Sharalyn Fraser
Agency

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CODE COMPLIANCE CERTIFICATE

Section 95 Building Act 2004 [Form 7 – Building (forms) Regulations 2004]

Consent No(s): 250084

The Building			
Street address of building:	62 Awanui Drive, Waikanae	**Building name:**	N/A
Current, Lawfully established, use:	Detached Dwelling	**Location of building within site/block number:**	Central
		Intended life of the building if 50 years or less:	-
Level/unit number:	-	**Year first constructed:**	2025
Legal description of land where building is located:	LOT 2 DP 578379		

The Owner			
Name of owner:	B & V Jefferies & TMF Trustees Services 2005 Ltd	**Street address /registered office:**	64 Awanui Drive Waikanae
Contact person:	Vanessa Jefferies	**Phone numbers:**	
Mailing address:	64 Awanui Drive Waikanae 5036	**Landline:**	-
		Mobile:	027 235 6560
		Daytime:	-
Email address:	vanessajefferies@msn.com	**After hours:**	-
Website:	N/A	**Facsimile number:**	-

First point of contact for communications with the Kapiti Coast District Council:

Agent
lodgements@idesignarchitecture.co.nz

Building Work

Building Consent No(s):	250084	**Issued by:**	Kapiti Coast District Council

Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that:

(a) the building work complies with the building consent

Michelle Salmon –
Building Inspections Team Leader
On behalf of **Kapiti Coast District Council** Date: 5/11/2025

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

ACW Construction Ltd
14 Tyne Street
Mt Maunganui
Tauranga 3116

14 April 2025

Dear Building Consent Applicant / Building Owner

Approval of Building Consent – Detached Residential / Outbuilding: 250084

Location: 62 Awanui Drive, Waikanae
Legal Description: LOT 2 DP 578379
Description: 3 bedroom dwelling.

I am pleased to inform you that the above building consent application has been approved. The building consent documents have been issued and are enclosed.

The building consent attached to this letter is consent under the Building Act 2004 to undertake building work in accordance with the plans and specifications that accompanied your application. Under section 49 of that Act, Council is satisfied that the provisions of the building code would be met if the proposed building work were completed in accordance with those plans and specifications. This consent does not affect any duty or responsibility under any other Act or permit any breach of any other Act.

This building consent does not give or imply any rights to transgress beyond your legal boundaries. Any work that is required beyond your legal boundaries can only be undertaken with the permission of the affected owner/s.

Before starting any work please read ALL the building consent documents carefully and in full so that you, as the owner, understand the conditions under which the consent has been issued.

Please note that this building consent includes restricted building work, the details of this are included in this letter.

Owner responsibilities

The owner is responsible for ensuring:

- building work starts within 12 months of the approval of the building consent and that work progresses at a reasonable pace.

175 Rimu Road, Paraparaumu 5032 | Private Bag 60 601, Paraparaumu 5254 | T: 04 296 4700 F: 04 296 4830 | www.kapiticoast.govt.nz

- written notice of every licensed building practitioner undertaking restricted building work is provided to Council before that work commences, and any changes are advised in writing

- the approved building consent documents are kept on site during construction and available for the District inspector at inspections

- all required inspections are completed and that a Code Compliance Certificate is obtained once the work has been completed. The list of supporting documentation required before issue of the Code Compliance Certificate and information on filling out the application form for code compliance certificate is attached. Failure to obtain a final inspection and a code compliance certificate may affect your insurance cover and could affect future re-sale of your property.
  Note: If you are the owner and your application was submitted through Simpli by an agent, please ensure you have been added as a collaborator so you can access the Simpli Code Compliance Certificate Application form.

- a Corridor Access Request is made and a Works Access permit is obtained before undertaking work in the legal road/road reserve, including installing a vehicle access crossing from the public road into your property. The process to be followed and the forms can be found on the Council website under Council Services/Roads or Council Services/Frequently asked questions/Access & Transport.

- before any excavations are undertaken a "Before U Dig" inquiry is made to check for locations of any underground services.

- no work with noisy equipment is to be carried out before 7.30 a.m. or after 6 p.m. Monday to Saturday. During the week there may be workers on site from 6.30 a.m. quietly preparing for work. Work with noisy equipment is not permitted on Sundays and public holidays.

- all loose materials that are capable of being carried by the wind are either secured or removed from the site. All activities must be carried out in a manner that keeps to a minimum the dust nuisance to adjacent properties.

- no damage occurs to public property, for example footpaths, water meters or retaining structures. Should damage occur you will be required to pay for any repairs.

- obtaining an amendment to the building consent for any changes to the approved building consent, prior to that work being undertaken.

- meeting the requirements of any easements, consent notices, covenants, and like listings registered on the title.

- the development contributions invoiced, if any, must be paid before a code compliance certificate can be issued.

- all maintenance recommended by the manufacturers is carried out at the required intervals.

General requirements

Note: Your attention is drawn to the notes contained in the ‘Addendum to the Consent’ and guidance documents referred to.

The following information is relevant to this building consent:

1. The Building Inspector is to be given 24 hours' notice before carrying out the inspections on the attached list. To arrange for inspections by the District Inspector, please contact the building inspectorate on 04 296 4700 between the hours of 8.00am and 4.30pm.
2. You are responsible for the safety of visitors to the work site including those undertaking building inspections. You must provide safe access to parts of the construction necessary for inspection. Ladder access must be securely founded and tied. Scaffold access and roof edge protection is generally required.
3. If required inspections, including those by designers of specifically designed elements, are not undertaken you may experience difficulty in obtaining a Code Compliance Certificate for the project. We suggest that at the time of the first inspection you discuss the inspection requirements with the inspecting officer.
4. This building consent will lapse and be of no effect if the building work concerned has not been commenced within 12 calendar months after the date of issue, or within such further period as the territorial authority allows.
5. The contractor is to leave the site clear of all demolition materials and in a tidy state.
6. Easements, consent notices, covenants, and like listings registered on the title are the responsibility of the applicant.
7. Note and comply with endorsements on approved plans.

Restricted Building Work

The following building work associated with this building consent is restricted building work [Section 7 and 402(1)(n) of the Building Act 2004 and Building (Definition of Restricted Building Work) Order 2011]:

Description of restricted building work including design work that is restricted building work
Primary structure
Foundations and subfloor framing
Walls
Roof
Columns and beams
Bracing
Other
External moisture management systems
Damp proofing
Roof cladding or roof cladding system
Ventilation system (for example subfloor or cavity)
Wall cladding or wall cladding system
Waterproofing
Other

Please note that the design work and restricted building work must be supervised or carried out by a licensed building practitioner who is licensed to carry out or supervise that kind of building work.

You or your agent will need to provide their details to the Council in writing prior to commencement of the building work. If after the restricted building work commences the named licensed building practitioner(s) ceases to be engaged to carry out or supervise the restricted building work under the building consent, this must also be advised in writing as must also the details of any other licensed building practitioner(s) subsequently engaged to carry out or supervise the restricted building work (Section 87 of the Building Act 2004). A form “Advice of licensed building practitioner(s)” is enclosed for you to use to advise the Council of licensed building practitioner details.

Please also note that it is an offence to engage another person to carry out or supervise restricted building work who is not a licensed building practitioner (Section 86 of the Building Act 2004).

Other reference material

- Guide for completing an application for code compliance, https://www.kapiticoast.govt.nz/your-council/planning/building/code-compliance-certificate/
- A guide to the inspection process https://www.kapiticoast.govt.nz/your-council/planning/building/building-services-inspections/

If you have any questions regarding your building consent or your responsibilities, please contact Kapiti Coast District Council on 04 296 4700 or toll free on 0800 486 486.

Building Consent

[Form 5, Building (Forms) Regulations 2004]

250084

Section 51, Building Act 2004

The building

Street address of building:	62 Awanui Drive, Waikanae
Legal description of land where building is located:	LOT 2 DP 578379
Valuation number:	1495104802
Building name:	
Location of building within site/ block number:	
Level/unit number:	

The owner

Name of owner:	B & V Jefferies & TMF Trustees Services 2005 Ltd
Contact person:	Vanessa Jefferies
Mailing address:	64 Awanui Drive, Waikanae 5036
Street address/registered office:	-
Phone numbers:	
Landline: -	*Mobile:* 027 235 6560
After hours: -	*Fax number:* -
Email address:	vanessajefferies@msn.com
Website:	-

First point of contact for communications with the council/building consent authority:

Full Name: ACW Construction Ltd

Mailing Address: 14 Tyne Street, Mt Maunganui, Tauranga 3116

Phones:: 07 578 7345

Email: accounts.kapiti@a1homes.co.nz

Building work

The following building work is authorised by this building consent:

3 bedroom dwelling.

Detached dwellings

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building). This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

Conditions of building consent

This building consent is subject to the following conditions:

1. Refer to the list of inspections required. Under section 90 of the Building Act 2004 agents authorised by the Council (acting as a Building Consent Authority) are entitled, at all times during normal working hours or while building work is being done, to inspect–
   a. land on which building work is being or is proposed to be carried out; and
   b. building work that has been or is being carried out on or off that building site; and
   c. any building.

Compliance schedule

A compliance schedule is not required for the building.

Attachments

Copies of the following documents are attached to this building consent:

- List of required inspections and supporting documentation required
- Building Consent Addendum
- Plans and specifications
- Advice of licensed building practitioners

Note: The cover letter and all attachments to this building consent should be read fully to ensure you understand all conditions of this consent.



Signature

Building Officer

Position

On behalf of: KAPITI COAST DISTRICT COUNCIL

Date: 10/04/25

Relevant Information

Issued in accordance with Building Consent No. 250084

1. Council`s manifold/meter box, base, and lid, are to be protected/re-instated to original specification. The cost to reinstate any damage to Council`s assets will be paid for by the owner/contractor.
2. Both hot and cold water pipes are to be tested to 1500kPa pressure.
3. Any external cladding system must be completed before a pre-lining inspection for the affected wall can take place.
4. The owner/builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey. NOTE: established fences are not necessarily on the boundary.
5. Plan notes take precedence over general specifications.
6. All work is to be undertaken in accordance with a section 221 consent notice imposed under the Resource Management Act. Resource Consents relevant to this property are listed.

Building Consent Addendum to 250084

Application	Building Consent No. 250084
ACW Construction Ltd	
14 Tyne Street	
Mt Maunganui	
Tauranga 3116	

Project	
Description:	New (& prebuilt) House, Unit, Bach, Crib, Town House etc.
	Being Stage 1 of an intended 1 Stages
	3 bedroom dwelling.
Intended Life:	Indefinite, but not less than 50 years
Intended Use:	Detached dwellings
Estimated Value:	$418,000
Location:	62 Awanui Drive, Waikanae
Legal Description:	LOT 2 DP 578379
Valuation No:	1495104802

Specific requirements

1. Ground bearing must be reconfirmed on site following excavation but prior to placing of concrete and reinforcing.
2. Names and registration numbers of the plumber and drainlayer are required before work commences.
3. A certifying plumber/drainlayer is to complete the attached producer statement forms and return to Council. Also provide a neat `as built` drainage plan showing sewer, stormwater and water.
4. The owner/builder must obtain a copy of the survey plans produced and certified by a Licensed Cadastral Surveyor with confirmation that the height of the finished floor level is at or above Q100 hazard. The Q100 hazard level should be measured to the underside of floor joists or underside of the foundation slab. This documentation must be provided to the council before the concrete slab is poured or once the bearers are in place, but prior to floor joist construction.

KAPITI COAST DISTRICT COUNCIL

Consent No: 250084 Building Category: R1

Site Address: 62 Awanui Drive, Waikanae

Owner/Agent: ACW Construction Ltd

Inspections

The following inspections are required:

1	Piles	Ground bearing must be reconfirmed on site following excavation but prior to placing of concrete and reinforcing.
1	Subfloor	
1	Drainage	
1	Preline Building	
1	Postline / Wet area Pre Application	
1	Pre Wrap	
1	Pre Clad	
1	Preline Plumbing	
1	Final Inspection	
9	Total Inspections	

Residential Documentation

1	Application for CCC	
1	Electrical safety certificate - Electrician	
1	Electrical safety certificate - Inspector	
1	As-built drainage plan	
1	Drainage (Form 126) for stormwater & private Sewer installation	
1	Plumbing (Form 125) for pressure test and installation piped services	
1	Construction review PS4 statement for structural engineering	Stormwater OSSW disposal system
1	Surveyors report	Licensed Cadastral Surveyor to confirm that the height of the finished floor level (FFL). Verifying FFL is above Q100 hazard
1	Record of Work	
1	Window manufacturers producer statement	

Building Practitioners

1	Designer 1	LBP - Design -Uros Plajh
1	Designer 2	CPEng - Hamish Wells
1	Carpentry 1	
1	Foundations 1	
1	Roofing 1	
1	Plumber	
1	Drainlayer	
1	Electrician	

BC250084
Received by
Kapiti Coast District Council
06/03/2025

APPROVED BY
BUILDING
jasona
OFFICER
10/04/2025



STAGE: PERMIT

CONTENTS:

1	PLAN NOTES
2	SITE PLAN
3	TOPOGRAPHICAL PLAN
4	DRAINAGE PLAN
5	BEDDING AND BACKFILLING
6	ROOF DRAINAGE PLAN
7	FOUNDATION PLAN
8	FRAMING PLAN
9	FLOOR PLAN
10	ELEVATIONS
11	ELEVATIONS
12	JOINERY SCHEDULE
13	CROSS SECTION AA
14	CROSS SECTION BB
15	ROOF PLAN
16	TRIMMING STUDS
17	FIXING CHARTS
18	TOP PLATE JOINTING
19	BRACING PLAN
20	TOP PLATE CONNECTIONS
21	ELECTRICAL PLAN
22	FOUNDATION DETAILS
23	STEPS DETAILS
24	CLADDING DETAILS
25	CLADDING DETAILS
26	ROOF DETAILS
27	ROOF DETAILS
28	VELUX DETAILS
29	JOINERY DETAILS
30	JOINERY DETAILS
31	WET AREA DETAILS
32	HWC DETAILS

BOUNDARY LINES
The Owner/Builder is responsible for clearly defining the site boundary lines and pegs.This may require a survey.
NOTE: established fences are not necessarily on the site boundary.

Noisy Equipment
It is the responsibility of the owner to ensure that no work with noisy equipment shall be carried out before 7:30 a.m. or after 6 p.m. Monday to Saturday. During the week there may be workers on site from 6:30 a.m. quietly preparing for work. Work with noisy equipment is not permitted on Sundays or public Holidays.

idesignarchitecture

The following design elements have been specified by other designers:

- Truss Design / Placemakers

www.A1homes.co.nz

All documentation copyright to A1 Homes NZ Ltd

Proposed New Home for:
Brad & Vanessa Jefferies

Job no: **AW611P**

Address:
62 Awanui Drive
Waikanae

Date: 21/02/2025

A1homes

Timber Subfloor Foundation (SG8)

140x45 H1.2 floor joists @ 450max crs, min 300 long flitch block nailed to side of joist @ joints (min 150 lap each way), joists supported over bearer. Joist/Bearer connection - 2/100x3.75 skewed nails or 3/90x3.15 power driven skewed nails.

R1.8 EXPOL Black UnderFloor Insulation (EPS), 60mm thick.

FIXINGS: Non corrosive nylon fixings with a stainless steel nail are used to fix EXPOL panels in place (All fixing components are supplied by EXPOL)

125 H5 piles spaced as per NZS3604 table on sheet 8.
2/140x45 H3.2 bearers stagger nailed together @ 270crs with 100mm galv nails.
Ordinary pile to bearer fixing 2 wire dogs + 2/100mm skew nails (cantilever piles use 6kN kit) (anchor/braced piles use 12kN kit).

3.6mx1.2m 20mm Strandfloor particleboard flooring, keep edge of sheet in from exterior frame 10mm. Nail sheet perimeter @ 150crs, nail centres @ 300crs.
Wet Areas: 3x coats of polyurethane to particleboard flooring.
Installed and finished to the latest manufacturers specifications.
- Where maintenance of an impervious coating cannot be assured in wet areas, 19mm H3.2 construction ply shall be used

rs100x25 H4 base boards with max 20mm gap between boards.

External Walls (SG8)

90x45 H1.2 frame + 90x45 top plate, studs @ 600crs max, nogs @ 800crs.

James Hardie Scyon Linea Weatherboard:
The following framing must be provided for cavity construction method:
• Double studs are required at internal corners.
• Extra packers may be required at external corners.
• Extra studs are required for aluminium internal corner sections.

MARSHALL WATERPROOFING Tekton building wrap to all exterior frames

Standard 10mm GIB linings throughout, except wet areas. Fixed to comply with the latest Winstones GIB Manual - level 4 paint finish

Wall framing behind cavities
Where stud spacing's are greater than 400 mm, and flexible wall underlay's only are used, an intermediate means of restraining the flexible wall underlay and insulation from bulging into the drained cavity shall be installed.
An acceptable method to achieve this is using one of the following:
• intermediate cavity batten between the studs.
• 75mm galvanised mesh.
• Polypropylene tape or galvanized wire at 300 mm centres fixed horizontally and drawn taut

Bottom plate fixing - Hiandri packers:
Installed to the latest Manufacturers specifications.
A timber floor may support an additional timber floor, and HIANDRI packers may be installed on both floors.
All plates are to be fixed down at 600mm crs using a 125mm long Type 17, 14 gauge Bugle or Hex head screw. Position as close as practical to a stud supported on a HIANDRI packer.
All bottom plates, whether load-bearing or not, require a joist or solid blocking directly underneath them for screw fixing.

Exterior Cladding

James Hardie 180 LINEA weatherboards installed, flashed and finished to the latest James Hardie specifications and in accordance with NZBC: E2/AS1 External Moisture.
Merchant to include all flashings & fixings as required by cladding system.

Cavity battens (ex50x20 H3.1 timber cavity battens fixed to studs):
• be minimum 18mm thick.
• be minimum as wide as the width of studs.
• be fixed by the cladding fixings to the main framing through the building underlay.
• until claddings are fixed the battens need only to be tacked to framing. (Batten fixing is required temporarily to keep them straight on the wall during construction.)
The cavity battens are installed as described below:
• Fix cavity battens to studs at maximum 600mm centres.
• Battens should be fixed with 40 x 2.8mm nails at 800mm centres maximum

External Joinery

Aluminium joinery installed to comply with NZBC: E2/AS1.
Pre-primed jambs, architraves.
Approved window sealing tape to all openings.
Protecto Tape flashing tape over flashing fixings. Do not fix cladding through flashings.
Glazing to comply with NZS:4223:2008/2016 amendments.

Internal walls (incl. LBW) (SG8)

90x45 H1.2 frame + 90x45 top plate, studs @ 600crs max, nogs @ 800crs.
Standard 10mm gib linings throughout, except wet areas. Fixed to comply with the latest Winstones Gib Manual.- level 4 paint finish
Bottom plate fixings - Hiandri packers:
Installed to the latest Manufacturers specifications.
Timber: as per external walls

Wet Areas

Floor finish: Refer to Floor Plan, 'Floor Finishes Key'
Non-slip vinyl lining over sealed floor. Minimum slip resistance co-efficient for level surface between 0.25 - 0.50 acceptable in accordance with NZBC: D1/AS1 Access.
Option 1 - Cove vinyl up wall 100mm, fix skirting or vinyl smooth edge to wall junction
Option 2 - Waterproof seal vinyl to edge of painted skirting, contractor to comply with NZBC: E3/AS1 Internal Moisture.

Wall & Ceiling finish: BATHROOM & ENSUITE
GIB Aqualine: 10mm to walls and 13mm to ceilings 1/coat GIB Sealer with 2/coats semi-gloss or gloss, acrylic enamel paint

Ceilings (SG8)

Rondo battens on clips fixed to trusses as per manufacturers specifications @ 600crs.
Ensure battens are straight prior to lining. 13mm Gib linings with 32mm x 6g GIB® Grabber™Screws @ 600crs. Glue daubs to be minimum of 200mm from centre screw. Do not screw where you glue. 32mm x 6g GIB® Grabber™ Screws @ 200crs around the perimeter. Gib stopping to level 4 paint finish. 1/850sq ceiling access to roof space.
Bottom chord restraints are required as per truss design.
Fix 90x45 runners to top of bottom chords.

BC250084
Further Information Received
10/04/2025

Roof (SG8)

Truss Design:
Pre-fabricated GANGNAIL 22.5° pitch H1.2 trusses @ 900crs synthetic breathable type self supporting underlay (DriStud RU24) laid vertically with min 150mm lap.
70x45 H1.2 purlins, spanning 900mm.
Purlin spacings - End Span - 600mm, Intermediate Span - 900ctrs.
Fixing - Type T - 1/10g self-drilling screw, 80mm long purlin/truss connection (2.4KN fixing)

Colorsteel valley trays fixed to ex 25mm H3.2 valley boards (see detail)

Longrun colorsteel roofing as per elevations. Roofing fixed with compatible roofing nails or screws and sealing washers, by qualified persons with flashings as required to all junctions - flashings fixed with compatible roofing screws and sealing washers
Fixing pattern = C2 fixing pattern = Hit 1, miss 1, hit 1, miss 2

8.4.8 Fixings: Corrugated Maxam
Fixings shall be as shown in Tables 11, 12, 14 and 15, and shall be a minimum 12-gauge screw, as shown in Figure 39, which complies with Class 4 of AS 3566: Part 2.
8.4.8.1 Fixing requirements
Fixings shall:
a) Be fixed through crests,
b) Penetrate purlins by a minimum of 40 mm for nail fixings and 30 mm for screw fixings,
c) Include sealing washers of:
i) neoprene (having a carbon black content of 15% or less by weight),
ii) profiled washer and EPDM washer where required to allow for expansion of the profiled metal roof cladding.

NZBC E2/AS1 8.4.10 Allowance for Expansion
Allowance shall be made for expansion of corrugated and trapezoidal roof cladding as shown in Table 16.
Refer also to the latest NZ metal roof & wall cladding code of practice

Insulation

R4.5C pink Batts insulation to all ceilings.
Maintain a 25mm gap clearance between the insulation and roof underlay with Insulation Guard. Notch over trusses.
R2.8W Pink Batts insulation to all 90mm exterior wall cavities. Friction fitted
R3.2W Pink Batts insulation to all 140mm exterior wall
R0.50 Joinery. (Low E_4 glass, Thermally broken frame, Argon gas)
R0.36 Velux Skylight

Soffit

4.5mm Hardiflex soffit lining fixed to 90x45 soffit bearers & 90x45 stringer at wall.
600 all round (refer roof plan), 25x19pp soffit mould.
Colorsteel Fascia & spouting with Marley Downpipe system.

Site Notes

Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building.
In suspended floor construction, firm turf and close-cut grass may remain provided that 'cleared ground level' shall be taken as the underside of soil containing organic matter.
Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor.
Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.2011

Contractor to
• confirm ground has adequate bearing to comply with NZS 3604: 2011, except in the case of SED design, or when using Firth RibRaft Floor System (refer Ribraft manual).
• locate all service connections points on site prior to commencement of works. Check invert levels or pipes and manholes.
• confirm plumbing route and fixture positions on site prior to commencement of works.
• locate all electrical and water services on site.
• confirm on site all boundary bearings, lengths & peg locations on site prior to commencement of works, to ensure house position is correct.

HIRB = Height in Relation to Boundary

Sediment Control:
• No building work will be started on this project until the construction of an approved stormwater outfall has been completed for this proposed Lot
• All erosion and sediment control structures are to be inspected and maintained daily
• Prevent any backfill or debris from washing onto council or neighbouring properties
• All ground cover vegetation outside the immediate building area to be preserved during the building phase
• All erosion and sediment control measures are to be installed prior to commencement of earthworks
• Stockpiles of clay and materials are to be covered with impervious sheeting
• Roof water downpipes to be connected to the main stormwater system as soon as roof sheathing & spouting is installed

NZBC F5:
Construction and Demolition Hazards
Acceptable Solution F5/AS1

1.0 Work-Site Barriers
1.0.1 The necessity for barriers will depend mainly on the site location. The need will be greater in areas with high levels of pedestrian traffic (i.e. in Central Business Districts), than in industrial or rural areas.
Barriers are not necessary for domestic dwellings up to 2 storeys above ground level unless specific hazards exist.
At all work-sites hazard evaluation will take account of:
1. Pedestrian counts adjacent to the site.
2. Car parking adjacent to the site.
3. Location of neighbouring buildings.
4. Presence of neighbouring work-sites or recreation areas.
5. Proximity to schools or early childhood centres.
6. Proximity to housing.
7. The depth of a water hazard.
8. The period of time for which ponded water will be present.
9. The accessibility and 'visibility' of the site.

1.0.2 If a work-site is not completely enclosed, and unauthorised entry by children is likely, it is acceptable for specific hazards to be fenced only when workers are absent from the immediate vicinity.

1.1 Site Fences and Hoardings
1.1.1 Fences and hoardings shall extend at least 2.0 m in height from ground level on the side accessible to the public.
1.1.2 An acceptable fence may be constructed with galvanised chainlink netting having a maximum sized grid of 50 mm x 50 mm. Post spacing shall be a maximum of 2.5 m, and the gap between the bottom of the fence and ground no greater than 100 mm.

Finished Floor Level (FFL) shall be:
a) For sites level with or above the road, no less than 150 mm above the road crown on at least one cross-section through the building and roadway
b) For sites below the road, no less than 150 mm above the lowest point on the site boundary
c) FGL to be a minimum of 225mm below FFL with a fall away from the building
d) FFL to be a minimum of 150mm above paving level at foundation, with a fall away from building

ARCHITECTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ALL RELEVANT PRODUCER STATEMENTS AND MANUFACTURERS SPECIFICATIONS.

DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional.

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PLAN NOTES

Scale:
Rev: **A**
Sheet no: **1**
Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

www.A1homes.co.nz

Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

BC250084
Received by
Kapiti Coast District Council
06/03/2025

Building Height Restrictions

9. The Covenanter will not allow to be built (or permit to remain) on Lot 2 or Lot 3 of the Burdened Land any building which is more than two stories and/or exceeds 8.5 meters in height measured from Ground Level.

10. Ground Level means the finished level of the ground at the time of the completion the subdivision in which the titles were first issued for the burdened and benefited lots on DP 578379.

11. Height will be calculated by the Rolling Height Method being vertical distance between ground level at any point and the highest part of the building immediately above that point where the maximum height plane exactly mimics the ground plane over the whole site.

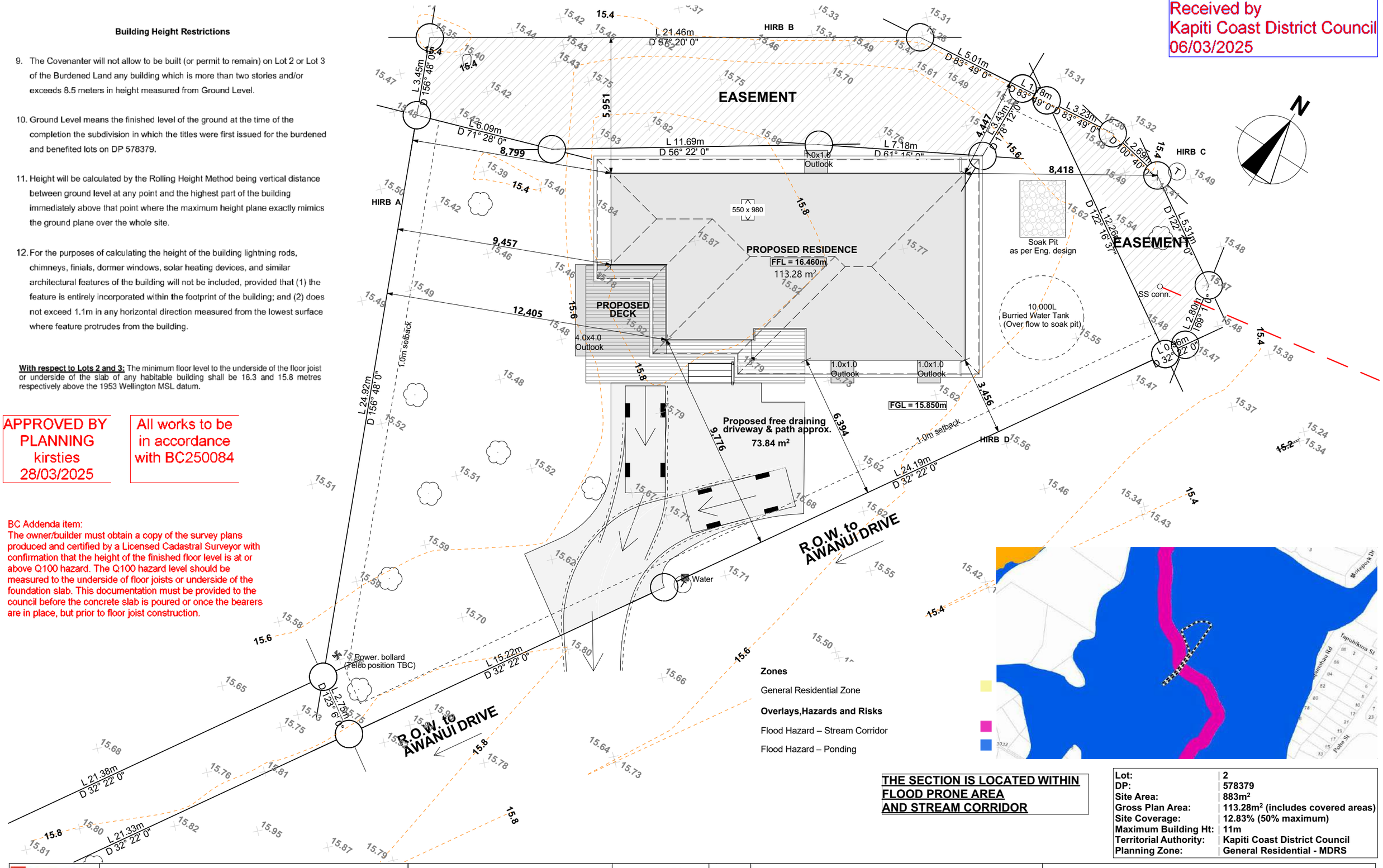
12. For the purposes of calculating the height of the building lightning rods, chimneys, finials, dormer windows, solar heating devices, and similar architectural features of the building will not be included, provided that (1) the feature is entirely incorporated within the footprint of the building; and (2) does not exceed 1.1m in any horizontal direction measured from the lowest surface where feature protrudes from the building.

With respect to Lots 2 and 3: The minimum floor level to the underside of the floor joist or underside of the slab of any habitable building shall be 16.3 and 15.8 metres respectively above the 1953 Wellington MSL datum.

APPROVED BY PLANNING
kirsties
28/03/2025

All works to be in accordance with BC250084

BC Addenda item:
The owner/builder must obtain a copy of the survey plans produced and certified by a Licensed Cadastral Surveyor with confirmation that the height of the finished floor level is at or above Q100 hazard. The Q100 hazard level should be measured to the underside of floor joists or underside of the foundation slab. This documentation must be provided to the council before the concrete slab is poured or once the bearers are in place, but prior to floor joist construction.



Zones

General Residential Zone

Overlays,Hazards and Risks

Flood Hazard – Stream Corridor

Flood Hazard – Ponding

THE SECTION IS LOCATED WITHIN FLOOD PRONE AREA AND STREAM CORRIDOR

Lot:	**2**
DP:	**578379**
Site Area:	**883m²**
Gross Plan Area:	**113.28m² (includes covered areas)**
Site Coverage:	**12.83% (50% maximum)**
Maximum Building Ht:	**11m**
Territorial Authority:	**Kapiti Coast District Council**
Planning Zone:	**General Residential - MDRS**

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SITE PLAN

Scale: 1:150
Rev:
Sheet no: **2**
Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

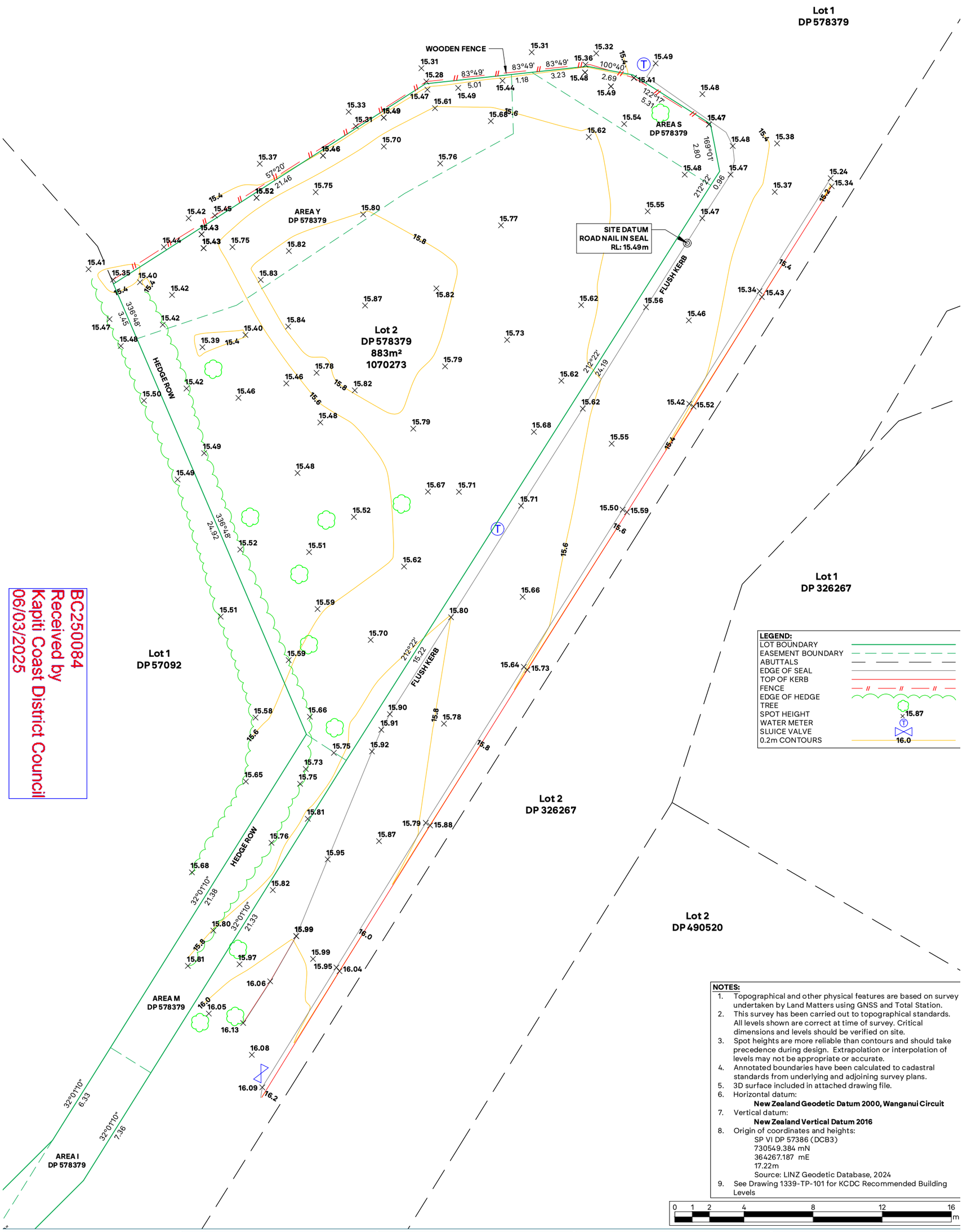
Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
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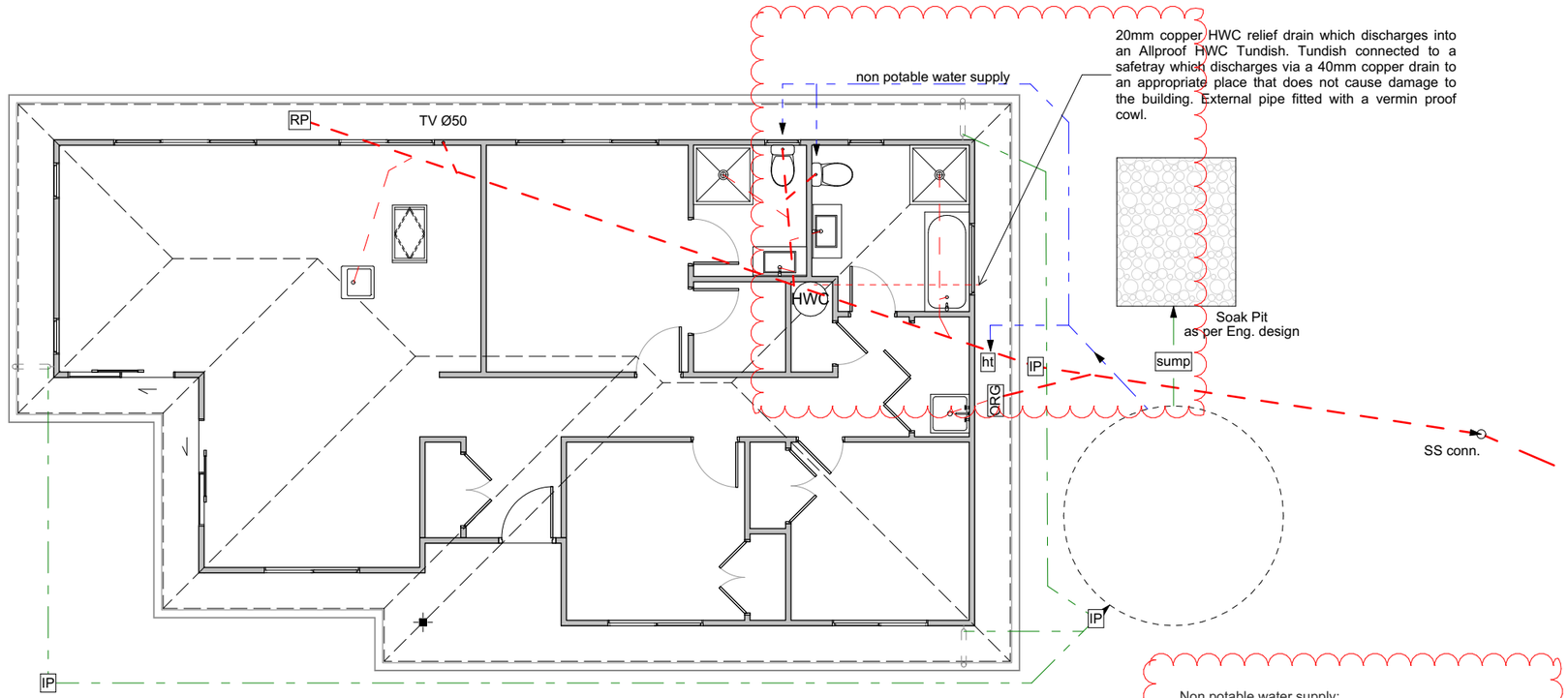
NOTES:

1. Topographical and other physical features are based on survey undertaken by Land Matters using GNSS and Total Station.
2. This survey has been carried out to topographical standards. All levels shown are correct at time of survey. Critical dimensions and levels should be verified on site.
3. Spot heights are more reliable than contours and should take precedence during design. Extrapolation or interpolation of levels may not be appropriate or accurate.
4. Annotated boundaries have been calculated to cadastral standards from underlying and adjoining survey plans.
5. 3D surface included in attached drawing file.
6. Horizontal datum:
   New Zealand Geodetic Datum 2000, Wanganui Circuit
7. Vertical datum:
   New Zealand Vertical Datum 2016
8. Origin of coordinates and heights:
   SP VI DP 57386 (DCB3)
   730549.384 mN
   364267.187 mE
   17.22m
   Source: LINZ Geodetic Database, 2024
9. See Drawing 1339-TP-101 for KCDC Recommended Building Levels

0 1 2 4 8 12 16 m

PREPARED BY: LAND MATTERS	CLIENT: ACW CONSTRUCTION LTD T/A A1HOMES KAPITI/HOROWHENUA	PROJECT: AW611P 62 AWANUI DRIVE	DRAWING TITLE: TOPOGRAPHICAL SURVEY	SURVEYED BY MK 13/11/24 DESIGNED BY CHECKED BY EP 14/11/24 DRAWING BY MK 14/11/24	DATE 14/11/2024 PROJECT NO 1339 SCALE 1:200 A3 1:100 A1 DRAWING NO. REV

BC250084
Further Information Received
10/04/2025



Downpipe leaf guards to be used to prevent debris in water tanks

Water tank - information:
A fill valve to be used in order to facilitate trickle feed top up from the Toby when the static tank water level is less than a 1000L

Non potable water supply:
1. All non-potable water outlets to have signs as per G12/AS1 section 4.2 and as required by F8
2. All non-potable pipe work is to be clearly identifiably (i.e. Lilac colour)
3. Non-potable water is to be supplied to at least one external hose tap and to all WCs

4.2 Outlet identification

4.2.1 NZBC F8 requires signs to be provided to all potential hazards. Outlets for non-*potable water* shall be identified non-*potable*, by displaying the safety sign shown in Figure 3.

Figure 3: Non-potable Water Sign
Paragraph 4.2.1



Construction Notes:
NZBC G13/AS3
Plumbing to AS/NZS:3500.2.2 (min 1:60 pipe gradient) by qualified tradesman.
Contractor to locate all service connections on site prior to earthworks confirm all boundary setbacks & restrictions comply with current regulations prior to commencement of foundations.
All waste pipes PVC. Sizes, fall, venting & discharge to be confirmed by NZ qualified plumber. Confirm positions of available services cabling etc on site prior to any excavation

Water Supply:
Internal water pipes to Polybutylene.
All pipework and pipes exposed to freezing to be lagged with closed cell foam
- Closed cell foam polymer insulation or fibre glass insulation which is preformed to the shape of the pipe and not less than 13 mm thick, is acceptable material for preventing pipes less than or equal to 40 mm diameter from freezing. Any insulation material that absorbs moisture shall be protected in a waterproof membrane.

Fixture unit rating: 20 units
Bathroom Group- 6 (x2)
Laundry tub - 5
Kitchen sink - 3

Table 3.9.3.1 — Size and rating of vents

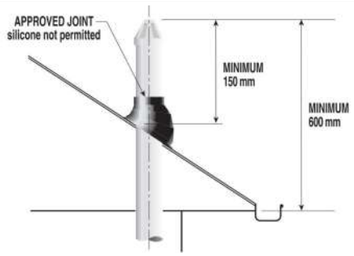
Size of vent pipe DN	Fixture units discharging to drain		Vent rating
40	> 1	≤ 10	0.5
50	> 10	≤ 30	1
65	> 30	≤ 175	2
80	> 175	≤ 400	3
100	> 400	≤ 600	6

TV min 50mm Ø NZS3500

Plumbing Legend as per AS/NZS 3500 part 2 : 2021

Symbol	Item	Symbol	Item
IP	Inspection point		DN100 uPVC SS pipe, DN100 min water closets (ref specs) min 1:60 gradient
	Downpipe		DN100 uPVC SW pipe, min 1:120 gradient
HT *	Hose Tap		min uPVC fixture waste pipe sizes: DN40 basins, single head showers, baths, sinks, dishwasher & ldy tubs, DN50 multiple heads showers, sinks + dishwashers, Ldy tub + washing machine (combined) DN65 unvented branch drains exceeding 2.5m long (max 5 fixture unit rating) DN65 to all wastes discharging directly into drain under slab min 1:40 gradient. 20mm HWC vent drain (copper)
org	Overflow relief gully		
oTV	Terminal vent		

Water supply pipe (from water tank) = DN20



NZBC: E1 Surface Water
3.7 Access for maintenance
3.7.1 Access for maintenance shall be provided on all drains. Access is to be achieved via an inspection point, rodding point, inspection chamber or access chamber, complying as appropriate with Figures 10, 11 or 12.
3.7.2 Points of access shall be spaced at no further than:
a) 50 m where rodding points are used.
b) 100 m where inspection points, inspection chambers or access chambers are used.
3.7.3 Points of access are required at:
a) Changes in direction of greater than 45°,
b) Changes in gradient of greater than 45°,and
c) Junctions of drains other than a drain, serving a single downpipe, that is less than 2.0 m long.
3.7.4 Inspection chambers or access chambers (see Figures 11 and 12) shall be provided where changes in both gradient and direction occur and where either is greater than 22.5°.
3.7.5 Where the depth to the invert of the drain exceeds 1.0 m, an inspection chamber is not acceptable and an access chamber shall be used.

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DRAINAGE PLAN

Scale:
Rev: **A**
Sheet no: **4**
Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

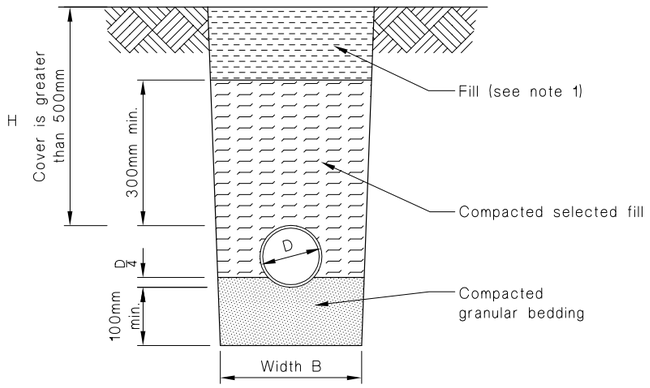
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Client Details:
Brad & Vanessa Jefferies

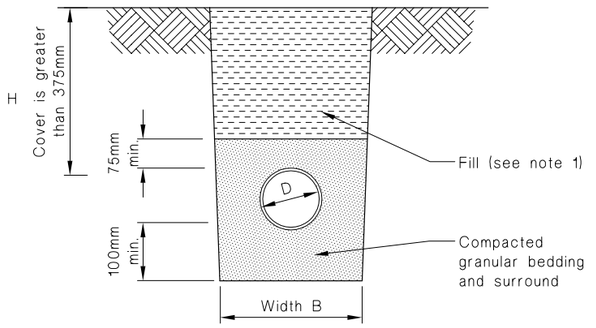
Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

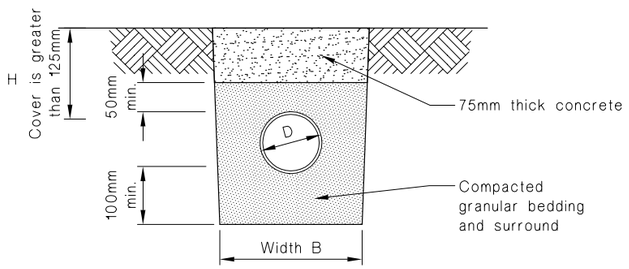
Figure 7: **Bedding and backfilling**
Paragraphs 2.1.1, 5.2.1, 5.3.1 and 5.4.1



(a) Cover greater than 500 mm



(b) Cover greater than 375 mm



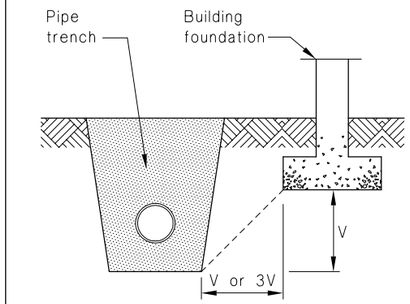
(c) Cover greater than 125 mm

NOTE:
1. Fill shall be:
-Ordinary fill where drains are located below gardens and open country.
-Compacted selected fill where the drains are located below residential driveways and similar areas subject to light traffic.

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06/03/2025

Proximity of trench to building
3.9.7 Proximity of trench to building
For light timber frame and concrete masonry buildings founded on good ground and constructed in accordance with NZS 3604 or NZS 4229, pipe trenches which are open for no longer than 48 hours shall be located no closer than distance 'V' (see Figure 14) to the underside of any building foundation. Where the trench is to remain open for periods longer than 48 hours, the minimum horizontal separation shall increase to 3V in all ground except rock.

Figure 8: **Relationship of pipe trench to building foundation**
Paragraph 5.6.1



Minimum horizontal seperation shall be V or 3V dependant on length of time trench open, see Paragraph 5.6.1

NZBC: E1 Surface water:
3.9 Bedding and backfilling
3.9.1 General
NZBC B1 requires all drains be constructed to withstand the combination and frequency of loads likely to be placed upon them without collapse, undue damage, undue deflection or undue vibration.
In addition, adequate support needs to be provided to prevent gradients becoming less than those required as a result of:
a) Differential settlement, or
b) Deflection of an unsupported span.
3.9.2 Bedding and backfilling
Figure 13 gives acceptable solutions for the bedding and backfilling of the drainage pipes
except where:
a) The trench is located within or above peat, or
b) Scouring of the trench is likely due to unstable soils, or
c) The horizontal separation between any building foundation and the underside of the pipe trench is less than that required by Paragraph 3.9.7, or
d) The cover H to the pipe is more than 2.5 m.
3.9.3 Trench slope
Where the slope of the trench is 1 in 8 or greater, anti-scour blocks shall be provided.
These anti-scour blocks shall be:
a) Constructed from 150 mm thick concrete (17 MPa),
b) Keyed into the sides and floor of the trench by 150 mm,
c) Extended to 300 mm above the drain or to ground level where the drain cover is less than 300 mm, and
d) Spaced at:
i) 7.5m centres for trench slopes between 1 in 8 and 1 in 5, or
ii) 5.0m centres for trench slopes greater than 1 in 5.
3.9.4 Trench width
The width B of the trench shall be no less than the pipe diameter D plus 200 mm.
Trench width at the top of the pipe shall be no more than 600 mm unless the pipe(s)
in the trench are covered with concrete, as shown in Figure 13 (c).
3.9.5 Acceptable materials
Acceptable fill materials shown in Figure 13 are:
a) Bedding material of clean granular noncohesive material with a maximum particle size of 20 mm, or
b) Selected compacted fill of any fine-grained soil or granular material which is free from topsoil and rubbish and has a maximum particle size of 20 mm, or
c) Ordinary fill which may comprise any fill or excavated material.
3.9.6 Placing and compacting
a) Granular bedding and selected fill shall be placed in layers of no greater than 100 mm loose thickness and compacted.
b) Up to 300 mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact
layer without obvious voids.
c) More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg.

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BEDDING AND BACKFILLING

Scale:	Sheet no:
Rev:	5
Design: A1	Drawn: MPP/TN	Check: UP	LBP: UP	Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	C	N1	3

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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**

KH110a

Downpipe calculations: NZBC:E1
Plan area of roof per single downpipe for roof pitch 0-25° = 85m² of roof area for (minimum internal size) DN74 downpipe.

Plan Roof area 1 =143.14m²
Calc. - Plan Roof area/area served by DP = DP's required
143.14/ 85 = 1.68 = 2 DP

Therefore minimum number of downpipes required = 2
Number of DP's provided = 3

Roof gutter profile calculations:
Metalcraft Quarter Round Gutter
Cross sectional area of gutter (CSAG) = 4880mm². 40m² of plan roof area (based on 100mm/hr.)

Rainfall intensity = 80mm/hr.

Plan Roof area 1= 143.14m²
Modified Plan Roof Area = 143.14 x 80 / 100 = 114.51 m²
Number of downpipes required to accomodate Modified Roof Area:
114.51 / 40 = 2.86 (3 DP)

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06/03/2025

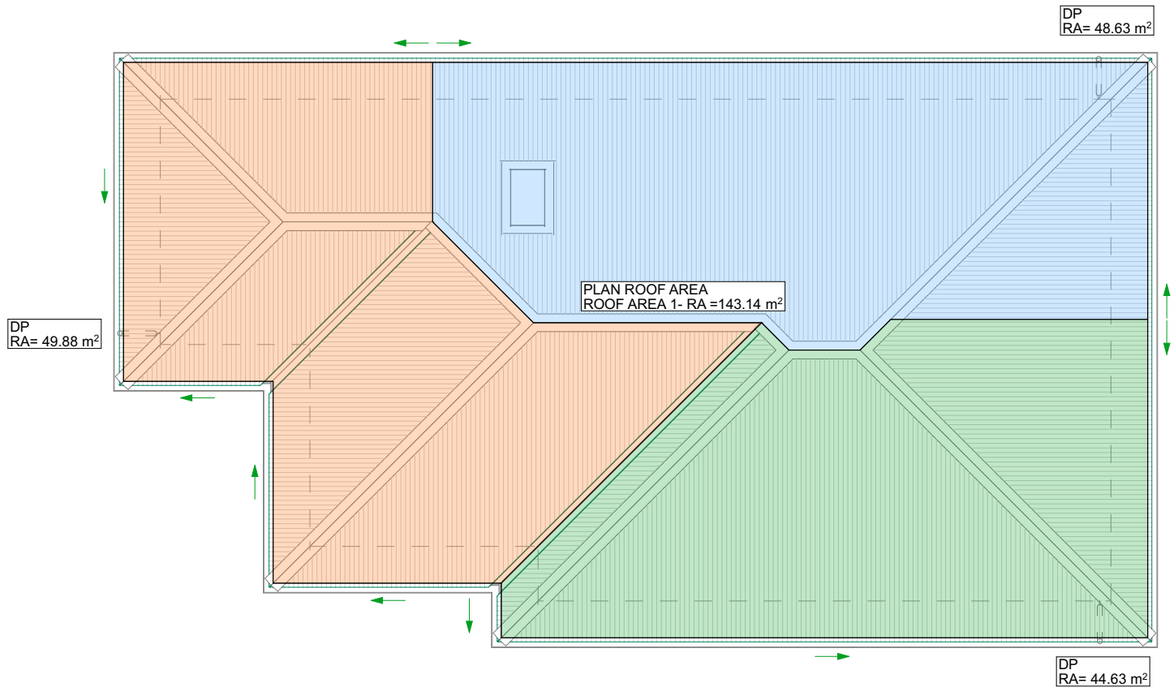


Table 5: Downpipe Sizes for Given Roof Pitch and Area
Paragraph 4.2.1

Downpipe size (mm) (minimum internal sizes)	Roof pitch 0-25°	25-35°	35-45°	45-55°
	Plan area of roof served by the downpipe (m²)			
63 mm diameter	60	50	40	35
74 mm diameter	85	70	60	50
100 mm diameter	155	130	110	90
150 mm diameter	350	290	250	200
65 x 50 rectangular	60	50	40	35
100 x 50 rectangular	100	80	70	60
75 x 75 rectangular	110	90	80	65
100 x 75 rectangular	150	120	105	90

Figure 15: Cross-sectional Area of External Gutter
Paragraphs 5.1.2 and 5.1.3

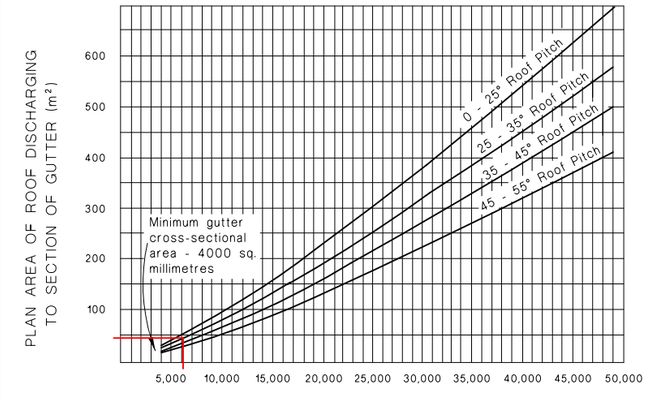
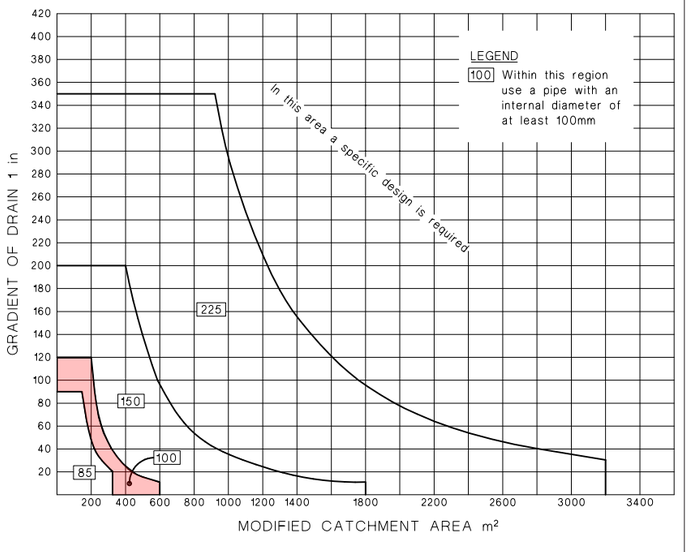


Figure 3: Sizing of Surface Water Drains
Paragraphs 3.2.2 and 3.2.3



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ROOF DRAINAGE PLAN

Scale: 1:100 | Sheet no: 6
Rev:
Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
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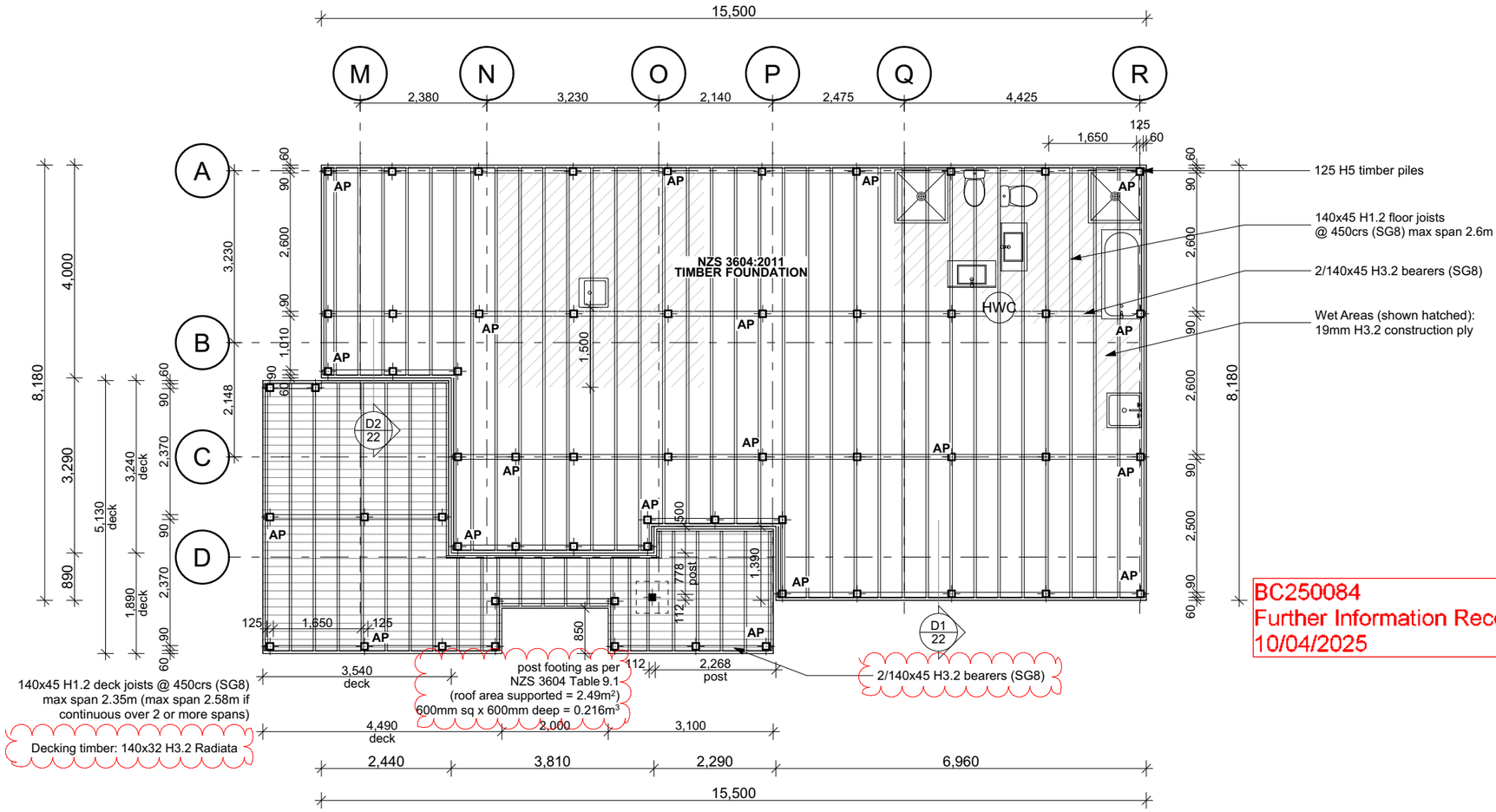
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Ground bearing must be reconfirmed on site following
excavation but prior to placing of concrete and reinforcing.

BC250084
Further Information Received
10/04/2025

Cautionary Notes:
Always cross reference the foundation plan with the framing plan prior to setting out

The contractor shall accurately locate the position of all public drains on site prior to starting work, If any discrepancies are found in these drawings then the contractor must contact A1 Homes before proceeding with any further works.

Construction Notes:
Floor joists under walls
• Where a loadbearing wall runs parallel to the line of floor joists beneath, it shall be supported by a pair of joists. Such a pair of joists may be separated by solid packing not exceeding 50 mm thick or half the thickness of the wall above, whichever is the lesser, at not more than 600 mm centres.

• Where a loadbearing wall runs at right angles to the line of joists, such a loadbearing wall shall be located at not more than 200 mm centre-tocentre from a bearer or subfloor loadbearing wall

• Where a non-loadbearing wall:
(a) Which contains wall bracing elements runs parallel to the line of floor joists beneath, it shall either:
(i) Be over a joist; or
(ii) Be supported by solid blocking between the joists on either side of the wall in accordance with 7.1.3.6;
or
(b) Does not contain a wall bracing element it shall be within 150 mm of a joist measured between centre lines.

7.1.3.6
Solid blocking shall be 90 mm x 45 mm cut neatly between joists, with its top flush with the top of the joists, set at each end of the wall above, at each side of any door openings, and at not more than 1.2 m centres elsewhere.

• Materials for piles
Timber piles shall comply with NZS 3605 and be treated to H5 of NZS 3640.
Where a timber pile has been cut after treatment, the well dried cut surface shall be brush-treated with a liberal application of either creosote, zinc naphthenate, TBTO (bis-(tri-n-butyltin) oxide) or TBTN (bis-(tri-n-butyltin)naphthenate).
The surface shall not be cut for fixings and other purposes closer than 150 mm to the finished ground level.

Confirm layout & fittings of kitchen & bathrooms etc before foundation commence

Lateral support of floor joists
7.1.2.1
• Lines of lateral support to floor joists as specified in 7.1.2.2 shall be provided within 300 mm of the following locations:
(a) Ground floor joists: Along all subfloor lines of horizontal support (i.e. over bearer lines); 2x story plans only>(b) Other floor joists: Along the line of each wall that contains a wall bracing element in the storey below.

7.1.2.2
A line of lateral support to floor joists shall consist of:
(a) At the ends of joists: A continuous boundary joist 25 mm thick and the same depth as the floor joists; or
(b) In any location including at joist ends: Full depth blocking or strutting complying with 7.1.2.4 between adjacent floor joists at not more than 1.8 m maximum centres provided that:
(i) There shall be solid blocking between the 2 edge pairs of joists;
and
(ii) Additional solid blocking shall be provided where required by 7.1.2.4.

7.1.2.3
In addition to any lateral support required by 7.1.2.1, floor joists having a span of over 2.5 m and a depth of 4 or more times their thickness shall be laterally supported by continuous blocking or strutting complying with 7.1.2.4 at mid-span.

7.1.2.4
Full depth blocking or strutting required by 7.1.2.2(b) or 7.1.2.3 shall be either:
Timber blocking 35 mm thick, the same depth as the joists, neatly cut between adjacent joists; or
Herringbone strutting consisting of 2 pieces of 35 mm x 35 mm timber set diagonally in opposite

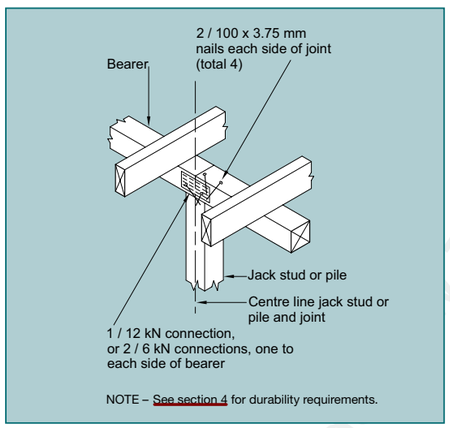


Figure 6.19 – Joints in bearers (see 6.12.7.1 and 6.12.7.2)

Note: Builder to ensure that positioning of joists will not conflict with shower and wc waste pipes.

NZS 3602:2003 Protection of interior flooring 110.3.1 Floor coverings in "wet areas" such as laundries, bathrooms, kitchens and toilets shall be as set out in E3/AS1. Where maintenance of an impervious coating cannot be assured in wet areas plywood or timber flooring that has been treated to a minimum of H3.1 shall be used.

- Considerable undetected water damage to particleboard and surrounding wall floor framing can occur under baths used as a shower and under certain types of shower trays. It is recommended that H3 treated plywood be used under such fittings where maintenance cannot be assured. Adjoining timber framing and timber supporting these fittings should be treated.

Areas in question have been highlighted with angle hatch, exact locations to be confirmed on site

Joints in bearers shall be made only over supports but shall not occur where the bearer is fixed directly to an anchor pile or a braced pile.

A joint in a bearer shall be made over a support with a connection having a capacity of:
(a) Not less than 12 kN in tension or compression along the line of the bearer, or 6 kN each on both sides, if the bearer is one piece of timber; or
(b) 6 kN on one side of the joint when one laminate is continued over the support.
See figure 6.19.

Deck Bracing Calculation:
Decks projecting more than 2m from the building shall have subfloor bracing provided by anchor and/or braced piles, at half the bracing demand required by table 5.8 for "light/light/light" cladding, for 0° roof slope and for "subfloor structures".

Deck area = 28.54m²
Demand = 28.54m² x 7.5 BU/m² = 214.05BUs
1x anchor pile = 120 BUs

Total required = 2 BPs

Pile Footing Key:
All footings to have a minimum 100mm pad under pile

Ordinary piles footing sizes:
- Standard piles (non-load bearing): min 250sq x 600 deep
- Load Bearing pile: min 400sq x 600deep
- Deck piles: min 300sq x 600 deep

AP = anchor pile
(max 600mm out of the ground)
footing size: min 460ø or 400sq x 900deep

NOTE:
As per Geotechnical Analysis Assessment Report by Hamish Wells
Good ground (300kPa) is at least 600mm below EGL.
For the ordinary and anchor piles bearing is to be reconfirmed on-site after excavation but before placement of concrete.

connections to treated timber piles = type 304 stainless steel

Always cross reference the foundation plan with the floor plan prior to setting out. If any discrepancies occur contact: admin@idesignarchitecture.co.nz immediately.

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FOUNDATION PLAN

Scale: 1:100
Rev: **A**
Sheet no: **7**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

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Client Details:
Brad & Vanessa Jefferies

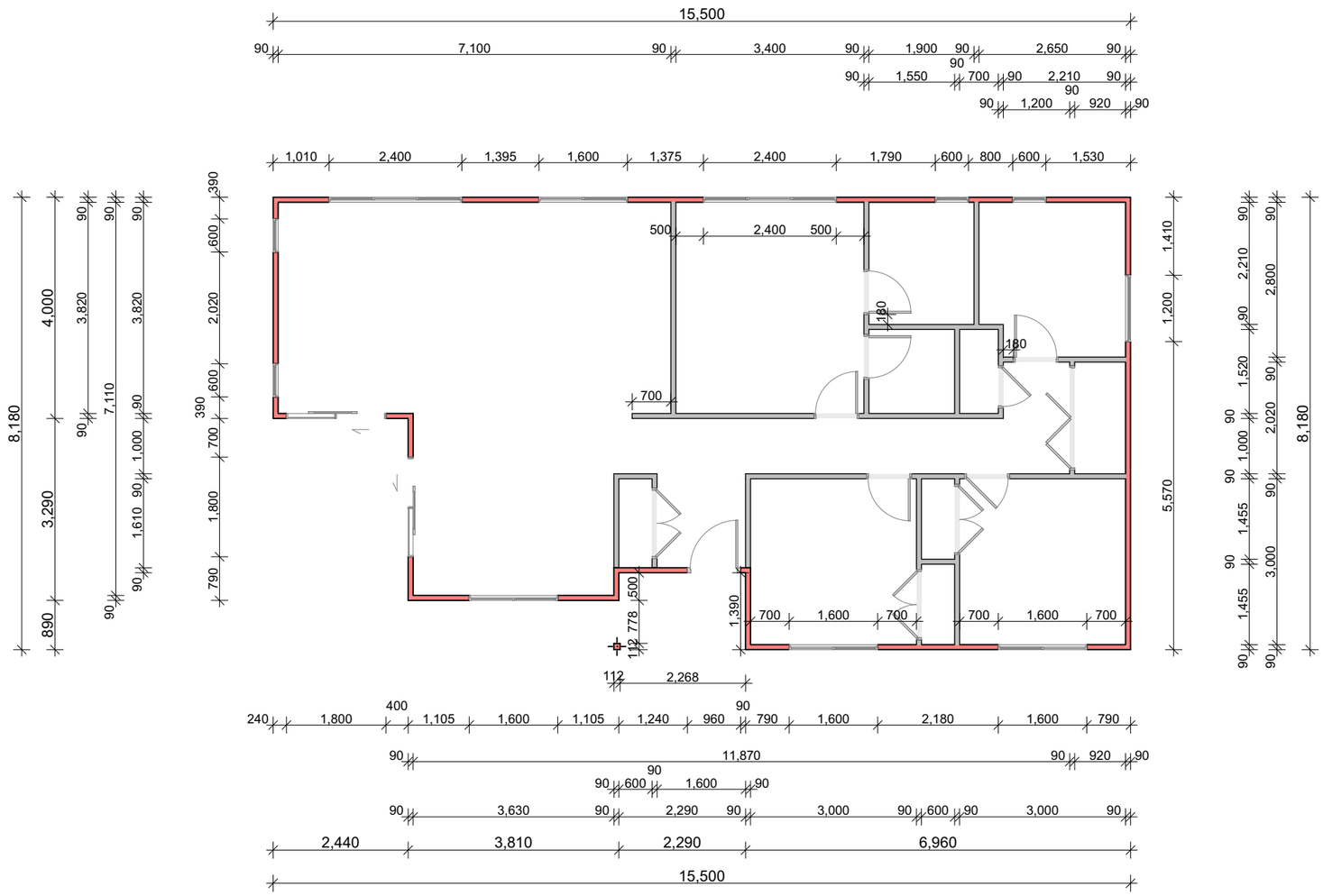
Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

Cautionary Notes:
Always cross reference the foundation plan with the framing plan prior to setting out

Joinery sizes shown are box sizes & are preliminary only.
Site measure and confirm all joinery sizes, reporting to designer any changes, PRIOR to ordering joinery. No liability shall be held by designer for incorrect supply of joinery.

Refer to all written dimensions, DO NOT scale off drawings.



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Kapiti Coast District Council
06/03/2025

Always cross reference the foundation plan with the floor plan prior to setting out.
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Note:
2420 stud ht. throughout

James Hardie Linea 180mm Weatherboard

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FRAMING PLAN

Scale: 1:100
Rev:
Sheet no: **8**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

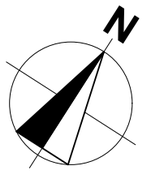
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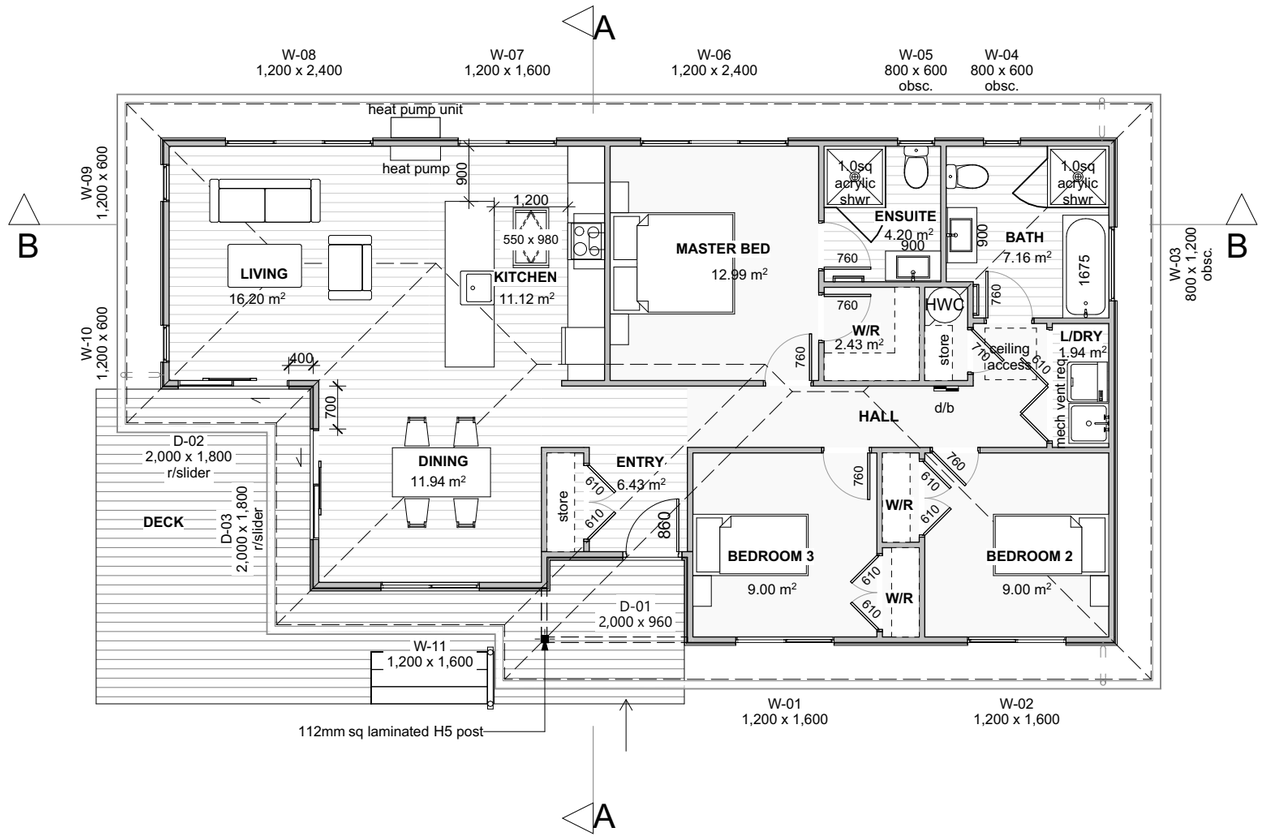
Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**

KH110a





FLOOR FINISHES:

Carpet
Master Bedroom
Bedroom 2
Bedroom 3
W/R, storage
Hall, storage

Vinyl
Living
Dining
Kitchen
Bath
Ensuite
Entry
Laundry
Storage

FLOOR AREAS:
o/frame area = 110.02 m²

CLADDING KEY:
JH Linea weatherboard

Note:
2420 stud ht. throughout

Cautionary Notes:
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Site measure and confirm all joinery sizes, reporting to designer any changes, PRIOR to ordering joinery. No liability shall be held by designer for incorrect supply of joinery.

Refer to all written dimensions, DO NOT scale off drawings.

Construction Notes:
Electric hobs with vented r/hood.
Polybutylene water supply pipes.
Hot water supply pipes shall be thermally insulated to comply with H1/AS1 5.0
Mains pressure 180L HWC with tempering valve & seismic restraint in accordance with NZBC: 2004 section G12.
The delivered hot water temperature at any sanitary fixture used for personal hygiene shall not exceed 50°C
*Check cylinder height for under stair locations

Tapered edge joints in ceilings
To reduce the risk of cracks caused by substrate movement, back-blocking of tapered edge joints is required in the following situations.
• When timber battens have been used:
Any area containing 3 or more tapered joints
• When steel battens have been used:
Any area containing 6 or more tapered joints

Please confirm layout & fittings of kitchen & bathrooms etc before foundation commences

Note:
- Kitchen layout diagramatic and only to be used for drainage reference, refer to kitchen plans for exact design.

Separation between electric hob and the Gib lined wall:
Cut out for hob: min. 55mm from back of bench top.
Overhead clearances: not less than 650mm from hob surface to range hood
Side clearances: Where dimension to any vertical combustible surface is less than 150 mm, surface shall be protected to a min. height of 150 mm above hob for full dimension (width or depth) of cooking surface area.
Protection of combustible surfaces: 5mm thick ceramic tiles or graphic glass is suitable to protect 10mm Gib board.

G3/AS1
1.1.3 Food preparation surfaces shall be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, and tiles are examples of suitable materials for these surfaces.

1.6 Wall linings
Wall linings adjacent to appliances and facilities shall have surfaces that can be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, tiles, wallboards with painted or applied impervious coatings or films, are examples of suitable materials for these surfaces.

Stairs to comply with NZBC:D1 access; main private
max 190rise, min 280 tread. Wall mounted grab rail @900ht from tread nosing

A landing min 900deep shall be provided at the top & bottom of every flight of stairs where the rise of the flight is more than 600mm. Handrails are required to one side of all stairs with 4 or more risers - NZBC D1/AS1: Access routes

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FLOOR PLAN

Scale: 1:100
Rev:
Sheet no: **9**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	C	N1	3

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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

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Further Information Received
10/04/2025

General Notes:
Any encroachments shown are to be confirmed by a registered surveyor prior to commencement of foundations. No liability shall be held by designer with this confirmation.



NORTH ELEVATION



EAST ELEVATION

With respect to Lots 2 and 3: The minimum floor level to the underside of the floor joist or underside of the slab of any habitable building shall be 16.3 and 15.8 metres respectively above the 1953 Wellington MSL datum.

Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Glazing in accordance with NZS 4223:2008/2016 plus amendments
All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery

Aluminium joinery head heights to be 2.0m
Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

HIRB = Height in Relation to Boundary

NZBC D1/AS1 Access Routes:
H3.2 timber steps and landing to all access points, H5 timber to ground (owners care)
Acceptable Slip Resistance for Walking Surfaces:
• Timber
- Uncoated profiled
Profile at right angles to direction of pedestrian traffic. Algal growth on uncoated timber walkways significantly reduces slip resistance when wet and requires regular removal, e.g. by high pressure waterblasting.

Risk Factor	Description	Risk	Score
Wind Zone	High	M	1
Number of Storeys	Single Storey	L	0
Roof/Wall Intersection Design	Fully protected (e.g. hip and gable roof with eaves)	L	0
Eaves Width	450mm - 600mm wide	M	1
Envelope Complexity	Simple rectangular with single cladding type.	L	0
Deck Design	Timber slat deck at ground floor level	L	0
		Total Score: 2	
Selected Cladding:	Fibre cement weatherboard over nominal 20mm drained cavity		

Foundation:
NZS 3604:2011 Timber Foundation

Wall Cladding:
James Hardie Linea weatherboard - 180 mm

Roof Cladding:
22.5° pitch. NZS Colorsteel MAXAM Corrugate profile

Fascia and Spouting:
Metalcraft 155 Colorsteel fascia
Metalcraft 1/4 round spouting
Marley PVC 80mmØ round downpipes

Joinery:
APL Residential suite Aluminium joinery

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ELEVATIONS

Scale: 1:100
Rev: A
Sheet no: 10

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	C	N1	3

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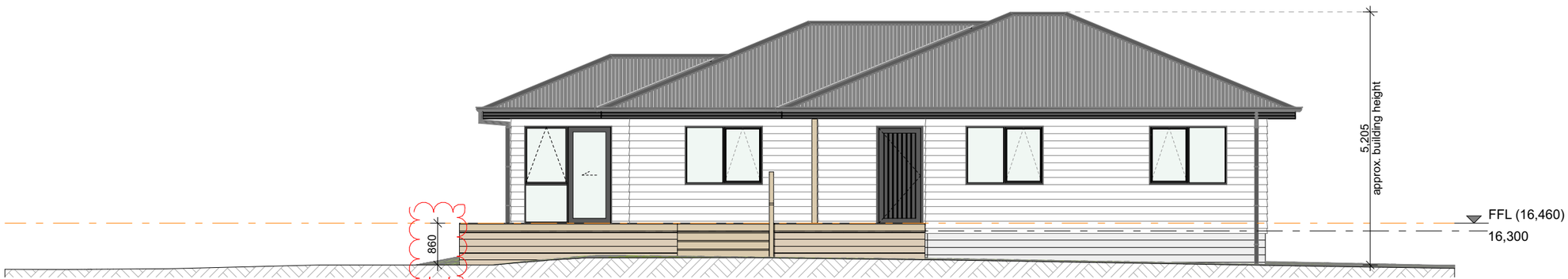
Client Details:
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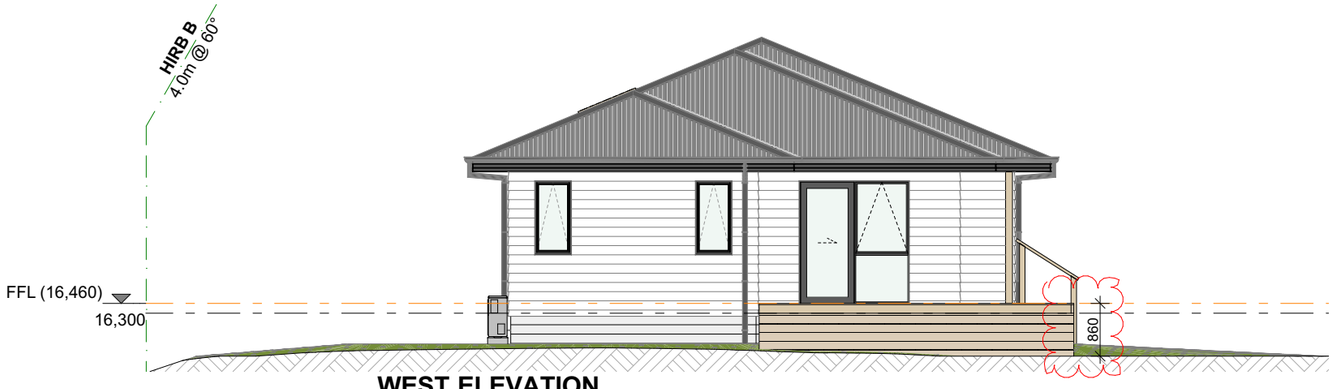
Job no: **AW611P**
KH110a

BC250084
Further Information Received
10/04/2025

General Notes:
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SOUTH ELEVATION



WEST ELEVATION

With respect to Lots 2 and 3: The minimum floor level to the underside of the floor joist or underside of the slab of any habitable building shall be 16.3 and 15.8 metres respectively above the 1953 Wellington MSL datum.

Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Glazing in accordance with NZS 4223:2008/2016 plus amendments
All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery

Aluminium joinery head heights to be 2.0m
Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

HIRB = Height in Relation to Boundary

NZBC D1/AS1 Access Routes:
H3.2 timber steps and landing to all access points, H5 timber to ground (owners care)
Acceptable Slip Resistance for Walking Surfaces:
• Timber
- Uncoated profiled
Profile at right angles to direction of pedestrian traffic. Algal growth on uncoated timber walkways significantly reduces slip resistance when wet and requires regular removal, e.g. by high pressure waterblasting.

Risk Factor	Description	Risk	Score
Wind Zone	High	M	1
Number of Storeys	Single Storey	L	0
Roof/Wall Intersection Design	Fully protected (e.g. hip and gable roof with eaves)	L	0
Eaves Width	450mm - 600mm wide	M	1
Envelope Complexity	Simple rectangular with single cladding type.	L	0
Deck Design	Timber slat deck at ground floor level	L	0
		Total Score:	**2**
Selected Cladding:	Fibre cement weatherboard over nominal 20mm drained cavity		

Foundation:
NZS 3604:2011 Timber Foundation

Wall Cladding:
James Hardie Linea weatherboard - 180 mm

Roof Cladding:
22.5° pitch. NZS Colorsteel MAXAM Corrugate profile

Fascia and Spouting:
Metalcraft 155 Colorsteel fascia
Metalcraft 1/4 round spouting
Marley PVC 80mmØ round downpipes

Joinery:
APL Residential suite Aluminium joinery

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ELEVATIONS

Scale: 1:100 | Rev: **A** | Sheet no: **11**

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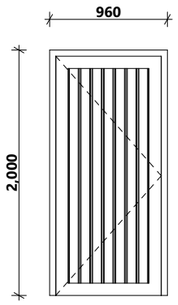
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HIGH	**3**	**C**	**N1**	**3**

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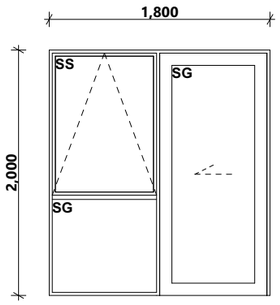
Client Details:
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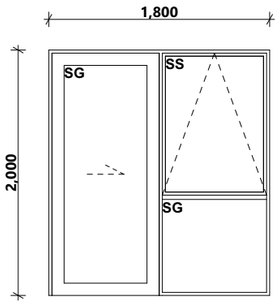
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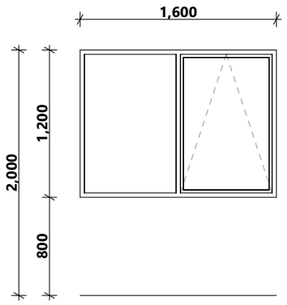
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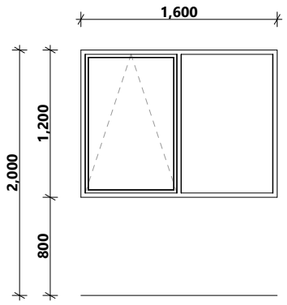
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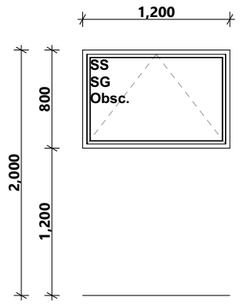
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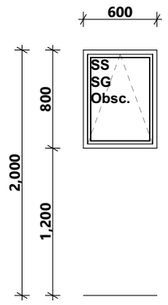
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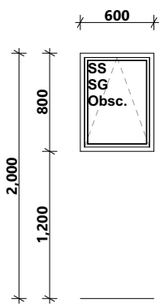
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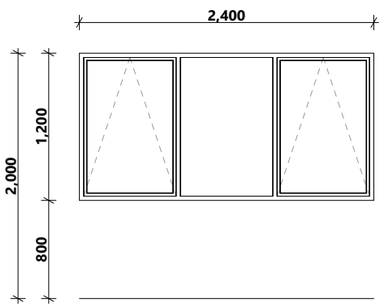
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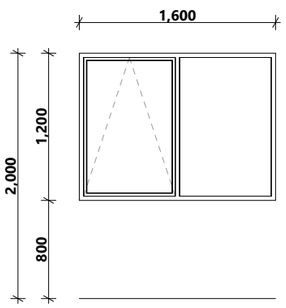
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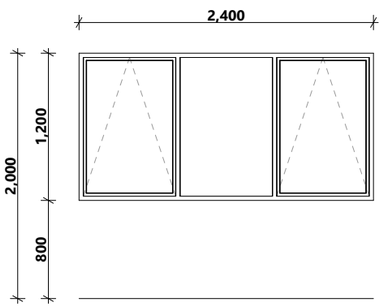
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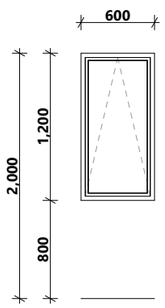
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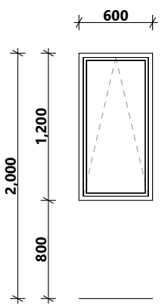
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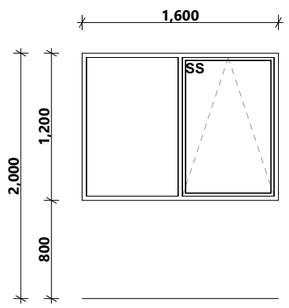
W-08



W-09



W-10



W-11

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Natural Light and ventilation

Room	Floor area	Window area	10% min	Window opening	5% min
Master Bed	12.99 m2	1200 x 2400 = 2.88 m2	22.17%	1200 x 1600 = 1.92 m2	14.78%
Bed 2	9.00 m2	1200 x 1600 = 1.92 m2	21.33%	1200 x 800 = 0.96 m2	10.67%
Bed 3	9.00 m2	1200 x 1600 = 1.92 m2	21.33%	1200 x 800 = 0.96 m2	10.67%
Living	16.20 m2	1200 x 2400 = 2.88 m2		1200 x 1600 = 1.92 m2	
-	-	1200 x 600 = 0.72 m2		1200 x 600 = 0.72 m2	
-	-	1200 x 600 = 0.72 m3		1200 x 600 = 0.72 m2	
-	-	2000 x 1800 = 3.60 m4	48.89%	2000 x 900 = 1.80 m2	31.85%
Dining	11.94 m2	2000 x 1800 = 3.60 m2		2000 x 900 = 1.80 m2	
-	-	1200 x 1600 = 1.92 m2	46.23%	1200 x 800 = 0.96 m2	23.12%

Safety restrictor stays:
ss = safety stays
- a restrictor fitted to limit the maximum opening so that a 100mmø sphere cannot pass through

Window restrictors are required to the following sized openings where the adjacent Ground Level is 1.0m below FFL or greater;
- openings less than 1.0m wide with sill ht within 760mm of FFL
- openings more than 1.0m wide with sill ht within 1000mm of FFL

Window restrictors are also required to outward opening windows that may protrude into walk paths
- Refer to Site plan for 'walk paths'
sg = safety glass

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JOINERY SCHEDULE

Scale: 1:50
Rev: **A**
Sheet no: **12**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

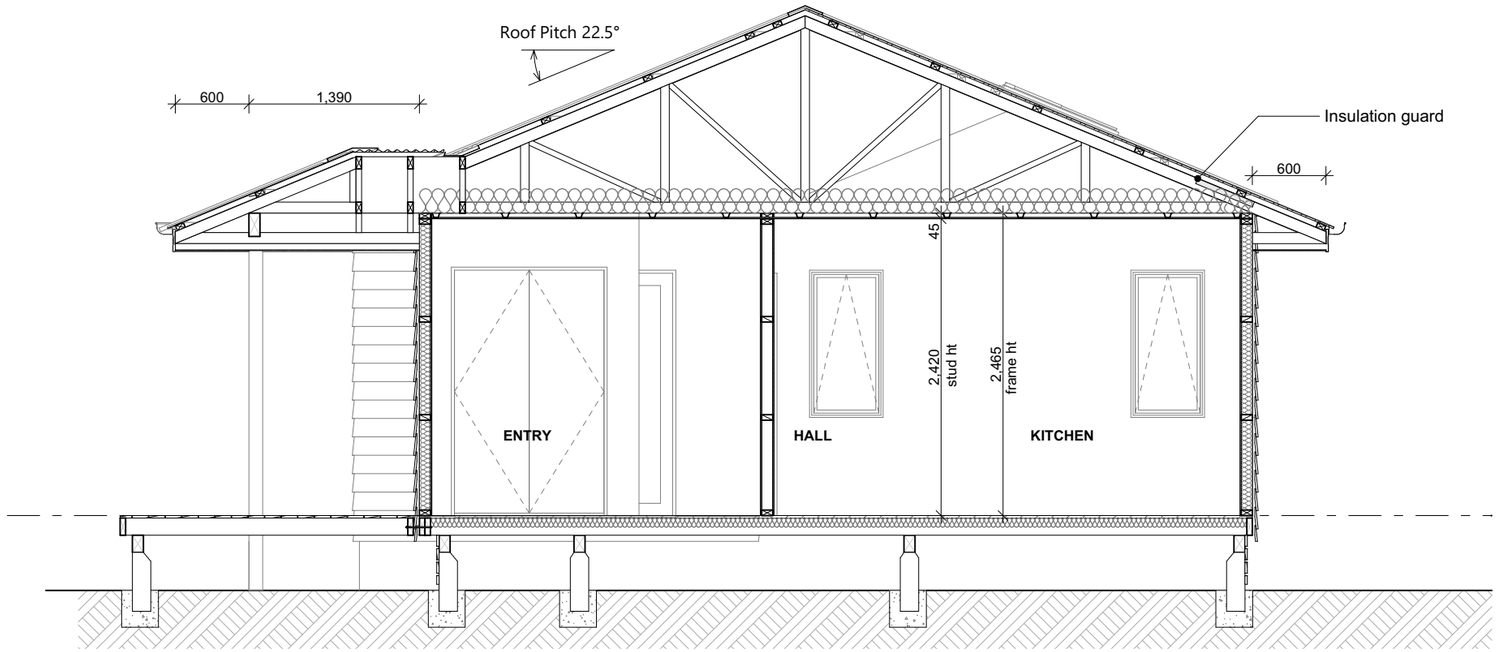
Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

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Client Details:
Brad & Vanessa Jefferies

Address:
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Waikanae

Job no: **AW611P**
KH110a



TIMBER FOUNDATION

Refer to foundation plan for footing sizes

Table 4 – Allowable moisture content (%)(1) at time of installation or in the case of framing timber at time of enclosure

	Use category level of finish	Air-conditioned or centrally heated buildings	Intermittently heated buildings(2)	Unheated buildings
1	Timber to which linings are attached to achieve a "level of finish" 4 to 5	8 – 18	12 – 18	12 – 18
2	Enclosed framing (including roof trusses) to achieve a "level of finish" 0 to 3	12 – 18	12 – 24	12 – 24
3	Load-bearing lintels and beams	8 – 18	12 – 20	12 – 20
4	Weatherboards, exterior joinery and finishing timbers	14 – 18	14 – 18	14 – 18
5	Flooring exposed to ground atmosphere	10 – 14	12 – 16	14 – 18
6	Interior joinery and finish, furniture, corestock	8 – 12	10 – 14	12 – 16
7	Flooring not exposed to ground atmosphere	8 – 12	10 – 14	12 – 16

NOTE –
(1) Allowable ranges of moisture content are specified on the basis that 90 % of pieces shall be within the specified range, the remainder shall be within a further 2 % moisture content above or below. The moisture content of individual boards shall be normally distributed within the range allowed. In special circumstances, e.g. flooring exposed in rooms with large window area, the upper limits may be reduced.

(2) Buildings periodically heated by open fires, electric heaters, etc., such as most domestic buildings.

Acceptable Solution E2/AS1
10.0 Construction Moisture

10.1 Moisture in materials
Moisture contained in the building structure at completion of construction shall not be permitted to damage the building elements.
Construction moisture includes the moisture contained in:
a) Timber products as a result of a treatment or manufacturing process,
b) Green timber, and timber or other materials that have been exposed to the weather, and
c) Concrete, mortar or plaster that is not completely cured.

10.2 Maximum acceptable moisture contents
The maximum moisture contents shall be:
a) For timber framing at the time of installing interior linings, the maximum acceptable moisture content shall be the lesser of:
i) 20% for insulated buildings, 24% for non-insulated buildings, or
ii) as specified in NZS 3602,
b) For timber weatherboards and exterior joinery, 20% at the time of painting,
c) For reconstituted wood products, 18% at all times, and
d) For concrete floors, sufficiently dry to give a relative humidity reading of less than 75%
at the time of laying fixed floor coverings.

• Where nail popping, joint peaking and ridges formed by stud warping and twisting are undesirable on the finished surfaces within 12 months of installation of wall linings, kiln dried timber shall be used, or alternatively the timber framing shall be dried to less than 18 % moisture content before wall linings are installed.

• Where timber framing is installed green or kiln dried timber that is wetted and allowed to dry, those members which are likely to deflect under their own weight shall be propped until they dry below a moisture content of 20 %.

Microclimatic Considerations:
In addition to exposure zones, evidence of local environmental effects (microclimates), and those produced by the erection of a structure or installation of equipment, shall be considered.

Significant acceleration of the corrosion of structural fasteners and fixings beyond what could be expected from the geographical location can occur in the following circumstances:

(a) Industrial contamination & corrosion atmospheres;

(b) Contamination from agricultural chemicals or fertilisers; and

(c) Geothermal hot spots. Hot spots are defined as being within 50m of a bore, mud pool, steam vent, or other souce.

Microclimatic conditions (a) to (c) require specific engineer design.

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CROSS SECTION AA

Scale: 1:50
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Sheet no: 13
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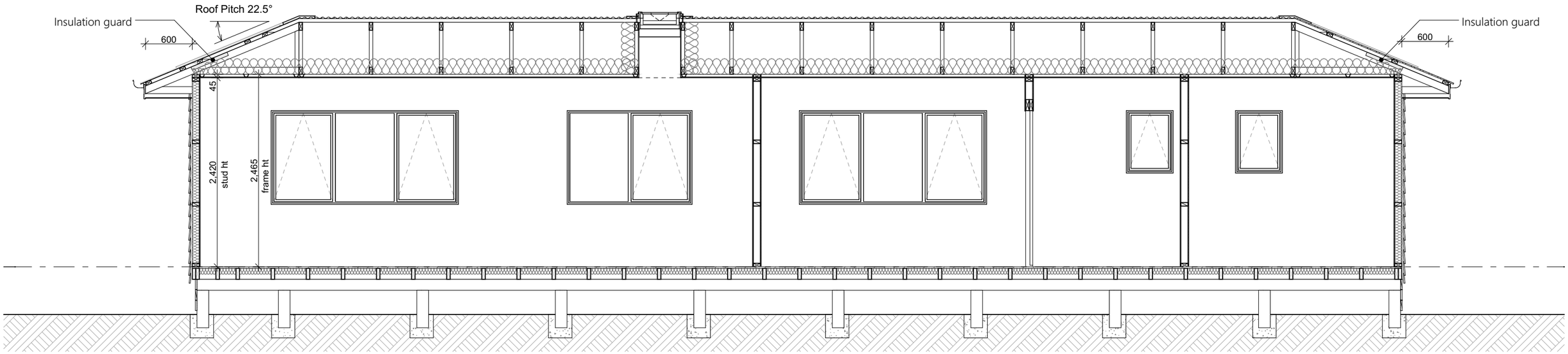
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TIMBER FOUNDATION

Refer to foundation plan for footing sizes

Note: Exposure Zone C
(exposure environments as defined by NZS 3604 : fig 4.2 & table 4.1)

Fixings & Fastenings (excludes nails and screws):
Nail Plates - In 'closed' & 'roof space' environments = continuously coated galv. steel
Wire Dogs & Bolts - In 'closed' & 'roof space' environments = hot-dip galv. steel
All other structural fixings - In 'closed' environments = mild steel (uncoated, non-galvanized)

All other structural fixings (except fabricated brackets (1))
- In sheltered environments = hot-dip galv. steel
- In exposed environments = type 304 stainless steel

Connections to treated timber piles = type 304 stainless steel

Nails & screws used for framing & cladding:
Non-structural cladding (15 year durability) = galv. steel
Framing in 'closed' areas including roof spaces = mild steel (3)
Framing in 'exposed or sheltered' areas = galv. steel (3)

*1. - "fabricated brackets" shall be made from 5mm (minimum thickness) mild steel and shall be hot-dip galv.
*3. - steel fixings and fastenings in contacts with timber treated with copper-based timber preservatives (H3.2 or higher) shall be minimum of type 304 stainless steel (exposed and Sheltered environments), and hot-dip galv. steel (all other locations)

Minimum concrete strength after 28 days shall be:
17.5 MPa OR 20 MPa exposed to weather

Fixing Materials: (as per Acceptable Solution E2/AS1) - for definitions refer to E2/AS1
Hidden/Exposed
Aluminium , or Bronze, or type 304 stainless steel
Nails = galv. steel
Screws = galv. steel, Painted or unpainted to AS 3566: Part 2
Sheltered:
Aluminium , or Bronze, or type 304 stainless steel
Screws = galv. steel, Painted or unpainted to AS 3566: Part 2

* The use of stainless steel fixings is not recommended by steel manufacturers for use with coated steel in severe marine and industrial environments, as they are considered to cause deterioration

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CROSS SECTION BB

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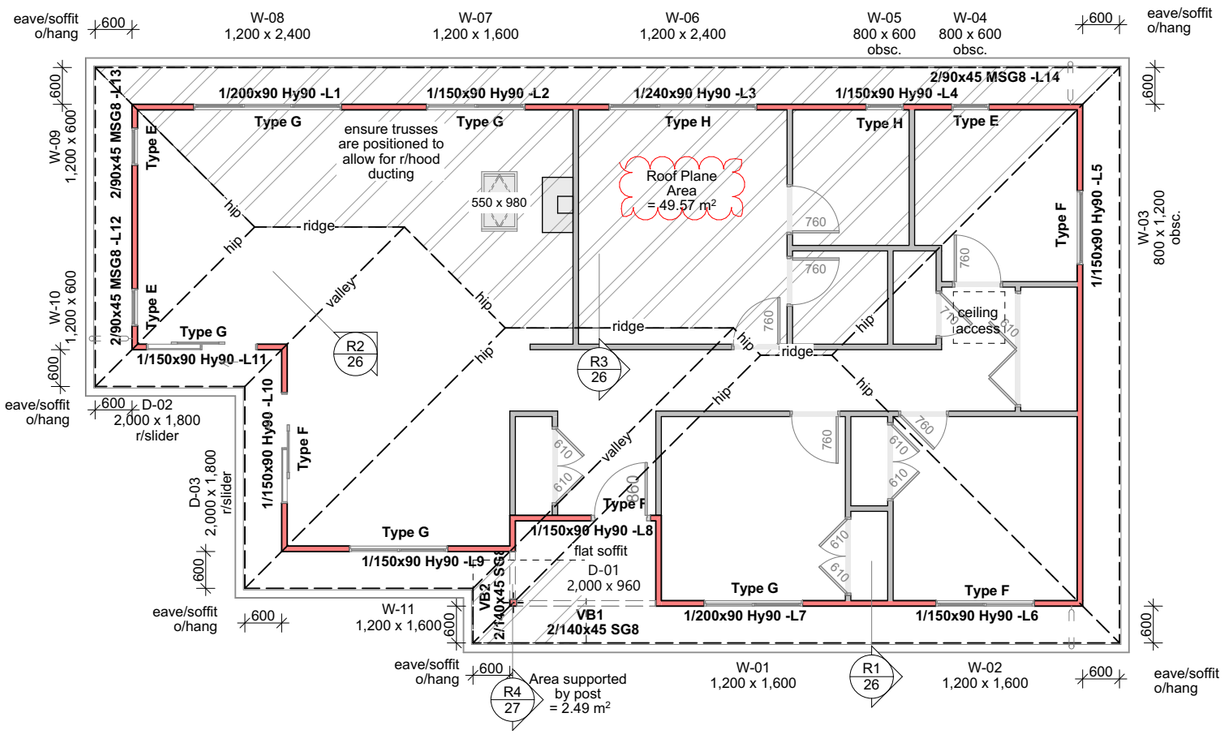
Wind:	Earthq:	Exposure:	Snow:	Climate:
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Cautionary Notes:
This layout is preliminary. Read in conjunction with final PS1 & pre-cut design & documents. Truss manufacturer to inform designer of any further load bearing footing / slab thickenings (piles or bearer lines) that are required to support roof loads. If a discrepancy occurs contact I Design Architecture immediately.

