitted.

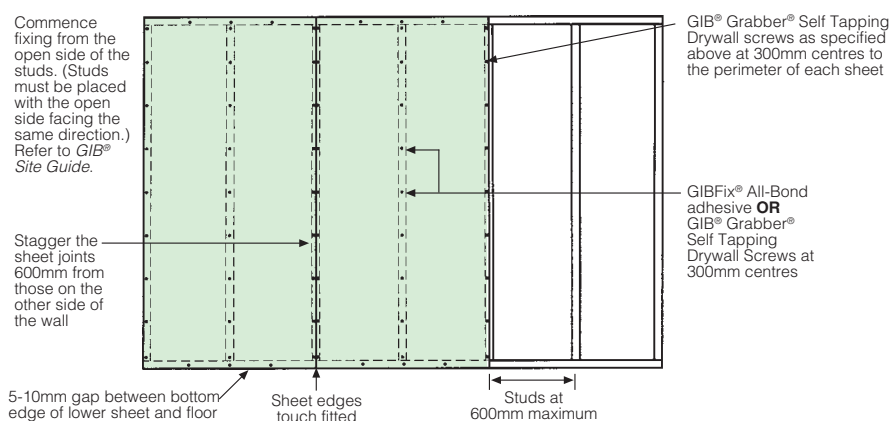
Jointing

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

Fastening and Jointing the Linings – Horizontal Fixing



Fastening and Jointing the Linings – Vertical Fixing



GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Tiled Walls

MARCH 2007

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

Wall Framing

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

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

Fasteners

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

Fastener Centres

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

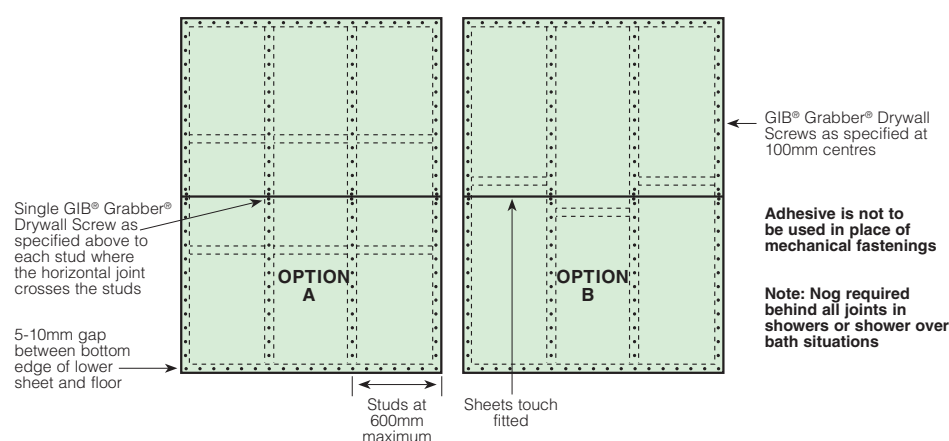
Lining

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

Jointing

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

Fastening the Linings – Horizontal Fixing in Tiled Areas



Note:

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

GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Ceilings

MARCH 2007

Ceiling Framing

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

Fasteners

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

Adhesives

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

Fasteners Centres

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

Lining

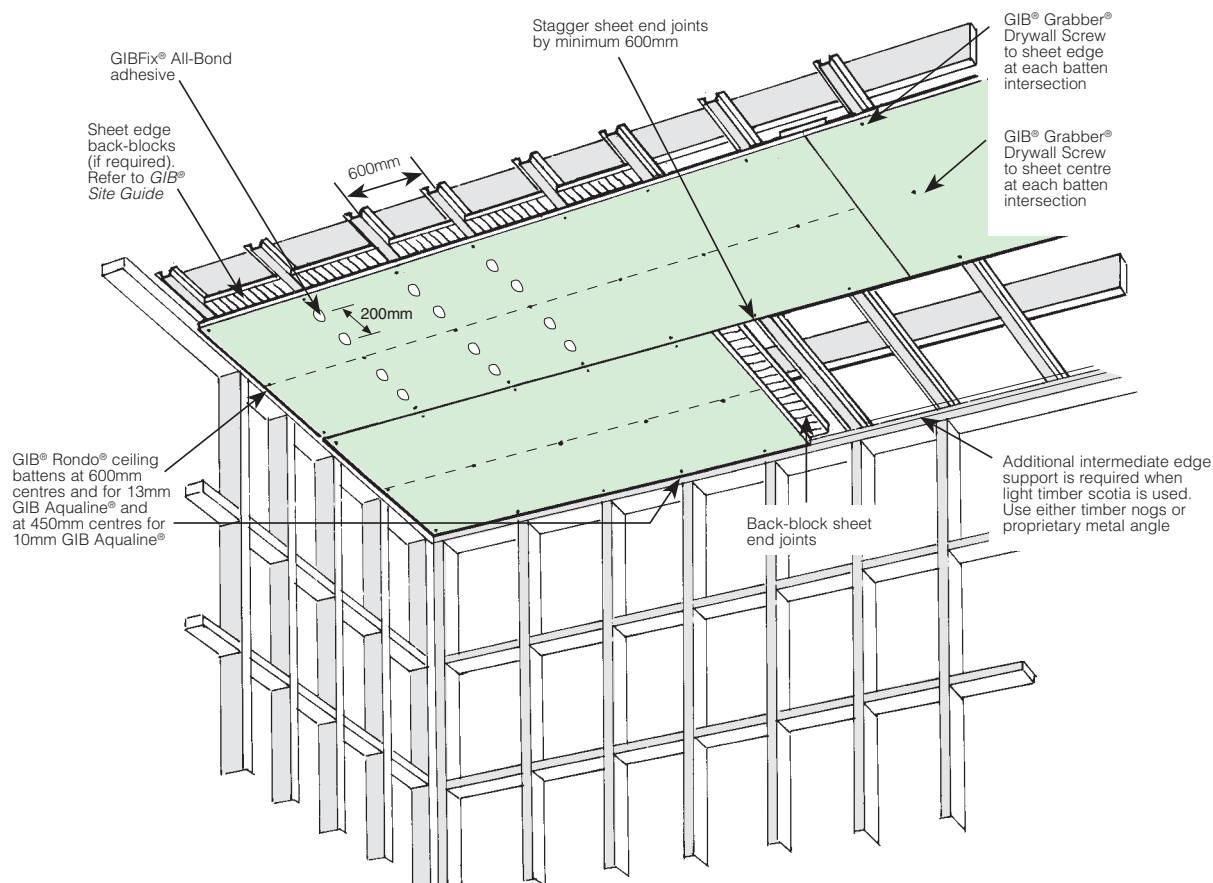
- The lining shall be fixed at right angles to the battens or joists
- Commence fixing from the centre of the sheets outwards
- Sheets to be touch fitted
- Use long length sheets to minimise sheet end butt joints
- Back-block sheet end butt joints
- See GIB® Site Guide for sheet edge backblocking requirements.

Batten Spacings

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

Jointing

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

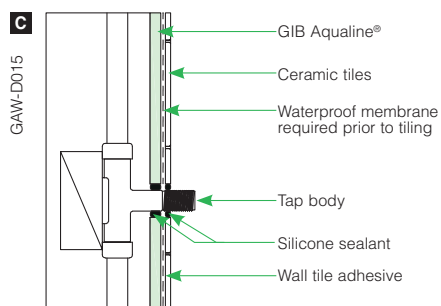
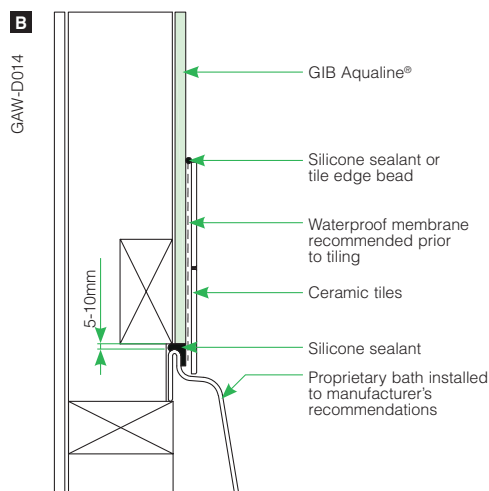
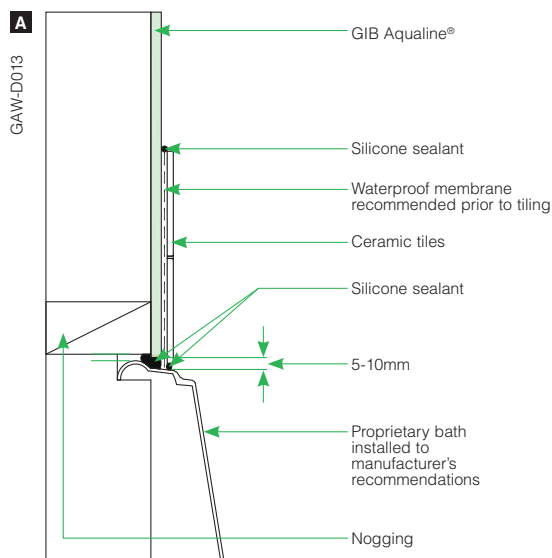


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

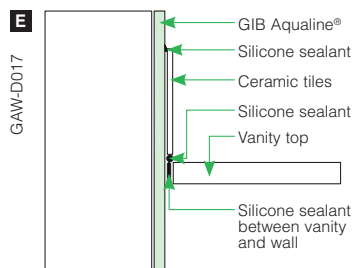
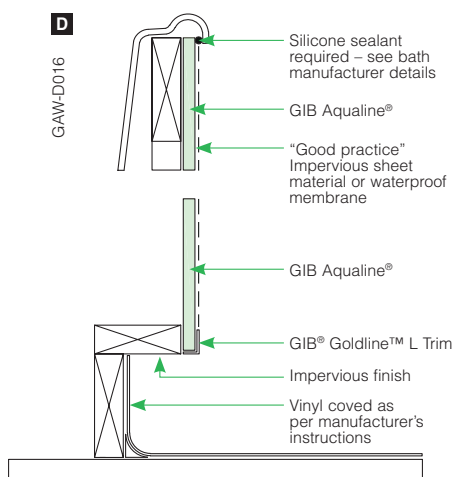
Bath – Tiled Upstand



MARCH 2007



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

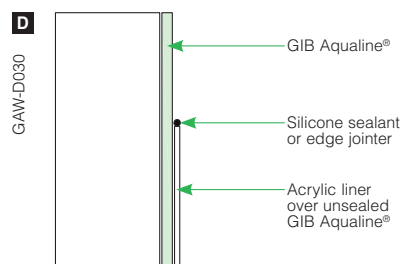
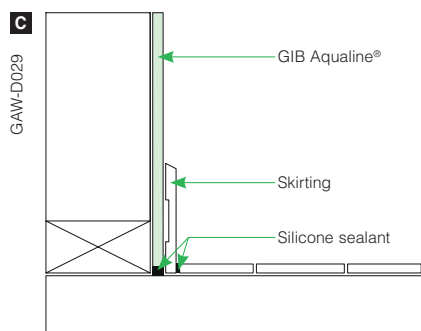
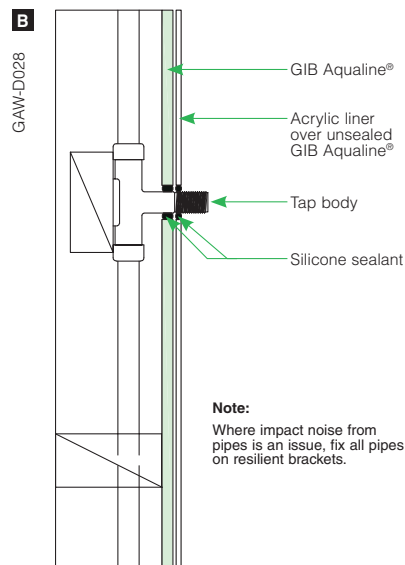
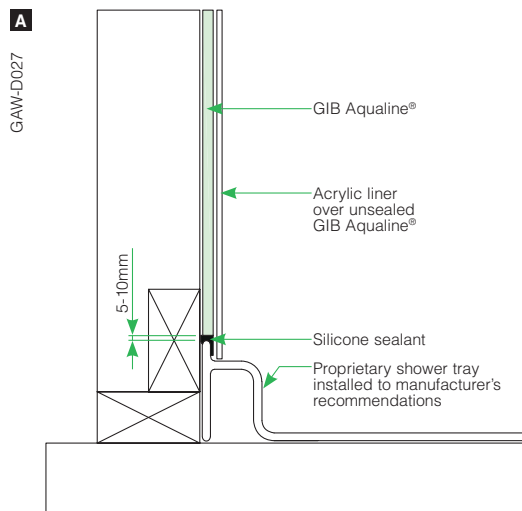


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GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

MARCH 2007 Shower – Acrylic Liner and Base

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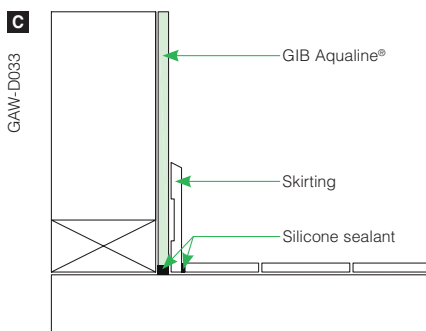
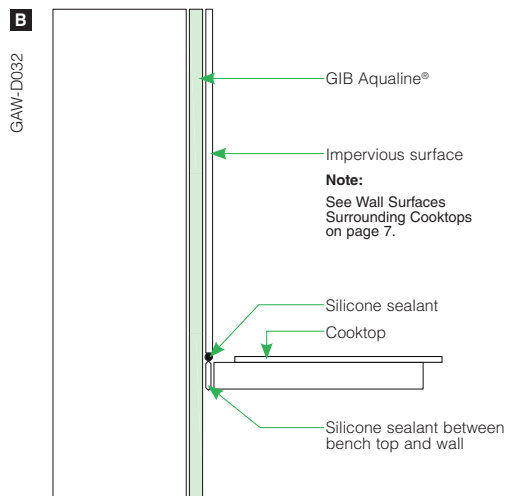
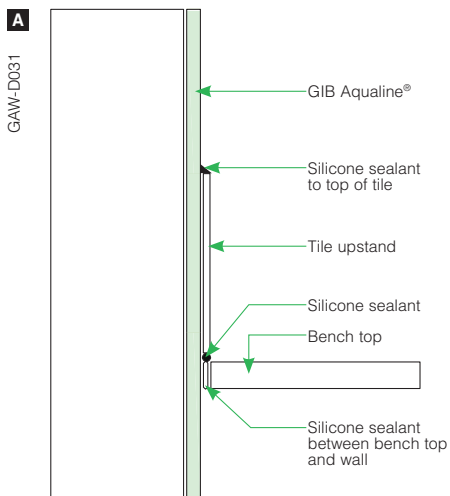


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

Kitchen and Laundry

MARCH 2007

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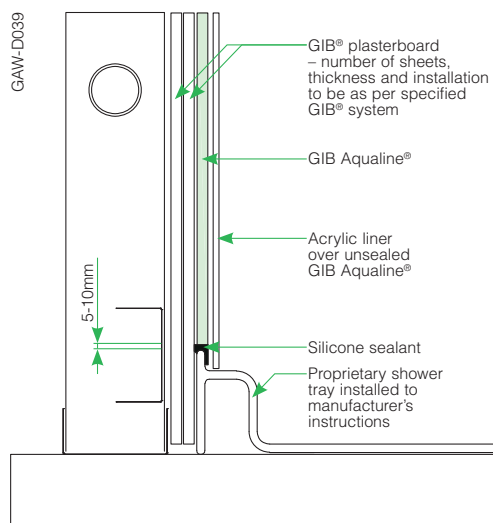
GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



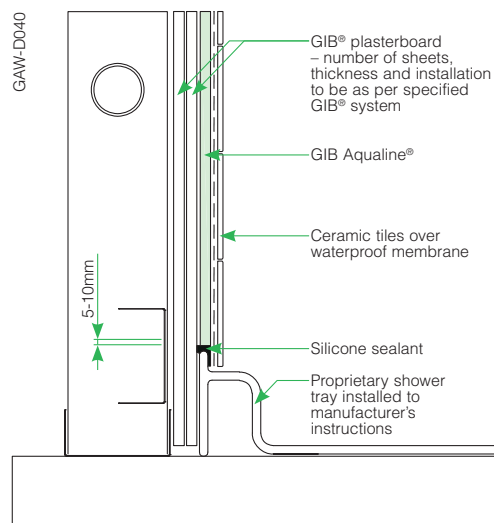
Fire Rated and Noise Control

MARCH 2007

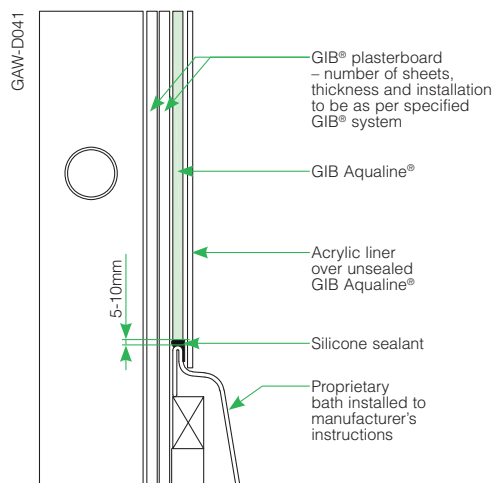
Shower – Acrylic Liner



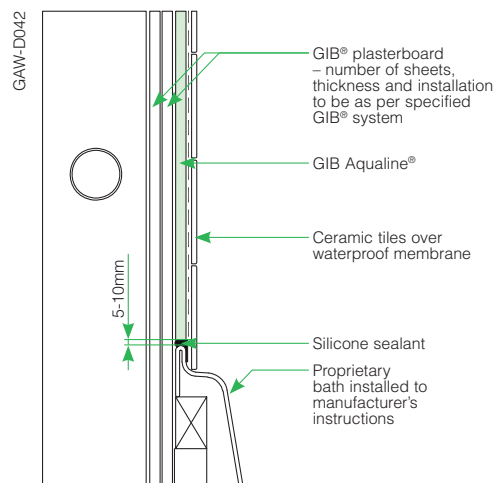
Shower – Tiled Walls



Shower Over Bath – Acrylic Liner



Shower Over Bath – Tiled Walls



GIB Aqualine® Fire Resistance and Noise Control Performance

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

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

GIB AQUALINE® WET AREA SYSTEMS



Specification and Installation Checklist

MARCH 2007

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

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

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Barricade™

Building Wrap



1. HT Green Concrete Underlay
2. Hydro™ Seal Bituminous treatment
3. Dry-Fix DPC
- 4. Building Wrap**
5. Wrapstrap™
6. Window Tape
7. Air Tight P.E.F Backing Rod

SPECIFICATION

PRODUCT DESCRIPTION

Barricade Building Wrap is a hydrophobic non-woven fabric that has a unique clear breathable overlay, which allows moisture and condensation to run off the face and then evaporate in the cavity area.