Construction Notes:
Ensure that all downpipes are positioned clear of Joinery units

Fixing Notes:
- refer to Lumberlok manual

Lintel Key:
190x90 - G ← Fixing
↑
└ Size

Trimming Studs:
Refer to following page for trimming stud requirements
All Lintels GREATER than 1.8m span require an additional trimming stud

Rondo Clip System:
Bottom chord restraints are required as per truss design.
Fix 90x45 runners to top of bottom chords.

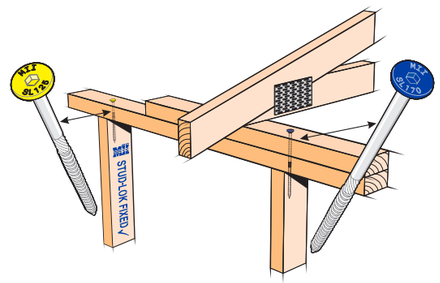
All Lintels and beams have been specified by Placemakers
- refer to documentation

Stud to Top Plate Fixings:

Stud to top plate:
As per Truss Design

11/2017

BOWMAC®
STUD-LOK
Provides a solution for top plate to stud fixings for residential timber frame buildings



- Complies with fixing requirements in Section 8 NZS 3604:2011
- The BOWMAC® STUD-LOK forms an integral part of the MiTek Truss & Frame design and layout
- Available in 2 lengths allowing for connections from stud to single top plate (SL125) and stud to double top plates (SL170)
- Applied in the factory
- Is a completely internal connection avoiding any clashes with wall linings

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ROOF PLAN

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NZS 3604:2011 8.5.2 Trimming studs
A trimming stud shall be provided to each side of any opening as follows;
• must be the same width as the studs in the wall
• whether single or double, shall not contain holes, notches, checks, or cuts in the middle third of their length.
• Where a doubling stud which provides support for a lintel is shorter by 400 mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of trimming studs from table 8.5

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Table 8.5 – Trimming studs (see 8.5.2.1)

Maximum clear width of opening (span of lintel)	Stud thickness required for 600 mm spaced studs	Thickness of trimming studs*
(a) Single storey, top storey or non-loadbearing walls		
(m)	(mm)	(mm)
1.8	35	45
	45	45
	70	90
	90	115
3.0	35	45
	45	70
	70	90
	90	135
3.6	35	70
	45	90
	70	140
	90	180
4.2	35	105
	45	135
	70	210
	90	270
(b) Any other location		
0.9	35	45
	45	70
	70	90
	90	135
1.8	35	70
	45	70
	70	115
	90	135
3.0	35	70
	45	90
	70	140
	90	180

* For brick veneer openings add extra stud for fixing veneer ties.

NOTE – To use this table:

(1) Enter the row corresponding to the lintel span being considered.

(2) From the second column, select the thickness of the studs required for the body of the wall, assuming that they are spaced at 600 mm.

(3) Read the trimming stud thickness from the right side column.

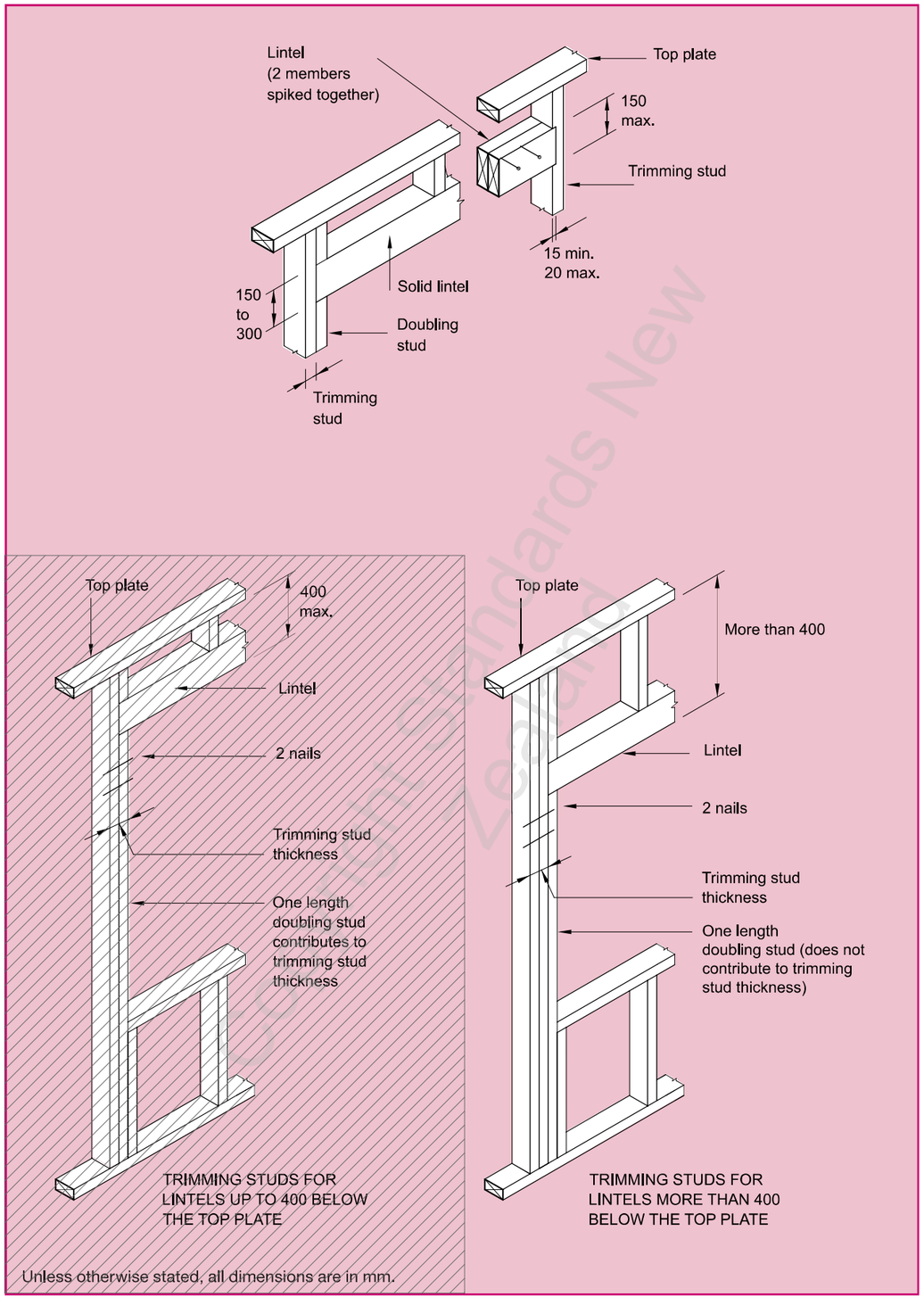


Figure 8.5 – Trimming studs and lintels (see 8.5.2.1)

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TRIMMING STUDS

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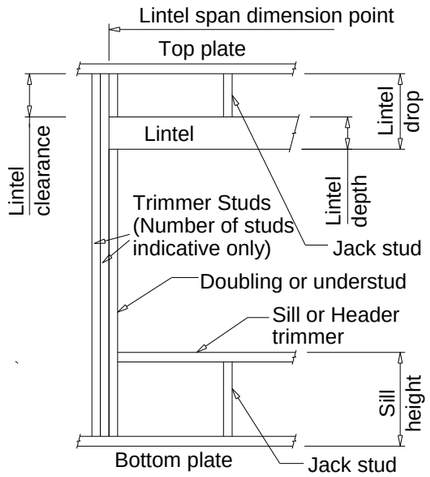
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STUD-LOK Lintel Fixings

NOTE:

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

DEFINITIONS



Lintel Supporting Girder Trusses:

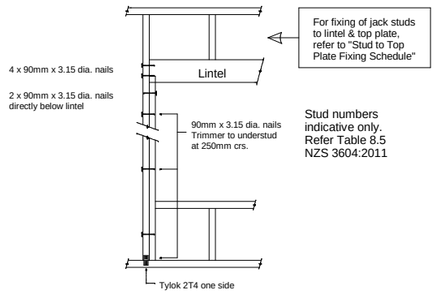
Roof Tributary Area	Light Roof Wind Zone			Heavy Roof Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6 m²	G	G	H	G	G	H
11.6 m²	G	H	H	G	G	H
12.1 m²	G	H	H	G	H	H
15.3 m²	H	H	-	G	H	H
19.1 m²	H	-	-	G	H	-
20.9 m²	H	-	-	H	H	-
21.8 m²	H	-	-	H	-	-
34.3 m²	-	-	-	H	-	-

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

SELECTION CHART FOR LINTEL FIXING

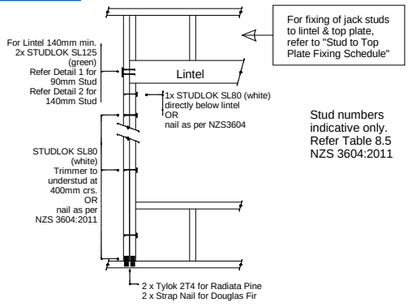
Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	H
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	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
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	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-

TYPE E 1.4kN



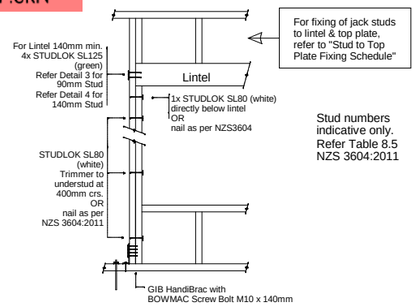
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE F 4.0kN



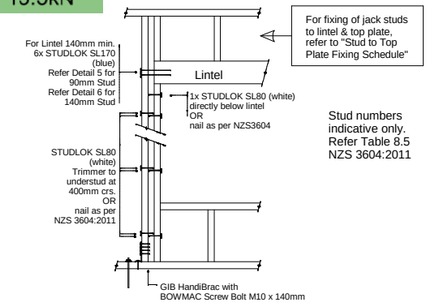
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE G 7.5kN



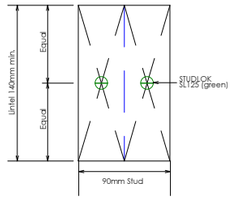
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

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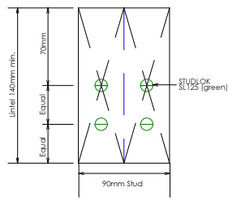


Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

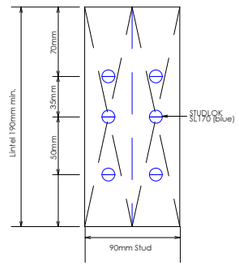
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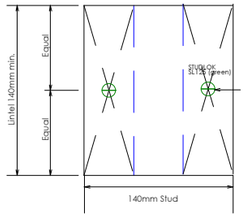
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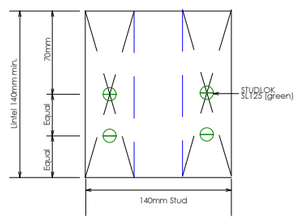
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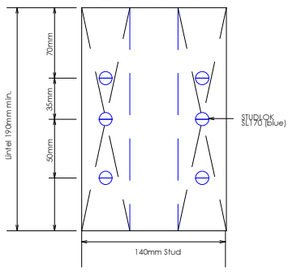
Detail 2:



Detail 4:



Detail 6:



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FIXING CHARTS

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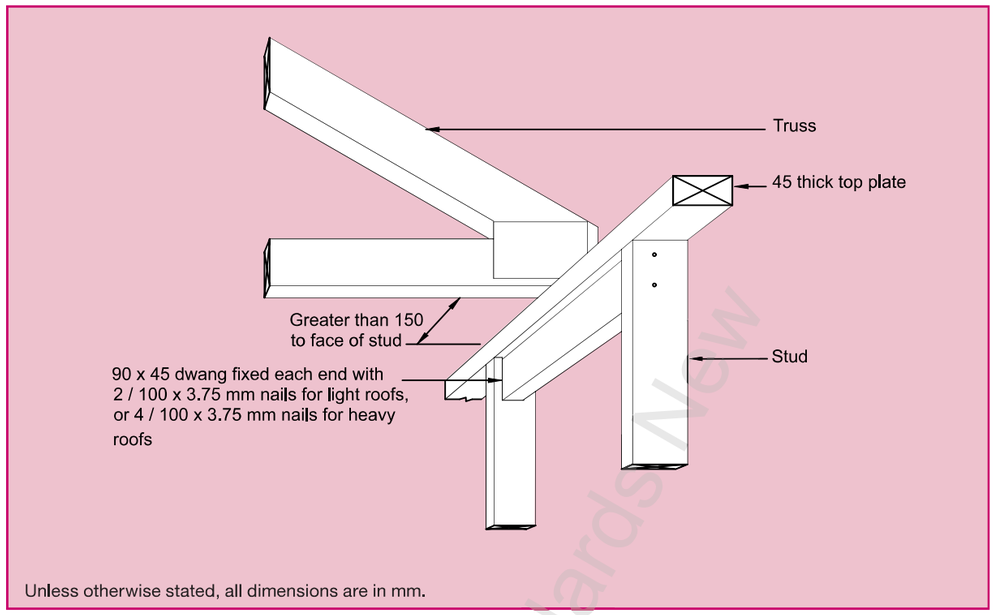


Figure 8.13 – Strengthening top plate (see 8.7.1.1 and table 8.16)

Joints in plates:
Joints in top plates shall be made only over supports being either a stud or blocking.
Joints in the top plate of a wall that does not contain any wall bracing elements (either in line or at wall intersections), shall be halved and nailed at the joints, see figure 8.14 (A), or be butted over blocking and nailed, see figure 8.14 (B), or be provided with an alternative fixing, having a capacity in tension or compression of 3 kN.

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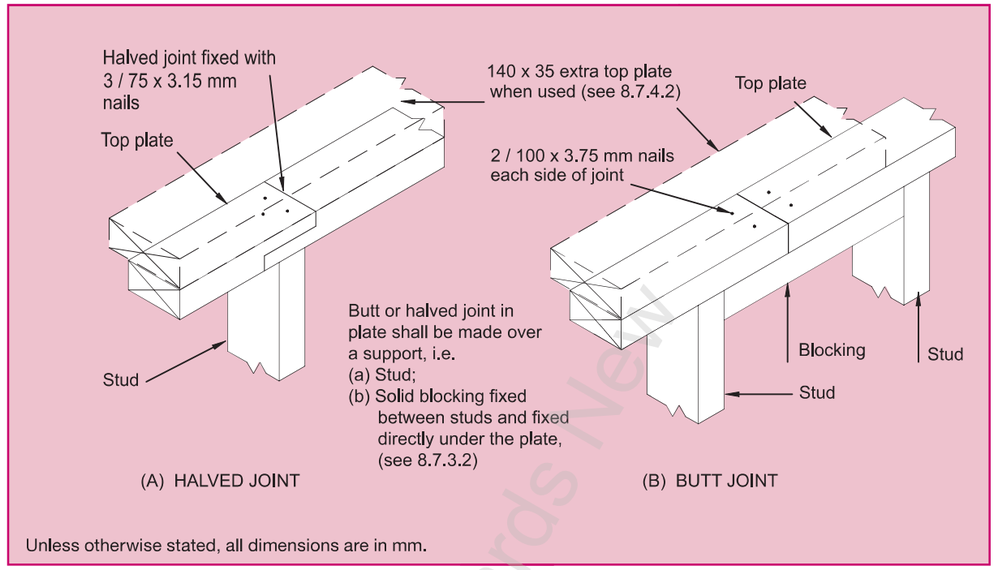


Figure 8.14 – Connecting top plates – Walls not containing bracing (see 8.7.3.2)

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TOP PLATE JOINTING

Scale:
Rev:
Sheet no: **18**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	C	N1	3

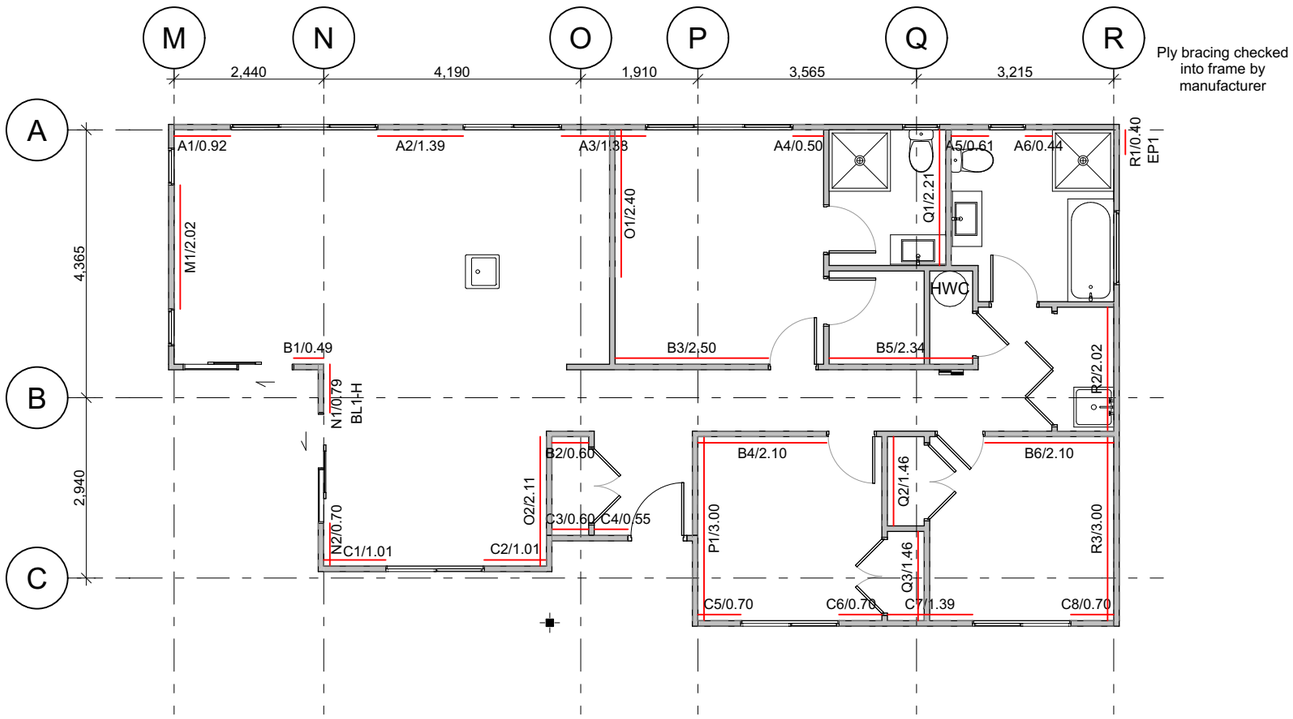
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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

All bracing elements are GS1-N unless otherwise stated



Ply bracing checked into frame by manufacturer

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Cautionary Notes:
ALL GIB BRACES FIXED IN ACCORDANCE WITH THE LATEST WINSTONES GIB BRACING MANUAL & GIB SITE GUIDE

Bracing Element Table	
Brace Type	
GS1-N	10mm GIB std plasterboard on one side, min. length 0.4m
BL1-H	10mm GIB BRACELINE on one side, min. length 0.4m + GIB Handibrac hold down ea. end
EP1	7mm Ecoply on one side, min. length 0.4m + GIB Handibrac hold down ea. end
All braces are GS1-N, unless otherwise stated	

Label No.
A1 / 1800
Brace Length

Openings in Bracing Elements
(as per GIB Ezybrace System)
SMALL OPENINGS
Small openings (e.g. power outlets) of 90 x 90mm or less maybe 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.

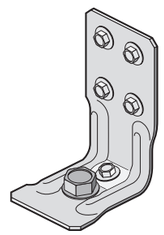
Connecting top plates to external walls:
Each wall that contains one or more wall bracing elements shall be connected at the top plate level, either directly, or through a framing member in the line of the wall, to external walls at right angles to it. - Refer to following page.

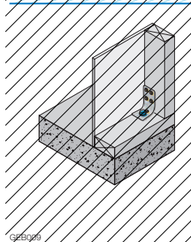
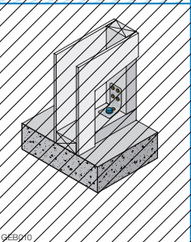
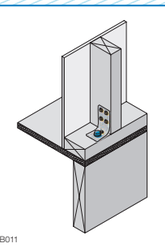
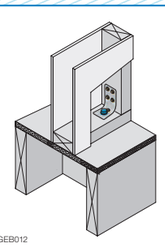
GIB HandiBrac® installation

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

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

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



Concrete floor		Timber floor	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

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BRACING PLAN

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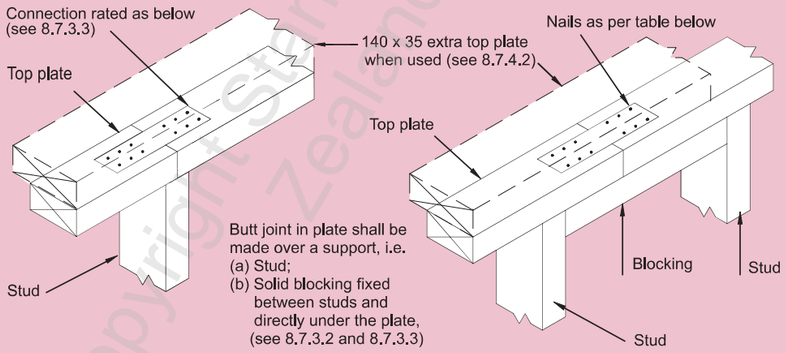
Job no: **AW611P**

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Connecting top plates to external walls:

For single-storey buildings the connection in line of the top plate of a wall that contains one or more wall bracing elements shall be jointed according to the bracing capacity of the highest-rated individual wall bracing elements as follows:
(a) Bracing capacity not exceeding 100 bracing units: A 3 kN connection as shown in figure 8.15;
(b) Bracing capacity exceeding 100 bracing units: A 6 kN connection as shown in figure 8.15.
(c) Wall top plates to which ceiling diaphragms are attached:
A 6 kN connection as shown in figure 8.15

Each wall that contains one or more wall bracing elements shall be connected at the top plate level, either directly, or through a framing member in the line of the wall, to external walls at right angles to it. Top plate fixing(s) of the capacity in tension or compression along the line of the wall bracing element are given as follows:
(a) For each wall containing wall bracing elements with a total bracing capacity of not more than 125 bracing units: to at least one such external wall by a fixing as shown in figure 8.16 of 6 kN capacity;
(b) For each wall containing wall bracing elements with a total bracing capacity of not more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each of 6 kN capacity;
(c) For each wall containing wall bracing elements with a total bracing capacity of more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each having a rating of not less than 2.4 kN per 100 bracing units.



Capacities of metal plate joints(2)	
Up to 3 kN Up to 6 kN	3 / 30 x 3.15 mm nails per side 6 / 30 x 3.15 mm nails per side

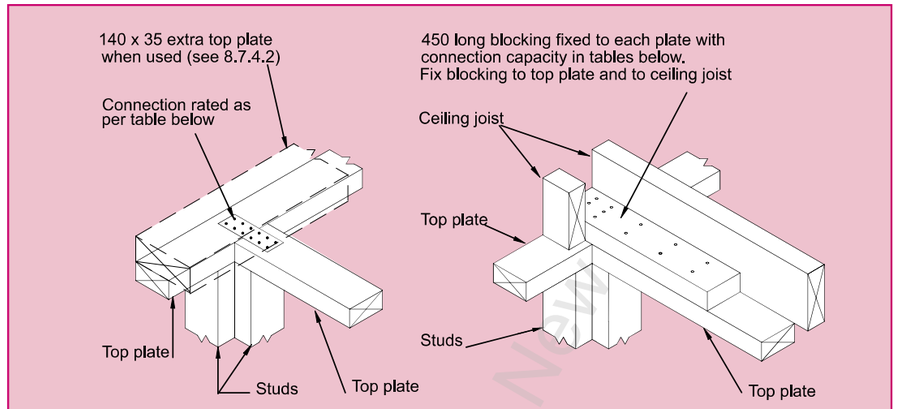
Capacities of nailed joints(2)	
Up to 3 kN Up to 6 kN	3 / 100 x 3.75 mm nails per side 6 / 100 x 3.75 mm nails per side

NOTE –
(1) See section 4 for durability requirements.
(2) Not required when extra top plate is used.

Unless otherwise stated, all dimensions are in mm.

Figure 8.15 – Connecting top plates in line – Walls containing bracing (see 8.7.3.3)

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Capacities of metal plate joints	
Up to 3 kN Up to 6 kN	3 / 30 x 3.15 mm nails per side 6 / 30 x 3.15 mm nails per side

Capacities of nailed joints	
Up to 3 kN Up to 6 kN	3 / 100 x 3.75 mm nails per side 6 / 100 x 3.75 mm nails per side

NOTE – See section 4 for durability requirements.

Unless otherwise stated, all dimensions are in mm.

Figure 8.16 – Connecting top plates to external walls at right angles – Walls containing bracing (see 8.7.3.4)

MiTek® LUMBERLOK®

2023 EDITION V1

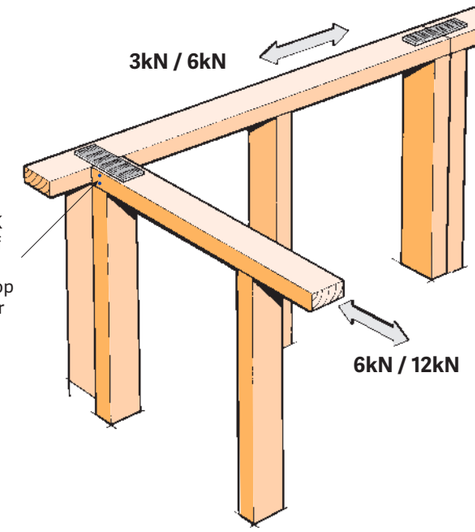
TOP PLATE JOINTING
AS PER CLAUSE 8.7.3 NZS 3604:2011

Top Plates at Right Angles

Connection capacity	LUMBERLOK Connector
6kN	Tylok 6T10 **OR** PLATE-LOK
12kN	2 x Sheet Brace Straps fixed with 6 x LUMBERLOK Product Nails 30mm x 3.15 dia. per end per strap (24 nails total)

Top Plates in Line

Connection capacity	LUMBERLOK Connector
3kN	Tylok 6T5
6kN	Tylok 6T10 **OR** PLATE-LOK



Available from leading Builders Supply Merchants throughout New Zealand

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TOP PLATE CONNECTIONS

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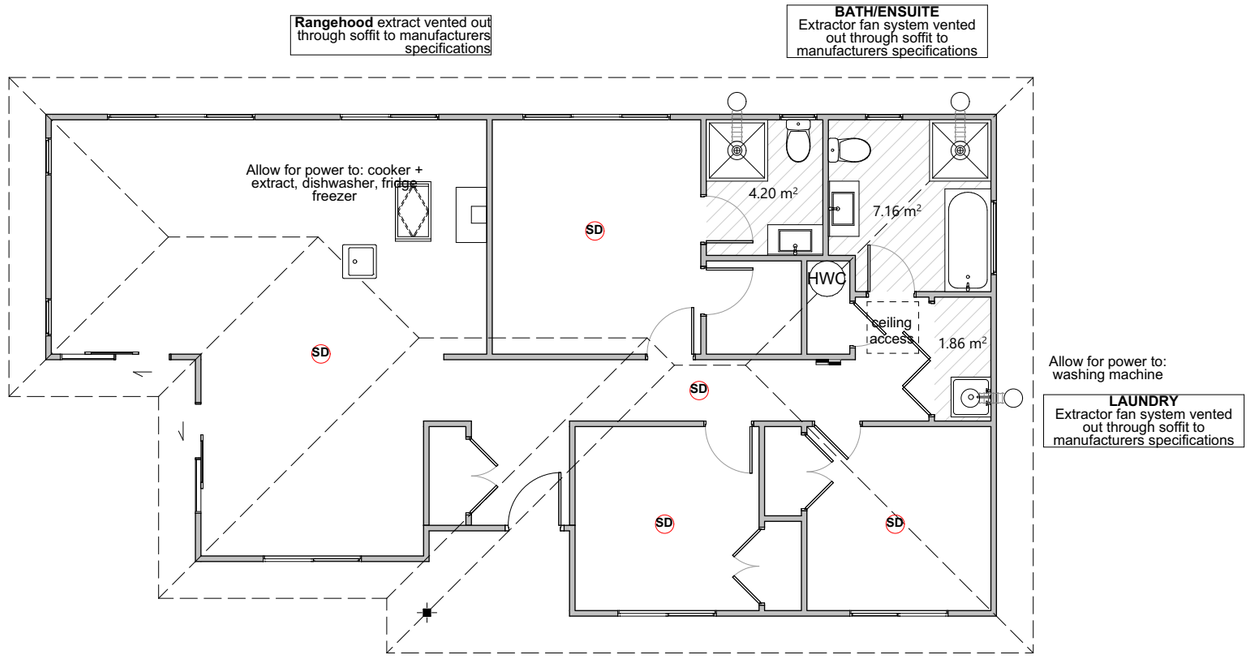
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Notes:
All electrical work & items to comply with:
NZBC F7/AS1, AS/NZS 3000, AS/NZS 3008, AS 3786, AS/NZS 5000.2: 2006

SD - Approved smoke detectors

Smoke alarms shall be located in all bedrooms, living spaces, hallways, and landings within the building.

Where more than one smoke alarm is needed to meet the requirements of this standard, these smoke alarms shall all be interconnected so that when one activates, all smoke alarm devices in the household unit will sound.

SD Position of Smoke detectors:
- Not less than 200mm from a wall
- Idealy in the centre of ceiling where possible (hallways)

Down lights to be IC-F or IC-4 Rated (max 1 per 5m²).

Ventilation system to vent ducts & r/hood to soffit outlet
Ventilation system to have mechanical exhaust rates in accordance with NZBC G4/AS1

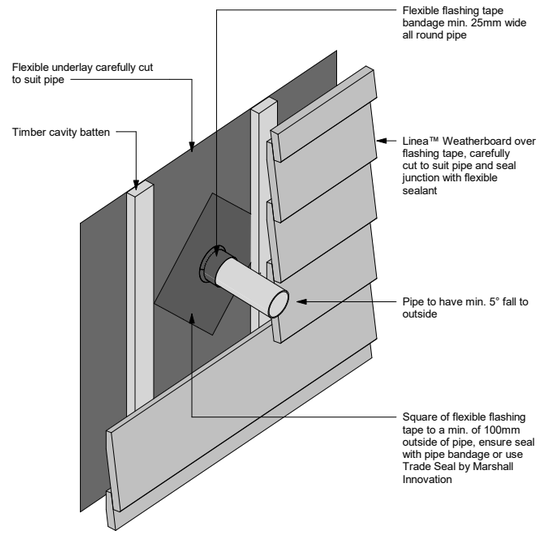
Ventilation of Sanitary rooms
Percentage of ventilated opening to be minimum 5% of room floor area

Room	Floor Area	Window Opening	Percentage
Bath	7.16m²	800x1200 = 0.96m²	
		800x600 = 0.48m²	20.11%
Ensuite	4.20m²	800x600 = 0.48m²	11.43%

Mechanical Ventilation Calc:
Laundry: 1.86 x 2.42 = 4.50m³
Recommended air changes for a laundry: 10 - 30
30 x 4.50 = 135.04m³/hr
add 20% = 162.04 / 3.6 = 45.01l/s

Lighting & Electrical
NZBC: Clause G8 Artifical Light
Requirement applys to: All access routes
Spaces within buildings used by people, shall be provided with adequate artificial lighting which, when activated in the absence of sufficient natural light
•Illuminance at floor level shall be no less than 20 lux. will allow safe movement

PIPE PENETRATION



Note: Site cut edges to be primed

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ELECTRICAL PLAN

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Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

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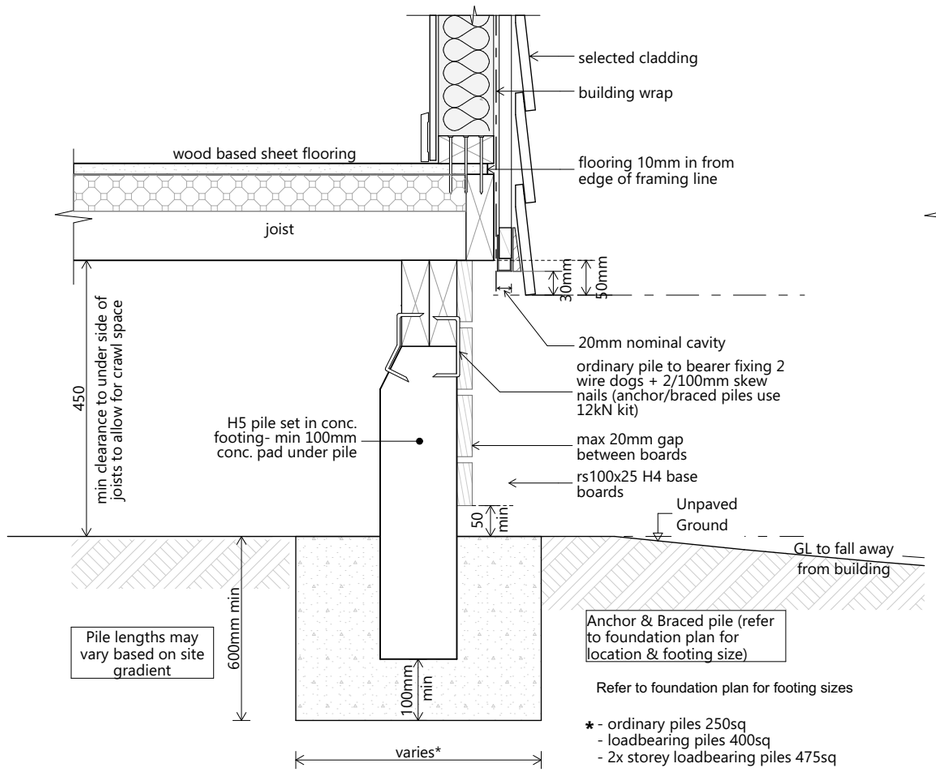
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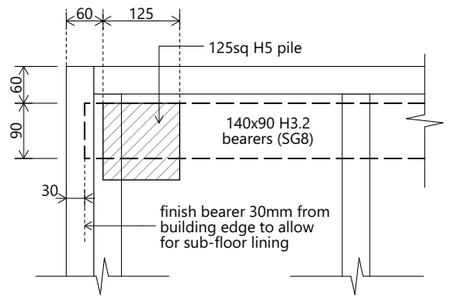
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Job no: **AW611P**

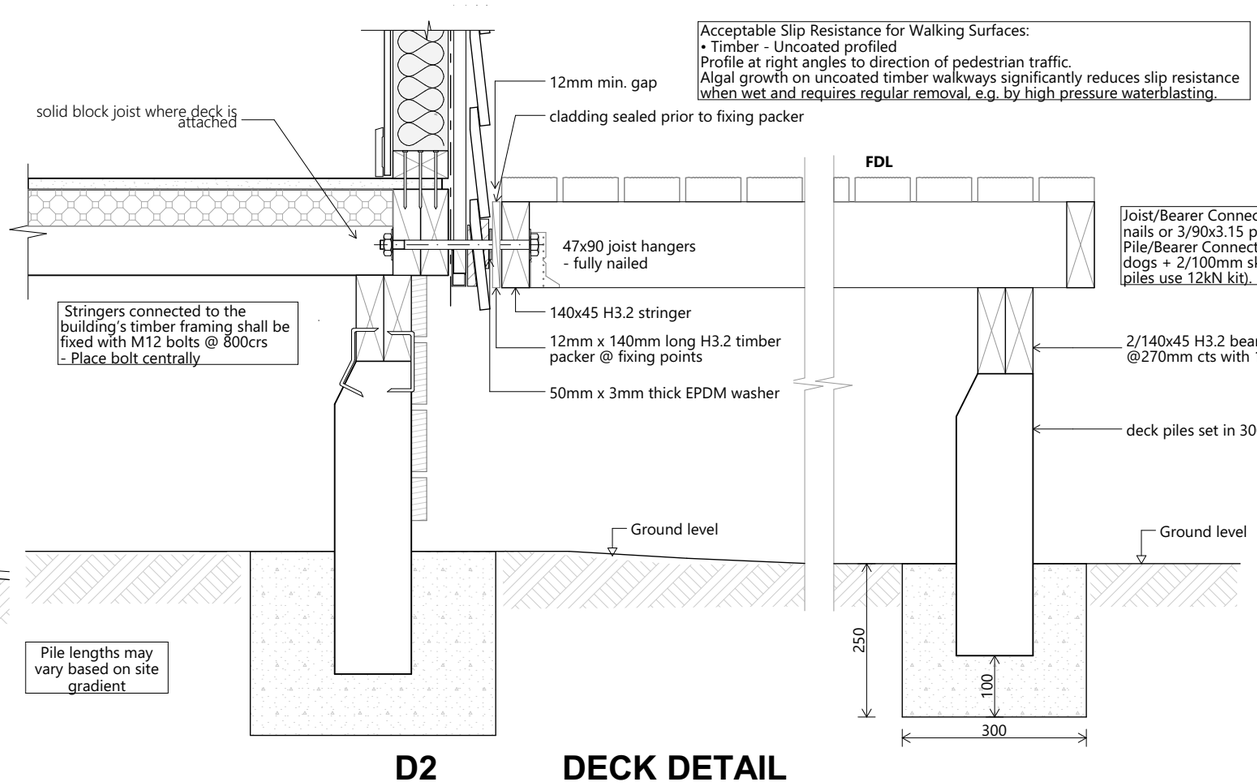
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D1 FOUNDATION EDGE



NOTE:
As per Geotechnical Analysis Assessment Report by Hamish Wells
Good ground (300kPa) is at least 600mm below EGL.
For the ordinary and anchor piles bearing is to be reconfirmed on-site after excavation but before placement of concrete.



D2 DECK DETAIL

BC250084
Further Information Received
10/04/2025

PREVENTION OF DAMPNESS
Ventilation opening area required:

To prevent subfloor dampness, provide subfloor ventilation openings over the whole subfloor area
Ventilation openings shall be not less than 3500 mm² per m² of floor area and evenly distributed around the foundation perimeter.

- Ventilators spaced regularly, commencing 750 mm from the corner and at intervals not exceeding 1.8 m (see figure 6.11);
- Continuous 20 mm wide slots between baseboards

Connections to treated timber piles = type 304 stainless steel

Figure 65: Levels and garage openings
Paragraphs 9.1.3, 9.1.3.4, 9.2.5, Table 18

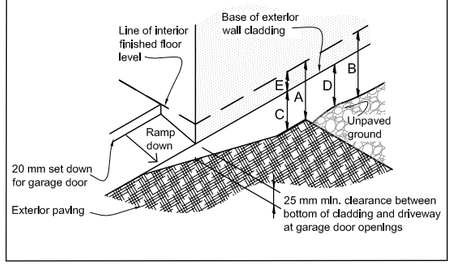


Table 18: Minimum clearances
Paragraphs 9.1.3, 9.1.3.1, 9.1.3.2, 9.1.3.3, 9.1.3.4, 9.1.3.5 and 9.2.7

Minimum clearances (mm)	Masonry veneer		Other claddings				
	A	B	A	B	C	D	E
Concrete slab	100	150	150	225	100	175	50
Timber floor Refer Note 1)					100	175	50 2)

NOTE: 1) Refer to NZS 3604 for requirements.
2) Cladding to extend minimum 50 mm below bearer or lowest part of timber floor framing.

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FOUNDATION DETAILS

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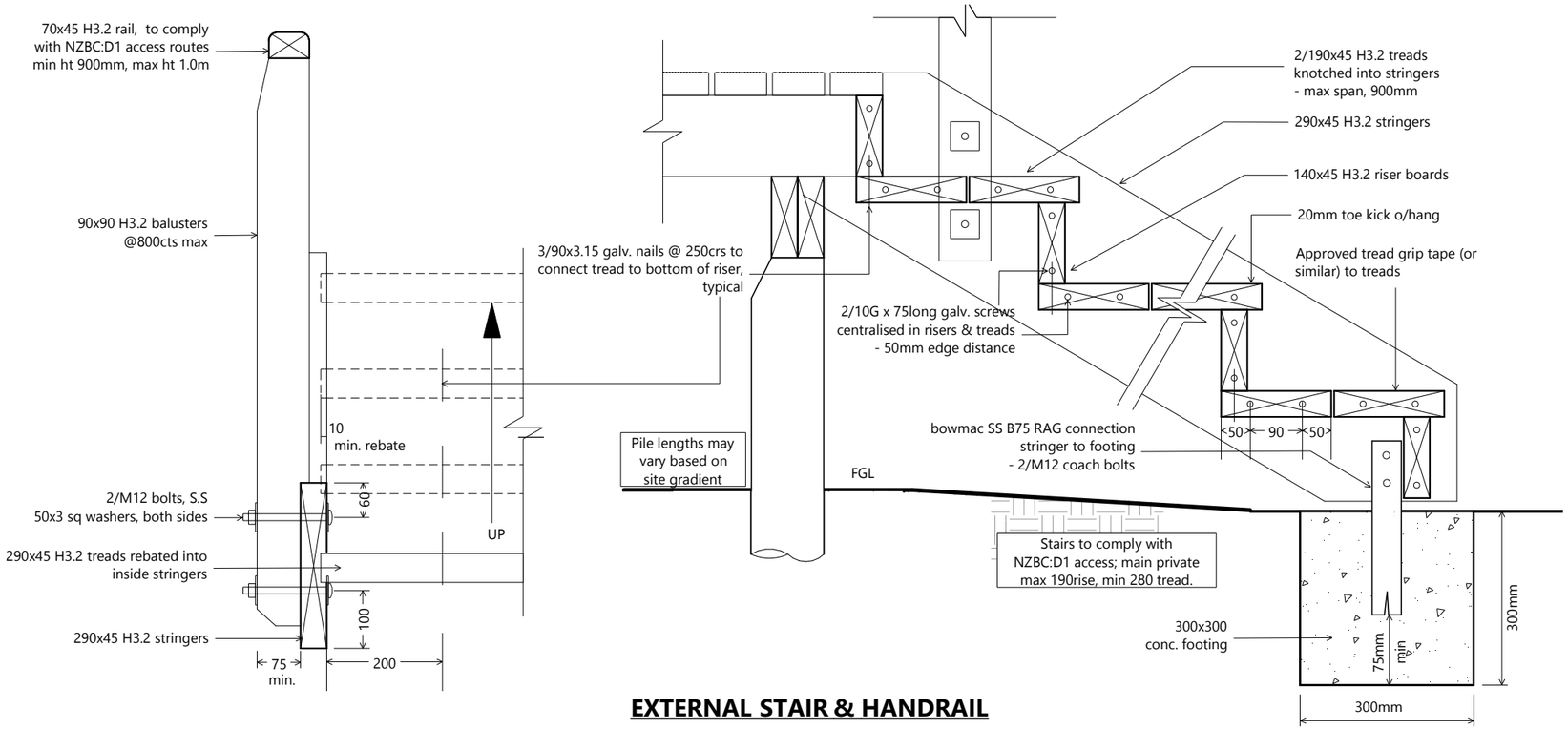
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EXTERNAL STAIR & HANDRAIL

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STEPS DETAILS

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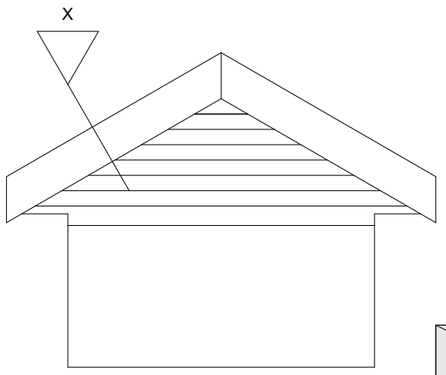
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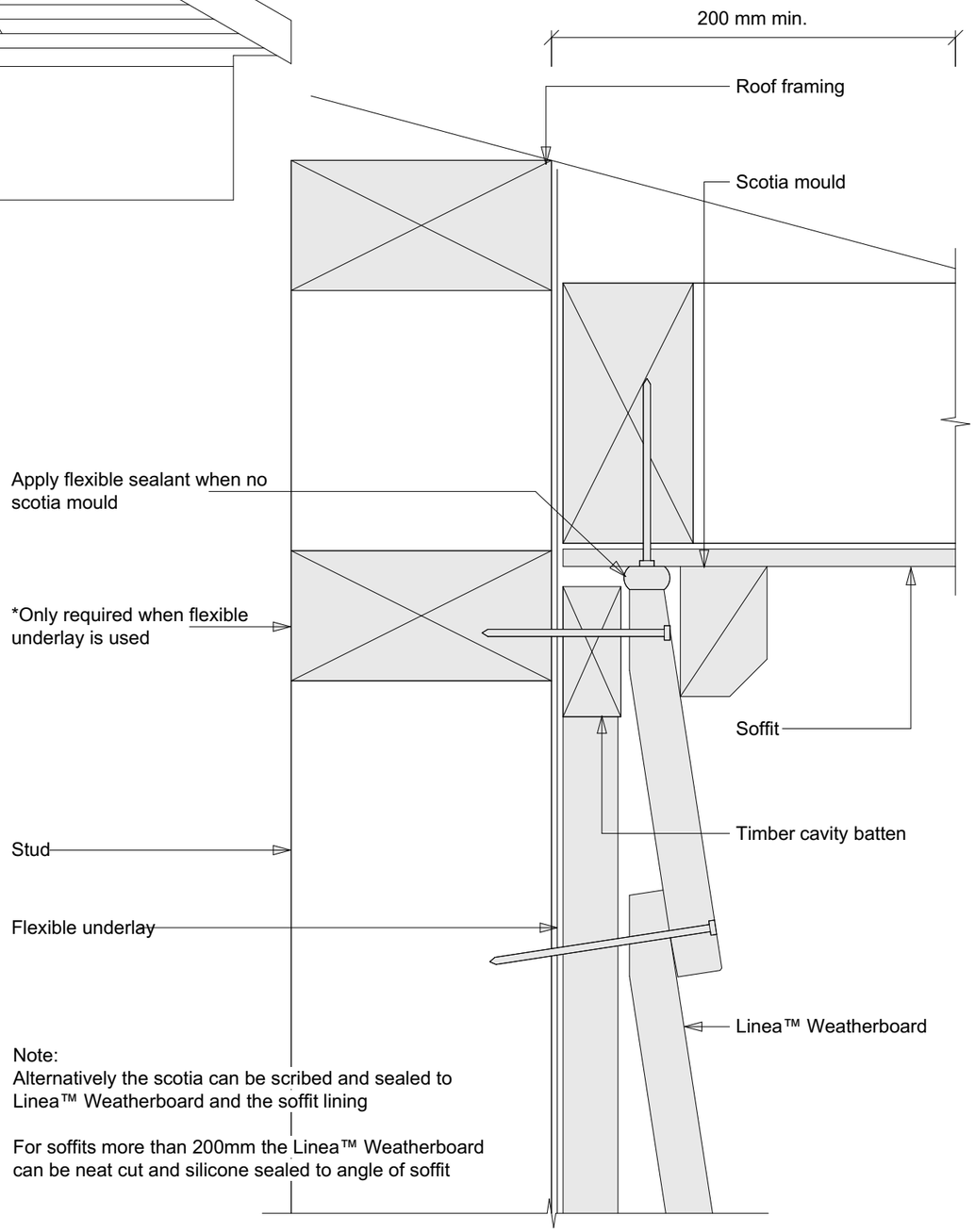
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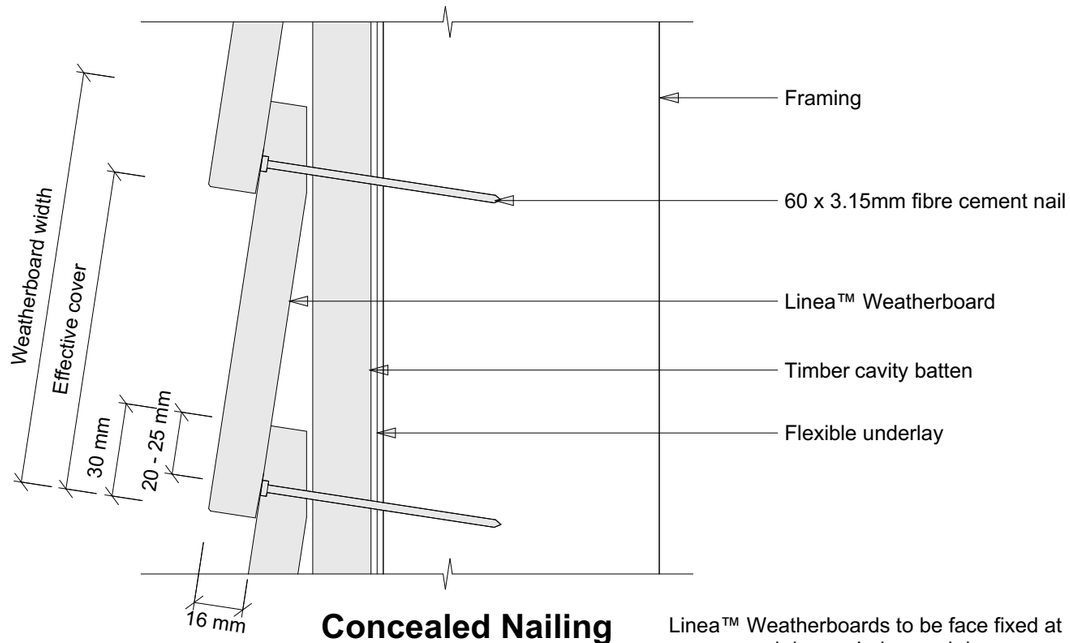




Note:
Alternatively the scotia can be scribed and sealed to Linea™ Weatherboard and the soffit lining

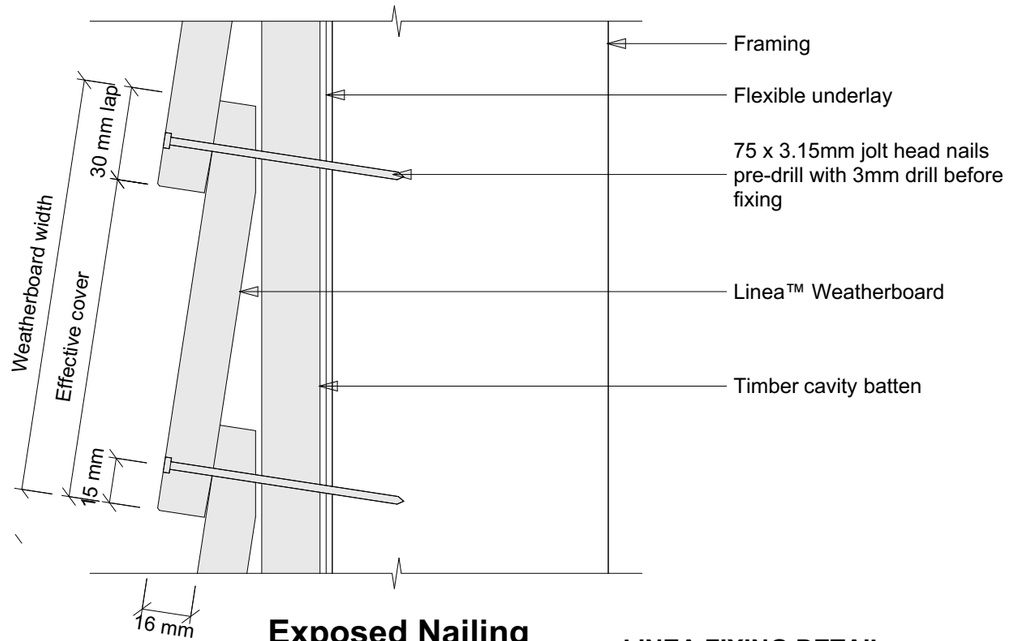
For soffits more than 200mm the Linea™ Weatherboard can be neat cut and silicone sealed to angle of soffit

LINEA SOFFIT DETAIL



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

LINEA FIXING DETAIL

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CLADDING DETAILS

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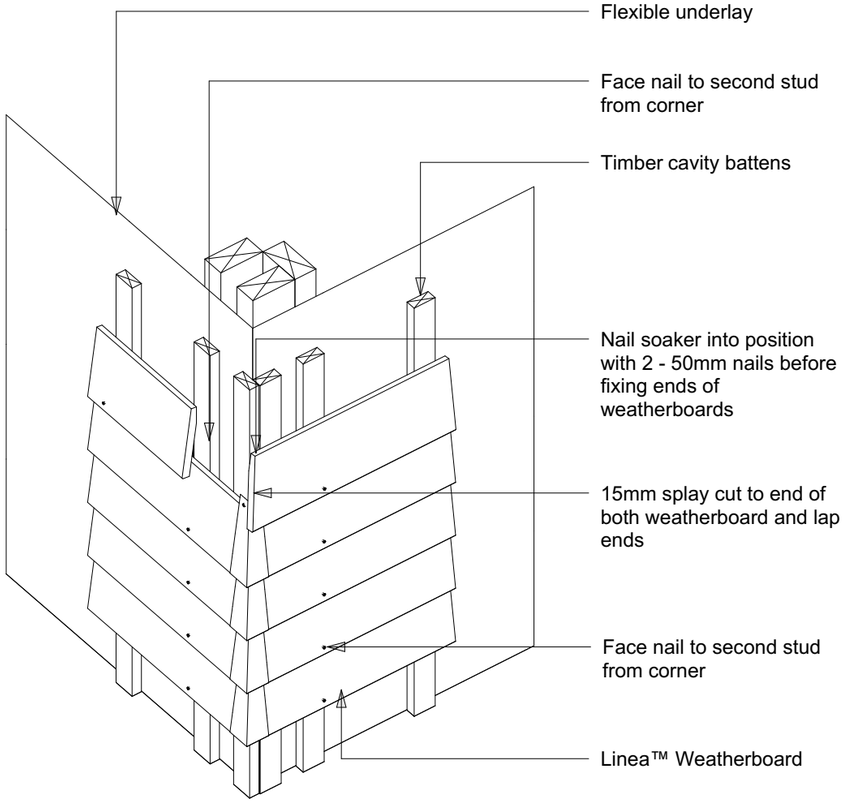
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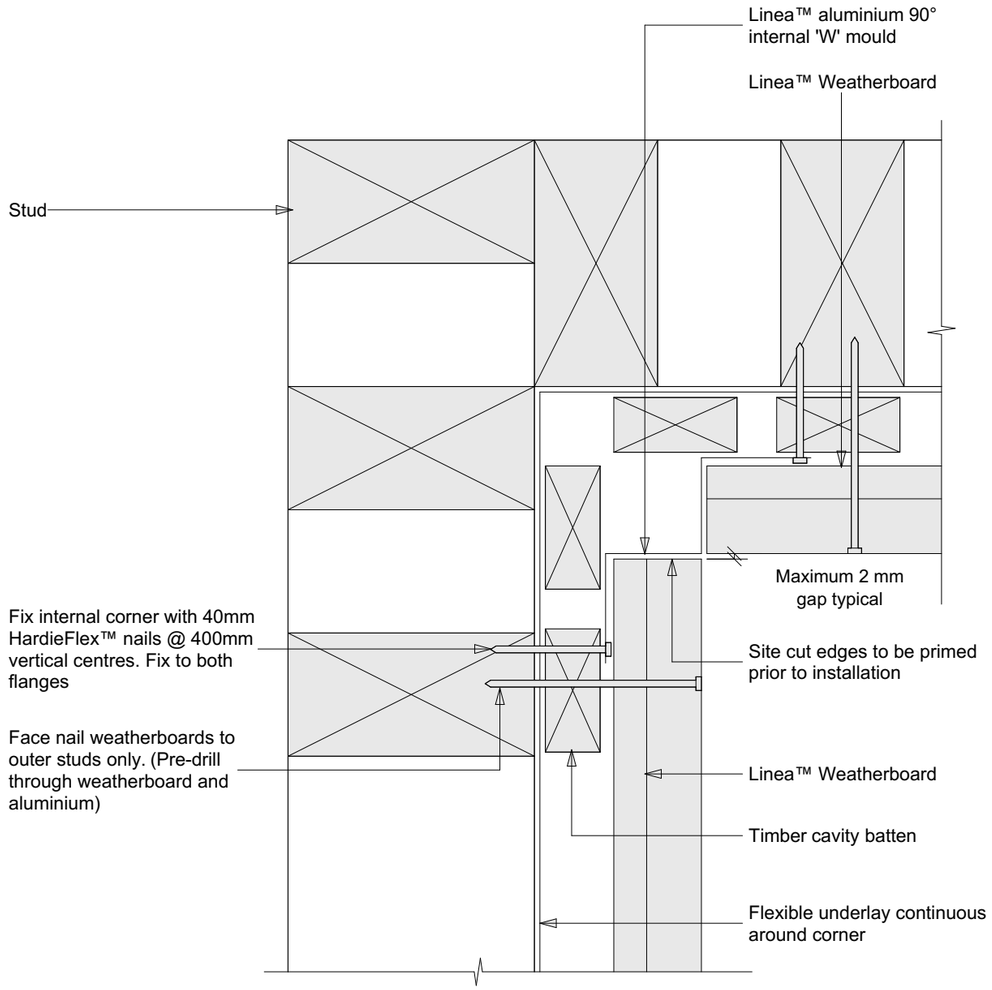
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Soaker material	Nail material
Copper	Copper or phosphor bronze
Aluminium	Hot dip galvanised
Stainless steel	Stainless steel

LINEA EXTERNAL CORNER SOAKER DETAIL



LINEA INTERNAL CORNER DETAIL

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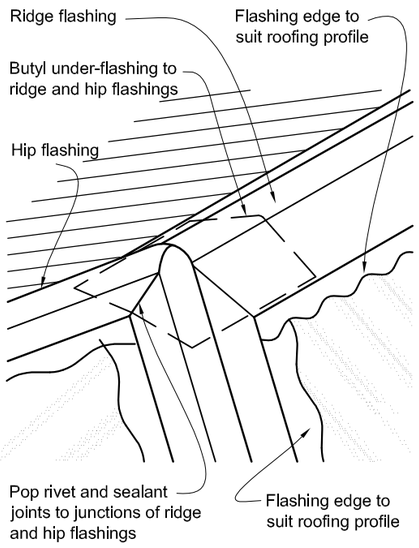
Address:
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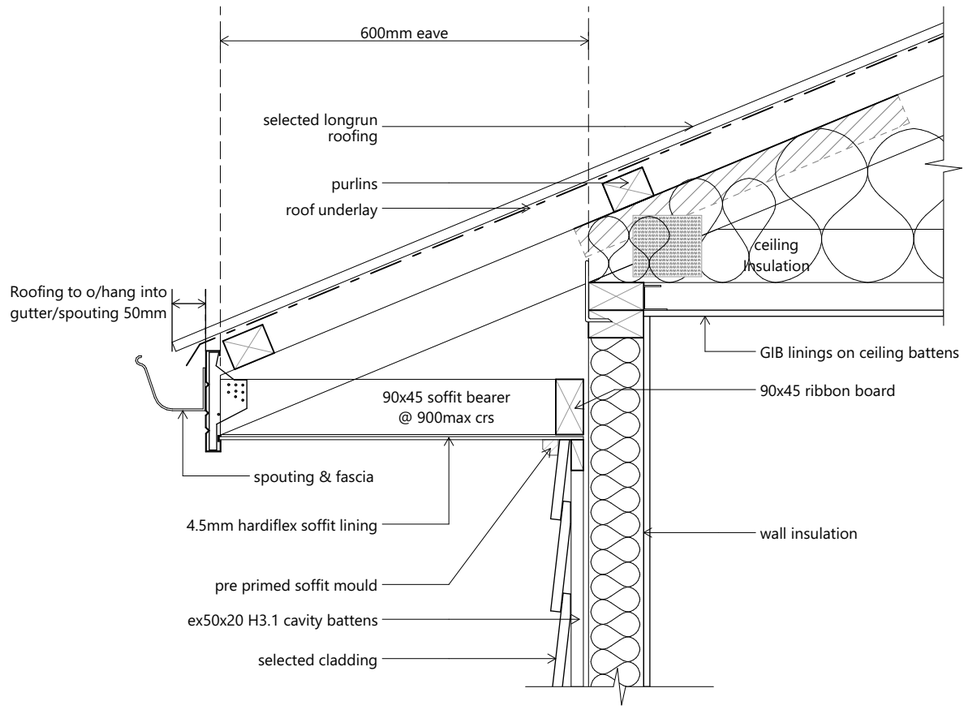
Job no: **AW611P**

KH110a

Figure 43: **Ridge to hip flashings**
Paragraphs 8.4.11 and 8.4.12

NOTE: *Flashing* cover varies according to *wind* zone - refer Table 7.
For other ridge to hip flashings refer to New Zealand Metal Roofing and Wall Cladding Code of Practice.

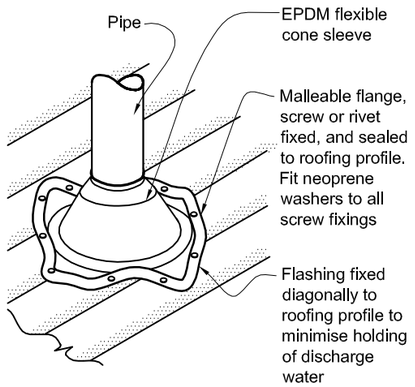




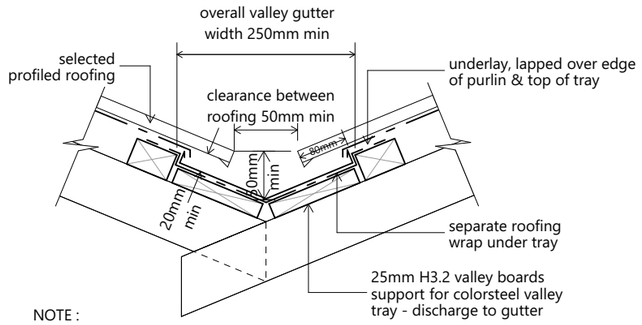
R1 **EAVE DETAIL**

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Figure 53: **Flashing for small pipes**
Paragraphs 8.3.10, 8.4.17, 9.6.8.5 and 9.6.9.6

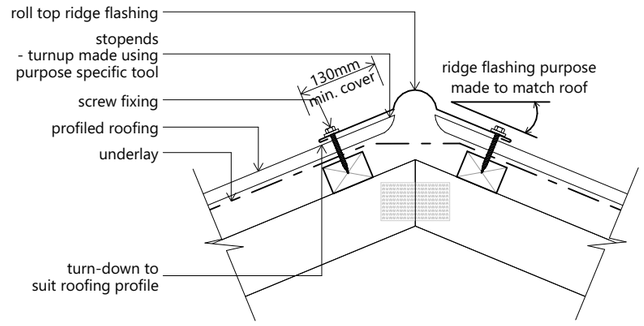


NOTE:
(1) Max. roof pitch for this flashing 45°, minimum pitch 10° if base of flange covers one or more complete troughs.
(2) For pipes up to 85 mm diameter.



NOTE :
valley to be waterproofed in accordance with E2 clause 8.1.6.2 NZ Building Code

R2 **VALLEY DETAIL**



R3 **RIDGE DETAIL**

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ROOF DETAILS

Scale: 1:10 | Rev: | Sheet no: 26

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
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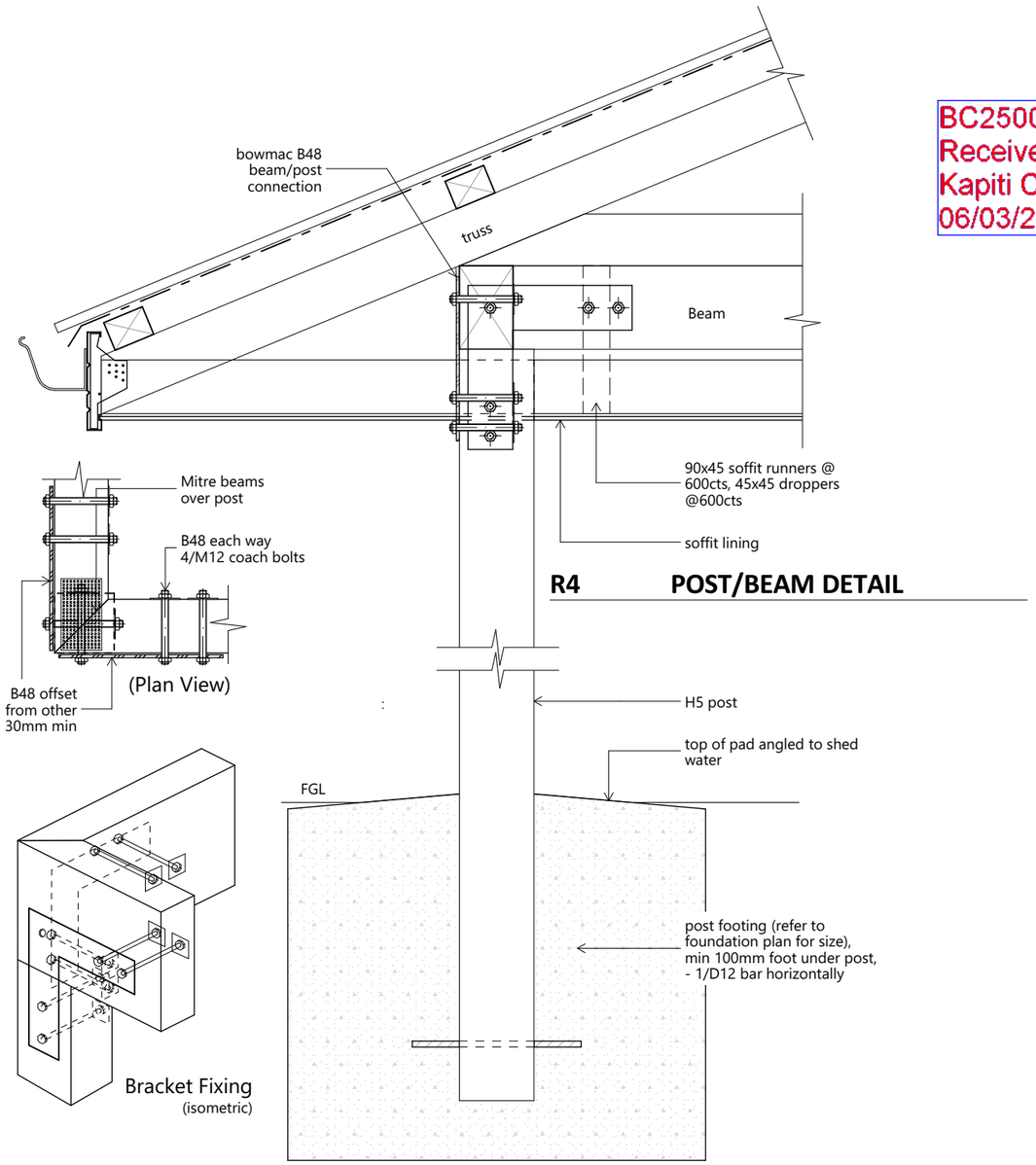
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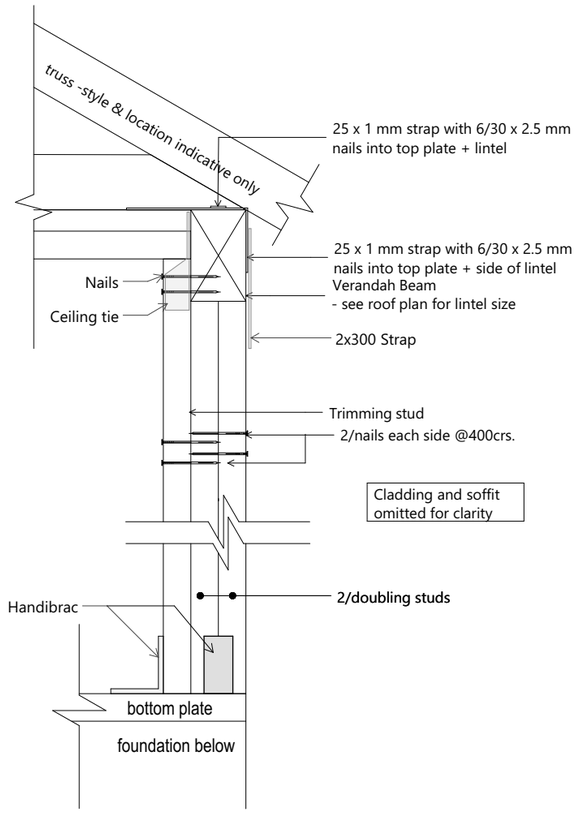
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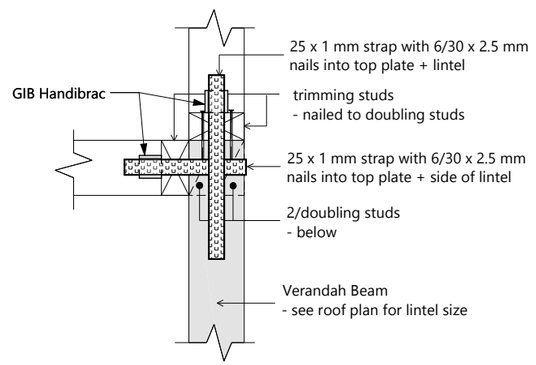
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R4 POST/BEAM DETAIL





(plan view)

BEAM CORNER DETAIL

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ROOF DETAILS

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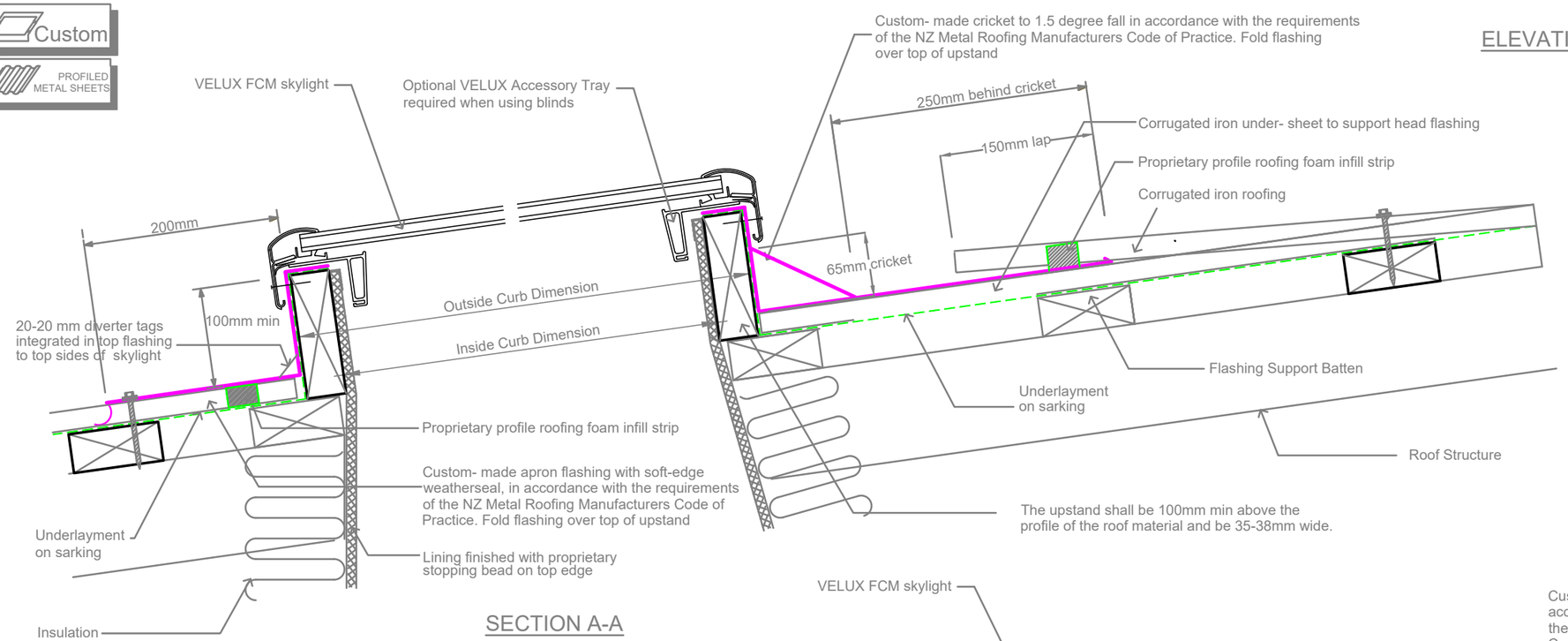
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FCM,

Custom

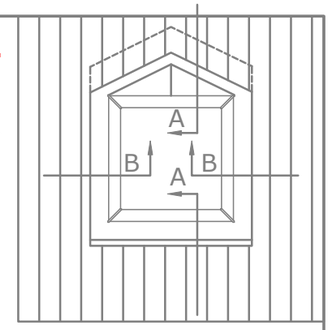
PROFILED METAL SHEETS

THIS DETAIL APPLIES TO METAL CORRUGATE ROOF PROFILES WITH ROOFPITCHES BETWEEN 8 AND 60 DEGREES.



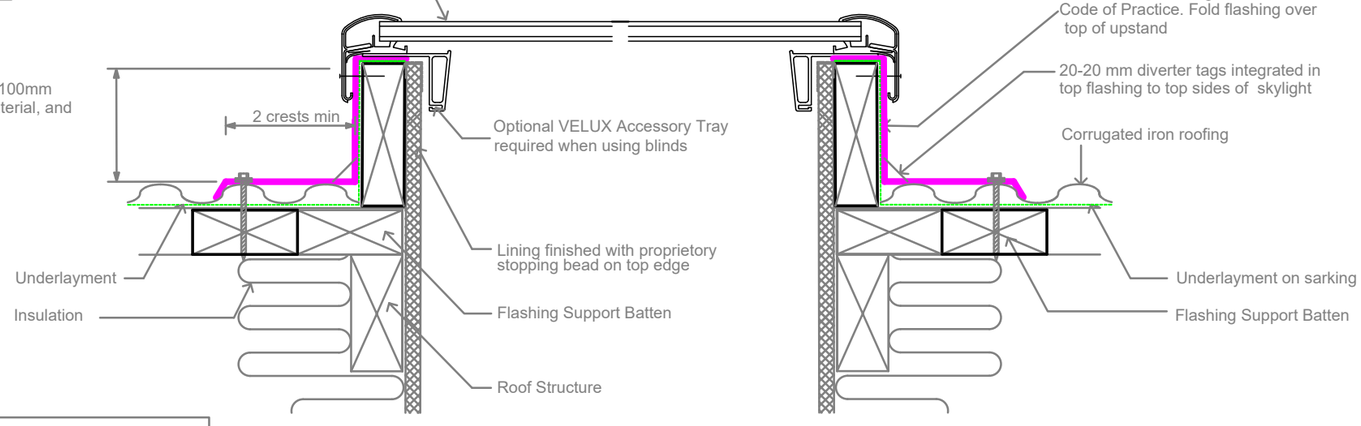
SECTION A-A

ELEVATION



Custom-made metal flashing in accordance with New Zealand Metal Roofing Manufacturers Code of Practice. Ensure all flashings meet the requirements for your projects' location.

Please note:
Below 15 degrees:- Any condensation that forms on the glass due to high humidity may drip



SECTION B-B

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BRANZ APPRAISED CUSTOM OVER-UNDER FLASHING

No cricket or diverter required when skylight is less than 600mm wide, and catchment less than 40 sqm.

Custom flashings must be designed to meet the requirements set out in the latest version of the New Zealand Metal Roof and Wall Cladding Code of Practice, and shall be manufactured and installed by a specialist flashing contractor to the latest trade practices.

The flashing and installation must be guaranteed against weathertightness by the specialist flashing contractor.

Insulation material meeting the requirements of NZBC/H1 is required in the cavities of the lightwell structure.

VELUX Sky-Product Management

NEW ZEALAND LTD.
0800 650 445

VELUX FCM Fixed Low Pitch Skylight in Corrugated Steel Roof with metal over-under flashing (8-60 degrees)

	Name	Date
Drawn by		Feb 19
Checked by		Feb 19
Drawing No.		

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VELUX DETAILS

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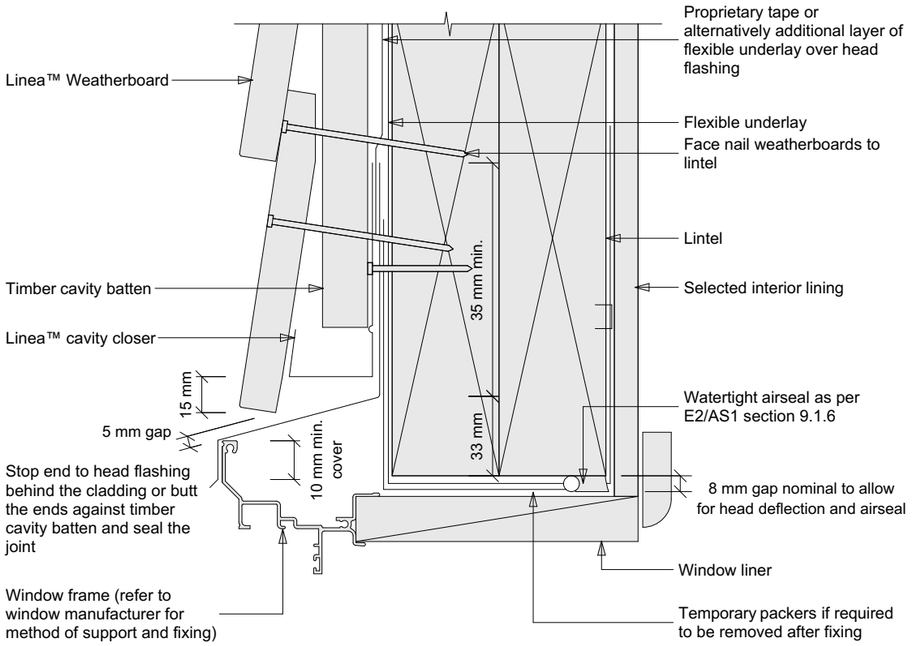
Client Details:
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Address:
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Job no: **AW611P**

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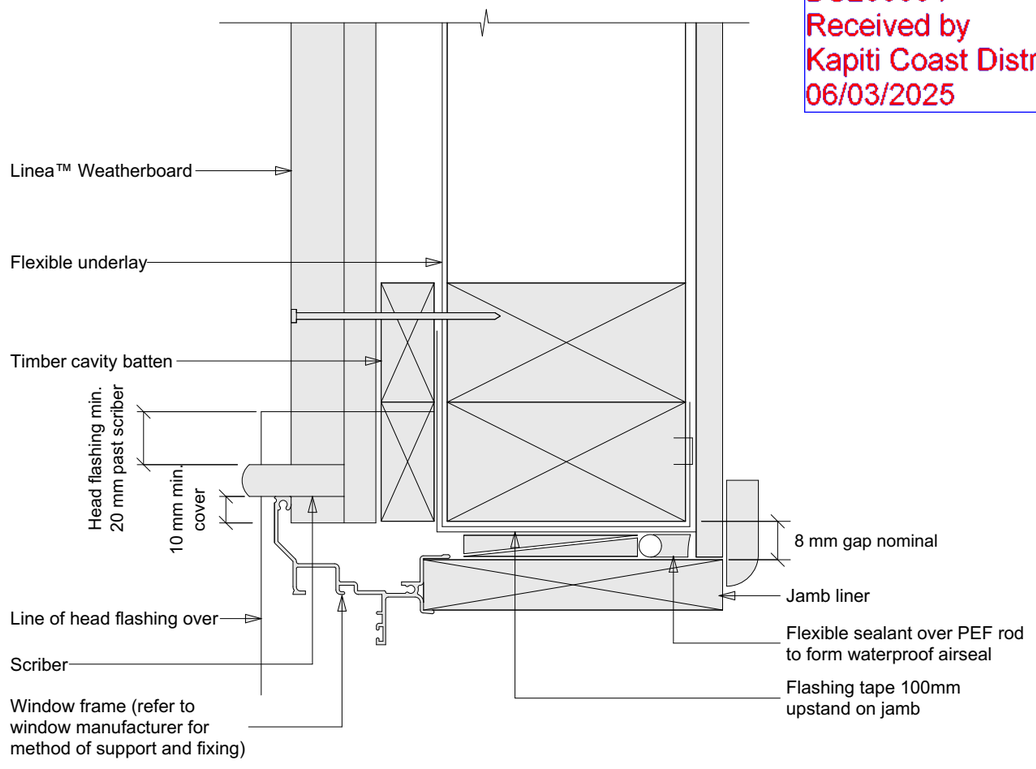
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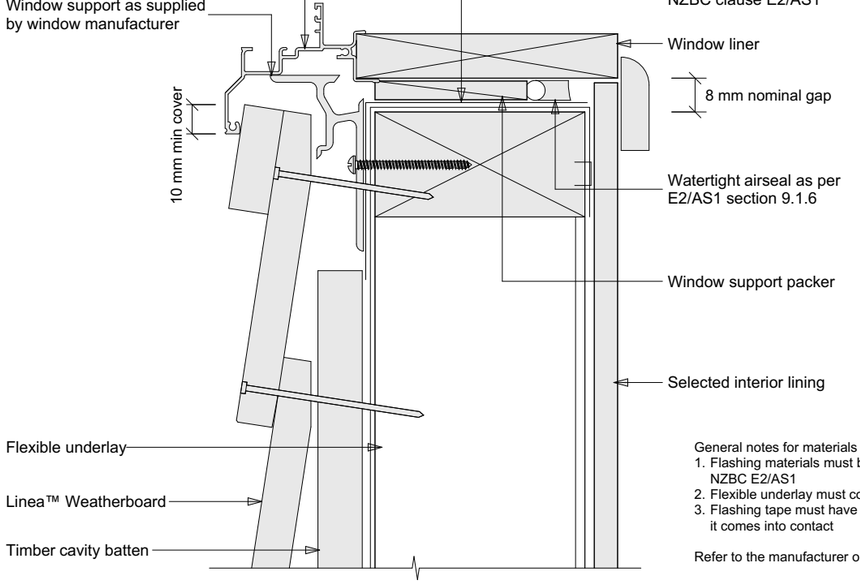
LINEA JOINERY HEAD DETAIL

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

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LINEA JOINERY JAMB DETAIL



LINEA JOINERY SILL DETAIL

General notes for materials selection
1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of 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

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

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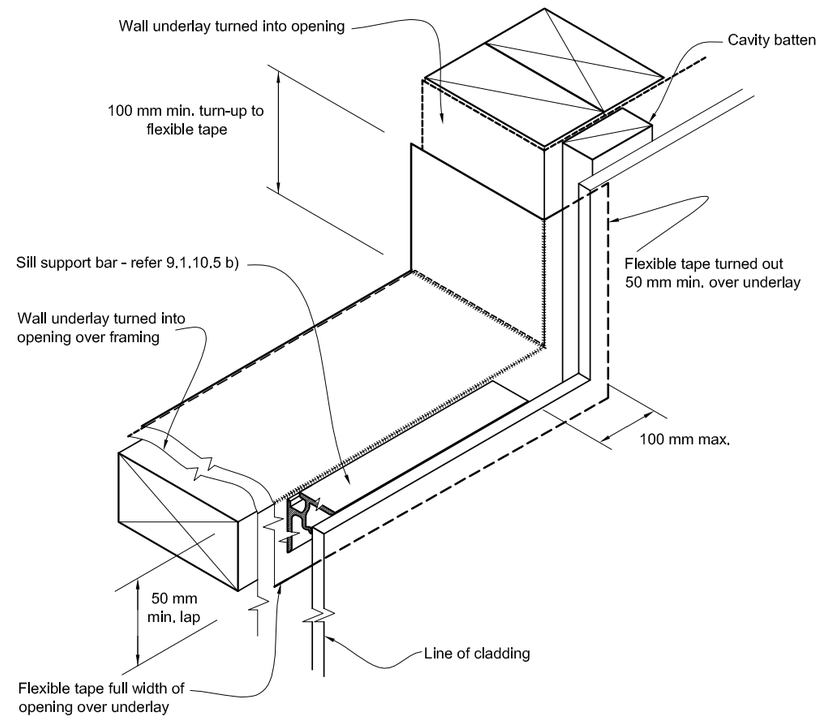
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KH110a

Figure 72B: **General window and door opening with drainage cavity**
Paragraphs 9.1.5, 9.1.9.3, 9.1.10.2, Figures 73C, 76, 85, 86, 91, 99, 116 and 128

NOTE:
(1) Detailed *cladding* omitted for clarity, refer to specific *claddings*.
(2) Head to be treated similarly with continuous *wall underlay* and *flexible tape* at corners.
(3) Refer individual cladding details for jamb flashings.



Flexible air seals;
The air seal shall be installed over a closed cell polyethylene foam (PEF) backing rod, or similar and made of self-expanding polyurethane foam

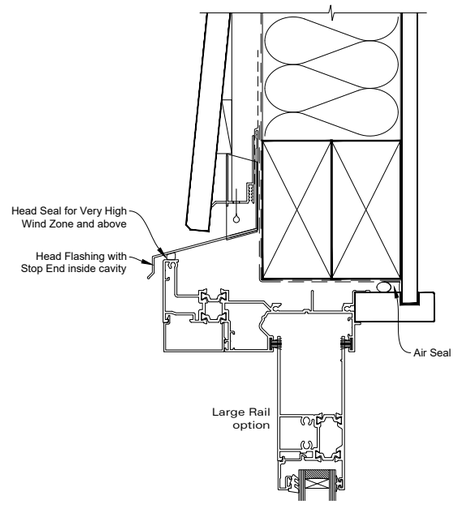
Backing rods are used for self-expanding polyurethane foam as there is a danger foam will expand to the outside of the wall and form a moisture bridge to the interior.

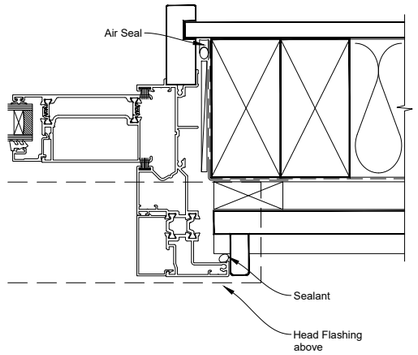
9.1.10.8 Attachments for windows and doors
Install windows and doors using pairs of minimum 75 x 3.15 galvanised jolt head nails or 8 gauge x 65 mm stainless steel screws, through reveals into surrounding framing at:
a) Maximum 450 mm centres along sills, jambs and heads, and
b) Maximum 150 mm from reveal ends.
Install packers between reveals and framing at all fixing points, except between head reveals and lintels.

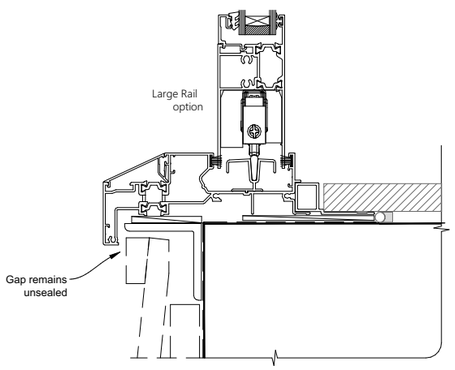
Flashing tape must be proven compatibility with selected building underlay
and other building materials with which it comes into contact as per table
21 of 'E2/AS1'

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06/03/2025

INSTALLATION DETAIL - RESIDENTIAL THERMAL HEART SLIDING DOOR ON BEVEL BACK WEATHERBOARD CAVITY CONSTRUCTION
Date: 01.04.22 **Scale:** 1:2 **CAD Ref.:** TRSDBW-CH







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JOINERY DETAILS

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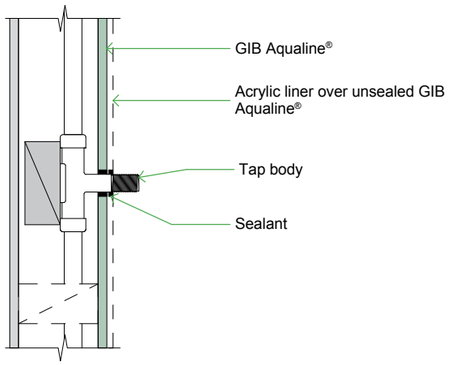
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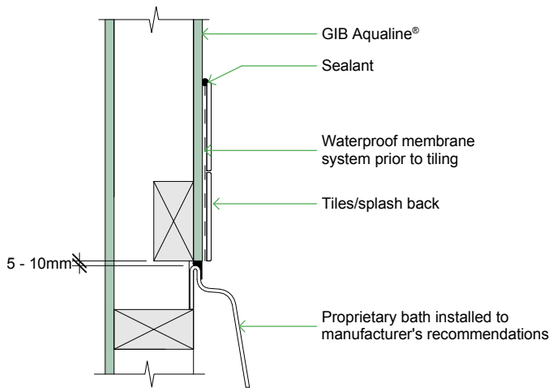
Address:
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Job no: **AW611P**
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E: SEALING SEMI WET AREA PENETRATION

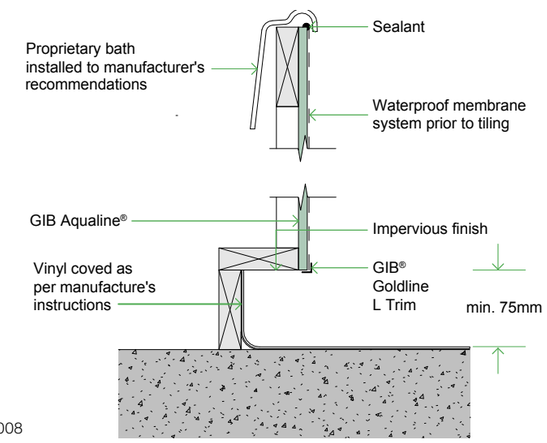


D: BATH LINING JUNCTION

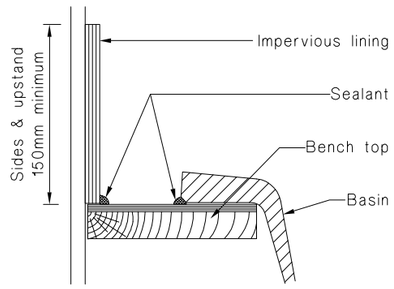


GAL-010

E: CRADLE VINYL LINING JUNCTION



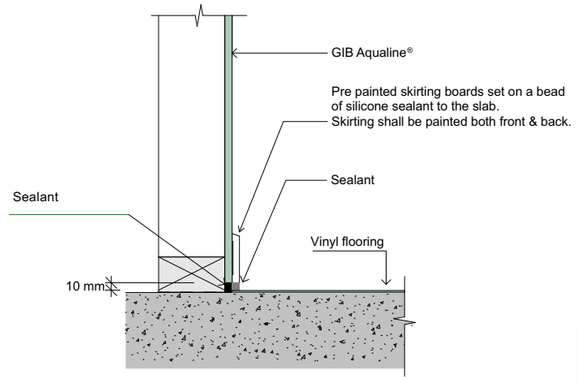
GAL-008



(b) Tub, sink and basin

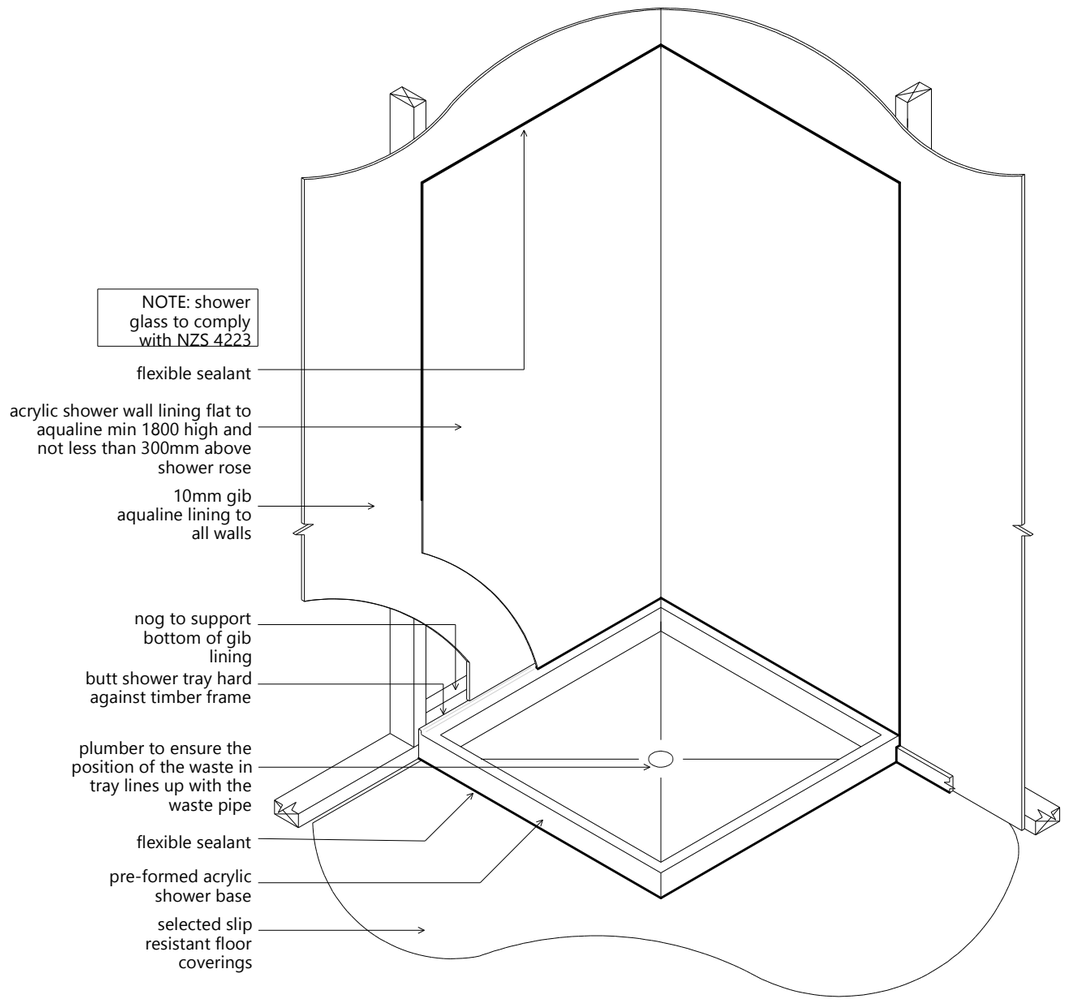
Shower glass:
10mm thick AS/NZS 2208 certified tempered safety glass as per NZS4223.3

FLOOR LINING JUNCTION

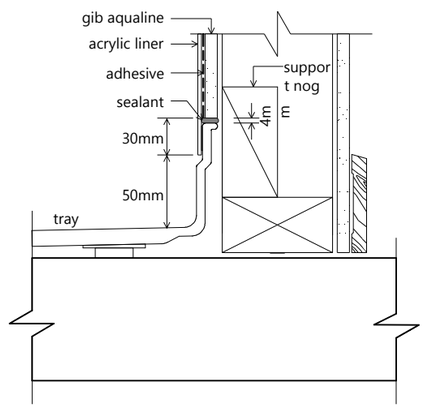


Sealant:
Vinyl compatible, continuous bead of Branz appraised wet area clear silicone sealant. Sealant & application to comply with E3/AS1 Section 2.1.1 & Section 3.0 (includes vertical joints of skirting at corner)

BC250084
Further Information Received
10/04/2025



Acrylic Shower Tray + Wall Linings



Shower Tray

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WET AREA DETAILS

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Sheet no: **31**

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Client Details:
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Waikanae

Job no: **AW611P**
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Table 4: **Tempering Valve or Thermostatic Mixing Valve and Nominal Pipe Diameters**
Paragraphs 5.4.1 and 6.12.1

	Low pressure (i.e. header tank supply or low pressure)	Low pressure unvented (valve vented) and open vented	Mains pressure
Pressure of water at Tempering Valve or Thermostatic Mixing Valve (kPa)	20 – 30	30 – 120	over 300
Metres head (m)	2 – 3	>3 – 12	over 30
Minimum Tempering Valve or Thermostatic Mixing Valve size	25 mm	20 mm	15 mm
Pipes to Tempering Valve or Thermostatic Mixing Valve	25 mm (see **Note 3**)	20 mm	20 mm (15 mm optional) (see **Note 1**)
Pipes to shower	20 mm	20 mm (see **Note 4**)	20 mm (see **Note 5**) (15 mm optional) (see **Note 1**)
Pipes to sink/laundry (see **Note 2**)	20 mm	20 mm	15 mm
Pipes to bath (see **Note 2**)	20 mm	20 mm	15 mm
Pipes to basins (see **Note 2**)	15 mm	15 mm	10 mm

Notes:

1. If supplied by separate pipe from *storage water heater* to a single outlet.
2. This table is based on maximum pipe lengths of 20 metres.
3. 2 m maximum length from *water heater* outlet to tempering valve or thermostatic mixing valve
4. 15 mm if dedicated line to shower.
5. 10 mm if dedicated line to shower.
6. Pipe sizes in this table have been calculated to deliver water simultaneously to the kitchen sink and one other *fixture.*

Figure 8(b): **Mains Pressure Storage Water Heater System (unvented) - Expansion Control Valve**
Paragraphs 6.1.2 and 6.2.1 c)

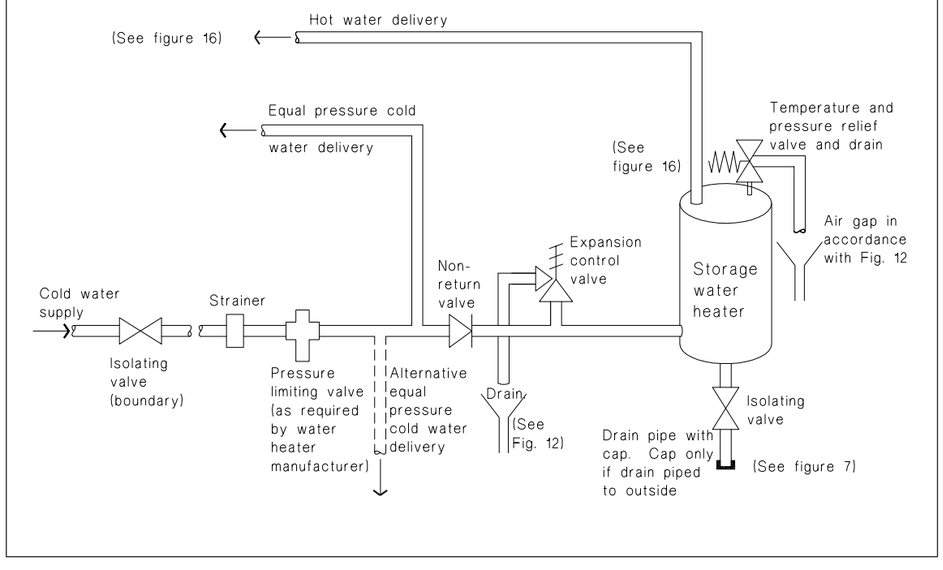
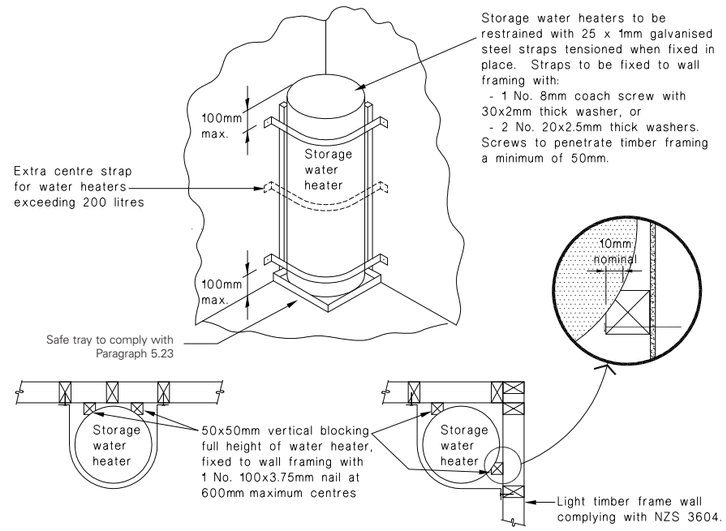


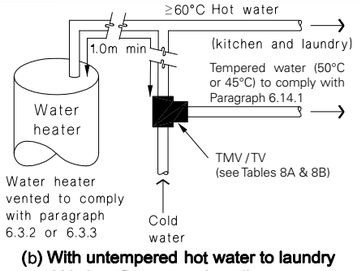
Figure 14: **Seismic Restraint of Storage Water Heaters 90 – 360 litres**
Paragraph 6.11.4



Notes:

1. An additional centre strap is required where a *storage water heater* is located more than 12 m above finished ground level.
2. Additional timber framing may be required in retrofit situations to ensure adequate strap fixing is available.
3. Straps shall not be installed where they clash with water heater inlets, outlets or controls.
4. Where the 100 mm maximum strap distance from the top or bottom of the *storage water heater* cannot be achieved, straps may be placed within the top and bottom 25% with one additional strap placed centrally for water heaters < 200 litres, and two additional evenly spaced straps for water heaters 200 - 360 litres.
5. A maximum total of four straps are required when complying with both Note 1 and Note 4.