PHYSICAL PROPERTIES

Barricade Building Wrap is a 90 gsm hydrophobic non-woven breathable composite building wrap.

The following tests have been carried out in accordance with NZBC Acceptable Solution E2/AS1 Table 23:

- Tensile Strength, edge tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1
- Resistance to water penetration in accordance with AS/NZS 4201.1.4
- Surface Water absorbency in accordance with AS/NZS 4201.6
- Air resistance to BS 6538.3
- Shrinkage in accordance with AS/NZS 4201.3
- pH of extract in accordance with AS/NZS 1301.421s

COMPATIBILITY

***Barricade Wall Wrap* has been appraised for use as a flexible wall underlay on timber framed buildings within the following scope:**

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- With absorbent wall claddings directly fixed to the frame; and,
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Very High'

***Barricade Wall Wrap* has been appraised for use as a flexible wall underlay on steel framed buildings within the following scope:**

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; with regards to building height and floor plan area; and,
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Very High'

***Barricade Wall Wrap* has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope:**

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Extra High'

**MASONS**
Designed Smart, Built Tough.

Protecting your building frame from water and damp

Barricade™**BRANZ Appraised**
Appraisal No.795 [2012]

Building Wrap

INSTALLATION

- Masons Building Wrap* must be fixed (with the printed side out) to all framing members at maximum 300 mm centres with large-head clouts 20 mm long, 6-8 mm staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.
- Masons Building Wrap* must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.
- The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess underlay may be cut off flush with the internal face of the wall frame. Masons **Flashing Tape** needs to be installed around the openings prior to fitting the doors and windows.
- Masons Building Wrap* must be restrained from bulging into the drained cavity in accordance with NZBC Acceptable Solution E2/ AS1, Paragraph 9.1.8.5. Installing Masons **WrapStrap** - horizontal at 300mm centres - prevents the wrap and insulation from bulging.
- Masons Building Wrap* can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.7(e).
- When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.
- Any damaged areas of *Masons Building Wrap*, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears with Masons **Flashing Tape**.

Provided Masons Wrap is not exposed to the weather or ultra-violet light for a total of more than 42 days, and provided the exterior cladding is maintained in accordance with the manufacturers instructions and the cladding remains weather resistant, the wrap is expected to have a serviceable life equal to that of the cladding.

DURABILITY

**BRANZ Appraised**
Appraisal No.795 [2012]

Barricade Building Wrap has been BRANZ appraised to ensure it meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding DURABILITY requirement or expected serviceable life is not less than 50 years.

STORAGE

Masons Wrap whether on or off site should

- Be stored on end under a cover, in a clean and dry area
- Do not crush the rolls
- The rolls must be protected from damage

Masons Building Wraps	Roll Sizes	Masons Code
Masons Barricade Building Wrap - 50m ²	H 2.74 m x L 18.24 m	MPBBW50 2.74m
Masons Barricade Building Wrap - 100m ²	H 2.74 m x L 36.49 m	MPBBW100 2.74m
Masons Barricade Building Wrap - 100m ²	H 1.37 m x L 73 m	MPBBW100 1.37m
Masons Barricade Building Wrap - 50m ²	H 1.37 m x L 36.50 m	MPBBW50 1.37m
Masons Barricade Building Wrap - 25m ²	H 1.37 m x L 18.25 m	MPBBW25 1.37m



40 Below™

Flashing Tape



1. HT Green Concrete Underlay
2. Hydro™ Seal Bituminous treatment
3. Dry-Fix DPC
4. Building Wrap
5. Wrapstrap™
- 6. Window Tape**
7. Air Tight P.E.F Backing Rod

SPECIFICATION

PRODUCT DESCRIPTION

40 Below™ Flashing Tape is a self adhesive flashing tape to seal around windows, doors, and other joinery openings as a secondary defense against water penetration.

PHYSICAL PROPERTIES

40 Below™ Flashing Tape:

- Is suitable for timber framed buildings
- Has been tested and passed by **CodeMark**
- For a risk score between 0-20 in accordance with NZBC Acceptable Solution E2/AS1
- Passed NZS3604 Building Wind Zones up to and including '**Extra High**'
- Compatible with all building wraps
- 0.2mm thick adhesive layer
- Low temperature adhesion. Can be applied as low as -40°C (up to 65°C)
- *Corner Guard* is easy to install and increases protection to framing

DURABILITY

Provided it is not exposed to the weather or ultra-violet light for a total of more than 6 months, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, the MASONS 40 Below™ Window Flashing System is expected to have a serviceable life equal to that of the cladding.

STORAGE

40 Below™ Window Tape must be:

- Stored on end under a cover, in a clean and dry area

40 Below™ flashing tape	Roll Sizes	Masons Code
40 Below flashing tape 75mm	H 75mm x L 20m	40BELOW75x20
40 Below flashing tape 100mm	H 100mm x L 20m	40BELOW100x20
40 Below flashing tape 150mm	H 150mm x L 20m	40BELOW150x20
40 Below flashing tape 230mm	H 230mm x L 20m	40BELOW230x20
Hydro corner guards	50	HYDROCG50

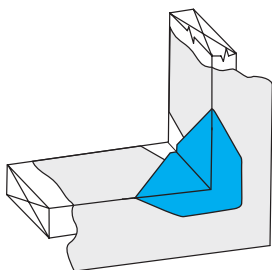


MASONS
Designed Smart, Built Tough.

Protecting your building frame from water and damp

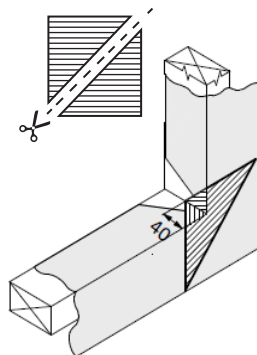
INSTALLATION

Window Sill Installation Instructions



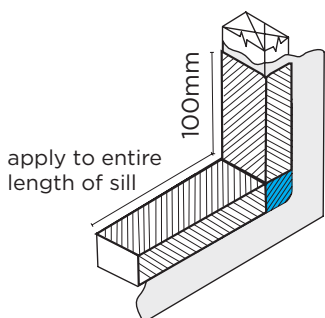
1. Corner Guard *option 1*

Place the *Masons Corner Guard* over the building wrap and into the **bottom** corners of the window or door sill, staple to the jamb. With steel frames use double sided tape to attach the *Corner Guard* to the metal.



1. Corner Guard *option 2*

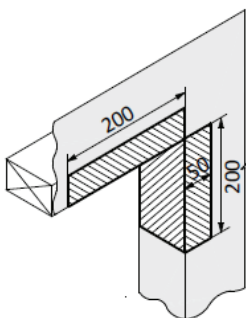
Cut a 150mm square of *Flashing Tape* into two equal triangular pieces. Install these at the **bottom** corners of the frame opening. The triangle needs to reach 40mm in from the extreme end of the window sill. With the remainder overlapping the building paper.



2. Sill Guard

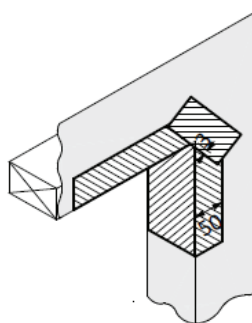
- Install sill tape flush with the interior face of the opening. Apply along entire length of sill, continue up each jamb with a minimum of 100mm
- IMPORTANT:** Press tape firmly into the corner over the Corner Guard first, then fold around onto the frame face.
- Fold remainder *Flashing Tape* against outer face of frame/building. Smooth out all creases & press firmly for good adhesion.

Window Head Installation



1. Lintel Piece

Install Lintel pieces on top corners of opening, 200mm along the lintel and 200mm down the jamb. Slit at each corner & fold onto outer face of building wrap (at least 50mm).

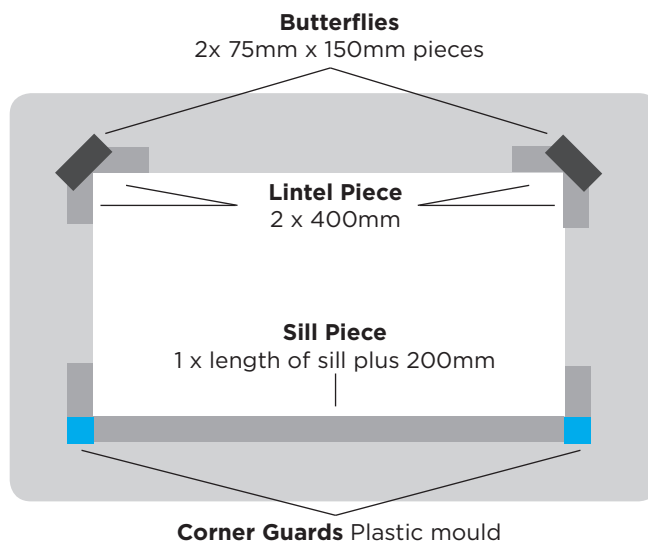


2. Butterflies

To create a seal at corner junction, install butterflies at 45° across the corner of head/jamb.

Window Head Flashing Installation

Apply *Masons Flashing Tape* to top of window head flashing, up-stand and building wrap. Refer to window & cladding details for specific application.



Cutting Diagram:

40 Below™

Flashing Tape



40 Below™ Flashing Tape is a 0.2mm thick - hot melt adhesive - flashing tape to seal around windows, doors, and other joinery openings as a secondary defence against water penetration. Adhesion from -40°C.

- Passes nail seal ability to ASTM D3330 and is **suitable as a single layer application** over timber frame.
- Not suitable where screw sealability is required
- Has been **CodeMark Certified** by Certmark International
- For a risk score between 0-20 in accordance with NZBC Acceptable Solution E2/AS1
- Passed NZS3604 Building Wind Zones up to and including 'Extra High'

40 Below™ Flashing Tape- Advantages

- **Compatible** with all building wraps
- Incredible adhesion in all conditions
- Simple 4 step installation, save time reducing costs
- Extremely thin only **0.2mm**, allows for easier fitting of windows and doors
- Reliable and dependable weather tightness
- Works in temperatures from **-40°C up to 65°C**
- An *Optional* **Corner Guard** is easy to install and increases protection to framing



Corner Guard



Scope of Use / Applications

Windows/Door/Timber & Steel Frame Flashings

Masons 40 Below Flashing Tape and Masons Corner Guard must be installed in accordance with the instructions outlined on page 16 of this catalogue.



**No Need to use
Primer Spray**



**No Need to use
Heat Guns**

RIGID AIR BARRIERS – 40 Below is **tested and approved** for sealing the joints on Rigid barriers. Tested and approved for use by: BGC Durabarrier and OS'BraceRAP.

Note: 150mm Wide tape is used for 100mm wide window or door framing. 200mm wide tape is used for 140mm-150mm wide reveals.

40 Below™ flashing tape	Roll Sizes	Bunnings Code
40 Below flashing tape 75mm	H 75mm x L 20m	00281783
40 Below flashing tape 100mm	H 100mm x L 20m	00281786
40 Below flashing tape 150mm	H 150mm x L 20m	00281789
40 Below flashing tape 230mm	H 230mm x L 20m	00318724
Hydro corner guards	50	00290608



ARDEX WPM 001

Superflex One-Part Undertile Waterproofing Membrane

Single-Component Undertile Liquid Waterproofing Membrane

Class III Membrane - Conforms to AS4858:2004

BRANZ Appraised (No. 472 and No. 473)

Suitable for internal and external use

Low VOC content – meets Green Building Council of Australia Green Star IEQ-13 requirements

Fast-drying acrylic membrane



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 Seven Hills NSW 2147
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ARDEX WPM 001

Superflex One-Part Undertile Waterproofing Membrane

PRODUCT DESCRIPTION

ARDEX WPM 001 (Superflex Bathroom & Balcony Premixed 1 Part) is a tough, ready to use waterproofing membrane specifically designed for use under tiles. ARDEX WPM 001 has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. ARDEX WPM 001 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification once cured.

ARDEX WPM 001 is flexible, safe to use, low in odour, and is fully compatible with polymer modified tile adhesives. ARDEX WPM 001 is one of the fastest drying one part acrylic membranes on the market – normally ready to tile in 48 hours @ 23°C.

ARDEX WPM 001 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 001 can be tiled over in 48 hours in non critical areas*
- Liquid reinforced: Excellent strength, eliminates need for reinforcing mat
- Flexible: Accommodates normal building movement class 3 membrane as per AS/NZ 4858: 2004 Wet Area Membranes
- Advanced acrylic: Will not re-emulsify once cured
- Designed for tiling - Fully compatible with ARDEX tile adhesive systems
- Water based, safe to use, low odour & easy cleaning
- CSIRO Appraisal #91 for undertile waterproofing in shower recesses
- Conforms to the requirements of AS/NZ 4858: 2004 Wet Area Membranes. (Ref: CSIRO Report 3779)

*Critical areas include areas where the membrane is applied at greater than 0.5mm or over impermeable substances such as over bond breakers or incorporating other reinforcement. Longer drying times are necessary in these areas.

APPLICATION RANGE

Performance Levels

Commercial and residential

Location

Internal wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic. Only recommended on concrete, screed and render substrates externally.

Surfaces

Walls & floors

Substrates

Concrete

Cured for min. 28 days or sealed when set with one coat of ARDEX WPM 300 (HydrEpoxy 300) at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. External wet concrete should be allowed to dry thoroughly or sealed with one coat of ARDEX WPM 300 as above.

Renders and screeds

Cured for min. 7 days or sealed when set with one coat of ARDEX WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of ARDEX WPM 300 as above.

Fibre cement

Suitable for wet area grade fibre cement.

Plasterboard

Wet area grade only.

Plywood

Structural plywood (PAA branded), marine grade or other wet area grade only. Not recommended for external use (Refer ARDEX). Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing. The maximum recommended span in E2/AS1 is 400mm. However specific design may allow 17.5mm plywood or greater to be laid on 400mm purlins with nogs or dwangs at 600mm or even 1200mm centres. Plywood shall be laid with the face grain at right angles to the supports. External edges shall be chamfered with a minimum radius of 5mm. Plywood shall be fixed with 10 gauge x 50mm stainless steel countersunk head screws with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets. All joints in the plywood and junctions of plywood with other materials shall have 25mm ARDEX Release tape applied before application of the membrane.

Particleboard

Wet area grade, internal use only (special preparation is required – contact ARDEX).

Permanent Immersion

In conditions of permanent immersion, it is recommended that ARDEX WPM 002 (Superflex Two Part) is used. Must be covered with tiles for full immersion.

Contact ARDEX for use over existing membranes, covering materials, and any other substrates not listed.

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	0.5mm	1.0mm	1.0mm	15m ²	7.5m ²	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m ²	15m ²	20kg(15L) unit

SPECIFICATION CLAUSE

ARDEX WPM 001 (Superflex Premixed)

The waterproofing membrane shall be ARDEX WPM 001: a one part acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

PACKAGING

Single component: 20kg (approx 15 litres) or 6.5kg (approx 5 litres).

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. Use remaining contents from part used containers within 3 months.

COVERAGE

Two coats are recommended for an effective waterproof membrane.

Coverage will vary depending on the porosity of the surface.

One 20kg (15 litre) unit will cover approximately 7.5-15m² (based on two coats) depending on area requirements between wall and floor surfaces to be treated. Refer Table 1.

DRYING TIMES

Recoat time

1-2 hours at (23°C/50% RH) between first and second coats. Alternatively, if a polyester mat is used 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 001 is totally dry in 48 hours at 23°C/50% RH, but can take up to 72 hours at 10°C/50% RH in corners or for thick films.

Fully cured

The shower should not be used until the membrane has reached its full strength. ARDEX WPM 001 membrane is 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.

SAFETY PRECAUTIONS

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with ARDEX WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of ARDEX WPM 300 at a coverage rate of 3.0 square metres 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).
- Where the surface temperature is below 10°C or greater than 35°C.
- All floor areas must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to application of the ARDEX WPM 001.

For substrates or situations other than those listed contact ARDEX.

SAFETY DATA

ARDEX WPM 001 is non-hazardous and non dangerous. It may produce discomfort of the eyes, respiratory tract and skin. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin. Wear eye/face protection. In case of contact with eyes, rinse with plenty of water and seek

ARDEX WPM 001

Superflex One-Part Undertile Waterproofing Membrane

medical advice.

ADDITIONAL INFORMATION IS LISTED IN THE MATERIAL SAFETY DATA SHEET.

QUALITY PRODUCT

ARDEX WPM 001 is manufactured and tested to ARDEX procedures which are maintained in accordance with Quality System Standard ISO 9001.

USER NOTES

The technical details and recommendations contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is the responsibility of the user to ensure that the product is used in accordance with ARDEX instructions and in applications for which they are intended.

APPLICATION

Apply ARDEX WPM 001 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.

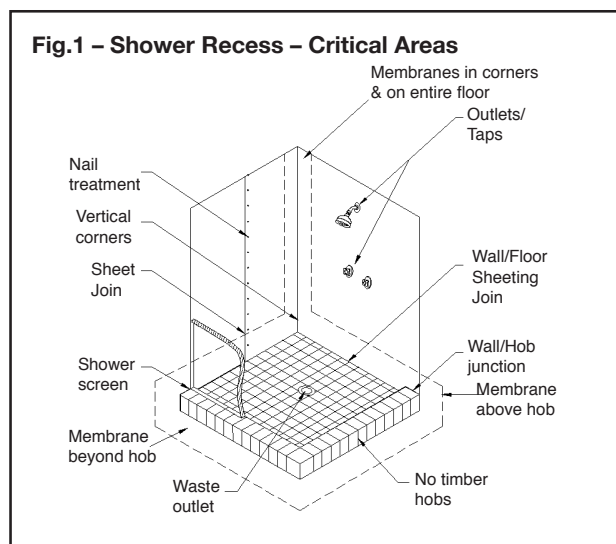
For best results with a paint brush use a good quality, 50mm long bristle variety.

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 001 needs to be applied at between 0.5 and 1.0 mm per coat depending on product and application (Refer Table 1).

CRITICAL AREAS:

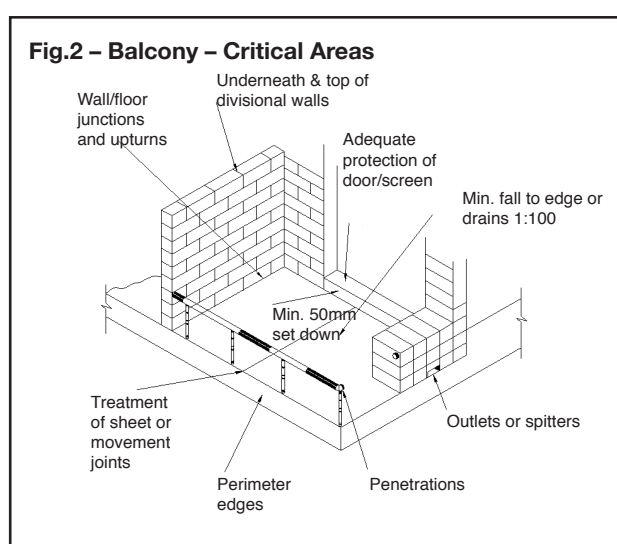
INTERNAL WET AREAS

1. Construction should be in accordance with Australian 3740 - 2004 Waterproofing of wet areas



within residential buildings.

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 & floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber).
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2mtr)) 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 6mm 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. Spreading the sealant to 6mm on either side of the joint.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS3740 & 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 puddle flange and the screed/floor.
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 150mm beyond the outside edge of the hob (ideally to entire wet area floor).

13. Apply the membrane 1800mm up the walls or to the height of the shower rose within the shower recess.
14. Install the shower screen to inside edge of the hob.

BALCONIES AND DECKS

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 a min set down (step down) of 50mm to the finished floor level (ie. top of tiles).
3. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/ sliding door.
4. Treat any sheet joints with a neutral cure silicone prior to waterproofing.
5. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
6. Apply the membrane up the step down and as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
7. Where possible, apply the membrane prior to building divisional walls, or other items such as planter boxes.
8. Apply the membrane to the entire balcony floor and at least 50mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
9. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
10. Apply the membrane down over the front edge of the balcony onto the drip rail.
11. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
12. Apply the membrane down into outlets and drains, ensuring excess material is removed.
13. 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 2mtr (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 (leveled) 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 (Sheltercoat/ Superflex Water Based Primer) by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to completely dry prior to the application of the ARDEX WPM 001 membrane. This will take around 20-30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m² per litre. Plastic (eg. 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

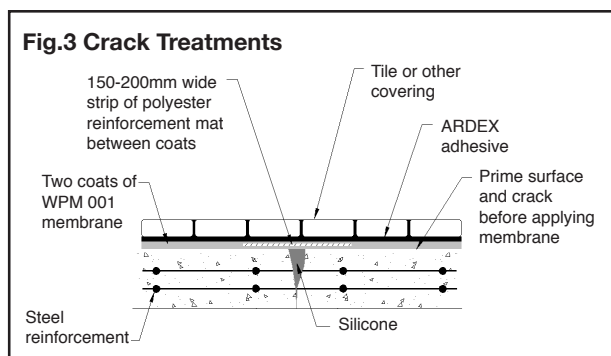
Crack preparation

Cracks <2mm:

Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with ARDEX WPM 265 and allow to dry before applying two coats of ARDEX WPM 001 membrane in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

Cracks 2-6mm:

(Refer 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 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of ARDEX "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly



ARDEX WPM 001

Superflex One-Part Undertile Waterproofing Membrane

wet out the cloth preferably using a fluted roller, and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Cracks >6mm:

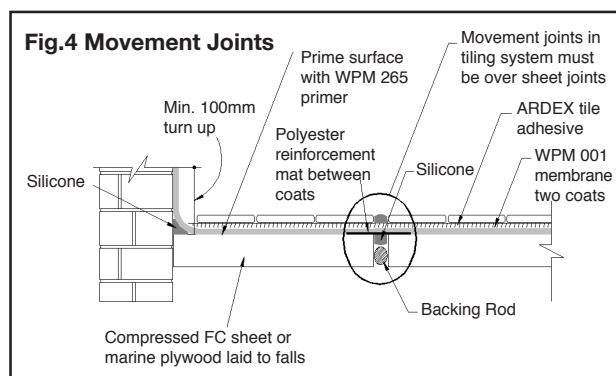
Contact your local ARDEX representative.

Movement/construction joints

Movement joints (<6mm)

Use same procedure as in crack preparation.

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 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of ARDEX "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the mat 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 Fig.4)

Corners & coving areas

After priming with ARDEX WPM 265 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates in coving areas and corners. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry.

Apply a first coat of ARDEX WPM 001 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 minimum of 1.0mm). Alternatively, if a

polyester 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 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry. Place a 190mm wide band of ARDEX "Deckweb" polyester woven mat 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 001 should be applied to at least 100 mm up the wall surfaces as per the recommendations for the application of ARDEX WPM 001 to floors.

Walls

Two coats of ARDEX WPM 001 are required to achieve a minimum total dry film thickness of 0.5mm.

After priming with ARDEX WPM 265 and allowing to dry, apply two coats of ARDEX WPM 001 (to achieve a minimum dry film thickness of 0.5mm) 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 001 are required to achieve a minimum total dry film thickness of 1.0mm. The flooring recommendations should be extended at least 150 mm up all perimeter walls.

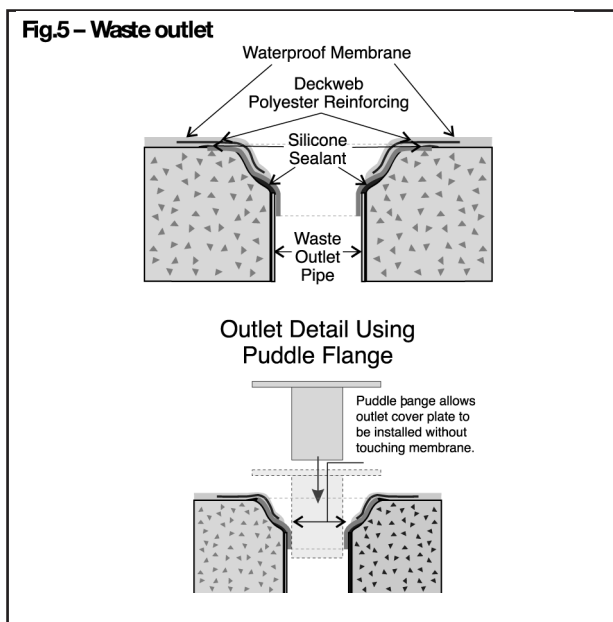
Prime the surface with ARDEX WPM 265 and allow to dry.

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 treatment. If a flange is not installed the membrane must be applied down into the pipe. (Refer Fig.5) Allow the membrane to dry completely before tiling. Refer drying times above.

Waste Outlet

Prime the surface with ARDEX WPM 265 and allow to dry. Surfaces of the outlet flange must be primed with an appropriate primer.

Apply ARDEX WPM 001 over the adjacent floor surface extending down into the waste outlet flange overlapping

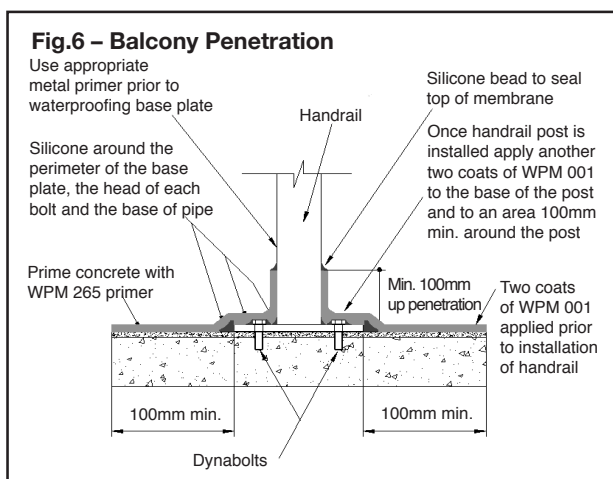


the edge of flange by at least 30mm. Place ARDEX “Deckweb” polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer Fig. 5)

Balcony penetrations (Refer Fig.6)

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 001 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 1.0mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.

Tiling systems

It is advisable to conduct a flood test of the shower once the membrane has cured (normally after 72 hours), and before the tiling commences. A broad range of ARDEX tile adhesives can be used over ARDEX membranes. Contact ARDEX or your nearest ARDEX stockist for advice on the most suitable system.

TECHNICAL DATA

ARDEX WPM 001 Characteristics of liquid

Form & Colour	Blue viscous paste
Type	Single part
Specific Gravity	Approx. 1.34kg/litre
pH of Liquid	8.5
Viscosity of Liquid (RVT Brookfield, spindle 7 speed 10)	52,000cps
Non Volatile Matter (volume) AS1321.10	50.3%±1
Tensile Strength 7 days dry AS1145	1.04 MPa
Full Cure	1.92 MPa
Elongation at Break 7 days dry AS1145	780%

Conforms to requirements of class 3 membrane of AS/NZ 4858: 2004 Wet Area Membranes.

NOTE: Most of the tests have been carried out in the ARDEX laboratory under standard conditions (23±2°C, 50±5% R.H)

ARDEX WPM 001

Superflex One-Part Undertile Waterproofing Membrane

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DISCLAIMER

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Technical Data

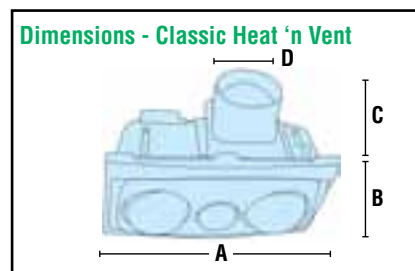
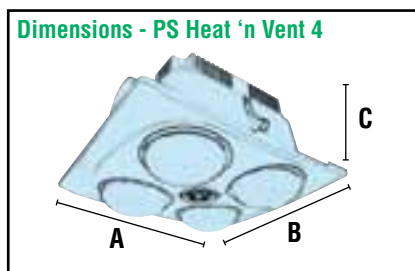
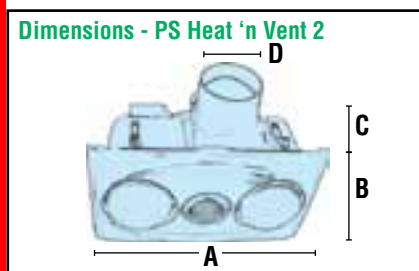
HEAT/FAN/LIGHT Models

GENERAL INFORMATION

Models	Cut-Out Size	Exterior Grille	Duct Type	Duct Length
PS Heat 'n Vent 4	300mm x 300mm	White Eggcrate	Aluminium	3m supplied (can be extended to 6m)
PS Heat 'n Vent 2	390mm x 210mm	White Eggcrate	Aluminium	3m supplied (can be extended to 6m)
Classic Heat 'n Vent 2	380mm x 200mm	White Eggcrate	Aluminium	3m supplied (can be extended to 6m)
Classic Heat 'n Light	390mm x 220mm	-	-	-

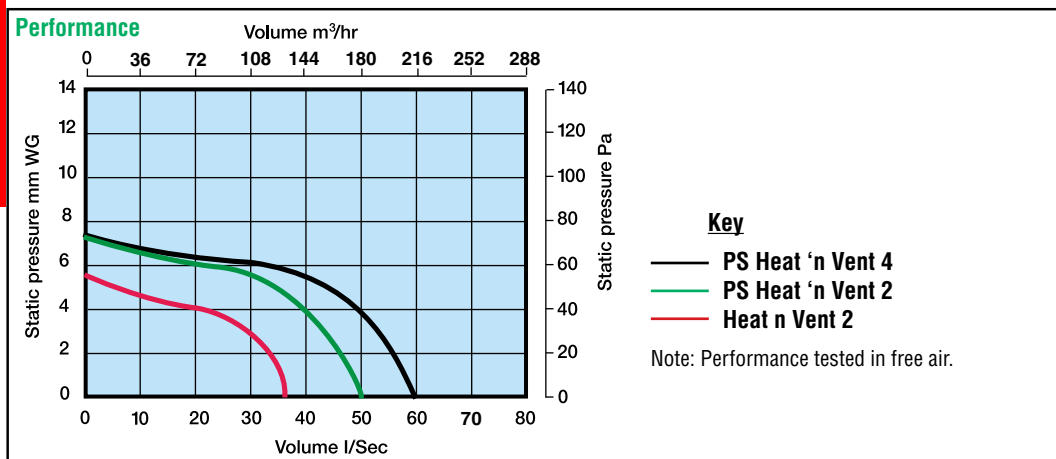
DIMENSION INFORMATION

Models	A	B	C	D
PS Heat 'n Vent 4	338	338	170	120
PS Heat 'n Vent 2	435	260	185	120
Heat 'n Vent	450	250	195	100
Heat 'n Light	450	250	195	100



TECHNICAL SPECIFICATION

Models	PS Heat 'n Vent 4	PS Heat 'n Vent 2	Heat 'n Vent 2	2 Heat'n Light
Power	220 - 240V	220 - 240V	220 - 240V	220 - 240V
Fan	Centrifugal	Centrifugal	Centrifugal	-
Fan Performance	60l/s, 216m ³ /hr	50l/s, 180m ³ /hr	35l/s, 126m ³ /hr	-
Heat Lamps	4 x 275W	2 x 275W	2 x 275W	2 x 275W
Light	GU10 Halogen	GU10 Halogen	ES Bulb	ES Bulb
Total Wattage	1180W	635W	670W	650W
Light Wattage	50W	50W	100W	100W
Switch Plate	4 sw. (supplied)	3 sw. (supplied)	3 sw. (supplied)	2 sw. (supplied)
Warranty	5 Years	5 Years	5 Years	5 Years



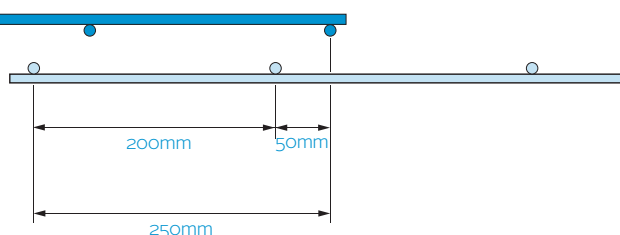
Thomas & Betts

DUCTILE PLUS RESIDENTIAL MESH

Designed to meet the Department of Building & Housing (DBH) new B1 Compliance standard, with equivalent mass to 2.27kg/m². Weld strength improved by 22% (for 6.1mm) and 100% (for 7.5mm) compared to the 5.3mm wire used for 665 mesh.

Ductile Plus 62 & 62L Mesh

- SE62 Plus — Easy to transport size 5.03 x 2.02
- SE62L — Larger 6.05 x 2.42 mesh size to maximise handling and lapping



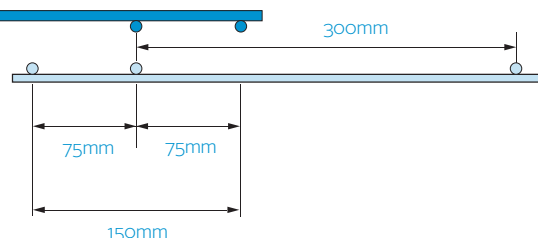
*Diagram not to scale

Ductile Plus 73DE, 73LDE Mesh

- 300mm Bar spacing for easy 'step through' while placing and working on site
- Easy lapping with double edge configuration

Ductile Plus 73LDE only:

- Large 14.49m² nett cover for less wastage in lapping = cheaper per square metre



*Diagram not to scale

MESH PROPERTIES

- All construction meshes have double edge bars to optimise the net cover of the sheets
- The required lap as per AS/NZS 3101:2006 Clause 8.6.2 (square + 50mm: with 150mm lap as min)
- Sheets individually tagged
- Test certificates available
- Independently tested to verify compliance to AS/NZS 4671:2001 Ductility 500E standards
- Grade 500E (seismic) as per AS/NZS4671
- Tensile Ratio (R_m/R_e) 1.15 to 1.40
- Uniform elongation (A_{gt}): min 10%



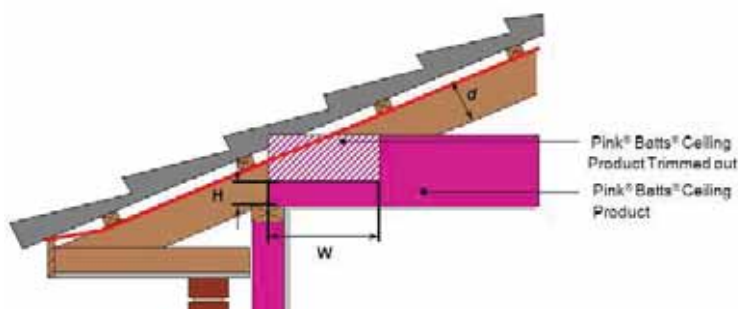
THERMAL INSULATION

Pitched Roof: Roof Underlay and Insulation Clearance

Option 2: Trim Product

The table below details the trimming required of the Pink® Batts® ceiling product located at the perimeter of the roof space.