Figure 16: **Tempering Valve or Thermostatic mixing Valve Installation**



(b) With untempered hot water to laundry and kitchen fixtures and appliances

Notes:

1. For optimum system efficiency the temperature control device, for other than a mains pressure system, may be located as low as practicable to achieve the manufacturer's recommended head, at the temperature control device.
2. 1.0 m minimum copper pipe length from storage water heater to temperature control device.

6.14.2 Hot water delivered from storage water heaters
a) An acceptable method of limiting hot water temperature delivered from storage water heaters is to install a mixing device between the outlet of the water heater and the sanitary fixture (see Figure 16).
b) Tempering valves shall comply with NZS 4617 or AS 1357.2.

Irrespective of whether a mixing device is installed, the storage water heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.

Safe trays for hot water cylinders shall be installed in accordance with the manufacturer's installation instructions

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Rev:
Sheet no: **32**

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 21/02/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**C**	**N1**	**3**

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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

Table 5.2 – Procedure for determination of topographic class, T1 – T4

Steps	Action	Reference	Values available
1	Determine hill height and formation	Figure 5.2	Hill, Escarpment
2	Determine smoothed gradient value and class	Figure 5.2	Low to Steep
3	Determine topography	Figure 5.2	Crest / Outer
4	Determine site exposure	5.2.4	Sheltered/exposed
5	Determine topographic class	5.2.5, table 5.3	–

In this table				
Gentle =	Gradient	< 0.05	i.e. slope max.	1:20
Low =	Gradient	0.05 < 0.1	i.e. slope max.	1:10
Mild =	Gradient	0.1 < 0.15	i.e. slope max.	1:6.7
Moderate =	Gradient	0.15 < 0.2	i.e. slope max.	1:5
Steep =	Gradient	> 0.2	i.e. slope max.	1:5

Table 5.3 – Determination of topographic class

Topography	Gentle	Low	Mild	Moderate	Steep
Crest	T1	T2	T3	T4	T4
Outer	T1	T1	T2	T2	T3

All sites outside the outer and crest zones are topographic class T1 except that:

(1) Sites within valleys which are known to have accelerated wind flows within them because of their shape and exposed mouths shall be classed as T4.

(2) Sites in areas with undulations of less than 10 m in height, and gradients less than 1:20 shall be classed as T1.

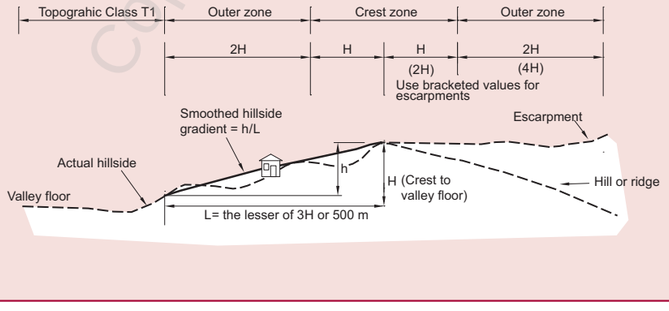


Figure 5.2 – Topography (including escarpment conditions)

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10/04/2025

Table 5.4 – Determination of wind zone

Region	Ground roughness	Topographic class and site exposure							
		T1		T2		T3		T4	
		Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed
A	Urban	L	M	M	H	H	H	H	VH
	Open	M	H	H	VH	H	VH	VH	EH
W	Urban	M	H	H	VH	H	VH	EH	EH
	Open	H	VH	VH	EH	VH	EH	SED	SED

NOTE –
Wind speeds below are the maximum ultimate limit state wind speed for each wind zone.
L = Low wind speed of 32 m/s
M = Medium wind speed of 37 m/s
H = High wind speed of 44 m/s
VH = Very high wind speed of 50 m/s
EH = Extra high wind speed of 55 m/s
SED = Specific engineering design (not covered by this Standard)

Winds in lee zones shall be increased as follows:
Low wind becomes High
Medium wind becomes Very high
High wind, and above become SED

C5.2.6

For roof pitches below 25° the horizontal loads on the roof are small compared with the loads on the walls. For this reason the gable overhang and eaves are ignored for calculation purposes.

For steeper roofs the horizontal loads on the roof are significant and the overall roof length (including overhangs) is used for calculations.

5.2.6 Determination of wind bracing demand

The influence on the wind *bracing demand* of the building size and shape and location of *bracing elements* within the building height is incorporated in tables 5.5 to 5.7.

The overall wind *bracing demand* on the building shall be determined by multiplying the value obtained from tables 5.5 to 5.7 (including the factor in the notes) by the building length (for calculating *bracing demand* across) and width (for calculating *bracing demand* along), where length and width are measured perpendicular to the direction of the wind (figure 5.3). The building *wall* length and width shall be used where the *roof* pitch is 25° or less, and the *roof* dimensions where the *roof* pitch is greater than 25°.

5.2.7 Mono-pitch roofs

For buildings with mono-pitch *roofs* the *roof* height above eaves shall be taken as the difference between the lower eaves height and the *roof* apex.

The wind demand in BU/m in both the ALONG and ACROSS directions shall be taken as the higher of the two.

5.2.8 Roofs with hip ends

For buildings with hip *roofs* the ACROSS values in tables 5.5 to 5.7 shall be used to determine the *bracing demand* in both ALONG and ACROSS directions.

5.2.9 Wind bracing demand for decks

Wind *bracing demand* for *decks* may be ignored.

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WIND ZONE

Scale:
Rev:
Sheet no: 33

Design: A1 | Drawn: MPP/TN | Check: UP | LBP: UP | Date: 10/04/2025

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	C	N1	3

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Client Details:
Brad & Vanessa Jefferies

Address:
62 Awanui Drive
Waikanae

Job no: **AW611P**
KH110a

GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

Name:	Jefferies
Street and Number:	62 Awanui Ave
Lot and DP Number:	Lot 2 DP 578379
City/Town/District:	Waikanae
Designer:	TN
Company:	IDA
Date:	Wednesday, 19 February 2025

Building Specification

Number of Storeys	1
Floor Loading	2 kPa
Foundation Type	Subfloor
Subfloor Cladding Weight	Light
	Single
Cladding Weight	Light
Roof Weight	Light
Room in Roof Space	No
Roof Pitch (degrees)	22.5
Roof Height above Eaves (m)	2.136
Building Height to Apex (m)	5.166
Ground to Lower Floor (m)	0.61
Average Stud Height (m)	2.42
Building Length (m)	15.50
Building Width (m)	8.18
Building Plan Area (m²)	110.02

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06/03/2025

Building Location

Wind Zone = High

Earthquake Zone 3

Soil Type D & E (Deep to Very Soft)

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

Bracing Units required for Wind

	Along	Across
Single Level	**416**	**734**
Subfloor Level	**693**	**1258**

Bracing Units required for Earthquake

	Along & Across
Single Level	**1187**
Subfloor Level	**1537**

Single Level Along Resistance Sheet

Job Name: Jefferies

Timber Floor Limit of 120 BUs/m Applied

									Wind	EQ
									Demand	
									416	1187
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1425 343%	1301 110%
a	1	0.92		2.42	GS1-N	GIB®	58	54		
	2	1.39		2.42	GS1-N	GIB®	95	83		
	3	1.38		2.42	GS1-N	GIB®	94	82		
	4	0.50		2.42	GS1-N	GIB®	27	29		
	5	0.61		2.42	GS1-N	GIB®	35	35		
	6	0.44		2.42	GS1-N	GIB®	23	25		
	External Length = 15.50								333 OK	309 OK
b	1	0.49		2.42	GS1-N	GIB®	27	28		
	2	0.60		2.42	GS1-N	GIB®	34	35		
	3	2.50		2.42	GS1-N	GIB®	171	149		
	4	2.10		2.42	GS1-N	GIB®	144	125		
	5	2.34		2.42	GS1-N	GIB®	160	139		
	6	2.10		2.42	GS1-N	GIB®	144	125		
	External Length = 2.44								679 OK	601 OK
c	1	1.01		2.42	GS1-N	GIB®	65	60		
	2	1.01		2.42	GS1-N	GIB®	65	60		
	3	0.60		2.42	GS1-N	GIB®	34	35		
	4	0.55		2.42	GS1-N	GIB®	31	32		
	5	0.70		2.42	GS1-N	GIB®	41	41		
	6	0.70		2.42	GS1-N	GIB®	41	41		
	7	1.39		2.42	GS1-N	GIB®	95	83		
	8	0.70		2.42	GS1-N	GIB®	41	41		
	External Length = 13.06								413 OK	391 OK

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Single Level Across Resistance Sheet

Job Name: Jefferies

Timber Floor Limit of 120 BUs/m Applied

									Wind	EQ
									Demand	
									734	1187
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1504 205%	1329 112%
m	1	2.02		2.42	GS1-N	GIB®	138	120		
	External Length = 4								138 OK	120 OK
n	1	0.79		2.42	BL1-H	GIB®	85	80		
	2	0.70		2.42	GS1-N	GIB®	41	41		
	External Length = 3.29								126 OK	121 OK
o	1	2.40		2.42	GS1-N	GIB®	164	143		
	2	2.11		2.42	GS1-N	GIB®	144	126		
	External Length = 0.5								309 OK	268 OK
p	1	3.00		2.42	GS1-N	GIB®	205	179		
	External Length = 1.39								205 OK	179 OK
q	1	2.21		2.42	GS1-N	GIB®	151	132		
	2	1.46		2.42	GS1-N	GIB®	100	87		
	3	1.46		2.42	GS1-N	GIB®	100	87		
									351 OK	305 OK
r	1	0.40		2.42	EP1_0.4	CHH	32	38		
	2	2.02		2.42	GS1-N	GIB®	138	120		
	3	3.00		2.42	GS1-N	GIB®	205	179		
	External Length = 8.18								375 OK	336 OK

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Subfloor Level Along Resistance Sheet

Job Name: Jefferies

									Wind	EQ
									Demand	
									693	1537
									Achieved	
Line	Element	Length or No.	Angle (degrees)		Type	Supplier	Wind (BUs)	EQ (BUs)	2560 369%	1920 125%
A	1	4.00			Anchor Pile	NZS3604	640	480		
	External Length = 15.50								640 OK	480 OK
B	1	4.00			Anchor Pile	NZS3604	640	480		
	External Length = 2.44								640 OK	480 OK
C	1	4.00			Anchor Pile	NZS3604	640	480		
									640 OK	480 OK
D	1	4.00			Anchor Pile	NZS3604	640	480		
	External Length = 13.06								640 OK	480 OK

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Subfloor Level Across Resistance Sheet

48

Job Name: Jefferies

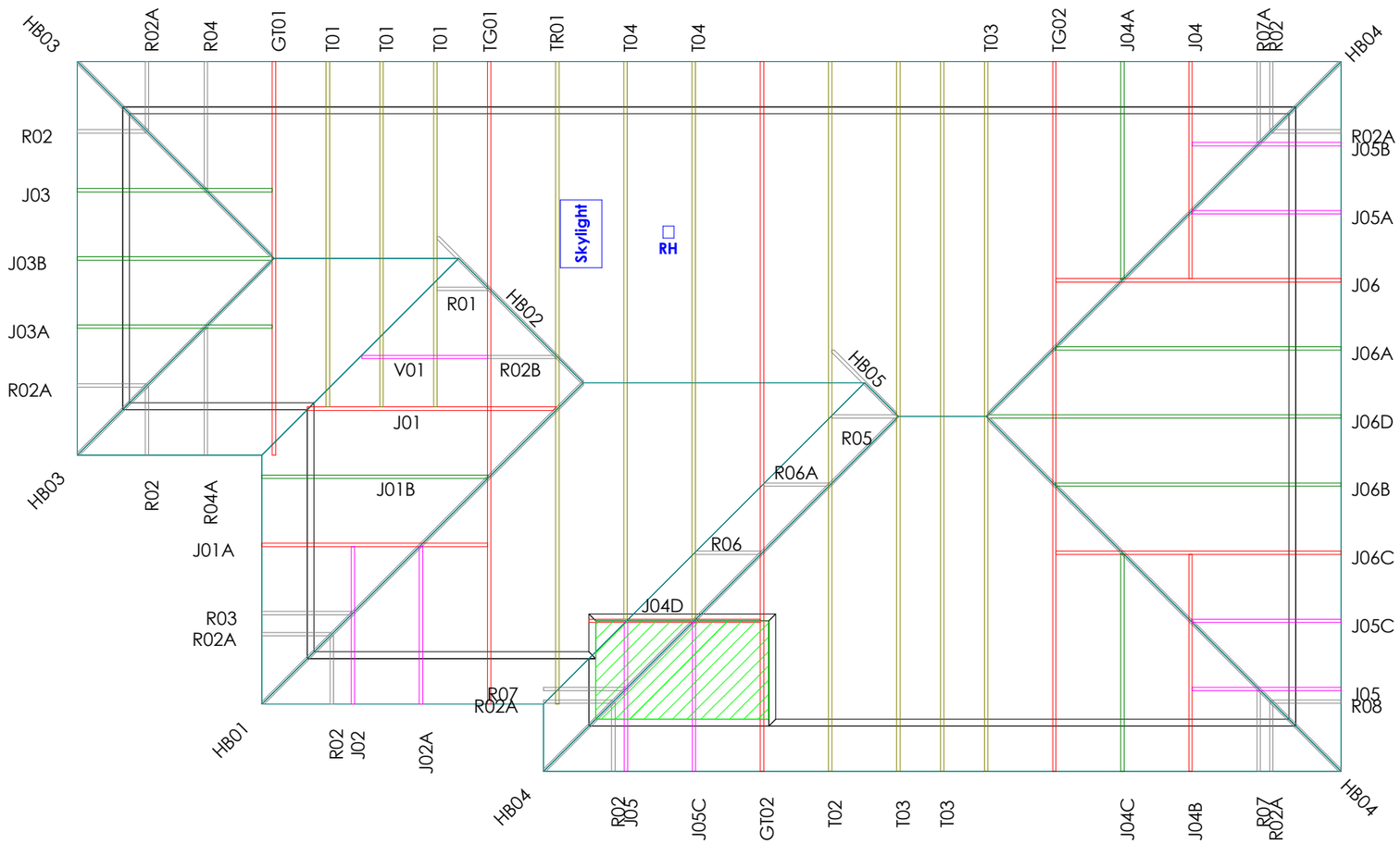
									Wind	EQ
									Demand	
									1258	1537
									Achieved	
Line	Element	Length or No.	Angle (degrees)		Type	Supplier	Wind (BUs)	EQ (BUs)	2560 203%	1920 125%
M	1	2.00			Anchor Pile	NZS3604	320	240		
	External Length = 4								320 OK	240 OK
N	1	3.00			Anchor Pile	NZS3604	480	360		
	External Length = 3.29								480 OK	360 OK
O	1	2.00			Anchor Pile	NZS3604	320	240		
	External Length = 0.5								320 OK	240 OK
P	1	3.00			Anchor Pile	NZS3604	480	360		
	External Length = 1.39								480 OK	360 OK
Q	1	2.00			Anchor Pile	NZS3604	320	240		
									320 OK	240 OK
R	1	4.00			Anchor Pile	NZS3604	640	480		
	External Length = 8.18								640 OK	480 OK

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Flat Soffit

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06/03/2025



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Site Address :
Jefferies - AW611P
62 Awanui Drive
Waikanae

Sheet Title :
For Building Consent
Buildable Truss Layout

Date : 5 Dec,2024 | Drawn : Coel Parkes
Scale : 1: 75 | System : MiTek 20/20

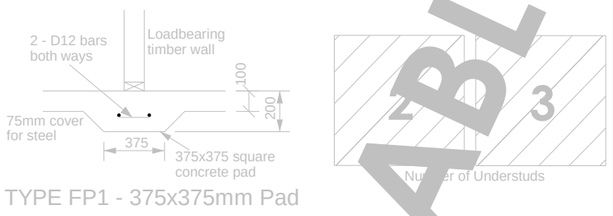
Job Details:

Roof Pitch	: 22.50deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on Clips-R @ 1800c	Overhang	: 600mm
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.000kPa		

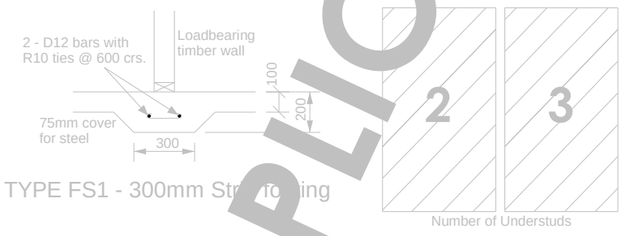
Job Title : 260613
Sheet : 1
Revision Number :

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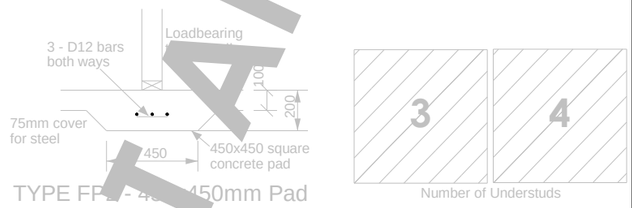
Slab Thickening Details



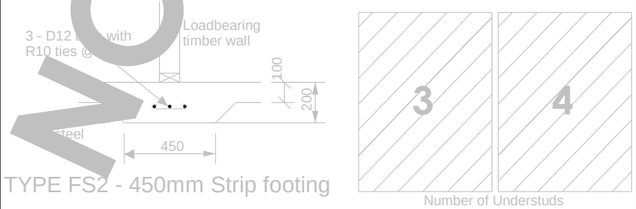
TYPE FP1 - 375x375mm Pad



TYPE FS1 - 300mm Strip footing



TYPE FP2 - 450mm Pad



TYPE FS2 - 450mm Strip footing

NOT APPLICABLE

NOTES:

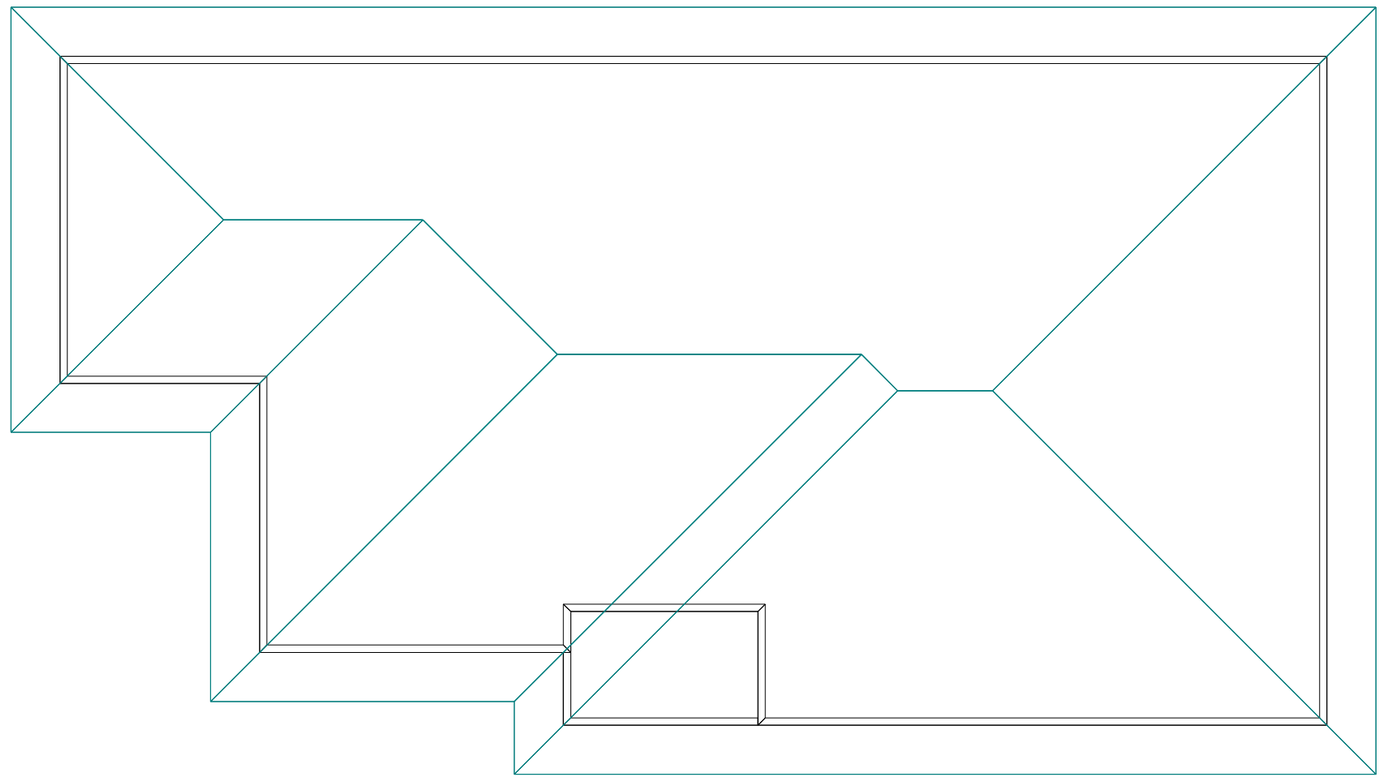
All point loads exceeding 8.0kN are indicated.

All walls shown to be considered load bearing.

Refer to Rib-raft floor desgin for slab thickening.

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NO SLAB THICKENING REQUIRED FOR TRUSS LOADS
ALL OTHER THICKENINGS SPECIFIED BY DESIGNER

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Site Address :
Jefferies - AW611P
62 Awanui Drive
Waikanae

Sheet Title :
For Building Consent
Rib-Raft Slab

Date : 5 Dec,2024 | Drawn : Coel Parkes
Scale : 1: 75 | System : MiTek 20/20

Job Details:

Roof Pitch	: 22.50deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on Clips-R @ 1800c	Overhang	: 600mm
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.000kPa		

Job Title : 260613
Sheet : 2
Revision Number :

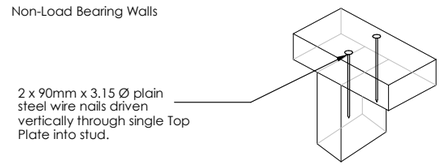
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BOWMAC
STUD-LOK
STUD TO TOP PLATE FIXING OPTIONS

TYPE A - 0.7kN

*Imges are indicative only.
Timber Sizes may vary.

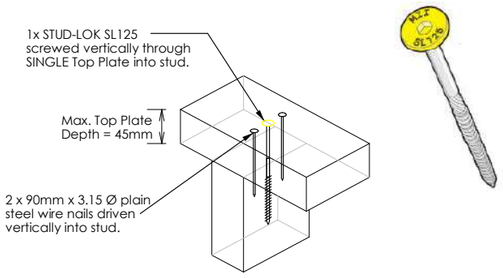
Non-Load Bearing Walls

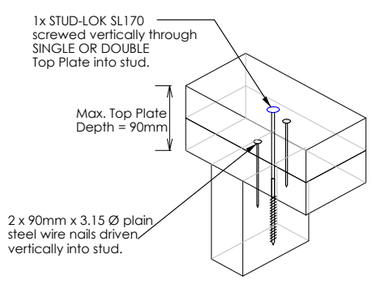


TYPE B- 4.7kN

Load Bearing Walls

STUD-LOK SL125
Yellow Head
125mm Long





STUD-LOK SL170
Blue Head
170mm Long

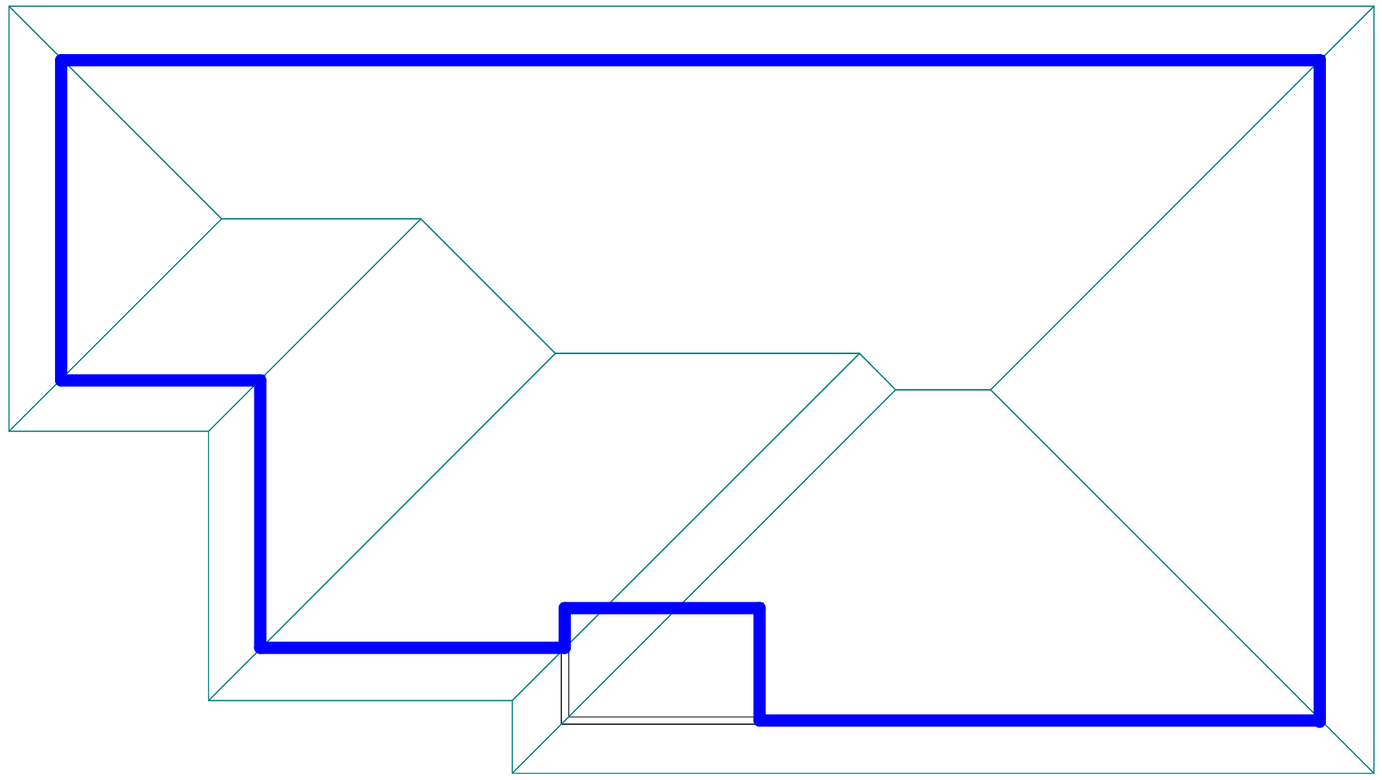


STUD-LOK Wall Fixing Chart - Stud to Top Plate Fixing Schedule (Alternative to NZS3604:2011 Table 8.18)

Loaded Dimension (m) Stud Centres			Light Roof Wind Zone					Heavy Roof Wind Zone				
300mm	400mm	600mm	L	M	H	VH	EH	L	M	H	VH	EH
3.0	2.3	1.5	2N	2N	SL	SL	SL	2N	2N	SL	SL	SL
4.0	3.0	2.0	2N	2N	SL	SL	SL	2N	2N	SL	SL	SL
5.0	3.8	2.5	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
6.0	4.5	3.0	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
7.0	5.3	3.5	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
8.0	6.0	4.0	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
9.0	6.8	4.5	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
10.0	7.5	5.0	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
11.0	8.3	5.5	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
12.0	9.0	6.0	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL

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Site Address :
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62 Awanui Drive
Waikanae

Sheet Title :
For Building Consent
Stud To Top Plate Fixing

Date : 5 Dec,2024 | Drawn : Coel Parkes
Scale : 1: 75 | System : MiTek 20/20

Job Details:

Roof Pitch	: 22.50deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on Clips-R @ 1800c	Overhang	: 600mm
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.000kPa		

Job Title : 260613
Sheet : 3
Revision Number :

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Truss Fixings

- D - Pair of Wire Dogs + 2/90x3.15mm skew nails
- X - LUMBERLOK JH47x90 Joist Hanger
- Z - LUMBERLOK JH47x120 Joist Hanger
- P - LUMBERLOK JH47x190 Joist Hanger
- E - LUMBERLOK JH95x165 Joist Hanger
- O - Pair of LUMBERLOK CT200 Ceiling Ties
- H - LUMBERLOK CT400 Cyclone Tie
- B - LUMBERLOK CT600 Cyclone Tie
- M - Pair of LUMBERLOK Multi Grips
- m - Single LUMBERLOK Multi Grip
- NP - LUMBERLOK Nailon Plate
- N - LUMBERLOK N21 Diagonal Cleat
- V - Single LUMBERLOK CPC40 Cleat
- G - LUMBERLOK TTP 9kN Truss to Top Plate set
- C - Single LUMBERLOK CPC80 Cleat
- K - LUMBERLOK TTP 16kN Truss to Top Plate set
- S - LUMBERLOK Split Hanger SPH140
- F - LUMBERLOK Split Hanger SPH180
- T - LUMBERLOK Split Hanger SPH220
- SB - LUMBERLOK 600mm Sheet Brace Strap
- 24 - MiTek Engineered 24kN Uplift Fixing
- 34 - MiTek Engineered 34kN Uplift Fixing
- 45 - MiTek Engineered 45kN Uplift Fixing

NOTES:

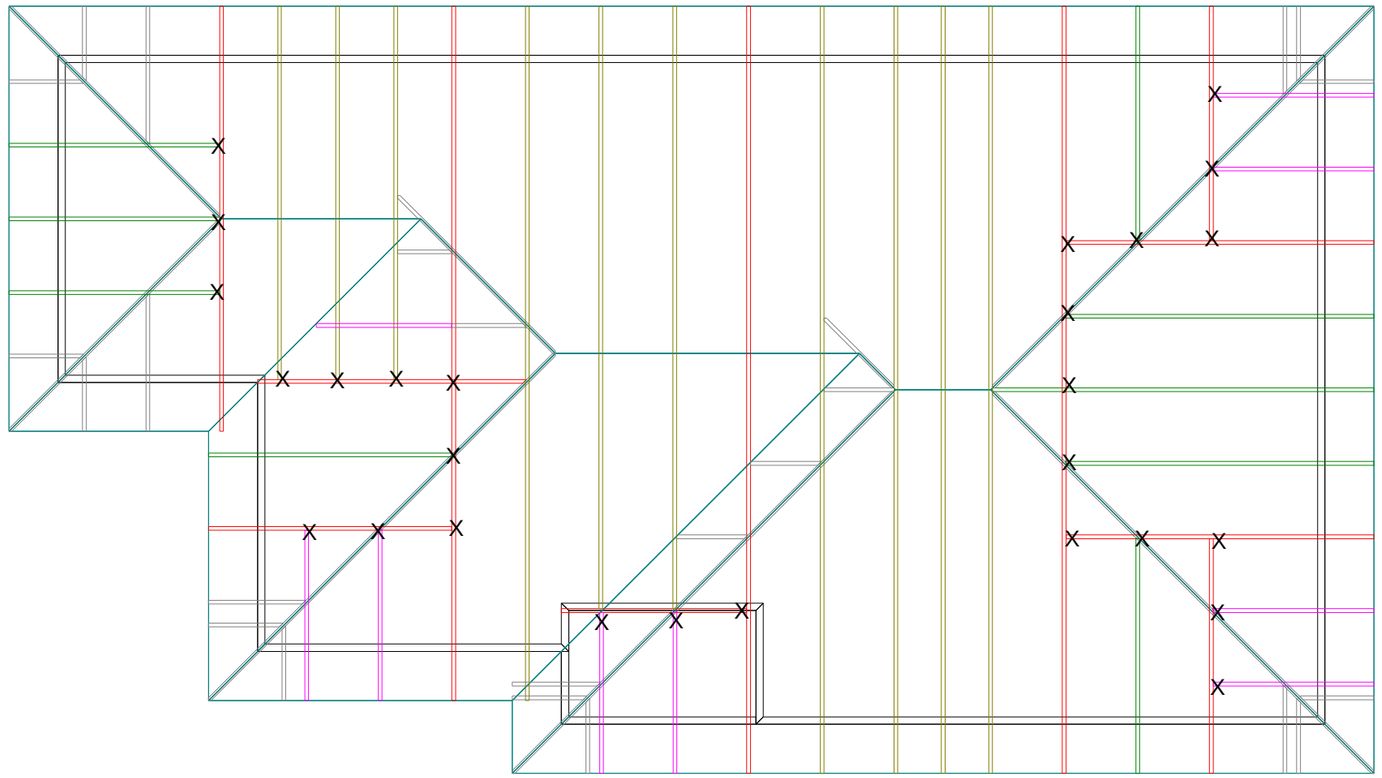
Where there are no fixings indicated, please use LUMBERLOK TTP 9kN Truss to Top Plate set
In situations where there are no overhangs shown, raised heels or internal LBW are indicated, a LUMBERLOK 9kN Truss to Top plate set is required for truss to Top Plate connections.

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

If MiTek Engineered Fixings are specified
Refer to the details attached to this document.

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Site Address :
Jefferies - AW611P
62 Awanui Drive
Waikanae

Sheet Title :
For Building Consent
Truss Fixings

Date : 5 Dec,2024 | Drawn : Coel Parkes
Scale : 1: 75 | System : MiTek 20/20

Job Details:

Roof Pitch	: 22.50deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on Clips-R @ 1800c	Overhang	: 600mm
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.000kPa		

Job Title : 260613
Sheet : 4
Revision Number :

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Lintel Fixing Details

TYPE E
1.4kN

TYPE F
4.0kN

TYPE G
7.5kN

TYPE H
13.5kN

NOTES:

Refer to:
Stud-Lok Lintel Fixing Schedule 11/2017 on the next page of this document.

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

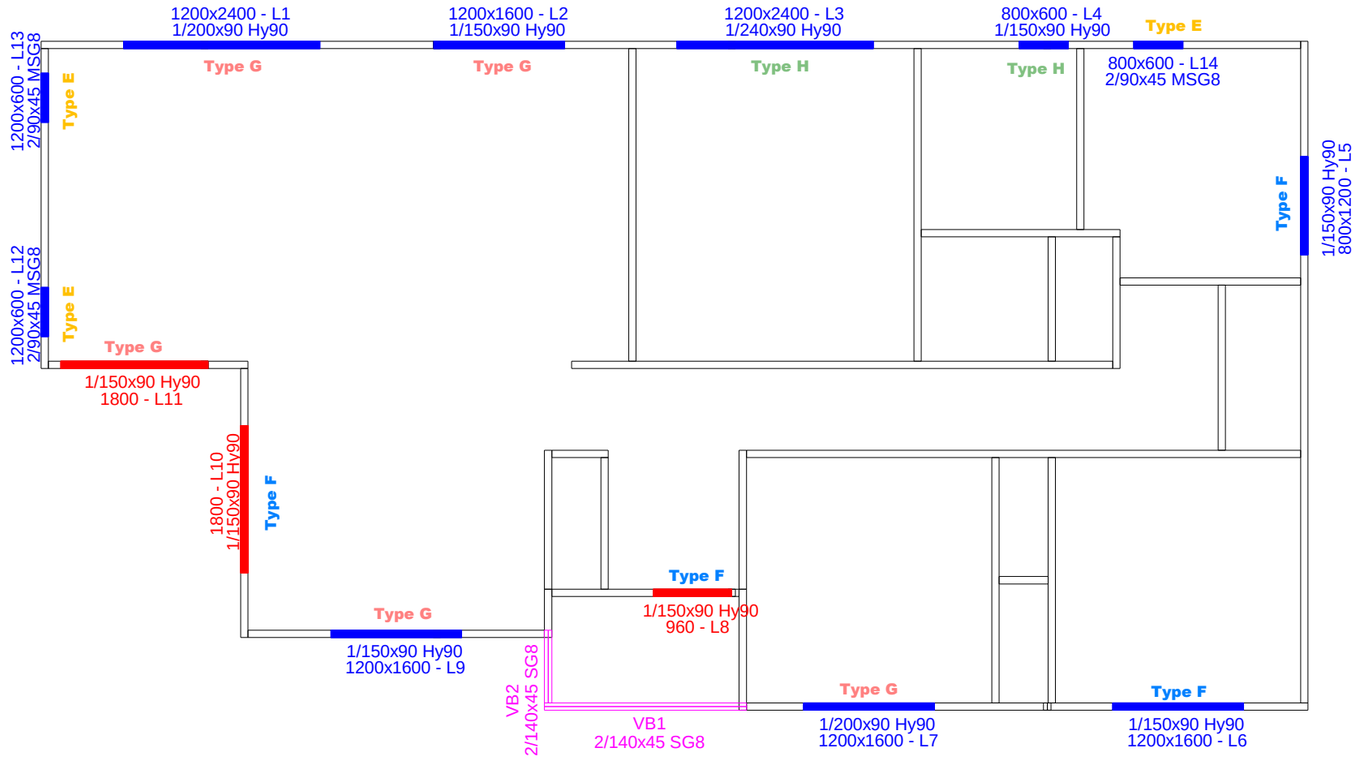
Beam fixings are for beam to wall connections only. All beam to post fixings are to be specified by other.

Single/Upper Level Lintels designed only. Lower storey lintels supporting floors are to be S.E.D.

In situations where brick is required above a lintel, the loading for the brick shelf has not been accounted for. If the brick shelf is to be supported by the lintel, an S.E.D design is required.

Layout is null and void if trusses not supplied by PlaceMakers

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PlaceMakers	Site Address : Jefferies - AW611P 62 Awanui Drive Waikanae	Sheet Title : For Building Consent Lintel Fixing Date : 5 Dec,2024 Drawn : Coel Parkes Scale : 1: 75 System : MiTek 20/20	Job Details: Roof Pitch : 22.50deg Roof Material : Longrun Iron Ceiling Material : Rondo on Clips-R @ 1800c Wind Zone : High Roof Snow Load : 0.000kPa	Truss Centres : 900mm Roof Live Load : 0.250kPa Overhang : 600mm Wind Speed : 44m/s	Job Title : 260613 Sheet : 5 Revision Number :	ESTIMATING NATIONAL ESTIMATING UNIT

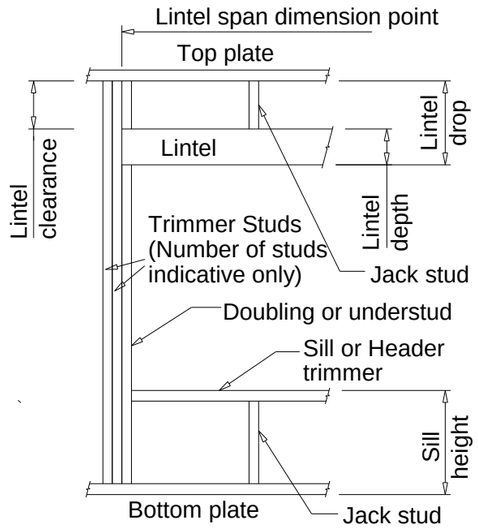
STUD-LOK Lintel Fixings

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NOTE:

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

DEFINITIONS



Lintel Supporting Girder Trusses:

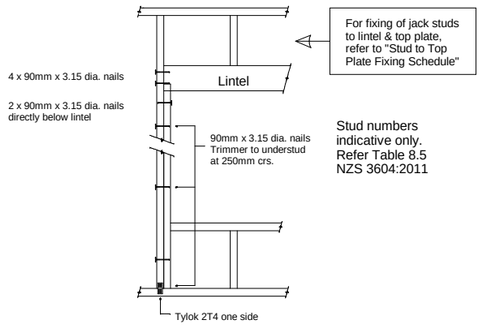
Roof Tributary Area	Light Roof Wind Zone			Heavy Roof Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6 m²	G	G	H	G	G	H
11.6 m²	G	H	H	G	G	H
12.1 m²	G	H	H	G	H	H
15.3 m²	H	H	-	G	H	H
19.1 m²	H	-	-	G	H	-
20.9 m²	H	-	-	H	H	-
21.8 m²	H	-	-	H	-	-
34.3 m²	-	-	-	H	-	-

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

SELECTION CHART FOR LINTEL FIXING

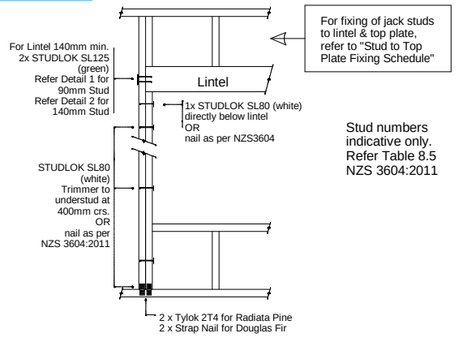
Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-

TYPE E 1.4kN



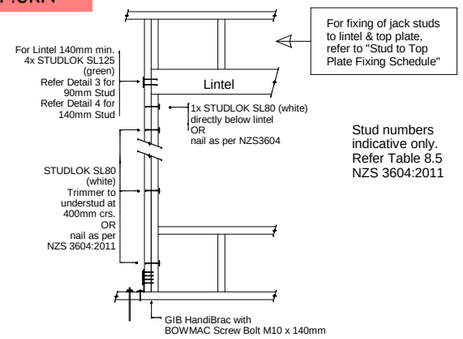
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE F 4.0kN



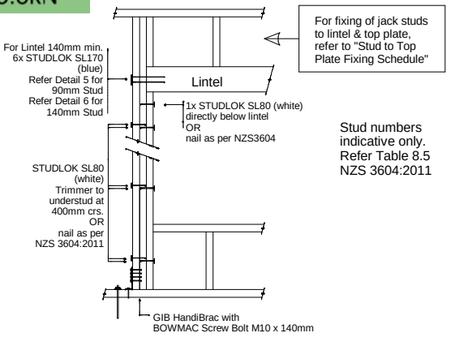
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE G 7.5kN



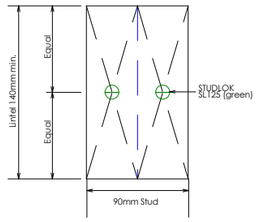
Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE H 13.5kN

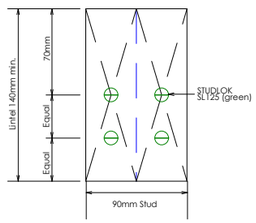


Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

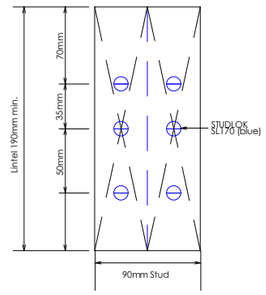
Detail 1:



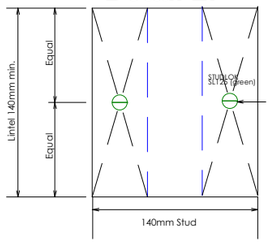
Detail 3:



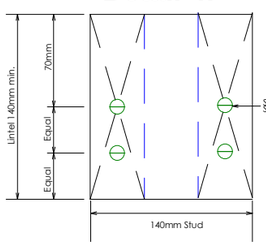
Detail 5:



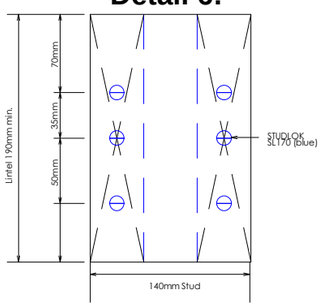
Detail 2:



Detail 4:



Detail 6:



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

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

www.miteknz.co.nz

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

ISSUED BY: **MiTek New Zealand Limited**

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

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

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **260613** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

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

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

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

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

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

On behalf of MiTek New Zealand Limited, **Date: Thursday, 5 December 2024**



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

BC250084
Received by
Kapiti Coast District Council
06/03/2025

Job: 260613
Client: A1 Homes
Phone:
Site: Jefferies - AW611P
62 Awanui Drive
Waikanae
Description:
Building Consent No.:
Phone:

MITEK FABRICATOR DESIGN STATEMENT

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

MiTek 20/20® TRUSS DESIGN DATA

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

Job Details

Importance Level : 2

Design Working Life : 50 years

Roof Truss

Timber Group:	NEU-H1.2	Pitch:	22.500 deg	Nominal Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Longrun Iron	Material:	Rondo on Clips-R @ 1800c	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	1800 mm centres		
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN		

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

MiTek® Truss List

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

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
GT02	1	8180	22.500	900	J04A	1	2267	22.500	900	*HB03	2	3645	16.325	900
J01	1	2380	22.500	900	J04B	1	2267	22.500	900	*HB04	3	6601	16.325	900
T02	1	8180	22.500	900	J04C	1	2267	22.500	900	*HB05	1	1210	16.325	900
T03	3	8180	22.500	900	J04D	1	2267	22.500	900	*R01	1	679	22.500	900
T04	2	6768	22.500	904	J05	2	1367	22.500	900	*R02	5	913	22.500	900
TG01	1	7290	22.500	900	J05A	1	1367	22.500	900	*R02A	6	913	22.500	900
TG02	1	8180	22.500	900	J05B	1	1367	22.500	900	*R02B	1	913	22.500	900
TR01	1	7290	22.500	900	J05C	2	1367	22.500	900	*R03	1	1193	22.500	900
GT01	1	4000	22.500	900	J06	1	3167	22.500	900	*R04	1	1690	22.500	900
J01A	1	2380	22.500	900	J06A	1	3167	22.500	900	*R04A	1	1690	22.500	900
J01B	1	2380	22.500	900	J06B	1	3167	22.500	900	*R05	1	856	22.500	900
J02	1	1480	22.500	900	J06C	1	3167	22.500	900	*R06	1	872	22.500	900
J02A	1	1480	22.500	900	J06D	1	3167	22.500	900	*R06A	1	868	22.500	900
J03	1	1977	22.500	900	T01	3	3965	22.500	900	*R07	2	1080	22.500	900
J03A	1	1977	22.500	900	V01	1	1660	22.500	900	*R07A	1	1080	22.500	900
J03B	1	1977	22.500	900	*HB01	1	6003	16.325	900	*R08	1	913	0.000	900
J04	1	2267	22.500	900	*HB02	1	2731	16.325	900					

Total quantity : 70

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06/03/2025

The computer design input has been carried out by:

Signed: .....

Date: ...Thursday, 5 December 2024....

Name of Estimator: Coel Parkes.....

Qualifications and Title: MiTek CoC - Estimator

On behalf of: Placemakers National Estimating Unit (NEU)



designIT® HOUSES

CarterHoltHarvey LVL

DESIGN CERTIFICATE

Technical basis for structural design methodology contained in designIT for houses - New Zealand.

designIT for houses, New Zealand has been developed by experienced timber engineers to assist designers in selecting appropriate sizes of structural laminated veneer lumber products manufactured by Carter Holt Harvey LVL Limited (including hySPAN, hy90, hyONE and hyJOIST) and other generic stress grades of timber, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604.

The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 and with timber structural design in accordance with NZS 3603:1993 including Amendment 4 (Verification method B1/VM1, 6.1).

designIT relies on the accurate input of span and loading information by the user. Where accurate inputs are submitted the product and/or stress grade and the size given will comply with the structural requirements of the New Zealand Building Code (NZBC), provided the installation is in accordance with the installation requirements provided by designIT and/or in product literature and/or NZS 3604, or specific engineering design, as appropriate.

Futurebuild LVL and SG8 components, when used and treated to the required treatment levels prescribed in NZS 3602 and NZS 3604, as modified by Acceptable Solution B2/AS1, will comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

References:
1. NZS 3603:1993 Timber Structures Standard.
2. NZS 3604:2011 Timber-framed buildings.
3. AS/NZS 1170.0 - 2002 Structural design actions, Part 0: General principles.
4. AS/NZS 1170.1 - 2002 Structural design actions, Part 1: Permanent, imposed and other actions.
5. AS/NZS 1170.2 - 2021 Structural design actions, Part 2: Wind actions.
6. AS/NZS 1170.3 - 2003 Structural design actions, Part 3: Snow and ice actions.
7. AS 1720.1 - 2010 Timber structures. Part 1: Design methods.
8. AS 1720.3:2016 Timber structures. Part 3: Design criteria for timber-framed residential buildings.

This Design Certificate, and any associated warranty/certification, is void where there has been substitution of alternate products not detailed within the Member Specification.

Version date: 30 October, 2024

For further information or advice contact:
Carter Holt Harvey LVL Limited,
173 Captain Springs Road, Onehunga. Auckland
Telephone: 0800 808 131
Email: designit@futurebuild.co.nz
Web: https://futurebuild.co.nz/

Specifier details:

Specifier:	Coel Parkes
Business name:	Placemakers NEU
Email:	coel.parkes@placemakers.co.nz

Project and site details:

Project:	Jefferies - AW611P
Reference:	24-00260613
Site address:	62 Awanui Drive Waikanae
For (owner/s):	A1 Homes
Design wind zone	High
Snow loading	Design snow zone: N1, Altitude: 100 m (sub-alpine), Ground snow load, $S_g^{1,2}$ = 0.0 kPa

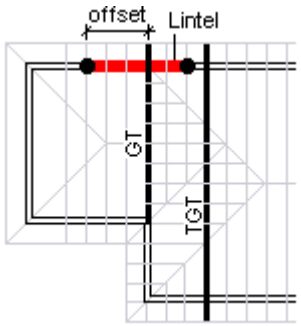
1. designIT does not include any allowance for the effects of drifting and sliding of snow.
2. Snow loads are applied to roofed over structures only, the design of exposed floors/decks are not covered by designIT.

MEMBER DESIGN DETAILS

Member 1

1) Member code and description L1 - Lintels - Supporting girder truss / truncated girder truss

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06/03/2025



2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

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06/03/2025

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m²
Roof pitch	22.5 º
Truss spacing	900 mm
Eaves overhang	600 mm
TGT setback	1977 mm
GT span	4000 mm
GT offset	990 mm
Lintel span	2400 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G + \Psi_L Q^*$	8.0 mm	2.1 mm (long term)	3.8
Live load - $\Psi_s Q$	9.6 mm	0.6 mm	16.0
Wind load - W_s	12.0 mm	1.8 mm	6.6

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

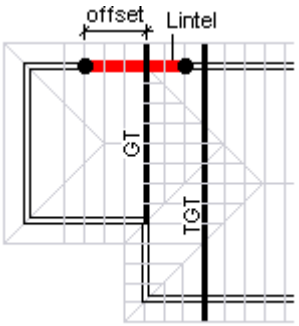
Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-2.8
1.2G + 1.5Q	0.80	-4.3
1.2G + W_u + $\Psi_c Q$	1.00	-6.0
0.9G + W_u	1.00	3.8

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 2

1) Member code and description L2 - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

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4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m²
Roof pitch	22.5 º
Truss spacing	900 mm
Eaves overhang	600 mm
TGT setback	2380 mm
GT span	7290 mm
GT offset	50 mm
Lintel span	1600 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	5.3 mm	0.7 mm (long term)	7.4
Live load - $\Psi_{s}Q$	6.4 mm	0.2 mm	30.8
Wind load - W_s	8.0 mm	0.6 mm	12.8

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-4.0
1.2G + 1.5Q	0.80	-6.3
1.2G + W_u + Ψ_cQ	1.00	-8.9
0.9G + W_u	1.00	5.8

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 3

1) Member code and description L3 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	2.4 m
Roof load width 'RLW'	6.8 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 240 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G + \Psi_L Q^*$	8.0 mm	2.0 mm (long term)	3.9
Live load - $\Psi_s Q$	9.6 mm	0.6 mm	16.0
Wind load - W_s	12.0 mm	1.8 mm	6.6

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

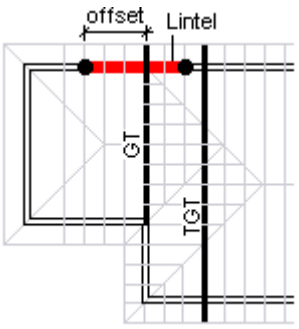
Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-5.5
1.2G + 1.5Q	0.80	-8.6
$1.2G + W_u + \Psi_c Q$	1.00	-12.0
$0.9G + W_u$	1.00	7.7

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 4

1) Member code and description L4 - Lintels - Supporting girder truss / truncated girder truss



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2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m²
Roof pitch	22.5 º
Truss spacing	900 mm
Eaves overhang	600 mm
TGT setback	3167 mm
GT span	8180 mm
GT offset	260 mm
Lintel span	600 mm
Nominal wall thickness	90 mm

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5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	2.0 mm	0.1 mm (long term)	14.6
Live load - Ψ_sQ	2.4 mm	0.0 mm	56.6
Wind load - W_s	3.0 mm	0.1 mm	23.5

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-2.8
1.2G + 1.5Q	0.80	-4.4
1.2G + W_u + Ψ_cQ	1.00	-6.3
0.9G + W_u	1.00	4.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 5

1) Member code and description L5 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.2 m
Roof load width 'RLW'	3.2 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	4.0 mm	0.5 mm (long term)	8.7
Live load - Ψ_sQ	4.8 mm	0.1 mm	34.9
Wind load - W_s	6.0 mm	0.4 mm	14.4

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-1.7
1.2G + 1.5Q	0.80	-2.7
1.2G + W_u + Ψ_cQ	1.00	-3.8
0.9G + W_u	1.00	2.5

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 6

1) Member code and description L6 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

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4) Design inputs

Span	1.6 m
Roof load width 'RLW'	2.3 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	5.3 mm	0.8 mm (long term)	6.6
Live load - Ψ_sQ	6.4 mm	0.2 mm	27.3
Wind load - W_s	8.0 mm	0.7 mm	11.3

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-1.5
1.2G + 1.5Q	0.80	-2.4
1.2G + W_u + Ψ_cQ	1.00	-3.3
0.9G + W_u	1.00	2.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 7

1) Member code and description L7 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

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4) Design inputs

Span	1.6 m
Roof load width 'RLW'	8.2 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	5.3 mm	1.2 mm (long term)	4.4
Live load - Ψ_sQ	6.4 mm	0.4 mm	17.5
Wind load - W_s	8.0 mm	1.1 mm	7.2

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-4.8
1.2G + 1.5Q	0.80	-7.5
1.2G + W_u + Ψ_cQ	1.00	-10.5
0.9G + W_u	1.00	6.8

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 8

1) Member code and description L8 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.0 m
Roof load width 'RLW'	8.2 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G + \Psi_L Q^*$	3.3 mm	0.7 mm (long term)	5.0
Live load - $\Psi_s Q$	4.0 mm	0.2 mm	19.6
Wind load - W_s	5.0 mm	0.6 mm	8.1

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

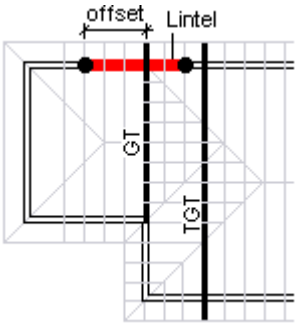
Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-4.2
1.2G + 1.5Q	0.80	-6.6
$1.2G + W_u + \Psi_c Q$	1.00	-9.3
$0.9G + W_u$	1.00	6.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 9

1) Member code and description L9 - Lintels - Supporting girder truss / truncated girder truss



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2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m²
Roof pitch	22.5 º
Truss spacing	900 mm
Eaves overhang	600 mm
TGT setback	2380 mm
GT span	7290 mm
GT offset	303 mm
Lintel span	1600 mm
Nominal wall thickness	90 mm

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5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	5.3 mm	1.5 mm (long term)	3.6
Live load - Ψ_sQ	6.4 mm	0.4 mm	14.5
Wind load - W_s	8.0 mm	1.3 mm	6.0

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-3.3
1.2G + 1.5Q	0.80	-5.1
1.2G + W_u + Ψ_cQ	1.00	-7.2
0.9G + W_u	1.00	4.7

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 10

1) Member code and description L10 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.8 m
Roof load width 'RLW'	1.9 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	6.0 mm	1.0 mm (long term)	6.2
Live load - Ψ_sQ	7.2 mm	0.3 mm	26.1
Wind load - W_s	9.0 mm	0.8 mm	10.8

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

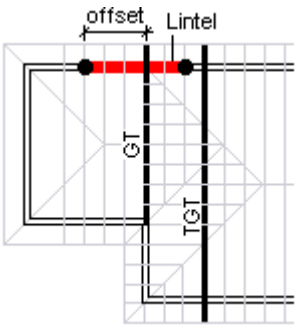
Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-1.4
1.2G + 1.5Q	0.80	-2.2
1.2G + W_u + Ψ_cQ	1.00	-3.1
0.9G + W_u	1.00	1.9

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 11

1) Member code and description L11 - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m²
Roof pitch	22.5 º
Truss spacing	900 mm
Eaves overhang	600 mm
TGT setback	1977 mm
GT span	4000 mm
GT offset	50 mm

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Lintel span	1800 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	6.0 mm	0.9 mm (long term)	7.0
Live load - $\Psi_{s}Q$	7.2 mm	0.2 mm	30.3
Wind load - W_s	9.0 mm	0.7 mm	12.6

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-2.4
1.2G + 1.5Q	0.80	-3.7
1.2G + W_u + $\Psi_c Q$	1.00	-5.2
0.9G + W_u	1.00	3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 12

1) Member code and description	L12 - Lintels - In single or upper storey load bearing walls
2) Date prepared	05 December 2024
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.6 m
Roof load width 'RLW'	1.7 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

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5) Member specification

Size, stress grade/product	Use 2/90 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	2.0 mm	0.2 mm (long term)	12.2
Live load - $\Psi_{s}Q$	2.4 mm	0.1 mm	47.5

Wind load - W_s	3.0 mm	0.2 mm	19.7

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-0.9
1.2G + 1.5Q	0.80	-1.4
1.2G + W_u + Ψ_cQ	1.00	-1.9
0.9G + W_u	1.00	1.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer Clause 2.4.4.7 NZS 3604

Member 13

1) Member code and description L13 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.6 m
Roof load width 'RLW'	1.7 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

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5) Member specification

Size, stress grade/product	Use 2/90 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_LQ*	2.0 mm	0.2 mm (long term)	12.2
Live load - Ψ_sQ	2.4 mm	0.1 mm	47.5
Wind load - W_s	3.0 mm	0.2 mm	19.7

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-0.9
1.2G + 1.5Q	0.80	-1.4
1.2G + W_u + Ψ_cQ	1.00	-1.9
0.9G + W_u	1.00	1.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer Clause 2.4.4.7 NZS 3604

Member 14

1) Member code and description L14 - Lintels - In single or upper storey load bearing walls

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.6 m
Roof load width 'RLW'	1.9 m
Roof type and mass	Light roof and ceiling - 40 kg/m²
Nominal wall thickness	90 mm

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5) Member specification

Size, stress grade/product	Use 2/90 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_{LQ}*	2.0 mm	0.2 mm (long term)	10.9
Live load - $\Psi_{s}Q$	2.4 mm	0.1 mm	42.5
Wind load - W_s	3.0 mm	0.2 mm	17.6

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-1.0
1.2G + 1.5Q	0.80	-1.5
1.2G + W_u + $\Psi_c Q$	1.00	-2.2
0.9G + W_u	1.00	1.4

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer Clause 2.4.4.7 NZS 3604

Member 15

1) Member code and description VB1 - Verandah beams

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.4 m - single span
Roof mass	30 kg/m²
Roof load width 'RLW'	1.4 m

5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G + \Psi_L Q^*$	3.5 mm	0.6 mm (long term)	5.6
Live load - $\Psi_s Q$	5.6 mm	0.2 mm	25.9
Wind load - W_s	7.0 mm	0.9 mm	7.5

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-0.7
1.2G + 1.5Q	0.80	-1.1
$1.2G + W_u + \Psi_c Q$	1.00	-2.2
$0.9G + W_u$	1.00	1.9

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer Clause 2.4.4.7 NZS 3604

Member 16

1) Member code and description VB2 - Verandah beams

2) Date prepared 05 December 2024

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.9 m - single span
Roof mass	30 kg/m²
Roof load width 'RLW'	1.0 m

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5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G + \Psi_L Q^*$	2.3 mm	0.1 mm (long term)	19.7
Live load - $\Psi_s Q$	3.6 mm	0.0 mm	87.8
Wind load - W_s	4.5 mm	0.2 mm	25.3

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-0.4
1.2G + 1.5Q	0.80	-0.7
$1.2G + W_u + \Psi_c Q$	1.00	-1.4
$0.9G + W_u$	1.00	1.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer Clause 2.4.4.7 NZS 3604

Notes for interpretation of serviceability data

1. 'average deflection' is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS 1170 and AS 1720.

2. Deflection is the flexural response to load 'out-of-level' measurements of installations are not necessarily deflections and can incorporate 'initial out-of-straightness', whether intended or not. Furthermore, loads can be higher/lower than the notional estimate and in any comparison with measured levels, material variability needs to also be considered. AS 1720 gives the following basis for estimation of upper bound deflections for various materials.

No 1 Framing – visually graded to NZS 3631	Average + 100%
SG grades - mechanically graded to AS/NZS 1748	Average + 43%
GL grades for glulam to AS 1328	Average + 33%
LVL to AS/NZS 4357 (includes hySPAN and hyJOIST)	Average +18%

As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

3. The limits referred are those specified in AS 1720.3 for the stated load case.

4. 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements detailed.

Notes for interpretation of reaction data

1. Duration of load factor 'k_1' for strength as per NZS 3603:1993
2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

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Design Navigator H1 Compliance Report

Project Summary

H1 Report created by:	i design architecture
Project Name:	AW611P
Client:	Jefferies
Lot No:	2
Comment:	
Project Id:	191139
Report Date:	28/11/2024

Compliance Result

This report shows compliance of the design with Clause H1 AS1 Fifth Edition from 4 August 2022 and the R-value targets of Clause E3 Second edition Amendment 7 from 5 November 2020.

This building **complies with Clause H1 AS1 Edition 5 Amendment 1 for all housing, and buildings up to 300m²**.

In order to comply with Clause H1 the building needs to comply with at least one of the three compliance paths (Schedule, Calculation or Modelling Method). This design complies with the Calculation Method.

The building **complies** with Clause E3 Second Edition Amendment 7 from 5 November 2020.

* Note that all floor, wall and roof R-values are rounded to 1 decimal point, window and skylight R-values are rounded to 2 decimal points.

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H1 Compliance Details

H1 AS1 Edition 5 - Calculation Method Compliance

The use of the Calculation Method is **permitted** because the vertical glazing area is **smaller** than 40% of the gross wall area.

In order to comply the heat loss of the proposed building must not be larger than the reference building heat loss AND all component R-values must be at least 50% of the R-values shown in the '50% Rule' table below. This design **complies** with the H1 Calculation Method.

HeatLoss:

Maximum permitted Heat Loss	Proposed Building Heat Loss	
178 W/°C	177 W/°C	✓

The reference building element areas and R-values are shown below. The last column shows the element areas of the proposed building.

Element	Reference Building Area	Reference Building R-value	Proposed Building Area
Roof	110.0 m²	6.6	109.5 m²
Wall	81.9 m²	2.0	91.1 m²
Slab Floor	0.0 m²	1.5	0.0 m²
Other Floor	110.2 m²	2.5	110.2 m²
Window and Door	35.1 m²	0.46	25.9 m²
Skylight	0.0 m²	-	0.5 m²

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Minimum R-values ("50% rule"):

Element Type	Minimum permitted R-value	Minimum proposed R-value	
Roof	3.3	3.6	✓
Wall	1.0	2.3	✓
Slab Floor	0.8		✓
other Floor	1.3	2.0	✓

Lighting Power Density Compliance

Residential buildings are not required to comply with the lighting power density targets.

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Compliance with Clause E3

This building **complies** with Clause E3 Second Edition Amendment 7 from November 2020.

Building Element	Minimum permitted R-value	Minimum project R-value	
Light timber frame wall or other framed wall constructions with cavities	1.5	2.3	✓
Single skin normal weight masonry based wall construction without a cavity	0.6		
Solid timber wall systems no less than 60 mm thick	0.6		
Roof or ceilings of any construction	1.5	3.6	✓

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Design Details

Climate		
Location	Kapiti Coast District	
Climate Zone	3	
Building Dimensions		
Total Floor Area	110.2	m²
Slab Floor Area	0.0	m²
Other Floor Area	110.2	m²
Gross Wall Area	117.0	m²
Net Wall Area	91.1	m²
North Wall Area	28.9	m²
East, South and West Wall Area	62.2	m²
Window Area	25.9	m²
North Window Area	8.6	m²
East, South and West Window Area	17.3	m²
Opaque Door Area	0.0	m²
Gross Roof Area	110.0	m²
Net Roof Area	109.5	m²
Skylight Area	0.5	m²
Glazing Areas		
Total Window Percentage	22.1	%
Total Windows over 30%	no	
Total Windows over 40%	no	
East, South and West Window Percentage	21.7	%
East, South and West Windows over 30%	no	
Skylight Area over 1.5m²	no	
Skylight Percentage	0.5	%
Skylight Area over 1.5%	no	
Opaque Door Area over 6m²	no	
Opaque Door Percentage	0.0	%
Opaque Door Area over 6%	no	

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Heat Loss Details

ID	Name	Orient.	Width	Height	Gross Area	Net Area	R	Heat Loss	Type	Heated	Construction
Floors											
F1					110.2	110.2	1.97	55.9			Floortype 2
Walls											
W1		S	15.50	2.42	37.5	26.2	2.32	11.3			Walltype 2 Linea 90
Wi1-1	D-02		1.80	2.00		3.6	0.50	7.2			Glazingtype 1
Wi1-2	W-11		1.60	1.20		1.9	0.50	3.8			Glazingtype 1
Wi1-3	D-01		0.96	2.00		1.9	0.50	3.8			Glazingtype 1
Wi1-4	W-01		1.60	1.20		1.9	0.50	3.8			Glazingtype 1
Wi1-5	W-02		1.60	1.20		1.9	0.50	3.8			Glazingtype 1
W2		W	8.68	2.42	21.0	20.0	2.32	8.6			Walltype 2 Linea 90
Wi2-1	W-03		1.20	0.80		1.0	0.50	1.9			Glazingtype 1
W3		N	15.50	2.42	37.5	28.9	2.32	12.4			Walltype 2 Linea 90
Wi3-1	W-04		0.60	0.80		0.5	0.50	1.0			Glazingtype 1
Wi3-2	W-05		0.60	0.80		0.5	0.50	1.0			Glazingtype 1
Wi3-3	W-06		2.40	1.20		2.9	0.50	5.8			Glazingtype 1
Wi3-4	W-07		1.60	1.20		1.9	0.50	3.8			Glazingtype 1
Wi3-5	W-08		2.40	1.20		2.9	0.50	5.8			Glazingtype 1
W4		E	8.68	2.42	21.0	16.0	2.32	6.9			Walltype 2 Linea 90
Wi4-1	W-09		0.60	1.20		0.7	0.50	1.4			Glazingtype 1
Wi4-2	W-10		0.60	1.20		0.7	0.50	1.4			Glazingtype 1
Wi4-3	D-03		1.80	2.00		3.6	0.50	7.2			Glazingtype 1
Roofs											
R1					88.0	87.4	3.97	22.0			Rooftype 1
Sky1-1			0.98	0.55		0.5	0.36	1.5			Glazingtype 2
R2					22.1	22.1	3.63	6.1	perimeter		Rooftype 2
Total Heat Loss								176.6			

* The floor and roof heatlosses are not included in the heatloss equation for commercial buildings (H1/AS2).

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Floor Construction Details

Name: Floortype 2 Slab Floor ☐ heated ☐ 1.97 m²°C/W



Type: Floor: Suspended Floor (no Lining)

internal surface 0.09

Flooring : generic - Particle Board 20mm
R-value: 0.17

Timber Frame & Cavity : 140mm joists @ 450mm

Floor Frame Area: 10.0% *Cavity Area: 90.0%*

Framing : *R-value: 1.16* Insulation : 1.8

Insulation value of the subfloor space

Suspended floor area [m²]: 110.2

Perimeter length [m]: 48.36

Perimeter height [m]: 0.61

Perimeter type: Exposed floor (pole house)

Wall Construction Details

Name: Walltype 2 Linea 90 heated ☐ 2.32 m²°C/W



Type: Wall: Timber Frame with vented Cavity

external surface 0.03

Cladding : James Hardie Linea weatherboard
R-value: 0.08

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

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

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

15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08

Framing : *R-value: 0.75*

15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08

Insulation : 2.8

still Airgap: none
R-value: 0.00

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

internal surface 0.09

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Roof Construction Details

Name: Rooftype 1 Ceiling Perimeter ☐ heated ☐ 3.97 m²°C/W

Type: Roof: Timber framed truss Roof, direct fixed or battened flat Ceiling

external surface 0.03

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

Insulation :

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

Roof Frame Area: 5.0%	*Cavity Area: 95.0%*
Roof space (still air) 0.11	Roof space (still air) 0.11
Framing : *R-value: 0.75*	Pink(c)Batts(c) Superbatts R4.5 Ceiling 4.5 notched to cover bottom chord☐

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

internal surface 0.09

Non-IC-rated recessed downlights
Ceiling Area [m²]: 87.95 Number of downlights: Clearance from lamp holder side [m]:

Name: Rooftype 2 Ceiling Perimeter ☒ heated ☐ 3.63 m²°C/W

Type: Roof: Timber framed truss Roof, direct fixed or battened flat Ceiling, compressed Perimeter Insulation

external surface 0.03

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

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

Roof Frame Area: 5.0%	*Cavity Area: 95.0%*
Framing : *R-value: 0.75*	Pink(c)Batts(c) Superbatts R4.5 Ceiling 4.5

Compressed Insulation Details

Roof Slope	22.5 °	Perimeter Width	500 mm
Wall Stud Width	90 mm	Offset	0 mm
Top Chord Lift	0 mm	Top Chord Depth	90 mm
Compression Constant	0.64		
Is a ventilation gap present?☒		Is insulation inside chord base?☐	

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

internal surface 0.09

Glazing Details

Name: Glazingtype 1 Opaque Door ☐ 0.50 m²°C/W

Type: Thermally Broken Aluminium Frame

Glass Type : Double Pane: Low E4/Clear - Argon - Thermally improved Spacer (Ug 1.10)
R-value: 0.50
Solar Heat Gain Coefficient (SHGC): 0.41

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Name: Glazingtype 2 Opaque Door ☐ 0.36 m²°C/W

Type: Velux

Type Velux Products

Product Velux FS - Fixed skylight

R-value: 0.36

Solar Heat Gain Coefficient (SHGC):
0.74

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iDesign Architecture

SPECIFICATION
of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Jeffereis

Project Specification

62 Awanui Drive, Waikanae, New Zealand
Project Ref: AW611

Printed: 18 December 2024

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masterspec

Specification built using Masterspec software
Project ID: 319746 - 386424

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1233 REFERENCED DOCUMENTS

1 GENERAL

1.1 REFERENCED DOCUMENTS

Throughout this specification, reference is made to various New Zealand Building Code Compliance Documents (NZBC __), acceptable solutions (__ AS_) and verification methods (__ VM_) for criteria and/or methods used to establish compliance with the New Zealand Building Code.

Reference is also made to various standards produced by Standards New Zealand (NZS, AS/NZS, NZS/AS), overseas standards and to listed Acts, Regulations and various industry codes of practice and practice guides. The latest edition (including amendments and provisional editions) at the date of this specification applies unless stated otherwise.

It is the responsibility of the contractor to be familiar with the materials and expert in the techniques quoted in these publications.

Documents cited both directly and within other cited publications are deemed to form part of this specification. However, this specification takes precedence in the event of it being at variance with the cited documents.

1.2 DOCUMENTS

Documents referred to in the GENERAL sections are:

NZBC F5/AS1	Construction and demolition hazards
AS/NZS 1170.2:2011	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 3012	Electrical installations - Construction and demolition sites
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 4781	Code of Practice for Safety in Welding and Cutting
AS/NZS 5131	Structural steelwork - Fabrication and erection
NZS 6803	Acoustics - Construction Noise

Building Act 2004
Building Regulations 1992
Health and Safety at Work Act 2015
Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
Health and Safety at Work (Hazardous Substances) Regulations 2017
Health and Safety in Employment Regulations 1995
New Zealand Building Code
Heritage New Zealand Pouhere Taonga Act 2014
Resource Management Act 1991
Smoke-free Environments Act 1990

WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Good Practice Guidelines - Excavation Safety
WorkSafe	Scaffolding in New Zealand - Good Practice Guidelines
WorkSafe	Managing Work Site Traffic - Good Practice Guidelines

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1234 DOCUMENTATION

1 GENERAL

This general section relates to documentation required by the Territorial Authority / Building Consent Authority for compliance with the New Zealand Building Code. It also includes documentation relating to:

- Substitutions
- Manufacturers' documents
- Branded work sections
- Care of construction documents
- Confidentiality of documents
- Receipt of construction documents

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Building Consent Authority documentation

1.1 BUILDING CONSENT

Obtain the original building consent forms and documents from the owner and keep them on site, preserve the condition of consent forms and documents. Liaise with the building consent authority for all notices to be given and all inspections required during construction to ensure compliance. Return the consent form and documents to the owner on completion.

1.2 BUILDING CONSENT COMPLIANCE

It is an offence under the Building Act 2004

- to carry out any work not in accordance with the building consent.
- to carry out Restricted Building Work by anyone other than a Licensed Building Practitioner licensed for that type of work.

The resolution of matters concerning building code compliance to be referred to the contract administrator for a direction and then if required to the BCA for consent.

Where any alteration is requested by the territorial authority or any other authority, do not undertake such alteration until the matter has been referred to the contract administrator for direction.

1.3 PROJECT PERSONNEL

Provide names and contact details of the contractor's key personnel and tradespersons who are involved with the project. Review the list once a month and reissue it if changes have been made.

Licensed Building Practitioner documentation

1.4 LICENSED BUILDING PRACTITIONERS

Provide LBP details. Provide names, LBP numbers, areas of practice and contact information. Provide this information to the BCA before commencing work on the Restricted Building Work in the form required by the BCA. Advise the BCA of any change to an LBP previously advised.

Include the following as applicable

- Site LBP
- Carpenter
- Foundations 1 Concrete foundation walls and concrete slab-on-ground constructor
- Foundations 2 Concrete or timber pile foundations constructor
- Bricklaying and block laying 1 Brick / masonry veneer
- Bricklaying and block laying 2 Structural masonry - Bricklayer / Blocklayer
- Roofing 1 Concrete / clay tile roofer
- Roofing 2 Profiled metal roofer and/or wall cladding installer
- Roofing 3 Metal tile roofer
- Roofing 4 Membrane roofer
- Roofing 5 Torch on membrane roofer
- Roofing 6 Liquid membrane roofer
- Roofing 7 Shingle / slate roofer
- External plastering 1 Solid plasterer
- External plastering 2 Proprietary Plaster Cladding Systems (PPCS) plasterer

Also provide names and contact details of the following

- Registered drainlayer

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- Registered plumber
- Registered gasfitter
- Registered electrician

1.5 RECORD OF WORK

Where Restricted Building Work is carried out by a LBP, on completion provide a Record of Work. Provide copies to both the BCA and the Contract Administrator.

Compliance information

1.6 DOCUMENTATION REQUIRED FOR CODE COMPLIANCE

Information may be required either as a condition of the contract documents or as a condition of the building consent. It may include the following:

- Applicators approval certificate from the manufacturer / supplier
- Manufacturer's / supplier's warranty
- Installer / applicator's warranty
- Producer Statement (PS1) - Design
- Producer Statement (PS3) - Construction from the applicator / installer
- Producer Statement (PS4) - Construction review from an acceptable suitably qualified person

Refer to the general sections for the requirements for compliance information to be provided by the contractor.

Refer to the building consent for the requirements for compliance information to be provided by the contractor.

Obtain required documents from the relevant parties for delivery to the contract administrator after the final inspection has been carried out by the BCA.

1.7 PRODUCER STATEMENTS

When producer statements verifying construction are required, provide copies to both the Building Consent Authority and the Contract Administrator. Provide producer statements in the form required by the BCA.

Residential building contract

1.8 CHECKLIST

If requested provide evidence of the prescribed checklist given to the residential client.

1.9 DISCLOSURE STATEMENT

If requested provide evidence of the disclosure statement given to the residential client.

1.10 BUILDING CONTRACT

If requested provide evidence of the written building contract that the residential customer has signed.

1.11 DOCUMENTATION REQUIRED ON COMPLETION

As soon as practicable after completion of the building work, provide in writing the following information and documentation to the client and the relevant territorial authority.

Information and documentation relating to:

- The identity of the building contractor and the subcontractors who carried out the work.
- Maintenance requirements for any products incorporated in the building.

If applicable also provide any guarantee or insurance obtained by the building contractor in relation to the building work.

Substitutions

1.12 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.13 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified products and systems listed in a section unless specified otherwise. If a product is not available then immediately contact the contract administrator for direction.

1.14 PROPOSED SUBSTITUTIONS

Substitution of products or systems contained within branded work sections is not allowed. The contractor may propose substitutions to products within non branded work sections, when the contractor has determined that the proposed substitution is an alternative to the specified product. The Contract administrator is not bound to accept any substitutions. Submit a draft proposal detailing the substitution to the contract administrator before proceeding with full notification.

1.15 NOTIFICATION OF SUBSTITUTIONS

Notify the contract administrator of proposed substitution of specified products. Notification to include but not be limited to:

- Product identification
- Manufacturer's name, address, telephone number, website and email address
- Detailed comparison between the properties and characteristics of the specified product and the proposed substitution
- Statement of NZBC compliance including durability
- Details of manufacturer warranties

Plus an assessment of:

- Any changes required to the programme including any extension of time required
- Any consequential effects of the proposed substitution
- Any effect the substitution may have on Health & Safety requirements
- Allowance for time and cost for re-design and documentation (if applicable)
- Allowance for time and cost for obtaining an amendment to the Building Consent (if applicable)
- Any change in cost associated with the proposed substitution

and if requested:

- All current manufacturer's literature on the product
- Accreditations and appraisals available
- Reference standards
- Product limitations
- Samples
- List of existing installations in the vicinity of the project

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1.16 ACCEPTANCE OF SUBSTITUTIONS

Acceptance of any proposed substitutions will be given in writing by the contract administrator.

Amendments to issued Building Consent

1.17 CONTRACTOR AMENDMENTS TO BUILDING CONSENT

Where the contractor has sought acceptance of a substitution or a variation which is for the contractor's own convenience and the substitution or variation requires an amendment to the Building Consent, the contractor must apply for and obtain the required amendment.

The contractor must:

- Obtain approval for substitutions from the contract administrator.
- Prepare and provide to the BCA all documentation required for the amendment.
- Pay all fees and other costs associated with this amendment.
- Where the amendment affects other approved plans, also amend those plans.

1.18 PRINCIPAL AMENDMENTS TO BUILDING CONSENT

Where the principal is proposing a substitution or a variation which requires an amendment to the Building Consent, the contractor must provide to the principal information that the contractor has that is required for the amendment.

The principal will:

- Prepare and provide to the BCA all documentation required for the amendment.
- Pay all fees and other costs associated with this amendment.
- Where the amendment affects other approved plans, also amend those plans.

Manufacturer's documents

1.19 MANUFACTURER'S AND SUPPLIER'S INSTALLATION REQUIREMENTS

Manufacturer's and supplier's requirements, instructions, specifications or details mean those issued by them for their particular product, material or component and are the latest edition.

1.20 CONTRACTOR TO OBTAIN CURRENT DOCUMENTATION

Where manufacturer's installation, application and execution requirements are referred to in this specification, the Contractor must ensure they are fully aware of this documentation. Whenever necessary obtain and keep on site the relevant latest version of such documentation and make it available to workers carrying out that part of the work.

1.21 DOCUMENTATION PROVIDED FOR BUILDING CONSENT

Documentation including manufacturer's installation instructions, specification data sheets, producer statements, BRANZ and similar appraisals may be included in the issued Building Consent. These documents have been provided only to demonstrate compliance with the NZBC.

Branded work sections

1.22 BRANDED PRODUCTS / SYSTEMS

Where branded products and systems are specified, all products and components of the system must be as per the specification.

1.23 CROSS REFERENCED WORK SECTIONS

If any related work is cross referenced to a generic work section, but only the equivalent branded section is included in the specification, use that branded section. Confirm with the contract administrator if there is any doubt.

Care of construction documents

1.24 CONSTRUCTION ISSUE

Take receipt of the plans, specifications and other documents issued "for construction". Keep at least one copy on site available for use by all on site workers. Keep a record of copies provided to others including subcontractors. Protect the documents as appropriate. Obtain replacement copies for documents that have become damaged.

1.25 REVISIONS TO CONSTRUCTION ISSUE

Where revised plans and other documents are issued ensure that superseded documents are deleted from the working sets. Ensure that subcontractors are provided with amended documents. Delete superseded documents by either:

- removing them from the working copy of the construction issue; or
- marking them as superseded

1.26 RETURN DOCUMENTS ISSUED FOR CONSTRUCTION

On completion of the contract works:

- Keep such copies of the plans, specification and other documents as reasonably required for contractor's record purposes.
- Retrieve all other copies no longer required by parties.
- Agree method of disposal of such documents with the Contract Administrator.

The Contract Administrator will advise whether such documents shall be:

- delivered to the Contract Administrator/Owner; or
- disposed of by normal waste disposal methods; or
- disposed of by secure document disposal methods.

Confidentiality of documents

1.27 CONFIDENTIALITY OF DOCUMENTS

Documents shall not be given or copied to others who do not require them for carrying out services required for the construction of the works. Documents are only to be used for the contract. Maintain confidentiality of documents.

2 SELECTIONS

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1250 TEMPORARY WORKS & SERVICES

1 GENERAL

This general section relates to temporary works and services required for the construction of the contract works. It includes

- Temporary works and services including temporary fencing and hoardings
- Scaffolding
- General care and protection
- Rubbish removal

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Temporary works

1.1 COSTS RELATING TO TEMPORARY WORKS

Pay all rates/fees in respect of temporary works.

1.2 MAINTENANCE OF TEMPORARY WORKS

Maintain alter, adapt and move temporary works and services as necessary. Clear away when no longer required and make good.

1.3 SAFEGUARD THE SITE, THE WORKS AND MATERIALS

Take reasonable precautions to prevent unauthorised access, including access outside working hours, to the site, the works and adjoining property. Safeguard the site, the works, materials and plant from damage and theft.

1.4 CONSULTANTS TEMPORARY SITE OFFICE

Provide temporary accommodation and facilities for site meetings and for use by consultants while on site.

1.5 SITE FENCING

Provide and maintain a site fence, 2 metres high from ground level on the side accessible to the public. Construct to comply with NZBC F5/AS1 Construction and demolition hazards. Construct as required for public areas and as shown on the drawings.
Construct the fence with:

- galvanized chain link netting with a 50mm x 50mm maximum grid size
- posts at 2.5 metre centres maximum
- gap at the bottom of the fence no greater than 100mm

1.6 SITE FENCING - NON-PUBLIC AREAS

Provide and maintain a 1 metre high site fence to non-public areas. Construct using:

- warratah stakes at 1.5 metre centres fitted with safety caps
- plastic safety mesh

1.7 PROVIDE SEDIMENT AND SILT RUN OFF PROTECTION

Provide appropriate measures to prevent or minimise sediment generation and silt run off. Comply with territorial and other authority requirements relating to carrying out earthworks.
Prevent silt run off by:

- exposing only as much ground as required at any time
- providing run off channels, contour drains or earth bunds to divert clean water away from the site on to stable sealed or grassed ground
- capture silt by the use of silt fences, vegetation buffer strips, sediment ponds or earth bunds.

Provide sediment control by:

- earth bunds constructed across the slope to control and detain run off
- silt fences constructed using filter fabric stretched between posts at a maximum of 1 metre spacing.

Pump water from trenches and other areas of the site using methods to prevent sediment entering any drain or watercourse. Filter dirty water before discharging into drainage system.

1.8 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

Provide appropriate measures to prevent cement/concrete washwater or slurry run off to; drains or waterways, landscaped areas new or remaining and adjoining public or private properties. Comply with territorial and other authority requirements relating to cement/concrete washwater.

Control run off from:

- Cement/concrete based material production, placing and finishing.
- Hosing down and cleaning of, tools and equipment, fresh material, and spilt or surplus material, pumps and mixers etc.
- Wet cutting or grinding.
- Slab watering etc.
- Water cleaning of new concrete elements, fresh used formwork etc.

Small project with relatively large exposed ground areas - prevent run off by:

- directing small amounts of washwater onto the area of ground closest to the work.
- for larger amounts provide run off channels, and small soak pits
- very small amounts of washwater with no aggregate and only a small amount of sand may be spread over existing lawns.

Large project and those without suitable ground area - prevent run off by:

- plan and implement washwater control measures based on the expected volumes, allow for the timely removal and safe disposal of liquids and solids.
- Limit the volume of water used for washing down to the extent required.
- Control the flow of washwater so that it is directed to proper catchments.
- providing watertight bunds, pits or tanks, filtered washwater is not to be discharged to drains.

Spilt or surplus material:

- if possible allow to set and either use or dispose of as hardfill.
- pre-made concrete items, either use or dispose of as hardfill.

Pump washwater away from drains, waterways and adjoining property.

1.9 EXCAVATION SAFETY

To the Health and Safety at Work Act 2015.
Carry out excavation to WorkSafe, Good Practice Guidelines - Excavation Safety. This may include deep excavation, trenching, and areas behind unfilled retaining walls.
Carry out excavation using plant and equipment suitable for the purpose.

Scaffolding

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1.10 SCAFFOLDING

Provide scaffolding for the efficient execution of the works.
Comply with:

- Health and Safety at Work Act 2015
- Health and Safety in Employment Regulations 1995
- Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
- Worksafe - Scaffolding in New Zealand - Good Practice Guidelines

Temporary services

1.11 WATER

Provide clean, fresh water for the works and make arrangements for distributing about the site.

1.12 ELECTRICITY

To AS/NZS 3012.
Nominate the person to install and be responsible for the complete temporary electrical installation. The name and designation of the person responsible is to be displayed prominently and close to the main switch or circuit breaker.

Inspect and overhaul the installation at such intervals as are prescribed by the network utility operator but not more than three monthly intervals.

1.13 TELEPHONE

Provide on-site temporary telephone facilities.

1.14 COMPUTER FACILITIES

Provide on-site temporary computer facilities complete with an email and internet connection capable of sending, receiving and printing site communications.

1.15 PRINTER

Provide on-site temporary printing facilities capable of printing A4 and A3 colour prints.

1.16 IMAGING

Keep available devices able to take and send quality printable digital photographs.

Care and protection - Site

1.17 LOCATE AND PROTECT SURVEY MARKS

Review information provided relating to survey marks. Physically locate and protect survey marks. Where required use a licensed cadastral surveyor to reinstate survey marks disturbed during construction.

1.18 LOCATE EXISTING SERVICES

Review information provided relating to underground and above ground services. Physically locate the position of all such services. Arrange with the network utility operator for all necessary exploratory work, location, protection, isolation, off-setting, reinstatement or alterations required. Record any alterations made to such utilities.

1.19 PROTECT EXISTING SERVICES

Protect existing services and parts of service systems, whether indicated or not, that are to remain in place during the execution of the works. Provide temporary caps or covers to prevent the ingress of dust and other contaminants into the systems, ducts, pipes etc. Reinstate where required and repair any damage resulting from carrying out the contract works.

1.20 PROTECT EXISTING LANDSCAPE ELEMENTS

Protect existing trees, fences, gates, walls, gardens and other designated landscape features which are to remain in position during the execution of the works. Construct a temporary fence at the outer edge of the drip line of trees to be protected. Comply with territorial authority requirements.

1.21 MAKE GOOD - SITE

Make good all damage to existing roads, footpaths, grounds, services, landscape elements and site features caused in carrying out the contract works.

Care and protection - miscellaneous

1.22 CONSTRUCTION KEYING AND SECURITY

Provide locksets with temporary keying, or install with the cylinders removed.

1.23 TEMPORARY STORAGE

Provide temporary storage areas and protective covers and screens to meet the requirements of the products to be stored.

Rubbish removal

1.24 PERIODIC RUBBISH REMOVAL

Maintain on site appropriate means for the storage and removal of construction waste material. Where required or appropriate provide for the separate storage of recyclable waste and other materials requiring special disposal.

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1270 CONSTRUCTION

1 GENERAL

This GENERAL section relates to common requirements for construction issues including:

- Quality control and assurance
- Noise and nuisance
- Set-out and tolerances
- Common execution requirements
- Qualifications
- Common product requirements
- Common requirements for samples and prototypes
- Common requirements for spare and maintenance products
- Cleaning during the works
- Removal of protection
- Completion requirements
- Commissioning
- Practical completion submission
- Defects period submissions
- Completion submissions

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Quality control and assurance

1.1 QUALITY ASSURANCE

Carry out and record regular checks of material quality and accuracy, including:

- Concrete quality and finish.
- Dimensional accuracy of structural column locations (following completion of foundations).
- All perimeter columns and frames for plumb.
- Levels of all floors relative to the site datum.
- Framing timber moisture content.

Where any material, quality or dimension falls outside specified or required tolerances, obtain written direction from the contract administrator. Where building consent approval is affected, confirm remedial action with the Building Consent Authority.

Provide all materials, plant, attendances, supervision, inspections and programming to ensure the required quality standards are met by all project personnel.

1.2 PROVIDE QUALITY PLAN

Prepare a quality plan for the execution of the contract works and submit a copy of the quality plan to the Contract Administrator within 10 Working Days of the date of award of the contract. The quality plan shall describe the procedures for meeting the requirements of the contract in respect of:

- Materials and workmanship
- Monitoring and maintaining subcontractors' performance
- Record keeping
- The level of documentation for signing off the contract works as complete
- Procedures to ensure that all persons engaged in undertaking the contract works are qualified, experienced and trained for the work they are undertaking
- Inspection and testing required by the contract
- Auditing the quality plan

1.3 REVIEW OF QUALITY PLAN

Within 5 working days of the contractor submitting a quality plan to the contract administrator for review, the contract administrator may advise that:

- they have completed their final review, or
- that they have undertaken a review and require resubmission of the quality plan.

Review by the contract administrator of the quality plan does not make the quality plan a contract document. The contractor at all times remains responsible for the construction of the Works. If resubmission of a quality plan is required, the contract administrator will give their reasons. The contractor shall take account of the reasons and resubmit a revised quality plan within a period of 5 working days.

1.4 COMMENCEMENT OF WORK

Do not commence any part of the contract works, other than establishment, setting out and site preparation until the contract administrator has completed their final review of the quality plan.

1.5 NOTICE

Give notice to the contract administrator and any other nominated person of hold points and notification points. Refer to work sections and 1260 PROJECT MANAGEMENT for hold points and notification points required.

1.6 NOTIFIABLE WORK

Lodge notice of the intention to commence any notifiable work and any work that will at any time include any notifiable work, in accordance with Health and Safety in Employment Regulations 1995.

Noise and nuisance

1.7 LIMIT CONSTRUCTION NOISE

Minimise the effects of noise generation by including in the planning of the work such factors as placing of plant, programming the sequence of operations and other management functions. Limit construction noise to comply with the requirements of NZS 6803, the requirements of the Resource Management Act sections 326, 327 and 328 and the Health and Safety in Employment Regulations 1995 clause 11.

1.8 ACCEPTABLE NOISE LEVELS

Refer to NZS 6803 Tables 2 and 3 for the upper limits of construction work noise received in residential zones, dwellings in rural areas, industrial areas and commercial areas, note also the allowed adjustments. Do not exceed these limits or any limits imposed by regional councils or territorial authorities.

1.9 PROVIDE INFORMATION TO NEIGHBOURS

Provide information to neighbours of any noise generation from the site liable to constitute a problem. Explain to them the means being used to minimise excessive noise and establish with them the timings most suitable for the noise generating work to be carried on.

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Discuss with any complainant the measures being used to minimise noise. Where possible modify these measures to accommodate particular circumstances. Finally, determine the sound level at the location under discussion using methods and observation reporting as laid down in NZS 6803. If the noise level is above the upper limits of NZS 6803, table 2 and table 3, cease the noise generating operation and remedy the problem.

1.10 INCONVENIENCE TO OTHERS

When the works are to be carried out in or around occupied premises, ascertain the nature and times of occupation and use. Carry out the works in a manner to minimise inconvenience, nuisance and danger to occupants and users.

1.11 ROADWAY AND FOOTPATH

Keep the adjacent footpath and road clear at all times. Where work must be carried out in the roadway or footpath, obtain required consents from the territorial authority. Where temporary use is made of the footpath or roadway for deliveries and the like ensure that public safety is protected and the goods and materials moved as soon as practicable. Sweep, wash and otherwise clean the roadway/footpath and restore it to its previous condition.

1.12 VEHICLE CROSSING

Make good damage that has occurred as a result of carrying out the contract works. Where there has been significant damage, contact the territorial authority and obtain instructions for making good. Pay the territorial authority costs associated with making good.

1.13 DIRT AND DROPPINGS

Remove dirt and droppings deposited on public or private thoroughfares from vehicles servicing the site to the satisfaction of the appropriate authorities and the contract administrator.

1.14 DAMAGE AND NUISANCE

Take precautions to prevent damage and nuisance from water, fire, smoke, dust, rubbish and all other causes resulting from the construction works.

1.15 SMOKE FREE REQUIREMENTS

In accordance with the Smoke Free Environments Act 1990 smoking is not allowed on site.

1.16 RESTRICTIONS

Do not:

- light rubbish fires on the site.
- bring dogs on to or near the site.
- bring radios/audio players on to the site.

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Set-out and tolerances

1.17 SURVEY INFORMATION

Locate and verify survey marks and datum points required to set out the works. Where these do not exist or cannot be located advise the contract administrator who will arrange for the required points to be established.

Record and maintain their position. Re-establish and replace disturbed or obliterated marks.

1.18 DATUM

Establish a permanent site datum to confirm the proposed levels and their relationship to all other existing and new levels.

1.19 SET-OUT

Set out the work to conform with the drawings.

1.20 SET-OUT BY LICENSED CADASTRAL SURVEYOR

Before commencing construction provide the contract administrator with a certificate prepared by a licensed cadastral surveyor that the set-out is complete and that the building is accurately placed on the site.

During construction provide the contract administrator with a certificate, prepared by the same licensed cadastral surveyor confirming the set-out of the foundations and grid lines. Necessary adjustments are to be determined and agreed to by the contract administrator before proceeding further.

1.21 CONFIRM HEIGHT IN RELATION TO BOUNDARY

Arrange for the licensed cadastral surveyor to provide a certificate certifying that the building has been constructed within the allowed height in relation to boundary. Obtain details from the principal of the person they have engaged to carry out this certification and advise the surveyor when they can carry out the required survey.

Provide the certificate to the local authority. Provide a copy of the certificate to the contract administrator.

1.22 USE OF SET-OUT INSTRUMENTS

Permit without charge, the use of instruments already on site for checking, setting out and levels.

1.23 CHECK DIMENSIONS

Check all dimensions both on drawings and site, particularly the correlation between components and work in place. Take all dimensions on drawings to be between structural elements before linings or finishes, unless clearly stated otherwise.

1.24 TOLERANCES

All work to be level, plumb, and true to line and face. Unless otherwise specified in specific work sections of this specification, tolerances for structural work shall comply with the following:

Concrete construction:	To NZS 3109 Concrete construction Clause 3.9 Tolerances for reinforcement Table 5.1 Tolerance for precast components Table 5.2 Tolerance for in situ construction To NZS 3114 Concrete surface finishes
Masonry construction:	To NZS 4210 Masonry construction: Materials and workmanship Clause 2.6.5 Tolerances Table 2.2 Maximum tolerances
Structural steelwork:	To NZS 3404.1 Steel structures standard Section 14.4 Tolerances (after fabrication) Section 15.3 Tolerances (erection)

Timber framing:	To NZS 3604 Timber-framed buildings Clause 2.2 Tolerances Table 2.1 Timber framing tolerances

Refer to work sections for tolerance requirements for finishes.

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Execution

1.25 EXAMINE PREVIOUS WORK

Before commencing any part of the work carefully examine the previous work on which it depends, to ensure it is of the required standard.

1.26 REPORT DEFECTIVE PREVIOUS WORK

Refer defects to the contractor to be remedied, if the remedy is outside the scope of the contract documents the contractor shall obtain direction from the contract administrator. Do not carry out work over previous work that is defective and will affect the required standard.

1.27 EXECUTION GENERALLY

Construct the work in accordance with the documents issued for construction including any direction that may have been given by the contract administrator that varies the construction document.

1.28 EXECUTION - NO DETAIL IS PROVIDED

The documents issued for construction will not include all details relating to every material, junction and interface with other materials.

Where the detail provided is of a general nature, or where no detail is provided, refer to the manufacturer's documents for information relating to installation and execution of that part of the work.

Where there is more than one method or detail appropriate to the part of the work in question, refer the options to the Contract Administrator for direction as to which detail or method to use.

1.29 EXECUTION - ACCEPTABLE SOLUTION IS REFERRED TO

Where a NZBC Acceptable Solution is referred to in the specification but not shown on the plans, obtain a copy of that Acceptable Solution and make it available to the workers carrying out that part of the work.

1.30 MINIMISE DELAYS DUE TO WEATHER

Use appropriate techniques and methods to prevent damage and minimise delays due to weather.

Qualifications

1.31 QUALIFICATIONS GENERALLY

The work is to be carried out by workers and / or supervisors who are experienced, competent and familiar with the materials and the techniques specified. Workers must also be familiar with the manufacturers' and suppliers' installation and application instructions and standard details provided by them in relation to the use of the products for this project. If requested provide evidence of qualification / experience.

1.32 QUALIFICATIONS WORKERS – RESTRICTED BUILDING WORK

Where restricted building work (RBW) forms part of the contract works, workers, or supervisors of that work must be licensed building practitioners (LBP) holding current licenses for the particular restricted building work.
For rare instances where non-RBW also requires an LBP refer to individual work sections for details.

1.33 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

Where required by a manufacturer or supplier, workers must be specifically trained /approved / accredited / registered / licensed / certified by them. Refer to individual work sections for details.

1.34 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

Where workers and / or supervisors of work are required to be licensed, registered or similar under legislation, they must have a current license before they start the work and maintain currency until their part of the work has been completed and all documentation that is required has been provided.

1.35 QUALIFICATIONS – PRODUCER STATEMENTS

Where producer statements are required for parts of the work, ensure that person is suitably qualified and authorized to issue such producer statements.

1.36 REPLACEMENT OF PERSON

Should it be necessary to replace a person, ensure that records of work, producer statements, warranties and the like required for the part of the work they have carried out are obtained.

Ensure that the replacement person takes responsibility for the work they carry out and that they are able to provide such records of work, producer statements, warranties and the like required as a condition of the contract and the building consent.

Products

1.37 NEW PRODUCTS

Products to be new unless stated otherwise, of the specified standard, and complying with all cited documents.

1.38 COMPATIBILITY OF PRODUCTS

Ensure all parts of a construction or finish are compatible and their individual use approved by the manufacturers and suppliers of other parts of the system. Source all parts of a system from a single manufacturer or supplier.

1.39 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Protect products during transit and delivery on site and / or off site. Reject and replace goods that are defective or damaged or will not provide the required finish.

Handle products carefully to avoid damage and distortion and in accordance with codes of practice and the manufacturer's or supplier's requirements. Avoid any contact with potentially damaging surfaces or conditions.

Store products to avoid visual damage, environmental damage, mechanical damage and distortion. Store in accordance with codes of practice and the product manufacturer's or supplier's requirements. Maintain the proper condition of any protective packaging, wrapping and support.

Refer to individual work sections for any special requirements.