Option 2: Trim Product



Pink® Batts® Ceiling Product			R 5.0	R 4.6	R 4.0	R 3.6	R 3.2	R 2.6	R 2.2	R 1.8
Pink® Batts® Ceiling Product Nominal Thickness (mm)			200	195	190	180	170	140	115	95
Pitch θ°	d (mm)	H (mm)	(mm)							
15	90	80	447	428	410	372	335	223	130	55
	140	132	254	235	216	179	142	30		
	190	184	61	42	23					
	240		No trimming required, product can be installed to the middle of the top plate and maintain a 25mm clearance							
	290									
20	90	87	310	296	283	255	228	145	77	22
	140	140	164	150	136	109	81			
	190	194	18	4						
	240		No trimming required, product can be installed to the middle of the top plate and maintain a 25mm clearance							
	290									
25	90	95	225	214	203	182	160	96	42	
	140	150	106	96	85	63	42			
	190									
	240		No trimming required, product can be installed to the middle of the top plate and maintain a 25mm clearance							
	290									
30	90	105	165	156	147	130	113	61	17	
	140	163	65	56	47	30	13			
	190									
	240		No trimming required, product can be installed to the middle of the top plate and maintain a 25mm clearance							
	290									

Note: This table is a guide only. The roof construction of each house may vary and the design should be checked on site to ensure the table is applicable.

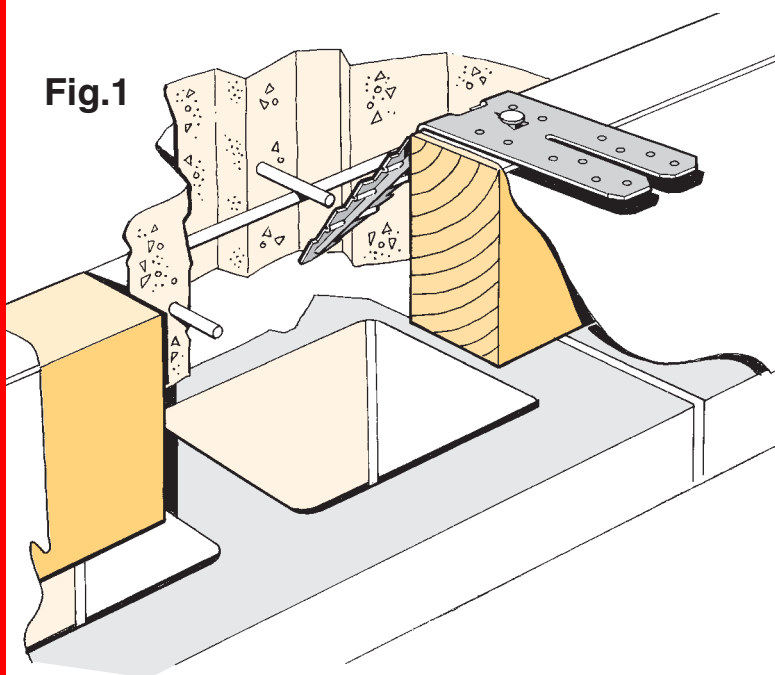
TECHNICAL UPDATE



BOTTOM PLATE FIXING ANCHOR

- ★ Eliminates the drilling of bottom plates
- ★ Makes the fixing of timber framework easier and quicker
- ★ Saves hand trowelling around cast-in anchor bolts or rods
- ★ Use at 900mm centres max.
- ★ Complies with Clause 7.5.12.2 NZS 3604:2011

Fig.1



1. Bottom Plate Fixing Anchors shall be fixed at 900mm centres max. to the boxing for concrete floor slabs, over a continuous vapour barrier.

Each Fixing Anchor is nailed prior to concrete pour, and shall be left undisturbed until concrete has hardened ready for timber frames to be installed. (Fig.1).

2. When timber framing is in place, the Fixing Anchors are folded up and over the bottom plate. (Fig. 2).

3. Two LUMBERLOK Product Nails 30mm x 3.15 dia. shall then be driven into the side of the bottom plate and two additional nails applied through each of the lugs. Should a stud coincide with the position of a Fixing Anchor, nail as shown in Fig. 3.

4. A 75mm x 4 dia. concrete nail must be fixed adjacent to each Fixing Anchor, through the bottom plate into the concrete, at no less than 70mm from the concrete edge. When used as a Bracing Wall hold-down, a Fixing Anchor must be positioned within 150mm from the end of that wall. Bracing wall must not exceed 70 BU/m.

Fig. 2

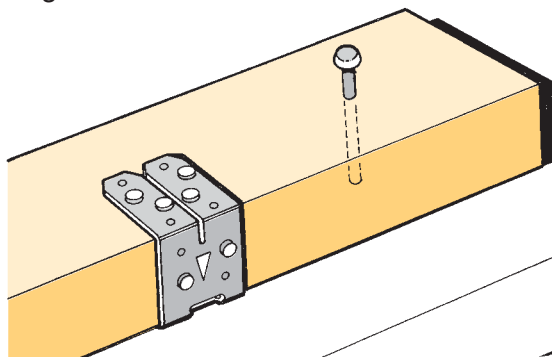
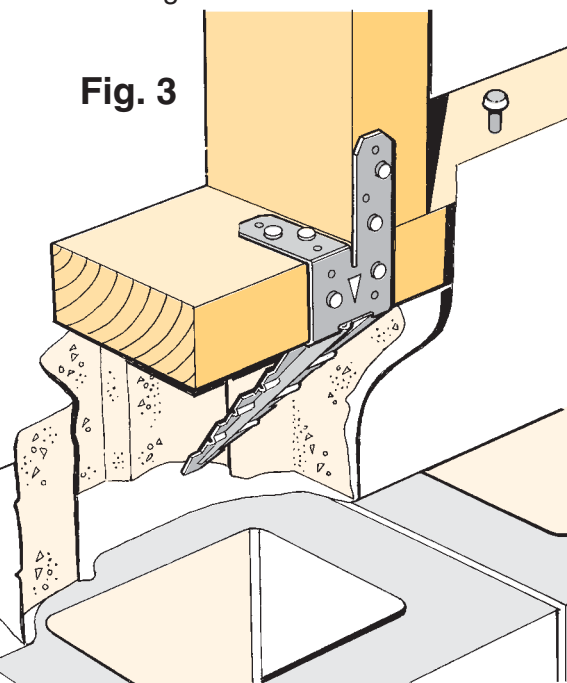
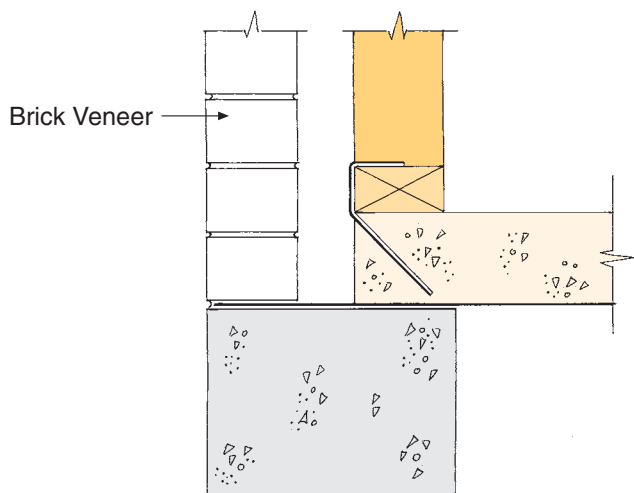
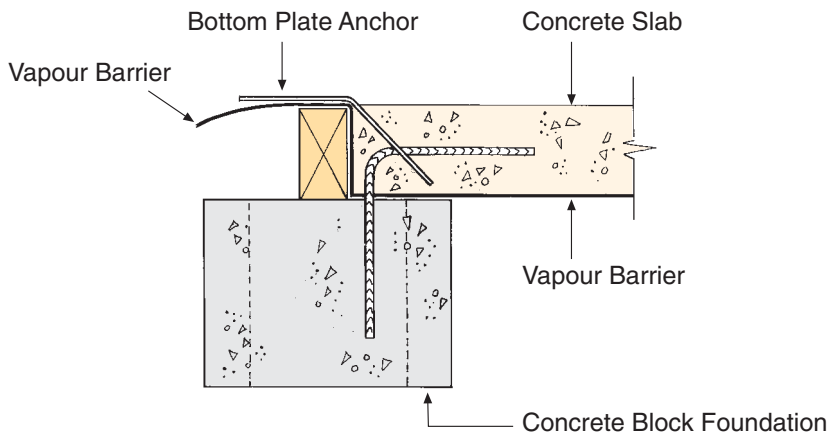


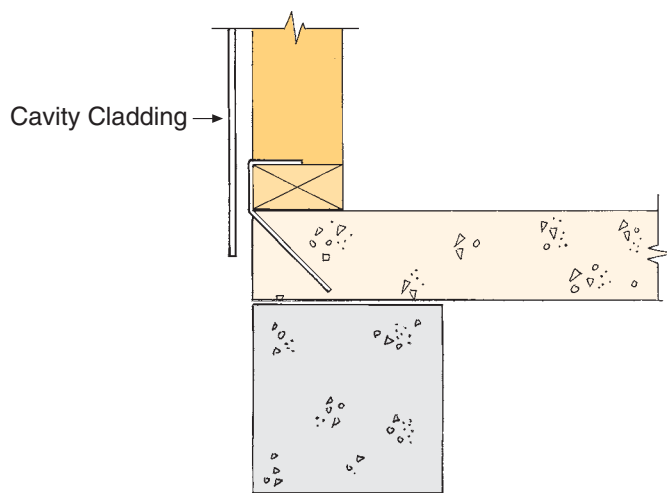
Fig. 3



Available from leading Builders Supply Merchants
throughout New Zealand



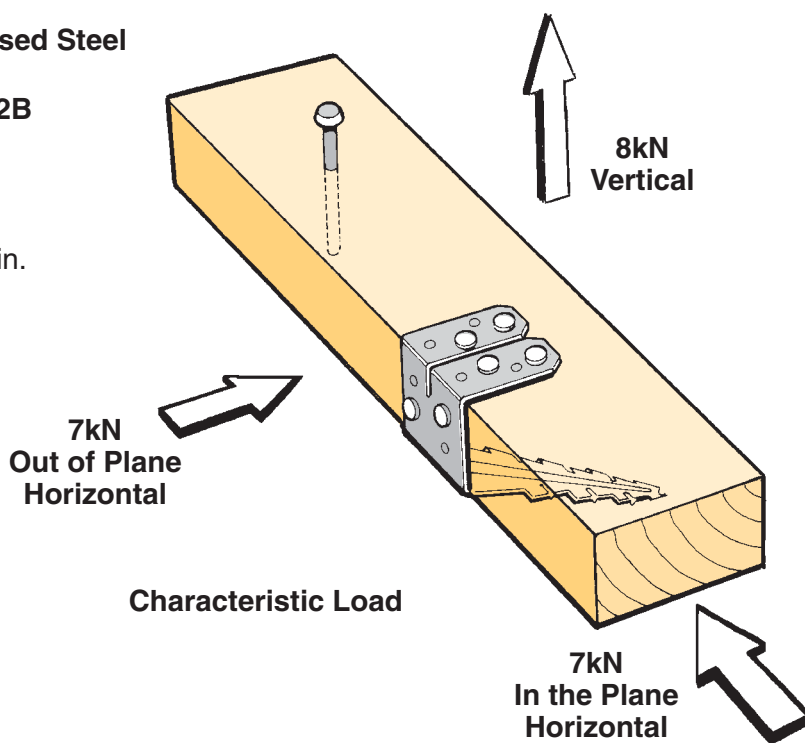
BRICK VENEER



CAVITY CLADDING

Code: BPA
Material: 0.95mm G300 Z450 Galvanised Steel
Code: SSBPA
Material: 0.9mm Stainless Steel 304-2B
Packaged: 50 per carton

Design Loads
 Concrete compressive strength 20 MPa min.



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MiTek New Zealand Limited

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 PO Box 58-014, Botany 2163
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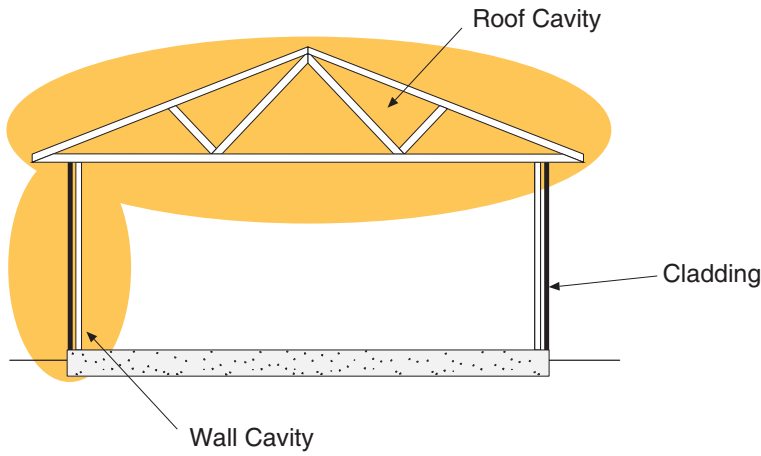
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GANG-NAIL® LUMBERLOK® BOWMAC®

DURABILITY FLOW CHART

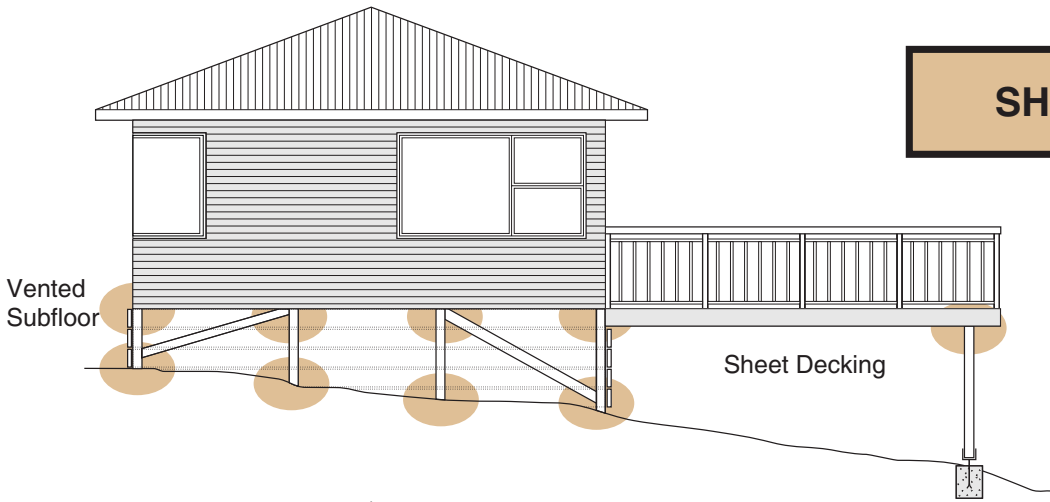
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4. DURABILITY



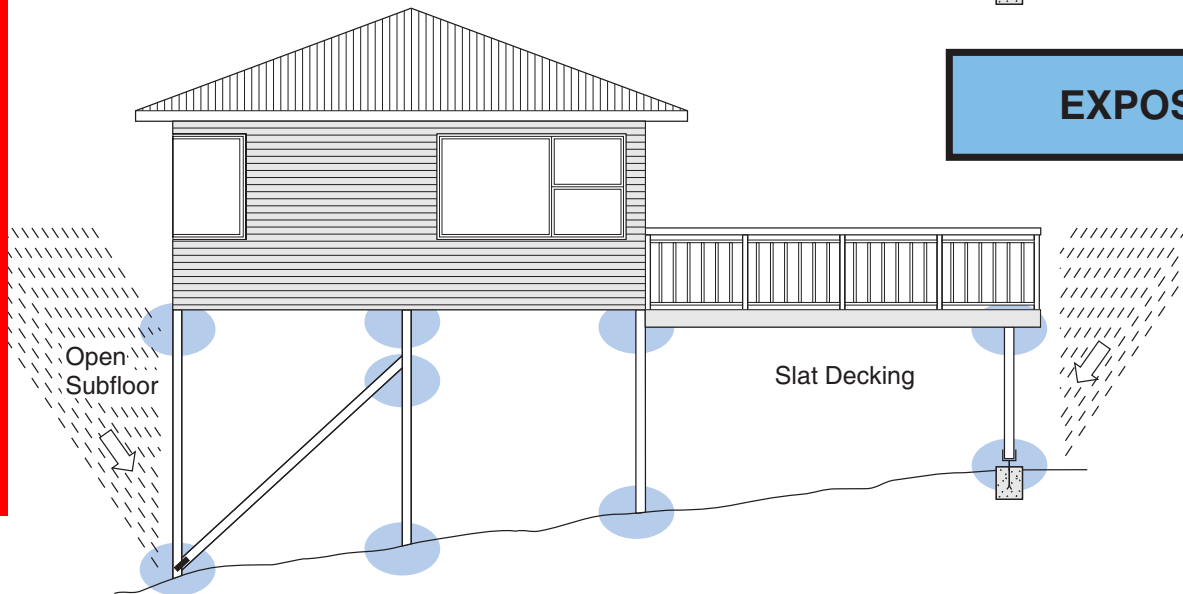
CLOSED

Dry, internal location, not subject to airborne salts or rain wetting.



SHELTERED

Open to airborne salts, but not rain washed.



EXPOSED

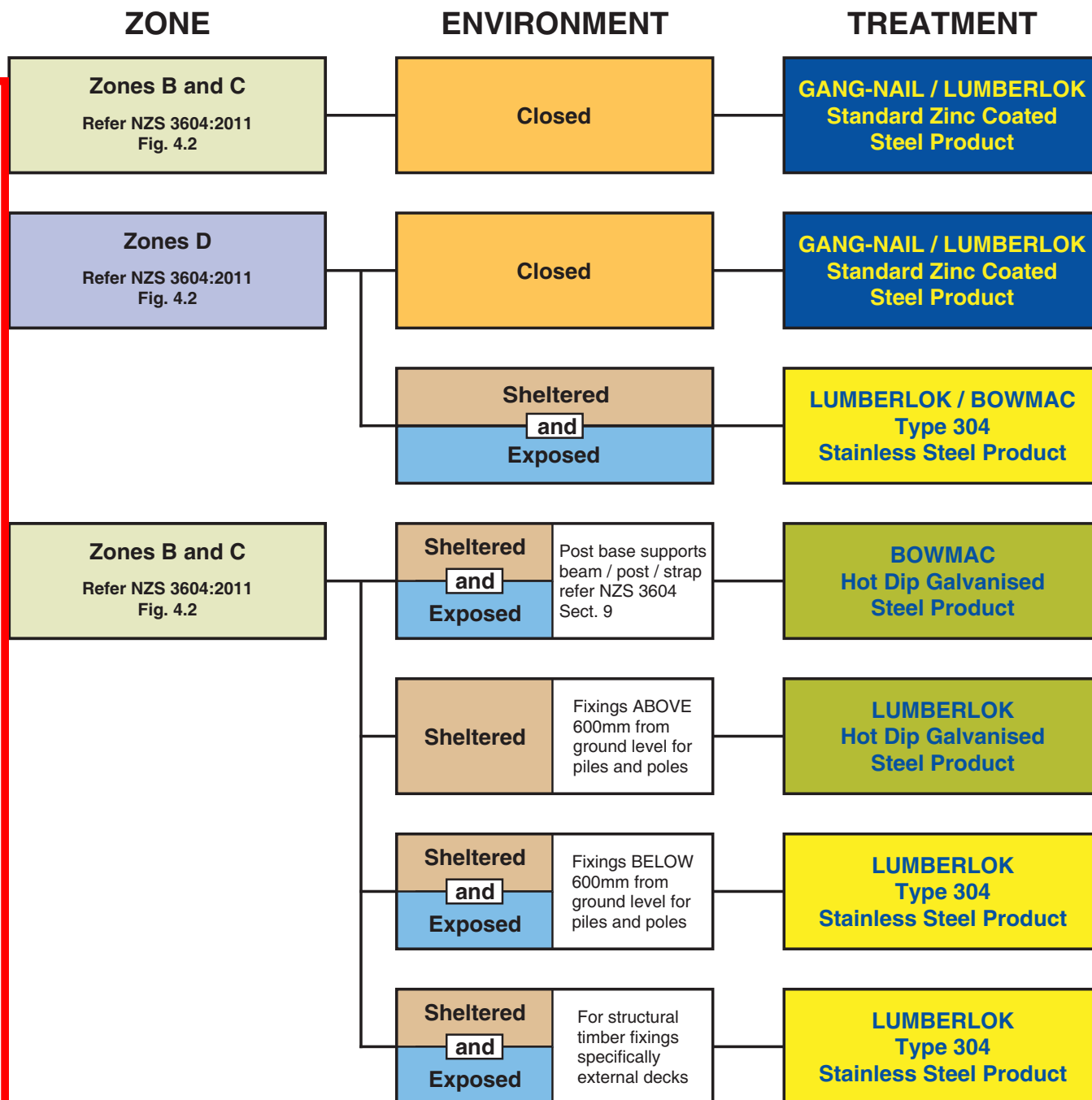
Open to airborne salts and rain washed.



DURABILITY FLOW CHART

4. DURABILITY

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Product Key

- Standard Zinc Coated Steel Product
- Hot Dip Galvanised Steel Product
- Type 304 Stainless Steel Product



SECTION 10 – ROOF FRAMING

NZS 3604:2011

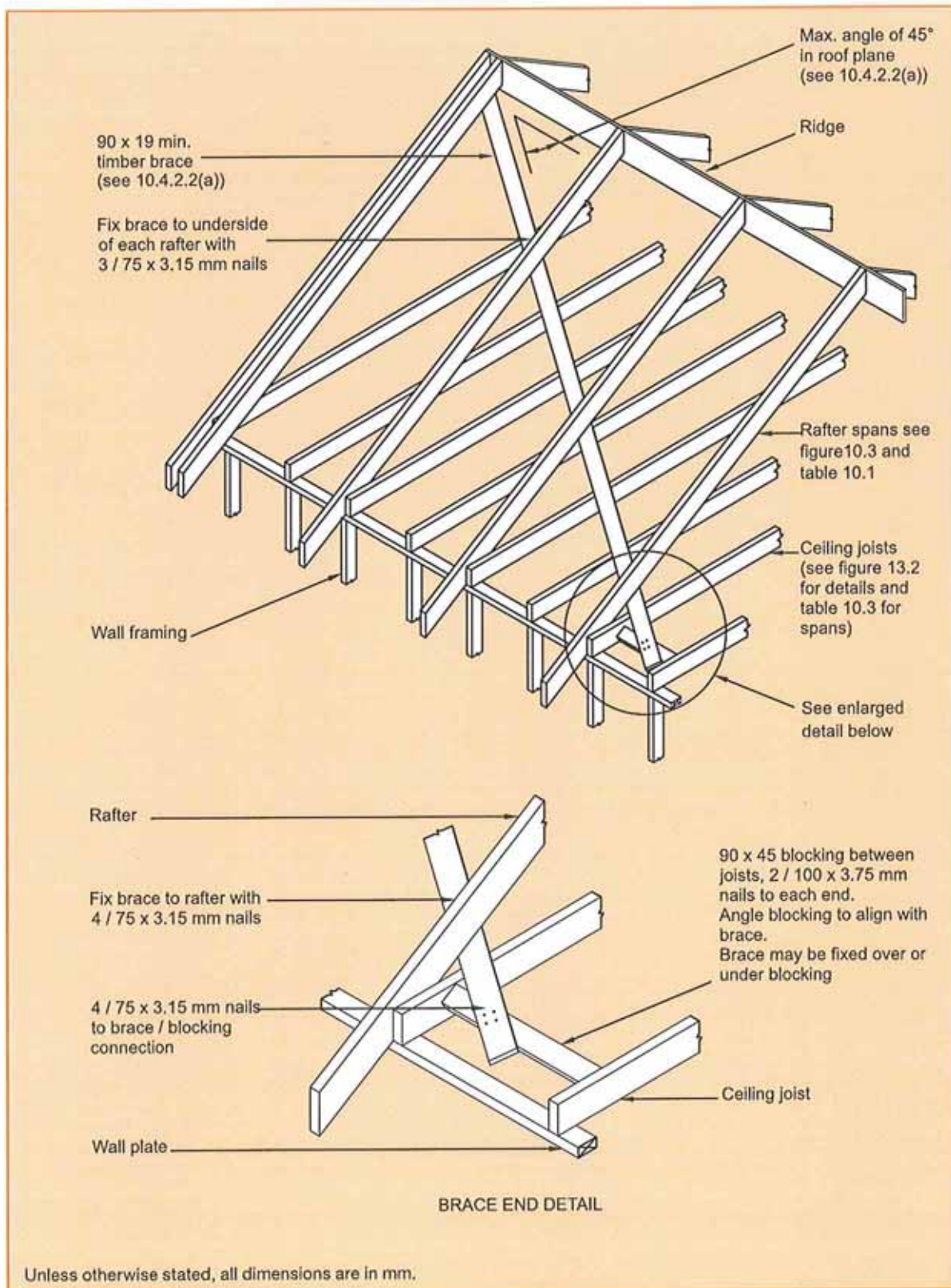


Figure 10.22 – Roof plane diagonal brace – Timber (see 10.4.2)

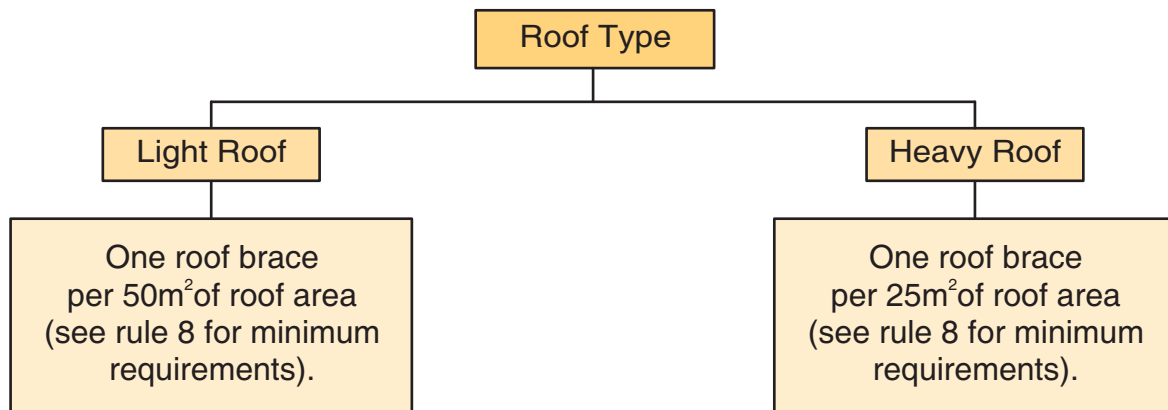
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ROOF BRACING SPECIFICATION AS PER NZS 3604:2011

- ★ Covers roof bracing requirements to resist horizontal loads as set out in NZS 3604:2011 Section 10.
- ★ A definitive guide to the description and installation of Roof Plane Braces and Roof Space Braces.

Roof Bracing Requirements



Roof Bracing - Rules & Definitions

1. The bracing described in this brochure covers both framed roofs and fully trussed roofs.
2. Roof planes less than 6m² (e.g. dormers & porches) do not require bracing.
3. Roof braces can consist of either i) Roof Plane Brace or ii) Roof Space Brace or combination of the two.
4. Roof braces are not required on roofs where sarking is installed as per NZS 3604:2011 Clause 10.4.4 or where a ceiling diaphragm is installed and is attached to the rafters.
5. Roof area is the actual plan area of the roof and includes overhangs.
6. A hip or valley rafter running continuously from ridge to top plate can be classed as one roof plane brace.
7. A pair of crossed LUMBERLOK Strip Brace (preferred for ease of installation) can be classed as one roof plane brace and shall be installed as detailed in this brochure.
8. There must be at least one roof plane brace in each roof plane. Each ridge line shall have a minimum of two roof braces.
9. Every design effort should be made to distribute the roof braces as evenly as possible over the entire roof area and run alternately in opposite directions.

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Roof Bracing Options

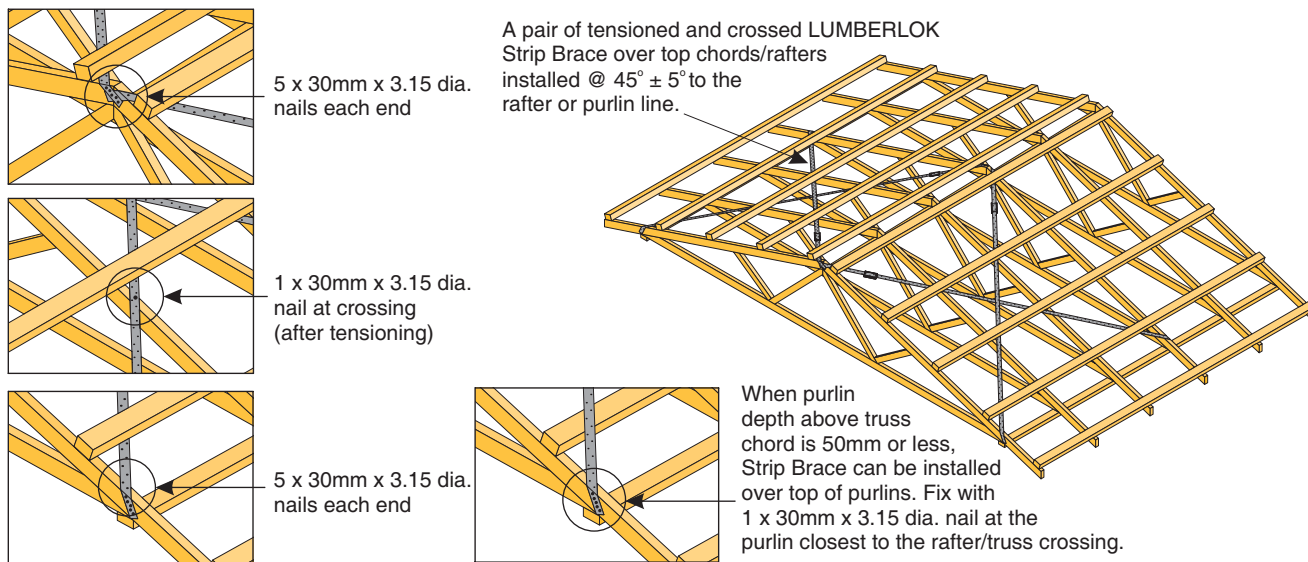
i) ROOF PLANE BRACE

Each roof plane brace can be:

- A hip or valley rafter running continuously from ridge to the top plate in accordance with NZS 3604:2011 Clauses 10.2.1.3.2 or 10.2.1.3.3

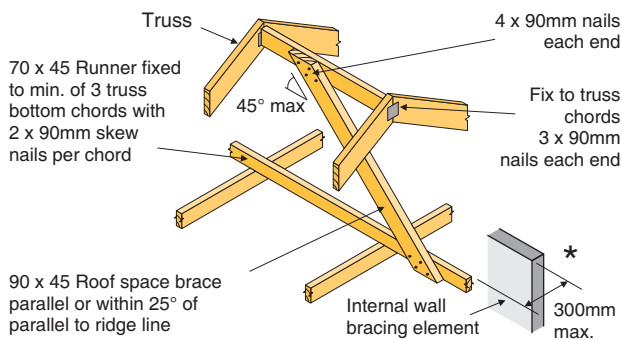
OR

- A pair of tensioned and crossed LUMBERLOK Strip Brace running continuously from ridge to top plate installed as detailed below.

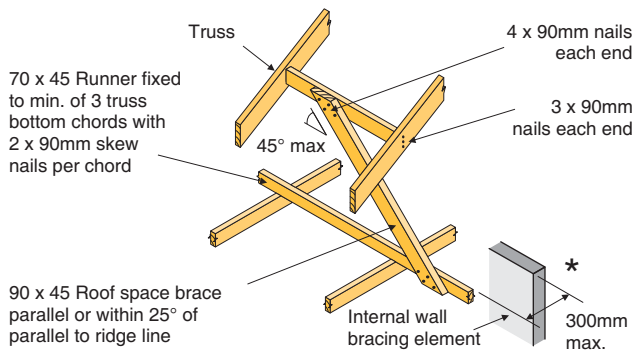


ii) ROOF SPACE BRACE

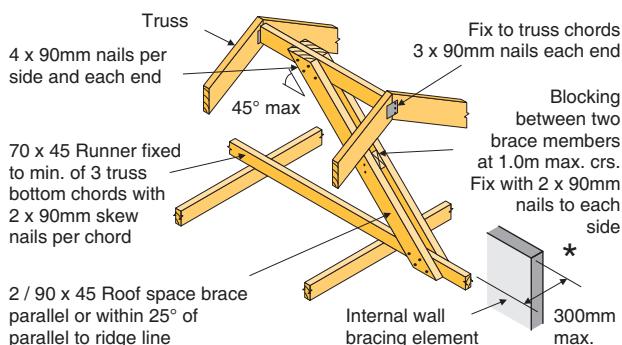
(A) Less than 2m long.



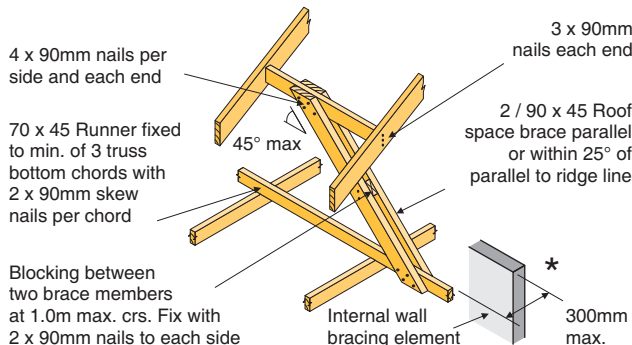
(C) Not directly under the ridge - less than 2m long.



(B) More than 2m long (Max. 4.8m).



(D) Not directly under the ridge - more than 2m long.



* Not required when a ceiling diaphragm complying with Clause 13.5 of NZS 3604:2011 is used.