1.40 SUBSTRATE CONDITIONS

Ensure substrate conditions are within the manufacturer's or supplier's stated guidelines both before and during the installation of any material, product or system. Obtain written instructions on the necessary action to rectify unsatisfactory conditions.

1.41 INSTALLING PRODUCTS

Install in accordance with the manufacturer's or supplier's technical literature. Ensure that all installers are familiar with the required substrate conditions and the manufacturer's or supplier's specified preparation, fixing and finishing techniques.

1.42 COMPLY WITH STANDARDS

Comply with the relevant and/or cited Standard for any material or component. Obtain certificates of compliance when requested by the contract administrator.

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1.43 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.44 INCOMPATIBLE PRODUCTS

Separate incompatible materials and metals with separation layers, sleeves or gaskets of plastic film, bituminous felt or mastic or paint coatings, installed so that none are visible on exposed surfaces.

Samples

1.45 SAMPLES FOR REVIEW

Where specified in the work sections submit samples and any nominated supporting documentation to the named reviewer and notify the contract administrator of the submission. Where no person is named as the reviewer, submit to the contract administrator.

Samples for review may be described as a portable sample for review, portable control sample, fixed sample for review or fixed control sample. A portable sample refers to a sample that is easily movable, convenient for carrying. A fixed sample refers to a sample that is not portable. If the location of a fixed sample is not defined in the work section, obtain direction from the contract administrator.

For samples that are located on site, or by agreement with the contract administrator are located off site, notify the reviewer and contract administrator of their location and availability for review.

Timing for the provision and review of samples is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review. Allow for such resubmission and further review as may be required. No extension of time will be allowed for resubmission and further review.

Obtain written instructions in relation to the samples from the contract administrator. Do not proceed further with related work items until advised to continue.

Samples may be incorporated in the finished work if confirmed in writing by the contract administrator, otherwise allow to completely remove any fixed samples. Remove from the site any rejected samples.

Refer to SAMPLES clauses in work sections for further detail.

1.46 CONTROL SAMPLES

Samples become control samples if an instruction is given by the contract administrator to that effect. Control samples will be used for comparison purposes throughout the contract. Control samples may be portable or fixed in place, refer to SAMPLES clauses in work sections for further detail.

Control samples that are to remain on site, or otherwise in the care of the contractor, are to be maintained in original condition.

If confirmed by the contract administrator, fixed control samples may be incorporated in the finished work, otherwise allow to remove fixed control samples from site when instructed by the contract administrator.

1.47 OTHER SAMPLE REQUIREMENTS

Where specified in the work sections obtain samples for the purposes described.

Prototypes

1.48 PROTOTYPES - TESTING

Where specified in the work sections provide and test prototypes. Timing for the provision, testing, disassembling, re-assembling, retesting and review of prototypes and test results is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review of test results. Submit test results to the named reviewer and to the contract administrator. Where no person is named as the reviewer submit test results to the contract administrator.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - TESTING clauses in work sections for further detail.

1.49 PROTOTYPES - REVIEW

Where specified in the work sections provide prototypes for review. Timing for the provision, disassembling, re-assembling and review of prototypes is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for review by the named reviewer. Where no person is named as the reviewer notify the contract administrator for direction.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - REVIEW clauses in work sections for further detail.

1.50 PROTOTYPES - GENERAL

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Refer to the PROTOTYPES - TESTING and PROTOTYPES - REVIEW clauses in work section for details on what is to happen after the review and or testing of the prototype is complete. Where no information is provided refer to the contract administrator for direction.

Prototypes may become control samples if an instruction is given by the contract administrator to that effect.

Spares & maintenance products

1.51 SPARES & MAINTENANCE PRODUCTS

Collect, protect, package, label and store safely all spares and maintenance products specified in the work sections. Give the contract administrator an inventory of all spares and maintenance products.

If no instruction is given within a work section for the location of spares and maintenance products, then deliver to the owner ~.

If no instruction is given within a work section for timing in relation to the provision of spares and maintenance products, then provide at practical completion.

Refer to SPARES & MAINTENANCE PRODUCTS clauses in work sections for further detail.

Cleaning during the works

1.52 PERIODIC SITE CLEANING

Carry out periodic site cleaning during the contract period. Place waste material in appropriate storage pending removal from the site. Keep food waste separate from construction waste.

1.53 TRADE CLEANING

Keep the work area clean, remove of all debris, unused and temporary materials and elements from the site as work progresses and on completion. Refer to individual work sections for any specific requirements.

Remove protection

1.54 REMOVE PROTECTION

Remove all temporary markings, labels, packaging and coverings to products unless instructed otherwise, or where they are required for protection.

Maintain temporary protection until removal is required by the manufacturer/supplier, the execution of the work or the requirements of individual work sections. Re-establish protection as necessary.

Remove temporary protection and special protection immediately prior to practical completion or before when there is no further risk of damage.

Refer to individual work sections for any special removal requirements.

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Completion

1.55 REMOVE CONSTRUCTION WASTE

Remove all debris, unused materials and the like from the site. Arrange for material to be recycled to be collected or delivered to the recycler.

1.56 COMPLETE ALL SERVICES

Ensure all services are complete and operational, with all temporary labelling removed, required labelling fixed and service instructions provided.

1.57 CLEANING BY CONTRACTOR

Clear the contract works of all construction materials, waste, dirt and debris. Clean the contract works including:

- Wipe all surfaces to remove construction dust.
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal scrappers that may damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings.
- Clean out the interior of all cabinetry.
- Remove rubbish and building material from the area immediately adjacent to the contract

works.

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Commissioning

1.58 MOVING PARTS

Adjust, ease and lubricate all doors, windows, drawers, hardware, appliances, controls and all moving parts to give easy and efficient operation.

1.59 INSTRUCTION AND DEMONSTRATION

Provide instruction and demonstration to the owner/occupier to the extent that is listed below and as required for them to reasonably occupy and use the building. This is to include at least the following:

- Location and isolation of all services connections.
- Operation of all emergency systems.
- Locking and security arrangements.
- Operation of basic building services including lighting, heating, mechanical ventilation, air conditioning and security.
- Special cleaning requirements and procedures.
- Any other features that the owner/occupier needs to know about.

1.60 SECURITY AT COMPLETION

Remove any temporary lock cylinders and complete final keying prior to handing over keys to the principal on completion of the works. Leave the works secure with all accesses locked. Account for all keys/cards/codes and hand to the principal along with an itemised schedule, retaining a duplicate schedule signed by the principal as a receipt.

Practical completion submission

1.61 ADDITIONAL PRACTICAL COMPLETION INFORMATION

In addition to requirements in the contract and contained elsewhere in the specification provide the following information submissions for practical completion:

- All documents which the contractor has obtained on behalf of the owner/occupier.
- Information required by the owner/occupier to be able to use the building.
- Advice that NUO accounts in the contractor's name have been closed and as appropriate changed to be in the name of the owner/occupier.
- A list of persons to be contacted to carry out any emergency or remedial work including 24 hour/7 day contact details.

1.62 ADDITIONAL PRACTICAL COMPLETION REQUIREMENTS

Refer to the conditions of contract for the definition of practical completion and the conditions relating to practical completion.

In addition to the requirements in the contract, the following conditions also apply:

- ~

Defects period submissions

1.63 DEFECTS REMEDIATION - SUBMISSIONS

Provide the following at periods required by the contract administrator, where no period is stated, provide this information monthly:

- A copy of the contractor's check list identifying remaining defects and omissions to be completed recording progress made in completing and correcting the items.
- A copy of lists issued by the principal/employer identifying omissions and defects recording progress made in completing and correcting the items.
- A copy of lists issued by the contract administrator identifying omissions and minor defects recording progress made in completing and correcting the items.

Completion submissions

1.64 FINAL COMPLETION - SUBMISSIONS

In addition to requirements in the contract and contained elsewhere in the specification provide:

- Contractors advice that all defects have been corrected and omissions and deferred work completed.
- All documents which the contractor has obtained on behalf of the owner/occupier.

2210 PREPARATION & GROUNDWORK

1 GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:

- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
WorkSafe	Good Practice Guidelines - Excavation Safety

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

Manufacturer/supplier contact details;

Company:	~
Web:	~
Email:	~
Telephone:	~

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1.3 SITE SAFETY

Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

1.4 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

2 PRODUCTS

2.1 EXCAVATED CLEAN FILL

Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

2.2 VOLCANIC TUFF FILL

Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL

Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL

Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.5 HARD FILL

Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL

Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE

Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

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3 EXECUTION

3.1 WASHOUT BAY FOR TRUCK

Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY

Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe, Good Practice Guidelines - Excavation Safety.

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained.

3.5 EROSION CONTROL

Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.6 SURFACE PREPARATION

Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.7 STOCKPILE TOPSOIL

Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.8 GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.9 ROCK EXCAVATION

If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.10 FOUNDATION EXCAVATION

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.11 INADEQUATE BEARING

If localised bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows:

- Below slabs on grade: Hardfill compacted in 150mm layers
- Below footings: 10 MPa concrete

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.
Confirm any changes with the territorial authority.
For inadequate bearing or over excavation of service trenches, use hardfill compacted in 150mm layers.

3.12 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.13 GRANULAR BASE FOR SLABS

To conform to NZS 3604, section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.14 GENERAL BACKFILLING

Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.15 RETAINING WALLS

Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.16 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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2310 FOUNDATIONS

1 GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3605	Timber piles and poles for use in buildings

Performance

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2 PRODUCTS

2.1 CONCRETE PILES IN SITU

To NZS 3604 for concrete, reinforcement, footing and type.

2.2 CONCRETE PILES PRE-CAST

200mm square parallel-sided to NZS 3604 for footing and type.

2.3 ROUND TIMBER PILES

Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross section, length, straightness, strength and branding. All to NZS 3604 for footing and type.

2.4 SQUARE TIMBER PILES

Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross-section, length, straightness, strength and branding. All to NZS 3604 for footing and type.

2.5 TIMBER SUB-FLOOR FRAMING

Species, grade, moisture content in service and level of treatment as set out in NZS 3602. Grading to NZS 3603 and treated to NZS 3602, table 1C.

2.6 NAILS

Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.

2.7 BOLTS

Steel, stainless steel, and galvanized steel to NZS 3604.
Refer to SELECTIONS.

2.8 NAIL PLATES

Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

2.9 CORROSION RISKS

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3 EXECUTION

3.1 FOUNDATIONS GENERALLY

Comply with NZS 3109, 3602 and NZS 3604 except as varied by this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 EXCAVATIONS

Refer to 2210 PREPARATION AND GROUNDWORK.

3.3 INSTALL CONCRETE PILES IN SITU

Box for, reinforce and pour in 17.5 MPa concrete the footings and piles in the various types to NZS 3604.

3.4 INSTALL CONCRETE PILES PRECAST

Pour 17.5 MPa concrete footing and set in pre-cast concrete piles in the various types to NZS 3604.

3.5 INSTALL ROUND TIMBER PILES

Prepare for and drive timber piles to NZS 3604, section 6.6, **Driven timber piles**. Protect pile heads with a suitable cushion.

3.6 INSTALL SQUARE TIMBER PILES

Prepare for, place and secure as detailed on the drawings.

3.7 SUB-FLOOR FRAMING

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6, **Foundation and subfloor framing**.

4 SELECTIONS

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3101 CONCRETE WORK - BASIC

1 GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

1.1 ABBREVIATIONS AND DEFINITIONS

The following definitions apply specifically to this section:

ACRS	Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS web site - www.steelcertification.com

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

2 PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5 to 50 MPa grade, (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

2.2 SITE CONCRETE

Concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, table 3.1, Prescribed mixes (P).

2.3 REINFORCEMENT

Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh Class E to AS/NZS 4671, and 500E mesh to AS/NZS 4671.

2.4 MESH FOR SLABS TO NZS 3604 OR NZS 4229

For slabs on ground mesh to be welded reinforcing mesh to AS/NZS 4671, Class E, minimum to B1/AS1 - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction).

2.5 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.6 SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

Accessories

2.7 WATERPROOFING FOR EXTERIOR OPENINGS

Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings to CCANZ CP 01. Refer to SELECTIONS.
Do not use bituminous coatings.

3 EXECUTION

3.1 HANDLE AND STORE

Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 FALSEWORK AND FORMWORK

Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 CUT AND BEND REINFORCEMENT

Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3109, table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.4 ADJUSTMENTS

Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

3.5 TOLERANCES, BENDING

To NZS 3109, 3.9, Tolerances for reinforcement.

3.6 SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

3.7 LAPPED SPLICES

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Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked.
Wire mesh laps to NZS 3101.1, lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.8 MESH LAPS FOR SLABS TO NZS 3604 OR NZS 4229

For slabs on ground the welded reinforcing mesh to be lapped such that the outermost wires overlap by the greater of:

- the spacing of the cross wires plus 50mm
- 150mm or
- manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

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3.9 REINFORCEMENT COVER TO NZS 3101.1

Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101.1, table 3.6, **Minimum required cover for a specified intended life of 50 years**. Sub-soil cover to NZS 3101.1, to suit soil and groundwater conditions. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.10 REINFORCEMENT COVER TO NZS 3604 OR NZS 4229

For in-situ concrete, foundations and interior slabs on ground, to NZS 3604 or NZS 4229, the reinforcement and welded mesh cover to be:

Location, cover to	**NZS 3604**	**NZS 4229**
Footing, to earth	75mm	75mm
Footing, to DPM	75mm	50mm
Foundation, to edge	75mm	75mm
Slab, to slab top	30mm	30mm
Slab, to slab edge	50mm to 75mm	50mm to 75mm

3.11 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Location and form of conduits to be approved in writing by the Contract Administrator. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

3.12 CONSTRUCTION JOINTS

Locate and construct as shown on the drawings or in accordance with NZS 3109, 5.6, Type B.

3.13 PRE-PLACEMENT INSPECTION

Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.

3.14 SURFACE FINISHES

To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.15 CONCRETE SURFACE TOLERANCES

To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.16 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to NZS 3109, 7.4, Handling and placing and NZS 3109, 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.17 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.18 FLOOR SLABS TO NZS 3604

Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 3604, 4.5 **Concrete and concrete masonry** and NZS 3604, 7.5, **Concrete slab-on-ground floors in timber buildings** as modified by NZBC B1/AS1, 3.0 **Timber**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 24m centres to NZBC B1/AS1, 3.1.13 **NZS 3604 New clause**.

3.19 FLOOR SLABS TO NZS 4229

Generally for slabs on ground to NZS 4229 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 4229, 6, **Footings** and NZS 4229, 7, **Foundation walls and concrete slab-on-ground** as modified by NZBC B1/AS1, 2.0 **Masonry**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 18m centres to NZS 4229, 7.8.5.3 **Free joints**.

3.20 SAW CUTS TO NZS 3604 OR NZS 4229

Cut slabs where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab after it has hardened (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 ºC, and 48 hours for average ambient temperatures below 20ºC).

3.21 SAW CUTS

Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring.

3.22 SPACING OF SAW CUTS

Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m
Carpet on underlay flooring	6m

3.23 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

3.24 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.25 STRIKE FORMWORK

Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.26 WATERPROOFING EXTERIOR OPENINGS

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Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.
Provide temporary protection from direct sunlight.

3.27 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.28 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

4 SELECTIONS

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3811M MITEK (GANG-NAIL) PREFABRICATED TIMBER TRUSSES

1 GENERAL

This section relates to the manufacture, supply and erection, of prefabricated:

- MiTek® timber roof trusses (GANG-NAIL® roof trusses)
- MiTek® bolted style timber roof trusses - (GANG-NAIL®) XPOTRUSS roof trusses
- MiTek® floor trusses (Posi-STRUT® truss systems)
- MiTek® rafter and purlin trusses (Posi-STRUT® truss systems)

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

FTMA	Frame and Truss Manufacturers Association of New Zealand Inc.
SED	Specific Engineering Design

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/VM1	Structure
NZBC B2/AS1	Durability
AS/NZS 1170.0	Structural Design Actions - General principles
AS/NZS 1170.2:2011	Structural Design Actions - Wind actions
NZS 1170.5	Structural Design Actions - Earthquake actions - New Zealand
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
MiTek® (GANG-NAIL®) Roof Truss System Manual
MiTek® (GANG-NAIL®) Roof Truss Installation manual
MiTek® (GANG-NAIL®) XPOTRUSS Roof Truss System brochure
MiTek® (GANG-NAIL®) Posi-STRUT® Truss System Manual
MiTek® Structural Fixings On site guide for Building Code Compliance (2012)
For the latest version of the documents refer to the manufacturer's web site.

Manufacturer/supplier contact details

Company:	**MiTek New Zealand Limited**
Web:	www.miteknz.co.nz
Email:	design@miteknz.co.nz
Telephone:	09 274 7109 or 03 348 8691

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Requirements

1.4 QUALIFICATIONS

Fabricators to be experienced competent workers, familiar with the materials and the techniques specified.
Fabrication companies to be MiTek® accredited fabricators.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.6 DESIGN CRITERIA NON-SPECIFIC DESIGN

Individual timber framing members used separately, but in association with the trusses, to NZS 3604.

1.7 DESIGN CRITERIA SED

Frames and trusses to, Alternative Solution MiTek® 20/20 and MiTek Sapphire® Design Programme, NZBC B1/VM1, AS/NZS 1170.0, AS/NZS 1170.2, NZS 1170.5 and NZS 3603.

Documentation for Building Consent/Code Compliance Certificate

1.8 DOCUMENTATION - FABRICATOR / MANUFACTURER

To NZS 3604, 10.2.2.3 **Drawings and Specifications** and the provisions/requirements of the following related clauses.

1.9 PROVISION OF STATEMENTS

Provide the following documentation. The statements shall include the name and position within the company of the person providing the statement.
Fabricator Design and Manufacturing Statements shall be noted as being:

- Issued by a named company, accredited as a fabricator by the nail plate manufacturer
- Issued to the named Owner and available for use by a BCA to assist in determining compliance with the NZBC.

1.10 SHOP DRAWINGS

Provide drawings showing the trusses and their layout;

- one prior to fabrication (buildable truss layout) for consent purposes.
- one post fabrication As Built (as fabricated layout) for construction and code compliance purposes.

The drawing shall be identified as 'Buildable' or 'As Built' (as fabricated) and shall include the following:

- The name and contact details of the accredited fabricator
- The job/design reference name or number
- The site address/location

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Site specific structural and loading information including

- Pitch
- Cladding type
- Wind and snow loading values
- Date drawn
- A truss layout with truss labels and dimensions to locate the trusses on the supporting structure
- Identification of all load bearing walls/beams used to support trusses
- Specification and location of truss to truss and truss to top plate fixings or notification that such items are specified by others
- Identification of the location of any resulting loads where the design of the supporting member will be outside the scope of NZS 3604 (point loaded lintels and point loads on internal walls where the downward and upward loads are higher than 16kN) and where appropriate, any slab thickening required
- Reference to the Fabricator Design Statement

1.11 AS BUILT DOCUMENTS

Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:
~

- Provide final post fabrication as built information for construction and code compliance purposes. .

1.12 DESIGN STATEMENT - BUILDABLE TRUSS LAYOUT SERVICE

Roof truss layouts, a truss design statement and a producer statement (design) produced by MiTek Buildable Truss Layout (BTL) service have been included as a part of building consent documentation.

1.13 DESIGN STATEMENT - FABRICATOR

Provide a Design Statement issued by the fabricator listing the job specific inputs used in the design process.

The Design Statement shall identify:

- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- Software date/version
- Reference to the Producer Statement - Design
- Supporting compliance documents including standards for material grades and sizes
- The job/design reference name or number
- The site address/location

Job specific information:

- Loads allowed for in the specific design including dead loads (cladding and ceiling) and live loads (wind and snow)
- Roof pitch
- Nominal overhang length
- Importance Level

Design working life:

- A list of the designed trusses, spans and maximum spacing
- Date of design

1.14 PRODUCER STATEMENT - DESIGN

Provide a Producer Statement - Design issued by the software provider, supporting the software and the engineering principles being applied by the software.

The Producer Statement shall:

- Have a level of detail consistent with that of an IPENZ Producer Statement PS1
- State the means of compliance with NZBC
- Reference the truss layout and Fabricator Design Statements
- Identify the job/design reference name or number
- Identify the software date/version
- Be signed by a Chartered Professional Engineer

1.15 MANUFACTURING STATEMENT

Provide a statement to support the manufacture of the roof trusses in accordance with the principles of the design statement and truss layouts. This statement is to be issued by a fabricator after manufacture has occurred and identifying:

- The job/design reference name or number
- The site address/location
- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- That the trusses were manufactured in accordance with the Design Statement
- The name and position within the company of the person providing the statement

Truss identification

1.16 IDENTIFICATION OF TRUSSES ON SITE

A selection of trusses in a job lot manufactured by a fabricator shall carry identification labels or markings fitted during manufacture, to NZS 3604, 10.2.2.5, **Truss identification**.

Identification shall be evident on the bottom chords of main rafter or girder trusses on a minimum of 6 trusses in a job lot, or on every truss where there are less than 6 trusses in the job lot.

Identification text shall be a minimum of 10mm high and shall include:

- The fabricator name
- The nail-plate manufacturer name
- The job/design reference name or number

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2 PRODUCTS

Materials

2.1 MITEK TRUSSES - TIMBER

Structural grade timber to NZS 3602, NZBC B2/AS1, gauged, maximum moisture content of 20%, treated to NZS 3640, NZBC B2/AS1, hazard class H1.2 and identified with its unique identifier.

2.2 MITEK ROOF TRUSSES - TOOTHED PLATE

MiTek® (GANG-NAIL®) timber roof trusses with toothed plate connectors. Design and layout to be determined by a MiTek® accredited fabricator, refer SELECTIONS.

Accessories

2.3 STEEL TOOTHED CONNECTOR PLATES

GANG-NAIL® 1.0mm to 2.0mm thick steel sheet, Z275 galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** and punched to form a toothed connector. For (roof) spaces designated closed environments to NZS 3604.

2.4 STAINLESS STEEL TOOTHED CONNECTOR PLATES

GANG-NAIL® 1.2mm to 2.0mm thick 316 grade, GS12 stainless steel sheet, punched to form a toothed connector.

2.5 BOWMAC GALVANIZED STRUCTURAL BRACKETS

MiTek® BOWMAC® >3mm thick steel plate brackets, hot-dip galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** with hot-dip galvanised bolts/screws and washers.

2.6 BOWMAC STAINLESS STEEL STRUCTURAL BRACKETS

MiTek® BOWMAC® >3mm thick, 304 stainless steel plate brackets with stainless steel bolts/screws and washers.

2.7 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3 EXECUTION

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Conditions

3.1 COMPLY

Comply with current standards, code requirements and the FTMA CoP in the design and fabrication of trusses and frames.

3.2 DELIVER, HANDLE AND STORE TRUSSES AND FRAMES

Deliver, handle and store frames and trusses so no structural damage occurs, corners and edges are not damaged, or surfaces marked or stained. Follow manufacturer's requirements. Handle all frames and trusses with nylon strops or similar to prevent damage. Store under cover and clear of the ground, to keep dry prior to installation.

Fabrication

3.3 DIMENSIONS, NOT EXPOSED ELEMENTS

Each member calculated length ±3mm. Width and thickness to gauging tolerances. Each overall joint within ±3mm of correct outside profile (including camber allowance).

3.4 FABRICATION

Factory fabricate to the GANG-NAIL® Manufacturing System. Build camber into all elements to accommodate normal deflection under load. Lay up members accurately with all joints tight fitting. Mechanically press plates to manufacturer's tolerances, fully and flat over their whole area into the members forming the joint.

Site installation

3.5 MITEK (GANG-NAIL) ROOF TRUSS ERECTION

To MiTek® (GANG-NAIL®) Roof Truss Installation manual.

Lift, place and fix trusses without overstressing or deformation. Use temporary supports as needed without causing damage. Fit trusses to wall plates and beams to MiTek® (GANG-NAIL®) requirements, but no less than NZS 3604, section 10, **Roof framing** and in particular section 10.2.2, **Roof trusses**. Fit and fix bracing as detailed and to NZS 3604: section 10.2.2, **Roof trusses** and section 10.3, **Systems to resist horizontal loads**. Ensure all trusses are correctly located, plumb and true to line and face.

3.6 MITEK (GANG-NAIL) ROOF TRUSS CONNECTION AND FIXING

To MiTek® (GANG-NAIL®) Roof Truss Installation manual.
Fit connectors and fixings to obtain full bearing over all contact surfaces and ensure the required loading capacity for the truss and frame roof is maintained. Fix each roof framing member in accordance with MiTek® (GANG-NAIL®) requirements and NZS 3604, Section 10, **Roof framing.** Ensure the size, number and location of nails to be used in roof framing comply with requirements of Table 10.8, **Nailing schedule for hand-driven and power-driven nails**, or to engineering specific design. Ensure all elements are correctly located, plumb and true to line and face.

3.7 ROOF BRACING

Refer to 3821M MITEK TIMBER FRAMING for roof bracing of trussed roofs.

3.8 WALL BRACING

Refer to 3821M MITEK TIMBER FRAMING for wall bracing.

3.9 DPC TO TIMBER

Lay DPC between all timber frames and concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. For LOSP treated timber use only a DPC specifically suitable with LOSP treatment.

3.10 TIGHTEN BOLTS

Check and tighten any related fixing bolts after erection is completed.

Completion

3.11 REPLACE

Replace or repair damaged elements.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

3.13 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

For further details on selections go to www.miteknz.co.nz.

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3813F FUTUREBUILD® NZ - LVL STRUCTURAL FRAMING

1 GENERAL

This section relates to the supply and installation of Futurebuild LVL engineered wood products including:

- hyONE®
- hySPAN®
- hyCHORD®
- hy90®
- hyJOIST®

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1.1 RELATED WORK

Refer to 3811 PREFABRICATED STRUCTURAL TIMBER FRAMING for supply of trusses and frames.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1	Structure
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed buildings
AS/NZS 4357.0	Structural laminated veneer lumber - Specifications

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER DOCUMENTS

Futurebuild LVL documents relating to work in this section are:

- Futurebuild LVL Residential Design Guide
- Futurebuild LVL Specific Engineering Design Guide
- hyJOIST Design and Installation Guide:2.1
- hyJOIST HJ240 45 and HJ300 45 Brochure
- Product Technical Statement - Futurebuild LVL Products specified for Residential Applications through software and literature
- Product Technical Statement - Futurebuild LVL Products: General/Specific Design
- Product Technical Statement - Futurebuild LVL Products: Specified through designIT for commercial floors
- Product Technical Statement - Futurebuild® LVL Products: Specified through computeIT® Software Solutions
- designIT Software which includes installation details, Design Certificate and Producer Statement

Copies of the above literature and software are available from Futurebuild LVL.

Web:	www.futurebuild.co.nz
Email:	info@futurebuild.co.nz
Telephone:	0800 808 131 (Customer Services), 0800 585 244 (Technical)

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Futurebuild LVL engineered wood products or associated components or accessories. The structural properties of other manufactures LVL products may not be comparable.

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 CO-ORDINATION

Refer to all drawings to ensure details and fixings required are provided for in the structural LVL work.

2 PRODUCTS

Materials - Laminated Veneer Lumber (LVL)

2.1 HYONE LINTELS & BEAMS

High stiffness structural LVL lintels and beams manufactured to AS/NZS 4357.0

2.2 HYSPAN

Structural radiata pine LVL bearers, lintels, rafters, floor joists, floor and roof beams, to AS/NZS 4357.0.

2.3 HYJOIST

Structural composite "I" beam floor joists and rafters comprised of a cross banded plywood web with LVL flanges in-grade tested to meet published Characteristic Values.

2.4 HYCHORD

Structural LVL truss chords for high load applications and wall studs to AS/NZS 4357.0

2.5 HY90 LINTEL

Structural LVL lintels and beams manufactured to the requirements of AS/NZS 4357.0

Components

2.6 JOIST HANGERS

Top mount hangers, full depth face mount hangers and partial depth face mount hangers with nails and/or screws to Futurebuild LVL technical literature requirements.

2.7 WEB STIFFENERS

Futurebuild LVL web stiffeners used to resist web buckling or installed in conjunction with partial height joist hangers, and/or to accommodate uplift forces. Fixed to Futurebuild LVL technical literature requirements.

2.8 STEEL STRAPS

Mild steel galvanized straps, to suit tie down applications for rafters, 27mm x 0.6mm, 25mm x 0.8mm and 25mm x 1.0mm.

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3 EXECUTION

Conditions

3.1 ERECTION GENERALLY

Carry out the erection of LVL and associated support framing for houses and similar structures to the requirements of NZS 3604 and/or Futurebuild LVL literature and software as detailed. Comply with NZBC B1/VM1, 6.0 Timber. Refer to Futurebuild LVL guidelines for the installation of LVL structural framing. Prop long length beams and lintels at the mid span until the moisture content has reached a suitable level for the application of internal linings.

Application - hySPAN & hyCHORD

3.2 ERECTION

Lift, place and fix hySPAN or hyCHORD without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hySPAN or hyCHORD to NZS 3604 and/or to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.3 HOLES AND NOTCHES IN SOLID FUTUREBUILD LVL FLOOR JOISTS

Holes and notches in Futurebuild LVL floor joists to NZS 3604 and/or Futurebuild LVL requirements.

Application - hyJOIST

3.4 ERECTION

Lift, place and fix hyJOIST without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hyJOIST to Futurebuild LVL requirements. Ensure all hyJOIST is correctly located, plumb and true to line and face.

3.5 WEB HOLE LOCATIONS IN HYJOIST

Circular holes, square holes and rectangular holes to be located in hyJOIST floor joists as per limitations in the hyJOIST Design and Installation Guide, designIT sITe APP or designIT Software. Do cut web area as specified. Do not cut, notch or bore through flanges.

3.6 HYJOIST RAFTERS AND OVERHANGS

To Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software, for details of rafter tie down, restraint at supports, lateral restraint for hyJOIST rafters, ridge support detail, fascia connection detail and overhang details. For sloping soffit with hyJOIST rafters birdsmouthed at supports, cut notch to provide 45mm minimum bearing. Flange must not overhang support. Do not cut beyond flange.

3.7 HYJOIST BEARING AND SUPPORT DETAILS

To hyJOIST Design and Installation Guide, or designIT Software, for details of bearing and support, nailing down to supports, installation of joist hangers, web stiffeners, web stiffeners for double joists, for joists oblique to bearer, concentrated loads from jamb studs or posts and limited notching at end supports.

3.8 JOIST HANGERS FOR HYJOIST JOISTS

To Joist Hanger Specification in Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software.

Application - hy90 & hyONE

3.9 ERECTION GENERALLY

Lift, place and fix hy90 or hyONE without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hy90 or hyONE to NZS 3604 and to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.10 LINTEL END CONNECTIONS

To hy90 and hyONE Lintels for residential construction - Information for design and installation for lintel end connections and cantilevered lintel connections construction details and to NZS 3604 and/or designIT for houses software for trimming stud connections and tie down where required for uplift.

Completion & Commissioning

3.11 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

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3820 CARPENTRY

1 GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber and engineered wood.

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 DIMENSIONS

All timber sizes except for battens are actual minimum dried sizes.

2 PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Structural grade (SG) to NZS 3604, NZS 3622 with properties to NZS 3603.

2.2 LAMINATED TIMBER

Radiata pine laminations to AS/NZS 1328.1; treated as required by NZS 3602, NZBC B2/AS1, to the requirements of NZBC B2/AS1, AS/NZS 1604.1, NZS 3640, with special attention to Appendix B "Specification advisory notes". Supply weather resistant sealed.

2.3 ENGINEERED WOOD

LVL members to AS/NZS 4357.0, to required sizes and lengths and the manufacturer design properties.
Treatment to NZS 3640 and AS/NZS 1604.1.

2.4 TIMBER TRUSSES

To FTMA CoP. Moisture content 16% at supply.

2.5 WALL DWANGS, NOGS AND BLOCKING

If dwangs, nogs or blocking is required for exterior insulated walls, ensure they are not full depth of framing. Install flush with face of wall required, leaving a minimum 20mm or 45mm preferable gap to the other face to NZS 3604, 8.8. Dwangs and nogs if required to be at 1350mm centres maximum to NZS 3604, 8.8.

2.6 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL

Extruded polypropylene battens, size approximately 45mm wide x 18mm thickness. Temporary fix battens before being fixed into the framing with the cladding fixings. To the scope limitations of NZBC E2/AS1, and NZS 3604 Building Wind Zones up to, and including "Extra High".

Components

2.7 NAILS

Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.8 BOLTS AND COACH SCREWS

Bolts and coach screws complete with washers, to the requirements of NZS 3604, clause 2.4.5 Bolts and Coach Screws, and section 4, **Durability**, and of the type, number and form required for each particular junction to NZS 3604, sections 6 - 10.

2.9 NAIL PLATES

Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6 - 10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.10 CONNECTORS

Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.11 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

2.12 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

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3 EXECUTION

3.1 EXECUTION GENERALLY

To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION

Separate all timber framing timbers from concrete, masonry and brick by: -

- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum

3.5 SET-OUT

Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings. When necessary provide framing to suit any required cladding/lining control joints and sheet joints.

3.6 FRAMING SUB-FLOOR

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6.10, **Framed subfloor walls**.

3.7 FRAMING FLOORS

Framed and fastened to NZS 3604, section 7, **Floors**.

3.8 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

3.9 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and 10, **Roof framing**.

3.10 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**. Trim for openings in ceilings and hatches to NZS 3604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.

3.11 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.12 FIT CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to NZS 3604. Fit and fix related flashings. Make allowance for cladding control joints where required. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.13 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.14 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

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3827E ECOPLY® PLYWOOD BRACING SYSTEM

1 GENERAL

This section relates to the use of Ecoply® sheets for structural wall bracing:

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

COC	Chain of Custody
EPD	Environmental Product Declaration
FSC®	Forest Stewardship Council®

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Documents

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E2/AS1	External moisture
AS/NZS 1170.2:2011	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1604.3:2012	Preservative-treated wood-based products - Part 3: Plywood
AS/NZS 2269.0	Plywood - structural - specifications
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber Structures Standard
NZS 3604	Timber-framed buildings
EN 15804+A2	Sustainability of construction works - Environmental product declarations - Core rules for product category of construction products
ISO 14025	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)

1.3 MANUFACTURER DOCUMENTS

Carter Holt Harvey Plywood Ltd documents relating to work in this section are:
Ecoply® Specifications and Installation Guide
Ecoply® Technical Notes.
CHH Ply - Plywood Environmental Product Declaration, EPD Registration S-P-05512
Declare Label CHH-0002 Ecoply® Untreated structural plywood, Carter Holt Harvey Plywood Ltd
Forest Stewardship Council (FSC®) Certificatation. Available Forest Stewardship Council (FSC®) certified (FSC-C012019) upon request

Manufacturer/supplier contact details

Company:	Carter Holt Harvey Plywood Limited
Web:	chhply.co.nz
Email:	info@ecoply.co.nz
Telephone:	0800 326 759

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

Performance

1.6 BRACING SYSTEM

The Ecoply® bracing system provides bracing resistance for walls and subfloor foundations for light timber framed buildings under wind and earthquake loading to NZBC B1 Structure, and to NZS 3604 Timber Framed Buildings or specifically designed to NZS 3603 Timber Structure Standard.

Provide braced wall systems using Ecoply® Bracing Specifications to meet the requirements of NZS 3604 when tested to BRANZ Technical Paper P21. Refer to drawings for location and type.

Refer to table for summary of P21 Ratings for 2.4m high Ecoply® wall element:

Brace No.	Minimum wall length	Lining Requirements	Bus/m Wind	Bus/m Earthquake
EP1	0.4m	7-12mm Ecoply® one side	80	95
EP1	0.6m	7-12mm Ecoply® one side	95	105
EP1	1.2m	7-12mm Ecoply® one side	120	135
EPG	0.4m	7-12mm Ecoply® one side and 10mm Gib® Standard plasterboard other side	100	115
EPG	1.2m	7-12mm Ecoply® one side and 10mm Gib® Standard plasterboard other side	150	150

Note:

- Plywood must be connected to both bottom and top plate for bracing.
- GIB Handibrac hold down connections required each end of bracing elements.
- Maximum 120 Bus/m for any bracing element on timber framed floor (NZS 3604)
- Bracing and other technical information has been specifically tested using Ecoply structural plywood. This information cannot be used with any other plywood brand and bracing data must be sought directly from the specific plywood manufacturer.

Environmental

1.7 ENVIRONMENTAL PRODUCT DECLARATION

Carter Holt Harvey Plywood has a third party verified Environmental Product Declaration (EPD) in accordance to ISO 14025 and EN 15804+A2. The EPD is based on a cradle to gate Life Cycle Assessment with end of life options, with modules A1-A3, C1-C4 & D. The EPD is registered with EPD Australasia, EPD Program Operator. Refer to CHH PLY-Plywood Environmental Product Declaration April 2023, EPD Registration Number S-P-05513, valid until 12.04.2028.

1.8 DECLARE LABEL

Carter Holt Harvey Plywood Limted, Ecoply® Untreated Structural Plywood has a Living Building Challenge (LBC), Declare Label and achieves a LBC Red List Free status. Refer to Declare Label CHH-0002.

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2 PRODUCTS

Materials

2.1 ECOPLY® STRUCTURAL PLYWOOD

Radiata pine veneer ply manufactured to AS/NZS 2269.0, DD face grade or better, 7mm minimum thick, H3.2 CCA treated to AS/NZS 1604.3. Available as FSC® certified (FSC® C012019) upon request.

Components

2.2 NAILS

Nail fixing for Ecoply® used as a structural bracing

Fixing type	Minimum nail length
Direct Fixed	50 x 2.8mm flat head hot dipped galvanized or stainless steel annular grooved nails

Accessories

2.3 TREATMENT OF SHEET CUTS

Soudal Metalex Ready to Use or Soudal Metalex Concentrated Timber Preservative. Clear or Green colour product.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

- Ecoply panels must be stored and handled with care to maintain good condition before use and after installation.
- Store protected from sun, rain and wind that would otherwise bring about rapid changes in temperature and humidity.
- Store sheets stacked flat (not on edge) and support for the sheets must be provided at both ends and middle to avoid distortion. Ensure bearers in packs above are aligned over bearers below (to avoid inducing curves in sheets).
- The stack must be kept dry and clear of ground contact, and placed so that it will not be exposed to mechanical damage.
- To avoid staining, fading and surface checking, the sheets must not be exposed to the weather while awaiting installation.
- Store in well-ventilated areas away from sources of heat, flames or sparks.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS - TIMBER FRAMING

Check work previously carried out and confirm it is of the required standard for this part of the work.

Use Kiln dried framing, e.g. Laserframe, in accordance with timber framing manufacturers specifications and treated in accordance with NZS 3602. All timber frame sizes and set out must comply with NZS 3604 (or be specially designed to NZS 3603).

Ensure all Ecoply® sheet edges and joints will be fully supported. Studs maximum 600mm centres with the framing width of 45mm at each Ecoply® sheet joint.

Application

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 BOTTOM PLATE FIXING

Use Gib HandiBrac® hold-down connections at each end of bracing element. Refer to the installation instructions supplied with connectors for correct bolt types to be used for either concrete or timber floors. Within the length the bracing element, bottom plates are fixed to the requirements of NZS 3604.

3.6 NAIL FASTENERS TO BRACING ELEMENT

Place nail fasteners at 150mm centres around perimeter, no less than 7mm or 3 fastening diameters from edge of the Ecoply® sheet and 300mm centres on intermediate supports of each Ecoply® sheet.

3.7 FIXING ECOPLY® STRUCTURAL PLYWOOD SHEETS

Fit and fix to Ecoply Bracing Specification and Installation Guide.
Install one layer of 7mm Ecoply plywood fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. Allow 2-3mm expansion gap between sheets.

3.8 TREATING CUT EDGES

Treat cut edges and penetration cut outs of Ecoply® sheet with Soudal Metalex to Soudal requirements.

3.9 FIXING GIB® PLASTERBOARD SHEETS

Fix Gib® plasterboard sheets to with relevant GIB® literature. Refer to the appropriate Gib® Plasterboard section.

Completion

3.10 PROTECTION

Protect work from the weather until it is covered, coated or sealed.

3.11 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to chhply.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

4.1 ECOPLY® STRUCTURAL PLYWOOD

Location:	Refer to drawings and bracing calculations
Manufacturer:	Carter Holt Harvey Plywood Ltd
Brand/grade:	Ecoply® DD or better A BOND
Stress grade:	F8
Thickness:	7mm
Treatment:	H3.2 CCA

4.2 BRACING SYSTEMS

Refer to Ecoply® Specification and Installation Guide for specific bracing details, and to relevant GIB® literature for bracing element fixing details. For location refer to drawn documentation and bracing calculations.

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4161MI MARSHALL WEATHERIZATION SYSTEM

1 GENERAL

This section relates to the application of the **Marshall Weatherization System** which consists of:

- **Tekton® Building Wrap** (also called **Tekton HouseWrap)**
- **HYDRA wall underlay**
- **HYDRA roof underlay**
- **SUPER-STICK Building Tape®**
- **Tekton® Seam Tape**
- **One-Piece Sill Tape**
- **TRADE-SEAL** (penetration seal)
- **Protecto Wrap Detail Tape**
- **Protecto Wrap Sill Tape**
- **Protecto Tak** (spray primer/adhesive)

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.
Roof underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic roof underlays

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
NZS/AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Specification for **Marshall Weatherization System**
Specification for **Tekton® Building Wrap**
Brochure for **Tekton® HouseWrap**
Specification for **SUPER-STICK Building Tape®**
Brochure for **SUPER-STICK Building Tape®**Specification for **TRADE-SEAL**
Brochure for **TRADE-SEAL**
BRANZ Appraisal 444 - Protecto Sill Window Sealing System
BRANZ Appraisal 548 [2024] - Tekton® Building Wrap
BRANZ Appraisal 591 [2024] - One Piece Sill Tape
BRANZ Appraisal 621 - The Marshall Weatherization System
BRANZ Appraisal 719 [2024] - Trade-Seal Pipe and Penetration Seal
BRANZ Appraisal 846 - SUPER-STICK Flexible Flashing Tape
BRANZ Appraisal 1071 - HYDRA Roof Underlay
BRANZ Appraisal 1072 - HYDRA Wall Underlay

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Manufacturer/supplier contact details

Company:	**Marshall Innovations Limited**
Web:	www.mwnz.com
Email:	headoffice@mwnz.com
Telephone:	0800 776 9727

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

15 years:Provide a material manufacturer/supplier warranty:
15 years: For **Tekton® Building Wrap**
15 years: For **HYDRA wall underlay**
15 years: For **HYDRA roof underlay**
15 years: For **SUPER-STICK Building Tape®**
15 years: For **Tekton® Seam Tape**
15 years: For **One-Piece Sill Tape**
15 years: For **TRADE-SEAL**
15 years: For **Protecto Sill Window System**

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS - WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS

Work to be carried out by competent, experienced tradespeople, who are familiar with the **Marshall Innovations Limited** materials and techniques specified, by or under the supervision of a Licensed Building Practitioner (LBP) with the relevant Licence Class.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified **Marshall Innovations Limited** systems, components and associated products listed in this section.

Performance - general

1.7 SURFACE FIRE PROPERTIES FOR LININGS

Flammability index ≤ 5, to NZS/AS 1530.2. Refer to SELECTIONS.

Quality control and assurance

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2 PRODUCTS

Materials

2.1 TEKTON BUILDING WRAP

Tekton® Building Wrap, a synthetic breather-type wall underlay, as a coated spun-bonded polypropylene product approximately 0.6mm thick. Supplied in rolls 2740mm x 37m and 1370mm x 37m.

2.2 HYDRA WALL UNDERLAY

HYDRA Wall Underlay, a synthetic wall underlay, as a plain non-woven scrim and a woven bottom scrim with a polymeric laminated face. Supplied in rolls 1370mm x 36.5m and 2740mm x 37m.

2.3 SUPER-STICK BUILDING TAPE

SUPER-STICK Building Tape®, a multi-layered silver polyester-faced, copolymer, self-adhesive tape. Utilizes a high tack pressure sensitive adhesive (PSA) combined with a high-performance toughened film. Tape is supplied in 75mm, 150mm and 200mm wide x 22.86m long rolls.

2.4 TEKTON SEAM TAPE

Tekton® Seam Tape, a white polypropylene film coated with a cold weather acrylic adhesive. Tape is supplied in rolls 48mm wide x 50m long.

2.5 ONE-PIECE SILL TAPE

One-Piece Sill Tape, a polythene-faced SBS modified rubberised asphalt self-adhesive membrane. Tape is supplied in rolls 150mm wide x 1.0mm thick x 20m long.

2.6 TRADE-SEAL

TRADE-SEAL, a one piece self-adhesive EPDM collar bonded to a polyethylene carrier, for pipes and conduits that penetrate the cladding/wrap/underlay. Provides secondary protection air and moisture seal, and is available in ten size options to suit penetration diameters from 8mm to 220mm.

2.7 PROTECTO WRAP DETAIL TAPE

Protecto Wrap Detail Tape, a black, self-adhering, un-reinforced, conformable, modified SBS rubberised asphalt membrane tape. Supplied in rolls 150mm wide x 1.0mm thick x 15m long.

2.8 PROTECTO WRAP SILL TAPE

Protecto Wrap Sill Tape, a polyethylene-backed, modified SBS rubberised asphalt adhesive membrane tape. Supplied in rolls 150mm wide x 0.5mm thick x 30m long.

2.9 PROTECTO TAK SPRAY PRIMER

Protecto Tak Spray Primer, a solvent-based spray-on adhesive primer, coloured blue. Primer is supplied in a 369g can.

Accessories

2.10 FIXINGS

Staples, clouts, screws, proprietary wrap fixings or other temporary fixings to attach the wall or roof underlay to the framing.

2.11 BUILDING WRAP/WALL UNDERLAY RESTRAINTS

Polypropylene tape or galvanized wire or 75mm galvanized mesh, to NZBC E2/AS1, clause 9.1.8.5, **Wall framing behind cavities**, for intermediate restraining of the building wrap/wall underlay from bulging into the drained cavity where stud spacings are greater than 450mm. Wire or tape to be run horizontally at 300mm centres.

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3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To NZBC E2/AS1 Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

3.2 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.
Store all products under clean dry conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture. Rolls of **Tekton® Building Wrap** to be to be stored on end.

3.3 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.4 PRE-INSTALLATION REQUIREMENTS

Before starting work, check that the framing will allow work of the required standard. The framing must be free from any sharp protrusions that may damage the wrap/underlay. Carry out remedial work identified before the installation of the **Marshall Weatherization System**.

Installation/application - generally

3.5 STANDARDS AND TOLERANCES

To NZBC B2/AS1 and NZBC E2/AS1. Refer to the general section 1270 CONSTRUCTION for general requirements.

Installation - Tekton® Building Wrap

3.6 WRAP/UNDERLAY GENERALLY

To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 548 - Tekton® Building Wrap.

Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

3.7 FIXINGS

Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.8 POSITION ROLL

Position roll against the framing with a short length of wrap/underlay free of the roll. Align the guide marks printed on the **Tekton® Building Wrap** with visible studs and nail/staple to the framing.

3.9 FIX TO FRAMING

Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - HYDRA Wall Underlay

3.10 WRAP/UNDERLAY GENERALLY

To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 1072 - HYDRA Wall Underlay.

Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

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3.11 FIXINGS

Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.12 POSITION ROLL

Position roll against the framing with a short length of wrap/underlay free of the roll. Align the **HYDRA Wall Underlay** with visible studs and nail/staple to the framing.

3.13 FIX TO FRAMING

Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - penetrations and joints

3.14 APPLY SEAM TAPE

Apply **Tekton® Seam Tape** to all horizontal and vertical building wrap/underlay joints. Lap joint to sit halfway under the tape width. Press all tape firmly into position to enhance adhesion. Use **Tekton® Seam Tape** to repair small rips, punctures or tears in the building wrap/underlay and tape into place. Ensure overlapping material extends at least 150mm beyond the damaged area.

3.15 INSTALL PENETRATION SEAL

For pipe and conduit penetrations of the cladding/wrap/underlay use the appropriate sized **TRADE-SEAL**, to ensure a tight fit around the pipe. Any paired cable or multiple air conditioning pipes must pass through a conduit. Conduits must be sealed to prevent entry of any wind driven moisture. Conduits can be sealed with either an expanding foam or sealant. Install the **TRADE-SEAL** to Marshall Innovations Limited requirements. Push back the collar to fit the cavity width. Ensure the **TRADE-SEAL** exposure to weather and UV does not exceed 90 days. Trade-Seals should never be forced over pipes or conduit, they can be trimmed to get appropriate fit.

Installation - openings

3.16 WRAP/UNDERLAY OVER OPENINGS

Run wrap/underlay over any openings and leave covered until windows and doors are ready to be installed.

3.17 FORM OPENINGS

Form openings by cutting wrap/underlay at a 45°diagonal in from each corner. Fold and staple wrap/underlay to the inside of the framed opening.

Installation - SUPER-STICK Building Tape

3.18 SUPER-STICK BUILDING TAPE

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 846 - SUPER-STICK Building Tape®.

3.19 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.20 SILL AREA – OVER BUILDING WRAP

Cut 4 strips of SUPER-STICK at 150mm x 75mm, Apply 2 strips at a 45 degree angle to the two bottom corners overlapping the corner by 3mm to create a seal at the corner junction. Measure and mark 150mm (for 90mm framing) / 200mm (for 140mm framing) up the jamb from the bottom corners of opening. Measure sill length. Measure and cut a length of **SUPER-STICK** 300mm (for 90mm framing) / 400mm (for 140mm framing) longer than sill length. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of the opening. Apply tape down frame and tight into corner.

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When the sill jamb junction is reached ensure tape is pressed firmly into corner. Continue removing backing paper and adhering SUPER-STICK across the length of the sill and up the other jamb. Keep tape flush with inside edge of opening and the overhang to the outside of the framing.

At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The remainder of the split release film can now be removed. Fold the overhang onto the face of the framing and smooth firmly into place over the building wrap and corner butterflies. Press the tape down firmly to ensure proper adhesion.

Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill or alternatively apply a 150 mm by 150 mm square of Super Stick on top of the original flashing tape on the sill, where a nail will penetrate, to provide a fixing seal as per BRANZ Appraisal.

3.21 TOP CORNERS - OVER BUILDING WRAP

Cut two 300mm (for 90mm framing) / 400mm (for 140mm framing) lengths of **SUPER-STICK**. Mark 150mm (for 90mm framing) / 200mm (for 140mm framing) down from the underside of the lintel. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of opening. Apply tape up the frame and tight into the corner. Press tape firmly into the corner junction, then continue across the underside of the opening. At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The rest of the split liner / release film can now be removed.

Fold the overhang onto the face of the framing and smooth firmly into place.

Take the 75mm x 150mm strips of **SUPER-STICK**, remove the backing paper. Adhere diagonally across each corner, overlapping the corner by 3mm to create a seal at the corner junction. Press the overlap tightly into the corner to form a tight bond between the tapes. Smooth all tape firmly into place to maximize adhesion.

3.22 SILL AREA – OVER RIGID AIR BARRIER (RAB)

Install tape over Rigid Air Barrier in accordance with Marshall Innovations Limited **SUPER-STICK** specifications and the Rigid Air Barrier manufacturer's specifications.

3.23 HEAD FLASHING

Install tape to head flashings using **SUPER-STICK** 75mm in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

3.24 RIGID AIR BARRIER - JOINT SEALING

Cut a length of **SUPER-STICK 75** and apply evenly over RAB joint. Smooth all tape firmly into place to enhance adhesion. Only to be used on vertical joints and in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

Installation - One Piece Sill Tape

3.25 ONE PIECE SILL TAPE

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 591 - **One Piece Sill Tape Flexible Flashing**.

3.26 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -5ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.27 APPLY PROTECTO TAK ADHESIVE PRIMER

Apply Protecto Tak adhesive primer to all surfaces that are to receive One Piece Sill Tape. The primed surface should be tacky when touched and have a light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.28 SILL AREA – OVER BUILDING WRAP

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To dress the bottom of the opening, cut One Piece Sill Tape to the opening plus sufficient length to return up either side of the opening 150mm. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

3.29 TOP CORNERS - OVER BUILDING WRAP

For the top corners of the opening, install a 300mm length of One Piece Sill Tape, 150mm down the jamb and 150mm across the lintel. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

Installation - Protecto Sill Window Sealing System

3.30 PROTECTO SILL WINDOW SEALING SYSTEM

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 444 - **Protecto Sill Window Sealing System**.

3.31 PROTECTO WRAP DETAIL AND SILL TAPES GENERALLY

To avoid wastage, the tape can be lapped 100mm minimum onto itself without reducing the performance of the Proteto Sill System.

3.32 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.33 APPLY PROTECTO TAK ADHESIVE PRIMER

Spray Protecto Tak adhesive primer to all surfaces prior to the application of Protecto Wrap Detail Tape and Protecto Sill Tape. The primed surface should be tacky when touched and have light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.34 APPLY PROTECTO WRAP DETAIL TAPE

Install a 300mm length of Protecto Wrap Detail Tape around all four corners of the opening, keeping the tape flush with the interior face of the opening and ensuring the exposed timber framing is covered. After removing the protective film, mould the tape that overhangs the front of the opening onto the face of the building wrap to create an airtight seal at the framing junction.

3.35 APPLY PROTECTO WRAP SILL TAPE - SILL AREA

Cut individual lengths of Protecto Wrap Sill Tape to suit the sill opening. Install tape flush with the interior face of the opening, and apply along the entire length of the sill. Fold the overhanging tape onto the face of the building underlay.

3.36 APPLY PROTECTO WRAP SILL TAPE - JAMBS

Cut two 300mm lengths of Protecto Wrap Sill Tape for the jambs. Install the tape flush with the interior face of the opening and tight into the sill/jamb junction. Fold the overhanging tape onto the face of the building underlay.

Completion

3.37 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.38 COMPLETION - TESTS & CERTIFICATION

Refer to 1270 CONSTRUCTION for general test and certification requirements at completion.
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4 SELECTIONS

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4161TH DRISPACE UNDERLAYS, DPC & AIRTIGHT SYSTEMS

1 GENERAL

This section relates to the application of DriSpace (a division of TCL Hunt) products, comprising:

- DriStud RU 24 - 170 gsm synthetic self-support roof underlay

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2	Durability
NZBC C/AS2	Protection from fire
NZBC C3	Fire affecting areas beyond the fire source
NZBC E2/AS1	External moisture
NZBC F2	Hazardous building materials
AS/NZS 2904	Damp proof courses and flashings
AS 1530.2	Methods for fire tests on building materials, components and structures – test for flammability of materials
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays - Materials
AS/NZS 4201.4	Pliable building membranes and underlays - Methods of test - Resistance to water penetration
AS/NZS 4389	Roof Safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
AAMA 711-13	Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Product
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

CodeMark™ Certificate of Conformity for DriStud RU 22, RU24, FRU36 & FRU38 Roof Underlays Cert No. CMNZ70021 (13 November 2023)

DriStud Product Literature
DriStud RU 24 Roof Underlay Product Technical Statement

Manufacturer/supplier contact details;

Company:	DriSpace, a division of TCL Hunt Ltd
Web:	www.drispace.co.nz
Email:	technical@drispace.co.nz
Telephone:	0800 374 7883

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1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of original purchase.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and products listed in this section.

1.7 QUALIFICATIONS

Installers to be experienced, competent trades people familiar with the materials and techniques specified.

Performance - General

1.8 COMPATIBILITY TEST - SEALANTS & DRISTUD COOL WINDOW FLASHING TAPE

The following sealants are tested and found to be compatible in accordance with AAMA 713-08 "Voluntary Test Method to Determine Chemical Compatibility of Sealants and Self-Adhered Flexible Flashings", using test temperatures of 5ºC, 30ºC, 60ºC and 80ºC with DriStud Cool Window Flashing Tape.

- Dowsil 758
- Dowsil 790
- Dowsil 795
- Fixall HG MS
- Fixall 220 MS
- Gorilla Firestop MS
- Sika AT
- Sika MS

1.9 COMPATIBILITY TEST - TRADE-SEALS (MARSHALL INNOVATIONS) & DRISTUD WALL WRAP

Trade seals from Marshall Innovations and DriStud Wall Wrap samples were tested and found to be compatible according to AAMA 713-08 "Voluntary Test Method to Determine Chemical Compatibility of Sealants and Self-Adhered Flexible Flashings", using test temperatures of 5ºC, 30ºC, 60ºC and 80ºC.

1.10 COMPATIBILITY - PROCTOR PASSIVE WRAPTITE SA, PROCTOR PASSIVE WRAPTITE UV-SA AND MULTIPLE SUBSTRATES

ProctorPassive Wraptite SA and ProctorPassive Wraptite UV-SA are compatible with the following substrates;

- Exterior Gypsum Sheathing
- Aluminium (painted or mill finish)
- OSB
- Most rigid insulation
- Cast in place concrete
- Rigid Vinyl
- Pre-painted steel
- Galvanized metal
- Pre-cast concrete
- Steel
- Concrete block
- Plywood

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2 PRODUCTS

Floor

2.1 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

Roof Underlays

2.2 DRISTUD RU 24 SYNTHETIC SELF SUPPORT ROOF UNDERLAY

Heavy weight, self support, synthetic non-woven roofing underlay consisting of two spun-bonded polyolefin fabric layers laminated to a micro porous water resistant film. CodeMark™ certified and designed for use as a water absorbent, breathable air barrier, water resistant roofing underlay under masonry tiles, metal tiles or profiled metal roof claddings, on timber or steel framing.
Suitable for wind zones up to and including Extra High, as outlined in NZS 3604.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

Design application and installation of DriStud products to NZBC E2/AS1, CodeMark™ certification, DriStud Technical Literature and Industry Codes of Practice.

3.2 STORAGE

Store building underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor, or lay horizontally on pallets, and protected from sunlight, UV radiation and moisture.

3.3 INSPECTION

Before starting work, check that the building construction phase will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application - DriStud Wall Wrap & REPEL Air Barrier

3.4 OPENINGS

Run the underlay over openings and leave covered until windows and doors are ready to be installed. Form openings in the membrane by cutting a 45° diagonal from each corner of the penetration. Fold back the flaps inside the opening and staple to the penetration framing. Cut off excess underlay flush with the internal face of the wall frame.
Restrain from bulging into the drained cavity to NZBC E2/AS1,9.1.8.5.

3.5 INSTALL STUD STRAPS

Where stud spacing is greater than 450mm centres, install 19mm wide polypropylene straps, over underlay, horizontally at 300mm centres, draw taut and fix to studs with stainless steel staples.

Application - Roofing Underlay and Foil

3.6 ROOF UNDERLAY INSTALLATION

Install in accordance with the DriStud Instruction Manual. Apply from the lowest point to allow laps to shed water. All edge and end laps must be overlapped by a minimum of 150mm. Ensure that the underlay is properly fixed to the surface at perimeters or around penetrations.

Completion

3.7 CLEAN UP

Clean up as the work proceeds.

3.8 LEAVE

Leave work to the standard required by following procedures.

3.9 REMOVE

Remove debris, unused materials and elements from the site.

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4 SELECTIONS

For further details on selections go to www.dristud.co.nz

4231HL JAMES HARDIE® LINEA™ WEATHERBOARD CLADDING

1 GENERAL

This section relates to the supply and fixing of Linea™ Weatherboard cladding

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC E2/VM1	External moisture
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings

CodeMark™GM-CM30018 James Hardie® Linea™ Weatherboard Direct fixed and Cavity Cladding

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie® documents relating to this part of the work:
Linea™ Weatherboard Technical Specification
James Hardie® Technical Supplement - James Hardie® Claddings Installation to Steel Framing
Fire and Acoustic Design Manual by James Hardie®
Bracing Design Manual by James Hardie®
James Hardie® Installation Checklist
BRANZ Appraisal 446 - Linea™ Weatherboard Direct Fixed Cladding
BRANZ Appraisal 447 - Linea™ Weatherboard Cavity Cladding

Manufacturer/supplier contact details

Company:	James Hardie New Zealand Limited
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

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Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

25 years:	For Linea™ Weatherboard product (refer to James Hardie® product warranty)
15 year:	For accessories supplied by James Hardie® (refer to James Hardie® product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.6 SAFE WORKING

To James Hardie® requirements for safe working practices with James Hardie® products, particularly with regards to cutting and drilling.

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following general operation and maintenance information as electronic PDF format documents:
Linea™ Weatherboard Care and Maintenance guide

Provide this information prior to practical completion.

1.8 CODEMARK CERTIFICATE

James Hardie® Linea™ Weatherboard meets the requirements of the NZBC when used within the Conditions and Limitations of its Certificate of conformity GM-CM30018

Performance - wind

1.9 PERFORMANCE, WIND

The design wind zones are to NZS 3604, up to and including Extra High Wind Zone. James Hardie® Technical Specifications are suitable for these conditions.

2 PRODUCTS

2.1 SPECIFIC DESIGN, WIND

The design wind pressures are to AS/NZS 1170.2, for specific design wind pressures up to 3.2kPa, as per James Hardie® design details included in the Technical Specification.

Materials

2.2 LINEA™ WEATHERBOARDS

Linea™ Weatherboards, bevel back, 16mm thick, pre-primed, manufactured toAS/NZS 2908.2 from a reduced density cellulose fibre cement formulation and cured by high pressure autoclaving.
Tested to the requirements of NZBC E2/VM1 for weathertightness and complying with the NZBC.

2.3 RIGID AIR BARRIERS

Refer to section 4171HR JAMES HARDIE® RIGID AIR BARRIERS.

2.4 WALL UNDERLAY

For flexible wall underlays and rigid wall underlays, refer to the appropriate separate section(s).

2.5 THERMAL BREAK BATTEN

For thermal break battens, refer to the appropriate separate steel framing sections(s).

2.6 TIMBER CAVITY BATTENS

Radiata pine battens, minimum 45mm wide x 18mm thick, H3.1 treated, height to match timber framing studs. To NZS 3602, Table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

Components

2.7 SOAKERS

External metal corner soaker. Refer to SELECTIONS.

2.8 EXTERNAL SLIMLINE BOX CORNER MOULD

Etched primed aluminium extrusion with box section.

2.9 BOX CORNER "Z" FLASHING

uPVC profiled 'Z' flashing.

2.10 INTERNAL "W" MOULD 90

Etched primed aluminium extrusion.

2.11 INTERNAL "W" MOULD 135

Etched primed aluminium extrusion.

2.12 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Perforated PVC, with upstands.

2.13 HARDIE™ CORNER UNDER FLASHING

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50 x 50mm PVC moulding.

2.14 HARDIE™ AXENT™ TRIM

19mm thick pre-primed fibre cement trim.

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2.15 CANT STRIP

Cant strip, uPVC profiled strip.

2.16 FILL

ADOS CRC Builders fill, two part exterior grade fill to finish over jolt head nails.

2.17 ADHESIVE SEALANT

Sikaflex 11FC for jointing weatherboards at external mitred corners only.

2.18 FLEXIBLE SEALANT

Bostik Seal N Flex-1 or Sikaflex AT Facade or Sikaflex MS sealant for tongue and groove joint at ends of Linea™ Weatherboards.

2.19 FASTENER TYPE

Fasteners to minimum durability requirements of the NZBC. Refer to NZS 3604, section 4, **Durability**, for requirements for fixing's material to be used in relation to the exposure conditions.

Refer to NZBC E2/AS1, Table 20, Material selection, and NZBC E2/AS1, Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Zone	**Fixings Material**
Zone D, Zone E / Microclimates (incl. Geothermal)	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized
Bracing - All zones	Grade 316 Stainless

Check against SED (specific engineering design) requirements for microclimate conditions. For fastener type refer to following clause(s).

2.20 STAINLESS STEEL CONCEALED NAILING OVER FLEXIBLE UNDERLAY

Grade 316 stainless, 40 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over flexible underlay into timber stud.

2.21 GALVANIZED STEEL CONCEALED NAILING OVER FLEXIBLE UNDERLAY

Hot-dipped galvanized, 40 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over flexible underlay into timber stud.

2.22 STAINLESS STEEL FACE NAILING OVER FLEXIBLE UNDERLAY

Grade 316 stainless, 60 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over flexible underlay into timber stud.

2.23 GALVANIZED STEEL FACE NAILING OVER FLEXIBLE UNDERLAY

Hot-dipped galvanized, 60 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over flexible underlay into timber stud.

2.24 STAINLESS STEEL CONCEALED NAILING OVER RIGID AIR BARRIER

Grade 316 stainless, 50 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over rigid air barrier into timber stud.

2.25 GALVANIZED STEEL CONCEALED NAILING OVER RIGID AIR BARRIER

Hot-dipped galvanized, 50 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over rigid air barrier into timber stud.

2.26 STAINLESS STEEL FACE NAILING OVER RIGID AIR BARRIER

Grade 316 stainless, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over rigid air barrier into timber stud.

2.27 GALVANIZED STEEL FACE NAILING OVER RIGID AIR BARRIER

Hot-dipped galvanized, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over rigid air barrier into timber stud.

2.28 STAINLESS STEEL CONCEALED NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Grade 316 stainless, 60 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over flexible underlay into timber stud.

2.29 GALV STEEL CONCEALED NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Hot-dipped galvanized, 60 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over flexible underlay into timber stud.

2.30 STAINLESS STEEL FACE NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Grade 316 stainless, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over flexible underlay into timber stud.

2.31 GALV STEEL FACE NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Hot-dipped galvanized, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over flexible underlay into timber stud.

2.32 STAINLESS STEEL CONCEALED NAILING OVER BATTENS & RIGID AIR BARRIER

Grade 316 stainless, 75 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over rigid air barrier into timber stud.

2.33 GALVANIZED STEEL CONCEALED NAILING OVER BATTENS & RIGID AIR BARRIER

Hot-dipped galvanized, 75 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over rigid air barrier into timber stud.

2.34 STAINLESS STEEL FACE NAILING OVER BATTENS & RIGID AIR BARRIER

Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.35 GALVANIZED STEEL FACE NAILING OVER BATTENS & RIGID AIR BARRIER

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.36 STAINLESS STEEL FACE NAILING - EH WIND ZONE

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Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.37 GALVANIZED STEEL FACE NAILING - EH WIND ZONE

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.38 STAINLESS STEEL FACE NAILING - SED PROJECTS

Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.39 GALVANIZED STEEL FACE NAILING - SED PROJECTS

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.40 NAILING FOR HARDIE™ AXENT™ TRIM OVER DIRECT FIX LINEA™ WEATHERBOAR

75 x 3.15mm jolt head nails at 400mm centres staggered nailing (with pre-drilling).

2.41 NAILING FOR HARDIE™ AXENT™ TRIM OVER CAVITY FIX LINEA™ WEATHERBOAR

90 x 3.55mm jolt head nails at 400mm centres staggered nailing (with pre-drilling).

2.42 FASTENER TYPE TO STEEL FRAME

Fasteners to minimum durability requirements of the NZBC.

Refer to NZBC E2/AS1, Table 20, Material selection, and NZBC E2/AS1, Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Zone	Coating Required
Zone D and Sea Spray Zone or Geothermal Areas	Class-4
Zone B, Zone C	Class-3

Check against SED (specific engineering design) requirements for microclimate conditions. For fastener type refer to following clause(s).

2.43 CLASS-4 CONCEALED SCREW FIXING - DIRECT FIX

8-10g x 40mm self embedding steel wingtek screw (class-4) for concealed fixing of Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.44 CLASS-3 CONCEALED SCREW FIXING - DIRECT FIX

8-10g x 40mm self embedding steel wingtek screw (class-3) for concealed fixing of Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.45 CLASS-3 FACE SCREW FIXING - DIRECT FIX

8-10g x 60mm self embedding steel wingtek screw (class-3) for fixing Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.46 CLASS-4 FACE SCREW FIXING - DIRECT FIX

8-10g x 60mm self embedding steel wingtek screw (class-4) for face fixing Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.47 CLASS-3 CAVITY BATTEN SCREW FIXING TO STEEL STUD

45 - 50mm x 8 - 10g wingtek screw (class-3) for 19mm thick timber cavity batten fixing over flexible underlay and 10mm thick thermal break battens into steel framing.

2.48 CLASS-4 CONCEALED SCREW FIXING - CAVITY FIX

8-10g x 60mm self embedding steel wingtek screw (class-4) for concealed fixing of Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.49 CLASS-3 CONCEALED SCREW FIXING - CAVITY FIX

8-10g x 60mm self embedding steel wingtek screw (class-3) for concealed fixing of Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.50 CLASS-4 FACE SCREW FIXING - CAVITY FIX

8-10g x 75mm self embedding steel wingtek screw (class-4) for face fixing Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.51 CLASS-3 FACE SCREW FIXING - CAVITY FIX

8-10g x 75mm self embedding steel wingtek screw (class-3) for face fixing Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

Accessories

2.52 SEALANT

Silaflex AT-Facade sealant.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 SUBSTRATE - TIMBER FRAMING

Do not commence work until the substrate is of the standard required by James Hardie® for the specified finish; plumb, level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after weatherboards are fixed.

Application - particular installations

3.4 FIRE RESISTANCE RATING

Refer to project drawings for FRR system construction details and Fire and Acoustic Design Manual by James Hardie® for further information.

Application - generally

3.5 INSTALL CAVITY BATTENS

Install 18mm minimum thick cavity battens to NZBC E2/AS1: 9.0 **Wall claddings**, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs under the wall underlay. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Do not use horizontal cavity battens. Use cavity spacers where fixing is required between cavity battens.

3.6 PENETRATIONS AND FLASHINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- Wall underlay appropriately incorporated with penetration and junction flashings.
- Materials lapped in a way that water tracks down to the exterior face of the wall underlay.
- Wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations.
- Required holes in cladding accurately formed and cut to James Hardie® requirements, ensure (if required) services penetration grommets/sleeves/seals/tapes are in place prior to cladding installation.
- Claddings neatly finished off to all sides of openings
- Installation of flashings (those required to be installed prior to installation of penetrating elements).

3.7 INSTALL LINEA™ WEATHERBOARDS

Cut weatherboards to required lengths and fit joints off-stud using tongue and groove ends. Prime site cut ends that are exposed prior to installation. Fit internal corners and fix weatherboards as per Linea™ Weatherboard technical specifications. Fit and fix external corners and flexible sealant to tongue and groove joints as required.

Completion & Commissioning

3.8 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz.

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4311M METALCRAFT PROFILED ROOFING

1 GENERAL

This section relates to the supply and fixing of **Metalcraft Roofing** profiled roofing complete with accessories.
It includes:

- Trough section roofing profiles
- Asymmetrical rib roofing profiles
- Corrugated roofing profile
- Translucent roofing

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 ABBREVIATIONS AND DEFINITIONS

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
MS	Modified silicone
LBP	Licensed Building Practitioner

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/VM2	Protection from fire
NZBC E2/AS1	External moisture
NZBC G12/AS1	Water supplies
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2728	Prefinished/prepainted sheet metal products for interior/exterior building applications - performance requirements
AS 3566	Self-drilling screws for the building and construction industries
ISO 5660.1	Reaction to fire tests - heat release, smoke production and mass loss rate. Part 1 Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction to fire tests - heat release, smoke production and mass loss rate. Part 2 Smoke production rate (dynamic measurement)
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Metalcraft Roofing Metdek500 product literature
Metalcraft Roofing Metdek855 product literature
Metalcraft Roofing Metrib760 product literature
Metalcraft Roofing MC760 product literature
Metalcraft Roofing T-Rib product literature
Metalcraft Roofing MC1000 product literature
Metalcraft Roofing Metcom7 product literature
Metalcraft Roofing Metcom930 product literature
Metalcraft Roofing Metcom965 product literature
Metalcraft Roofing Kahu® product literature
Metalcraft Roofing Corrugate product literature
Metalcraft Roofing Alsynite Topglass® product literature
Eco Choice Aotearoa Ecolabel certificates

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Manufacturer/supplier contact details

Company:	**Metalcraft Roofing**
Web:	www.metalcraftgroup.co.nz

Email: technical@metalcraftroofing.co.nz
Telephone: 09 274 0408

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
~ years for failure of coating adhesion
~ years for weatherproofing by material penetration

- For Warranty requirements in excess of this contact Metalcraft Roofing.
- Provide this warranty on the material manufacturers standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
5years for workmanship

- Provide this warranty on the material manufacturers standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include a copy of the Metalcraft Roofing maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.8 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

Performance - Wind (design by contractor)

1.9 DESIGN PARAMETERS WIND - DESIGN BY CONTRACTOR

Design the installation to the manufacturer requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.
Refer to Metacraft for "Wind Load Span Design Graphs" for load parameters.

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters and NZMRM CoP NZ. Refer to Metalcraft profiled roofing product literature for profile details. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Fixing pattern to also take into account fixing method and purlin spacings.

Performance - General

1.11 PERFORMANCE

Install roofing materials in accordance with the NZMRM CoP, and Metalcraft profiled roofing product literature, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.12 DRINKING WATER

Roofing for collecting potable water to NZBC G12/AS1.

1.13 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

2 PRODUCTS

Materials

Fixings

2.1 FASTENERS GENERALLY

Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code. Installation is to be in accordance with E2/AS1 and/or the NZMRM CoP and Metalcraft profiled roofing product literature.
For fixing patterns refer to Metalcraft product literature for roofing profile.

2.2 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK500

Galvanized steel (powdercoated) to suit the material and the roofing profile and location as required by Metacraft Roofing for roofing:

- For Metdek500 roofing, fixings for steel are 12 gauge galvanized Wafertek self-drilling screws and for timber 12 gauge galvanized screws or spiral shank nails. Minimum embedment 35mm.

2.3 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK855

Concealed plastic fixing lugs to suit the roofing profile and location as required by Metacraft Roofing for roofing:

- For Metdek855 roofing, plastic lugs to be fixed directly to steel using 14 gauge hex head tek screws and for timber use 12 gauge hex screws. Minimum embedment 35mm.

2.4 FIXING SCREWS

To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by Metalcraft and with a Class 4 or 5 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm. Screw fasteners to be head stamped identifying the manufacturer and class. Refer to SELECTIONS.

2.5 RIVETS

Sealed aluminium, minimum diameter 4.0mm. Refer to Metalcraft for requirements..

2.6 FLASHINGS GENERALLY

To NZBC E2/AS1, 4.0, Flashings.
Formable grade 0.55 BMT for galvanized, Type AZ or Type AM - coated and pre-painted steel and 0.90 BMT for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

Components

2.7 FLASHINGS TO VERGE, RIDGE AND HIP

To NZBC E2/AS1, 4.0, Flashings.
Supplied by the roofing manufacturer to match or to suit the roofing.

2.8 BOOT FLASHINGS

Generally to E2/AS1, 8.4.17 Roof penetrations (note; E2/AS1, Figure.54 Soaker flashing for pipe penetration, has an error, use as guide only).
EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

Accessories

2.9 WIRE NETTING AND SAFETY MESH

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.10 UNDERLAY AND REFLECTIVE FOIL

Refer to 4161 UNDERLAYS, FOIL AND DPC.

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2.11 SEALANT

Neutral curing silicone or polymer sealant as required by Metalcraft and used as directed.

2.12 CLOSURE STRIPS

Polyurethane profiled closed cell foam strips to fit the sheet profile.
Brand: Ecofoam
Profile: To suit selected cladding profile

3 EXECUTION

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Conditions

3.1 INSPECTION

Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2 FRAMING TIMBER MOISTURE

When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE

Upon delivery visually inspect sheets for damage and accept packs of undamaged roofing. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air circulation and drying between sheets.

3.4 HANDLING

Do not drag sheets across each other or other materials. Avoid distortion and contact with damaging substances, including cement. Long lengths of roofing should be lifted onto the roof using an approved load spreading beam. Protect edges and surface finishes from damage, keep under cover and remove as the product is being installed. Use soft, flat sole shoes when fixing and for all other work on the roof. Walk along the purlin line whenever possible.

3.5 SEPARATION

Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials.

Application

3.6 FIX INSULATION

Refer to thermal insulation sections.

3.7 SET-OUT

Carefully set out with consideration of the position of side laps to take account of the prevailing wind and line of sight. Ensure all sheets are square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.8 END LAPS

End laps are not recommended, except where specifically detailed.

3.9 THERMAL MOVEMENT

Fix for Thermal Movement to Metalcraft requirements for thermal movement.

3.10 FIXING GENERALLY

Install and fix in accordance with the NZMRM CoP recommendations, and to Metalcraft required fixing patterns and details for each area of the building roofing. Use only screws as required by Metalcraft. Paint colour matched fixings and accessories before installation.

3.11 MARKING AND CUTTING

Use ink pen, chalk line or coloured pencil for marking roof sheets prior to cutting. Do not use lead pencil for marking Zincalume® and Colorsteel®. Cut by shear only, using nibblers or hand snips. Remove all cutting and drilling debris from the roof.

3.12 FIX SHEETS - CONCEALED CLIP SYSTEM

Fix sheets in place using the clip fixing system required by Metalcraft for roofing profile, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.13 STOP ENDS AND DOWNTURNS

Form stop-ends at the upper end of sheets. Form downturns at the gutter line where the roof pitch is less than 8 degrees. Form using the required tools.

3.14 INSTALL FLASHINGS

Flash roof to parapets, walls and penetrations to detail. Flashings to be installed on timber framing with moisture content of less than 20%. Where no detail is provided flash to NZMRM CoP recommendations and Metalcraft and NZBC E2/AS1 requirements. Cut accurately and fix using sealant and rivets to detail and to Metalcraft requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.15 USE OF SEALANTS

Select and use sealants only as recommended by Metalcraft. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.16 FLASHING PENETRATIONS

Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

Completion

3.17 REPLACE

Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.

3.18 LEAVE

Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.19 REMOVE

Remove all trade rubbish, swarf and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spouting, gutters and rainwater pipes on completion of the roof. Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.metalcraftgroup.co.nz.

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4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

This section relates to the fabrication, supply and installation of APL Window Solutions residential window and door systems manufactured by either Altherm, First or Vantage. It includes:

- APL Aluminium windows and doors
- APL Roof windows and overhead glazing
- APL Ventient trickle ventilators
- Hardware and furniture
- Flashings and sealants

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1.1 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ
PQAS	Powder Coating Quality Assurance System

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC G4/AS1	Ventilation
NZBC H1/AS1-AS2	Energy efficiency
NZBC H1/VM1-VM2	Energy efficiency
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4303	Ventilation for acceptable indoor air quality
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
BS EN 673	Glass in building - Determination of thermal transmittance (U-value) - Calculation method
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - General
ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames
BRANZ BU 636	Protecting Glass From Damage

Window & Glass Association NZ (WGANZ) documents:

Window Installation Guide	Guide to Window Installation as described in E2/AS1
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)

US Federal Specification:

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

CodeMark CMNZ10033 (V1)	APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors.

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Altherm Specifier's Guide
First Specifier's Guide
Vantage Specifier's Guide
APL Specifier Guide to Fluoroset FP - Selling, Fabricating, Handling, Care and Maintenance
APL Window Energy Efficiency Rating System (WEERS) Report Series
APL Metro Series ThermalHEART® with Centrafix™ System Guide V1, April 2023
BRANZ Appraisal 1188 [2023] - APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors
BRANZ Appraisal 1259 [2024] - APL ThermalHEART+® Window and Door Systems
Declare Label - Residential Series, Metro Series and APL Architectural Series APL Window Solutions - APL-0001
APL Window Solutions Environmental Product Declaration v1.1
Summary of Toitu Carbonreduce Certification for APL Window Solutions Limited’s Metro Thermal, Residential Thermal and Commercial Series

Manufacturer/supplier contact details

Company:	APL Window Solutions
Web:	www.altherm.co.nz www.firstwindows.co.nz www.vantage.co.nz www.aplnz.co.nz
Email:	specifiersguide@aplnz.co.nz
Telephone::	07 849 2113

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Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years:	For fabrication
2 years:	For hardware

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years:	For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified APL aluminium system, or associated components and products.

1.7 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

Compliance Information

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Manufacturer / supplier warranty
- Installer / applicator warranty
- Other information required by the BCA in the Building Consent Approval documents.

1.9 COMPLIANCE - CODEMARK CERTIFICATE

APL Metro Series ThermalHEART® with Centrafix™ meets the requirements of the NZBC when used within the Conditions and Limitations of its CodeMark Certificate of Conformity CMNZ10033 (V1).

1.10 COMPLIANCE

Windows and doors to be manufactured and installed to NZBC E2/AS1.

1.11 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

Performance

1.12 PERFORMANCE - WINDOWS AND DOORS

To NZS 4211, including:

- Deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.13 STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window fabricator.

Performance - Wind

1.14 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of NZS 3604, table 5.1.
Refer to SELECTIONS for wind zone.

2 PRODUCTS

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Materials

2.1 ALUMINIUM EXTRUSIONS

Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.2 ALUMINIUM SHEET AND STRIP

Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.3 STAINLESS STEEL SHEET AND STRIP

Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

2.4 GLASS

Refer to the glazing section for glass types and installation.

Flashings

2.5 FLASHINGS GENERALLY

To NZBC E2/AS1, 9.1.10 Windows and Doors. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components for installation - cavity systems

2.6 STANDARD CAVITY CLOSER

A device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with NZBC E2/AS1 to the spaces above the window or door.

2.7 SUPPORT BAR

WGANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2/AS1, and support bar location bracket, to provide continuous support to the window unit. Size to suit cladding type.

Components

2.8 GLAZING GASKETS

Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.9 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.10 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Section 2.0, Opening windows.

2.11 FIXING BRACKETS

Designed by manufacturer to specific design.

2.12 WEATHERING/INSTALLATION SEALANT

Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT-S-001543A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT-S-00230C.

Accessories

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3 EXECUTION

Conditions - generally

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work.

3.4 PROTECTIVE COVERINGS

Retain protective coverings and coatings to BRANZ BU 636 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.5 ADDITIONAL PROTECTION

Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Assembly

3.6 FABRICATION

Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.7 HARDWARE GENERALLY

Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.8 SAFETY STAYS

Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.9 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

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3.10 EXPOSED FIXINGS AND FASTENINGS

Fixings and fastenings exposed to the weather to be aluminium or Type 304 stainless steel.

3.11 PROTECTED FIXINGS AND FASTENINGS

Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.12 CORROSION PROTECTION

Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.13 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Wall underlays to wall openings.
- Full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).
- application of waterproof sealer to all door and window sills in concrete floor or concrete sill situations. To door sills only, apply a suitable membrane over the sealer
- all in accordance with the shop drawings, where applicable.

3.14 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.15 INSTALLATION CAVITY CONSTRUCTION

Install to WGANZ Window Installation Guide details and drawings including WGANZ sill support bars.

For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, figure 62(d).

3.16 INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm plus any jamb scriber width at each end.

3.17 COMPLETE AIR SEAL

To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.18 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

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Application - jointing and sealing

3.19 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window and sealant manufacturer and to make the installation weathertight.. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.20 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.21 BACK UP

When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.22 SEALANT FINISH

Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

3.23 PROTECTIVE COVERINGS

Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades.
Anodised finishes should be protected from cement products and require immediate clean-up of cement splashes. Only use tapes that have passed WGANZ testing on powder coated products. Remove protection on completion.

3.24 IN-SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted to minor surface scratching. Otherwise replace all damaged material.

3.25 SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

4 SELECTIONS

For further details on selections go to www.aplnz.co.nz.

4610 GLAZING RESIDENTIAL

1 GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:

- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings
- balustrade systems, pool fences
- mirrors and mirror frames

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1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1-AS2	Energy Efficiency
NZBC H1/VM1-VM2	Energy Efficiency
AS/NZS 1170.2: 2011	Structural design actions - Wind actions
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Warrant glass under normal environmental and use conditions against failure of materials.

10 years:	for insulating glass units
10 years:	for laminated glass
10 years:	for toughened glass

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Performance

1.4 ENERGY EFFICIENCY

Provide glazing to comply with H1 Energy efficiency requirements of NZBC H1/AS1-AS2 and NZBC H1/VM1-VM2.

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2 PRODUCTS

Materials

2.1 LAMINATED GLASS

Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

2.2 TOUGHENED GLASS

Grade A Safety Glass to AS/NZS 2208.
Heat soaked toughened glass to NZS 4223.1, Appendix E required for critical areas.
Refer to SELECTIONS.

Materials, screens

2.3 GLASS SCREENS SHOWER & BATH

Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, timber glazing

2.4 PUTTY, TIMBER FRAME

Linseed oil base glazing putty. Not to be used with laminated or IGUs.

2.5 SPRIGS

Diamond metal pieces to retain glass in timber sashes and frames.

2.6 GLAZING TAPE

Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes for bead glazing. For internal use only.

2.7 GASKETS

PVC or Santoprene to window manufacturers' requirements.

2.8 SETTING BLOCKS

Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes. Use with bead glazing and for IGUs.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To NZS 4223.1, NZS 4223.3, NZS 4223.4. All external glazing to be wind and watertight on completion.

3.2 DELIVERY

Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 636.

3.3 GLASS CONDITION

All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS

If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1. For windows tested to NZS 4211, ensure glass meets the requirements of the window testing.
Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS

Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY

Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS

Glazing of doors, side panels, low level and window seat glazing, bathrooms, stairwell landings and similar locations, to NZS 4223.3 for thickness and maximum areas of safety glass.

3.8 SAFETY GLAZING MATERIAL

Use only safety glazing materials defined in NZS 4223.3, that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, 2.8 Identification.

3.9 CONTAINMENT

Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS

All working of glass as required in NZS 4223.1.

3.11 EDGE WORK AND BEVELLING

Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.12 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS

To NZS 4223.3.

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Application - timber glazing

3.15 PREPARE REBATES

Ensure all rebates and grooves are clean, dry and unobstructed at time of priming, sealing and glazing.

3.16 PREPARE TIMBER SURROUNDS

Ensure that all rebates have been primed with a primer suitable for this purpose and applied to the requirements of the painting section/s.

3.17 PREPARE TIMBER BEADS

Before fixing ensure that timber beads are sealed and painted to match the timber surround.

3.18 LOCATE BLOCKS

Centralise the glass in the rebate opening using setting, location and spacer blocks as required in NZS 4223.1, Section 4 Glazing, to prevent movement of glass in the rebate and cushion the effect of wind loading on the sealing system.

3.19 INSTALL PUTTY FRONTING

Back putty to give a bedding of not less than 1mm to 2mm between the glass and the back of the rebate when the glass has been pressed back. Strip off squeezed out putty at a positive angle. Fix glass to wooden surrounds with diamond points or sprigs at maximum 460mm centres. Fix glass to metal surrounds with spring clips or pins provided by the sash manufacturers. Apply putty to the face to form a triangular fillet stopping 1-2 mm below sight line. Finish putty smooth and true to line and face and with a light brushing.

Leave all windows and doors closed until putty has set sufficiently to prevent glass displacement.

Prime putty fronting once surface has skinned - normally within 10 - 15 days of completion of glazing, but this can be reduced with special XHP putty.

3.20 BEAD GLAZING, PREFORMED STRIPS

Apply the preformed tape to the rebate upstand with securely formed (or sealed) butt joints at corners. Place setting blocks, offer the glass and press back against the tape centralised in the opening and apply the second tape. Press the beads against and compressing the tapes and fix true to line and face sufficiently rigid to prevent flexing or movement. Trim off excess strip.

If a capping bead is required clean and paint the timber surface and when dry apply sealant capping between bead and glass and tool to a smooth camber.

3.21 BEAD GLAZING, NON SETTING COMPOUNDS

Apply compound to the rebate. Push setting blocks into place with distance pieces against the rebate upstand before offering the glass to the surround on setting blocks, centralised in the opening and pushed back into the glazing compound. Fill all voids with compound and apply more compound before setting distance pieces in it opposite the distance pieces already in place. Bed the beads to the glass and rebate and fix true to line and face sufficiently rigid to prevent flexing or movement. Finish compound off at an angle both sides of the glass.

3.22 INSTALLING INSULATING GLASS UNITS

Refer to the glazing manufacturer's requirements and before glazing ensure that the materials forming the opening are strong enough to accept the weight, the rebates are the correct size and prepared to receive the units to AS/NZS 4666. Fit setting and location blocks and bead glaze units using a compatible sealant to NZS 4666 section 3 Glazing, and to the glazing manufacturer's requirements.

3.23 INSTALLING REFLECTIVE AND COATED GLASS

In addition to the type of glazing specified refer to the requirements of the glass manufacturer and ensure that the rebate dimensions, clearances and edge cover are sufficient to allow for the movement created by the particular solar glass being used. Check thermal stability for the particular location and ensure any sealant or compound is compatible with the coating.

Application miscellaneous

3.24 INSTALL GLASS SHOWER & BATH SCREENS

Install shower and bath screens and doors to manufacturer's requirements.

Finishing

3.25 SAFETY

Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

Completion

3.26 TRADE CLEAN

Clean off or remove safety indicators at completion of the building.

3.27 REPLACE

Replace damaged, cracked or marked glass.

3.28 LEAVE

Leave work to the standard required by following procedures.

3.29 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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4710P PINK® BATTS® THERMAL & ACOUSTIC INSULATION

1 GENERAL

This section relates to Comfortech Building Performance Solutions™ Pink® Batts® thermal and acoustic insulation materials for walls, floors, ceilings and roofs.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

IIC	Impact Insulation Class
STC	Sound Transmission Class

1.2 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting, wall underlays and roofing underlays

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC H1/AS1-AS2	Energy efficiency
NZBC G6/AS1	Airborne and impact sound
NZBC G6/VM1	Airborne and impact sound
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS/NZS 3000	Electrical installations (Known as the Australian/ New Zealand Wiring Rules)
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents related to this section are:
Comfortech H1. Done - Insulation Guide
Comfortech Pink® Batts® Insulation - Safety Data Sheet.
Comfortech Pink® Batts® Thermal Solutions - Product Guide
Comfortech Pink® Superbatts® Thermal Solutions - Installation Guide
Comfortech Pink® Batts® - Product Data Sheets
Comfortech Pink® Batts® - Installation Instructions
BRANZ Appraisal 238 (2023) - Pink® Batts® Insulation - Amendment 04 November 2024
BRANZ Appraisal 632 (2023) - Pink® Batts® SnugFloor® Insulation - Amendment 12 August 2024
BRANZ Appraisal 767 (2023) - Pink® Batts® Skillion Roof Insulation - Amendment 04 November 2024

Manufacturer/supplier contact details

Company:	Tasman Insulation NZ Ltd
Trading as:	Comfortech Building Performance Solutions™
Web:	www.pinkbatts.co.nz
Telephone:	0800 746 522

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

50 years	For Pink® Batts® thermal insulation products

- Provide this warranty on the manufacturer/ supplier standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Compliance information

1.8 BRANZ APPRAISAL

Pink® Batts® Insulation meets the requirements of the NZBC when used in accordance with the conditions and limitations listed in the following Branz Appraisal:
BRANZ Appraisal 238 - Pink® Batts® Insulation
BRANZ Appraisal 632 - Pink® Batts® SnugFloor® Insulation
BRANZ Appraisal 767 - Pink® Batts® Skillion Roof Insulation

Performance - Fire

1.9 FIRE PROPERTIES - NON COMBUSTIBLE

Pink® Batts® insulation products, with the exception of Pink® Batts® R2.6 Wall Insulation and Pink® Batts® R2.8 Wall Insulation products, are classified as non-combustible when tested to NZS/AS 1530.1 and achieve a Group Number of 1-S.

2 PRODUCTS

2.1 FIRE HAZARD TESTING

Pink® Batts® insulation products withstand the 30s Needle Flame test in accordance with AS/NZS 60695.11.5, that is required for insulation abutting or covering recessed downlights intended to be in contact with IC, CA 80, CA 135 luminaires.

Materials - thermal insulation

2.2 PINK® BATTS® WALL INSULATION

Pink® Batts® Wall Insulation (Pink® Batts® Classic, Pink® Batts® Narrow, Pink® Batts® Ultra®, Pink® Batts® Ultra® 140mm Wall, Pink® Batts® Ultra® 140mm Narrow Wall) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

2.3 PINK® BATTS® CEILING INSULATION

Pink® Batts® Ceiling Insulation (Pink® Batts® Classic, Pink® Batts® Ultra® and Pink® Superbatts®) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

2.4 PINK® BATTS® SKILLION ROOF INSULATION

Pink® Batts® Skillion Roof Insulation (Pink® Batts® Skillion Roof and Pink® Superbatts®) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

Components

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2.5 FASTENERS

Insulation anchors complete with retaining washer.

2.6 WIRE NETTING

Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting used to support the insulation.

2.7 PLASTIC STRAPPING TAPES

Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall and ceiling locations.

2.8 ADHESIVE TAPE

Pressure sensitive adhesive tape.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work. Check that framing is free from moisture. Check cavities are not interconnected. Check required wire netting, roof/ underlays are in place and are dry, clean and homogeneous before installing insulation. Ensure main power is isolated and tagged prior to installation.

3.4 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Refer to Pink® Batts® Insulation - Safety Data Sheet.

Installation - general

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 INSTALL THERMAL INSULATION - GENERALLY

Install Pink® Batts® insulation in a dry protected environment. Lay, fit and fix insulation without gaps, tucks, folds and over compaction to NZBC H1/AS1-AS2 and Pink® Batts® installation requirements. For all housing and buildings up to 300m², install in accordance to NZS 4246 sections 5 Walls, 6 Ceilings & Roofs, 7 Underfloor - Suspended Framed Floors and 10 Concrete Slab-on-Ground Insulation, for residential light timber or steel framed buildings. Insulate around vents (not over them) to allow unhindered ventilation. Confirm with fireplace manufacturer for clearances; Pink® Batts® insulation is non-combustible and need not be separated except if used in conjunction with, or attached to other heat sensitive materials. Lift up electrical wires, lighting transformers/ controllers and lay the insulation underneath.

3.7 RECESSED LIGHT FITTINGS - RESIDENTIAL

Residential recessed light fittings to AS/NZS 3000, 4.5.2.3.5;

- Existing fittings or retrofit situations, fittings maybe unmarked
- New fittings can only be labelled - CA 80, CA 90, CA 135, IC, IC-F & IC-4

3.8 LAY WIRE NETTING - UNDER JOISTS / PURLINS

Lay at right angles across the rafters/ roof joists (under purlins). Pull tight and fix.

3.9 LAY WIRE NETTING - OVER PURLINS

Lay at right angles across the purlins with enough slack to allow insulation to retain its nominal thickness between. Tie edges of netting together with galvanized wire clips.

3.10 LAY PLASTIC STRAPPING TAPE

Lay at right angles across the framing at a minimum of 300mm centres, staple tape to each framing member with stainless steel staples.

3.11 PREPARATION

Before installation, gently agitate the insulation by gentle shaking or bouncing to assist recovery to the nominal thickness stated on the product label. Ensure the product is installed dry.

Completion

3.12 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.pinkbatts.co.nz.

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5113G GIB® PLASTERBOARD LININGS

1 GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- superior finish quality systems
- bracing systems
- fire rated garage boundary wall systems
- wet area systems
- GIBFix® Framing systems

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents which refer to work in this section:
GIB® Site Guide (April 2024)
GIB® Noise Control Systems (September 2017)
GIB® Fire Rated Systems (September 2024)
GIB® Wet Area Systems (February 2021)
GIB Toughline® Aqua (July 2018)
GIB Ezybrace® Systems (August 2016)
GIB Ezybrace® Bracing Design Software
GIB Ezybrace® Bracing Supplement Document (December 2016)
GIB Ezybrace® for Light Steel Frame Systems (March 2017)
GIBFix® Framing System (August 2016)
GIB Rondo® Metal Batten System (September 2024)
GIB-Cove®
GIB RocTape®
GIB® Goldline™ Platinum Tape-on Trims
GIB® UltraFlex high impact corner mould
GIB® Tough Systems (November 2014)
BRANZ Appraisal 289 (2024) GIB® Fire Rated Systems
BRANZ Appraisal 394 (2017) GIB® Noise Control Systems
BRANZ Appraisal 427 (2021) GIB® Wet Area Systems
BRANZ Appraisal 928 (2021) GIB EzyBrace® Systems
BRANZ Appraisal 940 (2022) GIB® Intertenancy Barrier Systems for Terrace Homes

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GreenTag Certification WWL:G102:2021:GR - GreenTag™ GreenRate Level A for:
GIB® Standard (10mm & 13mm)

GIB Fyreline® (10mm, 13mm, 16mm & 19mm)
GIB Braceline® (10mm & 13mm)
GIB Noiseline® (10mm & 13mm)
GIB Toughline® (13mm)
GIB Wideline® (10mm & 13mm)

GreenTag Certification WWL:G103:2021:GR - GreenTag™ GreenRate Level C for:
GIB Ultraline® (10mm & 13mm)

Manufacturer/supplier contact details

Company:	Winstone Wallboards
Web:	www.gib.co.nz
Telephone:	0800 100 442

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Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.5 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.7 BRACING REQUIREMENTS

Braced wall systems to NZS 3604 when tested to BRANZ Technical Paper P21, using:

- GIB Ezybrace® Systems and/or GIB Ezybrace® Bracing Design Software
- GIB Ezybrace® Bracing Supplement Document
- GIB Ezybrace® for Steel Frame Housing (NASH) Software (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2 PRODUCTS

Materials

2.1 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Wideline® plasterboard
GIB Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Toughline® Aqua

Components

2.2 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

2.3 SCREWS

GIB® Grabber® drywall type screws as follows:

Grabber® type	Used for fixing:
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber

Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.4 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.5 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

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2.6 CONTROL JOINTS

GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims
GIB® plastic W-profile control joints.

Accessories

2.7 ADHESIVE

Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE

GIB® jointing tape.

2.10 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE

Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS** 2589.

3.4 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide.

Application

3.5 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.6 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide. Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.7 BOARD ORIENTATION

Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.8 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.9 FORM BRACING SYSTEMS

Form bracing systems to:

- GIB Ezybrace® Systems

3.10 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide requirements.

3.11 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.12 FINISHING GENERALLY

To GIB® Site Guide and AS/NZS 2589.

Completion & Commissioning

3.13 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

4.1 GIB® BRACING SYSTEMS

Refer to:

- GIB Ezybrace® Systems

For bracing element location refer to drawn documentation.

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5230 INTERIOR DOORS

1 GENERAL

This section relates to the supply and installation of interior doors.

1.1 RELATED SECTIONS

Refer to glazing section/s for glass type and thickness.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3602	Timber and wood-based products for use in building
NZS 3610	Specification form profiles of mouldings and joinery

2 PRODUCTS

2.1 TIMBER

To NZS 3602.

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES

Traditional profiles to NZS 3610. Proprietary profiles and special profiles as detailed. Pencil radius corners of profiled schedules for paint finish.

2.3 DOORS, TIMBER VENEER

Doors as scheduled complete with matching 6mm clashing strip to both sides and to the exposed edge of cavity slider doors.

2.4 DOORS, PAINTED

Doors as scheduled (without clashing strips).

2.5 CAVITY SLIDERS

Doors hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.6 FRAMED AND GLAZED DOORS

Solid timber framed doors, stop end jointed and bead glazed.

2.7 FRAMED AND PANELLED DOORS

Solid timber framed doors, stop end jointed and beaded as detailed.

2.8 FRAMED AND LOUVRED DOORS

Solid timber framed doors, stop end jointed and beaded as detailed.

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2.9 DOOR HINGES

Size and gauge to carry door. 3 hinges per door.

2.10 SLIDING DOOR GEAR

To suit door/sash size and glazed weight and as detailed.

2.11 SLIDING-FOLDING DOOR GEAR

Bi-fold pattern to suit size and weight of doors and as detailed.

3 EXECUTION

3.1 SITE MEASURE

Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding or bi-fold door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

3.2 EXECUTION GENERALLY

Manufacture to the methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 FACTORY FIT HARDWARE

Factory fit the following where specified: -

- Hinges

3.4 FACTORY FINISHING

Before delivery to site: -

- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

Internal doors

3.5 INTERNAL JOINERY FRAMES

Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish.

3.6 DOOR FRAMES, SOLID REBATED

Fabricate as detailed. Hang doors to operate freely on hinges, sliding, or bi-fold gear and to the door manufacturer's requirements. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.7 DOOR LINERS

Heads and jambs finished minimum 18mm, with 10mm planted door stops. Width to match width of lined walls. Hang doors on hinges, sliding, or sliding-folding gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.8 DOOR LINERS, EXTENDED

Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.9 CAVITY SLIDERS

Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion

3.10 CHECK

Check and adjust operation of all sashes, doors, hardware and furniture.

3.11 TEMPORARY PROTECTION

On completion remove any temporary protection and leave ready for following work.

4 SELECTIONS

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6411 VINYL SURFACING

1 GENERAL

This section relates to the supply and installation of vinyl surfacing including skirtings, nosings, trims and edges.
It includes:

- PVC sheet
- PVC tiles

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Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC D1/AS1	Access routes
NZS/AS 1884	Floor coverings - Resilient sheet and tiles - Installation practices

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

~ years:	For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 years:	For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Performance

1.6 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

2 PRODUCTS

Materials

2.1 VINYL SHEET

High vinyl content homogeneous monolayer flexible PVC sheet flooring.

2.2 VINYL TILES

High vinyl content monolayer flexible PVC tiles.

2.3 COVINGS

Commercial applications:	Pencil cove with butterfly mitres to all external and internal corners. Fillet cove for safety flooring.
Domestic applications:	Pencil or fillet cove method.

2.4 VINYL SHEET WALL COVERING

High vinyl content homogenous flexible PVC sheet wall covering.

2.5 WALL AND FLOOR VINYL JOINING STRIP

White PVC floor to wall finishing strip.

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2.6 TRIMS AND EDGING

PVC as supplied by the sheet manufacturer to complete the work.

Accessories

2.7 ADHESIVE

Standard acrylic adhesive to suit the material and substrate and to the vinyl manufacturer's requirements.

2.8 PRIMER AND SEALER

To the adhesive manufacturer's requirements for the particular substrate.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Maintain rolls of sheet, packages of tiles and accessories undamaged and dry. Store rolls upright with other material on level surfaces in non-traffic, non-work areas that are enclosed, clean and dry.

Avoid distortion, stretching, marking and damage to edges while shifting, unrolling and handling sheet, tiles and accessories.

3.2 BEFORE COMMENCING WORK

Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

3.3 LAYING GENERALLY

Carry out the whole of the work to NZS/AS 1884, and to the flooring manufacturer's requirements.

3.4 LAYOUT

Before beginning the installation confirm the proposed layout of material, location of seams and other visual considerations of the finished work.

Application - General / substrate preparation

3.5 PREPARATION NEW CONCRETE

Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind level, then vacuum to remove all dust.

3.6 PREPARATION, NEW PLYWOOD OR PARTICLEBOARD

Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind smooth, then vacuum to remove all dust.

3.7 PREPARATION FOR WALL LININGS

Prepare wall linings to requirements of wall lining manufacturer and vinyl manufacturer,for vinyl over.

Application - laying

3.8 PREPARATION

Check that each colour supplied is from the same batch. Follow the vinyl manufacturer's requirements for conditioning of rolls and the working temperatures and conditions before, during and after laying. Protect work from solar heat gain and switch off under-floor heating during and for 48 hours either side, of the work period.

3.9 ADHESIVE APPLICATION

Apply approved adhesive as required by the vinyl manufacturer and without trowel marks after setting. Follow requirements for open time, taking note of substrate porosity, ambient temperature and relative humidity. Remove excess adhesive as the work proceeds using required techniques.

3.10 LAYING VINYL SHEET

Roll out, cut, leave to condition and install sheet vinyl to the vinyl manufacturer's requirements. Ensure there are no air bubbles or twisting, that the seams are kept clear of adhesive, and immediately the sheet is adhered roll with a 68 kg roller.

3.11 CROSS JOINS

Plan and allow cuts to avoid cross joins. Obtain written approval of the owner before proceeding if cross joins are unavoidable. Cross joins are not acceptable in wet areas.

3.12 COVE VINYL

Pencil cove flooring to the specified height and finish off as detailed.

3.13 MITRES

Perform butterfly method to internal and external mitres. Thermo-weld all mitres.

3.14 LAYING VINYL TILES

Set out from the centre of the area in two preparatory runs and modify to suit before laying tiles from the centre to the vinyl manufacturer's requirements. Ensure air is expelled and, as each section is completed, immediately roll with a 68 kg roller. Complete sections before scribing the perimeter tiles.

3.15 FIT VINYL SKIRTING

Fit skirting in accordance with the skirting manufacturer's requirements.

3.16 FIT VINYL EDGING

Fit tapered vinyl edging to all borders, except where abutting carpet.

3.17 WALL SURFACES

Clean off surface contamination, carry out minor repairs and bring to a smooth, even surface.

3.18 APPLY PRIMER OR SEALER FOR VINYL SHEET

Prime and/or seal porous plaster, concrete and timber substrates to the adhesive manufacturer's requirements.

3.19 FLOOR TO WALL FINISHING STRIP

Adhere to walls in a true, straight line using contact adhesive. Roll immediately using a seam-roller to ensure maximum bond strength is achieved.

3.20 APPLY VINYL WALL SHEET

Apply sheet to walls and heat weld seams under the technical direction of the wall sheet manufacturer's representative for each particular location.

Obtain written approval of the proposed joint layout approach from the owner, then adhesive fix either vertically or the T-method, ensuring all corners are wrapped and joints are no closer than 200mm to internal or external corners.

Cut vinyl neatly to recess on the floor/wall finishing strip and chemically weld this joint using Werner Mueller, type C welding compound.

3.21 THERMO-WELD VINYL WALL SHEET

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Hand groove and thermo-weld all seams, heating the sheet and weld rod to a sufficient temperature to melt and fuse them together into a single mass. Trim the weld to leave a smooth, flush surface with the sheet.

Cleaning

3.22 CLEAN VINYL

Leave vinyl flooring surfaces free of adhesive, dirt and debris. Clean and finish vinyl to manufacturer's requirements.

Completion

3.23 PROTECTION

Provide the following temporary protection of the finished work:
~

4 SELECTIONS

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6511 CARPETING

1 GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double bonded (double direct stuck).
It includes:

- carpet underlay
- woven sheet carpet

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2270	Plywood and blockboard for interior use
AS/NZS 2455.1	Textile floor coverings - Installation practice - General

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
1 year: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
1 year: For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

2 PRODUCTS

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Materials

2.1 UNDERLAY

To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

2.2 CARPET

To AS/NZS 2455.1 Textile floor coverings.
Refer to SELECTIONS for product selection.

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Components

2.3 BINDER BARS

Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS

Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER

Timber/plywood to AS/NZS 2270 with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

2.6 STAIR NOSING

Refer to SELECTIONS for type.

Accessories

2.7 ADHESIVE, UNDERLAY

To AS/NZS 2455.1, clause 1.5.3. and underlay manufacturer's requirements.

2.8 ADHESIVE, CARPET

To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.9 TAPE

To carpet manufacturer's requirements.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.2 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work. Ensure all fittings and fixtures around which the carpet is to be scribed are in place. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

Confirm moisture content of substrate in accordance with AS/NZS 2455.1. Appendix B Do not commence laying carpet until readings for the whole area are within acceptable levels as follows:

Moisture Content:	Timber substrate - 8 -12% for air conditioned buildings - 10 -14% for intermittently heated buildings - 12 -16% for unheated buildings
	Concrete substrate 75%RH

3.3 PROTECTION

Protect adjoining work surfaces and finishes during the carpet installation.

3.4 TAPE

Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.5 LAYOUT

Plan the general layout so that:

- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

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3.6 TEMPERATURE

Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

Application - general / substrate preparation

3.7 PREPARING NEW CONCRETE FLOOR

To be level, smooth, clean, cured and dry. Remove loose material and dust.

3.8 PREPARING NEW WOOD PRODUCT FLOOR

To be level, sanded smooth and dry with loose material and dust removed.

3.9 PREPARING EXISTING CONCRETE FLOOR

Remove existing coverings completely including adhesives, bituminous materials and paints. Patch cracks and depressions with compatible latex patching compound to the carpet manufacturer's requirements. Seal large areas of patching. Leave surface level, smooth and clean with loose material and dust removed. Seal powdery surfaces.

3.10 PREPARING EXISTING TIMBER OR WOOD PRODUCT FLOOR

Remove existing coverings completely including tacks, adhesives, bituminous materials, waxes and paints. Check for soundness, replace any substandard boards or panels and nail down loose boards. Sand smooth and remove loose material and dust.

3.11 SHEET UNDERLAYS FOR EXISTING TIMBER OR WOOD PRODUCT FLOORS

Refer to 6192 FLOORING SUBSTRATE PREPARATION for hard sheet underlays on existing floors.

Application - carpet laying

3.12 INSTALLATION, UNDERLAY

Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.13 INSTALLATION, CONVENTIONAL SYSTEM

Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.14 INSTALLATION, DIRECT STICK SYSTEM

Direct stick install to AS/NZS 2455.1, section 3. Apply adhesive evenly over the entire substrate surface to the carpet manufacturer's requirements. Lay carpet with all edges, selvages and joins tightly butted and completely bonded to the floor surface. Roll the carpet with a clean 25 kg roller and ensure complete contact with adhesive.

3.15 INSTALLATION, DOUBLE BOND SYSTEM

Double bond install to AS/NZS 2455.1, section 3. Apply adhesive on the underlay to the carpet manufacturer's requirements. Lay carpet with edges, selvages and joins tightly butted and completely bonded to the underlay surface.

3.16 LAYING TO STAIRS

Install on stairs in accordance with AS/NZS 2455.1.

3.17 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.18 PROTECTION

Provide the following temporary protection of the finished work:
~

3.19 SPECIAL PROTECTION

Self Adhesive carpet protective film: ~

4 SELECTIONS

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6700 PAINTING GENERAL

1 GENERAL

This section relates to the general matters related to painting work

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312.1	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings - Paint Coatings
AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 9001	Quality management systems - requirements
SNZ TS 3404	Durability requirements for steel structures and components
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Health and Safety Programme

Health and Safety at Work Act 2015

Requirements

1.3 NO SUBSTITUTIONS

Substitutions are not permitted to any specified manufacturer's system, or associated components and products.

1.4 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

1.5 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Health and Safety Programme. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Refer to WorkSafe: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.6 MATERIAL SAFETY DATA SHEET

Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.

Warranties

1.7 WARRANTY

Warrant this work under normal environmental and use conditions against failure.
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

Performance

1.8 MANUFACTURER'S INSPECTION

Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.

1.9 INSPECTION OF WORK

Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2 PRODUCTS

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Materials

2.1 PAINT TYPES

Use the manufacturer's complete system and only the products specified.

2.2 MATERIALS GENERALLY

Use only the Manufacturer's products which are guaranteed for their consistency and performance under AS/NZS ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.

2.3 THINNERS AND ADDITIVES

Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

2.4 FILLERS

For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3 EXECUTION

Conditions

3.1 EXECUTION

To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, the MPNZA Specification manual, and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE

Prepare surfaces to the coating manufacturer's requirements.

3.3 COATED SURFACES

Ensure that substrate surfaces are able to achieve the specified finish.

3.4 PRE-PRIMED SURFACES

Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.5 BRUSH DOWN

Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY

Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.7 TREATED SURFACES

Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 BACK PAINTING

Co-ordinate with cladding and/or lining installer as to who will do the work and timing.

Exterior
For exterior cladding and trim that require on site finishing, paint the back and exposed bottom edges at the base of the cladding (generally, bottom plate overhang and horizontal flashings) to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed.
Refer to appropriate exterior paint sections SELECTION clauses for claddings to be back painted.

Interior
For lining and trim that require on site finishing and/or back painting (usually wet areas), paint the back and exposed bottom edges at the base of the lining, to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed, or if no front finish seal to manufacturer's requirements.
Refer to appropriate interior paint sections SELECTION clauses for linings to be back painted.

3.9 ANCILLARY SURFACES

The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

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3.10 HARDWARE

Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

3.11 PROTECTION

Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation - unpainted and pre-primed timber and wood based products

3.12 MOISTURE CONTENT

Ensure moisture content at the time of application is near to the equilibrium moisture content pertaining to the particular locality in which the timber is used, without any excessive moisture content gradient between core and surface.

3.13 PREPARING DRESSED TIMBER

Ensure dressed timber is smooth, free from raised or woolly grain, planing burrs or other machining defects. Slightly round or ease sharp edges to ensure they can be properly coated. Sand timber to bring up to a smooth finish along the direction of the grain. Sand timber back to new condition timber that has been weathered.

3.14 PREPARING ROUGH SAWN TIMBER

Thoroughly brush along the direction of the grain to remove dust and dirt.

3.15 PREPARING PRE-PRIMED TIMBER

Check pre-prime coat for damage, powdering, weathering or loss of adhesion. Where primer is sound, thoroughly brush along the direction of the grain to remove dust and dirt. If there is doubt, sand back and re-prime.

3.16 TIMBER SPECIES

Check that the preparation and paint system is suitable for the timber species.

3.17 PREPARING DAMAGE AND DEFECTS

Scrape clean loose or soft material holes, depressions, resin or gum pockets, knot holes, surface splits, checks, or any localised decay. Apply primer and/or sealer specified and fill these areas with linseed oil putty or other appropriate filler.

3.18 FIXINGS

Take timber fixings below the painted or clear finished surface. Leave corrosion resistant timber fixings flush with clear finished surfaces.

3.19 CLEANING

Remove grease and oil by wiping down with solvent or water-based degreasing agent. Remove resin by wiping down with solvent or water-based degreasing agent or heating and scraping. Remove sanding dust. Bad staining may be untreatable and require replacement of timber, discuss with paint manufacturer and main contractor.

Preparation - gypsum plaster

3.20 PREPARING GYPSUM PLASTER

Fill and sand small crevices and cracks. Surface moisture content not to exceed 12% at time of coating.

Preparation - unpainted linings

3.21 PREPARING FIBROUS PLASTER

Check for and remove release agents and other contaminants by washing with clean water or solvent and allow to dry. Fill cracks and surface imperfections with patching plaster and lightly sand smooth. Remove dust.

3.22 PREPARING PLASTERBOARD

Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

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Preparation - unpainted plastics

3.23 PREPARING POLYESTERS (GRP) AND PHENOL FORMALDEHYDES

Wipe surfaces with methyl ethyl ketone or other suitable solvent. Lightly abrade with sandpaper and dust off. Proceed immediately with priming.

3.24 PREPARING UNPLASTICISED POLYVINYL CHLORIDE (UPVC)

Wipe surfaces with mineral turpentine, methylated spirits or white spirit. Lightly abrade with sandpaper and dust off. Proceed immediately with topcoats applicable for walls or timber finishes.

Preparation - painted surfaces generally

3.25 SURFACE PREPARATION

Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

3.26 MOULD

Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water. Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

3.27 GAP FILLING

Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using putty. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

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Preparation - painted surfaces in good condition

3.28 PREPARING SURFACES

Wash down surfaces with either:

- a chlorine based solution; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water

Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:

- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.29 PREPARING PAINTED TIMBER

Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:

- burning off using a blowtorch to soften paint without charring, before scraping off with a broad knife
- using an electrically heated hot air stream to soften paint, before scraping off with a broad knife
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow WorkSafe guidelines for minimising the hazards of stripping.

3.30 PREPARING PAINTED GYPSUM PLASTER

Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.31 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER

Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

3.32 PREPARING PAINTED CEMENT PLASTER, CONCRETE AND MASONRY

Remove the fine white powder of efflorescence by brushing and then wiping with a clean cloth. Remove faulty mortar by wire-brushing. Make good with fresh mortar to match.

Confirm that the cause of any dampness has been eliminated and that the substrate is dry before applying any coating.

Wire brush moss or lichen affected areas to remove loose, powdery growth. Treat the affected areas with a solution of 200 millilitres of formalin (40% solution) to 800 millilitres of water. Apply the solution and leave for 3 days, or until the moss and lichen turns brown. Scrub off with a hard bristle brush and hose down liberally with water. Swab the affected area using a solution of 1 volume of household bleach to 2 volumes of water. After 30 minutes wash down with clean water.

Remove grease by continued washing with a 1:40 solution of sugar soap and water until completely removed, wash with clean water and allow to dry.

Where necessary strip paint back to the original surface by water or abrasive blasting. Remove chalk dust and dirt when dry by stiff bristle brushing.

3.33 PREPARING PAINTED METALWORK

Remove corrosion in whatever form. Sand edges to form a smooth surface with surrounding areas unaffected by corrosion. Use a chemical pre-treatment to remove the last traces of and to inhibit future, corrosion. Clean down completely before spot priming to suit the coating system specified.

Application - before applying final coatings

3.34 OFF-SITE WORK

Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

3.35 PRIMING JOINERY

Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP. treated joinery has dried sufficiently to lose odour.

3.36 CONCEALED JOINERY SURFACES

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.37 CONCEALED METAL SURFACES

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

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3.38 DOORS

Prime or seal and paint all six faces of doors before hanging.

3.39 BEAD GLAZING

Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.

3.40 PUTTY GLAZING

Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.

Application - generally

3.41 PAINTING GENERALLY

Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.42 MIXING

Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.43 ENVIRONMENT

Paint exterior surfaces only in favourable weather conditions:

- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively

- as far as possible apply paint in the temperature range 15°C to 25°C
- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

3.44 SEQUENCE OF OPERATIONS

Painting work to generally follow the following sequences:

- back painting and pre-installation painting, then post-installation exposed-face painting
- complete surface preparation before commencing painting
- apply paint in the specified sequence using the specified paint
- allow full drying time between coats to the paint manufacturer's requirements
- do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
- finish broad areas before painting trim
- ensure batch numbers of tins are matched for whole areas
- internally, paint ceilings before walls and walls before joinery, trim and other items

3.45 PAINT APPLICATIONS

Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour.

3.46 DRYING TIME

Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

3.47 LIGHTLY SAND

Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.

3.48 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the paint system specified.

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3.49 EACH COAT

Each coat of paint and the completed paint system to have the following qualities and properties:

- uniform finish, colour, texture, sheen and hiding power
- the specified number of coats applied
- no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
- proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application

Completion

3.50 CLEAN

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.

3.51 CLEAN EQUIPMENT

Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.

3.52 LEAVE

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.53 REMOVE

Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

3.54 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

4 SELECTIONS

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7112 WATER STORAGE TANKS

1 GENERAL

This section relates to the installation of water storage tanks for potable or non-potable water.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E1/AS2	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G2/AS1	Laundering
NZBC G3/AS1	Food preparation and prevention of contamination
NZBC G12/AS1	Water Supplies
NZBC G12/AS3	Water Supplies
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent application
AS 1445	Hot-dipped zinc-coated, aluminium/zinc-coated or aluminium/zinc /magnesium-coated steel sheet - 76 mm pitch corrugated
AS/NZS 1546.1	On-site domestic wastewater treatment units - septic tanks
AS 2070	Plastic materials for food contact use
AS/NZS 2845.1	Water supply - Mechanical backflow prevention devices - materials, design and performance requirements
AS/NZS 3000	Electrical installations (Known as the Australian/New Zealand Wiring Rules)
AS/NZS 3500.1	Plumbing and drainage - water services
AS/NZS 3500.3	Plumbing and drainage - stormwater drainage
AS/NZS 4020	Testing of products for use in contact with drinking water
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 4671	Steel for the reinforcement of concrete
AS/NZS 4766	Polyethylene storage tanks for water and chemicals
NZS 3104	Specification for concrete production
NZS 3106	Design of concrete structures for the storage of liquids. - SPONSORED
NZS 3109	Concrete construction
NZS 7601	Specification for polyethylene pipe (Type 3) for cold water services
NZS 7602	Specification for polyethylene pipe (Type 5) for cold water services
NZS 7610	Specification for blue polyethylene pipes up to nominal size 63 for below ground use for potable water
HB 230	MPMSAA Rainwater Tank Design and Installation Handbook (Standards Australia)
HE4602	Household water supplies: The selection, operation, and maintenance of individual household water supplies
HE10148	Water collection tanks and safe household water (Ministry of Health)
SNZ PAS 4509	New Zealand Fire Service Firefighting Water Supplies Code of Practice
Ministry of Health	Guidelines for drinking-water quality management for New Zealand

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).

Requirements

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1.2 HEALTH REQUIREMENTS

Refer to HE4602 for guidance.

1.3 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

Performance

1.4 DESIGN AND INSTALLATION

To HB 230 Rainwater Tank Design and Installation Handbook, to AS/NZS 3500.1 as modified by NZBC G12/AS1, AS/NZS 3500.3 as modified by NZBC E1/AS2 and to NZBC G1/AS1 and NZBC G12/AS1.

1.5 TESTING OF PRODUCTS

Materials used in the manufacture of rainwater tanks to be tested to AS/NZS 4020.

2 PRODUCTS

Components

2.1 ABOVE GROUND WATER STORAGE TANK

Tank generally to NZBC G12/AS1, AS/NZS 3500.1 as modified by NZBC G12/AS3, section 2 Materials and products and section 8 Water storage tanks, AS/NZS 4020 and:

- Above ground tank manufactured from polyethylene to AS/NZS 4766 and to AS 2070.
- Above ground tank manufactured from precast concrete to NZS 3104, NZS 3106, NZS 3109 and AS/NZS 4671.
- Above ground tank manufactured from precast ferro-cement or reinforced plaster to AS/NZS 1516 and AS/NZS 4671.
- Above ground tank manufactured from hot dip galvanized corrugated steel sheet to AS 1445. Internal surface coated with food-grade polymer film.

Tanks to be fitted with a secure fitting lid to provide internal access for cleaning or inspection.

Accessories

2.2 TANK FITTINGS

Fittings kit supplied with the tank for complete installation.

2.3 PVC-U PIPES AND FITTINGS

Unplasticised PVC pipe and fittings to AS/NZS 1260.

2.4 POLYETHYLENE PIPES AND FITTINGS

High density polyethylene pipe and fittings to AS/NZS 4130.

2.5 WATER PRESSURE PUMP

Pump designed to pressurise water supply from tank into the building.

2.6 TANK VENT

Vent with insect proof stainless steel mesh fitted on top of the tank.

2.7 FIRST FLUSH WATER DIVERTER

Wall mounted or underground system specific to installation. To prevent the first flow of water from the roof entering the water storage tank.

2.8 FILTER SYSTEM

Inline cartridge filter housing fitted between the first flush diverter and the inlet, or a 955 micron filter tank screen system fitted within the tank.

2.9 TANK VACUUM SYSTEM

Designed to suck from the bottom of the tank when the tank is full to overflowing. System to include anti siphon device.

2.10 WATER TREATMENT (UV)

Combination filtration and UV disinfection system.

2.11 SEALS

Uniseals for pipe connections to the top of the tank.

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3 EXECUTION

Conditions

3.1 SITE ACCESS

Transportation on site to the position of the tank is at the risk and responsibility of the contractor. Make provision for manoeuvring and unloading of tank.

Installation - site

3.2 LAYING AND JOINTING

Lay in straight lines between changes of line or grade from the lower end of the drain with sockets pointing uphill. Set each pipe true to line and grade and each joint completed before the next pipe is laid.

Installation - fittings

3.3 WATER PUMP INSTALLATION

Install pump on a solid base bolted down through base plate. Place weather tight housing over the pump and secure to base. Connect to water supply and power supply.

3.4 WATER TREATMENT SYSTEM INSTALLATION

Install ultraviolet light radiation treatment unit between pump and house to manufacturer's specifications. Connect to power supply provided.

3.5 BACK FLOW PREVENTION DEVICES

Install to AS/NZS 2845.1, to AS/NZS 3500.1 as modified by G12/AS3 and to NZBC G12/AS1.

Installation - connections

3.6 FIRST FLUSH WATER DIVERTER

Install either adjacent to the tank or underground, first flush water diverter. Connect downpipes from the roof gutter to the first flush water diverter. Connect the first flush diverter to the top of the tank. Refer to manufacturer's installation details.

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3.7 FILTER INSTALLATION

Install proprietary in-line filter before the inlet connection.

3.8 INLET CONNECTION

Install inlet pipe into top of tank at manufacturer's designated mounting area using a Uniseal type connection.

3.9 OUTLET CONNECTION

Install pipe to manufacturer's installation details. To the outlet connect a floating arm draw-off to deliver water from 100mm below the surface. From the base connection run a flexible hose to the pump. Install ball valve in line between base connection and water pump. Support all pipework at outlet.

3.10 OVERFLOW PIPE

Install pipe to manufacturer's installation details and connect to approved discharge point or as detailed.

3.11 PIPE SEALS

Insert Uniseals in clean cut holes of the correct size. Insert Uniseal into hole with widespread facing the pipe to be inserted. Lubricate the pipe with detergent and push through the Uniseal. Use only on top of tank connections.

3.12 ELECTRICAL CONNECTION

Installation to Electricity (Safety) Regulations 2010, and AS/NZS 3000. Allow to connect up water pump and water treatment unit to the power supply as provided.

Completion & commissioning

3.13 POST INSTALLATION TESTING

Test and commission the completed system to manufacturer requirements and AS/NZS 3500.1, 17.3 Testing and for potable water, tanks shall be cleaned and disinfected prior to use, in accordance with AS/NZS 3500.1 Appendix G Cleaning and disinfection of storage tanks. At the completion and testing of the water service, check all valves and other components to confirm their correct performance.

4 SELECTIONS

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7120 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G4/AS1	Ventilation
NZBC G11/AS1	Gas as an energy source
NZBC G12/AS1	Water supplies
NZBC G12/AS3	Water supplies
NZBC H1/AS1-AS2	Energy Efficiency
AS 1432	Copper tubes for plumbing, gas fittings and drainage applications
AS/NZS 1477	PVC pipes and fittings for pressure applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2345	Dezincification resistance of copper alloys
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.1	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) General
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2537.3	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) fitness for purpose of system
AS/NZS 2537.4	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) Guidance for the assessment of conformity.
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply and gas systems - metallic fittings and end connectors
AS/NZS 3879	Solvent cements and priming fluids for PVC (PVC-U and PVC-M and ABS and ASA pipes and fittings
AS 4032.2	Water supply - Valves for the control of heated water supply temperatures - Tempering valves and end-of-line temperature actuated devices
AS/NZS 4129	Fittings for polyethylene (PE) pipes for pressure applications.

AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4606.1	Storage water heaters. General requirements
NZS 4606.2	Storage water heaters. Specific requirements for water heaters with single shells
NZS 4606.3	Storage water heaters. Specific requirements for water heaters with composite shells.
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS 4809	Copper pipe and fittings. Installation and commissioning
AS 5200 part 053	Plumbing and drainage products, Stainless steel pipes and tubes for pressure applications.
AS/NZS 5601.1	Gas installations - general installations
AS/NZS 60335.2.35	Household and similar electrical appliances. Safety - Pat 2.35 Particular requirements for instantaneous water heaters

Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2019, Field testing of backflow prevention devices and verification of air gaps

Warranties

1.2 WARRANTY

Provide warranty for:
2 years: For the supply and installation of the plumbing system and fixtures

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Requirements

1.3 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.4 INFORMATION FOR OPERATION AND MAINTENANCE

Provide the following general operation and maintenance information as electronic PDF format documents:
~

Provide this information prior to practical completion.

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1.5 HOT WATER TEMPERATURES

To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60ºC.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:

- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 50ºC - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.

- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

Performance

1.6 TESTING - TO NZBC G12/AS1

Test to NZBC G12/AS1, 7.6, Watertightness, for hot and cold water.

- Test to a pressure of1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.7 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.8 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.9 GAS APPLIANCE COMPLIANCE

Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS

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Materials

2.1 WATER METER

To the requirements of the network utility operator.

2.2 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1.

2.3 TEMPERING VALVE

Tempering valve to NZS 4617 or AS 4032.2 to NZBC G12/AS1.

Materials - Hot water heating appliances

2.4 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

To NZS 4305 NZS 4606.1, NZS 4606.2 and NZS 4606.3, electric water storage cylinder, insulated and complete with required fittings.

2.5 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Continuous flow unit with an integral gas burner and flue to NZS 4305.

2.6 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION

3.1 EXECUTION GENERALLY

Generally carry out the whole of this work and tests to NZBC G12/AS1 or AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3.

3.2 HANDLE AND STORE

Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE

Flow rates to each outlet to be no less than those given in AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE

Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Pipework installation

3.10 WATER SUPPLY CONNECTION

Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.11 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.12 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 9 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and AS/NZS 3500.4 as modified by NZBC G12/AS3 or G12/AS1.

3.13 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES

If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

3.14 IN-LINE FILTER

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Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.15 HOT WATER CYLINDER INSTALLATION GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6. 11, Water heater installation or NZS 4607 for Valve-vented systems.

3.16 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES

Gas appliances to be restrained to manufacturer's requirements, NZBC G11/AS1 and AS/NZS 5601.1 or AS/NZS 3500.4, 5.5.4 Seismic restraints.

3.17 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES

Non-gas (electric, wet-back, solar etc) water heating appliances (storage water heaters) to be restrained to manufacturer's requirements and NZBC G12/AS1, 6.11, Water Heater Installation or AS/NZS 3500.4, 5.5.4 Seismic restraints.

3.18 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS

Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11 or NZS 4607 for Valve-vented systems.

3.19 INSTALL GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1, 6. 11, Water heater installation. Install flue in accordance with the manufacturer's details and requirements and, AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances). Also refer to section 7221 GAS APPLIANCES for installation of gas appliances.

3.20 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to NZBC G12/AS1.

3.21 INSTALL TEMPERING VALVE

Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.22 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

3.23 INSTALLING BELOW GROUND ISOLATING VALVE

Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.24 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

Completion

3.25 LABEL

Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.26 CLEAN IN-LINE FILTER

Clean all in-line filters on completion of works.

3.27 REPLACE

Replace damaged or marked elements.

3.28 LEAVE

Leave work to the standard required by following procedures.

3.29 REMOVE

Remove debris, unused materials and elements from the site.

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4 SELECTIONS

Hot water systems

4.1 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

Brand: ~
Model size: ~

4.2 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Brand: ~
Model size: ~
Remote controller: ~
Gas type: ~

4.3 TEMPERING VALVE

Location: ~
Brand/type: ~

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7411M METALCRAFT ROOFING RAINWATER SPOUTING SYSTEMS

1 GENERAL

This section relates to **Metalcraft Roofing** rainwater disposal systems including gutters fascias and downpipes.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
Gutter	In this section includes spouting

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Are available on the website or by contacting Metalcraft Roofing.

For technical assistance contact **Metalcraft Roofing**
Web: www.metalcraftroofing.co.nz

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Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years:	Failure of coating adhesion (manufacturer's standard warranty)
10 years:	Weatherproofing failure caused by material penetration as a result of corrosion (manufacturer's standard warranty)

- Provide this warranty on the manufacturer/supplier standard form
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.6 QUALIFICATIONS

Installers to be experienced competent gutter installers, familiar with the **MetalcraftRoofing** materials and the techniques specified.

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Provide one copy of all relevant **Metalcraft Roofing** maintenance information on completion of the roofing work.

Performance

1.8 TEST - NZBC E1/AS1

Test the completed rainwater disposal system with water to ensure gutters are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in gutters. Comply with NZBC E1/AS1.

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2 PRODUCTS

Materials

2.1 GUTTERS

Complete with matching brackets with fixing screws to suit the gutter / fascia. Refer to SELECTIONS for type.

2.2 DOWNPIPES - PVC

To AS 1273 Unplasticised PVC (uPVC) downpipe and fittings for rainwater. Complete with stand-off brackets, galvanized screw fixed. Refer to SELECTIONS for type.

Components

2.3 DROPPERS

Steel or plastic droppers, sized to fit inside the downpipe.

2.4 DOMES

Wire mesh in round form with legs to clip inside the outlet opening to the downpipe.

2.5 GUTTER MESH

Flexible plastic mesh fitted into the gutter to the mesh manufacturer's requirements.

3 EXECUTION

Conditions

3.1 HANDLE AND STORE

Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE

Check that fascia, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT

Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 12 metres in length for steel gutter.

3.4 CORROSION

Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Check compatibility of metals used for rainwater goods, against the materials being used for roofing and flashings.

Application - metal

3.5 INSTALL METAL GUTTER AND FASCIA

Establish minimum falls necessary (minimum 1:500) to outlets to prevent ponding and screw fix brackets true-to-line at 900mm centres maximum. In areas where snow fall is possible and or high wind areas, the centres should be reduced to 600mm. Lap spouting joints in direction of flow, a minimum of 40mm to seal between and over the top of joint and seal with silicone sealant and fix with rivets. Ensure the joint is fixed over its full girth. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to Metalcraft Roofing details and NZMRM CoP recommendations.

3.6 INSTALL PVC DOWNPIPES

Install downpipes complete with 115 degree angle bends as needed with all joints lapped and glued. Galvanize screw fix with PVC pipe clips to rigidly stand 40mm off the wall plumb and discharging into stormwater gully or inlet pipe. All installation to Metalcraft Roofing details and NZMRM CoP recommendations, section 5.7,Outlets & Downpipes.

3.7 INSTALL RAINWATER HEADS

Install using rivets where required to detail as shown on drawings. Ensure colour matched blind aluminium rivets are used when joining metal surfaces.

3.8 INSTALL OVERFLOWS

Install as close as practical to downpipe locations, at a height allowing water to discharge to the outside and not into the building.

3.9 INSTALL PROTECTION

Fit wire mesh domes to downpipe outlets and plastic mesh to spouting to the spouting manufacturer's requirements.

Completion

3.10 REPLACE

Replace damaged or marked elements.

3.11 LEAVE

Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.metalcraftroofing.co.nz

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7411MA MARLEY RAINWATER DISPOSAL SYSTEMS

1 GENERAL

This section relates to **Marley** rainwater disposal systems.
It includes;

- uPVC spouting and downpipes
- Stratus Design Series® spouting and downpipes
- associated accessories necessary to complete the installation

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E2/AS1	External moisture
AS/NZS 3500.3	Plumbing and Drainage - Stormwater drainage
AS/NZS 4020	Testing of products for use in contact with drinking water

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Marley Rainwater Sales Brochures
Marley Product Catalogue
Marley - Spouting and Downpipe DIY Installation Guide
Marley Stratus Design Series® Sales brochure
Marley Stratus Design Series® - Design and installation guide

Manufacturer/supplier contact details

Company:	**Marley New Zealand Limited**
Web:	www.marley.co.nz
Email:	info@marley.co.nz
Telephone:	0800 MARLEY (0800 627 539)

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Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier Guarantee:

15 years:	Against defects in material and manufacture

- Commence the guarantee from the date of purchase
- Refer to Marley NZ Guarantee available at www.marley.co.nz

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

~ years:	For installation

- When installed to Marley's published installation instructions at time of installation.
- Provide this warranty on the installer/applicator standard form.
- Workmanship warranty to be issued separately by the installer
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

Installers to be experienced, competent workers familiar with the materials and techniques specified.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified Marley systems, components and associated products listed in this section.

Performance

1.7 TEST

Test the completed Marley rainwater disposal system with water to ensure, spouting is laid to correct fall, that both spouting and downpipes are unobstructed and that no ponding occurs in spouting.

1.8 DESIGN - NZBC E1/AS1

Layout, falls and capacity of spouting to falls and the size and position of downpipes to comply with NZBC E1/AS1.

1.9 DRINKING WATER

All Marley spouting and downpipe systems are tested for the collection of rainwater and drinking purposes to AS/NZS 4020. Care should be taken to ensure water is not contaminated by other sources.

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2 PRODUCTS

Materials

2.1 UPVC SPOUTING/DOWNPIPES

Marley uPVC spouting and downpipe systems in white and grey uPVC.

2.2 STRATUS DESIGN SERIES® SPOUTING/DOWNPIPES

Marley Stratus Design Series® spouting and downpipe systems in co-extruded colour outer layer with grey uPVC internal layer.

Products

2.3 MARLEY SPOUTING

Marley spouting system, complete with Marley fittings including jointers, brackets, expansion outlets, end caps and corners supplied by Marley. Refer to SELECTIONS for type.

2.4 MARLEY DOWNPIPES

Marley downpipe system, complete with Marley fittings including bends, clips, joiners and junctions supplied by Marley. Refer to SELECTIONS for type.

Components

2.5 MARLEY MCS SOLVENT WELDING CEMENT

Only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting and downpipe systems to manufacturer's instructions. Colour match to spouting or downpipes.

2.6 EXPANSION OUTLET/DROPPERS

Marley expansion outlet/droppers, compatible with spouting and downpipe profile.

2.7 SCREW FIXINGS - TIMBER FASCIA

Stainless steel, grade 304 finish, self tapping screws 6g x 20mm pan head or wafer head.

2.8 NAIL FIXINGS - TIMBER FASCIA

Marley galvanised nails (MCNAILS).

2.9 SCREW FIXINGS - METAL FASCIA

Self drilling tek screws 6g pan head or wafer head.

2.10 FABRICATION

Special items can be fabricated by Marley to specific dimensions on request including but not limited to angle flats, angle rakes, outlets and adaptors.

3 EXECUTION

Conditions

3.1 HANDLING AND STORAGE

Handle and store Marley downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Store out of direct sunlight. Refer to Marley installation guides for further details.

3.2 SUBSTRATE

Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT

Make adequate provision in the jointing of the spouting for thermal movement in the length of the spouting by using Marley expansion joiners and/or expansion outlets. Refer to Marley expansion technical information.

3.4 ENVIRONMENTAL

Marley Spouting and Downpipe systems are suitable for most environmental conditions and will never rust, rot or corrode.

3.5 RECYCLING

All Marley manufactured spouting and downpipe systems are 100% recyclable and Marley operates recycling programs with industry suppliers where uPVC pipes can be returned from site for recycling at Marley.

Application

3.6 INSTALL MARLEY SPOUTING

Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting systems to manufacturer's instructions. From high points fix brackets true-to-line to give a fall of 5mm every 10 metres to outlets. Set spouting brackets at 500mm centres; reduce to 300mm spacing for high wind zones or areas subject to occasional snowfalls. Make adequate provision for thermal movement.

3.7 INSTALL MARLEY DOWNPIPES

Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure that all joints are sealed properly using Marley MCS® Solvent Welding Cement. Assemble downpipes, solvent cement jointed complete, fit to outlets, fix with pipe clips every 1.2 metres, fix pipe clips with 304 stainless steel screws, plumb and discharging into the stormwater gully or pipe inlet to the Marley required practice.

Painting Marley uPVC spouting/downpipes

3.8 PAINTING

After installation use a mineral based undercoat and two coats of 100% weatherable acrylic paint. Do not paint the inside of spouting or internal brackets.

Completion

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3.9 REPLACE

Replace damaged or marked elements.

3.10 LEAVE

Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.11 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.marley.co.nz

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7420 SANITARY SYSTEMS

1 GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G1/AS1	Personal hygiene
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
Stainless steel pipe and associated fittings
PVC,PE polyethylene or polypropylene pipe including all associated fittings.

3 EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1

Carry out this work to NZBC G13/AS1 and NZBC G1/AS1 and complete all tests to G13/AS1, 7.1 Test Methods.

3.2 EXECUTION GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2, as modified by NZBC G13/AS3, and complete all tests to AS/NZS 3500.2, section15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.

3.3 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.4 INSTALL TRAPS, WASTE AND VENT PIPES - NZBC G13/AS1

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to NZBC G13/AS1 and jointing for PVC-U pipes to AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.5 INSTALL TRAPS, WASTE AND VENT PIPES - AS/NZS 3500.2

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2, as modified by NZBC G13/AS3, and jointing to PVC-U pipes to AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.6 INSTALL ELECTRIC PAN VENTS

Install electric pan vents to manufacturers' requirements. Leave ready for electrical connection by electrician.

3.7 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.8 TEST

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations,as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.9 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4 SELECTIONS

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7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - sanitary plumbing
NZBC G13/AS2	Foul water - drainage
NZBC G13/AS3	Foul water - sanitary plumbing and drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
NZS 3111	Method of test for water and aggregate for concrete
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4402 (set)	Method of testing soils for civil engineering purposes
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls
NZTA F2	Specification for pipe subsoil drain construction

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

Underground PVC-U pipe to be classified as follows:

Classification:	Use:
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES

Polyethylene pipes and fittings to AS/NZS 5065.

2.5 PERFORATED PIPE - SUBSOIL DRAINAGE

Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS - NZBC G13/AS2

To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 GULLY TRAPS - AS/NZS 3500.2

Gully traps complete with grating to AS/NZS 3500.2, 4.6 Gullies, as modified by NZBC G13/AS3.

2.8 SURFACE WATER SUMP GRATINGS

Cast iron frame with lift-up grating.

2.9 STRIP DRAIN CHANNEL

Proprietary, modular, variable invert, plastic, steel (various types), or polymer concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings.

2.10 INSPECTION COVERS

Cast iron frame with screw-down cover.

2.11 TRENCH BACKFILLING MATERIAL, FOUL WATER - NZBC G13/AS2

Bedding and backfilling material to NZBC G13/AS2, 2.0 Materials**,** for methods shown in NZBC G13/AS2, figure 7, Bedding and backfilling.

2.12 TRENCH BACKFILLING MATERIAL, FOUL WATER - AS/NZS 3500.2

Bedding and backfilling material to AS/NZS 3500.2, 5.4, Bedding of drains, and for concrete, if required, AS/NZS 3500.2, 5.3 Concrete Support.

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2.13 DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Free draining crushed stone, 7 mm to 20 mm in size.

2.14 FILTER FABRIC

Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency. The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

3 EXECUTION

3.1 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.
Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, Proximity of Trench to Building, for stormwater and subsoil drains.
- AS/NZS 3500.3, 6.2.8, Installation near and under buildings, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, Proximity of Trench to Building, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 FOUL WATER DRAINAGE GENERALLY - NZBC G13/AS2

Carry out foul water drainage work to NZBC G13/AS2 and NZBC G1/AS1 and complete all tests to NZBC G13/AS1, 7.1 Test Methods.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

3.4 FOUL WATER DRAINAGE GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2 and complete all tests to AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

3.5 LAY FOUL WATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

3.6 CONSTRUCT GULLY TRAPS - NZBC G13/AS2

Set in a minimum 75mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to NZBC G13/AS2, 3.3 Gully traps.

3.7 CONSTRUCT GULLY TRAPS - AS/NZS 3500.2

Set in a minimum 100mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to AS/NZS 3500.2, section 4.6, Gullies.

3.8 LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.

3.9 FILTER FABRIC TO DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.10 LAY PERFORATED PIPING - SUBSOIL DRAINAGE

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Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.11 LAY PERFORATED PIPING TO BASEMENT WALLS - SUBSOIL DRAINAGE

Ensure any required waterproofing and protection sheets are in place before starting work.
Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to 1:150 gradients with invert of the highest horizontal point 50 mm minimum below floor slab level, discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Fill with drainage material to full height of wall. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.12 LAY PERFORATED PIPING TO RETAINING WALLS - SUBSOIL DRAINAGE

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage metal comprising of filter material to the NZTA F2 specification. Pipe bedding not less than 75mm deep. Backfill not less than 300mm deep. The pipe must not excessively elongate during installation. Lay in straight runs to correct gradients , discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Place granular fill in layers not exceeding 150 mm thick loose depth, to full height of wall, with an allowance for the thickness of the surface finish. Compact to provide support of not less than that of the adjacent material. Where geocomposite drain is used, the backfill shall follow the manufacturer's recommendations. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.13 INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

3.14 INSTALL SURFACE WATER SUMP

To NZBC E1/AS1 or to AS/NZS 3500.3 section 7 as modified by NZBC E1/AS2, complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.15 INSTALL STORMWATER INSPECTION CHAMBERS

Construct as detailed on a poured concrete footing to NZBC E1/AS1, 3.7, Access for maintenance, or to AS/NZS 3500.3, section 7 as modified by NZBC E1/AS2. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.16 INSTALL FOUL WATER INSPECTION CHAMBERS - NZBC G13/AS2

Construct as detailed on a poured concrete footing to NZBC G13/AS2, 5.7 Access points. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.17 INSTALL FOUL WATER INSPECTION CHAMBERS - AS/NZS 3500.2

Construct as detailed on a poured concrete footing to AS/NZS 3500.2, 4.7 Inspection openings and 4.8 Inspection chambers, as modified by NZBC G13/AS3. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.18 SOAKHOLES OR TRENCHES

Dispose of stormwater on site as shown on the drawings, by soakage, to suit local geology and soil structure; all as directed by the territorial authority.

3.19 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.20 TESTING - FOUL WATER

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations, as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.21 TRENCH BACKFILLING GENERALLY - FOUL WATER

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid. Up to 300mm above the pipe, compaction shall be by tamping by hand tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.22 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

4 SELECTIONS

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7701 ELECTRICAL BASIC

1 GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting
- electrical automation
- security system
- complete with componentry
- electrically-powered fittings
- fire rated sealers, liners and accessories

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.
The following abbreviations apply specifically to this section:

AFDD	Arc Fault Detection Device
ELV	Extra Low Voltage
GLS	general lighting service
IP	international (ingress) protection classification
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

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Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1:2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3:2005	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
NZS 4514	Interconnected smoke alarms for houses

NZS 4246	Energy Efficiency - Installing bulking thermal insulation in residential buildings
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance.
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).
TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.3 WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year:	Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.4 COMPLY

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Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2, and TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

Workers and supervisors to be appropriately qualified to applicable legislative requirements. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 QUALIFICATIONS - SECURITY SYSTEM

Installation by an installer licensed under the Private Investigators and Security Guards Act. Installation of all security equipment to comply with AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance.

1.7 SAFETY OF INSTALLATION - DESIGN BY ELECTRICAL ENGINEER

Before installation work commences obtain from the electrical engineer a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulation 58.

1.8 SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN

Before installation work commences provide a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulations 58. It must be signed by the designer of the installation.

1.9 ELECTRICAL CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations 2010, prior to connection.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect high risk electrical work as required by regulation 70.

1.10 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, Reg 74A, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

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2 PRODUCTS

2.1 MAINS SUPPLY

Tough plastic sheathed neutral screened cable to AS/NZS 5000.2 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to AS/NZS 3439.3, or AS/NZS 61439.3, and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units.
Label all switch units that control electrical equipment or special lighting circuits by proprietary engraved switch mechanisms where applicable.
Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.
Refer to SELECTIONS.

2.8 HOT WATER SYSTEM SWITCH

One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS

10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang as detailed.

2.10 FIRE & SMOKE ALARM SYSYEM

Refer to SELECTIONS.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class ll surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class lll surge protection to switched socket outlets.

2.12 CEILING ROSES

White plastic mounting base with screwed cover, manufactured to AS/NZS 3113. Terminal type. Suspended fittings to have sheathed round flexible cord to AS/NZS 3008.1.2. Refer to SELECTIONS.

2.13 BATTEN HOLDERS

Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.14 DOOR BELL SYSTEM

Complete with transformer for mounting on distribution board.

2.15 LIGHT FITTINGS

Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise; integral/non-integral LEDs, reflectors, lenses, heatsinks and drivers - 3,000K to 4,000K, CRI >80, L70.

2.16 EMERGENCY LIGHT FITTINGS

Emergency escape lighting and exit signs for buildings to AS 2293.3. Exit, recessed, ceiling or wall mounted. Refer to SELECTIONS.

2.17 SPACE HEATERS

Fixed wired room heaters radiant or convector, and compliant with AS/NZS 60335.1. Flush or surface mount, fitted with safety cut-outs.

2.18 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 60335.1.

2.19 HEATED TOWEL RAILS

Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with AS/NZS 60335.1, scratch resistant powdercoated or chrome finish.

2.20 EXTERIOR SWITCHES AND SWITCHED SOCKET UNITS

Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches and sockets to IP56 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

Electrical automation system

2.21 ELECTRICAL AUTOMATION SYSTEM

Electrical automation system designed to enable if required:

- Lighting - automated control and dimming timer control.
- Heating including heated towel rails and ventilation systems.
- Security - programmable to simulate lights and other devices to give appearance home is occupied - ability to interface with security system and smoke detectors to activate lights.
- Energy efficiency - automatically switch circuits off when not required or on during low tariff times.
- Appliances.
- Spa pools.
- Irrigation systems.

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Security system

2.22 CONTROL PANEL

Control panel system with a minimum of one installer code, one master code, 6 zones minimum and 6 user codes. The installer to select codes to suit installation.

2.23 DETECTORS

There are two main types of detectors:

- Standard passive infrared sensors: Install in stable environments with no wind flow and no direct bright sunlight.
- Passive infrared/ microwave sensors: Install in area where environmental stability is an issue.

2.24 AUDIBLE DEVICES

Internal sirens can be either a 12V Piezo Siren or a Horn speaker with a sound pressure level of no less than 95dB.
External siren can be either a stainless steel design or have hardened plastic casing. Both designs to be fully weatherproof but not limited to IP66 Rating. The siren box to contain a strobe diffuser in either blue or red. The siren shall contain a horn speaker, 12v speaker or an electronic siren. The external siren box to have both a cover and rear wall tamper mechanism.

2.25 CABLING

Security alarm wiring to NZS/AS 1125 for cables.
Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm².

2.26 PERIPHERALS

Fit anti-tamper devices to detectors, control panels and equipment housings, programmed to give a tamper indication when the system is unset and a tamper alarm when the system is set.
Standard keypad manufactured of moulded hardened plastic with either a LED or LCD screen, to match the style of the wiring accessories in diameter, colour and aesthetics.

2.27 COMMUNICATIONS

Digital dialler to be built into the PCB of all control panels, with the options for both monitoring and remote dial in windows based software. Digital dialler to comply with all the industry standard communication formats including contact I.D and SIA, and NZ Telepermit certification.
Remote software able to upload / download programming changes and or history events and change status of the security alarm with the ability to be turned off if required.

3 EXECUTION

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Fire rated sealers and liners

3.1 MAIN SUPPLY

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX

Fit to meter box manufacturer and Electricity Retailer requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD

Fit to AS/NZS 3000 and board manufacturer requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION

Install MCBs at distribution board to AS/NZS 3000 to protect each final sub circuit.

3.5 MAIN EARTH

Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.6 EARTH LEAKAGE PROTECTION

Install RCD protection to AS/NZS 3000.

3.7 RCD - RESIDENTIAL INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

3.8 RCD - SPECIFIC INSTALLATIONS

Install fixed wired RCD protected outlets (SRCD) in the following higher risk areas:

- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.
- Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.9 SET-OUT

The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.10 CABLING

Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.11 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.12 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

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3.13 ISOLATING SWITCHES

Locate isolating switches in positions as instructed by the owner, when not specifically shown on the drawings.

3.14 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer requirements.

3.15 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer requirements and as close as practicable to the lamp. Ensure transformers/drivers and rear of light fittings are adequately ventilated and appropriately clear of any building elements, to AS/NZS 3000.

3.16 EMERGENCY LIGHTING

Emergency escape lighting and exit signs for buildings to AS 2293.1 and NZBC F6/AS1. Fit emergency light fittings to manufacturer specifications. Refer to plans for position of fittings.

3.17 ELECTRIC HOT WATER SYSTEM

For storage heaters, wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end. Hot water cylinders, thermostats and 3000 watt element supplied and fitted under the hot and cold water system section.

3.18 SPACE HEATERS

Install to the heater manufacturer requirements, and to AS/NZS 3000. Fit neatly and without damage to surrounding finishes. Ensure control switches and thermostats are fitted to appliance, or otherwise connect to a control switch located adjacent to the heater and a remote thermostat.

3.19 SURGE PROTECTION

Install surge protection devices to manufacturer requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class ll protection at the switchboard, protect the device by a dedicated MCB.

3.20 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.21 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heated towel rails: Install to manufacturers requirements and installed in accordance with AS/NZS 3000
- Mirror demisters: Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.

3.22 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with AS/NZS 3000 and in accordance with the manufacturer recommendations:
Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems. Refer to drawings for connection points. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches and sockets to IP56. Install to manufacturer specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

3.23 ELECTRICAL AUTOMATION SYSTEM

Fit distribution cabinet in wall, cut-out to finish flush with the wall surface, or surface mounted. Configure installation to manufacturer instructions. Provide adequate user training and operating manual to the owner.

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3.24 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Security system

3.25 SECURITY SYSTEM

Install to the system manufacturer requirements, control panel, detectors and associated equipment fitted neatly and without damage to surrounding finishes. Installation of security equipment to AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance. All 230v mains power connections to the security panel are to be in accordance with AS/NZS 3000. The 230V power is to be switched using a dedicated single gang Isolator switch or similar.

Fire rated sealers and liners

3.26 SEAL ALL PENETRATIONS

Seal all penetrations, including in and around conduits and sleeves, in accordance with manufacturer instructions. For fire and/or acoustic rated elements, maintain the rating with the seal systems.

3.27 PROVIDE CABLE SLEEVES

Provide PVC sleeves formed from pipe sections, unless fire and/or acoustic systems require sleeves for other building elements and/or different material for the sleeve.

Fire rated accessories

3.28 INSTALL WALL BOXES AND SWITCH UNITS - FIRE RATED

Install proprietary fire rated wall boxes and switch units in accordance with manufacturer instructions.

Completion & Commissioning

3.29 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.30 FIRE RATED SEALERS AND LINERS

Sealants, collars, wraps, expanding foam, mortars and liners, used to seal around pipe, conduit and sleeve penetrations through fire and acoustic walls and floors. Refer to SELECTIONS for type.

Fire rated accessories

3.31 WALL BOXES AND SWITCH UNITS - FIRE RATED

Proprietary intumescent pad for plastic electrical sockets installed in plasterboard lined fire rated partitions providing an acoustic barrier and fire protection. Refer to SELECTIONS for type.

4 SELECTIONS

Materials

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Certificate no: CMNZ70021
Version: 1
Original issue date: 31 October 2019
Version date: 13 November 2023

Product Certificate

DriStud RU22, RU24, FRU36 & FRU38 Roof Underlays

1. Certificate Holder Details

TCL Hunt Ltd
DriSpace
7 Fisher Crescent, Mt Wellington, Auckland 1064 New Zealand
technical@drispace.co.nz
Ph: 0080 374 7883
www.drispace.co.nz

2. Product Certification Body

Bureau Veritas Australia Pty Ltd
11/500 Collins Street
Melbourne VIC 3000 Australia
product.certification@bureauveritas.com
Ph: 1800 855 190
www.bureauveritas.com.au

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

Sam Guindi – Bureau Veritas Product Certification Manager

3. Description of Building Method or Product

Name of the product or method in Aotearoa New Zealand, including any brand names used. Description of what it is and the components that make up any system and its physical attributes including the materials and make-up of the product, where applicable. Matters that should be taken into account in the use or application of the building method or product can be found in item 6. Conditions and Limitations of Use. Continuation of description can be found in item 10 – Supporting Information about Description. [Delete if not applicable]. The building method's or building product's catalogue or model identification number or numbers or other unique identifiers that might be used to identify the building product or building method

DriStud RU22 and DriStud RU24 are non-fire retardant, synthetic tri-laminate water resistant, absorbent and vapour permeable underlays. DriStud RU22 is grey-faced and DriStud RU24 is black-faced. DriStud FRU36 and DriStud FRU38 are fire-retardent synthetic tri-laminate water resistant, absorbent and vapour permeable underlays. DriStud FRU36 and DriStud FRU38 are both white-faced.

All products are branded with DriStud branding and the specific product name.

4. Intended use of Building Method or Product

Intended use of the building method or product as described in the product manual and other instructional materials. A statement of the function or purpose of the building method or product. Continuation of intended use can be found in item 11 – Supporting Information about Intended use. [Delete if not applicable]

DriStud RU22 and RU24 are non-fire retardant, self-supporting, roof underlays.

DrStud FRU36 & FRU38 are fire retardant, self-supporting roof underlays.

5. New Zealand Building Code Provisions

The performance clauses of the New Zealand Building Code that are relevant to the intended use and with which the building method or product complies or contributes to (where used as part of a system).

How the building method or product complies or contributes can be found in item 8. Basis for Certification. Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.

Clause B2 Durability: B2.3.1 (b), B2.3.2 (a)
Clause C3 Fire affecting areas beyond the fire source: C3.4 (c) (FRU36 and FRU38 only)
Clause E2 External moisture: E2.3.1 (contributes to), E2.3.2 (contributes to); E2.3.5 (contributes to), E2.3.6 (contributes to); E2.3.7
Clause F2 Hazardous building materials: F2.3.1

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6. Conditions and Limitations of Use

The building method or product's use is to be in accordance with the installation instructions and requirements against which the building method or product was assessed.

Conditions or limitations of conformity for the performance requirements the building method or product is compliant with, including any requirements for people with the qualifications and skills to install or use the building method or product, any known or demonstrated situations where the building method or product should not be used. A statement as to whether there are any matters that should be taken into account in the use or application of the building product or building method and, if so, what those matters are.

1. DriStud RU22, DriStud RU24, DriStud FRU36, & DriStud FRU38 Roof Underlays are certified for use as a roof underlay:
   a) on buildings situated in wind zones up to and including Extra High (as set out in NZS3604) with a minimum roof pitch of 3°,
   b) under masonry tiles, terracotta tiles, metal tiles, profiled metal claddings, slate and composite panels,
   c) installed horizontally or vertically (subject to Condition 3 below)
   d) installed on timber or steel roof framing

2. DriStud FRU36, & DriStud FRU38 Roof Underlays are certified for use as a roof underlay and air barrier in locations exposed to view in an occupied space.

3. DriStud RU22, DriStud RU24, DriStud FRU36, & DriStud FRU38 Roof Underlays:
   a) shall be installed in accordance with the DriStud RU24 & RU22 Installation Guide Rev 4.0 (August 2023), the DriStud FRU36 Installation Guide Rev 4.0, (March 2019) and the DriStud FRU38 Installation Guide Rev 3.0 (March 2019) respectively (available at www.drispace.co.nz
   b) shall be supported by corrosion resistant mesh or alternative e.g. plastic strapping where:
      i. the span exceeds 1200mm or
      ii. the underlay is installed vertically where the roof pitch is less than or equal to 10°, or
   c) may be installed horizontally (with upper layers overlapping the lower layers) without support, for roof pitches 3° or greater, provided the underlay is installed flat and taut,
   d) separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of NZBC Acceptable Solutions C/AS1 and C/AS2, Paragraph 7.5.9 for the protection of combustible materials, and
   e) shall be protected from direct sunlight within 7 days of installation (21 days for FRU38).

7. Health and Safety Information

Health, safety, and well-being declarations associated with installation, maintenance, and use of the building method or product, and their specific editions and dates necessary to ensure the performance requirements of clauses F1 to F9 of the Building Code can be met.

The compliance with any manufacturer's installation instructions, maintenance, OH & S Statements, MSDS's and other Health and Safety declarations will provide the necessary Health and Safety Information pertaining to the product.

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8. Basis for Certification

How the performance requirements in the Building Code were met for each of the provisions. Where used as part of a system, the specific contribution to compliance.

B2 Durability - By comparison with Acceptable Solution E2/AS1 and NZS2295:2006; and Verification Method B2/VM1
C3 Fire affecting areas beyond the fire source - By testing and comparison with Acceptable Solutions C/AS1 and C/AS2
E2 External moisture - By testing and comparison with Acceptable Solution E2/AS1 and NZS2295:2006
F2 Hazardous building materials - By comparison with the requirements of performance clause F2.3.1

9. Supporting Documentation for Certification

Reference to any acceptable solutions, verification methods, New Zealand Standards, or other compliance pathways referenced against each individual performance requirement the building method or product is compliant with, and their specific version and date. Reference to documents describing tests and evaluations and any other documents relied on for certification or used to prove compliance, including their full title, specific version and date.

1. Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B2 Durability Second edition (Amendment 12), 28 November 2019
2. C/AS2 Acceptable Solution for Buildings other than Risk Group SH for New Zealand Building Code Clauses C1-C6 Protection from Fire First edition (Amendment 2), 5 November 2020
3. C/VM1 Verification Method for Solid Fuel Appliances C/AS1 Acceptable Solution for Buildings with Sleeping (residential) and Outbuildings (Risk Group SH) For New Zealand Building Code Clauses C1-C6 Protection from Fire (Amendment 5), 5 November 2020
4. Verification Methods E2/VM1 and Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3 for New Zealand Building Code Clause E2 External Moisture Third edition (Amendment 10), 5 November 2020
5. NZS 2295 2295:2006 Pliable, permeable building underlays
6. AWTA Test Report No. 21-000283 Properties of RU24-NP, 24 March 2021
7. SCION Report J48921 / QT9209 Surface Water Absorbency of Two TCL Korea Roof Underlays, June 2021
8. TITE Test Report T270-21-03485 Tensile Properties RU24-NP, 15 October 2021
9. AWTA Test report 21-000287 Flammability of FRU 36 NP AS 1530.2-1993 Methods for Fire Tests on Building Materials, Components and Structures. Part 2: Test for Flammability of Materials, 9 March 2021
10. AWTA Test report 21-000284 Flammability of FRU 38 NP AS 1530.2-1993 Methods for Fire Tests on Building Materials, Components and Structures. Part 2: Test for Flammability of Materials, 9 March 2021
11. TITE Test Report T270-21-03486 Tensile Properties FRU38-NP, 15 October 2021
12. TITE Test Report T270-21-03487 Tensile Properties FRU36-NP, 15 October 2021
13. SCION Report 55635 Strength and Moisture Properties of 210 and 135 Roofing Underlays, April 2015
14. SCION Report 55635 Air Properties of 210 and 135 Roofing Underlays, July 2015
15. SCION Report 52879 Surface Water Absorbency of Four Building Membranes, February 2014
16. SCION Report Strength and Moisture Tests on Four Building Membranes, February 2015
17. TORAY material safety data sheet for non-woven (polypropylene Spunbond Nonwoven Fabric, SS FR), 9 July 2015

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18. SCION Report J48921 / QT6808 Assessment of FRU-38 and DriStud Wall Wrap 24 Underlays, July 2018
19. SCION Report J31951 / QT5958 Duty Testing of DriStud W11 and FRU-38 Building Underlays, May 2017
20. SCION Report 68756261, Assessment of DriStud roof underlay with recycled non-woven to NZS2295, June 2023
21. Installation Guide DriStud RU24 & RU22 Roof Underlay Rev 4.0, August 2023
22. Installation Guide DriStud FRU36 Roof Underlay Rev 4.0, March 2019
23. Installation Guide DriStud FRU38 Roof Underlay Rev 3.0, March 2019

10. Supporting Information About Description (Optional)

Any supporting information for section 3.

N/A

11. Supporting Information About Intended Use (Optional)

Any supporting information for section 4.

N/A

12. Supporting Information About Conditions and Limitations of Use (Optional)

Any supporting information for section 6.

N/A

All CodeMark certificates that are current must be registered with MBIE. MBIE maintains a register of valid product certificates. Please find the register here.

If the certificate is not listed on this register or it appears as (SUSPENDED), it is not a valid CodeMark certificate and does not have to be accepted by a building consent authority as establishing compliance with the New Zealand Building Code.

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INSTALLATION GUIDE

REV 4.0 AUGUST 2023

DRISTUD RU24 & RU22 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

DESCRIPTION

DriStud RU24 and DriStud RU22 are non-fire retardant, self-supporting synthetic roof underlays intended to be used as an alternative to conventional kraft based roof underlays.

Once installed, these underlays serve as a secondary protective layer for roof framing, enhancing weather resistance. Additionally, they provide an air-impermeable barrier behind the roof cladding. These layers play a crucial role in the internal moisture management systems for roofs and roof cavities.

When roof underlays are in contact with roof cladding, it gets cold. Its absorbent properties effectively manage condensate. However, without passive ventilation it can lead to moisture issues including mould and mildrew growth in the roof cavity. For tray roofs, it is higly recommended the underlay is separated from the roof cladding using 10mm VB10 ventilation and drainage batten or Drainage mat to defer the dew point condenstaion from the roof cladding.

Refer to DriSpace Moisture Management Design Guide for more details.

- DriStud RU24 is nominal **170 gsm, black faced underlay**
- DriStud RU22 is nominal **145 gms, grey faced underlay**

WIND ZONES

Suitable in Wind Zones up to and including “Extra High” as defined in Section: 5, NZS 3604: 2011.

OVERLAPS/ SUPPORT

Printed imagery on all DriStud Roof Underlays must be facing outward with the minimum number of overlaps as possible. A minimum lap of 150mm is required for both vertical and horizontal overlaps. Upper sheets must be lapped over the lower sheets to ensure water is shed to the outer face of the underlay. DriStud RU24 & RU22 must not span more than 1.2m between adjacent supports.

DriStud RU24 & RU22 must NOT be installed where Fire Retardant underlay is specified.
DriStud RU24 & RU22 will provide temporary weather protection for up to 7 days and can be exposed to wet weather during installation. DriStud RU24 & RU22 must be supported on netting or safety mesh if used:

- On roof pitches less than 10° with vertical installation.
- If the support spacing is greater than 1200mm.

SAFETY

- The installer shall take all precautions to reduce work hazards.
- The installer of DriStud roof underlays is required to comply fully with Health and Safety in Employment Act 2002.
- Appropriate clothing, safety footwear and hand and face protection must be used in all cases.
- Safety scaffold and barriers must comply with the requirements of the Health and Safety in Employment Act 2002.

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INSTALLATION GUIDE

REV 4.0 AUGUST 2023

DRISTUD RU24 & RU22 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

FIXINGS

DriStud RU24 & RU22 must be fixed at maximum 300mm centres to all framing members with either 6-8mm staples or 20mm long large head clouts, or proprietary underlay fixings. If metal roof cladding is directly fixed straight onto the underlay, its fixings can replace the underlay fixing requirements.

ROOF PITCHES >10°:

If installing on a roof with a pitch greater than 10° then DriStud roof underlays may be installed either horizontally or vertically.

ROOF PITCHES ≤10°:

If the roof pitch is less than 10° self-support roof underlays can be installed horizontally an vertically. Horizontal installation is recommended over vertical installation where possible.
For vertical installation under 10° pitch roof, DriStud RU24 & RU22 must be installed over a supporting netting or equivalent system on a minimum side lap of 150mm. The netting and underlays must be installed flat and taut to ensure condensation will drain to the gutter. If any doubts vertical laps are recommended to be sealed with 75mm wide DriStud Cool Window Flashing Tape or DriStud Joining Tape to ensure it.

As an alternative solution, DriStud RU24 & RU22 may run horizontally with the higher layers sitting on top of the lower layers down to roof pitches of minimum 3° without supporting netting. The underlay must be installed flat and taut to ensure condensation will drain to the gutter. At the eaves, the roof underlay should be laid over the top of the fascia and project 20-33mm into the gutter.

WHO CAN INSTALL

Where DriStud roof underlays are used for new construction or in connection with a building consent the work should be undertaken or supervised by a Licensed Building Practitioner (LBP) where restricted building work applies. Alternatively, the installer shall have the suitable skills when installing DriStud roof underlays.

MAINTENANCE

DriStud roof underlays do not require any maintenance but when exposed through removal or roof cladding, the underlays must be inspected, and any damaged areas repaired or replaced.

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INSTALLATION GUIDE

REV 4.0 AUGUST 2023

DRISTUD RU24 & RU22 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

LONG RUN PROFILED METAL ROOF CLADDING

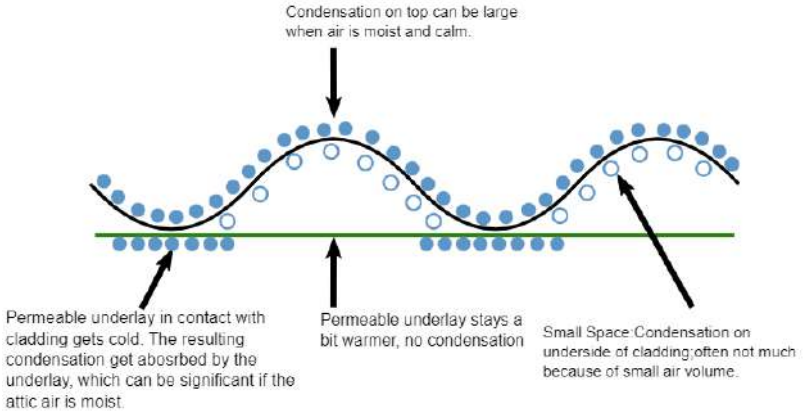
DriStud RU24 & RU22 must be installed over the purlins by fixing to the purlins on both edges by the roof fastenings. For horizontal laying, underlay must fit tightly and be lap-taped around all penetrations to provide drainage for condensation, and be free of tears, rips, and punctures. The purlin spacing must be 150mm less than the width of the underlay. If it exceeds this spacing it must be laid vertically.

COLD ROOF DESIGN RECOMMENDATIONS: INSTALLED UNDER LONG RUN METAL ROOFING

- Have a minimum air gap of 25mm between the underlay and any insulation.
- Use sufficient ventilation for air flow to minimize interstitial condensation.
- Install VB10 or HC8 Drainage Mat to create an air gap between the metal cladding and synthetic underlays where condensation risks are high, i.e tray or trapezoidal roofs.

CONDENSATION MANAGEMENT

MRM Code of Practice v24.03 - 10.11A Roof Cavity Condensation



AVOID UV EXPOSURE

In applications where DriStud RU22 & RU24 is used in non-residential buildings, direct and reflected UV exposure must be avoided. DriStud RU22 & RU24 will go brittle and degrade under prolonged UV exposure. UV reflection can come from surfaces such as water, white concrete, sand or pavement as well as large objects such as cars.

The suitability and compatibility of the underlay with the usage of the building must be checked prior to installation. Refer to the MRM Code of Practice for more information, or consult with industry experts or designers.

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INSTALLATION GUIDE

REV 4.0 AUGUST 2023

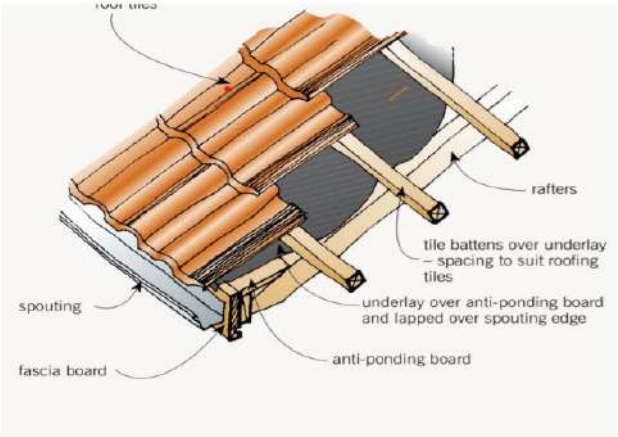
DRISTUD RU24 & RU22 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

CONCRETE AND METAL TILE ROOF CLADDING

DriStud RU24 & RU22 must be installed under the battens but over the rafters/top truss chords. Anti-ponding boards should be installed at the eaves to prevent the underlay sagging with a minimum fall of 5°.

Installation Under Concrete and Metal Tile Roof



DESIGN RECOMMENDATIONS

- Have a minimum air gap of 25mm between the underlay and any insulation.
- Use sufficient ventilation to minimize condensation.
- Use air gap between the metal cladding and synthetic underlays where condensation risks are high.

WARRANTY

TCL Hunt Ltd warrants that all DriStud roof underlays will be free from manufacturing defects. Upon receiving DriStud roof underlays, it is recommended that a visual check is made. Where defects are observed, these will be replaced at the discretion of TCL Hunt, provided they are returned to point of purchase. If installed in accordance with TCL Hunt installation requirements, TCL Hunt warrants that DriStud roof underlays will comply all relevant provisions of the NZ Building Code. DriStud RU24 & DriStud RU22 roof underlay will have a serviceability life equal to that of the roof cladding provided that:

- The balance of the external wall is installed in accordance with the NZ Building Code, and,
- All necessary maintenance is undertaken in respect of the external wall system.

Please refer to DriSpace website www.drispace.co.nz for more information on warranty and disclaimer.

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Distributed by DriSpace - a division of TCL Hunt
7 Fisher Crescent, Mt. Wellington
Auckland, New Zealand

CodeMark CERTIFIED

Ravago

DRISPACE
A DIVISION OF TCL HUNT
DriStud PROCTOR PASSIVE VENT

PRODUCT TECHNICAL STATEMENT

DSRU24012021

DRISTUD RU24 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

DESCRIPTION

DriStud RU24 is a black faced self-support, synthetic roof underlay. It is a micro porous, water resistant film that is laminated to two layers of non-woven spun-bonded polyolefin. DriStud RU24 is designed to be used as an underlay beneath all types of roof claddings to assist with the weather tightness of buildings. DriStud RU24 has a FR Index of 9 and therefore it is classified as a non-fire retardant roof underlay.

USE

DriStud RU24 is intended for use on buildings designed in accordance with NZS 3604:2011 paragraph 1.1 and in wind zones up to and including 'Extra High'. DriStud RU24 is designed to be used as a replacement for self-supporting kraft paper roof underlay. It can be installed over both timber and steel framing to ensure a dry roof cavity. DriStud RU24 can be used under masonry tiles, metal tiles and profiled metal roof claddings. However, DriStud RU24 must not span more than 1.2 m between adjacent supports.

NZBC CLAUSES

If designed, installed, and maintained in accordance with all TCL Hunt requirements, DriStud RU24 will comply with the following performance criteria of the NZ Building Code:

- B1.3.1
- B1.3.2
- B1.3.3 (a), (h)
- B2.3.1 (a)
- B2.3.2 (b)
- F2.3.1

And will contribute to compliance for:

- E2.3.1
- E2.3.2
- E2.3.7 (a), (b), (c)

CONDITIONS & LIMITATIONS

Where CodeMark is to be relied upon, then all conditions of that certificate must be met. These are:

- Must be installed in accordance with the DriStudRU24 installation guide.
- DriStud RU24 may be installed over timber and steelroof framing.
- The certificate covers the use of DriStud RU24 undermasonry tiles, terracotta tiles, metal tiles, profilesmetal claddings, slate, and composite panels.
- DriStud RU24 can span up to 1200mm betweenadjacent supports. Where the span exceeds 1200mma corrosion resistant mesh or alternative i.e., plasticstrapping must be used.
- Irrespective TCL Hunt recommends that all conditionsof the certificate are met.

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DRISTUD RU24 ROOF UNDERLAY

NON-FIRE RETARDANT, SELF-SUPPORT, SYNTHETIC ROOF UNDERLAY

DriStud™

TECHNICAL DATA

Product Properties	Test Method	Requirement	Results
Water Vapour Resistance	ASTM E96 Procedure B	≤ 7MN s/g	0.303 MN s/g
Absorbency	AS/NZS 4201: Part 6	≥ 150 g/m²	Pass
Air Permeance	BS ISO 5636-5:2003		0.068 um/Pa.s
Water Resistance	AS/NSZ 4201.4:1994	≥ 100mm H2O	Pass
Flammability	AS 1530.2:1993	FR Index ≤ 5	MD: 6.88KN/m CD:5.84KN/m
Mechanical	ASTM D882	Tensile Strength	MD: >3.99 CD: >3.48
Edge Tear Resistance	TAPPI T470	Edge Tear Strength	MD: > 197 CD: > 175

Technical Data: NZS 2295:2006 Pliable, Permeable Building Underlays

MAINTENANCE

DriStud RU24 rolls must be stored in a clean, dry place and must be protected from damage and weather. DriStud RU24 must not be exposed to UV light for more than 7 days.

STORAGE & TRANSPORTATION

DriStud RU24 rolls must be stored in a clean, dry place and must be protected from damage and weather. DriStud RU24 must not be exposed to UV light for more than 7 days.

QUALITY ASSURANCE

The manufacture of DriStud RU24 is ISO9001:2008 certified by Q.A. International Certification Limited (No. QAIC/KR/6001-A) on 20 January 2015. TCL Hunt is also ISO9001:2008 certified by International Certifications (No. C32413) on 5 December 2013.

WARRANTY

Please refer to DriSpace website www.drispace.co.nz for more information on the warranty conditions.

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ecoply®

ECOPLY® STRUCTURAL FLOORING

ECOPLY® STRUCTURAL ROOFING

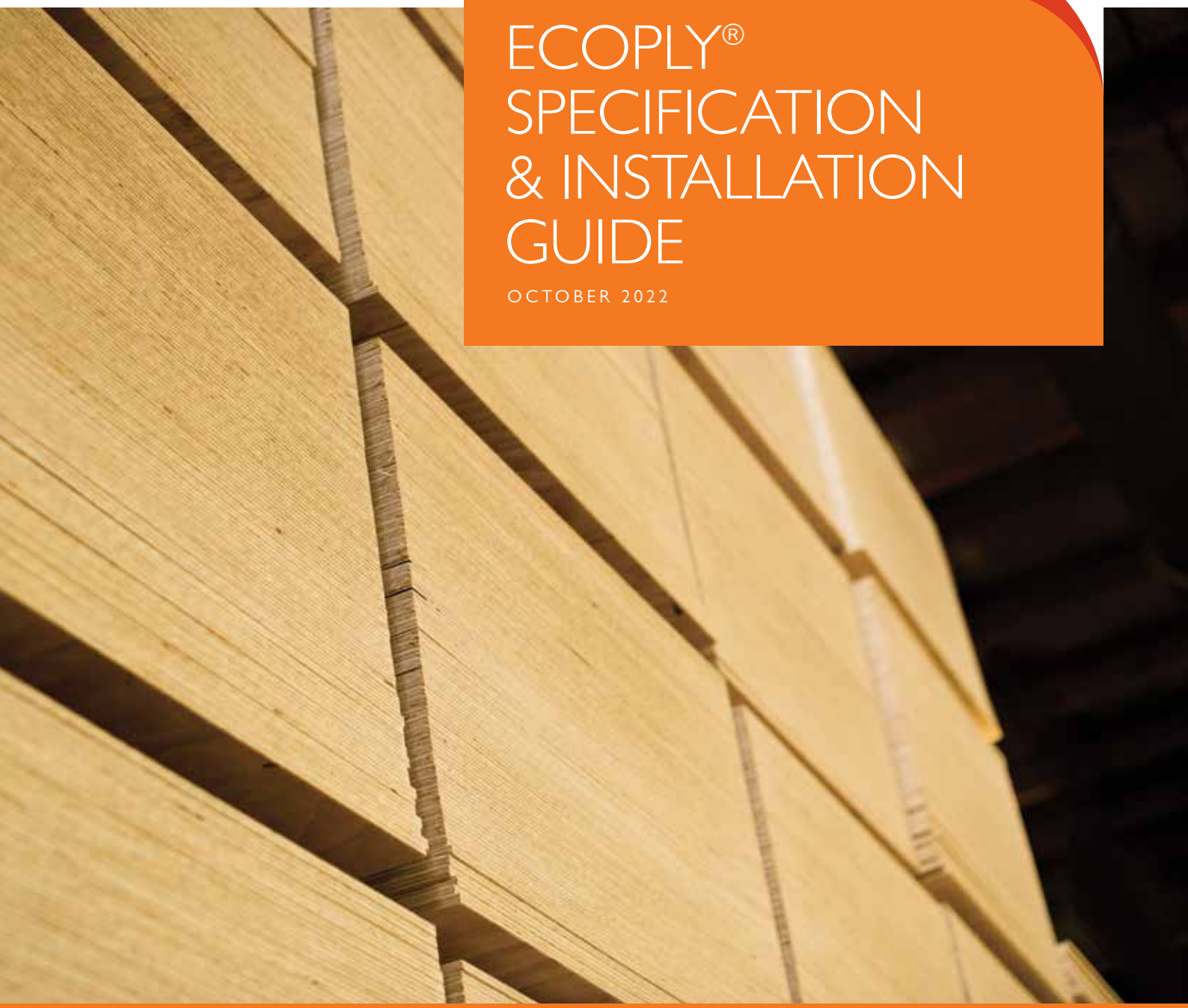
ECOPLY® STRUCTURAL Square EDGE

ECOPLY® STRUCTURAL BARRIER

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ECOPLY® SPECIFICATION & INSTALLATION GUIDE

OCTOBER 2022



CHH PLY

Information contained within is specific to Ecoply® structural plywood products and must not be used with any other plywood products, no matter how similar they may appear.

ecoply®

ECOPLY® SPECIFICATION & INSTALLATION GUIDE

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1.0 ECOPLY® PRODUCT RANGE

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

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

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

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

1.1 TECHNICAL INFORMATION & CAD DETAILS

When specifying or installing any Ecoply plywood products visit www.chhply.co.nz or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

The information contained in this document is current as at October 2022. It is your responsibility to ensure you have the most up to date information available.

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

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

1.2 PRODUCT DESCRIPTION & RANGE

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

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

The Ecoply plywood range can be specified for:

- Surface grade (e.g. CD) - where the first letter describes the face veneer appearance and the second letter describes the back veneer of the Ecoply sheet. Surface grades are defined in AS/NZS 2269 and summarised in Tables 2A and 2B.
- Stress grade - utilises the symbol F and a suffix for both parallel and perpendicular to the grain directions, for example;
  - F8/F8 as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade in both directions.
  - For plywood 15mm thick and below all Ecoply products are F8/F8.
  - For Ecoply plywood products 17mm thick and above most products are F8/F5.
  - Ecoply 19mm Longspan Flooring is F11/F8 stress grade (See Tables 1, 4 and 5). Other Ecoply products are also available in F11/F8 upon request.
- Thickness - ranging from 7mm to 25mm. (Thicknesses above 25mm subject to availability).
- Length - being 2400mm and 2700mm with a standard nominal width of 1200mm.
- Preservative treatment - being untreated, H3.2 CCA or H3.1 LOSP Azole treated.
- Edge finish - being square edge or for Ecoply Flooring and Roofing, routed on the long edges of the sheet with a polypropylene plastic tongue inserted into one side for a tongue-in-groove joint.

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

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

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

Note: Technical notes referenced in this guide can be downloaded from www.chhply.co.nz or contact Carter Holt Harvey Plywood on 0800 326 759.

Table 1: Ecoply® Product Range

Stress Grade (UNO)		F8/F8								F8/F5							
Nominal Thickness (mm)		7		9		12		15		17		19		21		25	
Sheet length (x 1200mm width)		2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700
Ecoply® Structural Square Edge	BD			●		●	●	●		●							
	CD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	DD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ecoply Flooring (pt)	CD							●	●	●	●	●[1]	●[1]	●	●		●
Ecoply Roofing (pt)[1]	DD							●	●								

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

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

1 Ecoply 15mm Roofing and Ecoply 19mm Longspan Flooring are supplied as standard in F11/F8 stress grade.

- Full range may not always be available ex stock, check with your Ecoply supplier to ensure availability.
- Non standard specifications, including thicker sheets may be available to special order in significant quantities.
- Other Ecoply products are also available in F11/F8 upon request.

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1.3 SURFACE GRADES

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

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

Table 2A: Ecoply® Structural Square Edge Products

Face Grade B	Face Grade C	Face Grade D
		
Appearance grade with a solid sanded surface. Suitable for a higher quality finish.	Solid sanded surface with filled holes and splits, with intergrown knots. Suitable for a basic paint finish.	Non appearance grade allowing open imperfections up to 75mm across the face veneer. Splits and knots allowable.
Possible Uses:	**Possible Uses:**	**Possible Uses:**
• Furniture/Joinery/Signs • Interior Linings • Sheathing • Engineering components where a superior visual finish is required	• Structural gussets • Stressed skin panels • Bins, boxes, crates • Hoardings • Membrane substrate	• Non visual bracing • Strength critical pallets • Structural components • Portal frame gussets

Table 2B: Speciality Ecoply® Products

Flooring CD	Roofing DD
	
Solid sanded C grade surface with tongue and groove profile on long edges. Features void free second layer under the face veneer for increased protection against high point loads.	Unfilled D grade surface with tongue and groove profile on long edges.
Possible Uses:	**Possible Uses:**
• Substrate for flooring overlays such as linoleum, tiles and rigid coverings • Substrate for membrane roofing and decking where visible appearance is critical	• Substrate for asphalt shingles • Substrate for roof systems where a smooth substrate is not required

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

1.4 PRESERVATIVE TREATMENT

Ecoply® structural plywood is available untreated or treated in accordance with AS/NZS 1604.3:2012 If treated, Ecoply structural plywood is treated with either H3.2 CCA (Copper Chrome Arsenate) or H3.1 LOSP (Azole) clear treatment. H3.1 LOSP is the standard preservative treatment for BD Structural Square Edge products and by special request for other Ecoply plywood products.

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

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

The characteristics of the treatments are shown in Table 3.

Table 3: Preservative Treatment

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

H3.2 CCA

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

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

For more information on face checking refer to section 1.8 General Design Considerations - Aesthetics.

H3.1 LOSP

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

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

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

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1.5 SECTION PROPERTIES

Table 4A: Section Properties of Ecoply® Structural Plywood

			Section Properties per mm width					
			Parallel to the Face Grain			Perpendicular to the Face Grain		
Nominal Plywood Thickness[2] (mm)	**ID Code[2]**	**Mass** (kg/m²)	**Parallel Moment of Inertia** (mm⁴)	**Section Modulus** Z (mm³)	**Shear Constant[3]** I/Q (mm²)	**Perpendicular Moment of Inertia** I (mm⁴)	**Section Modulus** Z (mm³)	**Shear Constant[3]** I/Q (mm²)
7	7-24-3	4.0	30.0	8.3	5.2	2.0	1.7	2.3
9	9-30-3	5.0	58.6	13.0	6.4	4.0	2.7	2.9
12	12-24-5	6.6	115.0	19.2	9.3	33.4	9.3	5.4
15	15-30-5	8.3	225.0	29.9	11.6	65.2	14.5	6.8
17	17-38-5	9.2	367.4	42.0	13.2	84.8	15.1	7.2
19	19-38-5	10.6	456.3	47.7	14.8	132.5	20.9	9.2
21	21-38-6	11.6	626.2	58.6	15.4	191.7	25.4	10.9
25	25-38-7	13.5	991.6	78.6	17.9	349.6	36.8	13.7

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

			Nominal Strengths (Limit States) per mm width					
			Parallel to the Face Grain			Perpendicular to the Face Grain		
Nominal Plywood Thickness[2] (mm)	**ID Code[2]**	**Stress Grade**	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm²)	**Rolling Shear $f_{pr}I/Q$** (N)	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm)	**Rolling Shear $f_{pr}I/Q$** (N)
12	12-24-5	F8/F8	1046.5	480.0	15.6	303.9	231.8	9.8
15	15-30-5	F8/F8	2047.5	747.5	19.5	593.3	362.5	11.4
15	15-30-5	F11/F8	2362.5	926.9	20.9	593.3	362.5	11.4
17	17-38-5	F8/F5	3343.3	1050.0	22.2	585.1	211.4	10.7
17	17-38-5	F11/F8	3857.7	1302.0	23.8	771.7	377.5	12.3
19	19-38-5	F8/F5	4152.3	1192.5	24.9	914.3	292.6	12.1
19	19-38-5	F11/F8	4791.2	1478.7	26.6	1205.8	522.5	14.0
21	21-38-6	F8/F5	5698.4	1465.0	25.9	1322.7	355.6	16.1
25	25-38-7	F8/F5	9023.6	1965.0	30.1	2412.2	515.2	20.3

[1] Actual thickness of Ecoply® sheets manufactured to thickness tolerances stated in AS/NZS 2269.

[2] Identification code: panel thickness – outermost veneer thickness x 10 – number of plies.

[3] I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603.

Notes:

- The section properties in Tables 4A, B and C have been calculated in accordance with AS/NZS 2269.
- For section properties for other thicknesses and Shadowclad® products contact CHH Plywood on 0800 326 759.

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Structural Properties of Ecoply® Plywood

The majority of Ecoply® plywood is either F8/F8 or F8/F5 grade (exceptions are identified in section 1.2: Product Description and Range) and the characteristic values may be used in conjunction with both NZS 3603 and AS 1720 for the design of timber components. The characteristic strengths in Table 5 have been used to provide the nominal strengths in Tables 4B and 4C.

Table 5: Structural Properties of Ecoply® Plywood

	Characteristic Strength MPa		
Stress Grade	**F5**	**F8**	**F11**
Bending (f_{pb})	14	25.0	31.0
Tension (f_{pt})	9.6	15.0	18.0
Panel Shear (f_{ps})	3.7	4.2	4.5
Rolling Shear (f_{pr})	1.5	1.7	1.8
Compression in Plane of Sheet (f_{pc})	12.0	20.0	22.0
Compression Normal to the Plane of the Sheet (f_{pp})		9.7	12.0
Modulus of Elasticity (E)	6900	9100	10500
Modulus of Rigidity (G)	345	455	525

Source: AS/NZS 2269

Wood is strongest when stressed parallel to the grain and weakest across the grain, so the lay up or arrangement of veneers in the panel determines the properties. Because of its cross banded construction, plywood possesses significant strength and stiffness both parallel and perpendicular to the direction of the face grain, but is generally strongest and stiffest along the direction of the face grain.

The section properties of structural plywood in Table 4A are calculated in accordance with AS/NZS 2269 to allow for the reduced contribution of veneers perpendicular to the direction of stress. For engineering design to NZS 3603, the section properties are multiplied by stresses and 'k' and ø factors to determine resistances for limit states design.

Resistances and nominal strengths in Tables 4B and 4C assume all 'k' factors are equal to 1.0. Multiply tabled values by the strength reduction factor ø and 'k' factors for specific in-service conditions for design to a structural code such as NZS 3603.

Table 5A: Strength Reduction Factors

Structural Timber Material	**Application of Structural Member**		
	Category 1	**Category 2**	**Category 3**
	Structural members for houses for which failure would be unlikely to affect an area[1] greater than 25m²; OR Secondary members in structures other than houses	Primary structural members in structures other than houses; OR Elements in houses for which failure would be likely to affect an area[1] greater than 25m²	Primary structural members in structures intended to fulfil essential services or post disaster function
	Value of Strength Reduction Factor Ø		
Structural Plywood – AS/NZS 2269.0	0.95	0.85	0.75

[1] In this context area should be taken as plan area.

1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, Ecoply structural plywood sheets have the following information marked on the back:

- Brand name: e.g. ECOPLY.
- Face grade, back grade: e.g. CD.
- Intended application: e.g. STRUCTURAL.
- Panel construction code: e.g. 15-30-5 (Thickness (mm)-Face veneer thickness (mm x 10)-Number of veneers).
  Note: In some cases the Panel construction code may be replaced by the Section Properties, in which case the values of second moment of area (moment of inertia) (I) and section modulus (Z) in the grain orientations are declared: e.g. 626.2, 58.6/191.7,25.4.
- Glue bond: e.g. A BOND.
- Formaldehyde emission class: E0 for A Bond Ecoply.
- Australasian Standard: e.g. AS/NZS 2269.
- Treatment Standard (if applicable): e.g. AS/NZS 1604.3:2012.
- Date and time of manufacture: e.g. 01/12/15 12:23:45.
- Stress grade: e.g. F8 (exceptions include Shadowclad® and Grooved Lining which are performance rated).
- The Engineered Wood Products Association of Australasia (EWPAA) brand and mill number: e.g. 911 (Tokoroa mill).

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Untreated example:

ECOPLY® CD FLOORING STRUCTURAL
19-30-7 A BOND E0 AS/NZS 2269.0:2012
PAT 01/12/15 12:23:45 F11/F8
911

Treated example:

ECOPLY CD STRUCTURAL
25-30-9 A BOND E0 AS/NZS 2269.0:2012
AS/NZS 1604.3:2012 046 01 H3 E CCA
RETREAT CUTS PAT 01/12/15 12:23:45 F8/F8
911

Note: Performance based products like Grooved Lining and Shadowclad® may include brand identification instead of visual quality, stress grade, and panel code. These panels, when accompanied with specification literature, are still deemed to comply with AS/NZS 2269.

1.7 CODE COMPLIANCE

Ecoply® plywood manufacture is third-party audited through the product quality control programme of the Engineered Wood Products Association of Australasia (EWPAA) which is itself audited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

CHH Plywood is licensed by the EWPAA to stamp plywood with the EWPAA/JAS-ANZ Product Certification Mark. This certifies it has been manufactured under the third party audited Joint Product Certification programme to monitor compliance with joint Australian/New Zealand Standard AS/NZS 2269 Plywood – Structural. Plywood to this standard is referenced in the NZBC Acceptable Solutions and Verification Methods through:

- NZS 3602 The Use of Timber and Wood-based products for Use in Building.
- NZS 3603 Timber Structures.
- NZS 3604 Timber Framed Buildings.
- AS/NZS 1604.3:2012 Specification for Preservative Treatment, Part 3:Plywood.
- E2/AS1 External Moisture.

PRODUCT CERTIFIED
JAS-ANZ

WARNING: Plywood which is non-certified or is manufactured to standards other than AS/NZS 2269, such as US voluntary standard PS1-95, is not referenced in the NZBC. There can be significant differences between AS/NZS 2269 certified and non certified plywood around bond durability, structural ratings and veneer quality.

Structure B1

Design to NZS 3603 Timber Structures complies with the NZBC in Verification Method B1/VM1 Clause 6.0 Timber. Plywood is the only sheet material with properties listed in NZS 3603. Ecoply structural plywood is available in F8/F5 and F8/F8 stress grade. Some specialty products are available F11/F8 or with specifically designed properties for specialised applications.

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1.8 GENERAL DESIGN CONSIDERATIONS

Durability (Clause B2) and Exterior Moisture (Clause E2)

Ecoply plywood is made from softwood solid radiata pine veneer. Designers should assess the level of exposure to biological, moisture, and other hazards and apply appropriate preservative treatment and detailing to minimise exposure to these hazards.

Information in this manual outlines suggested practices for detailing building components to exclude moisture to comply with the durability requirements of the NZBC.

Formaldehyde

Ecoply plywood is manufactured using phenol formaldehyde resins which are fully cured in the hot press. Cured resin is thermally and moisture stable and formaldehyde emissions for the glued plywood are similar to background levels for the wood by itself when tested to AS/NZS 2098.11 Determination of formaldehyde emissions for plywood. Accordingly every panel is branded with the lowest emission class (less than 0.5mg/litre for E_0).

Actual formaldehyde emissions for Ecoply plywood have been tested and approved as having an actual formaldehyde emission level of less than 0.3mg/litre (equivalent to a Super E_0 emission level).

Moisture Content and Dimensional Change

At the time of leaving the factory, the moisture content of untreated Ecoply plywood should generally be in the range of 8% to 15% as required by AS/NZS 2269. All wood products including plywood respond to changes in ambient humidity so the eventual moisture content of plywood varies according to how dry or how wet the environment is. After manufacture, the moisture content will move to equilibrium with the environment, and the veneers swell or shrink across the grain in response. The total expansion both along and across a 2400 x 1200mm panel can be in the order of 1.5mm to 3mm as the plywood changes from a dry to a saturated state.

Ecoply that is treated with waterborne preservatives (e.g. H3.2 CCA) is expected to be used in applications that have higher humidity than interior dry use, so following treatment it is dried to a higher average moisture content of approximately 18%. This provides for a more stable panel in service than placing a dry (less than 15%) sheet in a higher moisture environment.

Detailing and construction must allow for movement if the plywood will be subject to cycles of moisture change. Seasonal and daily cycles can be significant depending on the end use.

Temperature

Wood will expand upon heating as do practically all solids. The thermal expansion of plywood is quite small and there is little effect on the structural performance or durability of plywood when used in temperatures below 54°C. The average co-efficient of thermal expansion of plywood is 4.5 x 10^{-6} mm/mm/°C. At temperatures above 55°C wood begins to deteriorate. Colours of coatings and finishes should be selected to reduce heat gain. For extreme conditions, further technical information is available by calling CHH Plywood on 0800 326 759.

The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214 Methods of determining the total thermal resistance of parts of buildings. e.g. Plywood has a Conductivity (k) of 0.13W/mK so a 12mm panel has a thermal resistance R = 0.012/0.13 = 0.09.

Aesthetics

Ecoply® plywood products can be selected for decorative or weather protection functions as well as structural performance. Acceptable Solution E2/AS1- External Moisture allows plywood manufactured to AS/NZS 2269, (minimum CD appearance grade, minimum 12mm thickness and treated as required by NZS 3602) to be used for exterior cladding. For exterior cladding applications CHH Plywood strongly recommends Shadowclad® exterior cladding rather than smooth faced plywood such as Ecoply.

Shadowclad features a textured (bandsawn) face which reduces the visibility of face checking and other appearance related issues which can occur on smooth faced plywood if not regularly maintained by the homeowner. For more information on plywood used as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction.

Face Checks on Plywood Exposed to Weather

Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture. It is important to realise that these checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way. If you are the specifier, it is important to discuss these issues with your client and consider the length of exterior exposure, climate conditions and protection offered by the surface coating before finalising product choice.

Durability

The durability of Ecoply structural plywood will depend on the application. Detailing, treatment and installation details need careful consideration to satisfy the requirements of the NZBC.

Normally, 50 year durability can be achieved with untreated Ecoply in dry, interior exposure. For internal environments subject to high humidity or condensation H3.2 CCA treated Ecoply should be used.

For plywood as a rigid air barrier (including rigid air barrier acting as bracing) refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from www.chhply.co.nz.

Fire, Spread of Flame and Smoke Development

The following data on early fire hazard properties of uncoated Ecoply plywood are the result of tests carried out by Australian Wool Testing Authority AWTA to test structural plywood manufactured to AS/NZS 2269 in accordance with ISO 5660, reaction to fire tests (heat release, smoke production and mass loss rate). Part 1: Heat Release rate (cone calorimeter method).

Table 6 summarises the test configurations and associated material groups.

For plywood with decorative finish coatings or intumescent coating, performances depend on spread rates of the coating. For advice on specific coating systems and their suitability for use with Ecoply products, always refer to the coating manufacturer.

Table 6: Early Fire Hazard Properties of Ecoply® Plywood

Material	Species	Origin	Thickness	Treatment	Material groups
Plywood	Radiata Pine	New Zealand	7mm	CCA Treated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	CCA Treated	Group 3

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1.9 SUSTAINABILITY

Ecoply® is manufactured from radiata pine. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture. The crop is managed on a sustainable basis to yield millable trees.

New Zealand plantations are managed in compliance with the New Zealand Forest Accord.

Ecoply is manufactured in New Zealand at CHH Plywood.

Ecoply is available Forest Stewardship Council® (FSC®) certified (FSC® C012019) upon request.

1.10 HEALTH & SAFETY

Ecoply should be handled in accordance with the Safety Data Sheets (SDS) for untreated, H3.2 CCA and H3.1 LOSP treated Ecoply, which can be downloaded from www.chhply.co.nz.

Always wear safety glasses or non-fogging goggles when machining Ecoply panels.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc.) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

1.11 STORAGE & HANDLING

Ecoply panels must be stored and handled with care to maintain good condition before use and after installation:

- The storage area must be protected from sun, rain and wind that would otherwise bring about rapid changes in temperature and humidity.
- Support for the sheets must be provided at both ends and middle to avoid distortion. Ensure bearers in packs above are aligned over bearers below (to avoid inducing curves in sheets).
- The stack must be kept dry and clear of ground contact, and placed so that it will not be exposed to mechanical damage.
- The sheets must be stacked flat, NOT on edge.
- To avoid staining, fading and surface checking, the sheets must not be exposed to the weather while awaiting installation.
- Store in well-ventilated areas away from sources of heat, flames or sparks.

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2.0 GENERAL INSTALLATION GUIDE

The following is a general guide to be followed unless otherwise specified. For additional installation instructions for typical applications refer to sections 3, 4 and 5.

2.1 FRAMING

Use kiln dried framing e.g. Laserframe® in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. All timber frame sizes and set out must comply with NZS 3604 (or be specifically designed to NZS 3603). The current Laserframe Product Guide can be downloaded from www.chhwoodproducts.co.nz. Ecoply® may be specified for frame spacing determined by design, or using tables in section 3 for specific product applications such as bracing, flooring and as a substrate for shingle roofs or membrane roofs and decks.

H3.1 LOSP treated framing should be vented before fixing and if construction adhesives are required (for example to screw and glue floor panels) the adhesive must be compatible with H3.1 LOSP. See section 1.4: Preservative Treatment.

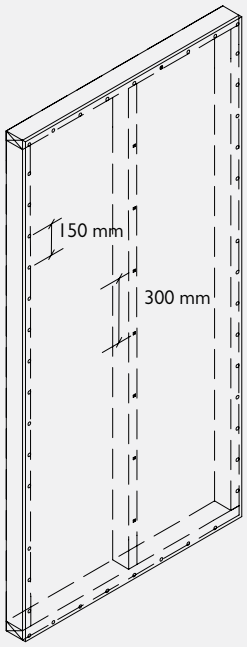
For plywood used as exterior cladding refer to the current Shadowclad® Specification and Installation Guide for Cavity Construction which can be downloaded from www.chhply.co.nz.

For plywood used as a rigid air barrier refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from www.chhply.co.nz.

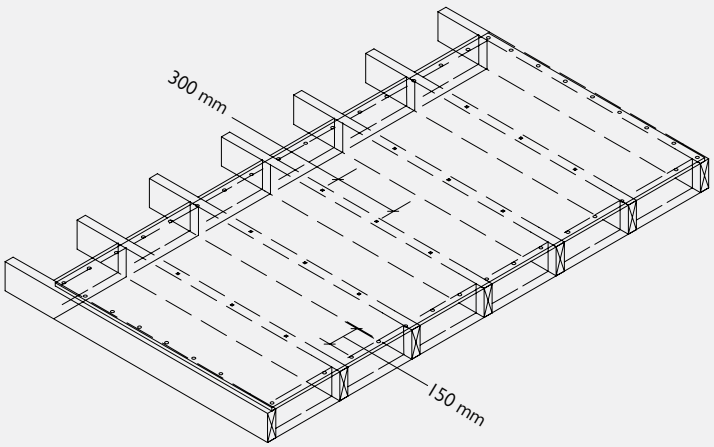
2.2 SHEET FASTENERS & FIXING

- Where there is risk of panel size change due to changes in moisture levels, allow a 2 to 3mm expansion gap between sheets.
- Use only flathead nails or screws, with or without construction adhesives.
- Fastener length should penetrate at least 10 nail diameters into the framing or be three times the sheet thickness, whichever is the greater. Longer or ring shank nails may be specified.
- Fasteners must be at least 3 fastener diameters or 7mm from the edge of the sheet.
- For tongue and groove products such as flooring and roofing fasten 15mm from tongue and groove edges.
- Standard fixing pattern: unless otherwise specified fasten edges and ends of sheets at 150mm centres, and within the panel at no more than 300mm centres (see diagram below).
- Use hot dipped galvanised fasteners or corrosion resistant fasteners (i.e. stainless steel) determined by design for specific hazards.
- Where using stainless steel nails, nails must be annular grooved
- Refer to Table 7 for minimum fastener sizes.
- Do not overdrive power driven nails.