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MiTek New Zealand Limited

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Phone: 09-274 7109
Fax: 09-274 7100

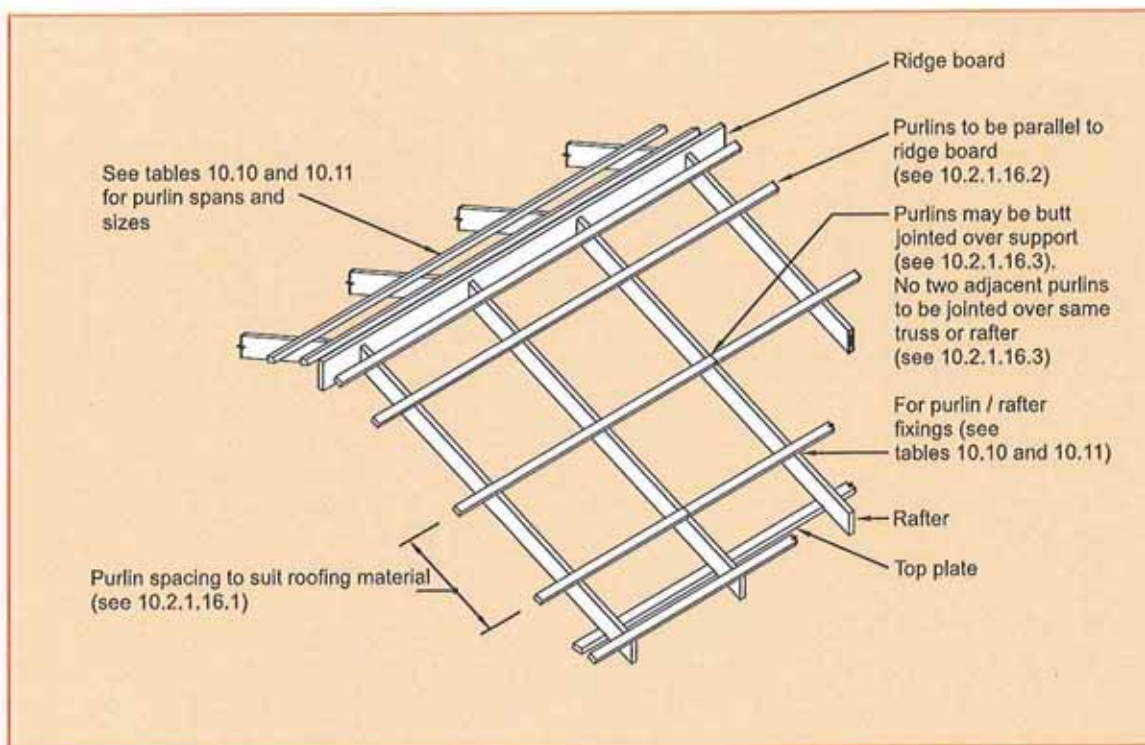
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Fax: 03-348 0314

www.mitek.nz.co.nz

GANG-NAIL® LUMBERLOK® BOWMAC®

SECTION 10 – ROOF FRAMING

NZS 3604:2011



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SECTION 8 – WALLS

NZS 3604:2011

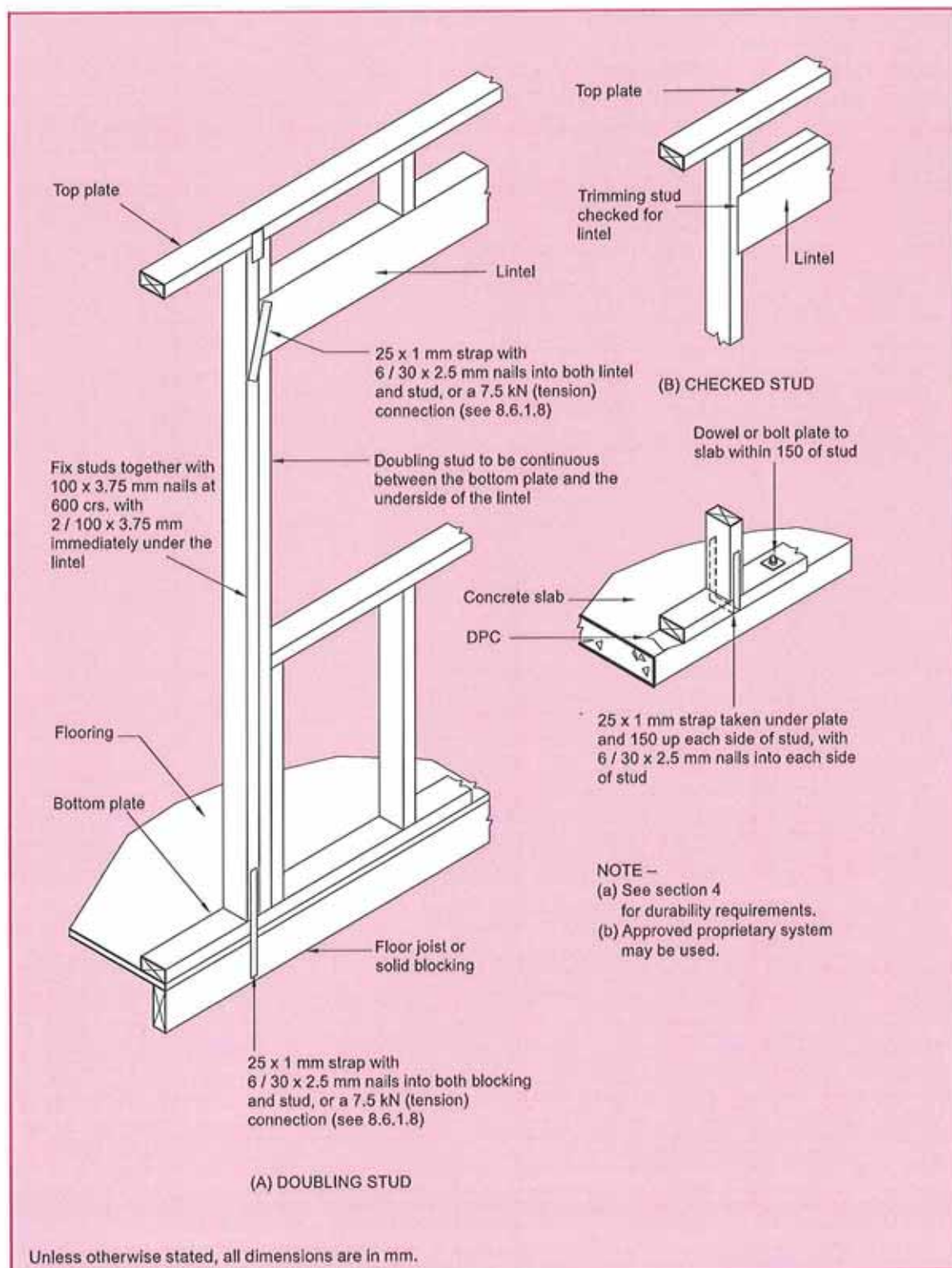


Figure 8.12 – Lintel fixing to prevent uplift (see 8.6.1.8 and table 8.14 (a) and (b))

THERMAKRAFT 215 BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY

APPLICATION AND INSTALLATION

Product Description	<p>THERMAKRAFT 215 BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY is specifically designed for use in Domestic and Commercial type buildings.</p> <p>THERMAKRAFT 215 is a breathable, absorbent bituminous wall and roofing underlay.</p> <p>THERMAKRAFT 215 will provide the following functions:</p> <ul style="list-style-type: none"> • Reduce wind entry into the cavity, thereby assisting the performance of thermal insulation. • Highly water vapour permeable, thereby allowing excess water vapour which might otherwise condense in the structure, to escape. • Provides a temporary protection against wind, dust, rain and other weathering elements until the external cladding is applied.
Applications	<p>THERMAKRAFT 215 is suitable as a wall and roofing underlay where Fire Retardancy is NOT required, and with all cladding types.</p> <p>THERMAKRAFT 215 is self supporting to 1200mm rafter/purlin spacing.</p> <p>THERMAKRAFT 215 can be used as an Air Barrier.</p> <p>THERMAKRAFT 215 must not be left exposed to the elements for more than 7 days. Cladding on the same day is recommended. If Fire Retardancy (FI <5) is required, use Thermakraft COVERIEK407.</p>
Installation Roofing	<p>THERMAKRAFT 215 may be run vertically over purlins with a 150mm lap if roof pitch >8 degrees. Fix securely to purlins with 8mm staples or 20mm clouts. The membrane should be firmly laid to avoid excessive dishing between purlins.</p> <p>THERMAKRAFT 215 may be run horizontally across rafter/trusses with a 150mm lap for roof pitches above 3 degrees. Fix securely with 8mm staples or 20mm clouts.</p>
Control of Condensation	<p>In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation to prevent moisture build-up in the roof cavities. Factors which adversely affect the condensation risk in roofing systems include;</p> <ul style="list-style-type: none"> • Humid, and/or cold climatic regions • Warm/Skillion roof construction • Low roof cavity air volume and restricted air movement • Omitting Vapour Control Layers • Ceiling penetrations and entry of warm air into roof cavities • Occupancy activities which have high moisture loading on conditioned spaces • Low pitched roof • Bulk insulation • Building structures ability to naturally dry Construction Moisture <p>Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer MRM Code of Practice for details.</p>
Storage	<p>THERMAKRAFT 215 should be stored on end in dry conditions. Protect from the weather and direct sunlight.</p>
Roll Dimensions	<p>1250mm x 40.0m = 50m² 20kg 1250mm x 20.0m = 25m² 10kg (2 per pack) 1450mm x 34.5m = 50m² 20kg</p>

For more information regarding **Thermakraft COVERIEK407 FIRE RETARDANT SELF SUPPORTING ABSORBENT BREATHABLE SYNTHETIC NON WOVEN ROOFING UNDERLAY** refer to the "DESIGNER and USER GUIDELINES" - Direct and Cavity Fix, or contact **Thermakraft Customer Services on 0800 806 595.**

THERMAKRAFT 215

BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY

TECHNICAL SPECIFICATIONS

Technical Data

THERMAKRAFT 215 BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY complies with the requirements of NZBC E2/AS1 Table 23.

Nominal Grammage 400g/m²

NZBC E2/AS1 TABLE 23 AS A WALL UNDERLAY REQUIREMENTS

NZBC E2/AS1 TABLE 23 WALL UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENTS	PROPERTY PERFORMANCE
Absorbency	≥100 gsm	Pass
Vapour Resistance	≤7 MN.s/g	Pass
pH of Extract	≥6 and ≤9	Pass
Shrinkage	≤0.5%	Pass
Water Resistance	≥100mm	Pass
Air Barrier	≥0.1 MN.s/m ³	Pass
Duty		Heavy

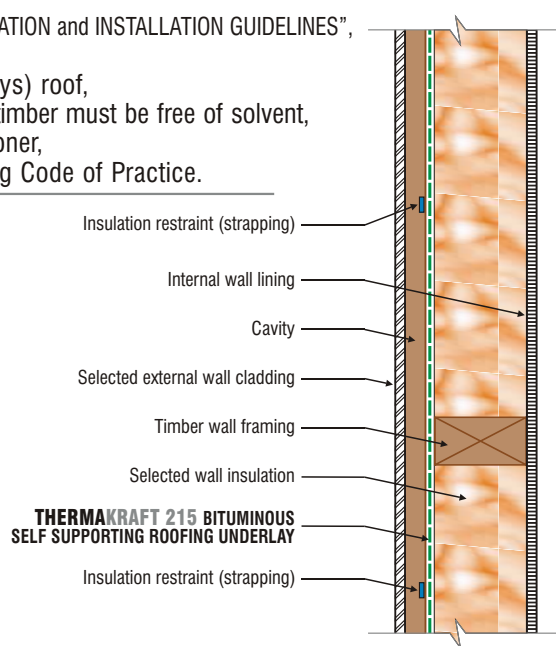
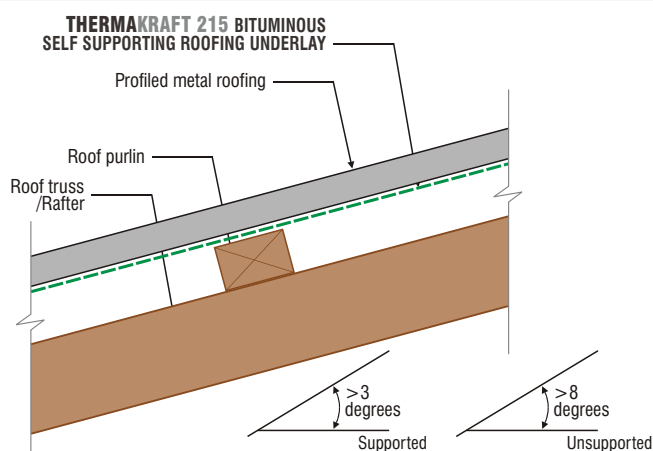
NZS2295:2206 Classification

Flammability Index		Non Fire Retardant
Wind Zone	R2	Up to Very High
NZS2295:2006 Classification	R2	Self Supporting

Durability/Limitations

For **THERMAKRAFT 215** to meet the Performance Requirements of NZBC Clause B2, Durability B2.3.1 (a) 50 years and B2.3.1 (b) 15 years, E2 External Moisture, **THERMAKRAFT 215:**

- must be installed in accordance to the "APPLICATION and INSTALLATION GUIDELINES",
- run length no greater than 10 metres,
- is not left exposed for more than (7 days) roof,
- when used on LOSP treated timber, the timber must be free of solvent,
- installed by a licensed building practitioner,
- installed in accordance with the Roofing Code of Practice.



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.

Metalline Fascia 185mm

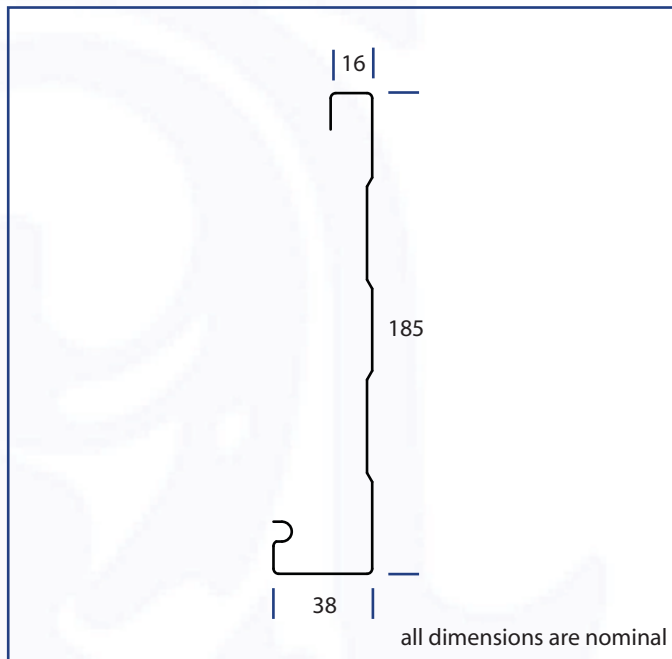
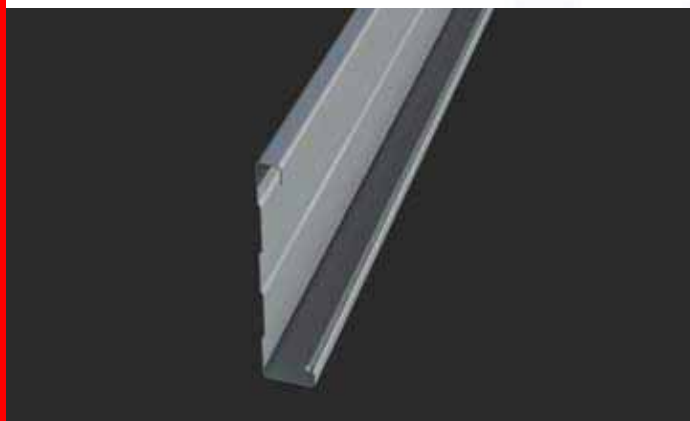
0800 ROOFNZ (0800 766369)
Issue Date August 2008

Metalline Fascia 185mm is used on both eave line and gables in conjunction with Metalline Quad Gutter to provide a quality Fascia and Gutter Solution. Metalline Fascia is also compatible with most gutter profiles and looks great with any residential roof finish. Metalline Fascia is available in Zinalume, Colorsteel Endura and Colorsteel Maxx. Please consult your nearest Metalcraft branch for timberwork set out details if you are unsure as there is some variances between different sized fascia systems.

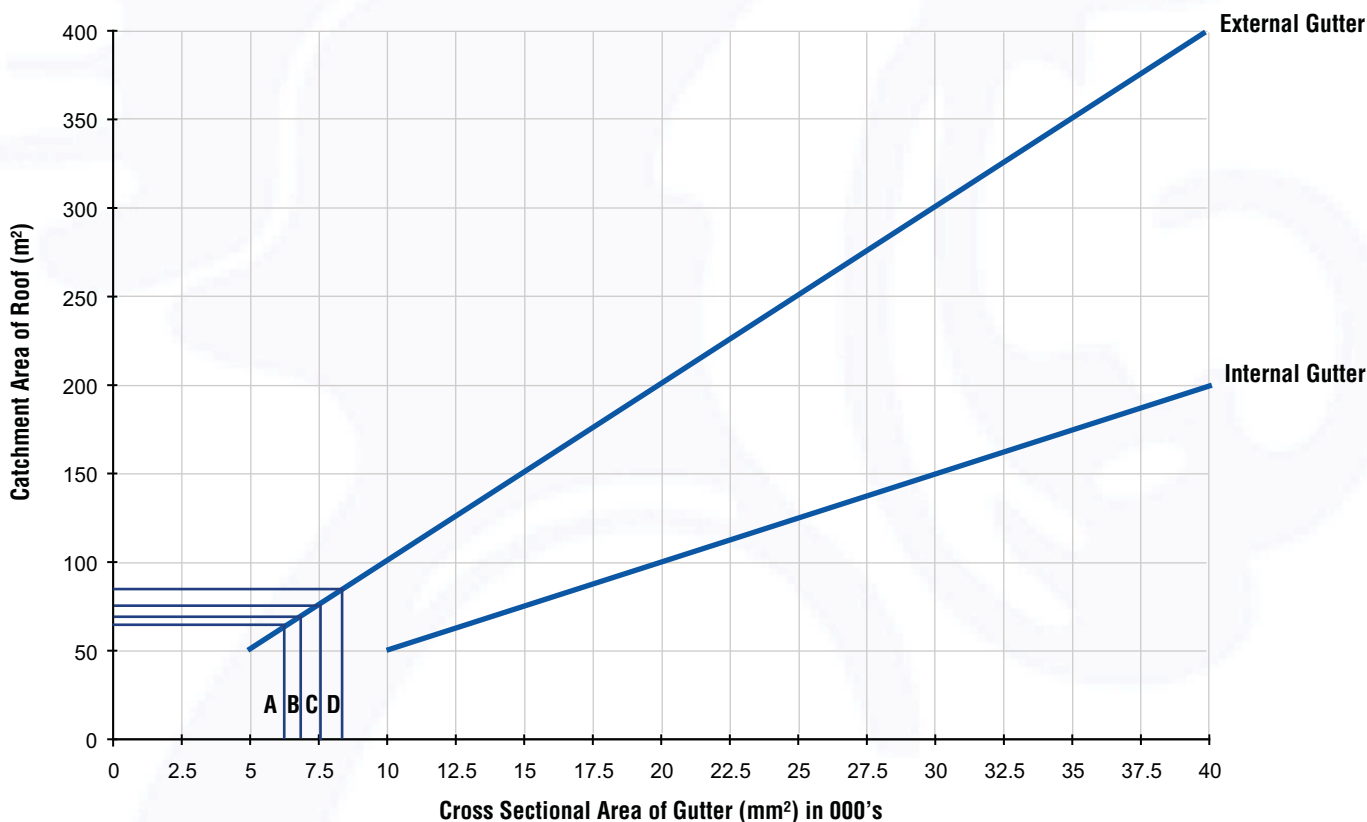
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Cross-sectional Area:

- Metalline Fascia 185mm with Metalline Quad Gutter = 5550mm² (A)
- Metalline Fascia 185mm with Squareline Gutter = 6090mm² (B)
- Metalline Fascia 185mm with Hiline Gutter = 7550mm² (C)
- Metalline Fascia 185mm with Box Gutter 125mm = 8435mm² (D)