EC001: Fastener Spacings for Ecoply®



Ecoply® fastened in vertical plane



Ecoply® fastened in horizontal plane

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EC002: Fastener Spacings from Edges

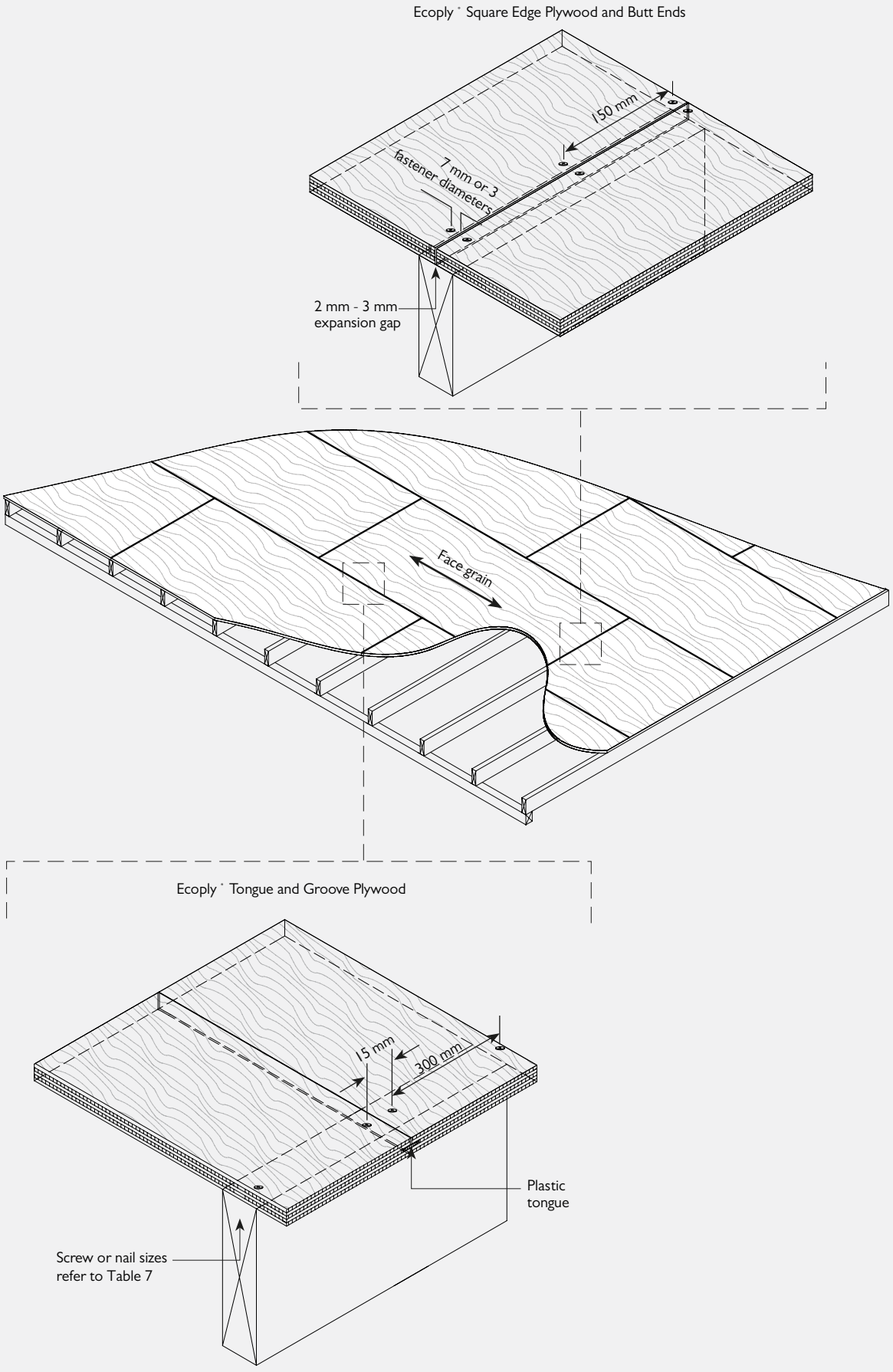


Table 7: Fasteners and Characteristic Shear Loads for Ecoply®

Nominal Thickness (mm)	7mm / 9mm	Load[1]	12mm / 15mm	Load[1]	17mm	Load[1]	19mm / 21mm	Load[1]	25mm	Load[1]
Minimum nail size in timber framing[2]	40 x 2.5mm	570	60 x 2.8mm	736	60 x 2.8mm	736	60 x 2.8mm	736	75 x 3.15mm	883
Screw size in timber framing[2]	8g x 30mm	1230	8g x 40mm	1230	10g x 40mm	1650	10g x 45mm	1650	10g x 50mm	1650
1.15mm steel framing[3]	10-24-35[4]	1300	10-24-40[4]	2000	10-16-45[4]	2100	10-16-45[4]	2100	10-16-45[4]	2100
Screw size in 2.80mm steel framing[3]	10-24-35[4]	1200	10-16-404	1200	14-20-45[4]	3000	14-20-45[4]	4000	14-20-45[4]	5000

[1] The load is the characteristic load (N) for one fastener in single shear.

[2] Characteristic load based on fixing into a timber of J5 joint group or better.

[3] Self tapping, self countersinking screw.

[4] Screw Numbers indicate: Gauge – Threads per inch – Length (mm).

Notes:

- Steel thickness, screw sizes, characteristic loads, refer to assemblies actually tested.
- Other screw sizes may be used. Screw properties vary between screw suppliers and the suitability of a particular size should be verified by the designer for performance under changing physical conditions and cyclic loading.
- Non-standard nailing may be specifically designed with NZS 3603 or similar.

Fasteners for H3.2 CCA Treated Ecoply®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Notes: H3.2 CCA treated timber should not be fixed in direct contact with light gauge steel products. Refer to the framing manufacturer for advise on fixing and treatments.

2.3 ADHESIVES

Tube Applied Construction Adhesives

Site applied construction adhesives may be used together with nails and screws for non permanent loads, reduced fastener popping, and to lower the risk of squeaking in floors. Available types include polyurethane (e.g. Soudal® Gorilla Nailpower®) and elastomeric (e.g. Bostik® Wallboard Gold) based adhesives.

Elastomeric adhesives should meet the requirements of APA Performance specification AFG 01 Adhesives for field gluing plywood to wood framing. Other types should have appraisal from an independent authorising body such as BRANZ or equivalent authorities for the specific applications proposed. Follow manufacturer's recommendations. In addition:

- Use a bead or daubs of adhesive as per manufacturer's recommendations.
- Apply pressure using fastener patterns outlined in section 2.2: Sheet Fasteners and Fixing.
- Work from the middle of the sheet outwards to develop glueline pressure.
- Ensure adhesives are compatible with treatment in the framing timber, see section 1.4: Preservative Treatment.

Structural Adhesive Joints

Structural bonds are generally only achievable in factory controlled conditions using approved structural adhesives in accordance with approved standards for glue lamination, e.g. Resorcinol formaldehyde joints made to AS/NZS 1328 Glued laminated structural timber. Site gluing is not recommended for structural plywood components. Contact CHH Plywood on 0800 326 759 for further information.

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3.0 STRUCTURAL BRACING & CEILING DIAPHRAGMS

The Ecoply® bracing system provides bracing resistance for walls and subfloor foundations for light timber framed buildings under wind and earthquake loading, to meet the requirements of the NZBC - B1 Structure, and NZS 3604 Timber Framed Buildings or specifically designed to NZS 3603 Timber Structures Standard.

Any Ecoply structural panel may be used for bracing as long as it is 7mm, 9mm or 12mm thick, has a minimum wall length as described in Table 9, treated for the specific application in accordance with NZS 3602 (summarised in Table 8) and fixed in accordance with Ecoply bracing specifications outlined in this guide.

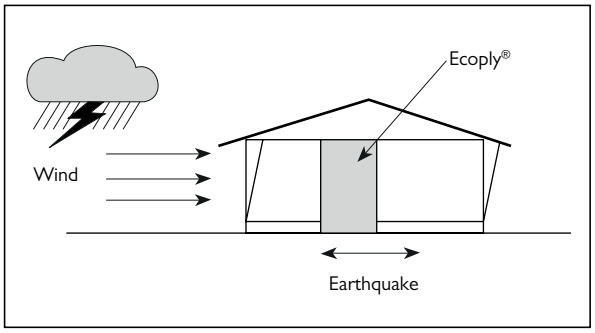
3.1 DESIGN TO COMPLY WITH THE NEW ZEALAND BUILDING CODE

Structure

Timber framed buildings to NZS 3604 Timber Framed Buildings is listed as an Acceptable Solution under Clause 3.0 Timber in Acceptable Solution B1/AS1 Structure.

CHH Plywood have developed a range of wall bracing elements tested using P21 testing methods referenced in NZS 3604.

Specific Design



Ecoply structural plywood is manufactured to AS/NZS 2269, and it is suitable for design and use in earthquake and wind bracing systems constructed in accordance with NZS 3603 and AS/NZS 1170.

Structural plywood to AS/NZS 2269 is the only sheet brace material with properties defined in a published New Zealand engineering design code, NZS 3603 Timber Structures, and so can be designed in compliance with Verification method B1/VM1 under Clause 6.0 Timber for use in buildings over three storeys in height.

Demand is calculated by following section 5, Bracing Design of NZS 3604 or using the GIB EzyBrace® software, downloadable from www.gib.co.nz.

EP bracing systems properties can be easily loaded into the EzyBrace software by way of an Excel patch downloadable from www.chhply.co.nz together with loading instructions.

Timber Floors

When carrying out a bracing design for buildings with timber floor structures, the maximum bracing rating that can be accounted for when summing up the bracing units is 120BUs/m. This does not exclude the installation of bracing elements that are rated higher than 120BUs/m, however the extra bracing capacity can not be accounted for in the bracing design.

Specific design of floor and sub-floor framing is required for elements rated higher than 120BUs/m.

Durability

Ecoply plywood is manufactured to meet the requirements of NZS 3602 Timber and Wood based products for use in buildings. If the product is used, handled and installed in accordance with CHH Plywood product literature it will meet the durability Clauses of the NZBC.

Table 8 summarises the applications in which Ecoply can be used as structural bracing together with the required preservative treatment and fastener material.

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Table 8: Ecoply® Suitability for Bracing Applications Including Treatment Type and Fastener Material

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray): E.g. Interior linings.	Ecoply® Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B and C, as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/without building paper/wrap over, with/without cavity battens behind cladding.	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/without building paper/wrap over, with/without cavity battens behind cladding.	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply® Barrier Specification and Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B and C, as per section 4 of NZS 3604.	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones1 D.	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones, as per section 4 of NZS 3604 (including sea spray).	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

Note: Power driven nails are suitable for use. Do not overdrive, nails must be full round head.

Rain Wetting and Construction Bracing

Untreated Ecoply® will withstand normal exposure conditions during construction for up to 3 months however aesthetically the sheet appearance will deteriorate as the level of exposure increases. Rain and exposure can cause thinner plywood panels to buckle. Plywood stability is related to the number of veneers and thickness of the panel. Where panel stability is critical, consider using thicker panels.

Humidity and Condensation

In conditions where the moisture content may exceed 18% for prolonged periods, Ecoply must be H3.1 LOSP or H3.2 CCA treated to resist decay or insect hazard.

Subfloor Sheet Bracing

H3.2 CCA treated Ecoply can be used as sheet bracing where dampness does not allow the use of untreated plywood or other sheet materials (section 5 of NZS 3604). Where Ecoply subfloor sheet bracing is exposed to both rain and sun, it must be coated with a three coat, 100% acrylic exterior coating system with a light reflectance value of 50% or greater.

Adjustments for Wall Height

Use section 5 of NZS 3604 to calculate bracing values: "Adjustment of bracing capacity of walls of different heights and walls with sloping top plates shall be obtained by the following method:

(a) For wall bracing elements of heights other than 2.4m, the bracing rating determined by test or from Table 9 should be multiplied by 2.4 ÷ element height in metres, except that elements less than 2.4m high shall be rated as if they are 2.4m high.
(b) Walls of varying heights, should have their bracing capacity adjusted in accordance with section 5 of NZS 3604 using the average height."
(c) Walls with heights < 1.5m, Specific Engineering Design is required.

Joining Panels for Walls Higher Than Maximum Sheet Length

Ecoply bracing panels must be fixed from top plate to bottom plate. For wall heights over 2.4m, Ecoply and Shadowclad® is available in 2.7m sheet lengths. Alternatively, a part sheet can be stacked above a full sheet, butt joined on a single row of nogs with each sheet/part sheet independently nailed off as per the nail spacing in the Ecoply bracing specifications (e.g. 2.4m x 1.2m sheet with a 0.3m x 1.2m part sheet above it to give a 2.7m x 1.2m bracing element).

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Cladding as Bracing

12mm Ecoply® (CD face grade or better) can be H3 treated to meet the requirements of Acceptable Solution E2/AS1 and will perform as a structural, durable and weathertight cladding and bracing element when installed in accordance with E2/AS1.

It should be noted smooth faced plywood such as Ecoply may be prone to appearance related issues such as face checking which occurs naturally and is not considered by CHH Plywood to be a manufacturing or product fault. For more information refer to section 1.8: General Design Considerations - Face Checks on Plywood Exposed to Weather. H3.2 CCA treated Ecoply may also have a green tinge to the wood surface and may have fillet marks on the face of the sheet.

Plywood for exterior cladding applications where a high visual appearance is desired, CHH Plywood recommends the use of Shadowclad® as an exterior cladding. Shadowclad has a textured (bandsawn) face which reduces the visibility of face checking and is most commonly H3.1 LOSP treated (clear preservative treatment) which does not leave fillet marks on the panel face.

For further information on Shadowclad as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction which can be downloaded from www.chhply.co.nz.

Soil

Ecoply must not be allowed to come in contact with soil. The bottom edge of the plywood sheet must be a minimum of 100mm above decks or paved ground and a minimum of 175mm above unprotected ground.

Service Penetrations in Bracing Elements

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, or waste pipe outlets of max. 150mm diameter placed at no closer than 150mm to the edge of the braced element.

3.2 ECOPLY® BRACING SPECIFICATIONS SUMMARY

CHH Plywood has a range of bracing specifications called the EP bracing series. The EP bracing series simplifies the design and construction of bracing elements using plywood, by itself or in conjunction with GIB® Plasterboard and features:

- Single sided and double sided bracing elements
  High performance bracing element utilising GIB® Standard plasterboard.
- A single type, GIB Handibrac®, hold-down for all bracing elements.
- Specifications for each bracing element type.

Table 9: Summary P21 Ratings for 2.4m High Ecoply® Wall Elements

Specification No.	Minimum Wall Length	Lining Requirements	BUs/m Wind	BUs/m Earthquake
EP1	0.4m	Ecoply® one side	80	95
	0.6m		95	105
	1.2m		120	135
EPG	0.4m	Ecoply one side and 10mm GIB® Standard plasterboard other side	100	115
	1.2m		150	150

Note: Bracing and other technical information has been specifically tested using Ecoply® branded structural plywood. This information cannot be used with any other plywood brand and bracing data must be sought directly from the specific plywood manufacturer.

More Information

The following pages provide a full specification of EP bracing elements. Copies of specifications can be downloaded from www.chhply.co.nz.

NZS 3604 provides the method of calculating demand on a building. Calculation sheets are available from BRANZ or GIB EzyBrace® software is available as a free download from www.gib.co.nz. Information is available at www.chhply.co.nz which can be placed in the custom elements of GIB EzyBrace® for ease of calculation.

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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3.3 ECOPLY® BRACING SPECIFICATION - EPI

Table 10: Singled Sided Structural Plywood Brace

Specification No.	Minimum Wall Length	Lining Requirements	BUs/m Wind	BUs/m Earthquake
EP1_0.4	0.4m	Ecoply® one side	80	95
EP1_0.6	0.6m	Ecoply one side	95	105
EP1_1.2	1.2m	Ecoply one side	120	135

Framing

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604).
- 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 7mm, 9mm or 12mm Ecoply® plywood fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3mm expansion gap should be left between sheets.

Fastening the Ecoply® Panels

Fasten with 50 x 2.8mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

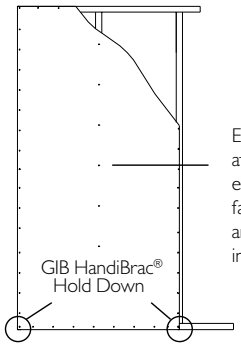
Fasteners for H3.2 CCA Treated Ecoply Panels

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

In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

Fastening Centres

Fasteners are placed at 150mm centres around the perimeter of each sheet and 300mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® fixed with 50 x 2.8 mm nails at 150 mm centres to perimeter of each sheet at no less than 7 mm or 3 fastener diameters from sheet edge and at 300 mm centres to intermediate studs

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Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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Table 11: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray):	Ecoply® Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B and C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification and Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B and C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply® Specification and Installation Guide.

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3.4 ECOPLY® BRACING SPECIFICATION – EPG

Table 12: Structural Plywood Brace With Plasterboard Other Side

Specification No.	Minimum Wall Length	Lining Requirements	BUs/m Wind	BUs/m Earthquake
EPG_0.4	0.4m	Ecoply® one side and 10mm	100	115
EPG_1.2	1.2m	GIB® Standard plasterboard other side	150	150

Framing

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604).
- 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

Side 1: One layer of 7mm, 9mm or 12mm Ecoply® plywood exterior wall cladding fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3mm expansion gap should be left between sheets.

Side 2: One layer of 10 or 13mm GIB® Standard plasterboard vertically or horizontally fixed. Sheet joints are touch fitted and fastener heads and joints stopped in accordance with the GIB® Site Guide.

Fastening the Ecoply® Panels

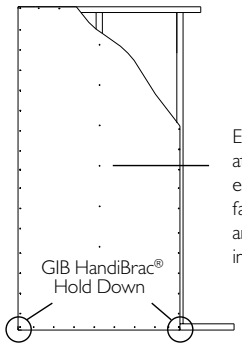
Fasten with 50 x 2.8mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

Fasteners for H3.2 CCA Treated Ecoply

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 150mm centres around the perimeter of each sheet and 300mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® fixed with 50 x 2.8 mm nails at 150 mm centres to perimeter of each sheet at no less than 7 mm or 3 fastener diameters from sheet edge and at 300 mm centres to intermediate studs

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Fastening the GIB® Plasterboard

32mm x 6g GIB® Grabber® Screws or 35mm GIB® Nails.

Fastening Centres

Fasten 50, 100, 150, 225 and 300mm from each corner and 150mm thereafter around the perimeter of the bracing element. For vertical fixing place fasteners at 300mm centres at intermediate sheet joints. For horizontal fixing place single fasteners in the tapered edge where sheets cross studs.

Place fasteners 12mm from paper bound edges and 18mm from cut sheet edges. GIB® plasterboard must be treated in every respect in accordance with relevant GIB® literature.

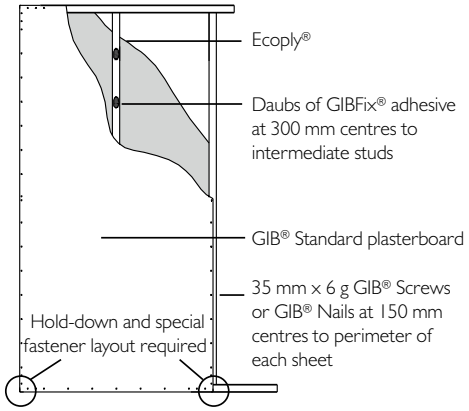


Table 13: Ecoply® Suitability for Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones including sea spray, as per section 4 of NZS3604):	Ecoply® Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones1 B and C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone1 D (sea spray), as per section 4 of NZS3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification and Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B and C, as per section 4 of NZS 3604.	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zone D, as per section 4 of NZS 3604.	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604.	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply® Specification and Installation Guide.

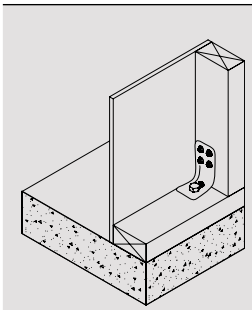
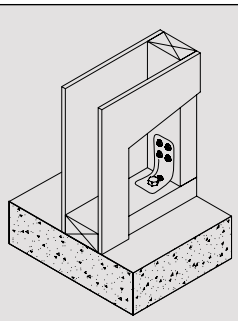
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3.5 GIB HANDIBRAC® – RECOMMENDED INSTALLATION METHOD

Developed in conjunction with MiTek®, the GIB HandiBrac® has been tested for use as the hold-down in all EP bracing elements.

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

Concrete Floor

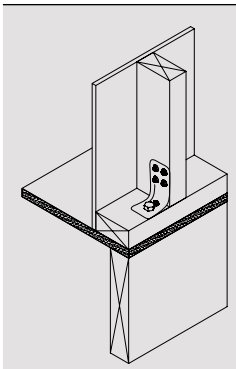
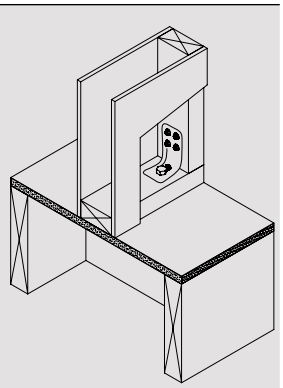
External Walls	Internal Walls
	
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/ plate junction.

Hold-down Fastener Requirements

A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket

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Timber Floor

External Walls	Internal Walls
	
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

M12 x 150mm galvanised coach screw

3.6 STRUCTURAL CEILING DIAPHRAGMS

Diaphragms are used to transfer lateral loads to braced walls and allow for greater spacing between bracing lines. Diaphragms do not have a BU rating themselves.

Plywood diaphragms are an acceptable solution as described in section 13 of NZS 3604 13.5.2 which allows for plywood not less than 6mm thick and a minimum of three ply for:

(a) Diaphragms not steeper than 25 degrees to the horizontal and not exceeding 12 metres long under light or heavy roofs and;
(b) Diaphragms not steeper than 45 degrees to the horizontal and not exceeding 7.5 metres long under light or heavy roofs.

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Plywood ceiling diaphragms required to comply with NZS 3604 must be constructed as follows:

(a) The length of diaphragm shall not exceed twice its width measured between supporting walls.
(b) The ceiling lining must consist of plywood over the entire area of the diaphragm.
(c) Complete sheets with a minimum size of 1800 x 900 must be used.
(d) Framing size and spacing must comply with NZS 3604.
(e) Fastener size should comply with Table 7 of this guide. E.g. 40mm x 2.5mm flat head nails for 7mm and 9mm Ecoply®.
(f) Fastening is at 150mm centres around the perimeter of each sheet and at 300mm centres to intermediate framing.
(g) Fixings are no closer than 10mm from sheet edges.
(h) Perimeter ceiling framing must be connected to wall framing by a perimeter 140mm x 35mm ribbon plate nailed to the top of the top plate or alternative such as a 0.55mm thick steel angle or proprietary steel channel.
(i) Sheets must be layed in a staggered pattern.
(j) The basic shape of a ceiling diaphragm should be rectangular. Protrusions are permitted but cut-outs are not (see Figure 13.4 NZS 3604).

4.0 ROOFS & DECKS

The section below covers the use of Ecoply® plywood used as a substrate for flexible membrane and tile systems in roofing and decking applications. The information below should be considered as supplementary to system specifications from roofing and decking suppliers.

Further guidance on installation and detailing factors can be found in the EWPAA Technical Note; Plywood Roofing and Flooring: Installation and Detailing Factors. This can be downloaded from www.ewp.asn.au.

Ecoply is not recommended as a substrate for exterior decks without a properly detailed barrier material such as butyl rubber, vinyl or E.P.D.M to protect the surface from weathering.

Always refer to the roofing and decking system supplier for installation, plywood selection and surface preparation requirements for specific roofing and decking products.

4.1 FLEXIBLE MEMBRANE SYSTEMS

- Roofing and decking membranes may comprise synthetic rubber sheeting glued to the Ecoply, or torch welded bitumen membranes.
- Always ensure Ecoply is dry and free of imperfections such as surface dust and blemishes as membranes coatings will telegraph any substrate imperfections.
- Use Ecoply Flooring or Structural Square Edge (CD Grade).
- Where Ecoply Flooring is used consider the use of a small daub of glue or nail in the Tongue and Groove of each sheet if potential movement of the plastic tongue joint is not acceptable.
- For trafficable decks use a minimum 17mm thickness, refer to Table 15A and 15C for specification.
- Use countersunk stainless steel screws and adhesive on framing to avoid head popping. Apply adhesive between screw locations.
- Use kiln dried timber framing such as Laserframe® or appropriate LVL framing from the Futurebuild® range.
- Consult the membrane manufacturer regarding use of bond breaker tapes over joints to allow elongation with natural plywood movement.
- Where treatment is required use only H3.2 CCA treated Ecoply. Do not use H3.1 LOSP treated Ecoply (solvent based carrier). It is not compatible with most membrane systems. If there is evidence of treatment salt crystals on the Ecoply surface remove by scrubbing with a small amount of water and allow the surface to dry prior to laying the membrane system.

Plywood Substrates, Face Checking and Flexible Membrane Systems

All natural wood based products (including Ecoply) have the potential to develop natural surface face checks when exposed to external environmental conditions. The degree of face checking is dependent on a number of factors including the length of time and level of exposure to weather during construction which is outside the manufacturing control of CHH Plywood. For more information see section 1.8: General Design Considerations - Face Checking on Plywood Exposed to Weather.

Face checks, while typically not present after manufacture, do not affect structural performance of the sheet and are acceptable under AS/NZS 2269. They are not a manufacturing fault.

Designers and membrane suppliers must carefully consider the suitability of plywood as a substrate for the membrane system in question if the potential of telegraphing of face checks onto the membrane surface is not acceptable.

The risk of telegraphing can be reduced by protecting the plywood surface from weather and moisture during the construction process.

Where the potential of face checking in the plywood substrate is not acceptable designers should consult the membrane supplier for a more suitable membrane or an alternative substrate.

Allowing for Moisture Expansion of Plywood Under Roof and Floor Coverings

Membrane suppliers have held different views on the requirements for plywood substrates. The fixing instructions within this guide are the starting point but designers must detail joints that allow for expansion in accordance with practices recommended by the chosen membrane supplier.

CHH Plywood' view, and the recommendation of a number of suppliers here and in North America is that expansion and contraction at sheet edges should be allowed for by loosely butting tongue and grooved edges so that the tongues can absorb movement and providing a small gap (2 to 3mm) between square sawn edges. Use a bond breaking tape over these joints to spread elongation in the membrane over a longer distance than the narrow gap in the joint itself. This tape can double as a rain seal over the sheet edges during construction.

Other membrane suppliers believe that sheets should be tightly butted and glued and screwed hard up to each other. This practice constrains movement at the small joint between sheets, but over a wider area requires significant allowance for movement around the perimeter of a roof segment. Junctions between the roof slopes and walls need careful detailing to allow for the potential movement. Movement control joints should be provided at regular intervals following the recommendation of the membrane manufacturer, especially if this method is adopted.

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4.2 ROOF TILE SYSTEMS

Most fibreglass, asphalt or wooden shingle and tile systems will tolerate DD grade surface characteristics.

- Use unsanded Ecoply® Roofing (DD grade), or sanded Ecoply of the required thickness in Table 15A.
- The unsanded surface provides extra grip on steeper roofs for roofers.
- Fix tiles according to the tile manufacturer's specification.
- Under asphalt shingles use felt underlay over the Ecoply.

4.3 ROOFING & DECKING – PRODUCT SELECTION GUIDE

Table 14: Roofing and Decking Product Selection Guide

	Structural Square Edge (CD Grade)	Flooring (CD Grade)	Roofing (DD Grade)
Product Description	CD face grade sheets are available in a range of thicknesses and size	Solid sanded C grade surface with tongue and groove profile on long edges	Unfilled D grade surface with tongue and groove profile on long edges
Recommended Applications	Substrate for flexible coverings requiring a smooth substrate and where avoidance of visible surface indentations is critical. Use as a substrate for flexible roof and deck membranes and thin roofing tiles		Substrate for coverings with the ability to span holes in the D face grade (up to 75mm in diameter) such as asphaltic roof tiles and torch welded polyester reinforce membranes. Do not use under flexible membrane coverings or where avoidance of visible surface indentation is critical
Face Grades	Front: C solid sanded. Back: D unsanded		Front and Back: D unsanded
	Refer to Table 1 for range and treatment options		
Product Features	Blocking required to support all edges	Second void free layer under surface veneer for increased protection against punching through the first veneer under high point loads and increased moisture resistance. Blocking not required to support tongue and groove edges (unless otherwise specified).	Specifically designed for use under shingles and tiles that have a courser finish. Unsanded surface for extra grip for installers on steep roofs. Blocking not required to support[2] tongue and groove edges (unless otherwise specified).
Thicknesses Available	12, 15, 17, 19, 21, 25mm	17, 19, 21, 25mm	15mm
Sheet Sizes Available	2400/2700 x 1200m		
Stress Grades Available	F8/F8, F8/F5[1] (F11/F8 available upon request)	F8/F5 (F11/F8 available upon request) 19mm Longspan supplied F11/F8 as standard	F11/F8
Treatment	Untreated, H3.2 CCA and H3.1 LOSP	Untreated, H3.2 CCA, (H3.1 LOSP available upon request)	
Span Capabilities	Refer to frame spacings in Tables 15A to 15C		

[1] Refer to Table 1 and 4B for availability of F8/F8 and F8/F5 products and thicknesses.

[2] Where roofing products use tongue and groove CHH Plywood recommends fastening the tongue to rafters/joists at a minimum of one point.

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4.4 FRAME SPACINGS FOR ECOPLY® ROOFS & DECKS

Table 15A: Roofing - Sheathing, Non Trafficable, Above 2 Degree Pitch

Application	Roof Pitch	Maximum Wind Zone	Maximum Frame Centres (mm) for Ecoply® With Face Grain Across Framing			
			Ecoply Nominal Thickness (mm)			
			15	19	21	25
			Stress Grade			
			F11/F8	F8/F5		
Sheathing, non trafficable roof for all roof pitches above 2 degrees. Suitable for roof mass up to 30kg/m² (additional to Ecoply® weight or 40kg/m² including Ecoply).	>2°	Extra High	600	800	800	900
		High	900			
		Very High	800			
		Extra High	800			
	>20°	Very High	900			
		Extra High	800			

- Suggested applications include substrates for Asphalt Shingle and Membrane type roofs. The above suggested maximum framing spans are based on the following deflection criteria:
- Under a short term 1kN point load, deflection is less than Span/130.
- Under a long term self weight load, deflection is less than Span/400.
- Under a short term wind gust load, deflection is less than Span/150.

Table 15B: Sub-Sheathing

Application	Maximum Frame Centres (mm) for Ecoply® With Face Grain Across Framing				
	Ecoply Nominal Thickness (mm)				
	12	15	19	21	25
	Stress Grade				
	F8/F8	F11/F8	F8/F5		
Under steel or self supporting cladding for support of building paper or lateral diaphragm action. Sag not critical.	800	1200			

Table 15C: Decking

Application	Maximum Frame Centres (mm) for Ecoply® With Face Grain Across Framing			
	Ecoply Nominal Thickness (mm)			
	17	19	21	25
1. Trafficable roof decking limited by dynamic response of roof as floor	540	600	600	750
2. Roof decking to Clause 8.5.5.1 c) of E2/AS1	400	400	400	400

- The current requirement in E2/AS1 is extremely conservative when compared with calculations determined for other applications using VM1 Clause 6 and calibrating the spans against codes of practice from North America and Australia. CHH Plywood recommends designers consider the alternative solution in row 1 of Table 15C for membrane decking in consultation with the membrane manufacturer.
  Unless otherwise stated spans apply equally to square edge or tongue and groove panels. Check Table 1 for availability of grades and lengths to match span multiples in Table 16.
- Use the next lower recommended frame spacing or thicker Ecoply® where appearance is critical.
- To suit trusses at 900 centres, 2700 long sheets are available. See Table 16.

Table 16: Frame Set Outs to Match 2400mm and 2700mm Sheet Modules

Length (mm)	Typical Frame Spacing to Suit Sheet Length			
2400	400	480	600	800
2700	450	540	675	900

- **Limitation for the use of Table 16.**
- CHH Plywood does not have access to information about designs for specific sites. Table 16 is a guide to estimate the initial selection of a span for design. Each site should be evaluated by qualified persons to ensure all loading parameters and site conditions have been considered, and appropriate changes should be made by the building designer.

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4.5 ROOFING – DESIGN CONSIDERATIONS

Durability

In general, H3.2 CCA treatment of Ecoply® plywood with waterborne preservatives is recommended for roofing.

Roofing Materials

Various roofing materials used over Ecoply plywood have different durability expectations, normally in excess of the 15 years required by the NZBC Clause B2. Durability of the roofing is subject to the specifications, installation and maintenance requirements of the roofing manufacturer. The durability of the Ecoply can only be assured as long as the overlying roofing and detailing excludes moisture. With good building practice and maintenance, roofing materials can be repaired or replaced at regular intervals to achieve life from the Ecoply in excess of the original roofing. The durability of Ecoply structural plywood will continue to satisfy the relevant requirements of the NZBC for 50 years, if installed in accordance with the instructions and limitations within this guide and the roof system is adequately maintained.

High Humidity, Condensation and Solar Driven Moisture

Where the moisture content of wood may exceed 18% for prolonged periods, Ecoply must be H3.2 CCA treated, to resist decay hazard. This includes Ecoply used under roof coverings that may be subject to condensation, or where rain moisture soaked in the roof covering can be driven into the Ecoply by the sun. Appropriate building detailing and ventilation is recommended which can reduce the need for treatment.

Roof Ventilation

Good ventilation and the avoidance of moisture are important design considerations when using H3.2 CCA treated Ecoply panels. Poorly ventilated spaces can develop very high temperature and moisture levels. The most likely source of moisture is the condensation of vapour from warm interior air on the underside of cold roofing. Good ventilation can limit the build up of excess moisture vapour in warmer climates but in regions where winter nights are consistently colder, H3.2 CCA treated Ecoply should be used. Moisture induced decay is only one risk that needs to be managed. If incorrectly detailed, roof spaces can be very tight and the dark colour of many roofing materials means that excessive heat can build up causing distortion in plywood or even framing members. Use the suggested details or alternatives to suit. Designers must consider roofing type, seasonal conditions, wind effects and the intended use of the building.

As a minimum, CHH Plywood recommends a vent area of 1/300th of the ceiling plan area (approx. 3350mm^2 per square metre of ceiling) equally distributed at the eaves and ridge to allow free flow under the Ecoply, up the roof slope, and out.

Roofing material suppliers should detail vent systems suited to their specific membrane or tile roofing. Proprietary ridge capping profiles or vents are available from roofing suppliers.

Detail gaps of 25mm in the plywood at ridges, and at walls where a roof slopes up to an upper storey. For flat roofs, natural ventilation flows may be impeded. Use proprietary roof vents. Consider forced ventilation as appropriate.

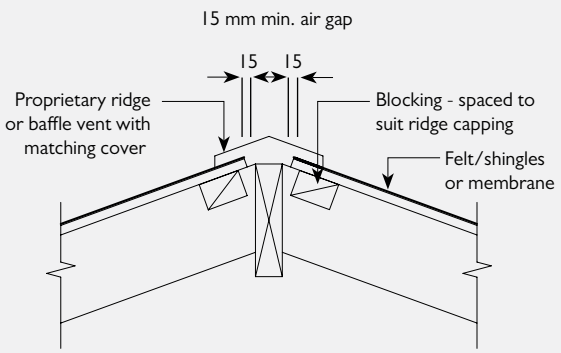
Bubbling

Plywood bubbling occurs when moisture trapped in knot holes in inner veneers expands as the temperature rises. This moisture will dissipate through the face veneer and will not affect the structural integrity of the plywood panel. As membrane coverings can prevent moisture dissipation, Ecoply Flooring and Structural Square Edge CD is recommended if the visual appearance of bubbling is not acceptable, or a high visual finish is required.

Soil

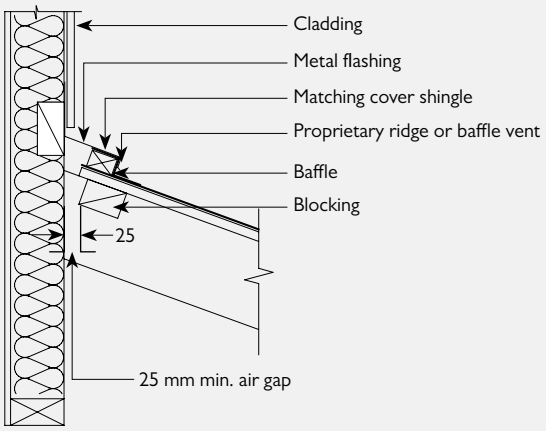
Ecoply plywood (untreated or H3.1 LOSP/H3.2 CCA treated) must not be allowed to come in contact with soil. Surfaces, flashings and gutters should be detailed to avoid trapping detritus and moisture.

EC003: Ridge Detail With Ridgeboard



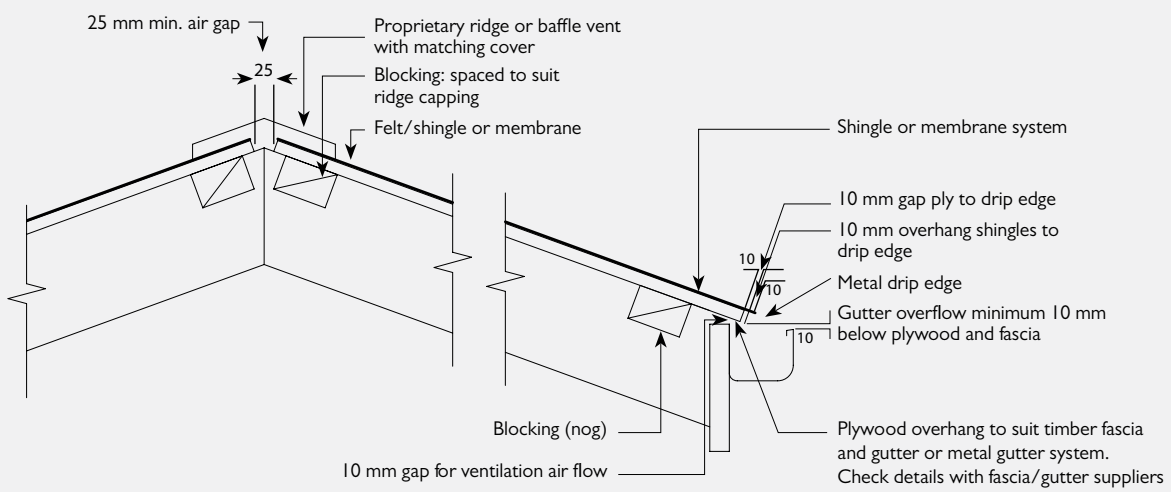
(use also with Hip Rafter if extra ventilation required)

EC004: Roof to Wall Junction Vent



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EC005: Truss Ridge Detail



Rain Wetting and Construction Time

Untreated Ecoply® will withstand a reasonable amount of rain wetting and exposure during construction for up to three months. In extreme weather conditions of high temperature and/or high rainfall this period may be less. Appearance issues such as discolouration and face checking of the sheet surface can be expected if Ecoply is exposed. For roofs uncovered for longer periods use H3 treated Ecoply to lower the risk of decay. Return Ecoply to below 18% moisture content before installing moisture sensitive materials, coverings, coatings or adhesives. Where a high visual finish is desired (such as membrane roofing and decking) protect Ecoply from exterior moisture during construction. For detailed information see section 4.1 Flexible Membrane Systems.

Gutter Details

Where Ecoply structural plywood sub-sheathing supports roofing at gutters, a metal drip edge must be provided with appropriate gaps to shed water. Gutters should have a front edge overflow or ends lower than the back to shed water overflow away from framing and sub-sheathing Ecoply.

H3.2 CCA treatment is recommended for Ecoply sheets that protrude into gutters, with regular maintenance to avoid leaf mould (soil) development. Untreated Ecoply must not be exposed to gutter splash or moisture.

Fastener Spacing for Wind Suction

Wind pressure applies withdrawal loads to nails holding plywood to purlins and trusses. For the frame spacing in Table 15A designers may use the following guidelines for wind zones expressed in NZS 3604.

Note: Full penetration of fasteners into the supporting member is assumed.

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The Main Body of the Roof

For wind zones up to and including high, use 60 x 2.8mm nails spaced at 150mm centres on all cross framing. For very high and extra high wind zones, use 75 x 3.15mm nails spaced at 150mm centres on all cross framing.

Roof Edges

All Ecoply structural plywood used at local pressure suction zones at the roof edges, gutters, eaves and gable ends must be supported on framing, and fixed at 75mm centres with minimum 60 x 2.8mm nails for regions up to, and including high wind zones (use 75 x 3.15mm nails for very high and extra high wind zones). Local pressure zones are interpreted from AS/NZS 1170 as being within 20% of the building length, width or the average of the gutter and ridge height.

Designers and builders should review site conditions to ensure adequate fixing is applied. Buildings in exposed sites and lee zones should be specifically designed using the loading standard (AS/NZS 1170) and the timber structures standard NZS 3603. In some wind conditions, the tiles themselves may be sucked from the plywood. Use a consulting engineer to assess site conditions, calculate wind pressures for the specific site, and determine the fastening and span requirements, and to check that the truss system can resist the loads being applied through the plywood.

Fixing of Roofing

Fixing methods for tile, shingle and membrane systems must be designed for the expected wind and weather exposure to protect the Ecoply substrate. Some shingle systems may not be suitable for use in very high or cyclonic wind zones.

Follow the specifications of the roofing manufacturer and refer to the appropriate BRANZ Appraisals.

4.6 ROOFING – INSTALLATION

Framing

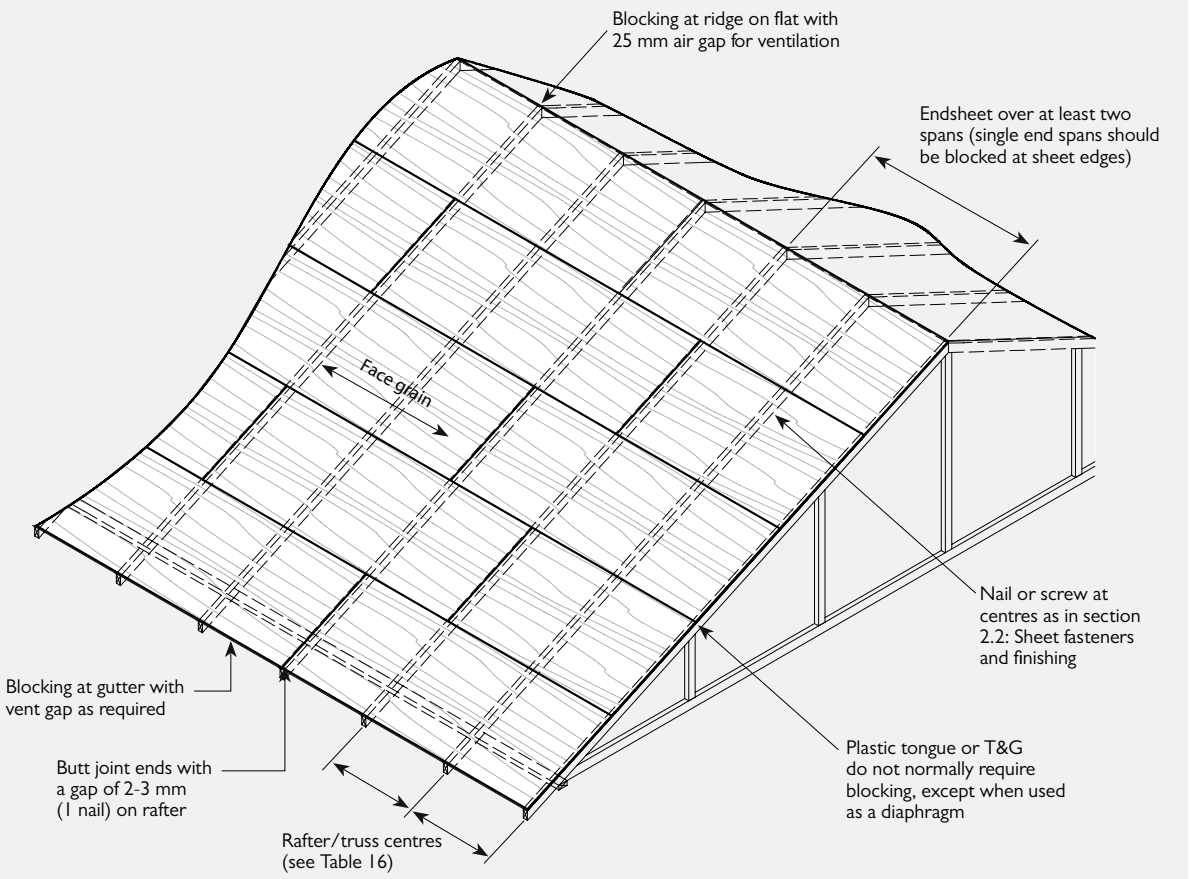
Frames should be at spacings to suit plywood thicknesses in Table 15A, page 25. Additional requirements for roof framing are:

- Ensure top edges of framing are properly aligned.
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to lower moisture level in roof spaces, second floor spaces, and reduce differential truss, rafter or joist deflections.

Blocking (Nogs, Dwangs)

- Block all edges of Ecoply® Structural Square Edge plywood.
- Block all edges at the ridge and gutter lines to prevent sag at capping or gutters.
- Block for high face loads or under areas accessed for maintenance.
- Blocking within the body of the roof is not required under tongue and grooved edges when using Ecoply Flooring and Roofing, unless required for framing stability or the plywood is being used as a diaphragm to resist horizontal wind or earthquake loads. In this case fixings transfer shear across the joints and details should be specified on drawings.
- Use blocking on the flat to provide gaps where air flow is needed for ventilation.
- Specific roofing suppliers may require blocking to suit their system.

EC006: Sheet and Framing Layout



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Sheet Layout

- Ensure Ecoply® sheets are dry before installation.
- Place face grain at right angles to supports.
- Sheets must be continuous over at least two spans (three framing members).
- Lay the sheets in a staggered pattern.
- Allow sufficient clearance inside confining structure such as concrete or brick walls adjacent to the roof. Use extra allowances with large areas.
- Allow clearance for ventilation as required.

Fixing of Sheets

Ecoply may be fixed to different types of framing with nails, screws or a combination of fasteners and construction adhesives.

Fasteners should be corrosion resistant to a level appropriate to the end use life expectancy (15 or 50 years) and expected exposure to moisture. Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

The integrity of a plywood based roof system is directly related to how well the panels are fixed to the framing. Ecoply must be fixed to resist wind suction loads, and to maintain surface qualities of the overlying roof covering.

- Always refer to the roofing system supplier for system requirements.
- For roofing, check the additional requirements according to wind exposure.
- For very exposed sites, cyclonic conditions or roofs above 10 metres in height, carry out specific structural design to the relevant standards.
- Screw fixing must be used for membrane roofing, and is preferred for all systems because of increased holding power and avoidance of head popping.
- For minimum fastener spacing for wind suction, refer section 4.5 Roofing - Design Considerations - Fastener spacing for wind suction.

Fixing to Timber Frames

- Ring shank nails or annular grooved nails or screws are recommended for additional holding power.
- Use flathead nails. Do not use jolt or bullet head nails.
- Stainless steel nails must be annular grooved.
- Ensure fastener is compatible with the roofing cover (consult roofing system supplier).
- Staples may be used provided that the withdrawal load is equivalent to the hand driven galvanised flathead nail. A suggested minimum is a 50mm long staple with 12mm crown and legs 1.8mm diameter. Space staples 20% closer than nails. Refer to the manufacturer's information for corrosion resistance and durability.

Fixing to Steel Frames

- Fix directly to roll formed steel (up to 2mm thick) with self-drilling, self-tapping screws. If plywood gets damp and expands, screws in thicker steel may shear. Keep Ecoply dry or use larger screws or;
- Bolt or screw battens to the steel and apply Ecoply as above for timber. Ensure that battens have adequate thickness for the minimum nail or screw length.
- H3.2 CCA treated plywood must not be fixed to steel framing.

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5.0 FLOORING

The following section covers the use of Ecoply® Flooring plywood used as a flooring substrate with flexible and rigid overlays.

Ecoply Flooring is suitable as a substrate for overlays such as carpet, tiles and some membrane products (refer to flooring manufacturer).

5.1 FLOORING – RANGE

- Ecoply Flooring features a void free second layer under the surface veneer for increased protection against moisture bubbles and punch through of the first veneer under high point loads than normal Ecoply Structural Square Edge plywood.
- The tongue and groove on long sheet edges does not require support blocking under the joint (unless otherwise specified).
- Supplied in F8/F5 stress grade (F11/F8 available upon request).
- Ecoply 19mm Longspan Flooring supplied as standard in F11/F8 stress grade.
- Supplied standard with a sanded C grade surface with D grade back.
- Sanded B grade surface is available in 19mm thickness (untreated only) for clear finish applications. Designers must expect the surface to dent or mark more easily than hardwood flooring systems as Ecoply is manufactured from relatively soft radiata pine.
- Available untreated or H3.2 CCA treated, (H3.1 LOSP treated available upon request).
- LOSP treated plywood is not recommended for internal applications.
- Refer to Table 1 for range and treatment options.

5.2 FLOORING – INSTALLATION

Table 17: Flooring Frame Spacings

Application	Maximum Frame Centres (mm) for Ecoply® with Face Grain Across Framing			
	Ecoply Nominal Thickness (mm)			
	17	19	21	25
1. Domestic flooring 2kPa - 1.8kN	540	600 F11/F8 Longspan	600	750
2. Institutional and public assembly up to 4kPa - 2.7kN	300	480	540	750
3. Institutional and crowd assembly up to 5kPa - 3.6kN		400	450	600
4. Corridors, industrial up to 5kPa - 4.5kN		300	400	540
5. Domestic garage floor** 2.5kPa - 9kN				270

** Provide blocking to all edges of the sheet.

- Use the next lower recommended frame spacing or thicker Ecoply® flooring where appearance is critical.
- To suit frames at 900 centres, 2700 long sheets are available. See Table 16.

Floor Loads

For domestic garage floors blocking is required under all edges to control wheel loads on the tongue. Testing with 113mm diameter load head (0.01m²) confirms commercial floor capabilities.

Refer to Table 16 to match frame set outs with 2400mm and 700mm sheet modules.

Framing

- Joist spacings should be at spacings to suit plywood thicknesses in Table 17.
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to achieve a moisture content of 18% or less.

Blocking

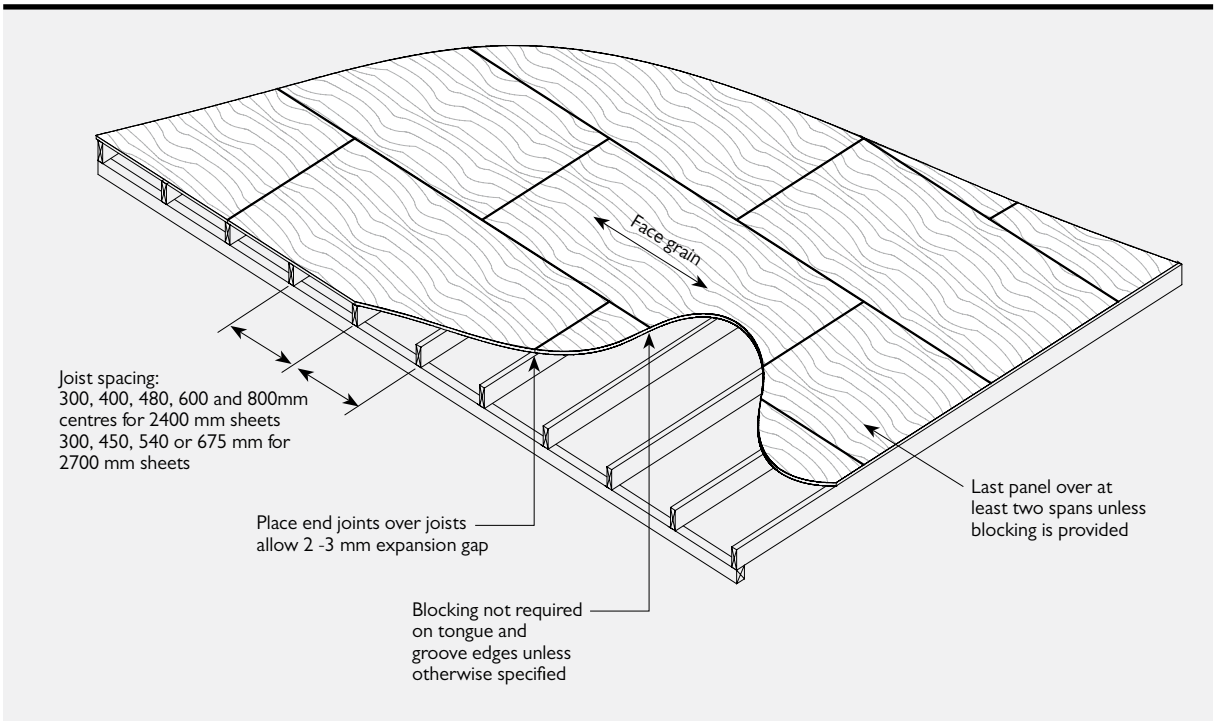
- Blocking within the body of the floor is not required under tongue and groove edges unless otherwise specified (such as in domestic garage floors).

Sheet Layout

- Ensure Ecoply sheets are dry before installation.
- Place face grain at right angles to supports.
- Sheets must be continuous over at least two spans (three framing members).
- For panels at floor edges where a continuous two span coverage is not possible, sheet edges must be supported by blocking.
- Lay sheets in a staggered pattern.
- Allow clearance for ventilation as required.

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EC007: Ecoply® Flooring Layout



Fastener Selection and Treatment

Fasteners should be corrosion resistant to a level appropriate to the end use, life expectancy (15 or 50 years) and expected exposure to moisture.

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Fasteners and Fixing of Sheets

- Ecoply® Flooring may be fixed with nails or screws or a combination of mechanical fasteners and construction adhesives.
- For fastener specifications (including lay out and sizes) refer to section 2.2: Sheet Fasteners and Fixing.
- For construction adhesive specifications refer to section 2.3: Adhesives.
- Ring shank or annular grooved nails, or screws are recommended for additional holding power.
- To reduce the risk of fastener popping or floor squeak the use of construction adhesives is advised.
- Do not use jolt or bullet head nails.

5.3 FLOORING – FINISHING

- Overlays and coatings should be applied following the manufacturer's specifications.
- Avoid heavy sanding that may remove the critically important structural face veneer.
- Adhesives must be compatible with CCA (Copper Chrome Arsenic) treatment in H3.2 CCA treated sheets. Compatibility can often be improved by lightly washing, scrubbing and drying the plywood surface prior to fixing.
- Where clear or stained finishes are desired, designers should select sheets and protect the floor as much as possible from the weather and construction activities.
- Ecoply is made from relatively soft radiata pine and as such will dent or mark more easily than hardwood flooring systems. This is to be expected and designers must consider the long term appearance requirements of the project. Ecoply Flooring is a good substrate for harder wearing flooring overlays, and is not primarily intended for clear finishing, especially if it is exposed to moisture during construction.
- For improved surface finish, floors should be protected from weather during construction as soon as possible.

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6.0 FREQUENTLY ASKED QUESTIONS

Q: How much space should be allowed for expansion?
A: Allow a 2 - 3mm expansion gap between square edges of Ecoply® sheets. If using Ecoply Flooring, a 5mm expansion gap is recommended at the perimeter of the floor or deck. Check by calculation for large areas.

Q: Can power driven nails be used to fix Ecoply®?
A: Paslode power driven nails have been tested for fixing Ecoply and Shadowclad® plywood products for particular bracing and cladding applications. For power driven nail specifications refer to the Paslode Special Fixing Applications document available from http://www.paslode.co.nz/images/fix-app-CHH-Plywood.pdf. Use the Paslode Impulse Compact Nailer fitted with a No Mar(k) work contact element to eliminate any contact marks on the plywood. Adjust the work contact element to the flush position and fire the nail at 90° to the work surface. Hammer any nails flush which are left proud. Do not overdrive.

Q: How close to sheet edges can I nail?
A: Fixings must be at least 3 fastener diameters or 7mm from the sheet edge.

Q: Do I have to use stainless steel nails when using Ecoply for bracing?
A: Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Q: What is the weight of Ecoply?
A: Refer to Table 4A for weight (kg/m^2) of different Ecoply thicknesses.

Q: What is the R-value of Ecoply?
A: The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214. Plywood has a conductivity (k) of 0.13W/mK so a 12mm panel has a thermal resistance R = 0.012/0.13 = 0.09.

Q: Are there any compatibility issues when using Ecoply with other materials?
A: Adhesives for flexible rubber membranes may react with LOSP treatment and should therefore only be applied to H3.2 CCA treated Ecoply unless the membrane supplier advises differently. Check with the membrane manufacturer if in doubt. H3.2 CCA treatment is also corrosive and this must be taken into account when specifying H3.2 CCA treated plywood next to metals. For further guidance, refer to Tables 21 and 22 in Acceptable Solution E2/AS1.

Q: Can Ecoply be used as a rigid sheathing (air barrier)?
A: CHH has a specific system called Ecoply Barrier. Ecoply Barrier has been developed as a rigid air barrier. Refer to the current Ecoply Barrier Specification and Installation Guide for further information. 7mm H3.2 CCA treated Ecoply can also be used if combined with building underlay in accordance with E2/AS1 for a rigid air barrier system.

Q: What is the relevance of AS/NZS 2269?
A: Ecoply structural plywood is manufactured to AS/NZS 2269 Plywood Structural. This Standard is referenced by the NZBC Compliance Documents including NZS 3602 Timber and Wood-based Products for Use in Building, NZS 3603 Timber Structures, NZS 3604 Timber Framed Buildings, AS/NZS 1604.3 Specification for Preservative Treatment, Part 3:Plywood and Acceptable Solution E2/AS1 - External Moisture. Plywood not manufactured to AS/NZS 2269 does NOT meet the requirements of these NZBC Compliance Documents.

Q: What is the relevance of the EWPAA stamp?
A: Ecoply is manufactured under a third party audited, product quality control programme by the Engineered Wood Products Association of Australasia (EWPAA) to monitor compliance with AS/NZS 2269. Given that compliance with Standards is not actively policed by Standards New Zealand, this third party auditing provides important peace of mind for users and consumers of Ecoply plywood products.

Q: What is marine ply?
A: Marine plywood manufactured to AS/NZS 2272 Plywood Marine may contain species of low durability (source: BRANZ Good Practice Guide – Timber Cladding). Whilst marine plywood has a Type A glue bond, it is generally specified for its high surface appearance grade and lack of core knots as opposed to structural performance. AS/NZS 2272 limits marine plywood to a number of approved species that pass stringent property requirements for things like moisture permeability. These requirements are different from those in standards from other countries. Marine plywood is rarely treated as it is usually coated with resin, fibreglass, or a paint finish for long term durability.

Q: What should a specification for structural plywood include?
A: A specification for structural plywood should include:

Specification Check List	Example
Quantity/size	20 sheets of 2400 x 1200
Thickness	12mm
Edge finish	Square edge
Brand name	Ecoply® structural plywood
Reference to Standard	To AS/NZS 2269
Stress grade[1]/(layup)	F8/F5 (12-24-5)
Surface grade/bond type	CD A-Bond[2]
Accreditation	EWPAA product certified[3]

[1] Stress grades may vary between different manufacturers and products.

[2] Type A-bonds are suitable for permanent exposed applications and structural applications.

[3] The EWPAA JAS-ANZ Product Certification Mark certifies that Ecoply® structural plywood products have been manufactured under a third party audited joint product certification programme to monitor compliance with AS/NZS 2269.

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Q: What are F-grades?

A: The stress grading system is a ranking system which utilises the symbol F and a suffix 8, 11 etc. as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. For plywood of a given thickness, the higher the F-grade, the further it will span. For load bearing applications (e.g. flooring, roofing) the required F-grade as well as the plywood thickness must be specified to achieve the required span. F8/F5 is the most common structural plywood grade found in New Zealand. All Ecoply® structural products are F8 in parallel to the grain direction. Ecoply 19mm Longspan Flooring are F11/F8. Other Ecoply Flooring products are also available in F11/F8 upon request.

Q: What are surface/appearance grades (e.g. CD)?

A: Appearance grades (e.g. BD, CD, DD) denote the appearance grade of the plywood including the number and size of knot holes as defined in AS/NZS 2269 and summarised in Table 2A and 2B of this guide. The first letter describes the appearance of the face veneer and the second letter describes the back face.

Q: How long can Ecoply® be left exposed to the weather?

A: Untreated Ecoply will typically maintain its structural integrity when exposed to the weather during construction for up to 3 months. The surface colour will start to silver off and face checking will become evident. Where the finished appearance of the Ecoply is important, it should be protected during construction. Ecoply is also available H3 treated to resist decay or insect hazard. When used in accordance with this guide, it can be specified to meet the durability requirements of the NZBC, however appearance issues such as face checking may still occur dependent upon the degree of exposure to weather during construction.

Q: What treatment levels and types are used for Ecoply?

A: Ecoply is available untreated or preservative treated. Ecoply is treated to the H3 hazard class for above ground use. The standard Ecoply treatment type is H3.2 CCA (Copper Chrome Arsenate) although H3.1 LOSP Azole (Light Organic Solvent Preservative) may also be specified where a clear treatment is required. LOSP Azole is the standard treatment type for BD, Grooved Lining and Shadowclad®. CCA treatment gives the plywood sheets a green tinge and the drying process after CCA treatment may leave fillet marks on the face of the sheet.

Q: Does Ecoply have to be treated when used as structural bracing?

A: Ecoply used as bracing must be treated unless it is installed in an interior dry situation. Note, behind exterior cladding and in cavities (even if the Ecoply is covered with building wrap) are not considered to be an interior dry situation.

Q: Do I have to re-treat cut edges of treated Ecoply?

A: It is important to re-treat any cuts and holes with a brush on remedial treatment such as Holdfast® Metalex® Clear.

Q: What type of glue is used to manufacture Ecoply?

A: Phenol formaldehyde (PF) resins are used to bond the plywood veneers. This forms a Type A (Marine) bond suitable for structural applications and exterior use. Phenol formaldehyde resins are dark red/brown in colour. Product details printed on the back of Ecoply sheets indicate the 'A Bond'.

Q: Does Ecoply emit formaldehyde?

A: Formaldehyde occurs naturally in the environment and is emitted by processes such as combustion, decay and naturally by all timber species. Ecoply and Shadowclad meets the lowest formaldehyde emission class (E_0 - less than 0.5mg/litre). Actual formaldehyde emissions have been tested to be less than 0.3mg/litre.

Q: How should Ecoply be installed to maximise its stiffness properties?

A: Structural plywood has greatest stiffness along the long grain of the sheet (i.e. along its length). Therefore, flooring/roofing should be laid across joists/rafters rather than parallel to them.

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7.0 REFERENCES & SOURCES OF INFORMATION

- New Zealand Building Code (NZBC).
- CHH Plywood technical notes - downloadable from www.chhply.co.nz/document-library.
- NZS 3640:2003 "Chemical Preservation of Round and Sawn Timber".
- NZS 3602:2003 "Timber and Wood-based products for use in Buildings".
- NZS 3603:1993 "Timber Structures Standard".
- NZS 3604:2011 "Timber Framed Buildings".
- AS/NZS 1170:2011 "Structural design actions".
- AS/NZS 2269:2012 "Plywood Structural".
- AS/NZS 1604.3:2012 "Specification for Preservative Treatment, Part 3: Plywood".
- AS 1684:2010 "Residential Timber Framed Construction".
- US Product Standard PS1-95.
- Acceptable Solution 'E2/AS1 – External Moisture'.
- Acceptable Solution 'B2/AS1 – Durability'.
- BRANZ Bulletin 345: Flat membrane roofs – design and installation.
- BRANZ Bulletin 346: Flat membrane roofs – materials.
- BRANZ Bulletin 289: Asphalt shingle roofing.
- BRANZ Appraisals 307, 404, 411.
- Shadowclad® Specification and Installation Guide for Cavity Construction.
- Ecoply® Barrier Specification and Installation Guide.
- Safety Data Sheets.
  - SDS Azole Treated Plywood, LVL and I-Joists.
  - SDS H3 CCA Treated Plywood and I-Joist.
  - SDS Untreated Plywood.
- APA (www.buildabetterhome.org).
- EWPAA (www.ewp.asn.au).
- Product Technical Statement for Ecoply available online (www.chhply.co.nz/product-technical-statements).
- EWPAA Technical Note - Plywood Roofing and Flooring: Installation and detail factors.

Standards can be purchased online at www.standards.co.nz. Building Code Compliance Documents can be downloaded free of charge at www.building.govt.nz/building-code-compliance/

8.0 LIMITATIONS

The information contained in this document is current as at October 2022 and is based on data available to CHH Plywood at the time of going to print.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of Ecoply products installed in accordance with this document or NZBC compliance documents.

This publication replaces all previous CHH Plywood design information and literature relating to Ecoply structural plywood products. CHH Plywood reserves the right to change the information contained in this document without prior notice.

It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on 0800 326 759 or visit www.chhply.co.nz to obtain current information.

CHH Plywood has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH Plywood assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.

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9.0 HISTORICAL ECOPLY® SECTION PROPERTIES

Table 18A: Section Properties of Ecoply® Structural Plywood

			Section Properties per mm width					
			Parallel to the Face Grain			Perpendicular to the Face Grain		
Nominal Plywood Thickness[1] (mm)	**ID code**[2]	**Mass** (kg/m²)	**Parallel Moment of Inertia** (mm⁴)	**Section Modulus** Z (mm³)	**Shear Constant**[3] I/Q (mm²)	**Perpendicular Moment of Inertia** I (mm⁴)	**Section Modulus** Z (mm³)	**Shear Constant**[3] I/Q (mm²)
7	7-24-3	4.0	30.0	8.3	5.2	2.0	1.7	2.3
9	9-30-3	5.0	58.6	13.0	6.4	4.0	2.7	2.9
12	12-24-5	6.6	115.0	19.2	9.3	33.4	9.3	5.4
15	15-30-5	8.3	225.0	29.9	11.6	65.2	14.5	6.8
17	17-24-7	9.2	285.0	33.9	12.2	122.0	20.4	9.4
17	17-24-6	9.2	273.0	32.5	12.3	134.0	22.3	9.5
19	19-30-7	10.6	451.0	46.9	13.7	157.0	23.8	10.7
21	21-30-7	11.6	556.0	52.9	15.2	239.0	31.9	11.8
25	25-30-9	13.5	897.0	72.9	17.8	381.0	41.0	13.9

Table 18B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F8/F8 Grade

		Nominal Strengths (Limit States) per mm width					
		Parallel to the Face Grain (F8)			Perpendicular to the Face Grain (F8)		
Nominal Plywood Thickness[1] (mm)	**ID code**[2]	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm)	**Rolling Shear $f_{pr}I/Q$** (N)	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm)	**Rolling Shear $f_{pr}I/Q$** (N)
12	12-24-5	1046.5	480.0	15.6	303.9	231.7	9.2
15	15-30-5	2047.5	747.5	19.5	593.3	362.5	11.4
17	17-24-7	2593.5	847.5	20.5	1110.2	510.0	15.9
17	17-24-6	2484.3	812.5	20.7	1219.4	557.5	16.0
19	19-30-7	4104.1	1172.5	23.0	1428.7	595.0	18.0
21	21-30-7	5059.6	1322.5	25.5	2174.9	797.5	19.8
25	25-30-9	8162.7	1822.5	29.9	3467.1	1025.0	23.4

Table 18C: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F11/F8 Grade (Including Longspan Flooring)

		Nominal Strengths (Limit States) per mm width					
		Parallel to the Face Grain (F11)			Perpendicular to the Face Grain (F8)		
Nominal Plywood Thickness[1] (mm)	**ID code**[2]	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm)	**Rolling Shear $f_{pr}I/Q$** (N)	**Bending Stiffness EI** (1000 Nmm²)	**Bending Moment $f_{pb}Z$** (Nmm)	**Rolling Shear $f_{pr}I/Q$** (N)
12	12-24-5	1207.5	595.2	16.7	303.9	231.7	9.2
15	15-30-5	2362.5	926.9	20.9	593.3	362.5	11.4
17	17-24-7	2992.5	1050.9	22.0	1110.2	510.0	15.9
17	17-24-6	2866.5	1007.5	22.1	1219.4	557.5	16.0
19	19-30-7	4735.5	1453.9	24.7	1428.7	595.0	18.0
21	21-30-7	5838.0	1639.9	27.4	2174.9	797.5	19.8
25	25-30-9	9418.5	2259.9	32.0	3467.1	1025.0	23.4

[1] Actual thickness of Ecoply® sheets manufactured to thickness tolerances stated in AS/NZS 2269.

[2] Identification code: panel thickness – outermost veneer thickness x 10 – number of plies.

[3] I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603.

Notes:

- Use Tables 18A and B values for all F8 stress grade Ecoply products.
- Use Tables 18A and C values for all F11/F8 stress grade Ecoply (including 19 mm Ecoply Longspan Flooring).
- The section properties in Tables 18A, B and C have been calculated in accordance with AS/NZS 2269.
- For section properties for other thicknesses and Shadowclad® products contact CHH Plywood on 0800 326 759.

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GIB®

EzyBrace® Systems

Specification and installation manual



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NATIONAL SUPPORT

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

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners[1]
- Encourages more even bracing distribution throughout the building.

[1] Actual savings dependent on building and bracing design

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UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

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

NEW — GIBFIX® FRAMING SYSTEM

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

BRANZ Appraised
Appraisal No.928 [2016]

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GIB EzyBrace® Systems — August 2016

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

USE ONLY THE CURRENT SPECIFICATION

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

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

PATENTS

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

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 *The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.*

Note 2 *The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.*

Note 3 *Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.*

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Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

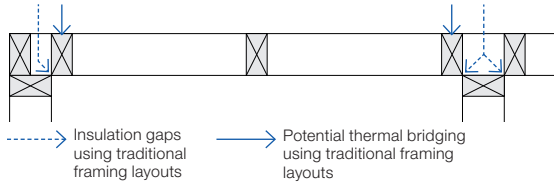
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

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

Bracing 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.

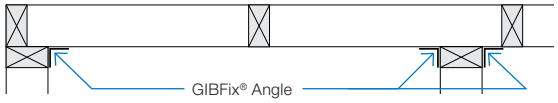
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

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[1].
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

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Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

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

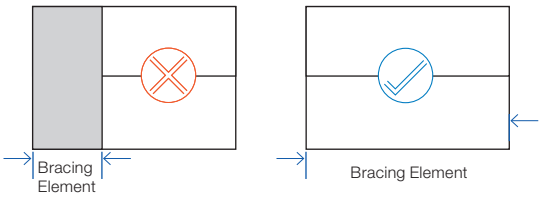
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Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

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

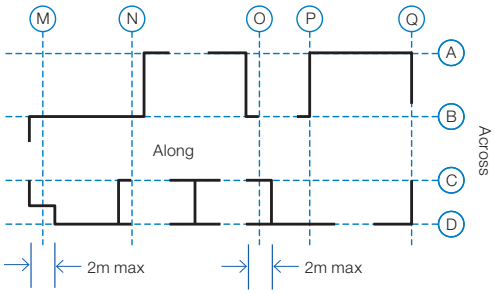
The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

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

DEMAND

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

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

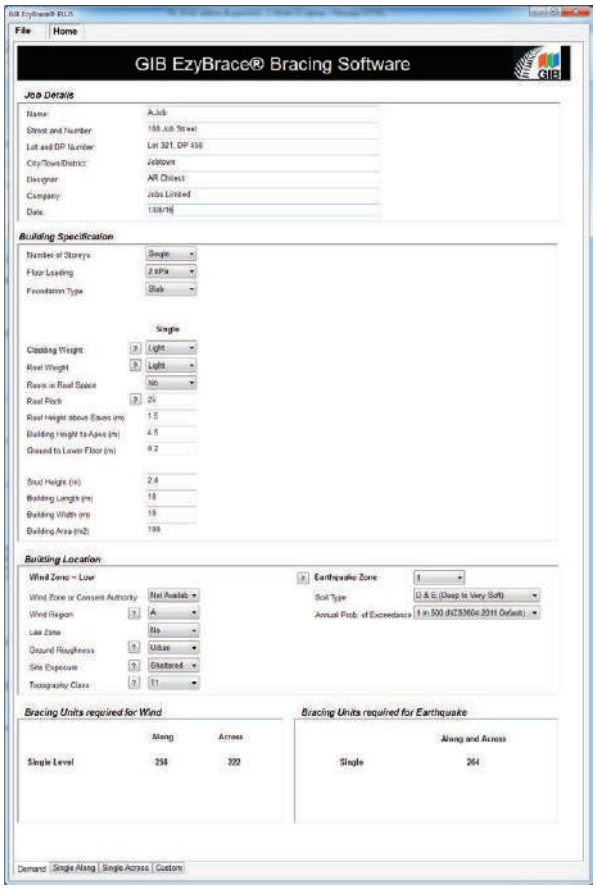
The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design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

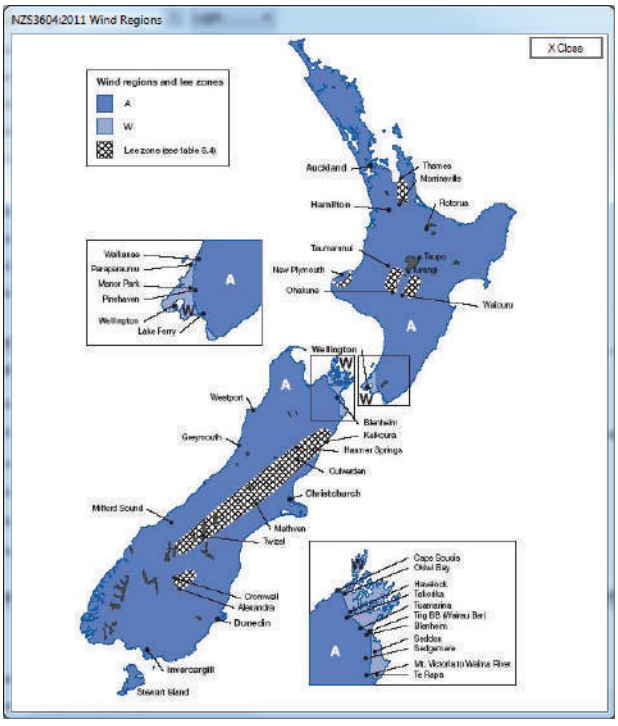
Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

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

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





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

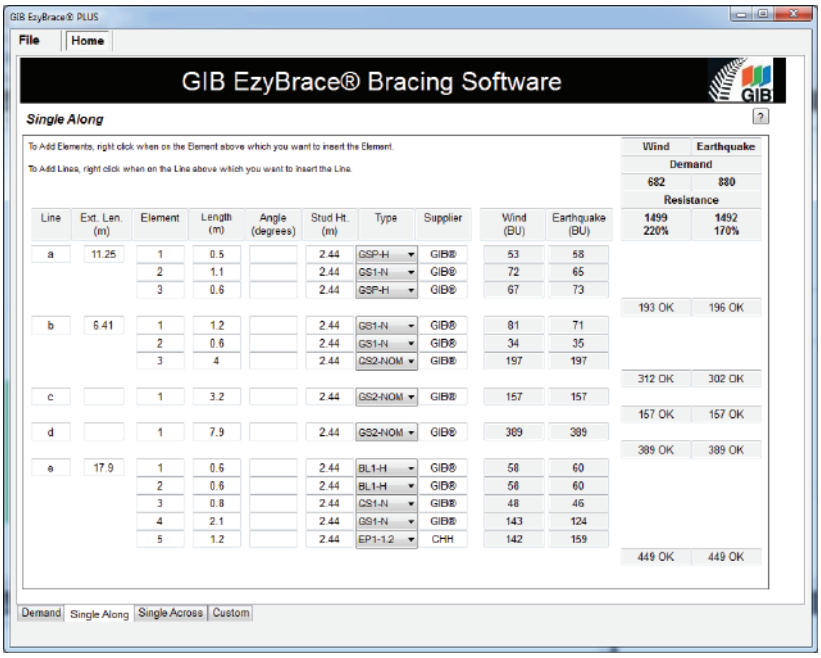
Software functionality

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.

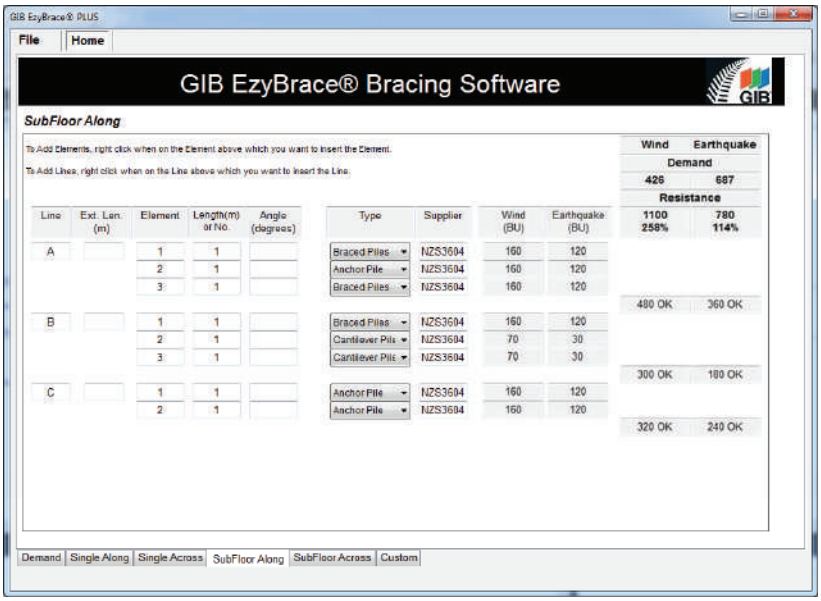
Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

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



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

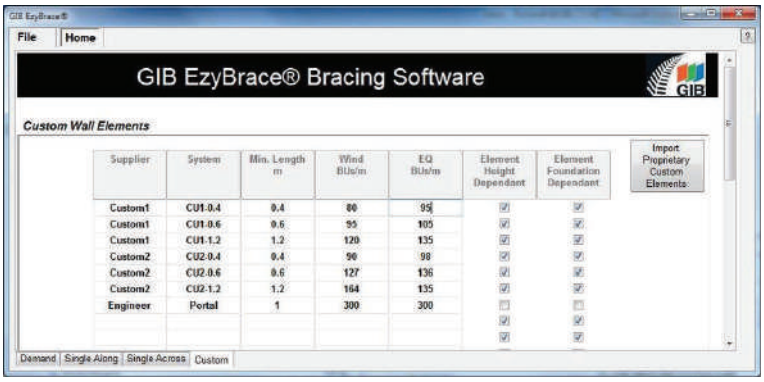


Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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



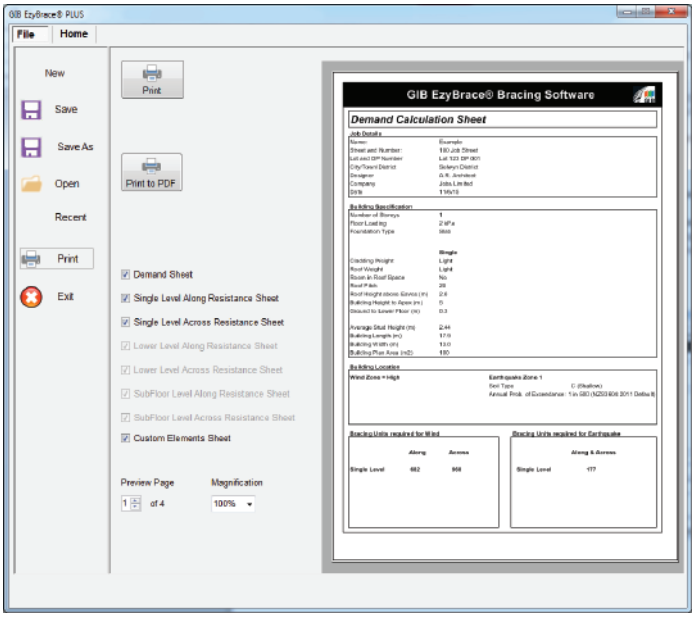
Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.
- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW



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

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GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For futher design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

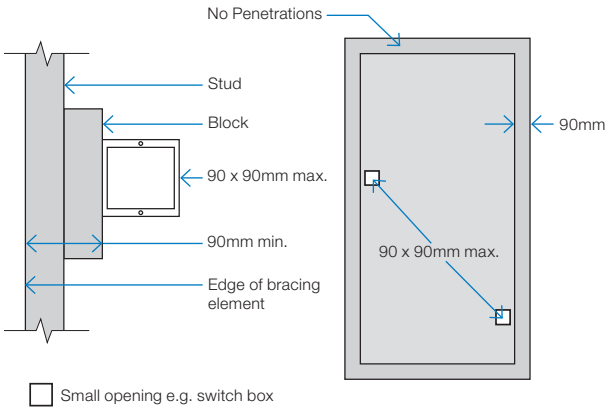
SMALL OPENINGS

Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

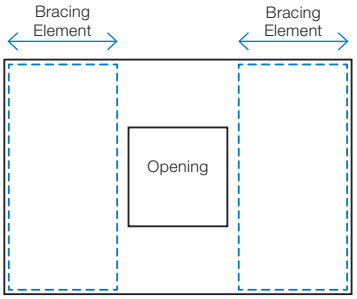
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



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Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

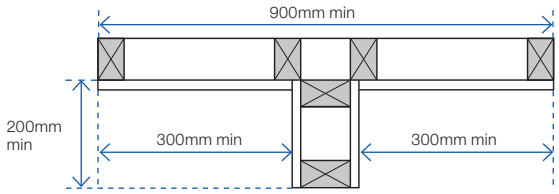
Guidelines for intersection walls

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

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

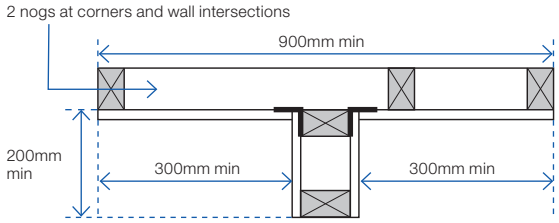
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



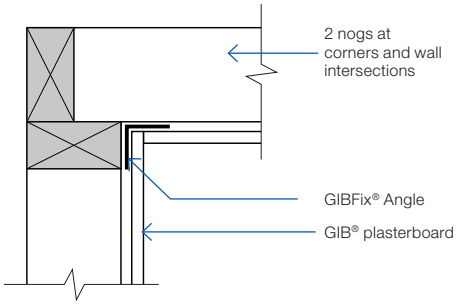
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



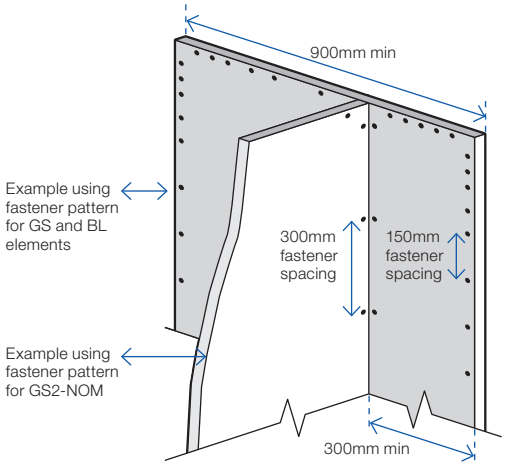
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFIX® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.

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Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR — EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR — INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

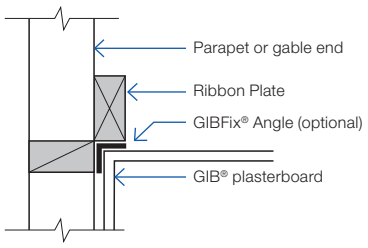
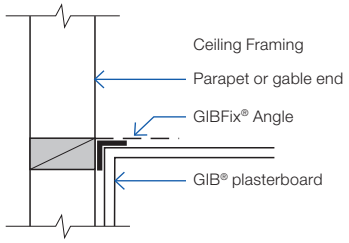


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

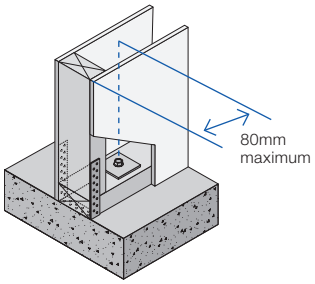
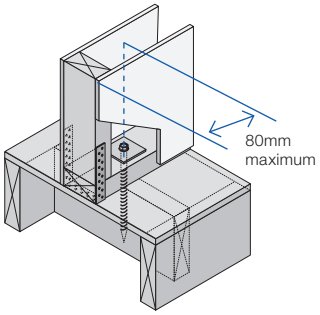
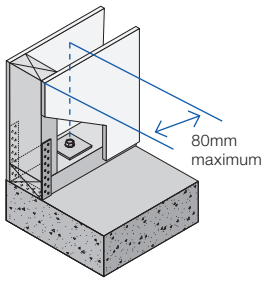
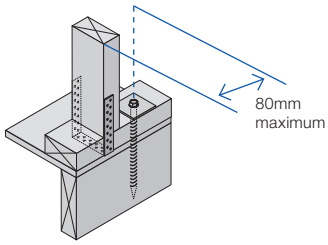
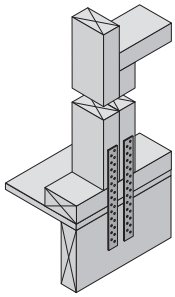
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BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	

Bracing strap installation

Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor	Timber floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.	
Internal wall	
 GEB004	 GEB005
External wall	
 GEB006	 GEB007
Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.	2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.
	 GEB008

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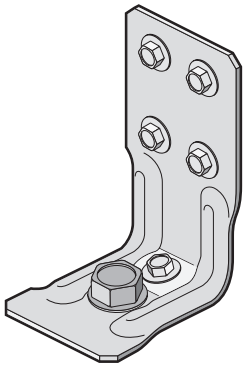
Hold-down fastener requirements	
Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.	12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element

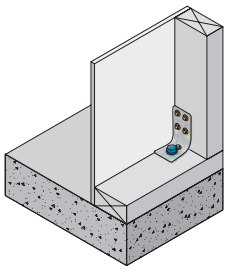
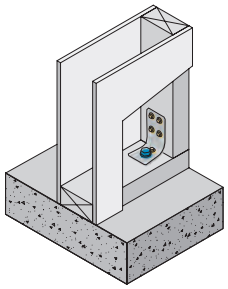
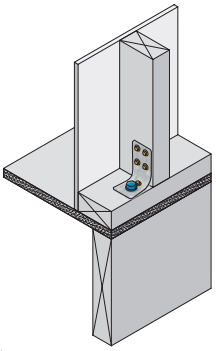
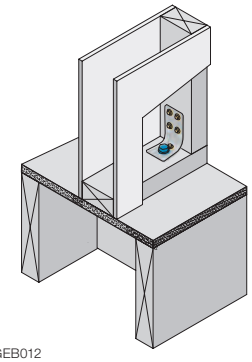
GIB HandiBrac® installation

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

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

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



Concrete floor		Timber floor	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

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

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

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

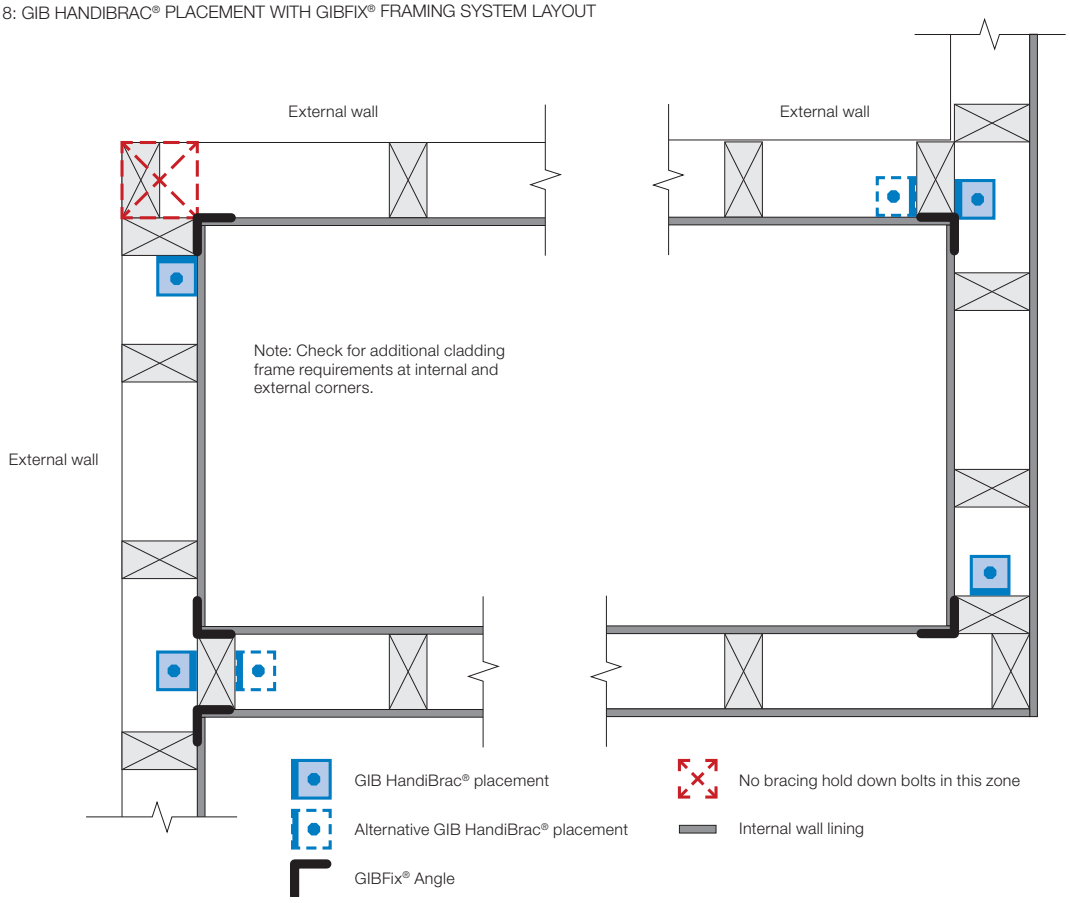
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

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

TIMBER FLOORS

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

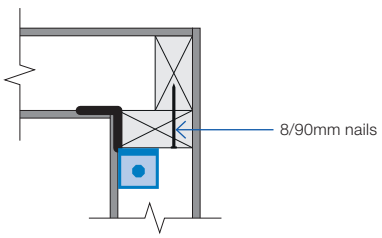
FIGURE 18: GIB HANDIBRAC® PLACEMENT WITH GIBFIX® FRAMING SYSTEM LAYOUT



GEB013

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

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GEB014

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.

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FIGURE 20: PROTRUSIONS AND CUTOUTS

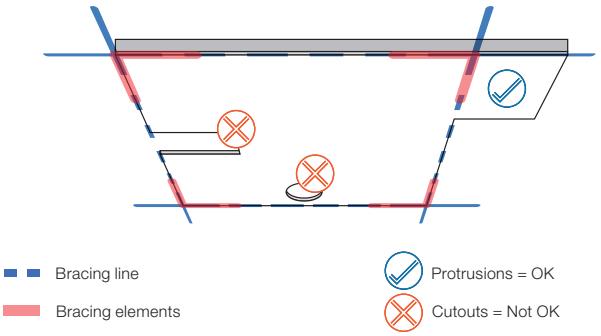


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

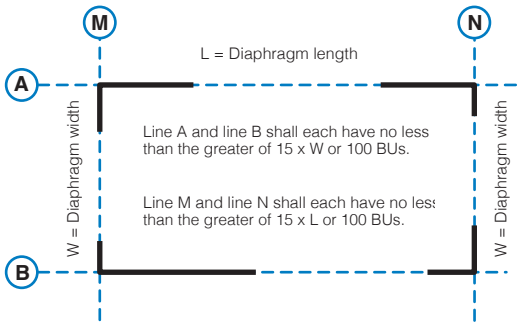
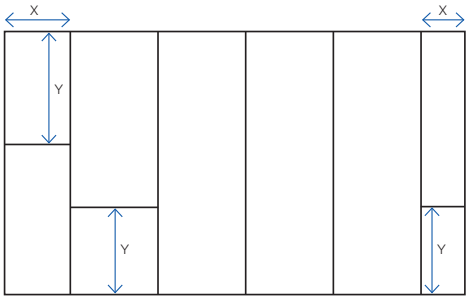


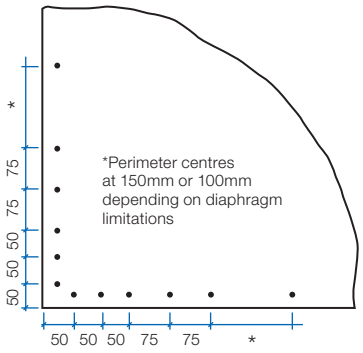
FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm min provided all adjacent joints are back-blocked.

Y = 1800mm min sheet lengths at ends of ceiling diaphragms.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015

Ceiling battens in ceiling diaphragms

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

Battens shall be spaced at a maximum of:
— 500mm for 10mm GIB® plasterboard.
— 600mm for 13mm GIB® plasterboard.

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

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

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

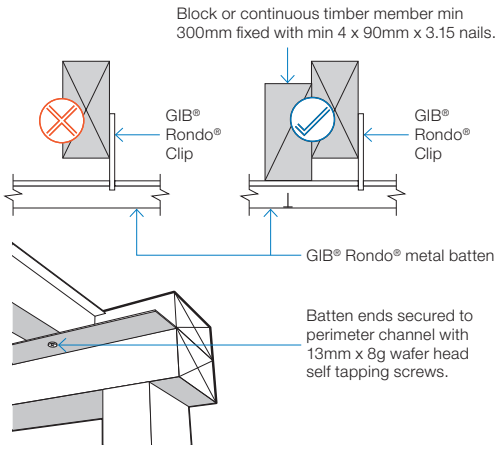
GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

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

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

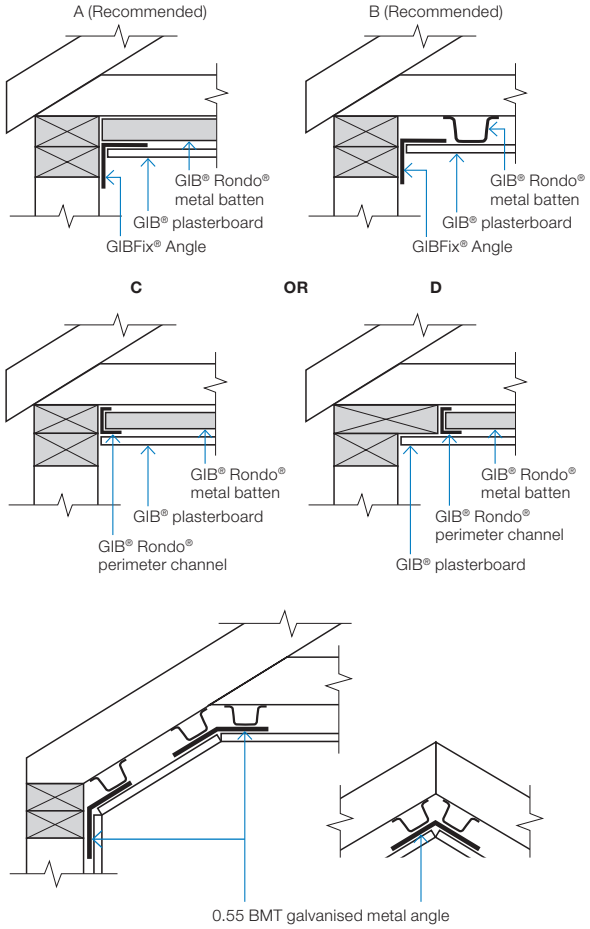
Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:
— Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
— Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



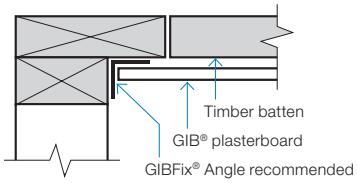
GEB016

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



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

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Openings in ceiling diaphragms

SMALL OPENINGS

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

LARGE OPENINGS

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

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

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

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

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

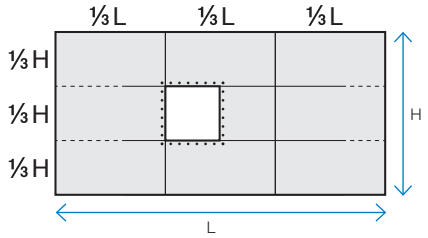
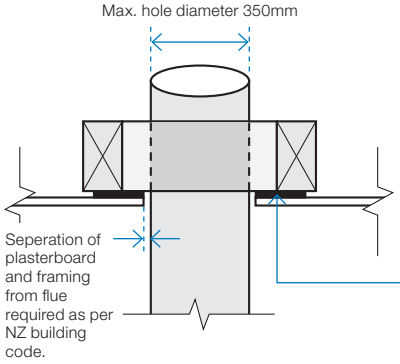
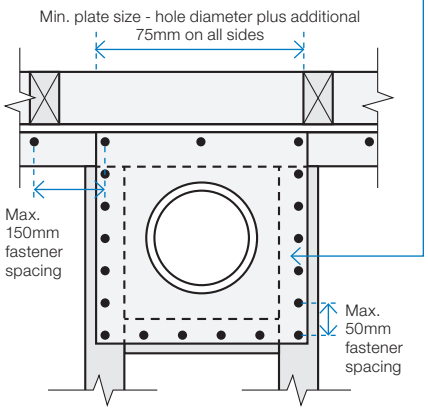


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



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

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

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

Plasterboard ceiling not shown in plan view

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Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

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

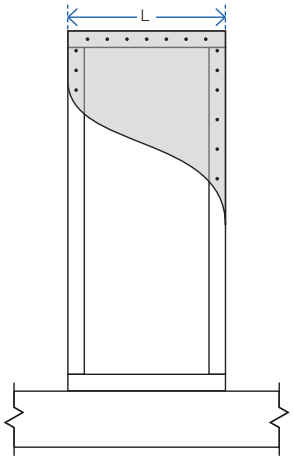
The dimension 'L' shall not be less than 400mm.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

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

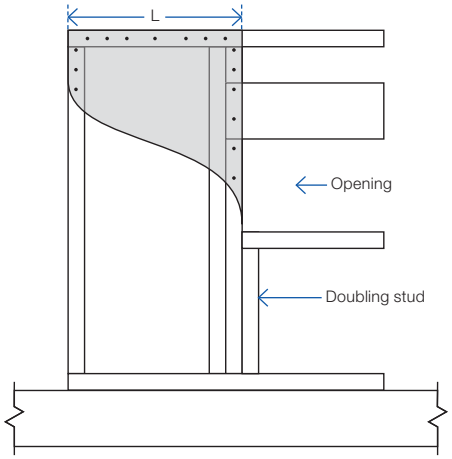
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FIGURE 29: GS BRACING ELEMENTS (OPTION A)



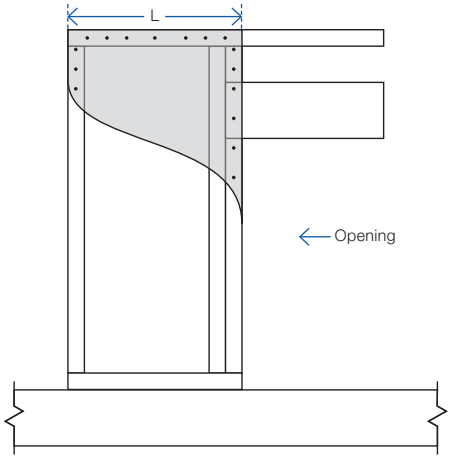
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



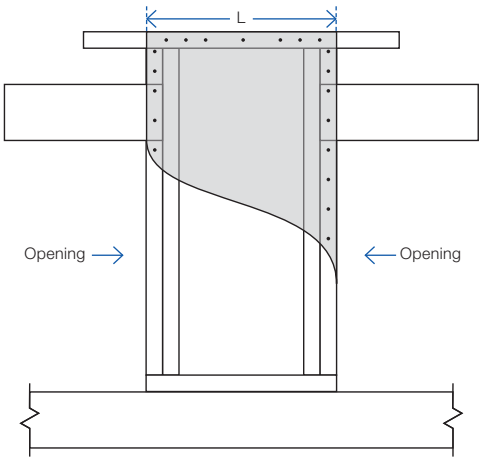
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

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.

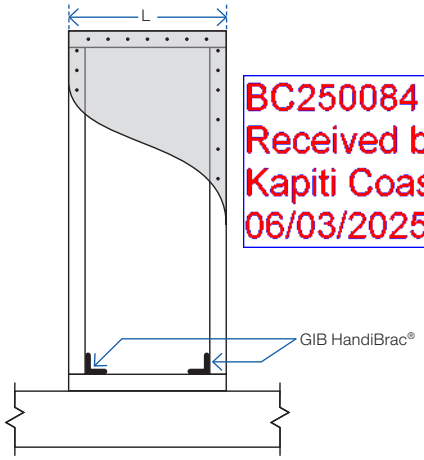
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

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.

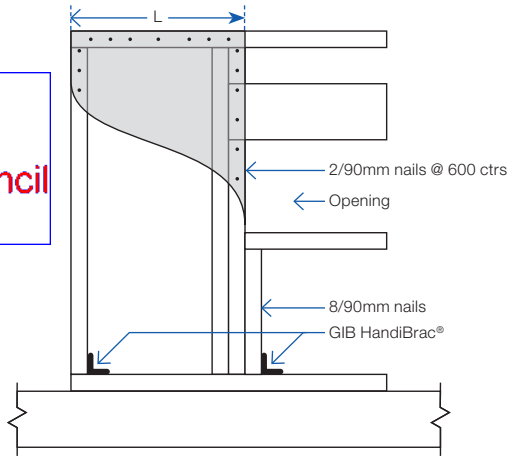
FIGURE 33: BL BRACING ELEMENTS (OPTION A)



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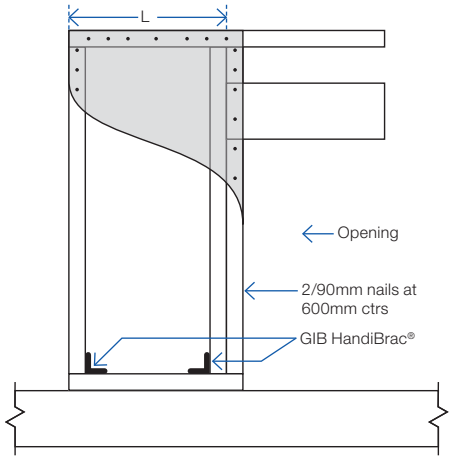
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



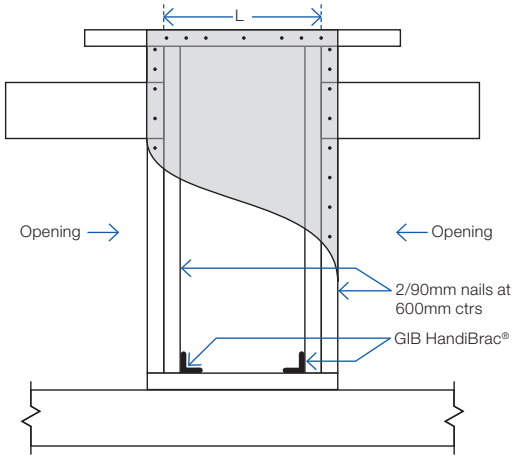
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



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

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



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

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.

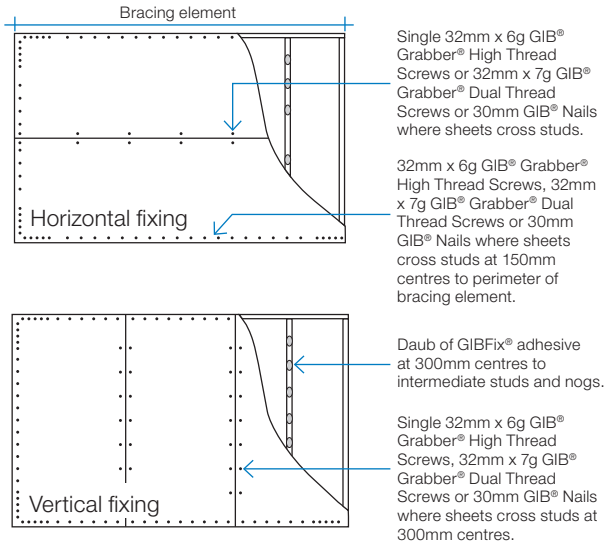
Fastener centres

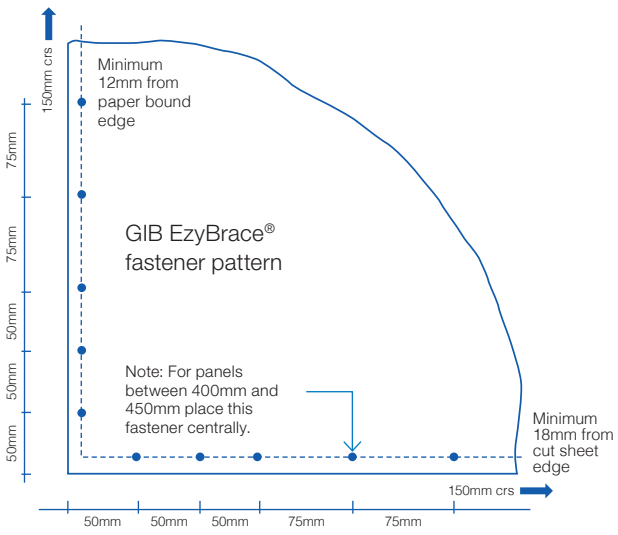
50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses 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.

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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 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.

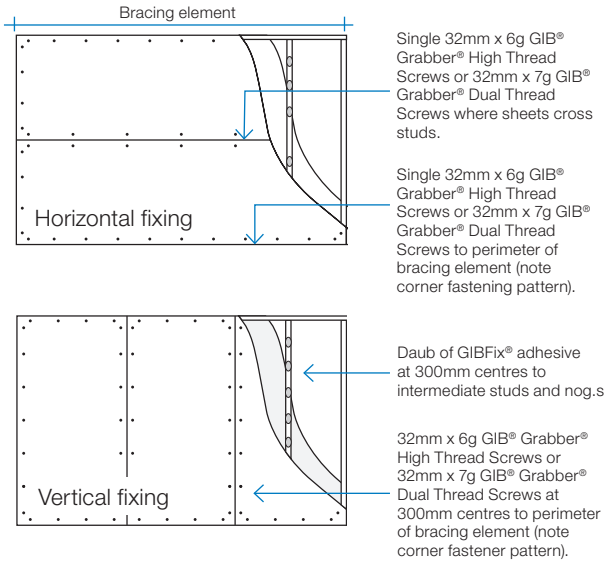
Fastener centres

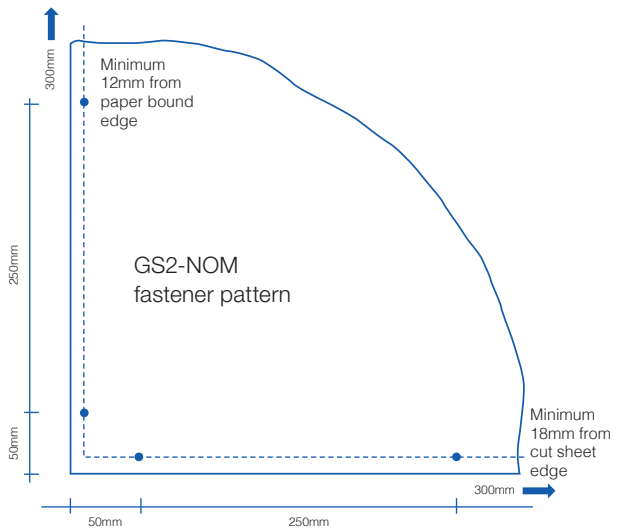
50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer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

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Unless stated all fastener spacings are maximums.

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GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

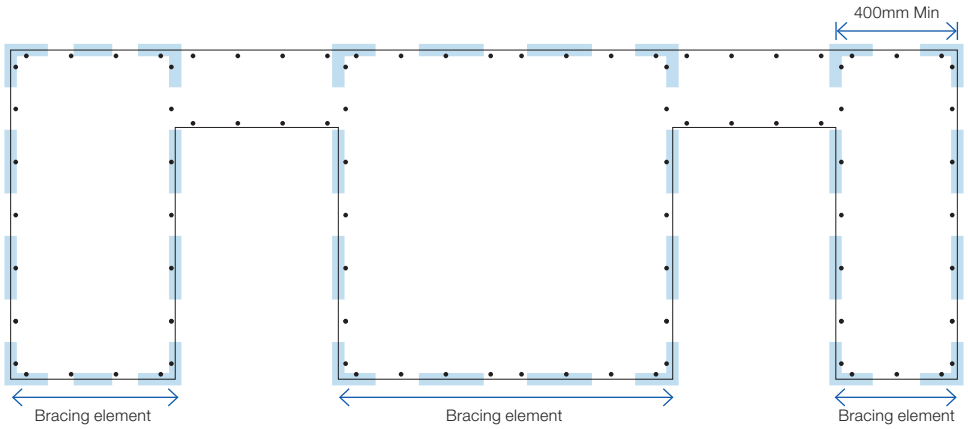
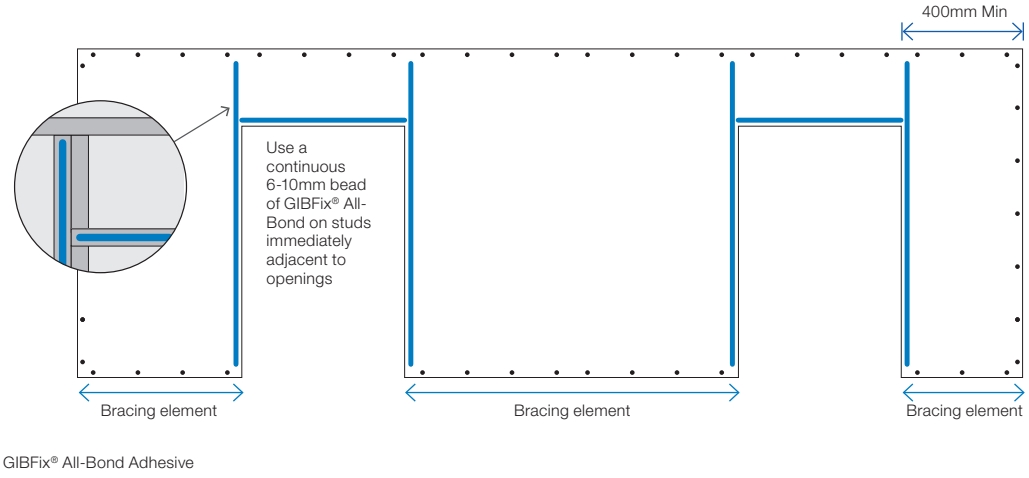
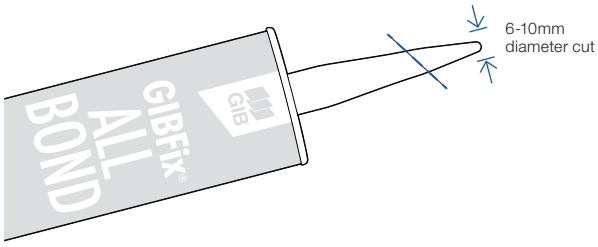


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE



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GIB EzyBrace® Systems specification GS2-N

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber Floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

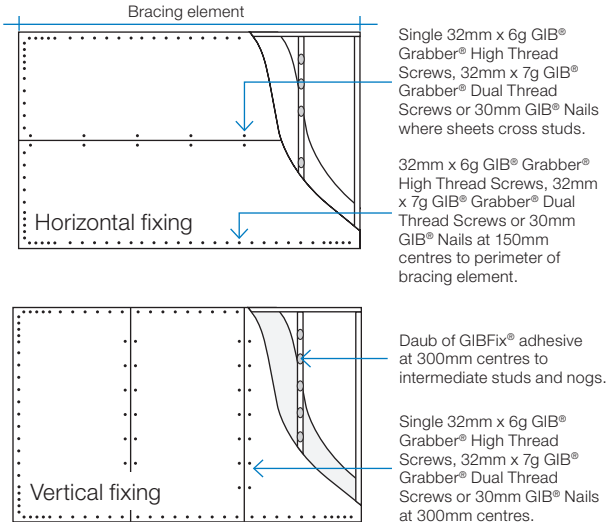
Fastener centres

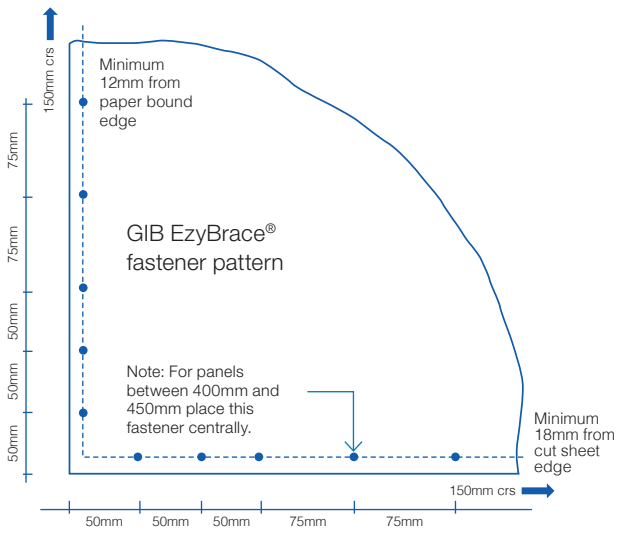
50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses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

JOINTING

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

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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. Width/the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

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WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

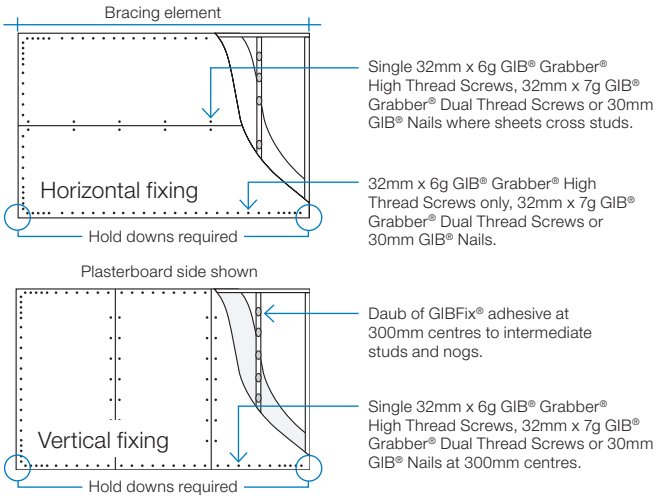
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

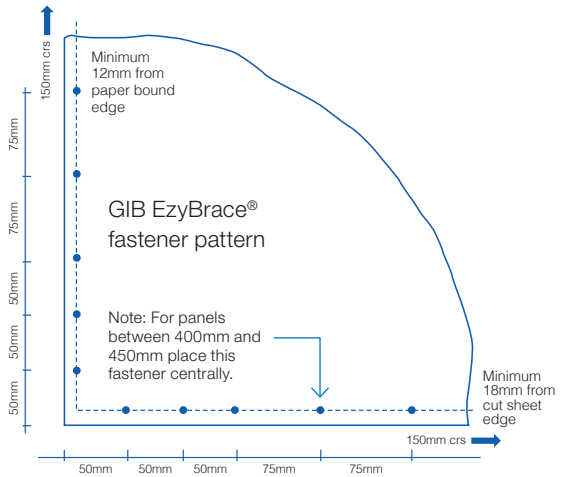
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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.

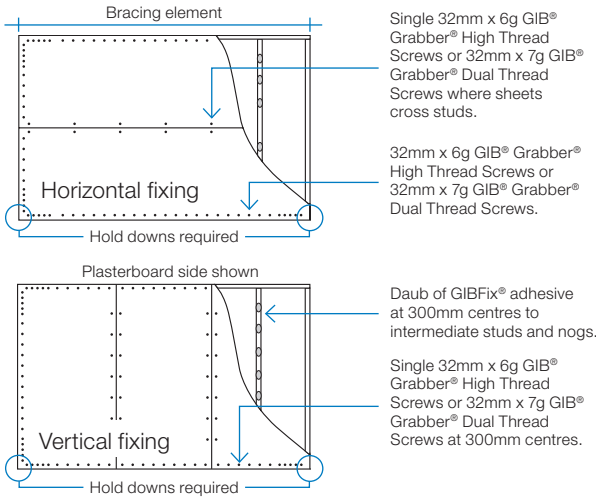
Fastener centres

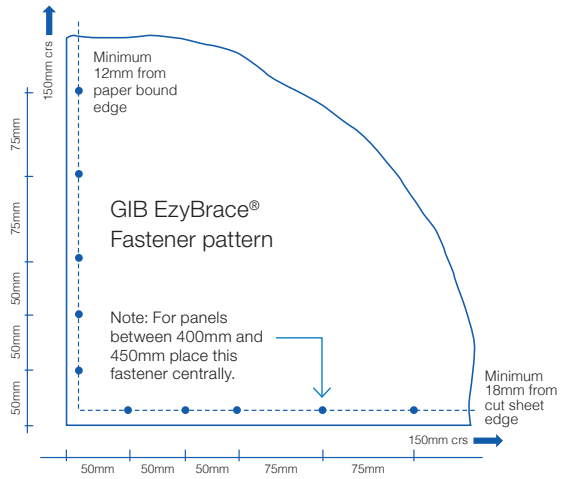
50,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. 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.

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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 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.

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PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

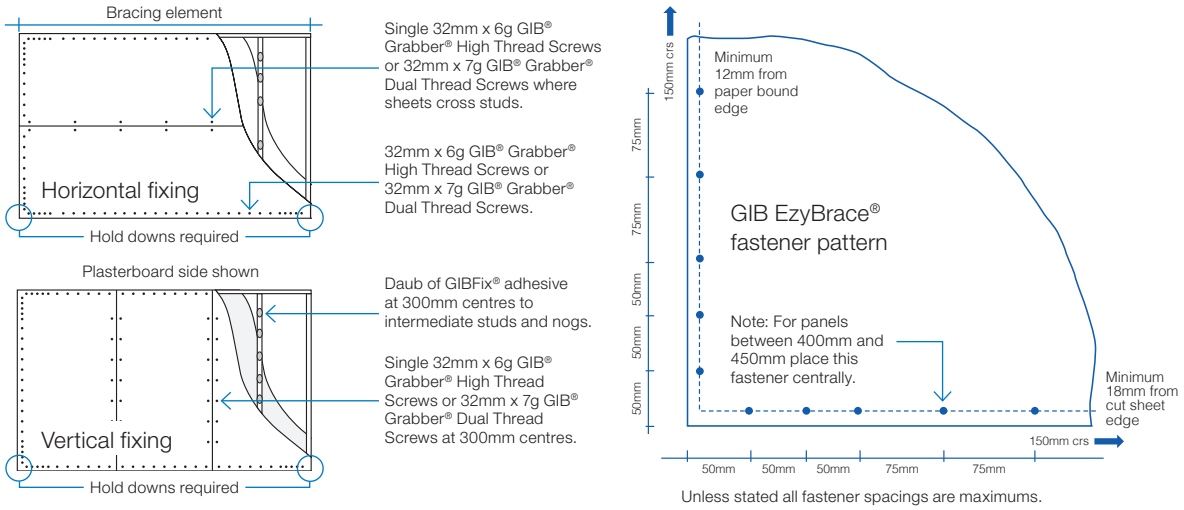
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

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

JOINTING

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



Unless stated all fastener spacings are maximums.

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

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.

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WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

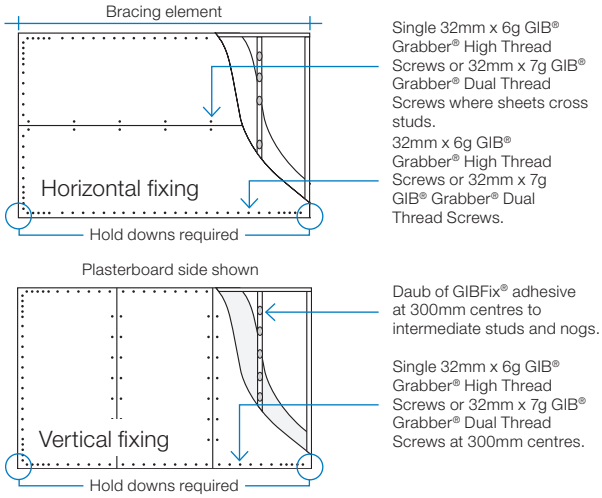
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread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

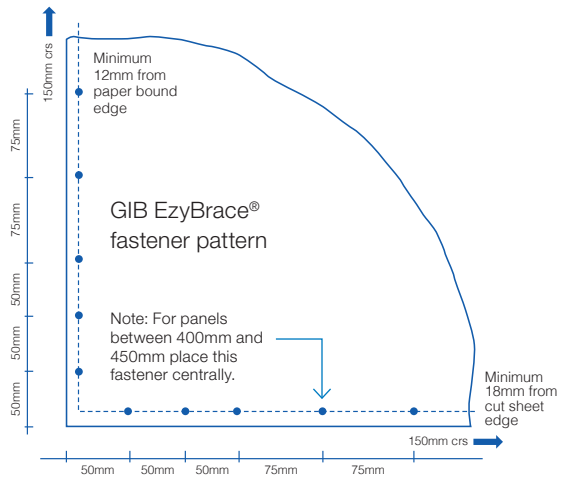
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERTTM}

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

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

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

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

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

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

TRADEMARKS

The names GIB,® GIB Fyreline,® GIB Ultraline,® GIB Braceline,® GIB Toughline,® GIB Noiseline,® GIB Aqualine,® GIB Nail,® GIB Tradeset,® GIB Plus 4,® GIB-Cove,® GIB Lite Blue,® GIBFix,® the colour mauve for GIB Toughline,® GIB HandiBrac,® GIB EzyBrace,® the colour blue for GIB Braceline,® the colour pink for GIB Fyreline,® the colour green for GIB Aqualine,® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

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

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FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

GIB®

Rondo® Metal Batten Systems

Specification and Installation Manual

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NATIONAL SUPPORT

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GIB® RONDO® METAL BATTEN SYSTEMS PROVIDE A STABLE SUBSTRATE FOR PLASTERBOARD CEILING LININGS.

Regular users of metal batten systems consistently have fewer call-backs for movement related ceiling defects such as peaking or cracked joints and popped fasteners.

GIB® Rondo® Metal Batten systems offer framing options to enable the construction of resilient and high performing, smooth surfaces. They form an essential part in many GIB® Fire Rated and GIB Noise Control® Systems and allow for the installation of services in the created cavity.

Some of the wall and ceiling systems are suitable to use as an integral part of airtight and thermal designs for 'high performance' homes.

WHY USE GIB® RONDO® METAL BATTEN SYSTEMS

- Consistent performance
  - Less influence from moisture or environmental factors than timber. Unlike timber battens which can vary in grade, species and with temperature and humidity
- Lighter weight
  - Lower transport costs and easier to handle on site
- Require less storage space
  - Storage space is often at a premium on building sites and a house-lot of GIB® Rondo® componentry will occupy substantially less space on site than timber battens
- Easy to achieve a flat, stable substrate
  - This results in a trouble-free ceiling and reduces the risk of costly call-backs
- Noise Control
  - Clip fix systems can noticeably improve inter-storey noise control
- Technical back up, our well established and highly rated technical team are available to quickly and efficiently handle any enquiries, call us on **0800 100 442** or email **helpline@gib.co.nz**

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WHAT'S NEW OR CHANGED IN THIS BOOK?

- Introduction of GIB® Rondo® Metal Batten ceiling and wall systems for easier specification and installation using system specification ID codes
- System selectors for
  - Direct fix systems
  - Clip fix systems
  - Fully suspended systems
- Suspended ceiling specification and installation
- Full component list with parts dimensioned and SKU numbers
- Updated fastener requirements
- Links to installation videos on the GIB® Website

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SCOPE OF USE

The GIB® Rondo® Metal Batten systems covered in this literature are suitable for applications within the following scope of use:

- For buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144m^2, not exceeding 12 metres in any direction
- For use in dry internal environments
- Supporting a single layer 10mm or 13mm GIB® plasterboard ceiling lining

GIB NOISE CONTROL® AND GIB® FIRE RATED SYSTEMS

Fire rated and noise control systems have specific requirements to ensure their performance. Please refer to the relevant GIB® literature* for details about the use and installation of those GIB® systems especially regarding requirements for multiple layers of GIB® plasterboard and perimeter detailing.

*GIB® Fire Rated Systems and GIB Noise Control® Systems manual

GIB EZYBRACE® SYSTEMS

Specific design is required to use GIB® Rondo® Metal Battens in a GIB EzyBrace® wall bracing element.

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements that transfer loads to wall bracing lines. Full details can be found in the GIB® EzyBrace® System specification and installation manual or the GIB® Site Guide.

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COMPLIANCE AND STANDARDS

When used within the scope of application and the details in this literature, compliance is achieved with the following NZBC Clauses:

- B1 Structure
- B2 Durability
- F2 Hazardous Building Material

Relevant standards:

- AS/NZS 1170 Structural design actions
- AS/NZS 4600:2018 Cold-formed steel structures
- NZS 3404 Parts 1 and 2:1997 Steel structures standard
- AS 1397:2021 Continuous hot-dip metallic coated steel sheet
- AS 3566:2002 Self drilling screws
- AS/NZS 2589:2017 Gypsum linings

ELECTRICITY

Earthing is not required when electrical fixtures such as light fittings are installed between metal battens or fixed to timber blocking between battens.

Do not run electrical cabling inside metal battens.

For any other scenarios, consult an electrical contractor for any earthing requirements that may need to be incorporated.

CEILING LOADS

To limit sag, loads on GIB® plasterboard ceilings must not exceed an insulation weight of 4.2kg/m^2, and a fixture weight of 1kg or more unless they are independently supported. The placement of ceiling fixtures such as light fittings are to be limited to one fixture per m^2 unless independently supported.

BOTTOM CHORD RESTRAINT AND LATERAL SUPPORT OF TOP PLATES

Directly fixed GIB® Rondo® Metal Battens will provide bottom chord restraint for roof trusses and lateral support for top plates for buildings compliant with NZS 3604:2011 or NASH Standard for Residential and Low-Rise Steel Framing. Clip or full suspended systems provide minimal or no restraint or lateral support.

RAKING AND COVED CEILINGS AND SKILLION ROOFS

Due to the higher and fluctuating air moisture content, temperatures, and low air movement that can occur in raking ceilings, it is strongly recommended that clip fixed GIB® Rondo® Metal Batten systems are used. Unlike the various species and grades of timber battens which are variously affected by temperature and humidity, the performance of GIB® Rondo® Metal Battens is consistent throughout New Zealand.

Roof space ventilation, ceiling control joints or perimeter relief, and back-blocking will help reduce the risk of cracking in large expansive plasterboard ceilings.

Specific Engineering Design (SED) is required when designing raking suspended ceilings. See the Suspended Ceiling section in this manual for further details (p.16-19).

WALL LOADS

Metal battens on walls are not suitable for mounting heavy items such as shelving, cupboards, or vanity units.

TILING WALLS ON BATTEN SYSTEMS

To support tiles, reduce batten spacing to 450mm centres maximum and batten spans to 800mm centres maximum. Use 13mm GIB Aqualine® when tiling on metal battens.

BACK-BLOCKING

Back-blocking is the practice of laminating an offcut of plasterboard to the back of a joint using GIB-Cove® Bond. The back-blocking process is described in detail in the GIB® Site Guide.

Back-blocking is required as outlined below:

- Timber battens
  - When there are 3 or more tapered edge joints in a ceiling area
- Metal battens
  - When there are 6 or more tapered edge joints in a ceiling area
- To achieve a Level 5 Finish (all joints)

When using clip fixed metal battens or suspended ceiling, back-blocking tapered edge joints is not required when a Level 4 Finish is specified.

We strongly recommend back-blocking in the following situations:

- Sheet end joints not formed over battens
- All sheet joints in garages
- All sheet joints in ceiling application for superior performance

CONTROL JOINTS

Control joints are recommended to provide relief from stresses associated with changes in temperature, humidity, and the performance of junctions between dissimilar construction materials. Control joints must be positioned at maximum 12.0m centres in either direction. For general requirements refer to the GIB® Site Guide or for more significant structural movements consult the building designer.

Control joints in the GIB® Rondo® Metal Batten system can be achieved as shown in the details section of this manual (p.22).

Refer to the GIB® Fire Rated and GIB Noise Control® Systems literature for control joints in those systems.

HEALTH AND SAFETY

Use appropriate PPE such as eye protection and gloves. PPE must be used when handling or cutting GIB® Rondo® Metal Batten system components. Avoid breathing the dust while cleaning metal battens, and avoid any sharp edges when cutting.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded.

Before using this publication check whether this is the current publication; simply call the GIB® Helpline on 0800 100 442 or visit gib.co.nz

GIB® WARRANTY STATEMENT AND SUBSTITUTION

Product and System Warranty

The Winstone Wallboards warranty covers GIB® products and/or systems for a minimum of 10 years from the date of purchase. Winstone Wallboards warrants that GIB® products will be free from defects caused by factory workmanship or materials and, subject to compliance with the conditions in the Winstone Wallboards warranty statement, that the product or system will perform to the extent set out in relevant Winstone Wallboards published literature current at the time of installation. 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.

We are 100% Behind our Products and Systems

If any of our products or systems fail to perform as claimed or an issue associated with any GIB® product or system does occur, Winstone Wallboards will work with the relevant parties to help resolve the issue.

System and Product Components

A system is a group of related product components that interact to perform a task. Ensure the full GIB® building system, including the appropriate GIB® branded products, are specified and installed. This will ensure performance is not compromised and that any failure that is attributable to GIB® products and/or systems will be supported. Winstone Wallboards will not support system performance where substitute products are used.

SUSTAINABILITY

- Winstone Wallboards Ltd is committed to protecting the environment. Environmental planning is integrated into all our 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 must all accept
  - We allocate management time and resources to address relevant environmental issues and continuously improve our activities in that area
  - We will achieve our standards through positive action, employee involvement and constant communication with our neighbours, local authorities and customers
- Recycled steel content in Rondo® product is maximised, without being detrimental to the quality of the product
- The Rondo® EPD provides the Life Cycle Assessment (LCA) data

Rondo® is constantly reviewing its processes to minimise Rondo® Australia and New Zealand's consumption of energy from fossil fuels and reducing waste to landfill. Rondo® is constantly reviewing advancements in technology that could be introduced to benefit Rondo® by reducing annual energy consumption and the waste sent to landfill annually. Rondo® also recognises its responsibility in making a genuine commitment to the environment, aiming to achieve and maintain a high standard of environmental care within all areas of its operations.

GIB® sustainability

Rondo® sustainability

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HANDLING AND STORAGE

- Metal components must be protected from the weather prior to installation and stored dry and flat on suitable dunnage
- Do not make service holes in metal battens or accessory components
- Metal battens can be cut using tin snips, a hacksaw or grinder disk. Wear appropriate PPE and take care when using a grinder not to damage the surface of the battens.
- Follow normal safe practices to protect yourself and others

INSTALLATION

- Install GIB® Rondo® Metal Batten system after the roof is on. This is important with heavyweight roofs to reduce any unevenness and stress in the ceiling plane as the roof settles. Truss bottom chords usually have a pre-camber which changes under the roof load and will also affect the 'flatness' of the finished ceiling and create stress points especially near wall framing
- Do not line the ceiling until the moisture content of the timber framing supporting the battens is less than 18%. It is recommended that a moisture content of 8-12% is achieved if the building is to be air-conditioned and/or centrally heated
- To minimise the risk of plasterboard surface defects, ensure all ceiling battens run in the same direction. Consider control joints at a change in direction

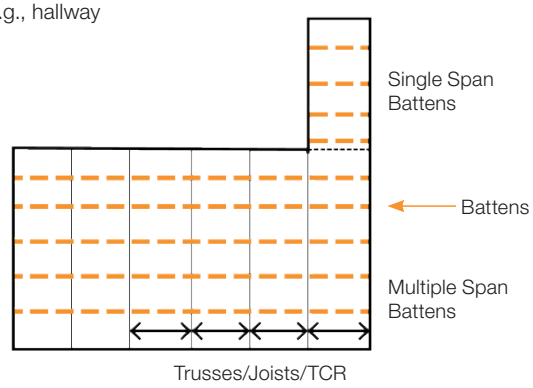
Scan to view GIB® installation videos

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BATTEN SPACING AND SPAN

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

- A multiple span batten is continuous across more than 2 supports
- A single span batten spans between 2 supports only e.g., hallway



DROP HEIGHT

For ceiling applications, the following drop heights can be achieved depending on batten type, Direct Fix (DF), Clip Fix (CF) and Suspended Ceiling (SC). The drop height is measured from the underside of the floor framing or slab to the top of the plasterboard ceiling lining.

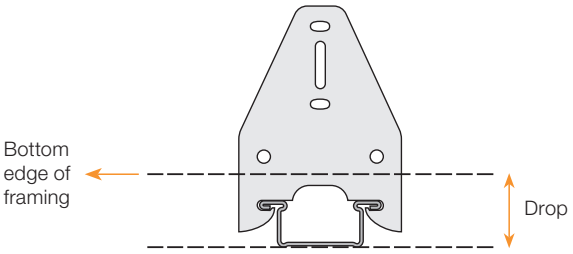


Table 1

Batten	Fixing	Type	Drop Range (mm)	Page
GIB® Rondo® 310	Direct Fix	N/A	35	12
	Clip Fix	311D Clip	40-65	13
		313 Long Clip	40-165	
		A311 GIB® Quiet Clip	40-65	
Rondo® 308	Clip Fix	226 Clip	20-45	14
		394 Long Clip	20-145	
		STWC Acoustic Clip	30-40	
		Betagrip Clip	35 / 40	
		A239 Clip 100mm Bolt	55-130	
		A239 Clip 180mm Bolt	55-210	
	Suspended Ceiling	Grid	150-1000	18
		Grid + STSU Clip	165-1000	
Rondo® 129	Clip Fix	226 Clip	30-55	15
		394 Long Clip	30-155	
		STWC Acoustic Clip	40-50	
		Betagrip Clip	30-50	
		A239 Clip 100mm Bolt	70-140	
		A239 Clip 180mm Bolt	70-220	
	Suspended Ceiling	Grid	165-1000	18
		Grid + STSU Clip	180-1000	



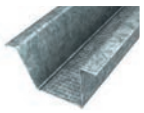
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GIB® Rondo® Metal Batten Selector - Direct Fix (DF) and Clip Fix (CF) Options

GIB® RONDO® 310 SYSTEM
DF AND CF

310 BATTEN
12639 3.6m
12640 4.8m
12641 6.0m

35mm (h) x 40mm (face)



311D CLIP
12711

92mm (h) x 90mm (w)
Adjustment range 2-30mm



313 LONG CLIP
14907

190mm (h) x 90mm (w)
Adjustment range 2-130mm



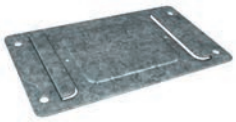
A311 GIB QUIET CLIP®
14209

92mm (h) x 90mm (w)
Adjustment range 2-30mm



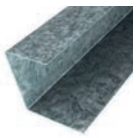
312 JOINTER
12643

55mm (l) x 21mm (w)



340 PERIMETER CHANNEL
12642 3.0m

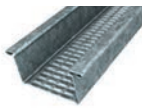
35mm (h) x 24mm x 36mm
(uneven leg)



GIB® RONDO® 308 SYSTEM
CF ONLY

308 BATTEN
14918 3.6m
14919 4.8m
14920 6.0m

16mm (h) x 38mm (face)



394 LONG CLIP
14909

190mm (h) x 66mm (w)
Adjustment range 2-130mm



STWC ACOUSTIC CLIP
14984

Resilient mount. Direct fix to wall or ceiling. Adjustment up to 5mm possible.

Also referred to as ST001.



226 CLIP
14903

90mm (h) x 66mm (w)
Adjustment range 2-30mm



A239 CLIP
14911

100mm Rod & Clip

A239 CLIP
14913

180mm Rod & Clip



For direct fixing to concrete walls or ceilings.

Accepts 129 or 308 Batten.

BETAGRIP CLIP
14914

For direct fixing to concrete walls or ceilings. Approx. before 25mm adjustment for height in 5mm increments.

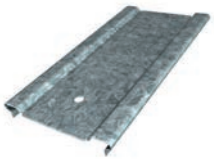
Accepts 129 batten in all slots and 308 batten in upper 2 slots.

Previously known as BETAFIX CLIP.



138 JOINTER
14924

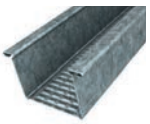
91mm (l) x 51mm (w)



GIB® RONDO® 129 SYSTEM
CF ONLY

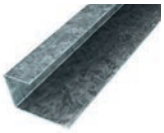
129 BATTEN
14915 3.6m
14916 4.8m
14917 6.0m

28mm (h) x 38mm (face)



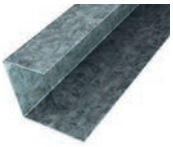
142 PERIMETER CHANNEL
14937

16mm (h) x 13mm x 28mm
(uneven leg)



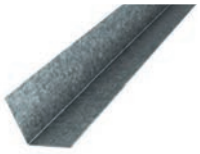
140 PERIMETER CHANNEL
14936

28mm (h) x 20mm x 30mm
(uneven leg)



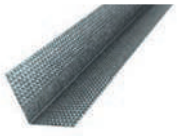
NZ18 PERIMETER ANGLE
12645 3.0m
Can also be used for internal corners in tiled shower situations (see GIB® Site Guide).

32mm (h) x 32mm (w)



GIBFIX® ANGLE
15662 2.4m
15663 2.7m

45mm (h) x 45mm (w)



*NZ18 & GIBFix® angle are compatible with all ceiling battens types.

Scan to view GIB® Rondo® range

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SPECIFICATION EXAMPLE

Fixing
Direct Fix (DF)
Clip Fix (CF)

GIB® Rondo®

GR → 310 → CF → 311D

Batten
310
308
129

Clip Options

Batten	Clip
310	311D
	313LC
	A311
308/129	226
	394LC
	STWC
	BGC
	A239100
	A239180

INTRODUCTION

This section describes Direct Fix (DF) and Clip Fix (CF) ceiling applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options are the GIB® Rondo® 310 Batten with a depth of 35mm, the Rondo® 308 Batten with a depth of 16mm, and the Rondo® 129 Batten with a depth of 28mm.

GIB® Rondo® 310 System

- Only the GIB® Rondo® 310 Batten can be direct fixed
- For clip fixing to framing, the 311D and 313 Long Clip are used with the GIB® Rondo® 310 Batten
- To reduce noise attenuation between floor levels the GIB Quiet Clip® can be used with the GIB® Rondo® 310 Batten

GIB® Rondo® 308/129 System

- The Rondo® 308 and 129 Battens require clip fixing
- For clip fixing to framing, the 226 and 394 Long Clip are used with Rondo® 308 and 129 Batten
- To reduce noise attenuation between floor levels the STWC Acoustic Clip can be used with the Rondo® 308 or 129 Batten
- The Betagrip Clip and A239 Clips are used with Rondo® 308 or 129 Battens

Specification Reference

A specification reference can be assigned by combining the batten type, fixing method, and clip type as follows:

GR308/129 Systems	GR310 Systems
GR308 or GR129-CF-226	GR310-DF
GR308 or GR129-CF-394LC	GR310-CF-311D
GR308 or GR129-CF-STWC	GR310-CF-313LC
GR308 or GR129-CF-BGC	GR310-CF-A311
GR308 or GR129-CF-A239100	
GR308 or GR129-CF-A239180	

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INSTALLATION

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.

JOINTING BATTENS

When direct fixing using GIB® Rondo® 310 Battens, batten joints can be made over a supporting framing member. When batten joints fall between framing or when clip fixing is used, the GIB® Rondo® 310 Battens can be joined using the 312 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Stagger joints between adjacent battens.

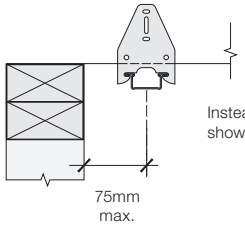
PERIMETER FIXING

There are several options to fix the ceiling perimeter.

When direct fixing using GIB® Rondo® 310 Battens. The ceiling perimeter can be fixed to a nominally 140 x 35mm oversize top plate. The batten dimensions match the nominal top plate thickness. When clip fixing, or with a conventional plate arrangement, use the 340 Perimeter channel or a NZ18 or GIBFix® Angle.

When clip fixing Rondo® 308 or 129 Battens, the ceiling perimeter is fixed to a 142 or 140 Perimeter channel respectively, or a NZ18 or GIBFix® Angle.

When a batten runs parallel and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements. Raking or skillion roofs may have specific perimeter requirements for folded metal angles.

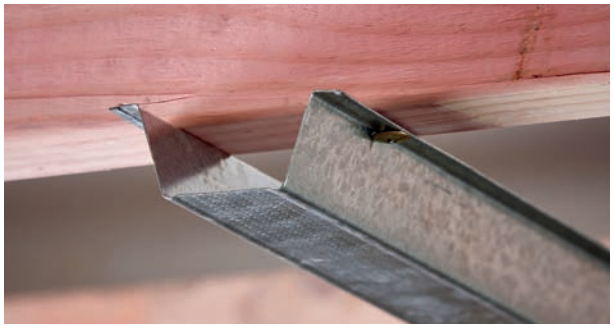


Instead of a metal angle a batten can be positioned as shown (not suitable for fire-rated applications)

GIB® RONDO® 310 DIRECT FIX (DF) SYSTEM

This fixing method applies to the GIB® Rondo® 310 Metal Batten only. For specification purposes the following string can be used.

GR310-DF



FASTENERS

Fix directly by fastening with pairs of 32mm x 8g GIB® Grabber® Wafer Head or 32mm x 7g GIB® Grabber® Dual Thread Screws.

- Alternatively, pairs of min. 45mm x 2.8mm flat or 'D' head nails can be used
- For fixing to steel framing a drill tip screw is recommended
- Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle
- To fix the batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets

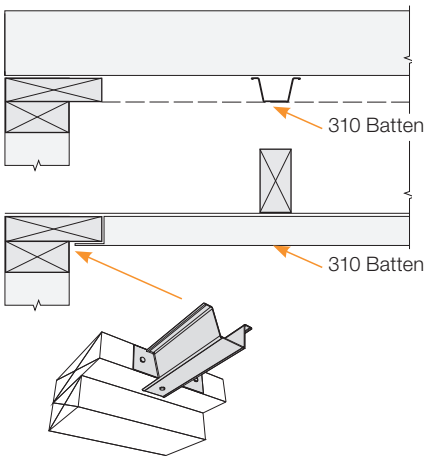
PERIMETER

GIB® Rondo® NZ18 angle, 340 Perimeter channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

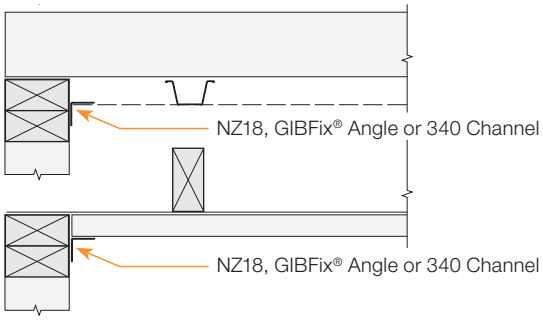
INSTALLATION

1. Establish ceiling height
2. Fix any perimeter channels or angles at required level
3. Set out batten centres
4. Cut the battens 10mm short to leave a 5mm gap at each end
5. Set the battens in the correct position and fasten to the framing taking care not to distort the batten

PERIMETER OPTIONS



PREFERRED OPTION



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GIB® RONDO® 310 CLIP FIX (CF) SYSTEM

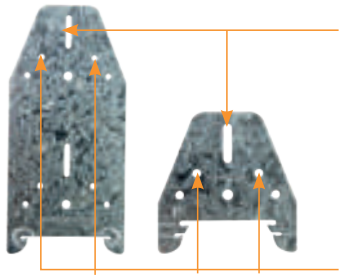
This fixing method applies to the GIB® Rondo® 310 Metal Batten and matching clip options selected, depending on the desired drop height or acoustic requirements.

Clips available for use with the GIB® Rondo® 310 Batten are the 311D Clip, the 313 Long Clip, and the A311 GIB Quiet Clip®.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR310-CF-311D
GR310-CF-313LC
GR310-CF-A311

FASTENING THE SHORT AND LONG CLIP

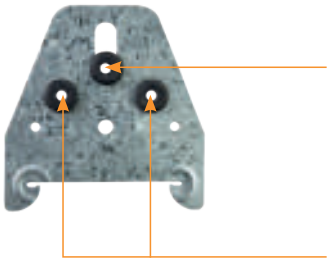


Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection

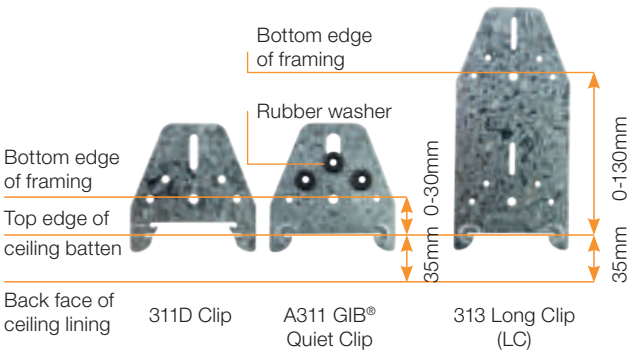
FASTENING THE A311 GIB QUIET CLIP®

Insert the first screw into the middle rubber grommet, tighten enough to hold the A311 GIB® Quiet Clip® in place, adjust the clip to the correct position insert the remaining two screws and tighten. Do not overtighten the screws to the point where the grommet is crushed. The screws should be tightened enough to allow the flexibility to remain in the connection.



Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection



PERIMETER

GIB® Rondo® NZ18 Angle, 340 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

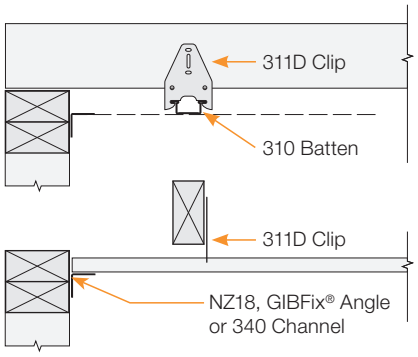
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles at the level required
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk. Cut the battens 10mm short to leave a 5mm gap at each end
7. Insert the batten into the channel at each end and fit into the clips
8. Install remainder of clips ensuring that the batten is straight and flat

GIB® RONDO® 310 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



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GIB® RONDO® 308 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 308 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 308 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100mm or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR308-CF-226	GR308-CF-BGC
GR308-CF-394LC	GR308-CF-A239100
GR308-CF-STWC	GR308-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

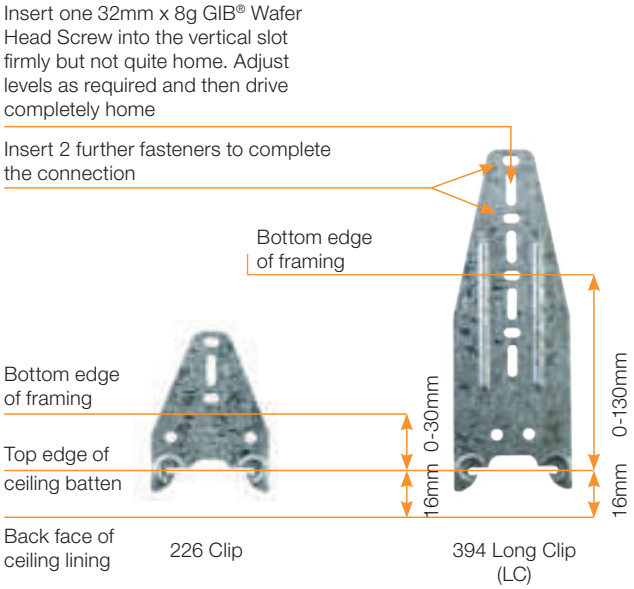


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 142 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

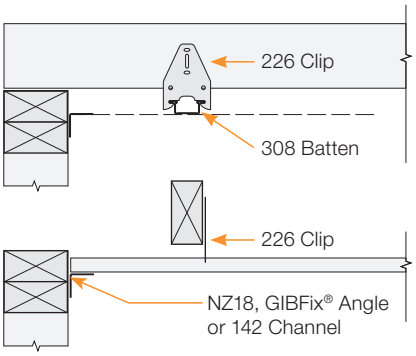
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 308 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



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GIB® RONDO® 129 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 129 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 129 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100 or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR129-CF-226	GR129-CF-BGC
GR129-CF-394LC	GR129-CF-A239100
GR129-CF-STWC	GR129-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

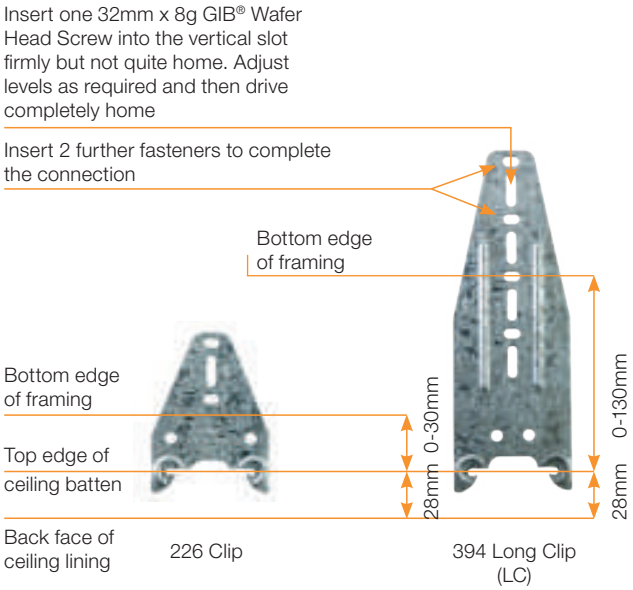


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 140 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

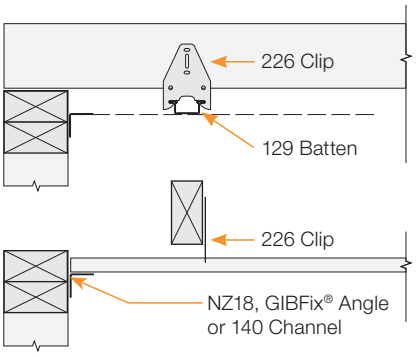
To fix batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 129 CLIP FIX (CF) SYSTEM EXAMPLE

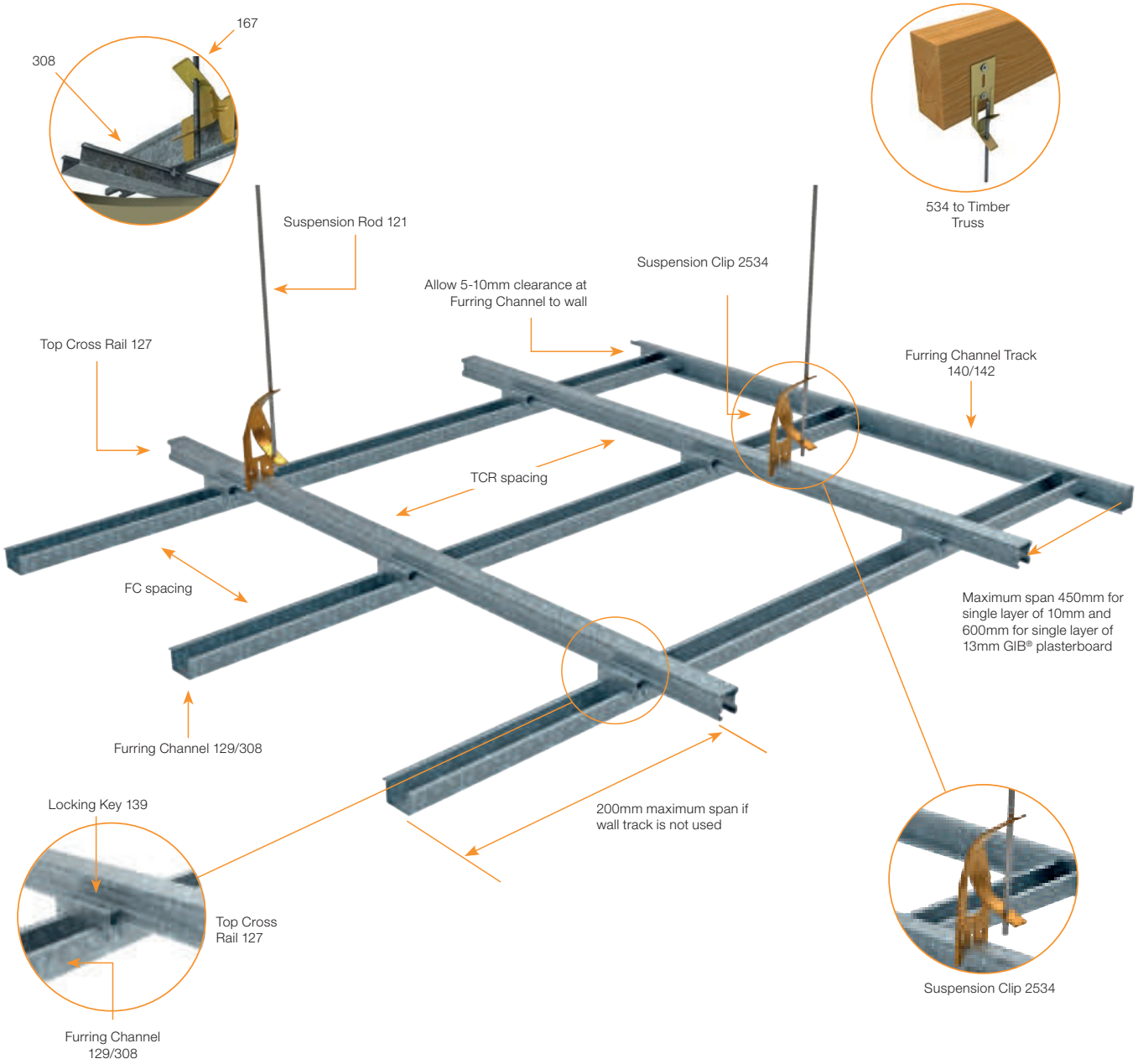
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Suspended ceiling metal battens (SC) on rod

Fully suspended (150–1000mm drop)



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CEILING ACCESSORIES (COMPATIBLE WITH THE 308 & 129 BATTENS)

547 CLIP

14935

Fix vertically.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 547 clip. Easily adjustable for height.



STSU CLIP

14983

Ceiling resilient mount.

Fits 127 or 128 TCR.

Accepts either 129 or 308 Battens.



534 CLIP

14934

Fix horizontally.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 534 clip. Easily adjustable for height.



167 CLIP

14929

Side mount clip - low profile alternative for 2534 clip.

Connects 127 TCR to 5mm rod.

Provides height adjustment.

Only suitable for single layer systems.



121 ROD

14931 3.6m

5mm galv. rod for use with 547, 534, 2534, 8167 clips.



2534 CLIP

14930

Friction fitted to 121 rod.

Connects to TCR 127 & 128



127 TCR – 25mm

14921 3.6m
14922 4.8m

25mm (h) x 21mm (w)

Top Cross Rail. (TCR)
Also called strongback, works with 2534 clip.



128 TCR – 38mm

14923 4.8m

Top Cross Rail (TCR). Also called a strongback. Works with 2534 clip.

38mm (h) x 21mm (w)



139 CLIP

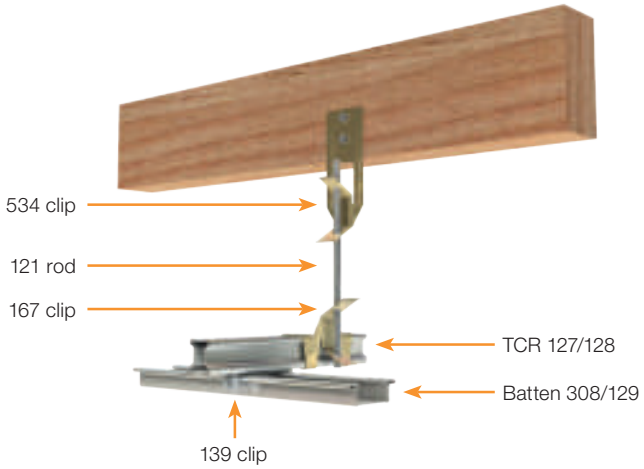
14925

Clicks into TCR at spacings to suit the ceiling lining, i.e. 450mm for 10mm plasterboard and 600mm for 13mm plasterboard.

Connects to 308 or 129 batten.



EXAMPLE



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SUSPENDED CEILINGS

This section describes suspended ceiling (SC) applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options, also referred to as furring channels, are the Rondo® 308 and 129 Battens.

The Rondo® 308 or 129 Batten is clipped to a top cross rail (TCR) using 139 Clips. The 127 or 128 TCR is connected via 2524 Clips or 167 Side Mounted Clips to 5mm galvanised suspension 121 Rods. Rods are fixed to the supporting structure using 547 Clips for mounting to a horizontal surface, or 534 Clips for side mounting to a vertical face.

The suspended ceiling option permits a drop from 150 to 1000mm.

A specification reference can be assigned for the selected system by combining the batten type, and fixing method. For example:

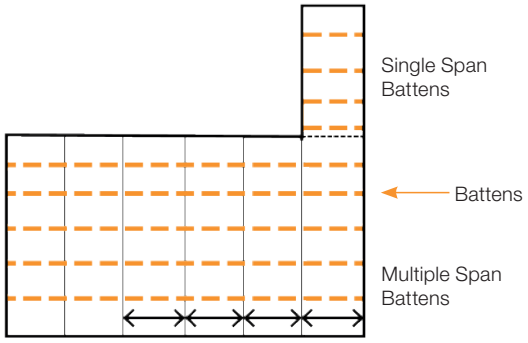
GR308-SC
GR129-SC

SUPPORTING FRAMING AND BATTEN LAYOUT

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.



JOINTING BATTENS

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

JOINTING TOP CROSS RAIL

To join TCRs, use a 200mm long piece of the 127 TCR and clip it over the top of the rail (see Control Joint Details p.22).

PERIMETER FIXING

The Rondo® 308 and 129 Battens can be terminated at the ceiling perimeter into a 142 or 140 Perimeter Channel respectively or can be fixed to a NZ18 or GIBFix® Angle.

When a batten runs parallel, and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements.

FASTENERS

1. 534 Top mount fixed to timber framing by fastening with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
2. 547 Top mount fixed to underside of the timber with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
3. Perimeter Channel to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix the perimeter channels or angles. There must be a nog/dwang behind the channel or angle
3. Cut the suspension rod (121) to length using a hacksaw
4. Attach top mount clip (534) to one end of the rod and TCR clip (167) to the other end
5. Fix the rod assembly to floor or roof structure above to support the TCR along its length at maximum 1200mm centres and space the TCRs at 1200mm centres maximum to form a 1200mm grid. The first hanger to be a maximum of 400mm from the wall perimeter channel
6. Adjust all hangers to correct drop using a string line or laser
7. Attach TCR (127) to suspension clips (TCR clip 167)
8. Click the 139 locking key batten clips into the TCR at 600mm centres
9. Cut the battens to length using tin snips, a hacksaw or grinder disk
10. Insert the batten into the channel at each end and fit into the batten clips. Stagger any batten joints and use the 138 batten jointer. Ensure the battens are straight and flat

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SPECIFIC ENGINEERING DESIGN

The suspended ceiling systems in this technical literature can be specified without the need for Specific Engineering Design (SED), provided they are intended for installation within the following scope of use:

- Buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144 m^2, not exceeding 12 metres in any direction
- Supporting a single layer of 10mm or 13mm GIB® plasterboard ceiling lining
- Suspension drop not exceeding 1000 mm measured from the supporting structure above to the back of the ceiling lining
- GIB® plasterboard installed to the suspension grid in accordance with the current GIB® Site Guide
- The ceiling is level, with no height variations along the ceiling plane

This scope assumes buildings of limited height and a ceiling perimeter which is fixed to bounding walls by means of plasterboard fixings to the perimeter channel or angle, and a coved or square stopped junction detail between the ceiling and wall linings.

For application outside this scope, Specific Engineering Design SED is required. Options include full fixing of plasterboard ceiling linings to perimeter walls capable of transferring the associated seismic forces, designing the grid suspension system to transfer these forces to structural walls, or bracing the suspension system so that forces are directly transferred to the floor above.

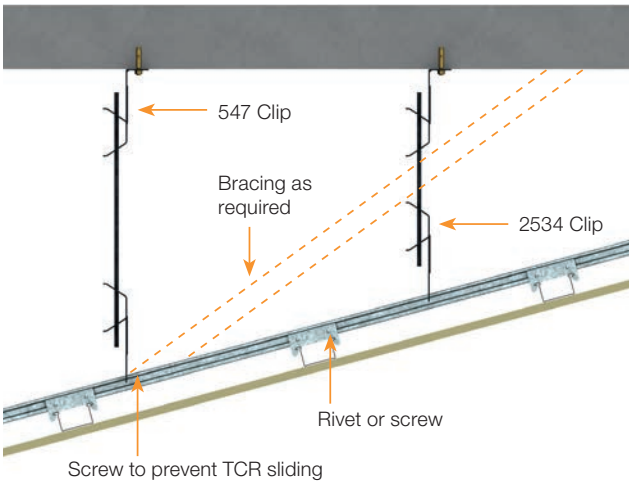
AS/NZS 2785:2020 Suspended Ceilings - Design and Installation provides one way of designing the suspended ceiling systems. When using this Standard care must be taken not to confuse the performance of a plasterboard lined ceiling with a two-way grid system which accommodates proprietary ceiling tiles.

When other areas of performance are required, such as fire-resistance or noise-control, the design must carefully consider compliance with all relevant NZBC clauses.

RAKING CEILINGS

Specific Engineering Design (SED) is recommended when designing raking suspended ceilings. Due to the slope of the ceiling, lateral forces will develop. If these forces are not directly transferred to the perimeter walls by the ceiling linings, they will be imposed on the grid and hangers in which case a separate bracing system is required.

Raking or skillion roofs may also have specific perimeter requirements for folded metal angles (see Raking Ceilings p.23).



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BATTEN FIXING TO WALLS

This section describes batten fixing to walls. Only the GIB® Rondo® 310 Batten can be direct fixed. The GIB® Rondo® 310 Batten as well as the Rondo® 308 and 129 Battens can be clip fixed. Note that the Rondo® 308 and 129 Battens use a different clip design.

- Do not fix metal battens direct to masonry walls
- Metal batten to wall fixing is not suitable for wall bracing elements without specific design
- Refer to GIB® Fire Rated Systems and GIB Noise Control® Systems for use in those applications
- Specific thermal design is required when installing metal battens over an internal vapour control membrane as part of an air tightness design
- Battens must be spaced no further than 600mm apart and be supported at 1200mm maximum

LININGS

When linings and battens run in the same direction with longitudinal sheet joints formed over battens, there is no need for nogs/dwangs between the battens unless to support sheet end butt joints.

When linings run perpendicular to the battens, there is no need for nogs/dwangs behind the tapered sheet joints.

Sheet end or cut edge joints must be supported by framing.

PERIMETER

Use an NZ18 or GIBFix® Angle behind wall-to-ceiling and wall-to-wall joints and fix to battens either side using 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screws.

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GIB® RONDO® 310 SET OUT AND DIRECT FIXING (DF)

Install battens perpendicular to studs or nogs/dwangs and fix at no more than 1200mm centres with pairs of 32mm x 8g GIB® Grabber® Wafer Head Screws through each flange.

When fixing horizontally, place the lowest batten about 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Batten end joints can be formed over framing or use the 312 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Pack where necessary to provide a flat substrate and fasten taking care not to distort the batten
- Form internal and external corners using the NZ18 or GIBFix® Angle

BATTEN SET OUT AND CLIP FIXING (CF)

The GIB® Rondo® 310 and Rondo® 308 and 129 Battens can all be clip fixed to walls. Note that the Rondo® 308 and 129 Battens use a different clip design, but otherwise separation achieved with the standard and long clips are the same.

The A311 GIB Quiet Clip® can only be used with the GIB® Rondo® 310 Batten and the STWC Acoustic Clip only accepts Rondo® 308 and 129 Battens.

For standard clip fixing to walls, simply use the ceiling specification turned 90 degrees, except that batten spacing for walls can be 600mm for both 10mm and 13mm GIB® plasterboard linings.

Alternatively, the A239 Clip and threaded rod, the STWC Acoustic Clip, or Betagrip Clip can be used with the Rondo® 308 and 129 Battens for face fixing to flat surfaces, including concrete masonry.

Place clips at no more than 1200mm centres along the battens. Space battens at no more than 600mm. When fixing battens horizontally, set out to locate the lowest batten 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Rondo® 308 and 129 Batten joints are formed using the 138 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Using a laser or string lines, install the clips at the required centres, creating a level surface
- Fit the battens into the clips
- Form internal and external corners using the NZ18 or GIBFix® Angle

FASTENERS

- Betagrip Clip - 38mm x 8g GIB® Grabber® Wafer Head Screws to timber or 6.0mm diameter screw bolt with minimum 50mm embedment for masonry
- STWC Acoustic Clip - 63mm x 8g GIB® Grabber® Self Tapping Drywall Screws to framing
- A239 Threaded Rod (100 or 180mm) and Clip - supplied 6.5mm masonry anchor

STWC Acoustic Clip



Betagrip Clip



A239 Clip and Threaded Rod



FIXING TO MASONRY

If installation is required to concrete or masonry, it is recommended that GIB® Rondo® 308 battens are clipped to GIB® Rondo® A239 clips as shown. A239 clips should be spaced at 1200mm centres (maximum) vertically and 600mm centres (maximum) horizontally

Anchor Bolt



Polystyrene



A239 Clip



308 Batten

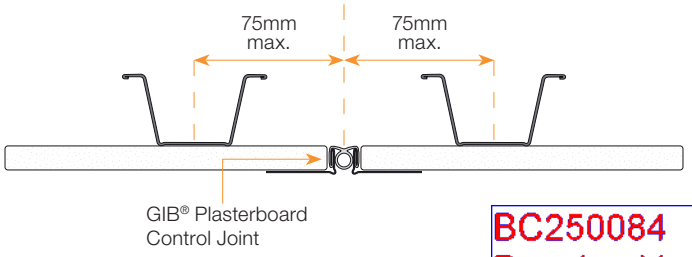


GIB® Plasterboard Overlay

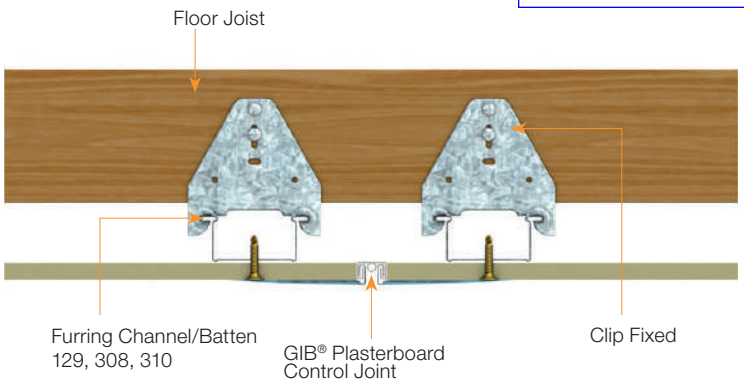


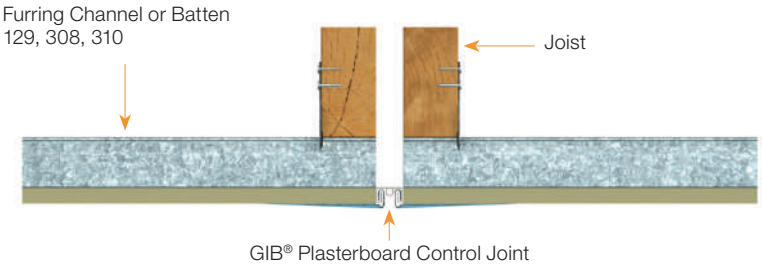
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CONTROL JOINT: DIRECT AND CLIP FIXED

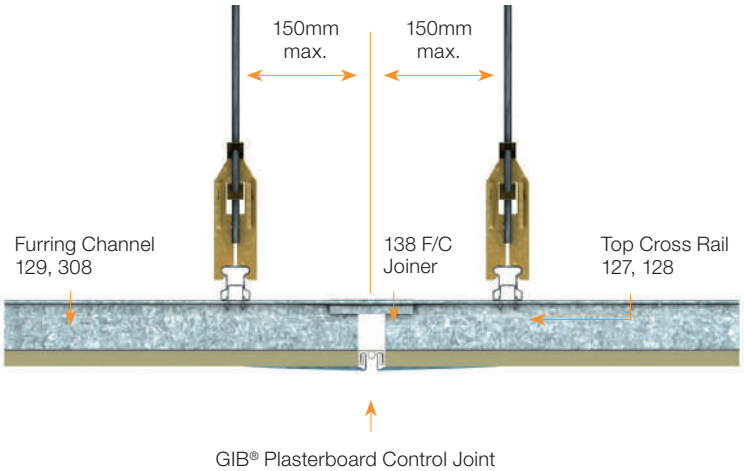


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CONTROL JOINT: SUSPENDED CEILING



RAKING CEILINGS AND SKILLION ROOFS

Due to the higher temperatures and low air movement that can occur in raking ceilings it is strongly recommended that clip fixed GIB® Rondo® metal battens are used (these are considered to be ceiling suspension systems).

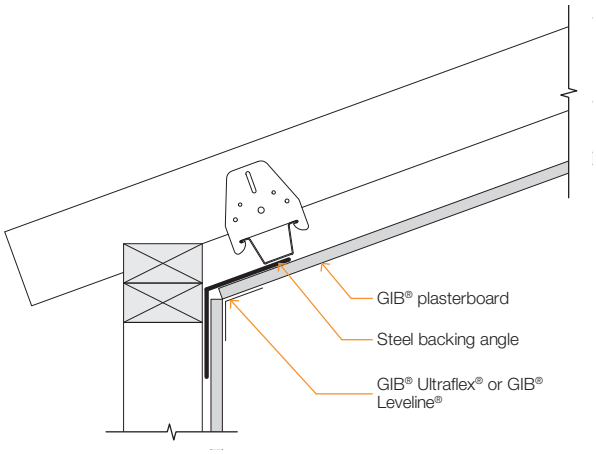
Because of the heat that can be generated in roof spaces, timber battens can be subjected to conditions that contribute to joint failure and popped fasteners.

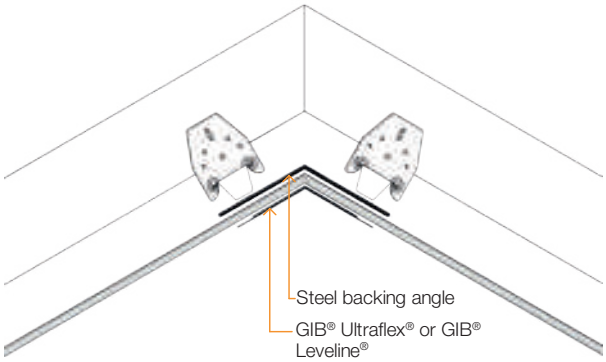
The use of control joints or perimeter relief will help reduce the risk of cracking in large, expansive ceilings.

These may not be suitable for use in Fire Rated Systems or Noise Control Systems.

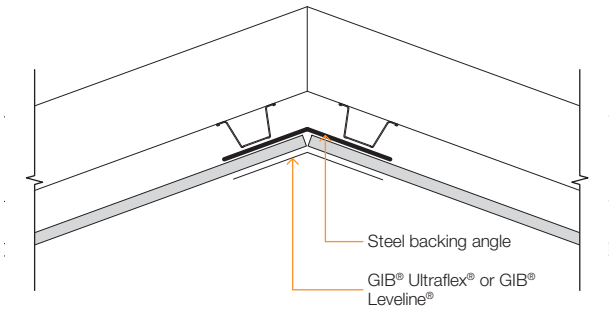
Back-blocking of all ceiling joints is highly recommended as it can reduce the likelihood of cracking.

FIXED — STEEL BACKING ANGLE



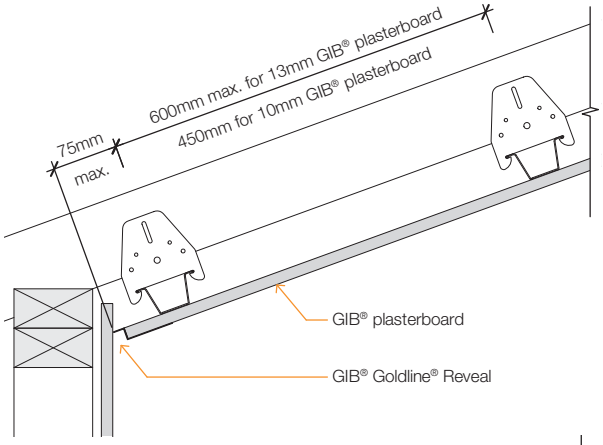


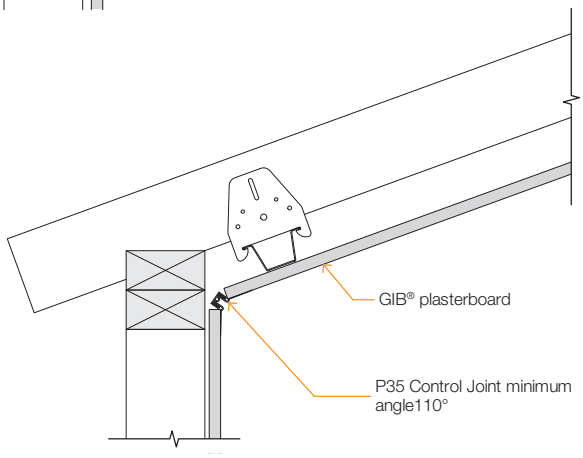
NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

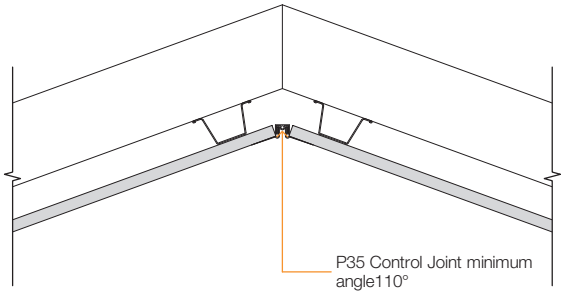


NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

FLEXIBLE — PERIMETER RELIEF

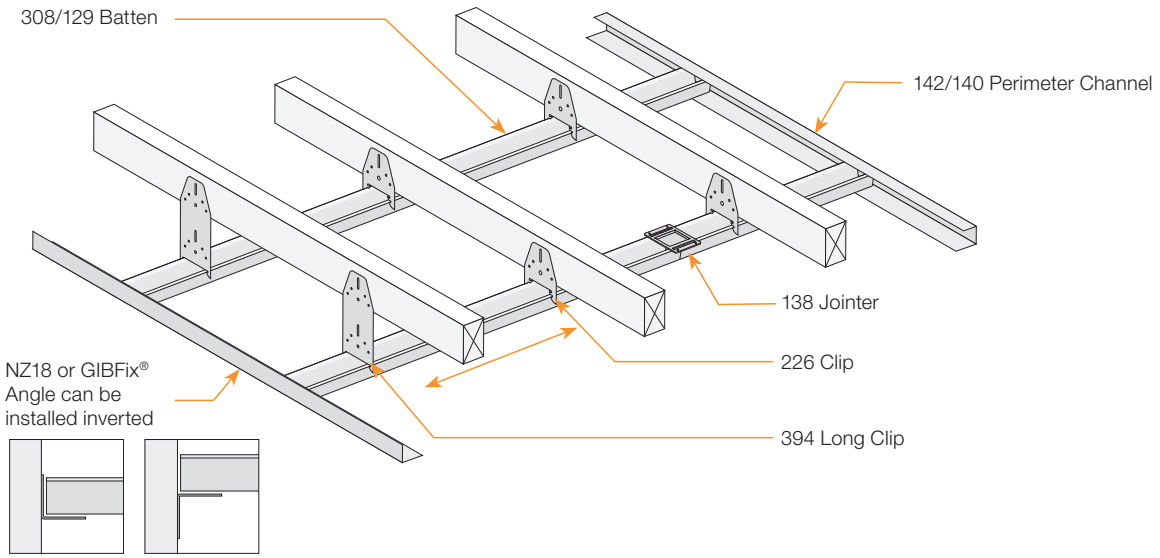




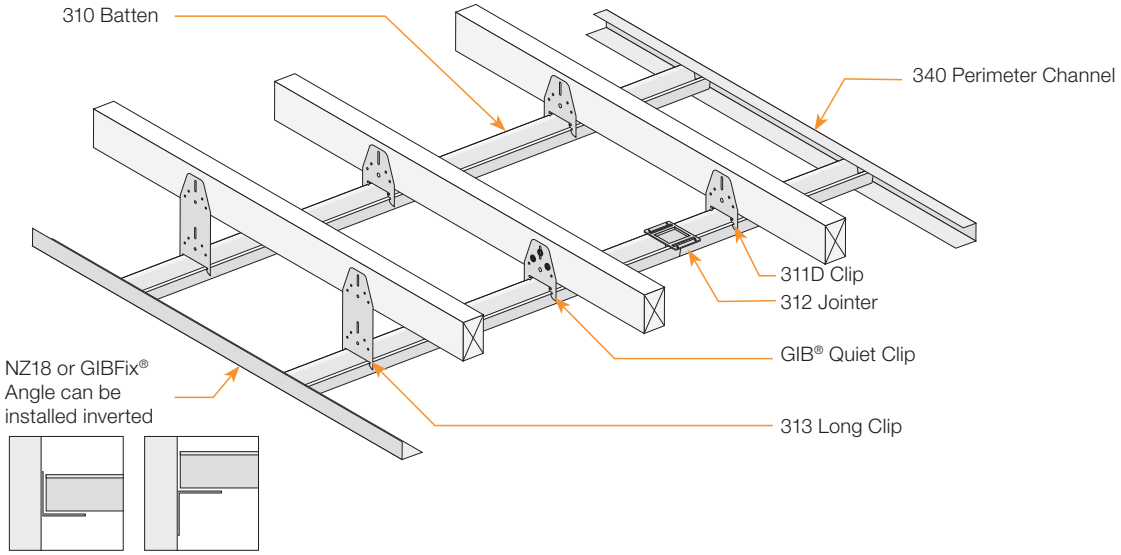


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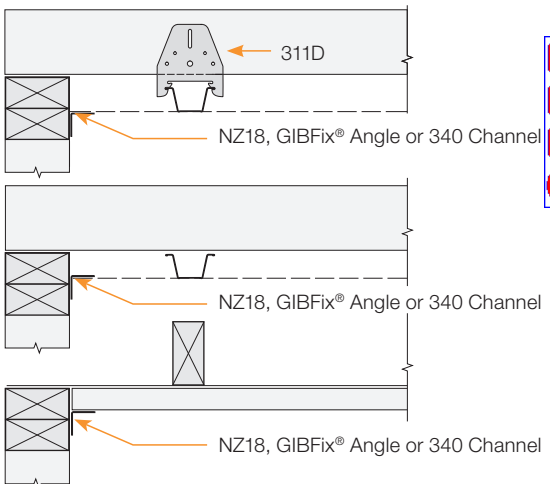
GIB® RONDO® 308/129 SYSTEM



GIB® RONDO® 310 SYSTEM



Recommended Best Practice Details



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GIB® Rondo® Metal Batten Systems, September 2024

LIMITATIONS

Winstone Wallboards Ltd accepts no liability if the GIB® Rondo® Metal Batten systems and junction details are not installed in strict accordance with instructions contained within this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. You should check the GIB® website to ensure you are using the current publication. If you are unsure whether this is the current publication, simply call the GIB® Helpline on 0800 100 442.

SUBSTITUTION

GIB® Rondo® Metal Batten systems have been specifically designed and tested to achieve the stated performance levels. To maintain the GIB® product and system warranty, all system components detailed in this publication must be used when specifying and installing GIB® Rondo® Metal Batten systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Toughline®, GIB Braceline® GIB Noiseline®, GIB Aqualine®, GIB Weatherline®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB® Quiet Stud®, GIB Rail®, GIB Barrierline®, GIB X-Block®, GIB Fire Soundseal®, GIB Clip®, the colour mauve for GIB Toughline®, the colour blue for GIB Braceline® GIB Noiseline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour purple for GIB Weatherline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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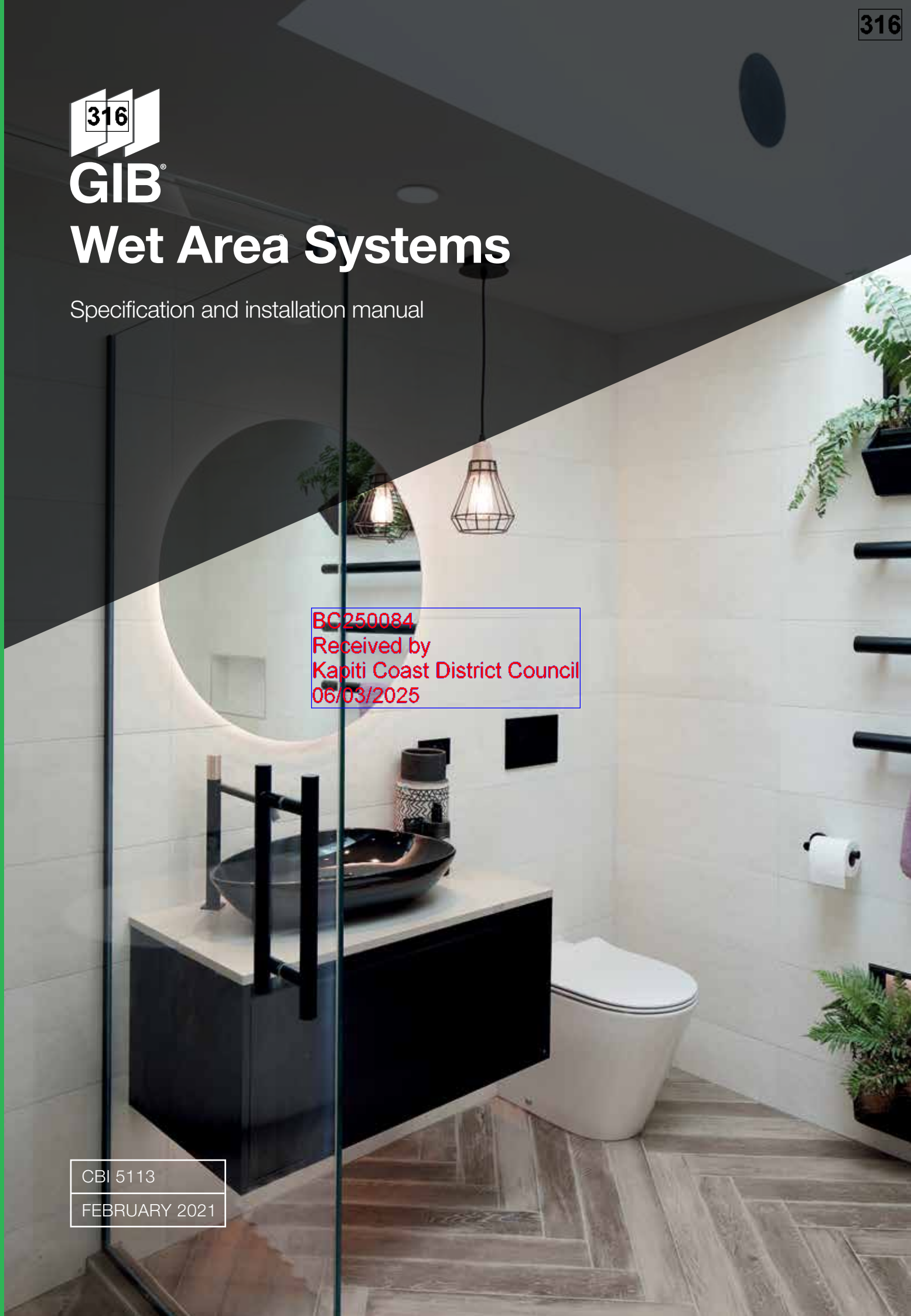
OR CALL THE GIB® HELPLINE

0800 100 442

GIB®

Wet Area Systems

Specification and installation manual



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RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS. BATHROOMS, LAUNDRIES, TOILETS AND KITCHENS.

Protection from internal moisture is an important consideration when designing interior lining systems for homes, multi-unit apartments, educational, healthcare and commercial applications.

The New Zealand Building Code sets out minimum standards for wet area spaces in residential dwellings. However, often higher levels of performance and protection from internal moisture is demanded.

The GIB® Wet Areas System specification and installation manual provides internal lining options and details for specifiers, builders and building owners.

USE ONLY THE CURRENT SPECIFICATION

This manual supersedes the publication GIB Aqualine® Wet Area Systems March 2007. Winstone Wallboards Ltd accepts no liability for reliance upon publications that have been superseded.

If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442 or go to gib.co.nz

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BEWARE OF SUBSTITUTION

The performance of GIB® Wet Area Systems requires accurate design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested, assessed or appraised, to ensure the required level of performance. It is important to use GIB® components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

BRANZ Appraised
Appraisal No.427 [2021]

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This publication

This publication is a best practice guide to the design and construction of wall and ceiling linings in wet areas with intermittent water exposure within residential and non-residential buildings, as covered by NZ Building Code Clause E3 Internal Moisture.

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

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

To form a complete wet area system it is important to specify compatible materials and systems, designed to cope with conditions that are common in wet areas, and to ensure correct installation using best practice.

WET AREAS

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Within wet areas the following requirements apply;

1. NZBC Clause E3.3.4 states that wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.
2. NZBC Clause E3.3.6 states that surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

NZ Building Code Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management. Ongoing maintenance of wet areas is also important to maximise service life.

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GIB AQUALINE®, GIB TOUGHLINE® AQUA AND GIB WEATHERLINE®

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

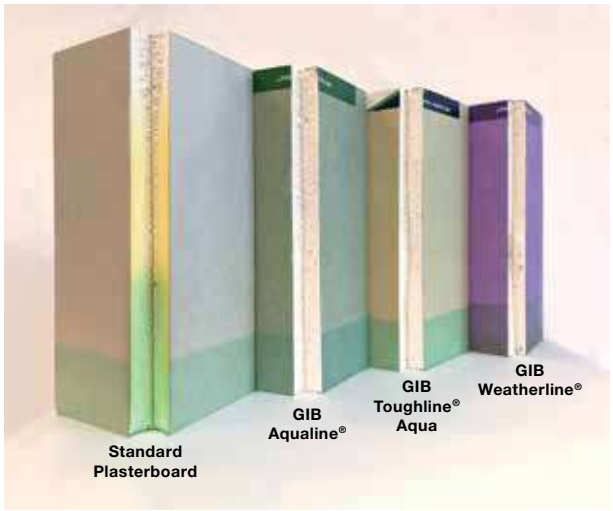
The NZ Building Code does not call for water resistant linings in wet areas but it is desirable to specify lining materials which will maintain their integrity longer when exposed more frequently to moisture, and to one-off events such as leaks or flooding.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® feature a water-resistant polymer impregnated core, designed for wet area applications. These core formulations not only resist penetration of moisture through the lining into the framing behind, but also resist water “wicking” up the core, a common cause of long-term damage where a water-resistant lining has not been used.

WATER ABSORPTION TEST

The illustrations below show how GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® compare with standard plasterboard after soaking for two-hours in green dye.





WHERE TO USE GIB® WET AREA LININGS

In order to prolong the life expectancy of the space it is highly desirable to include wet area linings in situations where there is an increased risk of water or moisture damage. Applications include walls and ceilings in bath and shower rooms, and walls in laundries, toilets and kitchens.

BENEFITS

- Water resistant and durable linings help protect against water damage
- Proven substrate for paint, wallpaper, waterproofing membranes, tiles, sheet vinyl and rigid sheet shower linings
- Suitable for both residential and non-residential applications
- Dimensionally stable and an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains glass fibres and other additives to increase strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB Noise Control® Systems (see Compliance with the NZ Building Code, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details

HANDLING AND STORAGE

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

LIMITATIONS

- GIB® wet area linings must not be used for bracing purposes in shower cubicles or above baths. For more information refer to page 9 of this manual
- Do not use GIB® wet area linings where exposed for extended periods to humidity levels above 90% RH, such as in group shower or steam rooms, or where exposed to moisture and chlorine rich environments such as in indoor swimming pools
- GIB® wet area linings used in a bathroom or other high humidity environment must not be directly applied to solid plaster (gypsum or cement), wood-based sheet linings or similar materials, masonry or concrete, without strapping or steel furring channels
- GIB® wet area linings must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® or GIB Toughline® Aqua must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details

Table 1: GIB® Wet Area linings sheet dimensions and weights

Product	Sheet face colour	Thickness (mm)	Sheet width (mm)	Edge Type	Sheet length (mm)						Max. Weight (kg/m²)
					2400	2450	2700	3000	3600	4800	
GIB Aqualine®	Green	10	1200	TE/TE	■		■	■	■		8.0
			1200	TE/SE	■					■	
			1350	TE/SE	■				■		
		13	1200	TE/TE	■		■	■	■		11.0
GIB Toughline® Aqua	Mauve	13	1200	TE/TE	■		■	■			11.4
GIB Weatherline®	Purple	10	1200	SE/SE		■	■	■			9.0
		13	1200	SE/SE			■	■			11.5

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BOARD SUBSTITUTION OPTIONS

Acceptable GIB Aqualine® alternatives	
10mm GIB Aqualine® can be replaced with:	10mm GIB Weatherline® 13mm GIB Toughline® Aqua
13mm GIB Aqualine® can be replaced with:	13mm GIB Weatherline® 13mm GIB Toughline® Aqua

GIB® Wet Area System construction details in this manual refer to the use of GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® sheets may also be used in place of GIB Aqualine®.

FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® are suitable substrates for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures are presented in this literature, except that the lining gap at the floor is no more than 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles behind internal lining corners is recommended for sheet vinyl applications in showers or shower over bath situations
- The lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph even through a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl

RIGID SHEET SHOWER LININGS

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

WATERPROOF MEMBRANE SYSTEMS AND TILING

- A waterproof membrane system must be applied to lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane system over the lining and once penetrations for shower mixers, taps and associated fittings are sealed
- The installation of galvanised steel reinforcing angles behind internal lining corners is required for tiled wall applications in showers or shower over bath situations
- In-situ waterproofing membrane materials manufactured to AS/NZS 4858:2004 “Wet Area Membranes” are recommended and must be applied to manufacturer’s recommendations. Typically, these types of membrane systems are not suitable for paint and wallpaper finishes
- Waterproof membrane systems must be fully cured and dry prior to application of tiling adhesives
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this manual are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane system

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

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PENETRATIONS AND SEALANTS

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

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Ensure shower mixer and tap penetrations are sealed with a proprietary flange system to prevent the passage of moisture into the wall cavity
- Sealants should be of a mould inhibiting type and be paintable. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Apply a bead of sealant to the full depth of the lining in the following locations:
  - Around all tap/pipe bodies
  - The gap between the bath rim and the bottom edge of the wet area lining
  - Between the upstand of preformed shower bases and the bottom edge of the lining
  - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable always use tested and approved proprietary penetration seals

RENOVATIONS

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

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

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

MAINTENANCE

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

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

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

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Compliance with the NZ Building Code

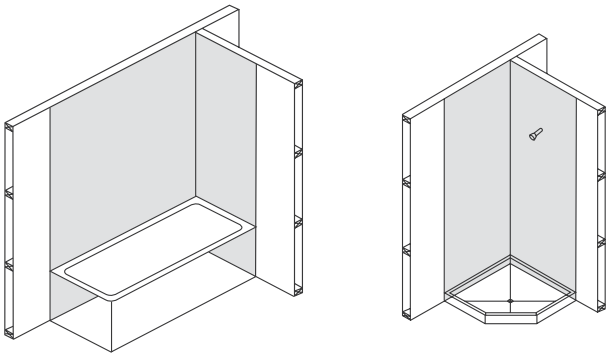
STRUCTURE – CLAUSE B1

The design and material specification for steel and timber framing used in GIB® Wet Area systems must be in accordance with the performance requirements of NZ Building Code Clause B1 (Structure).

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

Otherwise, GIB® Bracing Systems can be used in water-splash areas, provided these are maintained impervious for the life of the building.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. They can also be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB® Grabber 32mm x 6g screws at 100mm centres, using the GIB Braceline® corner fixing pattern. Refer to the GIB® Bracing System literature.



No bracing in the shaded areas.

DURABILITY – CLAUSE B2

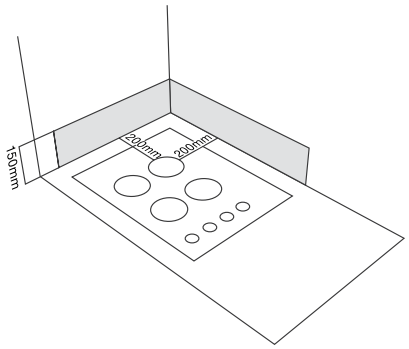
When installed and maintained in accordance with this literature, GIB® Wet Area systems tiled or vinyl covered have a serviceable life of at least 15 years. They comply with the requirements of NZ Building Code Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers,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

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

FIRE AFFECTING AREAS BEYOND THE SOURCE – CLAUSE C3

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

The protection of combustible surfaces surrounding gas cooking appliances is covered by the latest version of AS/NZS 5601.1.



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

- 5mm tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the specific requirements of AS/NZS 5601.1

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

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INTERNAL MOISTURE – CLAUSE E3

The New Zealand Building Code Clauses that relate to wall surfaces are;

E3.3.4 - Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

E3.3.5 - Surfaces of the building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned.

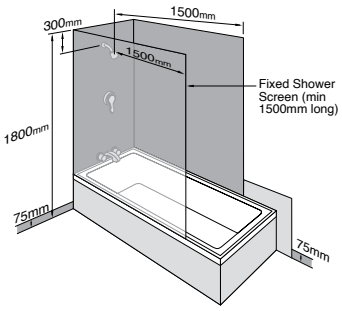
E3.3.6 - Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

New Zealand Building Code Acceptable Solution E3/AS2 substantially refers to the Waterproof Membrane Association Incorporated (WMAI) Code of Practice for Internal Wet Area Membrane Systems (IWAM), August 2020.

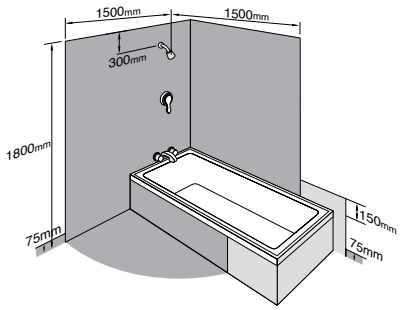
The IWAM Code of Practice refers to wet area membranes and over-surfaces that are easy to clean and suggests an extent as outlined below for a typical bathroom application. For further details refer to the IWAM Code of Practice which also lists suitable rigid sheet materials and tiling membranes.

Shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.

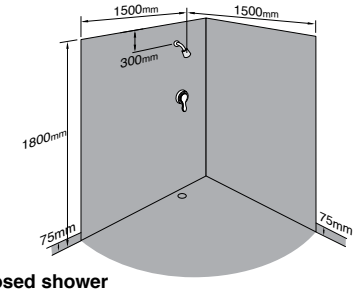
Enclosed shower over bath



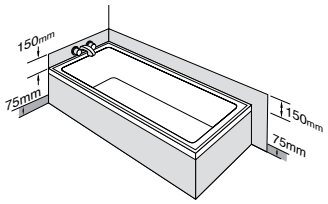
Unenclosed shower over bath



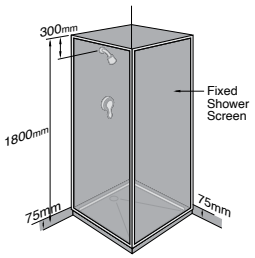
Unenclosed shower



Bath



Enclosed shower



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HAZARDOUS BUILDING MATERIALS – CLAUSE F2

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

VENTILATION – CLAUSE G4

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

AIRBORNE AND IMPACT SOUND – CLAUSE G6

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

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TIMBER WALL FRAMING

Framing dimensions must comply with the requirements of NZS 3604:2011.

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

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread screws.

FASTENER CENTRES

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

LINING

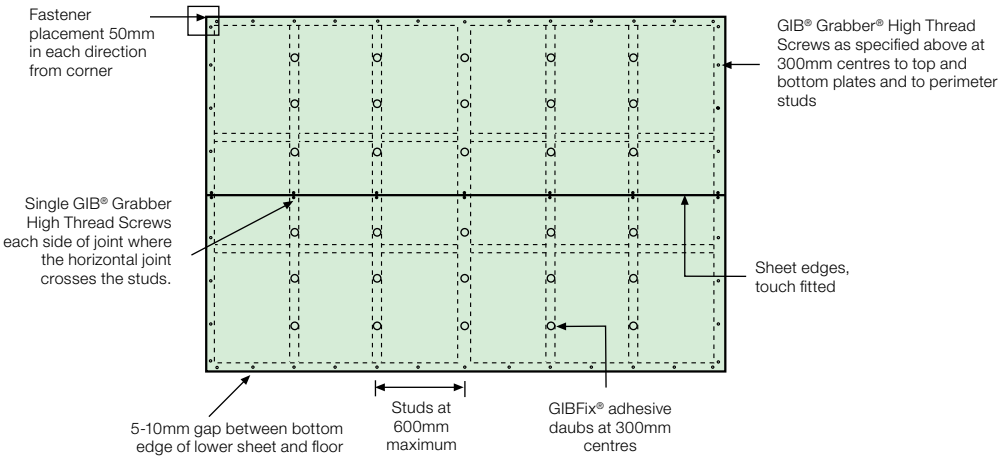
- Use minimum 10mm GIB® plasterboard
- Install the sheets leaving a 5-10mm gap at the floor line to allow for movement of the framing members and to allow for cleaning dirt and rubbish before sealing
- Sheets to be touch fitted.

JOINTING

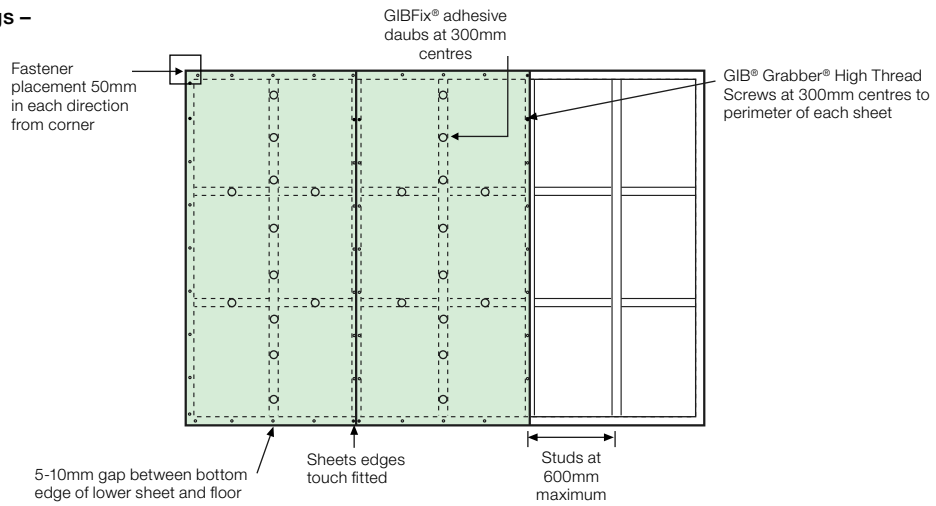
- Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide.

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Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



STEEL WALL FRAMING

The minimum sheet thickness for fixing on light gauge 0.55mm base metal thickness (BMT) steel framing is 13mm GIB® plasterboard. For bracing, noise control or fire rating applications consult the relevant GIB® technical publication.

Steel frame for residential construction is in accordance with NZBC B1/AS1 9.1 NASH Standard Part 2 Light Steel Framed Buildings, or by specific design. 10mm GIB plasterboard is commonly used on minimum 0.75mm BMT residential steel framing.

FASTENERS

— Minimum 25mm x 6g GIB® Grabber® Self Tapping 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 and 18mm from sheet ends

— 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.

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

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

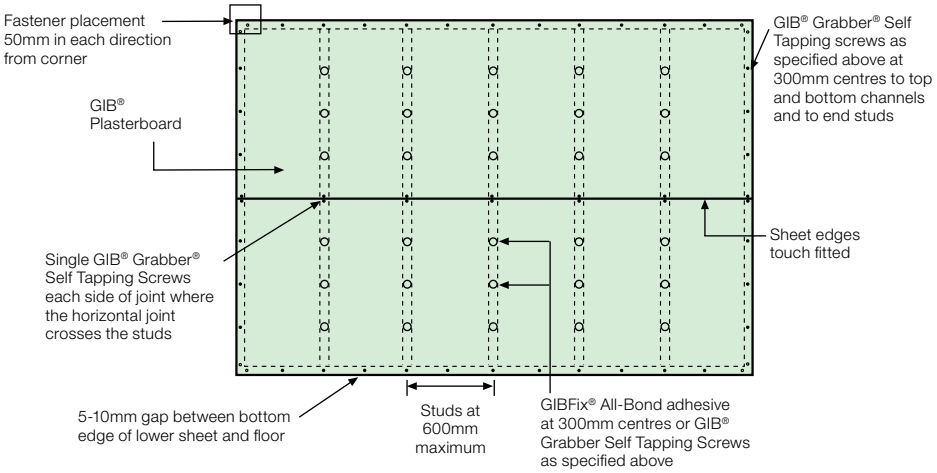
— Sheets to be touch fitted.