Catchment Area of Roof v Cross Sectional Area of Gutter



Note: The graph is based on a rainfall intensity of 100mm / hour and roof pitches less than 10 degrees. For more information on roof catchment areas and the effect of gutter cross sectional areas download the document on Roof Drainage

Manufacturing Locations Auckland, Christchurch

Metalline Fascia 185mm is available for purchase from all Metalcraft branch locations www.metalcraftroofing.co.nz

Metalline Quad Gutter

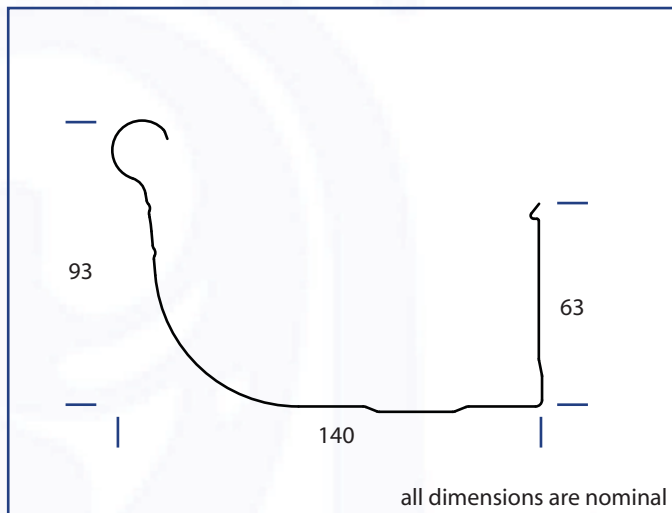
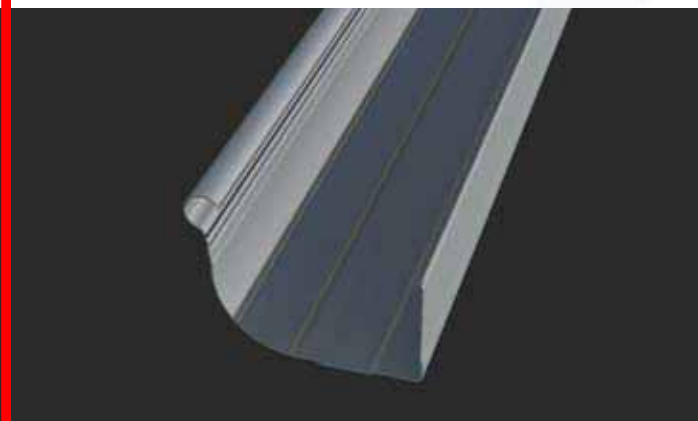
0800 ROOFNZ (0800 766369)
Issue Date August 2008

In Christchurch product is known as Colonial Quad Gutter

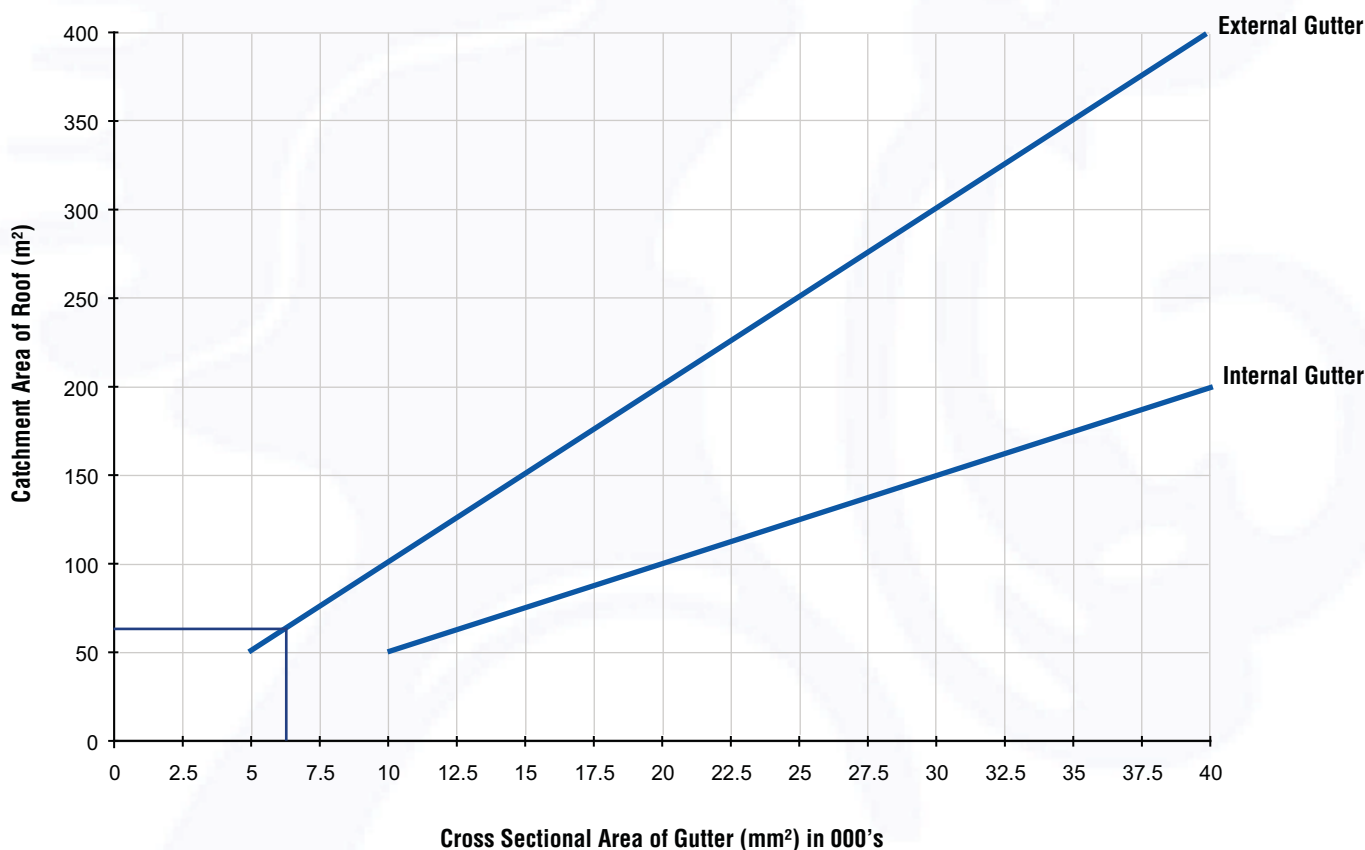
Metalline Quad Gutter is our most popular residential profile. Whether you are renovating or involved in a new build, this profile will enhance the appearance of your home. The Metalline system uses concealed brackets and is compatible with Metalcraft Metalline Fascia or timber fascia. Metalline Quad Gutter is available with overflow slots to prevent flooding from blockages, and snow straps are stocked to suit this profile if required. Metalline Quad Gutter is available in Zinalume, Galvsteel, Colorsteel Endura and Colorsteel Maxx.

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Cross-sectional Area: 5550mm²



Catchment Area of Roof v Cross Sectional Area of Gutter



Note: The graph is based on a rainfall intensity of 100mm / hour and roof pitches less than 10 degrees. For more information on roof catchment areas and the effect of gutter cross sectional areas download the document on Roof Drainage

Manufacturing Locations Auckland, Christchurch

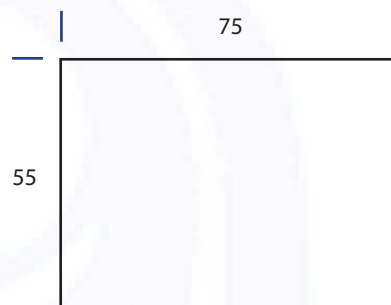
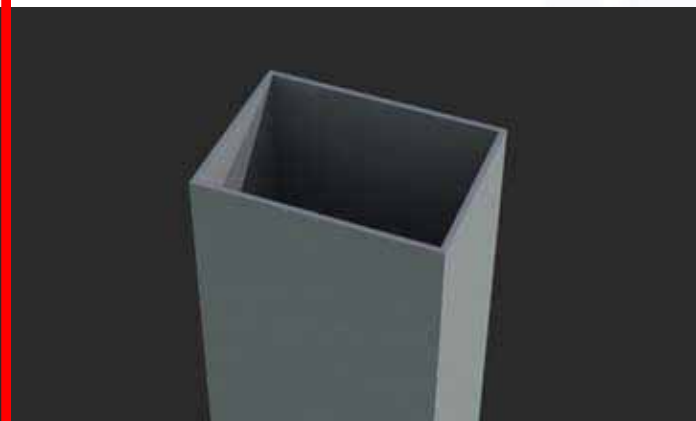
Metalline Quad Gutter is available for purchase from all Metalcraft branch locations

www.metalcraftroofing.co.nz

Rectangular Downpipe

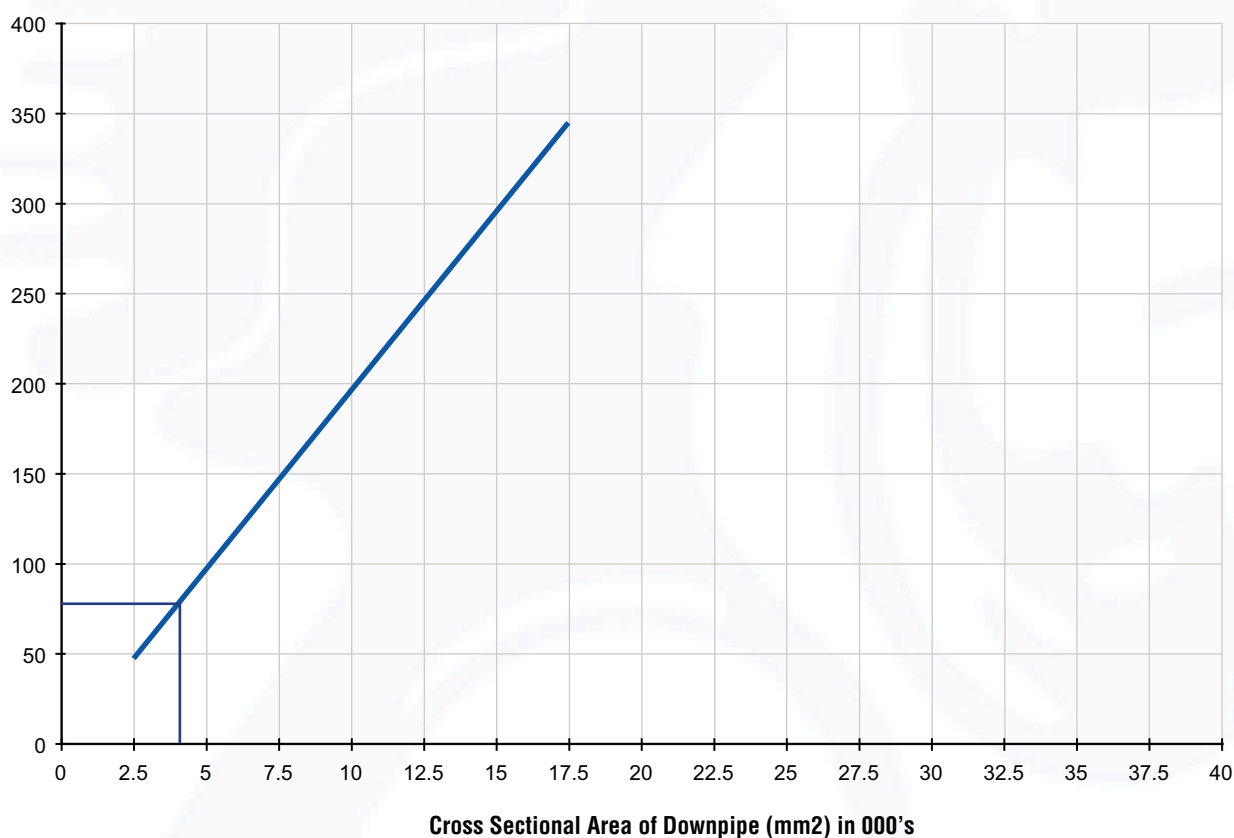
Rectangular downpipe is an excellent alternative to the standard round downpipes available and looks great in combination with the Metalcraft range of box gutters. Rectangular downpipe is 75mm by 55mm and is available in Zinalume, Galvsteel, Colorsteel Endura and Colorsteel Maxx.

Cross-sectional Area: 3712mm²



all dimensions are nominal

Catchment Area of Roof v Cross Sectional Area of Downpipe



Note: The graph is based on a rainfall intensity of 100mm / hour and roof pitches less than 10 degrees. For more information on roof catchment areas and the effect of gutter cross sectional areas download the document on Roof Drainage.

Manufacturing Locations Christchurch

Rectangular Downpipe is available for purchase from all Metalcraft branch locations

www.metalcraftroofing.co.nz



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

www.mitek.nz.co.nz

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

GANG-NAIL® LUMBERLOK® BOWMAC®

Producer Statement – BOWMAC® Screw Bolt

ISSUED BY: MiTek New Zealand Limited

IN RESPECT OF: BOWMAC® Screw Bolt

DESCRIPTION: BOWMAC® screw bolts M10 x 140mm are identified with blue hexagonal heads and a marking “10/140 mm” stamped on the head. They are manufactured from heat treated carbon steel with a nominal tensile strength $f_u = 1000$ MPa and yield strength $f_y = 900$ MPa. They have a nominal shank diameter of 10mm. The underhead shank length is 140mm of which 95mm is threaded. They are protected with nominal zinc plating of 5 micron.

USE: To be used in conjunction with GIB HandiBrac® for fixing proprietary bracing systems to concrete and timber floors.

CHARACTERISTIC WITHDRAWAL STRENGTH: 1) In Concrete = 15 kN 2) In Timber = 12 kN

REFERENCE TESTS:

- 1) Powers® FASTENERS Test Ref Number: BTNZ120710.1 Screw Bolt tests in concrete masonry header block dated 27 July 2010.
- 2) MiTek New Zealand Limited Test Report for BOWMAC® Screw Bolt in Timber Joist dated 30 November 2010.

Note: Tests were carried out in accordance with BRANZ EM1

On behalf of MiTek New Zealand Limited and subject to:

- 1) **Fixing to concrete floor or concrete masonry header block**
 - 1.1. Minimum concrete strength shall be 17.5 MPa
 - 1.2. Minimum edge distance to centre of screw bolt shall be 59mm
 - 1.3. Minimum embedment depth in concrete shall be 88mm
 - 1.4. Drill 10mm diameter hole x 96mm minimum depth
 - 1.5. In sea-spray zones, masonry header blocks shall be waterproofed/weather-proofed to the requirements of NZS4210:2001
- 2) **Fixing to timber floor**
 - 2.1. Minimum timber grade shall be MSG8, VSG8 or SG8
 - 2.2. Moisture content of timber joist shall be less than 18%
 - 2.3. Minimum joist size shall be 140x45 mm on edge
 - 2.4. Minimum embedment depth in joist shall be 66mm
 - 2.5. Drill 8mm diameter hole x 74mm minimum depth on centreline of joist
- 3) **General Requirements**
 - 3.1. BOWMAC® screw bolts can be used in **ALL ZONES** in a “Closed” environment in accordance with Table 4.1 of NZS3604:2011
 - 3.2. Installation shall be in accordance with the manufacturer’s technical literature and “GIB HandiBrac® Panel Hold-Down Bracket” brochure packed with product
 - 3.3. All proprietary products meeting their performance specification requirements

I BELIEVE ON REASONABLE GROUNDS that the use of BOWMAC® screw bolts in buildings if constructed in accordance with the drawings, specifications, and other documents provided, will comply with Clause B1 and B2 of the NZ Building Code.

For and on behalf of MiTek New Zealand Limited

In Ling Ng
Technical Services Manager
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Date: 23 APRIL 2013

3.3 ECOPLY® BRACING SPECIFICATION – EPI

SINGLE SIDED STRUCTURAL PLYWOOD BRACE

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI	0.6 m	7 mm Ecoply® or Ecoply Barrier one side	125	130

Framing

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604:2011)
- NZBC B2 - Durability: AS1 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®, 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 Ecoply plywood or Ecoply® Barrier fixed directly to framing or over cavity battens. 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®

Fasteners

Fasten with 50 x 2.8 mm galvanised or stainless steel flat head nails for direct fix, or 60 x 2.8 mm over cavity battens. Place fasteners no less than 7 mm from sheet edges.

Fasteners for H3.2 CCA treated Ecoply

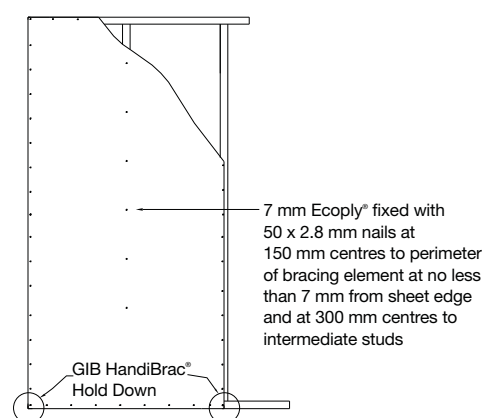
Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised.

In certain circumstances stainless steel fasteners may be required. Refer to 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 New Zealand Building Code 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 and Laserframe SG8 timber framing manufactured by

Carter Holt Harvey Limited trading as CHH Woodproducts New Zealand, 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.

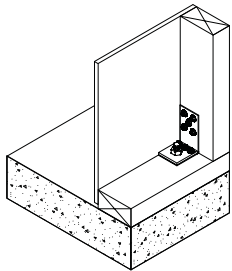
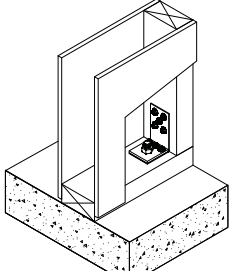
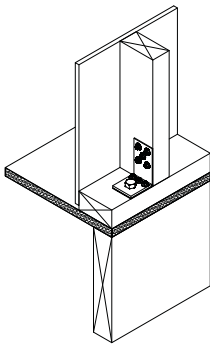
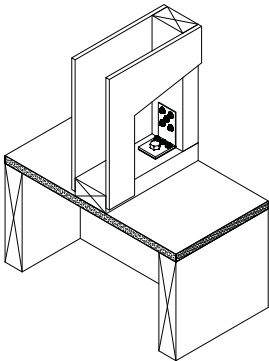
3.7 GIB HANDIBRAC® - RECOMMENDED INSTALLATION METHOD

Developed in conjunction with MiTek™ NZ, the GIB HandiBrac® has been tested for use as a 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		Timber Floor	
External walls	Internal walls	External walls	Internal walls
			
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate	Position GIB HandiBrac® at the stud/plate junction	Position GIB HandiBrac® in the centre of the perimeter joist or bearer	Position GIB HandiBrac® in the centre of the floor joist or full depth solid block
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket		12 x 150 mm galvanised coach screw or screw bolt supplied with the bracket	

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3.8 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 NZS 3604 13.5.2 and 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 10 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

Ceiling Diaphragms are 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 publication. E.g. 40 mm x 2.5 mm flat head nails for 7 mm and 9 mm EcoPLY
- 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

Tip: To get the saw started, drill holes at each of the corners but within the opening. In some cases the saw can simply be pushed through the sheet without the need for holes.

Attaching GIB® plasterboard sheets

The best practice for fixing GIB® plasterboard involves the use of screws and adhesive. For walls adhesive is used to fix the areas in the centre of the sheet that come into contact with framing while screws are used around the perimeter of the sheet. For ceilings the same process is used. However, additional screws are required down the centre of the sheet. Sheet edges at door or window openings can be fixed with adhesive or mechanically fastened unless the edge forms part of the perimeter of a bracing element, in which case it must be fixed with the appropriate nails or screws.

GIB® Nails can also be used in place of screws. These nails are specially designed for use with GIB® plasterboard. The nailing of ceilings is not recommended due to the 'springiness' in some timber ceiling battens. Provide a 5-10mm gap at the wall/floor junction.

Tip: Do not fix nails or screws through or closer than 200 mm to adhesive as this can cause the nails or screws to 'pop' as the adhesive dries and shrinks.

Adhesive

GIBFix® All Bond is a solvent based adhesive suitable for most surfaces except polystyrene (Minimum application temperature 5°C).

GIBFix® One is an acrylic based adhesive with an ultra low VOC content, compatible with timber and steel framing (Minimum application temperature is 10°C)

1. Make sure that the framing is clean and free from oil or dirt
2. Apply adhesive at the appropriate spacing. An adhesive daub approximately the diameter of the framing timber should be used (see page 30)
3. Fix the sheet immediately after applying the adhesive to avoid 'skinning', resulting in poor adhesion

Screwing

1. Hold the sheet tight against the framing
2. Sink screws to just below the sheet surface, leaving the paper intact

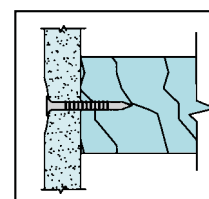
Tip: Use an electric drywall screwgun equipped with an adjustable depth control head and Philips bit. If a screw is overdriven and the paper and/or core of the GIB® plasterboard is damaged, insert a second screw approximately 50 mm from the first and then remove the first screw. Do not screw within 200 mm of any adhesive daubs as this can lead to problems such as 'popping'.

Nailing

Although screws are the preferred method of fixing plasterboard, GIB® Nails can be used for fixing to timber wall framing.

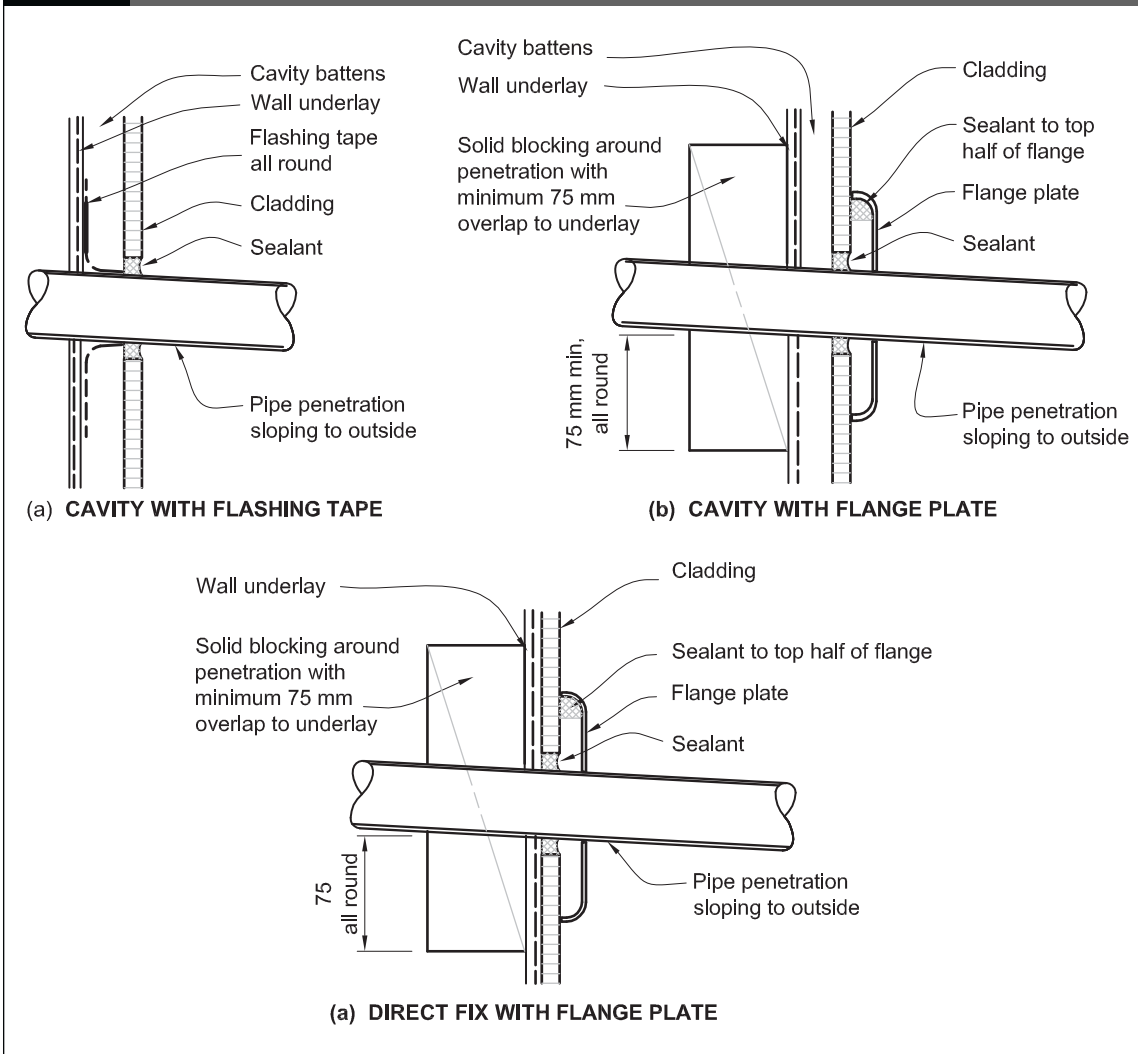
Tip: Galvanised nails lack holding power and are not recommended.

1. Drive the nail into the GIB® plasterboard so that a shallow dimple is formed by the last blow of the hammer.
2. Drive nails in straight, not on an angle. Do not overdrive or countersink nails as this results in breaking of the face paper and fracturing of the GIB® plasterboard core.



Tip: If damage does occur, drive a second nail approximately 50 mm from the first. Then drive the first nail until it is just below the surface of the board using a nail punch. Do not nail within 200 mm of any adhesive daubs as this can lead to problems such as 'popping'. Remove any loose or damaged plaster prior to stopping.

Figure 68: General pipe penetration
Paragraph 9.1.9.3, Figure 126



COMMENT:

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

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Dektite®



The versatile solution for hundreds of applications.

Designed to enable practically any pipe flashing operation to be carried out within minutes, **Dektite®** is simple to install - and very effective. Providing the perfect weatherproof, flexible seal, **Dektite®** protects against leakage on a wide range of pipe or vent projections, and is designed to conform to most roof profiles and pitch. For a maintenance-free seal on pipes from 0 - 440mm diameter, it's much more than a flexible solution to pipe flashing. It's a means of saving **time and money!**

Easy Selection Guide

Code	PIPE mm	BASE mm	PITCH	COLOUR
DB 0-35 DG 0-35	0-35	99x99	0 - 60°	BLACK (EPDM)* DB GREY (EPDM)* DG
DB 5-55 DG 5-55	5-55	137x137	0 - 45°	
DB 50-70 DG 50-70	50-70	178x178	0 - 45°	
DB 5-120 DG 50-120	5-120	218x218	0 - 45°	
DB 110-170 DG 110-170	110-170	284x284	0 - 45°	
DB 160-220 DG 160-220	160-220	365x365	0 - 45°	
DB 160-300 DG 160-300	160-300	453x453	0 - 45°	
DB 290-440 DG 290-440	290-440	581x581	0 - 45°	

E.P.D.M. withstands temperatures from -50°C to 115°C, & up to 150°C intermittently

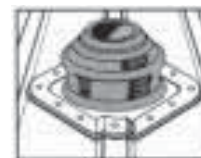
* **DEKTITE® Pipe Flashings can also be used to flash square pipes.**
Just add 30% to the pipe diameter and trim the cone to suit.

EPDM - Perfect for approved flues!

Dektite® EPDM polymer flashings have been officially tested by the Coal Corporation of Victoria, Australia and conform to all Australian and UK Standards on approved flue systems. Under no circumstances should any polymer flashing be installed on a non approved flue or an 'active' combustion heater flue.

INSTALLATION INSTRUCTIONS

For more effective drainage always fit the Dektite on the Diamond or bias.



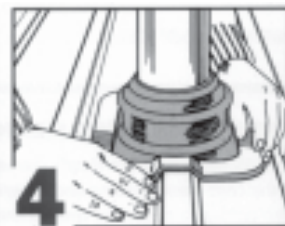
1 Cut a neat hole in roofing sheet with minimum clearance for pipe and insert pipe through hole. Trim the cone to suit pipe size using sharp tin snips. Where necessary, support cut sections of sheet with additional framing.



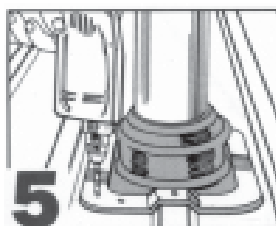
2 Slide Dektite® flashing down over pipe. Lubricating the pipe with water allows the pipe to slide snugly into position.



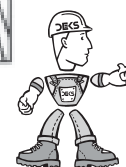
3 Apply a neutral cure silicone* sealant by turning back the flexible flange.



4 Press base to the roof profile by hand, smooth out any awkward creases. Don't fully extend to allow for vibration.



5 Fasten using sealed rivets or washered screws. Fit fasteners progressively outward in opposing pairs to avoid gaps.



Dektite®
First and the Best!

*Refer to page 28 for silicone usage

HINT: When flashing a metal flue that has an exposed seam, using a neutral cure sealant, seal the seam from underside of cowl to the top of Dektite® cone.

Colours



GREY EPDM



BLACK EPDM



Silicone Sealants

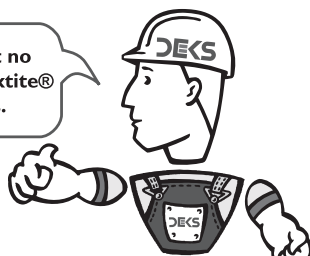
Use only Neutral Cure, Alcohol free, Low Modulus Sealant (Silicone). Deks Industries have trialed the following silicone sealants and found them to provide a satisfactory seal between the EPDM and most commonly used roofing materials.

- **OCI Roof and Gutter N-192, Silicone Sealant**
- **Selleys® Roof & Gutter Silicone Sealant**
- **Sikasil®-C Multipurpose Silicone Sealant**
- **Bostik Findley Roof & Gutter Silicone Sealant**
- **Dow Corning® 791 Silicone Weatherproofing Sealant**

Look at this performance

ASTM Method	Test Description	Spec. Req.	Test Results Black EPDM Dektite®	Test Results Grey EPDM Dektite®
D2240 D412 D412	Shore 'A' Hardness: Tensile Strength (MPa min): Elongation @ Break (% min):	60 +/-5 7.0 min 350 min	60 10.5 650	60 10.5 650
D624	Tear Resistance Die C (KN/m min): Trousar Tear (KN/m min):	20.0 min 10.0 min	31.5 14.0	32.0 14.5
D573	Heat Resistance 70hrs @ 100°C Change in Hardness (points): Change in Tensile (%): Change in Elongation (%):	+/- 10 +/-25 +/-25	+1 +3.5 +14.0	+3 -5.0 -16.0
D395	Compression Set 22hrs @ 70°C (%max)		14.0	14.5
D1171	Resistance to Ozone	100ppm No Cracks	Passed	Passed
D2137	Low Temp. Brittleness 3 mins @ -50°C:	Non Brittle	Passed	Passed
U.L.94	Flame Resistance	U.L.94 H.B.	Passed	Passed

There's just no mistaking Dektite® Flashings.



Helpful Hints

Getting the best results from the DEKS range of flexible flashing products.

DEKTITES

- When cutting, do not use a knife. Sharp tin snips will provide the smoothest finish.
- Always cut where sizes are indicated. Incorrect point of cutting may result in poor fit.
- Hand form aluminium edge before fastening.
- Fasten from vertical centre to outside.
- When pulling the Dektite down a pipe, wet the pipe first.

SOAKERS

- Hand preform aluminium metal flange prior to cutting roof.
- Fasten from vertical centre to outside. Fasten sides last.
- In particular circumstances, we recommend use of Soakers **particularly** where roof pitch is below 1.5° or above 45° and pipe sizes are in excess of 100mm.
- Use of a stainless steel band at pipe / soaker join is only necessary in extreme roof pitch situation 55 - 60°

RETROFITS

- Do not overcrimp seam.
- For pipes over 150mm diameter use a stainless steel support clip.

TILE FLASHING

- Dress to profile, avoiding unnecessary beating.
- In flue applications, apply a liberal coating of sealant* over worm drive mechanism.

STRIP FLASHING

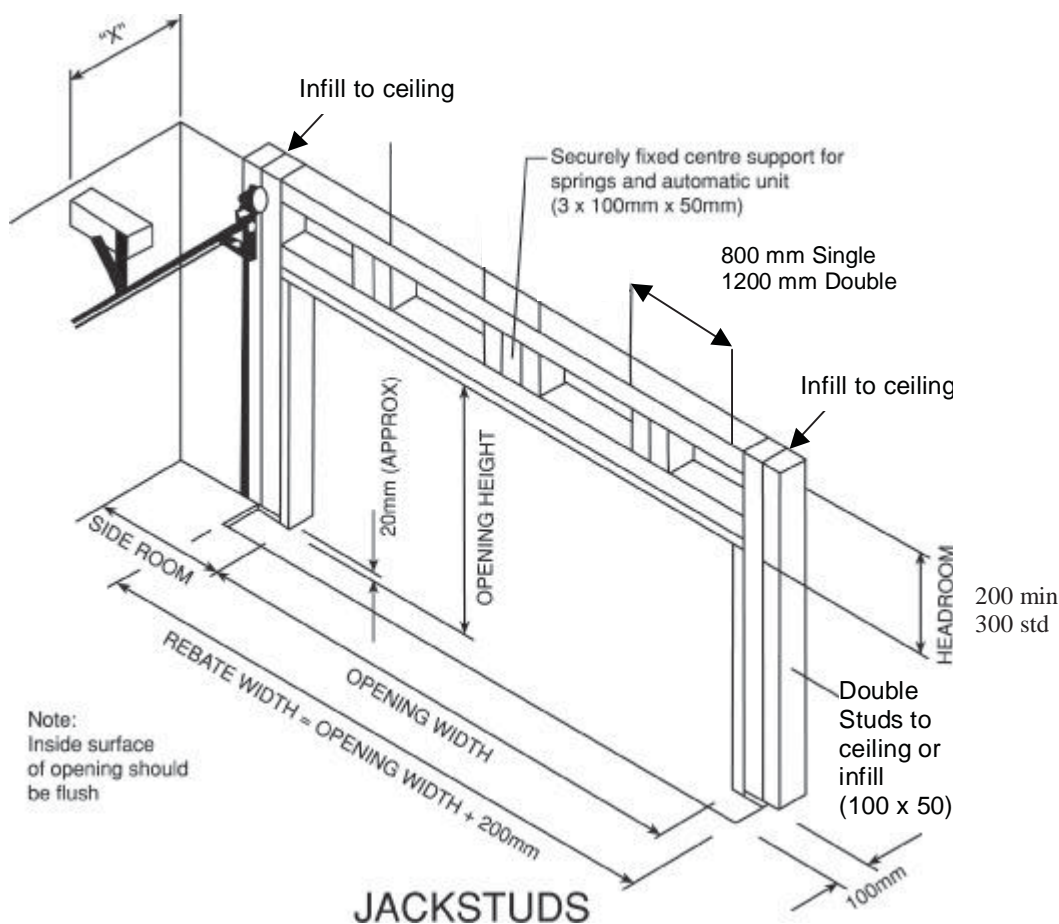
- Stretch expanding sides only when necessary and just before fastening.
- Due to the flexibility of the expanding edges and providing that a liberal amount of sealant is used underneath these edges, it is recommended to 'valley' fix where possible.
- Use only neutral-cure, alcohol free, low modulus sealant* (silicone).
- Avoid contact between strip flashing and sharp exposed metal edges.

GENERAL POINTS -APPLICABLE TO ALL DEKS FLASHING PRODUCTS

- Always ensure that a liberal amount of sealant is applied UNDER any perimeter aluminium-backed edge.
- **Seamed Pipes:** Where these are found, always apply a bead of sealant from the Dektite point of contact along the entire seam length.
- Where multiple skin flues are used, E.P.D.M. Dektite are appropriate.
- Under **NO** circumstances should any Dektite product be used on an unapproved (i.e. single skin) flue discharging from a wood combustion appliance.
- Overstretching of E.P.D.M. compound products can lead to shortened life expectancy.

*Refer to previous page for silicone usage

Fixing Specs. For Windsor Sectional Doors



Note: If call back required due to incorrect fixings a surcharge of \$50 will be added to your account