JOINTING

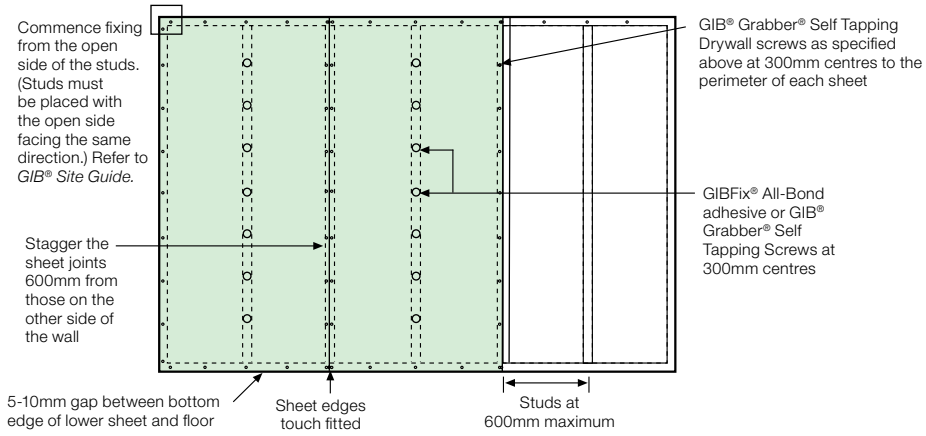
— Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide

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Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



TIMBER WALL FRAMING

Framing dimensions and spacing must be appropriate for the tile weight and comply with the requirements of NZS 3604:2011 Timber Framed Buildings, or relevant specific design Standard.

NOGS

For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require vertical fixing or the installation of additional nogs. Also provide nogs:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases

CORNER REINFORCING

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum
- 32 x 32 x 0.55mm NZ18 or 45 x 45 x 0.55mm GIBFix® Angle. Each leg shall be fastened to the framing at 300mm centres

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread Screws

FASTENER CENTRES

- 150mm centres to perimeter of wall and all intermediate studs
- Adhesive is not to be used in place of mechanical fasteners
- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Single fasteners to each stud where the horizontal joint crosses the studs
- Where relevant, fastener lengths must comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

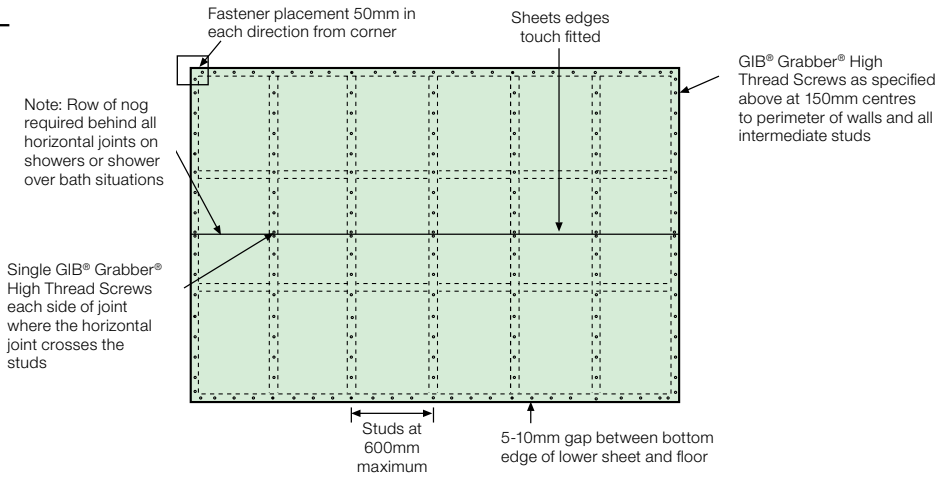
LINING AND TILE WEIGHTS

- Use minimum 10mm GIB® plasterboard
- For maximum permitted tile weights refer to pg 16 of this manual
- GIB® Wet Area linings may be fixed vertically or horizontally
- Sheets are touch fitted
- Provide a 5-10mm gap at the wall/floor junction and between the bottom edge of the lining and any bath rim or preformed shower base to allow for placement of sealant
- Do not tile on the resilient side of GIB Rail® or STWC Acoustic Clip (ST001) and channel noise control system
- GIB® Wet Area linings are suitable for tiling full height of walls, but if a wall is to be partially tiled (e.g. half high), only the area of wall under the tiles needs to be fixed as required for tiled areas. The remainder of the wall may be fixed as for non-tiled areas

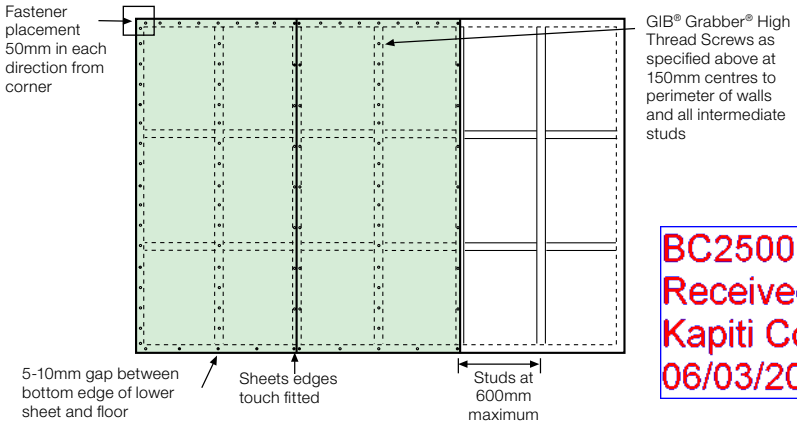
JOINTING

- Jointing shall be carried out in accordance with the instructions of the GIB® Site Guide

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



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STEEL WALL FRAMING

Framing dimensions and spacing must be appropriate for the tile weight and comply with the requirements of NASH Standard Part 2:2019 Light Steel Framed Buildings, or relevant specific design Standard.

- Linings are placed hard to floor, bedded into a sealant bead
- Steel framing for tiling to have a minimum base metal thickness (BMT) of 0.75mm

NOGS

For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require vertical fixing or the installation of additional nogs. Also provide nogs:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases

CORNER REINFORCING

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum
- 32 x 32 x 0.55mm NZ18 or 45 x 45 x 0.55mm GIBFix® Angle. Each leg is fastened to the framing at 600mm centres

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® Self Tapper screws

FASTENER CENTRES

- 150mm centres to perimeter of wall and all intermediate studs
- Adhesive is not to be used in place of mechanical fasteners
- Single screws to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges and 18mm from sheet ends.

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

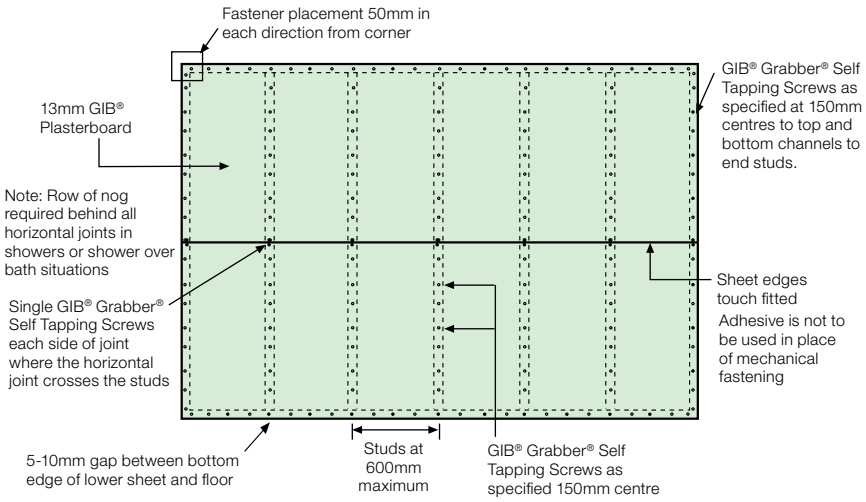
LINING AND TILE WEIGHTS

- Use minimum 13mm GIB® plasterboard
- For maximum permitted tile weights refer to pg 16 of this manual
- GIB® Wet Area linings may be fixed vertically or horizontally
- Sheets are touch fitted
- Provide a 5-10mm gap at the wall/floor junction and between the bottom edge of the lining and any bath rim or preformed shower base to allow for placement of sealant
- Do not tile on the resilient side of GIB Rail® or STWC Acoustic Clip (ST001) and channel noise control system
- GIB® Wet Area linings are suitable for tiling full height of walls, but if a wall is to be partially tiled (e.g. half high), only the area of wall under the tiles needs to be fixed as required for tiled areas. The remainder of the wall may be fixed as for non-tiled areas

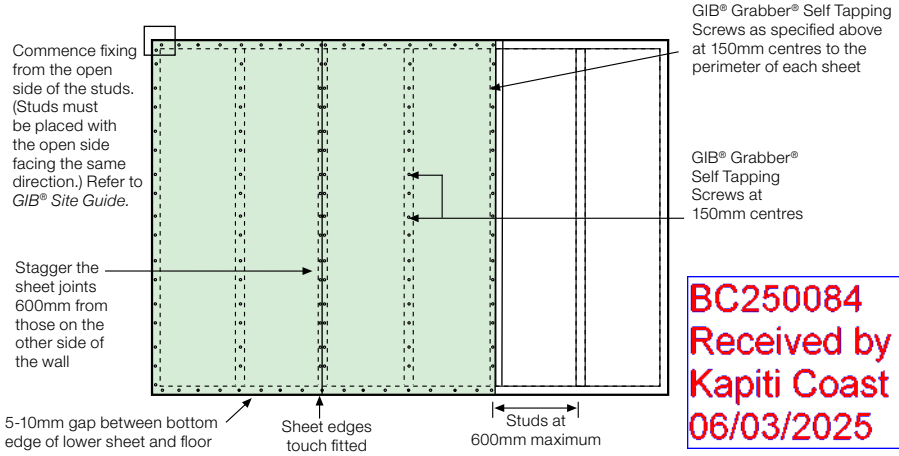
JOINTING

- Jointing shall be carried out in accordance with the instructions of the GIB® Site Guide

Fastening the Linings – Horizontal Fixing Only



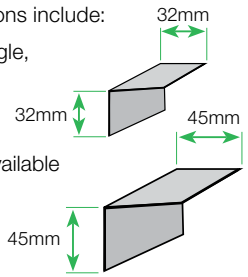
Fastening the Linings – Vertical Fixing Only



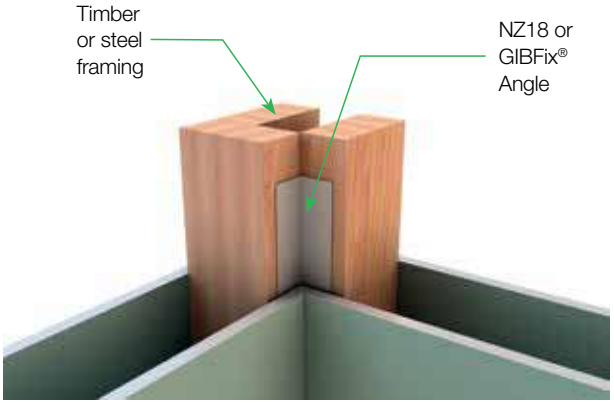
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METAL ANGLES FOR TILED INTERNAL CORNERS

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle.
- Suitable GIB® metal angle options include:
  - GIB® Rondo® NZ18 metal angle, available length: 3.0m
  - GIBFix® Angle metal angle, available lengths: 2.4m and 2.7m



- Each side of the angle is secured to the framing with at 600mm centres
- Minimum height of the metal angle is 1800mm



WATERPROOF MEMBRANE SYSTEMS

A waterproof membrane system must be applied to all lining materials used as a substrate for ceramic tiles in a shower or shower over a bath application, or any other tiled application exposed to frequent water splash.

For further information see p10.

TILES AND TILE WEIGHTS

In areas likely to be directly exposed to water, tiles may be ceramic, porcelain or stone must comply with the over-surface finish requirements of the IWAM Code of Practice and be bedded with a suitable tile adhesive on the waterproof membrane system. See page 10 for the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.

Smaller mosaic tiles are often lighter, but the integrity of grout joints might be more prone to impact, whilst heavier tiles are larger and have less and deeper grout and sealant joints. For more information also see AS 3958:2007 Ceramic tiles – Guide to the installation of ceramic tiles.

Table 2: Recommended maximum tile weights

Maximum Tile Weights for GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline®			
Stud Centre (maximum)	**Fasteners Centre (maximum)**	**Lining Thickness**	**Tile Weight**
600mm maximum	150mm maximum	10mm	26kg/m^2
		13mm	40kg/m^2

ADHESIVE AND GROUT WEIGHTS

The weight of adhesive and grout can vary depending on the type of tile and the installation process used. The maximum tile weights stated in table 2 are conservative and refer to the tile weight excluding grout and adhesive used. An additional 3kg/m^2 has been factored into tile adhesion testing on top of the above stated tile weights to account for adhesive and grout weight used during the installation of the tile.

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CEILING FRAMING

Framing dimensions and spacing must comply with the requirements of NZS 3604:2011, NASH for steel or relevant NZ Standard.

For noise control or fire rating applications consult the relevant GIB® technical publication.

FASTENERS

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

ADHESIVES

- Steel battens - GIBFix® All-Bond
- Timber battens - GIBFix® All-Bond or GIBFix® One

FASTENERS CENTRES

- Single screws to the edges and centre of the sheets across each batten
- Single screw at 600mm maximum to the perimeter of the ceiling
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw pops

LINING

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

BATTEN SPACINGS

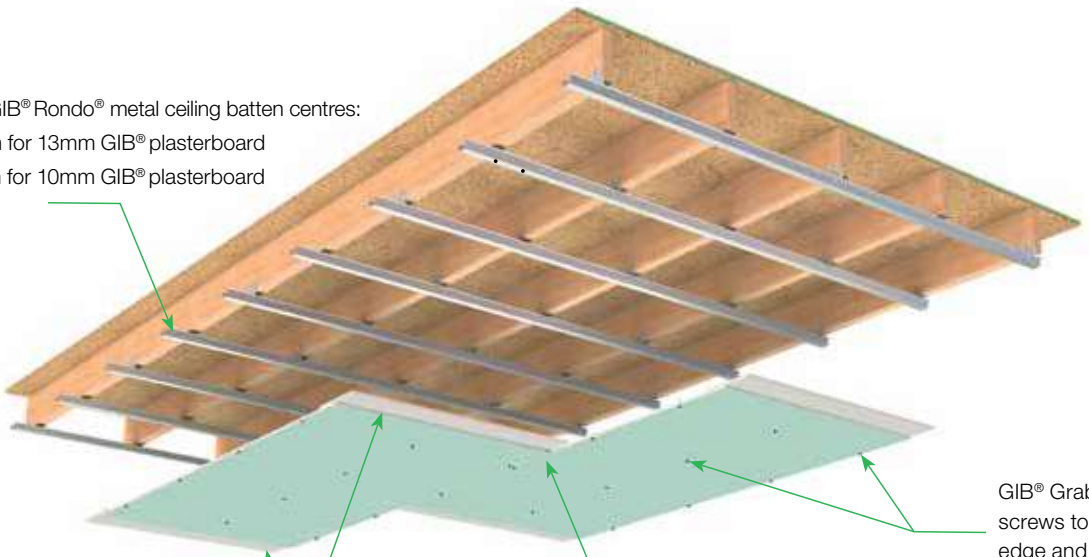
- 13mm GIB® plasterboard – 600mm centres maximum
- 10mm GIB® plasterboard – 450mm centres maximum

JOINTING

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the GIB® Site Guide
- Do not fix tiles to GIB® plasterboard ceilings

Maximum GIB® Rondo® metal ceiling batten centres:

- 600mm for 13mm GIB® plasterboard
- 450mm for 10mm GIB® plasterboard

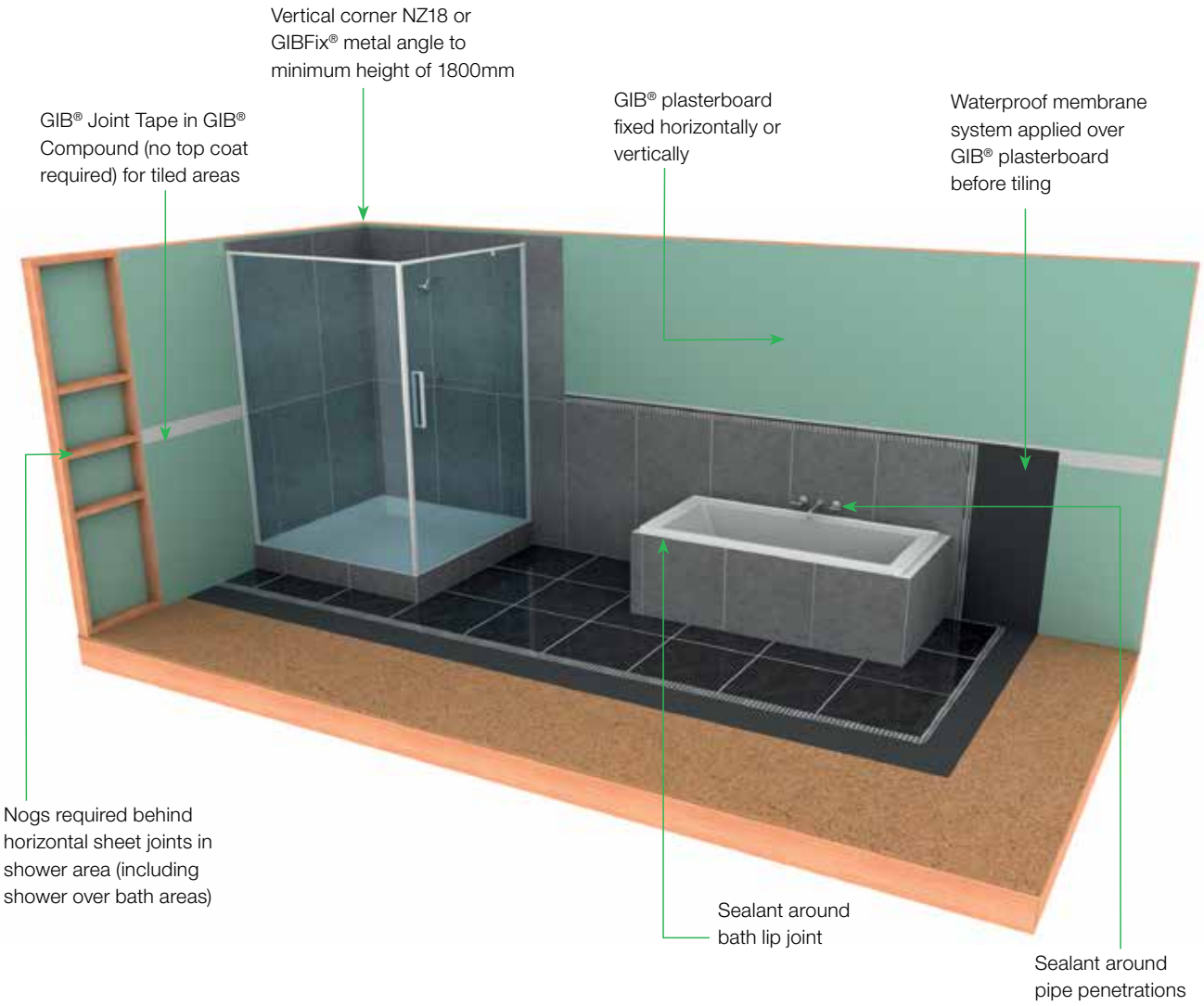


GIB® Grabber® screws to sheet edge and sheet centre at each batten intersection

Back-block sheet end joints (see GIB® Site Guide)

Stagger sheet end joints by 600mm or nearest batten

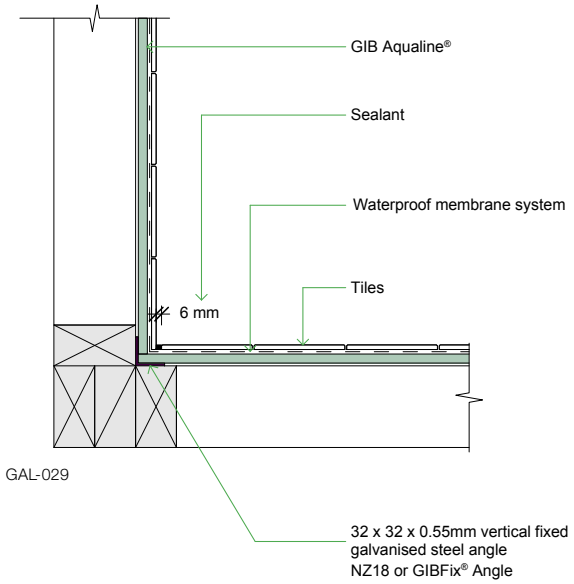
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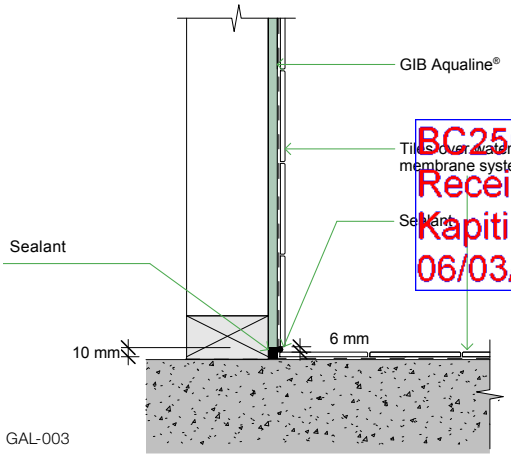
SHOWER OVER BATH – TILED WALL DETAILS

A: TILED INTERNAL CORNER



GAL-029

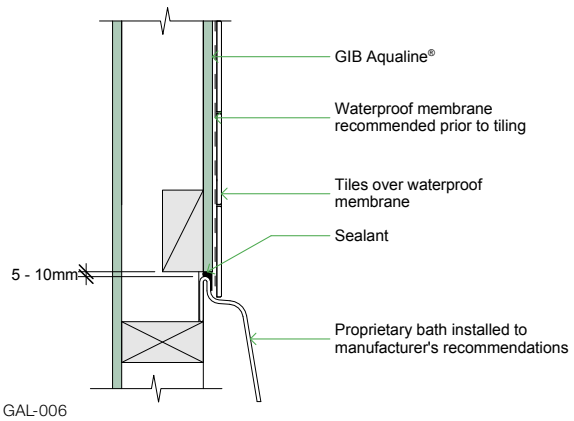
B: CERAMIC FLOOR LINING JUNCTION



GAL-003

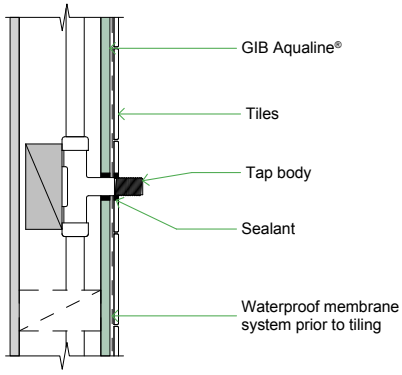
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C: BATH LINING JUNCTION



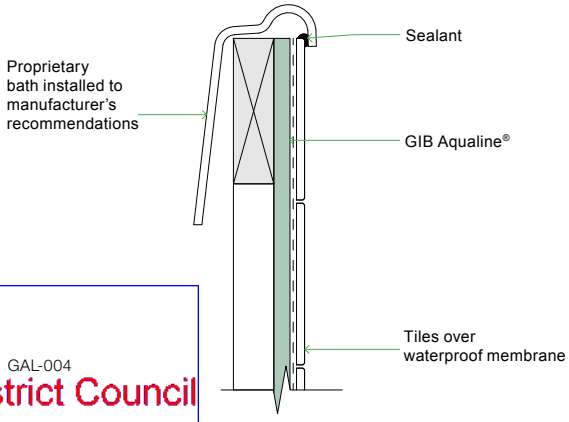
GAL-006

D: SEALING WET AREA PENETRATION



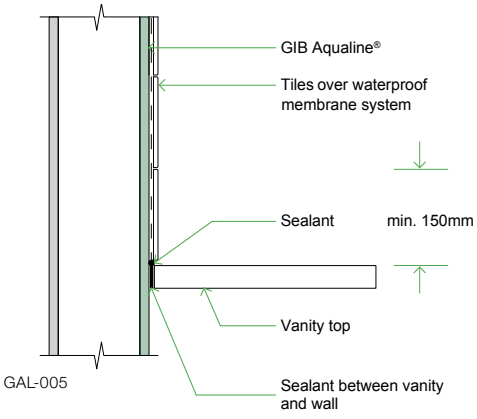
GAL-002

E: BATH CRADLE LINING DETAIL

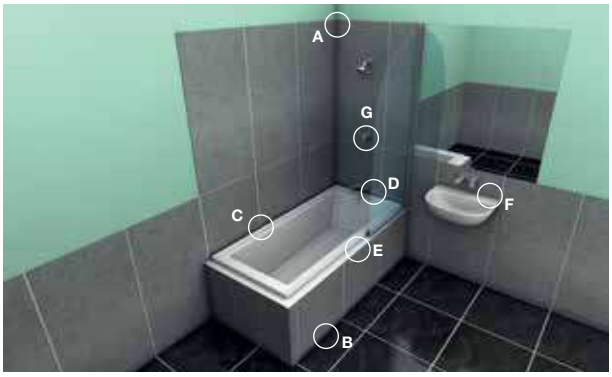


GAL-004

F: VANITY TOP LINING JUNCTION



GAL-005

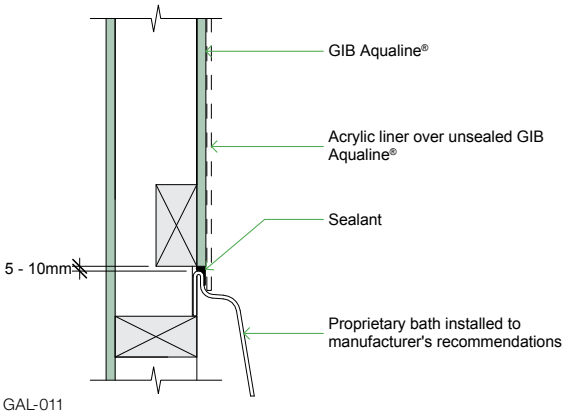


G: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

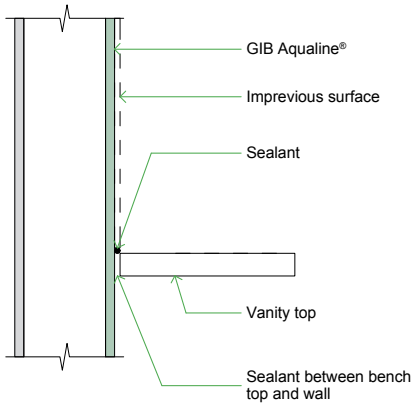
SHOWER OVER BATH – ACRYLIC LINER DETAILS

A: BATH LINING JUNCTION



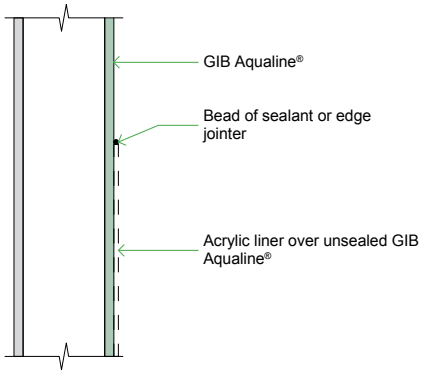
GAL-011

B: VANITY TOP LINING JUNCTION



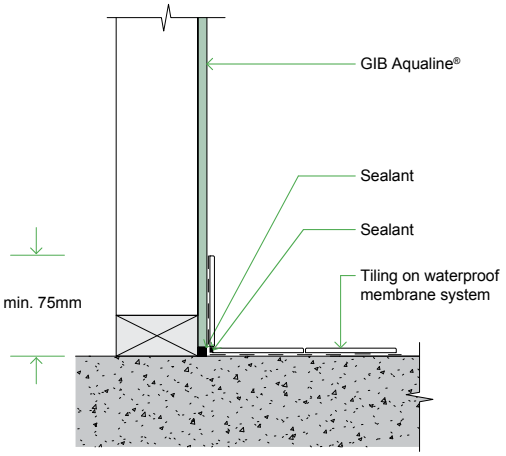
GAL-023A

C: UNSEALED PLASTERBOARD LINING



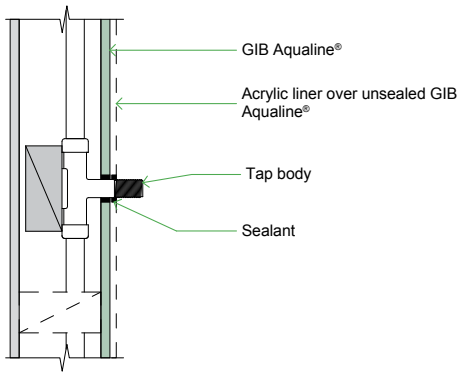
GAL-028

D: CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001

E: SEALING SEMI WET AREA PENETRATION



GAL-019

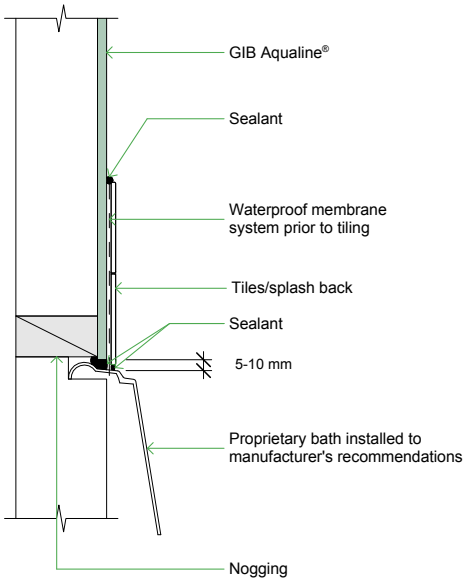
F: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



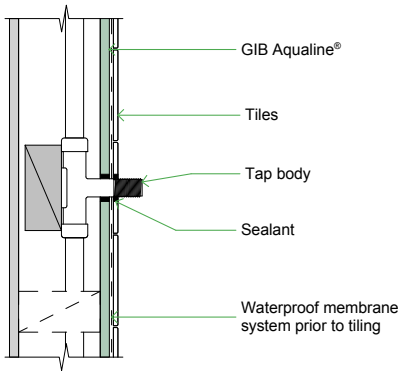
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A: BATH LINING JUNCTION



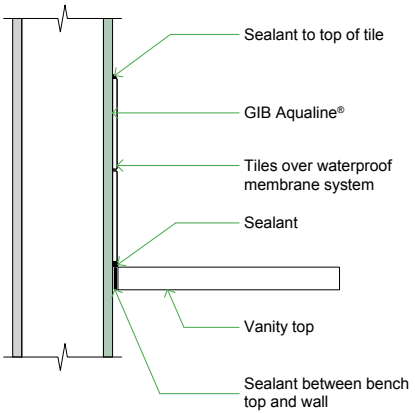
GAL-009

B: SEALING SEMI WET AREA PENETRATION



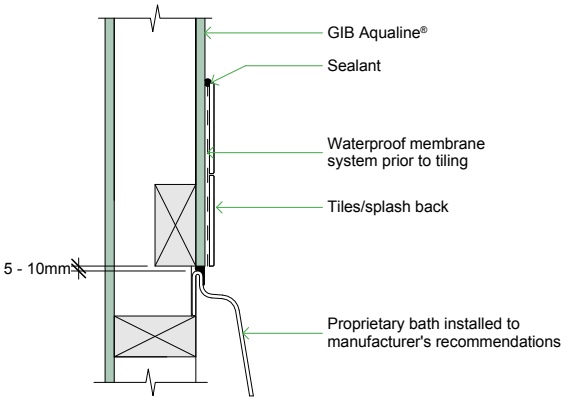
GAL-020

C: VANITY TOP LINING JUNCTION



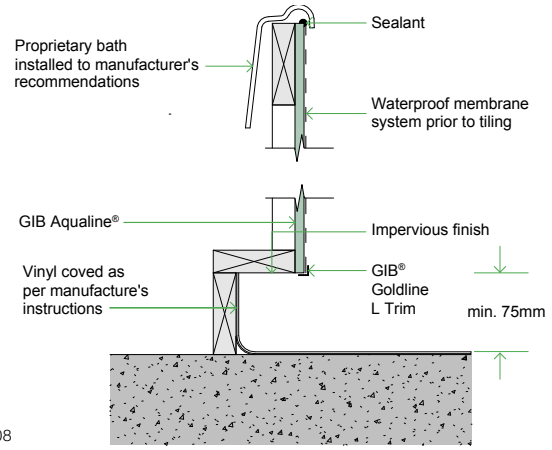
GAL-024

D: BATH LINING JUNCTION

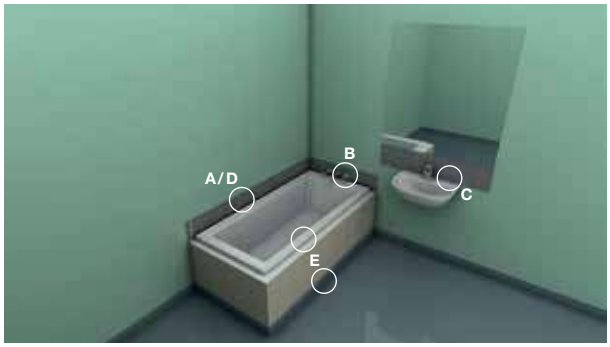


GAL-010

E: CRADLE VINYL LINING JUNCTION

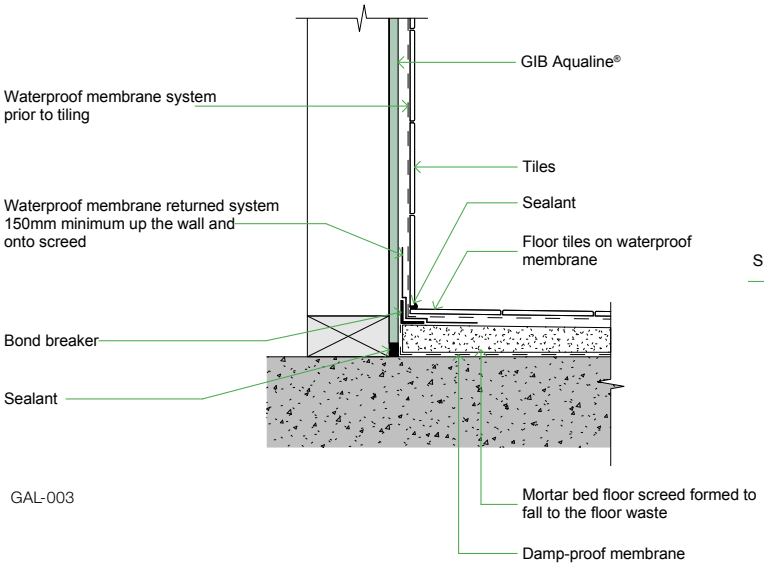


GAL-008



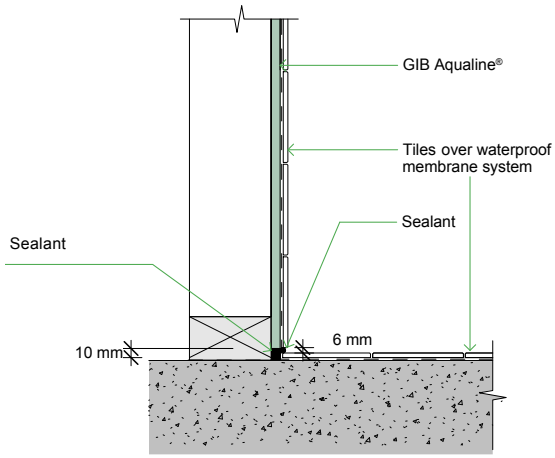
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A: MORTAR UNDER CERAMIC FLOOR LINING JUNCTION



GAL-003

C: CERAMIC FLOOR LINING JUNCTION

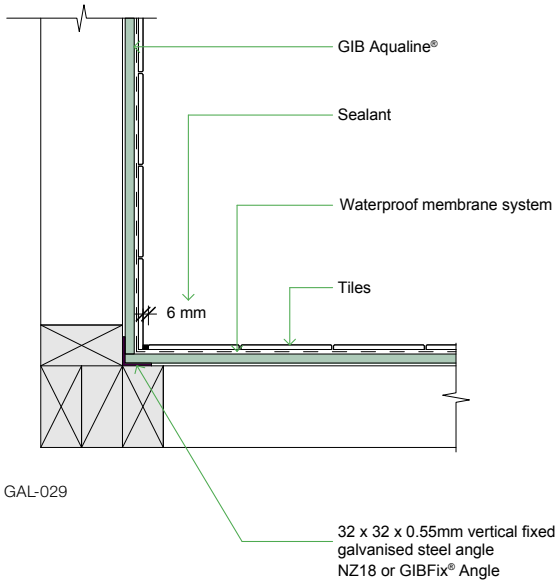


GAL-002A

PREFORMED SHOWER BASE JUNCTIONS

Refer to the shower base manufacturer for proprietary shower tray installation detailing including wet wall lining junction detailing.

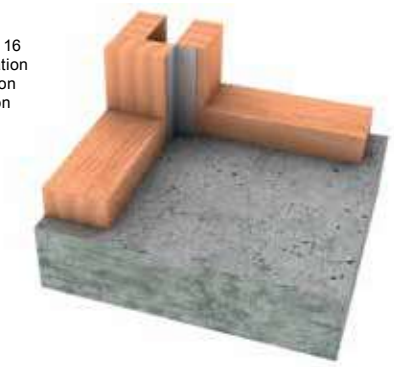
B: TILED INTERNAL CORNER



GAL-029

D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.



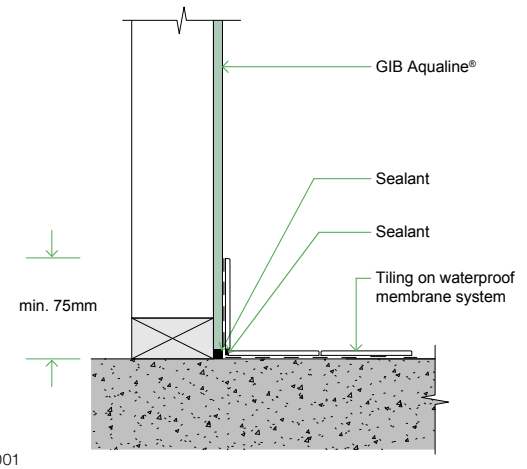
E: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



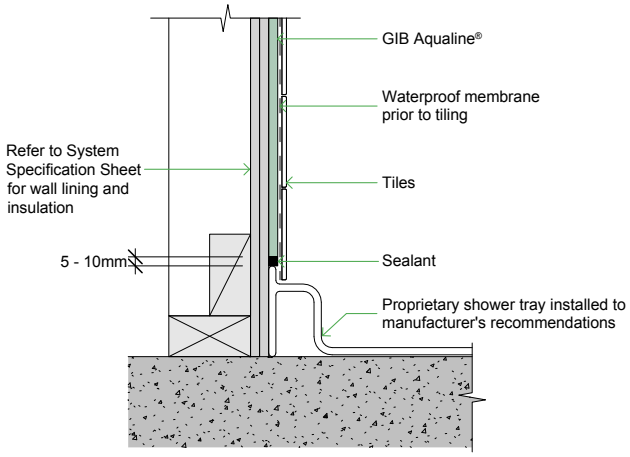
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A: CERAMIC FLOOR SKIRTING LINING JUNCTION



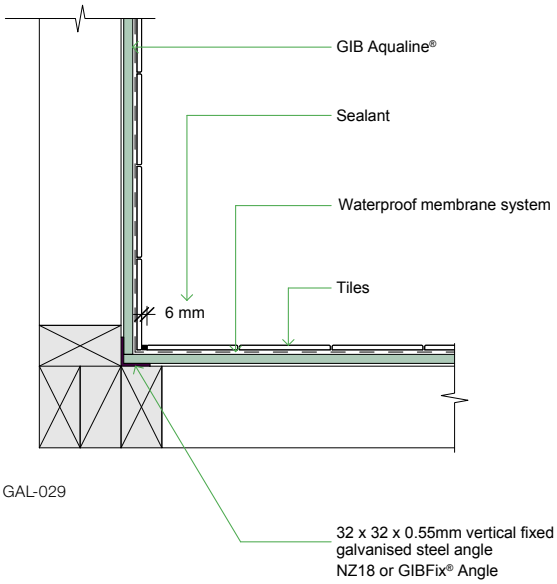
GAL-001

B: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



GAL-016

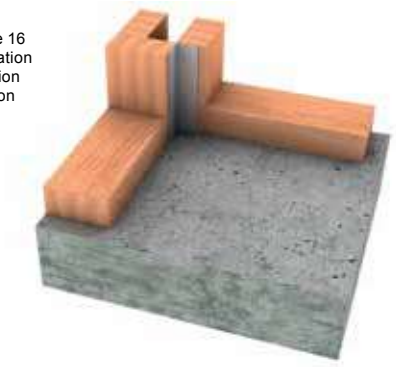
C: TILED INTERNAL CORNER



GAL-029

D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.



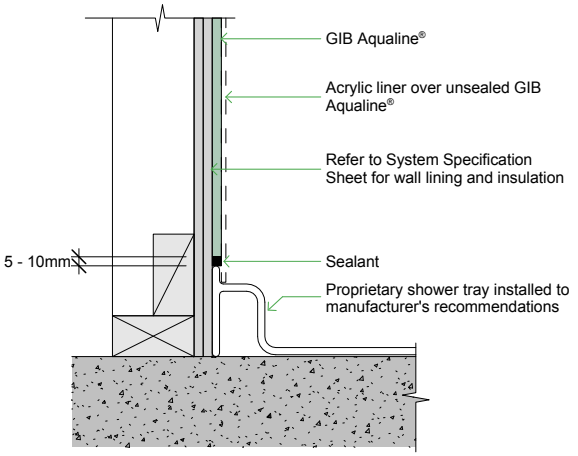
E: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



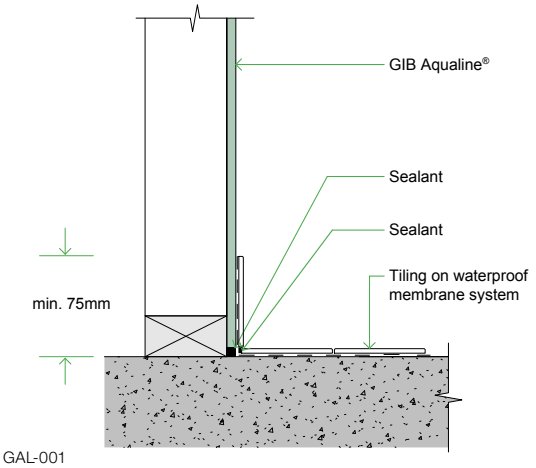
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A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



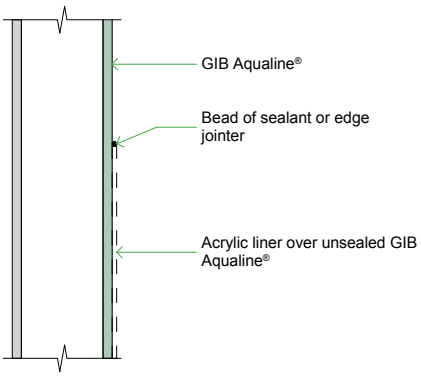
GAL-015

B: CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001

C: UNSEALED PLASTERBOARD LINING



GAL-028

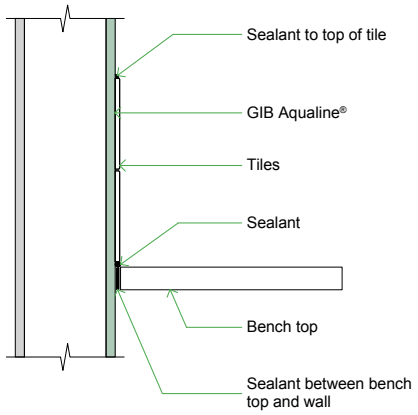
D: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



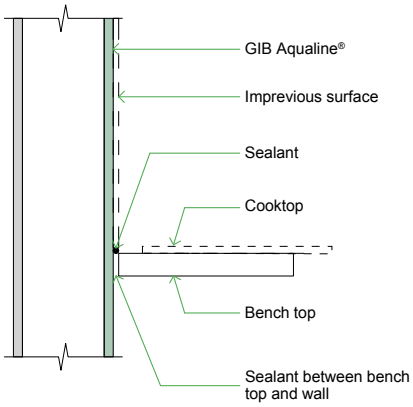
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A: BENCH TOP LINING JUNCTION



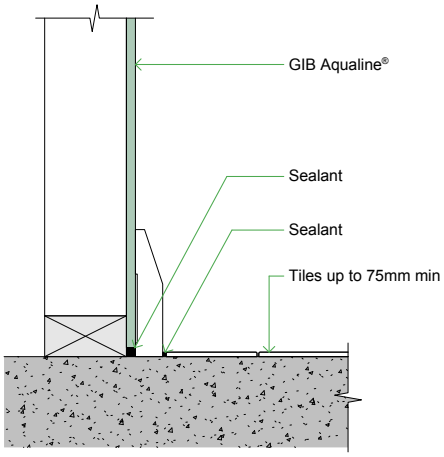
GAL-024

B: COOKTOP LINING JUNCTION



GAL-023B

CERAMIC FLOOR SKIRTING LINING JUNCTION

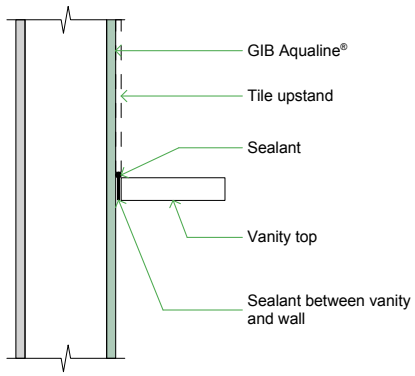


GAL-001A

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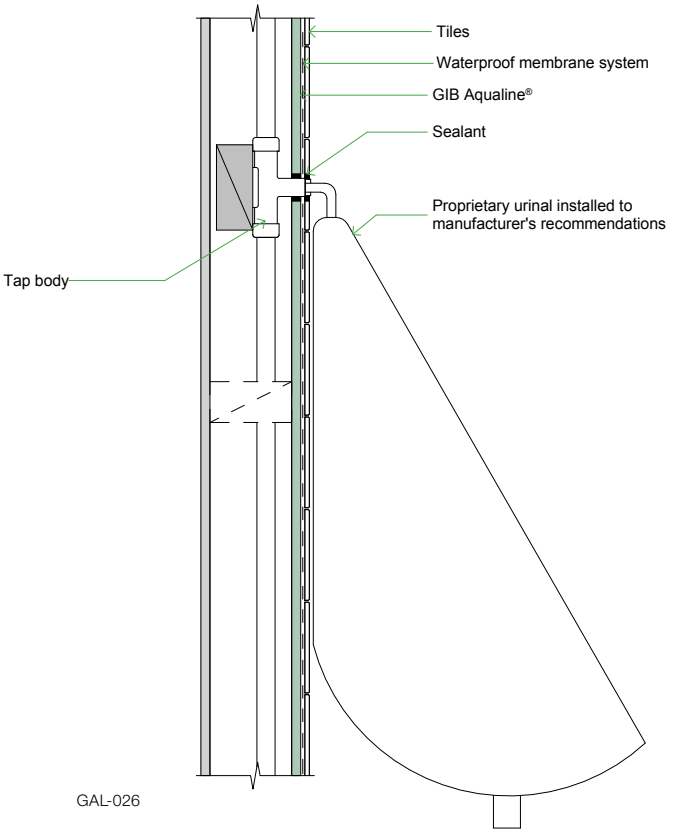
A: VANITY TOP LINING JUNCTION



GAL-022

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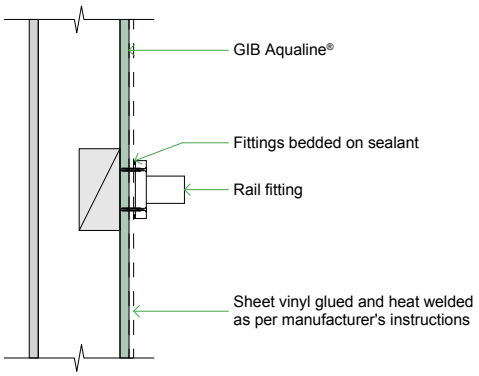
B: SEALING WET AREA PENETRATION LINING JUNCTION



GAL-026

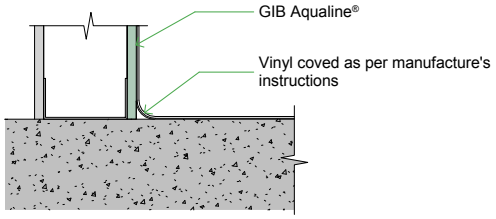


A: SURFACE MOUNTED WITH NOG



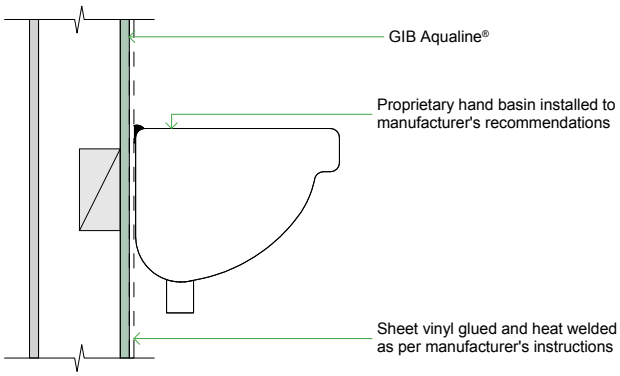
GAL-027

B: VINYL FLOOR LINING JUNCTION



GAL-006A

C: BASIN LINING JUNCTION

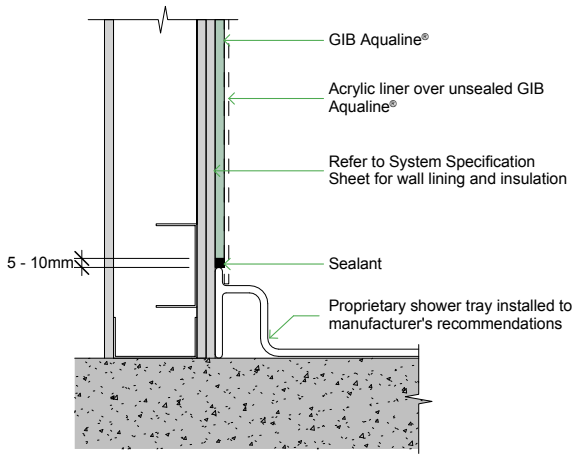


GAL-025



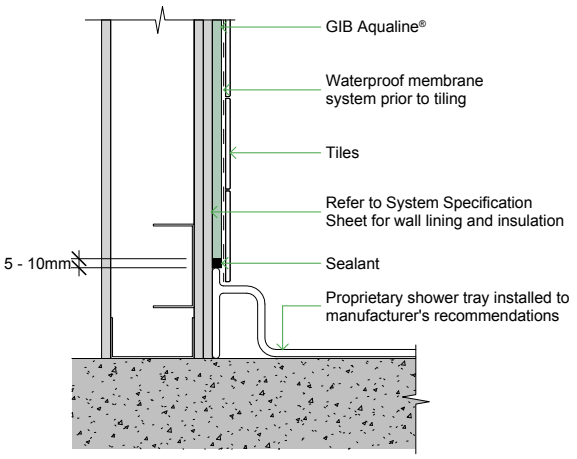
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A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



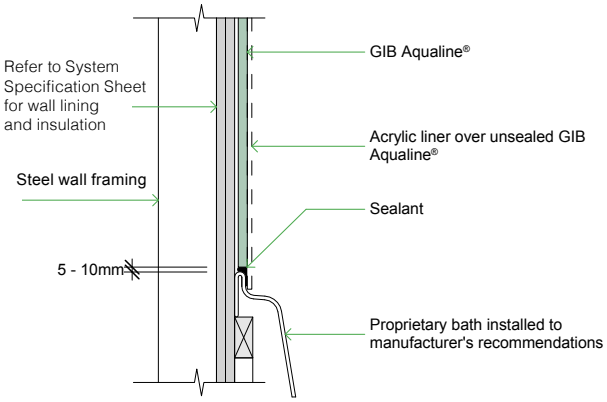
GAL-017

C: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



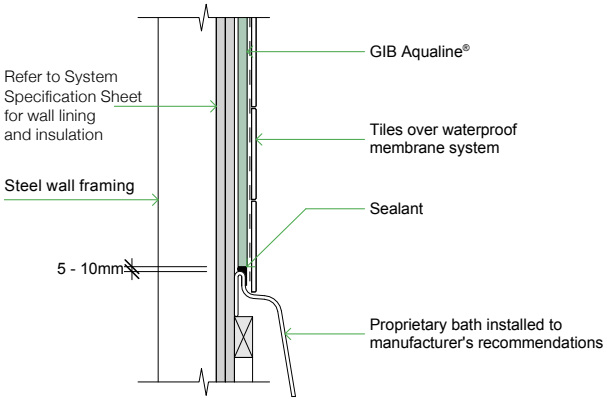
GAL-018

B: BATH DOUBLE LINING JUNCTION



GAL-013

D: BATH DOUBLE LINING JUNCTION



GAL-014

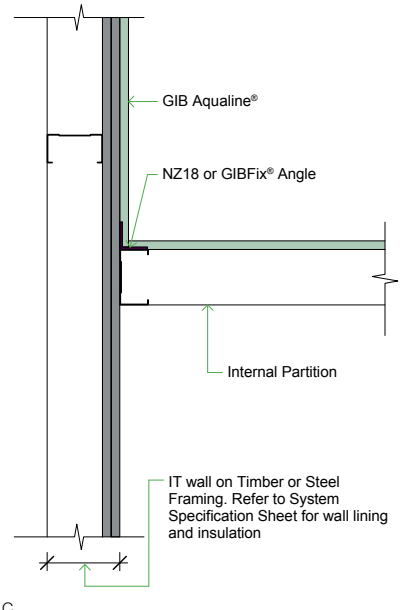
GIB® WET AREA SYSTEMS FIRE RESISTANCE AND NOISE CONTROL PERFORMANCE

Given recesses required for shower trays, bath upstands, etc., and the likelihood of renovations during the service life of the building, it is recommended that GIB® Wet Area linings in water splash areas are installed in addition to and over required fire and noise control systems in commercial or multi-residential applications.

Do not tile on the resilient side of a GIB Rail® or Acoustic Resilient Mount (ST-001) and channel noise control system.

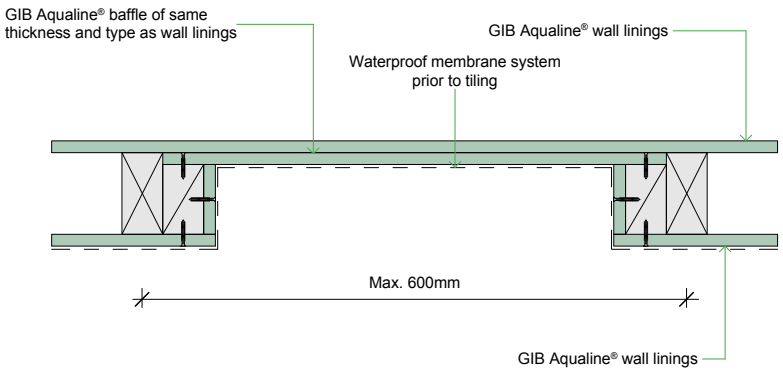
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E: INTERTENANCY WALL AND WET AREA WALL JUNCTION

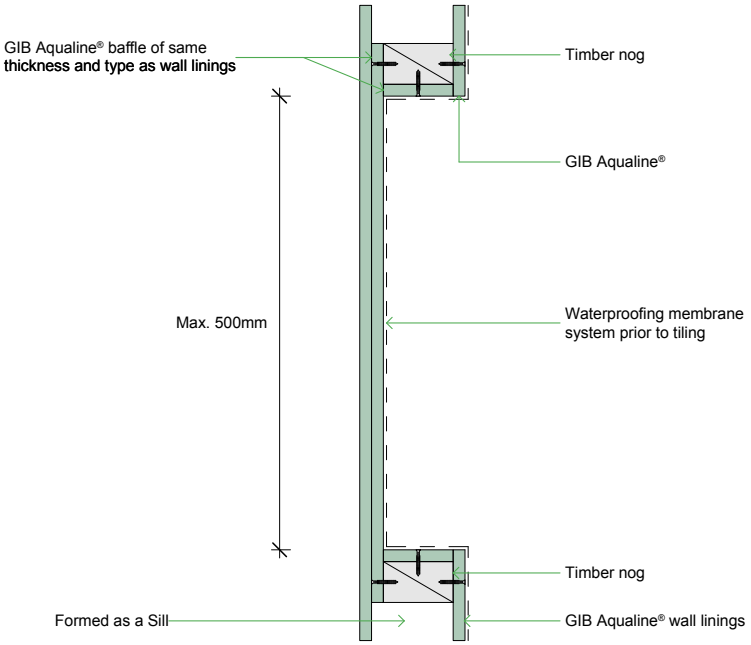


GAL-031C

TIMBER FRAME TILE RECESS



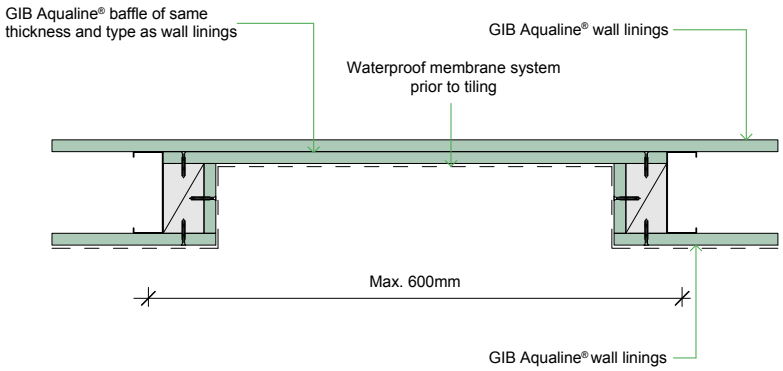
Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.



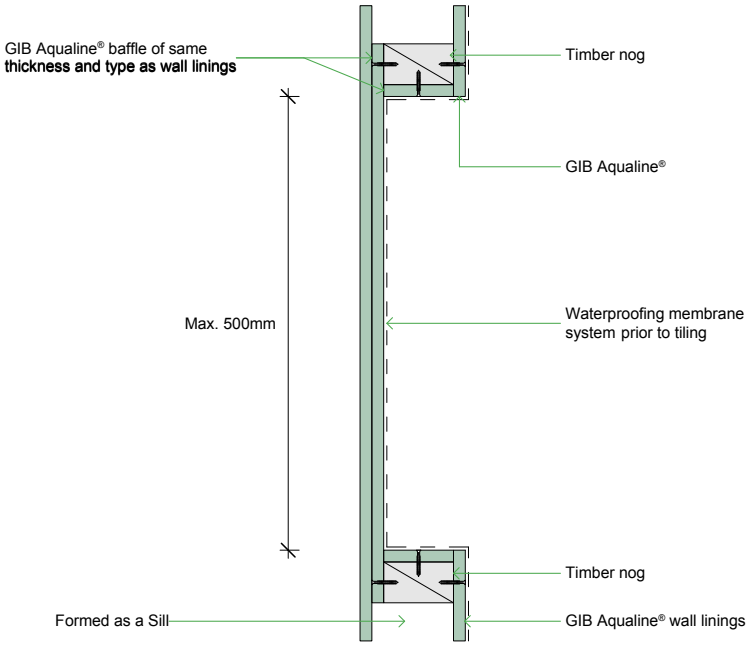
GAL-029B

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STEEL FRAME TILE RECESS



Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.



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GIB® Wet Area Systems, February 2021

LIMITATIONS

Winstone Wallboards Ltd accepts no liability if the GIB® Wet Area Systems and junction details are not installed in strict accordance with instructions contained within this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. You should check the GIB® website to ensure you are using the current publication. If you are unsure whether this is the current publication, simply call the GIB® Helpline on 0800 100 442.

SUBSTITUTION

GIB® Wet Area Systems have been specifically designed and tested to achieve the stated performance levels. To maintain the GIB® Product and System Warranty, all system components detailed in this publication must be used when specifying and installing GIB® Wet Area Systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Toughline®, GIB Braceline® GIB Noiseline®, GIB Aqualine®, GIB Weatherline®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB® Quiet Stud®, GIB Rail®, GIB Barrierline®, GIB X-Block®, GIB Fire Soundseal®, GIB Clip®, the colour mauve for GIB Toughline®, the colour blue for GIB Braceline® GIB Noiseline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour purple for GIB Weatherline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

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V.6 – March 2023

HIANDRI™

HIANDRI SOLUTIONS LIMITED

INSTALLATION MANUAL FOR HIANDRI BOTTOM PLATE PACKERS

IMPORTANT
Hiandri Solutions Limited accept no liability if Hiandri packers are not used in accordance with instructions contained in this manual. When specifying or installing Hiandri packers, ensure you have the current manual. If you are not sure you do or if you require further information, visit www.hiandri.com. For any work that is outside the scope of this manual you will need specific design.

CODEMARK™
BRANZ-CM-1019

BRANZ Appraised
Appraisal No.1095 [2020]

Raising the building industry to a new level!

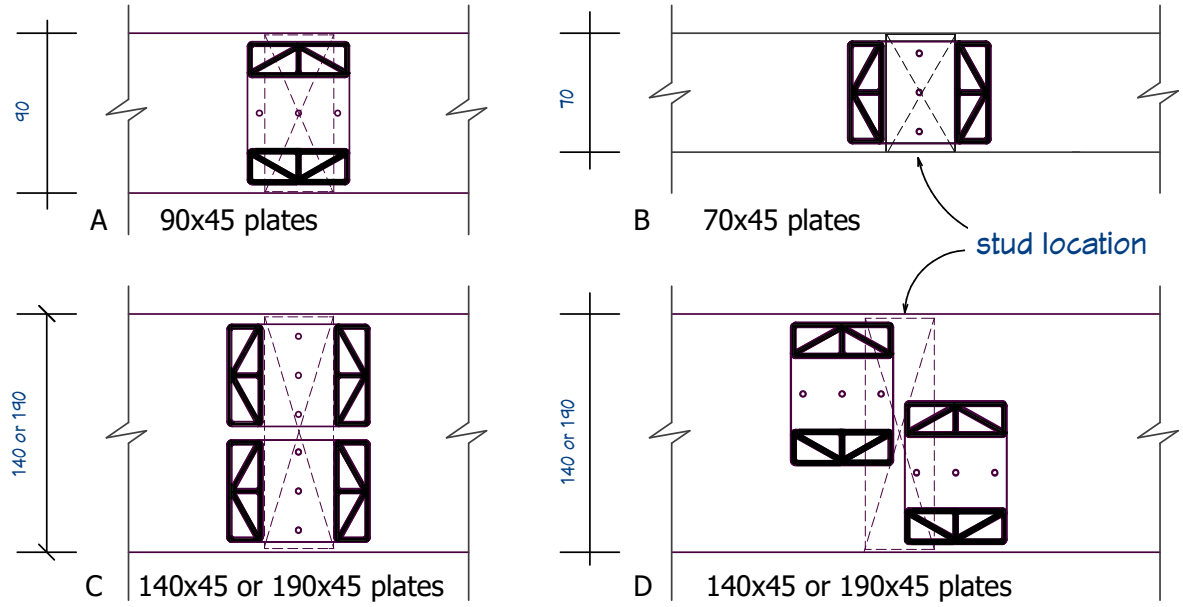
GENERAL COMMENT

1. **HIANDRI** can be used on timber and concrete floors.
2. **HIANDRI** packers are 84mm x 60mm x 12mm, manufactured using polypropylene plastic and each has a compressive strength of 70kN.
3. HIANDRI Packers can be used in some Fire rated and noise control walls. See www.hiandri.com for a full list of walls. Design situations that do not conform to these 'Installation Instructions' require 'Specific Design'.

INSTALLATION

1. **HIANDRI** packers are to be installed to the underside of the bottom plate directly under supporting studs at 600crs max to match framing set-out. **HIANDRI** packers may be set back at corners of the frame by 90mm.
2. **HIANDRI** packers may be fixed to the bottom plate at the pre-cut stage, hand-nailed on site with clouts or fixed with brads by a finishing gun. Additional **HIANDRI** packers may be slipped underneath the bottom plate if required and do not have to be fixed in place.

Acceptable layouts and orientation of HIANDRI packers as shown below



POSITIONING OF HIANDRI PACKERS ON PLATES

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FIXING BOTTOM PLATES

Concrete Floors:

External walls – Location of anchors as per NZS3604, using either cast insitu M12 bolts or M12x140 Trubolts, M12x135 through bolts, Hilti M12x150 screw bolts, M10x150 Ramset Anka screws, Bowmac M10x140 screwbolts, SIMPSON strong-tie THD M12x150 Screw Anchor.

Internal walls – Fix the bottom plate of frames using either Ramset 90mm powder powered pins with a washer or a 97mm Hilti powderpowered pin and washer at max 500mm centres.

Timber Floors:

A timber floor may support an additional timber floor, and **HIANDRI** packers may be installed on both floors.

All plates are to be fixed down at 600mm crs using a 125mm long Type 17, 14 gauge Bugle or Hex head screw. Position as close as practical to a stud supported on a **HIANDRI** packer.

All bottom plates, whether load-bearing or not, require a joist or solid blocking directly underneath them for screw fixing.

BRACING – (refer to www.hiandri.com for currently "approved" bracing systems)

1. The **HIANDRI** system has been tested and may be used in conjunction with approved bracing systems and bracing panels. When fixing down the bottom plates of a 'bracing panel', you **MUST** use minimum of 90mm Ramset pins or 97mm Hilti pins with washers for concrete floors; or on timber floors, a 125mm long Type 17, 14 gauge Bugle or Hex head screw.

2. Adhere to the installation instructions of the manufacturer for their bracing unit or panel and install propriety brackets and fixings where required and follow all bottom plate nailing patterns as required by the manufacturer. For concrete floors M10x140 GIB HandiBrac screwbolts, M10x150 Ramset Anka screws, M12x150 Hilti screw Anchors, SIMPSON strong-tie THD M12x150 Screw Anchor will meet the 15kN capacity required.

3. In bracing situations, where additional power driven nails are required, place additional packers in close proximity to the nail locations to reduce the bounce from the power driven nail. For Timber floors M12 x150 Coach bolts meet the 12kN when used in conjunction with HIANDRI packers capacity required.



Bracing element showing "Proprietary" hold down bolt/bracket.



Bracing element showing additional bottom plate fixings and suggested additional packer on concrete floors.

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AIR SEAL & INSULATION

Air seals must be installed to all exterior frames when using **HIANDRI** packers. Where and how the air seal is located depends on whether the cladding is on a cavity or direct fixed. See details below for exact location and type of air seal required. Air seals should be installed after the roofing is installed and floor is dry.

Figure 1
AIR SEAL FOR DIRECT FIXED CLADDINGS
AND RIGID WALL UNDERLAY

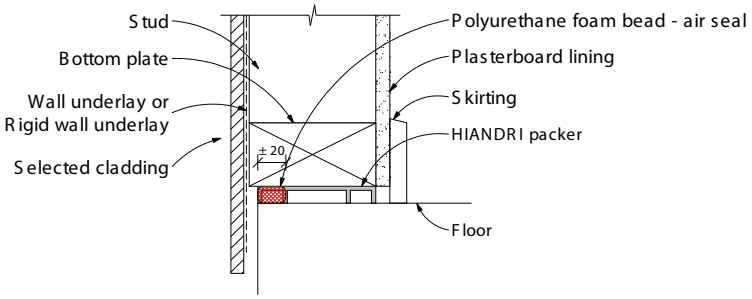
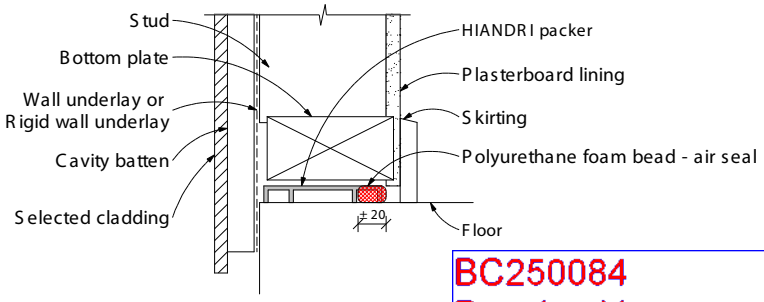


Figure 2
AIR SEAL FOR CAVITY



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INSTALLATION

When Installing the air seal it is important to hold application gun on a 45 degree angle to the floor situate the nozzle only just in the cavity and only apply foam while moving the gun along the bottom plate this will ensure that you do not over fill the cavity. See photo below.



On direct fixed claddings or a rigid wall underlay an air seal is required as per figure1 to enclose bottom plate fixings.

LIMITATIONS AND COMMENT

1. The **HIANDRI** system is engineered to meet the Compliance Clauses of the Building Code NZS3603, NZS3604 and NZS1170.
2. May be used in conjunction with all cladding options. Up to 4.0m height of brick veneer may be supported on a 'shelf angle' attached to the timber framing.
3. Timber Lintels & Point Loads –

   >1400mm up to 4000mm – **HIANDRI** packer under each stud either side (2 studs).

   >4000mm up – **HIANDRI** packer under each stud either side (3 studs).

   ALL point loads, such as truss loads, require a packer under each supporting stud.

4. Girder trusses supporting a tributary roof area greater than 36m2 and up to 50m2 require a double packer. Where a girder truss with a tributary roof area greater than 20m2 and a mid floor lintel coincide a triple packer is required under the lower storey studs supporting the mid floor lintel.



Packers on plates directly under studs. No additional packer is required at the fixing location. Hold down fixing distances as per NZS 3604 Approved fixings (page 3).



Lintels over 1400mm wide require a minimum of 2 packers. Lintels over 4m require a minimum of 3packers

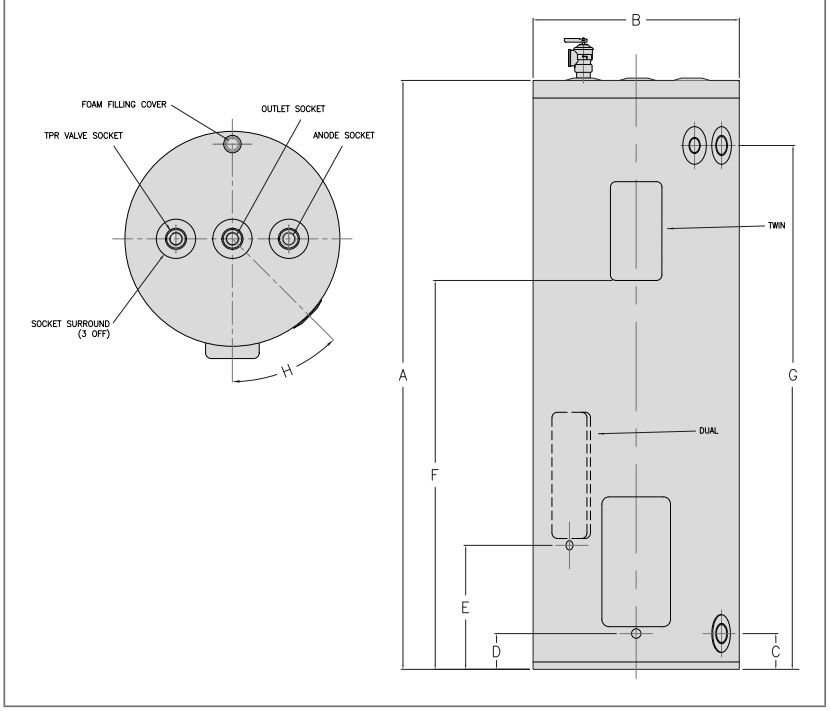
SPECIFICATIONS

MAINS PRESSURE – VITREOUS ENAMEL (VE)

Product		Models											
Single Element Indoor		31202519V	31204515	31209015	31213513 31213515	32213515	31218013 31218015		32218015	31225015	31230015		
Twin Element (non-simultaneous) Indoor							31218025			31225025			
Dual Element (simultaneous) Indoor											31230033 31230055		
Optima Outdoor/Indoor								91318015					
Optima Twin Element (non-simultaneous) Outdoor/Indoor												91330025	49240068
Approx. Storage Capacity	Litres	25	45	90	135	135	180	180	180	250	300	300	400
Boost Capacity (Twin Element)	Litres	-	-	-	-	-	45*	-	-	50**	50	47	90
Height	A (mm)	398	525	925	1325	935	1710	1720	1165	1555	1815	1820	1840
Width	B (mm)	400	490	490	490	580	490	490	580	580	580	580	690
	C (mm)	116	120	120	120	120	120	120	120	120	120	120	120
	D (mm)	32	65	65	65	65	65	-	65	65	65	-	105
	E (mm)	-	-	-	-	-	-	-	-	-	162	-	-
	F (mm)	-	-	-	-	-	1182*	-	-	1126**	-	1298	1323
	G (mm)	246	-	-	-	-	-	1546	-	-	-	1636	1479
	H (°)	45	45	45	45	45	45	36	45	45	45	36	97
Approx Weight Empty	Kg	15	26	38	49	54	60-62	64	64	80-82	91	97	113
Relief Valve Setting	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water Connections		RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20	RP ¾ /20
Element Rating (@230V)	kW	2.0	3.0	3.0	2.0 or 3.0	3.0	2.0 or 3.0	3.0	3.0	3.0	3.0 or 5.0	3.0	4.8^

*31218025 only **31225025 only ^ @ 240V

Cylinder Dimensions



1. Inlet/Outlet and TPR valve are side mounted on left-hand side of 31202519V.
2. Inlet/outlet and TPR valve are side mounted on right-hand side of 91318015 and 91330025.

Specifications Electric (@230V)

kW	Recovery on a 50°C rise	AMPS
2.0 kW	34 litres per hr	8.7 A
2.4 kW	40 litres per hr	10.4 A
3.0 kW	51 litres per hr	13.1 A
3.6 kw	62 litres per hr	15.7 A
4.8 kW	82 litres per hr	21.0 A
5.0 kw	85 litres per hr	21.8 A
6.0 kW	103 litres per hr	26.1 A
2 × 3.0 kW	103 litres per hr	26.2 A
2 × 5.0 kW	171 litres per hr	43.6 A

Quality System
Quality Endorsed Company
ISO 9001
Lic. QEC 14766
SAI Global

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316581G
May 2018

INSTALLATION INSTRUCTIONS
&
OWNERS GUIDE

RHEEM MAINS PRESSURE ELECTRIC HOT WATER HEATERS

Congratulations for choosing a Rheem Water Heater

It is important that you take a few minutes
to read this booklet as it may save you
time and trouble later.
If you require any further information or your
water heater needs to be serviced, please contact the
Rheem Service Department on 0800 657 335,
or the nearest service center
Or visit www.rheem.co.nz

Important to the Installer

Do not leave this booklet inside the element cover
after installation
Please leave the booklet with the water heater's
owner

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IMPORTANT INFORMATION

GENERAL

- The information contained in this manual, and all other information or advice given at any time by Rheem New Zealand Limited in connection with the purchase, installation or use of a Rheem water heater, is given in good faith. Subject to any rights the owner may have under the “Consumer Guarantees Act 1993”, Rheem New Zealand Limited will not be liable to any person for any inaccuracy or omission in the information or advice arising through the fault or negligence of Rheem New Zealand Limited or any other person or through any other cause whatsoever.
- This water heater is not intended to be operated, adjusted or tampered with by young children or infirm persons. Young children should be supervised to ensure they do not play with the water heater.

ABOUT YOUR WATER HEATER

Q. DOES THE WATER QUALITY AFFECT THE WATER HEATER?

A. Your water heater is suitable for most public water supplies, however, some water qualities may have a detrimental effect on it. **If you are in a known harsh water area please refer to page 6**.

Q. HOW HOT SHOULD THE WATER BE?

A. All models (temperature range 60 - 70°C) require an authorised person to make any temperature adjustments. For reasons of safety and economy, we advise the thermostat is adjusted to the lowest setting that meets your needs.

The New Zealand Building Code requires a stored temperature setting of not less than 60°C. A tempering valve set at a maximum of 55°C must be used on domestic wet areas.

Q. HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

A. Refer to the installation requirements on page 4.

Q. HOW LONG WILL THE WATER HEATER LAST?

A. There are a number of factors that affect the life of the water heater. These include; the water quality, water pressure, water temperature and the usage pattern, however, your Rheem water heater is supported by a comprehensive warranty (refer to page 7).

The life of the water heater may be extended by arranging for an authorised person to inspect the anode and replace it, if required.

The suggested time after installation when the anode should be inspected is:

Vitreous Enamel 8 years
Optima 10 years

For softened water supplies or in areas of poor water quality, it is recommended the anode be inspected 3 years earlier than shown (refer to "Water Quality" on page 6).

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HOW THE WATER HEATER WORKS

SINGLE AND TWIN ELEMENT MODELS

Water stored within the water heater is heated by the electric heating element. The thermostat controls the electricity supply to the heating element so that a constant water temperature is maintained. As the cold water is heated it expands approximately 1/50 of its volume and, as a result, a small amount of water is discharged from the cold water expansion valve.

NON-SIMULTANEOUS ELEMENT MODELS

The two heating elements are wired for non-simultaneous operation, so that only one heating unit can operate at a time. The bottom heating unit is usually connected to an off-peak (overnight) supply and the top heating unit to a continuous supply. **The red link wire must be removed from the terminal block during installation if two separate power supplies are to be used**. Leaving the link in place ensures both elements operate correctly with a single power supply.

The basic operation is as follows: when the water temperature at the top of the water heater has reached the set temperature, the thermostat switches the top element off. This creates a circuit to the bottom heating element by switching the neutral.

SAFETY

On all models, a Temperature and Pressure Relief valve is supplied with each water heater. It can be found inside the front cover and must be mounted on top of the water heater.

Also fitted to the water heater is a thermostat, which incorporates an over-temperature thermal cut-out device.

⚠ ***Warning:*** *The operation of the thermal cut-out indicates a possible dangerous situation. The thermostat and thermal cut-out is to only be adjusted or reset by an authorised service person.*

These safety devices must not be tampered with, or removed, and under no circumstances operate the water heater unless both devices are fitted.

REGULAR CARE

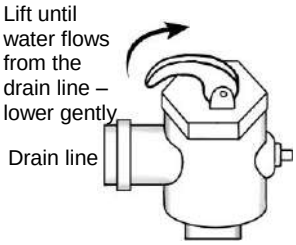
MANUALLY OPERATING THE TEMPERATURE AND PRESSURE RELIEF (TPR) VALVE:

The easing lever (see diagram. 1) on the TPR valve should be operated regularly to remove lime deposits and verify that it is not blocked. **It is very important that you raise and lower the lever gently.**

⚠ ***Warning:*** *To ensure the relief valve is working correctly, operate the relief valve easing lever at least every six months. Failure to do this may result in the water heater over-pressurising.*

DIAGRAM 1

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Water Heater

If water does not flow freely from the drain line or the valve fails to completely close and water continues to be discharged, contact the Rheem Service Department, phone **0800 657 335,** or the nearest Rheem Service Centre (look in the Yellow Pages under "Plumbers).

GOING ON HOLIDAYS:

If you plan to be away from home for one or two nights, we suggest that you leave the water heater switched on. However, if you plan to stay away more than a few nights, conserve energy by switching the water heater off at the isolating switch, or at the main switchboard. In locations where freezing could occur, you should leave the water heater turned on.

SAVE A SERVICE CALL

CHECK THE ITEMS BELOW BEFORE MAKING A SERVICE CALL. YOU MAY BE CHARGED FOR SERVICE IF THE FAULT IS NOT RELATED TO THE WATER HEATER MANUFACTURE OR PARTS SUPPLIED WITH THE WATER HEATER BY RHEEM.

WATER DISCHARGING FROM EXPANSION CONTROL VALVES

It is normal for the cold water expansion valve and the temperature and pressure relief valve to discharge a small quantity of water during the heating cycle. If either of these valves discharge more than a bucket full of water in 24 hours, one of the following may be the cause.

- **Continuous dribble**
  Try gently raising the easing lever on the relief valve for a few seconds. This may dislodge small particles of foreign matter and clear the fault.
- **Heavy flow of hot water until the water is cold – then stops while the water reheats**
  Immediately turn off the electricity supply to the water heater. Call the Rheem Service Department or look in the Yellow Pages under "Plumbers" for your nearest Rheem Service Centre or www.rheem.co.nz to arrange an inspection.
- **A steady flow of water (often at night)**
  This may indicate that your cold water pressure sometimes rises above the design pressure of the water heater. A Pressure Limiting valve should be installed, or if one is installed, it may need replacing.

NOT ENOUGH HOT WATER (or no hot water)

- **Is the electricity turned on?**
  Check the switch marked 'water heater' at the switchboard and the water heater isolating switch.
  Check the fuse or circuit breaker marked 'water heater'.

WHERE THE WATER HEATER IS CONNECTED TO AN OFF PEAK (NIGHT RATE) ELECTRICAL TARIFF, THE SUPPLY MAY NOT BE AVAILABLE AT CERTAIN TIMES OF THE DAY.

- **Do you have the correct size heater for your requirements?**
  Refer to the sizing guide in the Rheem sales literature or the Rheem website.
- **Is one outlet (especially the shower) using more hot water than you think?**
  Carefully review the family's hot water usage and if necessary, check the shower flow rate.
  For maximum efficiency we recommend the flow rate through the shower is between 8 to 10 litres per minute (mixed hot and cold). This can be achieved by installing a flow control valve if provision is not made to fit a flow restrictor in the shower rose.
- **Ensure the thermostat setting is appropriate. Note, some models require an authorised person to make electrical thermostat adjustments.**

HIGH ELECTRICITY BILLS

- **Consider recent changes to your hot water usage pattern and check if there has been an increase in tariffs since your previous account.**
- **Is either of the expansion valves discharging too much water?**

- **Is one outlet (especially the shower) using more hot water than you think?**
- **Is there a leaking hot water pipe, dripping hot water tap, etc?**
  Even a small leak will waste a surprisingly large quantity of hot water and energy. Replace faulty tap washers, and have your plumber rectify any leaking pipe-work.

INSTALLATION

Please take careful notice of the advice given as Rheem New Zealand Limited will not be liable for any loss or damage suffered as a result of the incorrect installation of the water heater, or any failure to check the capability of the electrical supply wiring to the water heater.
The water heater must be installed by a certified person or registered plumber and the installation must comply with the New Zealand Building Code, Rheem Installation Instructions, AS/NZS 3000 electrical installations and all local codes and regulatory authority requirements. Note that no warranty costs will be payable where the water heater is located in a position that does not comply with the Rheem water heater installation instructions or relevant statutory requirements, where the unit is installed in a position that does not allow safe or ready access, the cost of that access shall not be payable (refer to "Rheem Warranty" on page 7).

- **WATER HEATER LOCATION**
  Water heaters with a galvanised outer casing are only suitable for indoor installations, whereas water heaters with a painted casing are suitable for both indoor and outdoor installations.
  Clearance must be allowed for servicing and removal of the water heater and it must be accessible without the use of a ladder or scaffold. (Typical clearances are: TPR valve removal 135 mm, Element Cover and Element Removal 400 mm). Also, you must be able to read the information on the rating plate and if possible, leave headroom of one water heater length so the anode can be inspected or replaced.
- **CONNECTION SIZES**
  - Hot and Cold water connections: RP *¾ / 20.*
  - Relief valve connection: RP ½ / 15.
- **INLET/OUTLET CONNECTIONS**
  A union must always be provided at the cold water inlet and hot water outlet for disconnection reasons. All connection sockets on the water heater are parallel threaded and therefore tapered brass nipples must be used to ensure watertight connections. Both connections are fitted with plastic liners and it is important that they remain in situ for the water heater to function properly. These liners will be pushed into the correct position as the fitting is being screwed in.
- **NON RETURN VALVE**
  A non return valve must be installed on the cold water line to the water heater.
- **PIPE SIZES**
  The cold water line to the water heater should be the same size or bigger than the hot water line from the water heater. For best results, choose the most suitable pipe size for each individual application.
- **COLD WATER EXPANSION VALVE**
  A cold water expansion valve must be fitted to the cold water line to the water heater.
- **TEMPERATURE AND PRESSURE RELIEF VALVE**
  When fitting the temperature and pressure relief valve, ensure the probe has not been bent. Seal the thread with PTFE tape, or similar, as recommended by the valve manufacturer and screw the valve into the off-centre socket. Do not use a wrench on the valve body – use the spanner flats provided. Drain the TPR valve with a pipe the same size as the valve outlet. The drain must run downwards to a visible point outside the house, preferably over a gully trap.
  In some setups or circumstances, such as if freezing could occur, an air break must be provided in the drain within 300 mm of the TPR valve, refer to the New Zealand Building Code - Clause G12 for requirements and acceptable solutions for the running of hot water drain line(s).

Warning: The drain line from the TPR valve must be in copper. *A Rheem mains pressure water heater must* ***not*** *be installed and operated without a suitable (valve that complies with AS 1357.1) temperature and pressure relief valve. Under no circumstances block the outlet of this valve or its drain pipe.*

- **WATER SUPPLY PRESSURE**
  Maximum permitted mains water pressure - refer product label and Table 5.2 AS/NZS 3500.4. Note inlet pressure control valve is required where maximum permitted mains pressure is likely to be exceeded.
  Minimum inlet pressure: 60 kPa
- **PRESSURE LIMITING/REDUCING VALVE**
  If the water supply pressure exceeds the requirements of Table 5.2 AS/NZS 3500.4, a pressure limiting valve with a maximum setting of 500 kPa is to be fitted in the installation.
- **SAFE TRAY AND SEISMIC RESTRAINTS**
  The water heater must be installed with a properly drained safe tray where there is the possibility of water damage to furniture, carpets or building. All water heaters must be restrained to protect against seismic forces. (Refer to the Zealand Building Code for acceptable solutions.)

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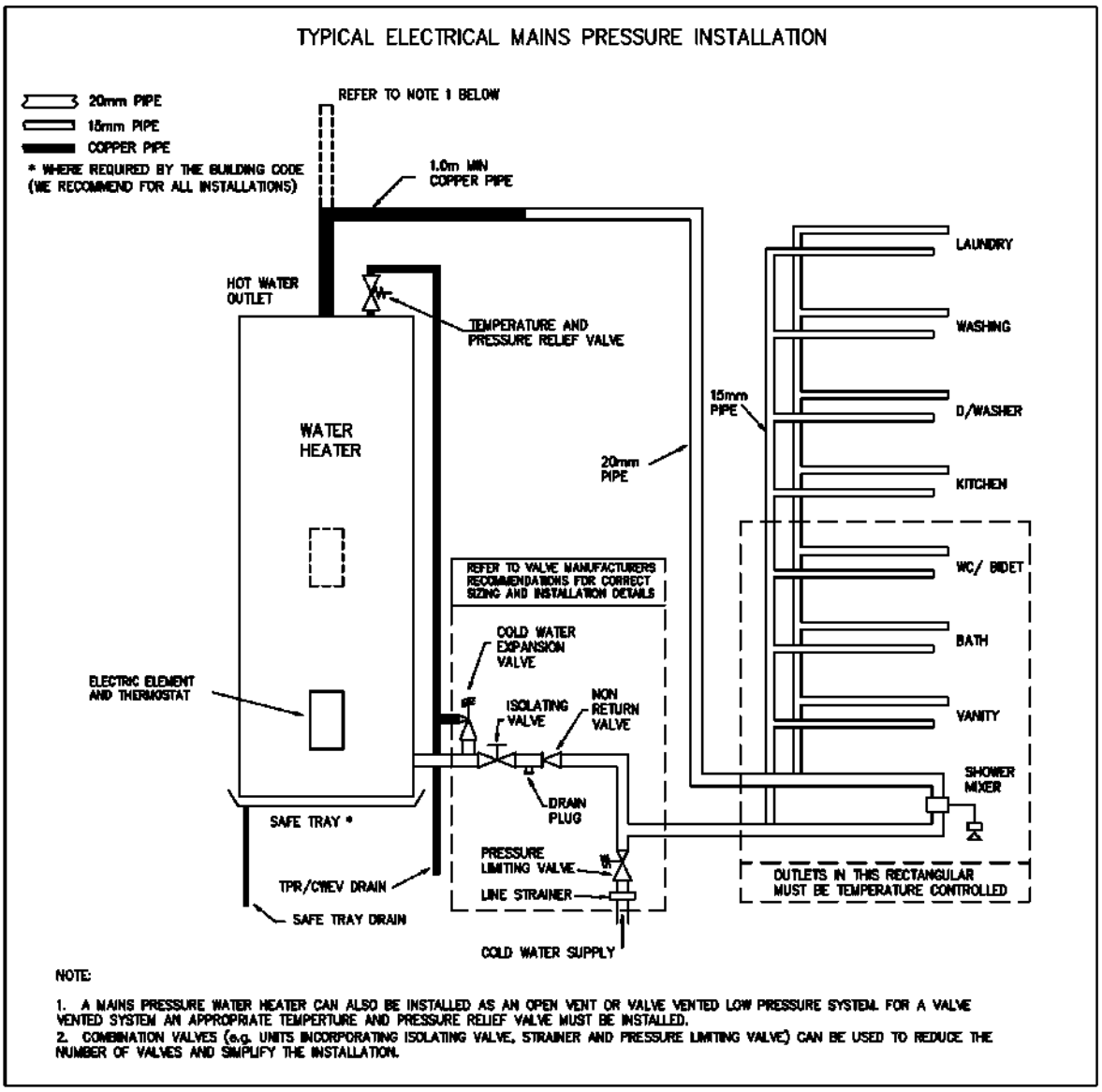


DIAGRAM 2:

CONNECTIONS - ELECTRICAL

The electrical installation must be completed in accordance with AS/NZS 3000. All water heaters are designed for 230 VAC, 50 Hz mains operation and a means of disconnection from the power supply must be incorporated in the fixed wiring during installation.

A flexible 20 mm conduit is required for the electrical cable to the water heater. The conduit is to be connected to the unit with a 20 mm plain to screw adaptor. Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover. For details, refer to the wiring diagram on the inside of the element cover. **A separate heating element earth wire is not required because the element earths by the thread of the element boss or the flange being in contact with the element socket.**

COMMISSIONING

TO FILL AND TURN ON THE WATER HEATER

⚠ ***Warning:*** *The power supply to the water heater must not be switched on until the water heater is filled with water and an "earth continuity test", as outlined in Annex A of AS/NZS 60335.1 has been carried out. Failure to do so will damage the element and shorten its life and may create a dangerous situation.*

- Open all of the hot water taps in the house (don't forget the shower). Open the cold water isolation valve fully to the water heater to force the air out of the taps. As water flows freely from each tap, close it. Check the pipe-work for leaks.
- Switch on the electrical supply at the isolating switch to the water heater.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then;

- Switch off the electrical supply at the isolating switch to the water heater.
- Close the cold water isolation valve at the inlet to the water heater.

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DRAINING THE WATER HEATER

- Switch off the electrical supply at the isolation switch to the water heater.
- Close the cold water isolation valve.
- Operate the relief valve easing lever to release the pressure in the water heater.
- Drain the water heater through the drain valve or plug.
- Undo the top outlet union or operate the relief valve easing lever again to let air into the water heater and allow the water to drain

WHAT YOU SHOULD KNOW ABOUT WATER QUALITY

WATER SUPPLY CHEMISTRY

Water quality can have a detrimental effect on water heater operation, components and life expectancy and may affect the warranty.

⚠ ***Warning****: This water heater must be installed in accordance with advice given to be covered by the Rheem warranty.*

Your Rheem water heater is manufactured to suit the water condition of most local authority water supplies. However, some water supplies can have a detrimental effect on the water heater and its operation and/or life expectancy. This water heater must only be connected to a water supply which complies with these specifications for the Rheem warranty to apply. If you are unsure of your water chemistry you may be able to obtain information from your local water supply authority or you can contact Rheem and we will provide you with contact details of a suitable agency capable of testing your water for compliance with Rheem standards. Water quality tests must be carried out at the owner's cost.

HARSH WATER AREAS

Rheem water heaters are designed for use in areas where the Total Dissolved Solids (TDS) content of the water supply is less than 2500 mg/L.

In areas where the TDS exceeds 600 mg/L it is possible the standard magnesium anode fitted to the water heater, may be excessively active. To alleviate this, the magnesium anode should be replaced with an aluminium anode. Where the TDS of the water is less than 40 mg/L, such as when the water has been deionised or is from an alpine supply, a high potential anode should be used. The changing of anodes must be carried out by a plumber or qualified service person.

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CAUTION

If your water supply has a TDS greater than 600 mg/L and the anode has not been changed, there is a possibility of hydrogen gas accumulating in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (e.g. automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flames near the tap whilst it is turned on. Any hydrogen gas will be dissipated as indicated by an unusual spurting of the water from the tap. Once the water runs freely again any hydrogen in the system will have been released.

SATURATION INDEX

The saturation index is used as a measure of the water's corrosive or scaling properties. In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. When scaling water has a saturation index greater than +0.40 an expansion control valve must be fitted on the cold water line after the non-return valve.

Where the saturation index exceeds +0.80, low watts density elements should be used. Where the saturation index is less than -1.0, a corrosive resistant heating unit should be used (contact your local Rheem Service Department or an authorised service person).

Scaling water is water that containing levels of calcium carbonate (total hardness in excess of 200 mg/litre at any time when the water heater is operating) Scaling water can block and prevent the pressure & temperature relief valve from operating, resulting in damage to the water heater storage cylinder and water components. A cold water expansion control valve must be fitted where in all areas with scaling water to assist in preventing blockage of the pressure and temperature relief valve.

⚠ ***Warning:*** *Failure to install an expansion control valve where scaling water conditions occur may result in the water storage cylinder failing or under certain circumstances over pressurising.*

To avoid damage to the storage cylinder and components Rheem strongly recommends scaling water be treated before entering the water heater by fitting appropriate water filters, conditioners, etc – refer to your local water authority for information on water in your area. A build up of white sediment on the hot taps or shower rose can be indicative of scaling water. Contact Rheem if this condition is observed.

⚠ ***Warning:*** *Damage caused by scaling water can affect the Rheem warranty.*

The Rheem warranty of this water heater will not cover resultant faults on components, including storage tank, due to the effects of sludge and/or sediment as a result of connection to a water supply from silted or untreated sources, i.e. springs, dams, bores, rivers or town supplied from a bore.

WATER HEATERS NOT INSTALLED IN ACCORDANCE WITH THE ABOVE ADVICE WILL NOT BE COVERED BY THE RHEEM WARRANTY.

RHEEM WARRANTY

Mains Pressure Electric Water Heater Product Warranty New Zealand Only

In addition to your legal right, in New Zealand Rheem New Zealand Limited makes the following promise to the owner. We will repair or, if necessary, replace a defective unit or part of it, which has failed due to faulty manufacture on the following terms and conditions:

1. THE RHEEM WARRANTY – GENERAL

1.1 This warranty is given in respect of sales in New Zealand by Rheem New Zealand Limited of 475 Rosebank Road.

1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the unit subject to the terms of the Rheem warranty in New Zealand – contact your Rheem Service Centre on 0800 657 335.

1.3 For details about this warranty, you can contact your Rheem Service Centre in New Zealand on 0800 657 335.

1.4 The terms of this warranty are set out in section 2 and apply to units manufactured after 1st July 2016.

1.5 If a subsequent version of this warranty is published, the terms of that warranty will apply to units manufactured after the date specified in the subsequent version.

2. TERMS OF THE RHEEM WARRANTY AND EXCLUSIONS TO IT

2.1 The decision of whether to repair or replace a faulty component is at Rheem New Zealand Limited's sole discretion.

2.2 Where a failed component or unit is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Rheem warranty.

2.3 Where the unit is installed outside the boundaries of a metropolitan area, defined by Rheem as further than 25 km from a Rheem service centre, the cost of transport, insurance and travelling between the Rheem service centre and the installed site shall be the owner's responsibility.

2.4 Where the unit is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors, walls, roofs or trap doors and the cost of any special equipment to bring the unit to floor or ground level or to a serviceable position is not covered by this warranty.

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2.5 This warranty only applies to the original and genuine Rheem unit in its original installed location and any genuine Rheem replacement parts. It does not cover any plumbing, gas fitting or electrical parts supplied by the installer, that are not an integral part of the unit, e.g. pipe-work, pressure limiting valve, stop valves, non-return valves, electrical switches, pumps and fuses.

2.6 The Rheem warranty does not cover faults that are a result of:

a) Accidental damage to the unit or any component, for example Acts of God such as floods, storms, fires, lightning strikes and the like and Third party acts or omissions.

b) Misuse or abnormal use of the unit.

c) Installation or use not in accordance with the Owner's Guide and Installation Instructions, New Zealand Building Code requirements or with relevant statutory and local requirements including failure to install a properly drained safe tray where required by the owners guide and installations.

d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions, or poor water quality outside the limits specified in the owners guide and installation instructions.

e) Repairs, attempts to repair or modifications to the unit by a person other than Rheem Service or a Rheem Accredited Service Technician.

f) Faulty plumbing or faulty power supply.

g) Failure to maintain the unit in accordance with the Owner's Guide and Installation Instructions.

h) Transport damage.

i) Fair wear and tear from adverse conditions (for example, corrosion).

j) Cosmetic defects.

2.7 If you require a call out and we find that the fault is not covered by the Rheem warranty, you are responsible for Rheem Service Centre call out costs. If you wish to have the relevant component repaired or replaced by Rheem that service will be at your cost.

2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims however arising including under contract or tort for damage to furniture, carpet, walls, foundations or any other consequential loss or incidental expenses either directly or indirectly due to leakage from Rheem unit, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.

2.9 This warranty excludes to the extent permissible all implied warranties set out in the sale of goods act 1908 (New Zealand) and all guarantees set out in the consumers guarantees act 1933 (New Zealand) to the extent that the goods are acquired for the purpose of resupply in trade consumption in the course of a process of production or manufacture or repairing or treating in trade other goods or fixtures on land.

3. WHAT IS COVERED BY THE RHEEM WARRANTY FOR THE UNITS DETAILED IN THIS DOCUMENT

3.1 The following Warranty terms apply for all Rheem Water Heaters manufactured after 1st June 2018. Rheem will repair or replace a faulty component of your unit if it fails to operate in accordance with its specifications as follows:

Warranty Cover	**The period from date of installation, in which the fault must appear, in order to be covered**		*Domestic use is defined as; when the appliance is installed in a single family domestic dwelling.
What components are covered	**Domestic use***	**Non-domestic use***	**What coverage you receive**
Low & Mains Pressure	**Years**		**(Excludes Optima)
All components	1	1	Repair or replacement of failed component, or if necessary, replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	5	1	Repair or replacement of the complete water heater, free of charge, including labour.
Cylinder only - Vitreous Enamel (Thermostat setting must be below 70°C)	10	3	Repair or replacement of the complete water heater, free of charge. Installation and labour cost are the responsibility of the owner.
Optima	**Years**		
All components	3	1	Repair or replacement of failed component, or if necessary, replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	5	1	Repair or replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	12	5	Repair or replacement of the complete water heater, free of charge. Installation and labour cost are the responsibility of the owner.

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

4.1 To be entitled to make a claim under this warranty you need to:

a) Be the owner of the unit or have consent of the owner to act on their behalf.

b) Contact Rheem New Zealand Limited Service Department without undue delay after detection of the defect and, in any event, within the applicable warranty period.

c) Return the faulty component or unit as directed by the Rheem New Zealand Limited Service Department.

4.2 You are **not** entitled to make a claim under this warranty if your unit:

a) Does not have its original serial numbers or rating labels.

b) Is not installed in New Zealand.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

5.1 If you wish to make a claim under this warranty, you need to:

a) Contact Rheem New Zealand on 0800 657 335 and provide owner's details, address of the unit, a contact number and date of installation of the unit or if that's unavailable, the date of manufacture and serial number (from the rating label on the unit).

b) A Rheem service centre will arrange for the unit to be tested and assessed on-site.

c) If Rheem determines that you have a valid warranty claim, Rheem will repair or replace the unit in accordance with this warranty.

5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

RHEEM SERVICE DEPARTMENT
475 Rosebank Road, Avondale, Auckland

www.rheem.co.nz

FOR SERVICE TELEPHONE
Phone: 0800 657 335
Fax: 09 829 0222
or visit www.rheem.co.nz for your nearest Rheem Service Centre

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Supplier Declaration of Compliance

(In accordance with Regulation 101A of the Electricity Regulations 1997)

Ministry of Economic Development
Manatū Ōhanga
Energy Safety

THIS COMPLETED FORM REMAINS WITH THE SUPPLIER AS PART OF THE DOCUMENTATION REQUIRED FOR THE "*COMPLIANCE FOLDER*"
DO NOT SUBMIT THIS FORM TO THE MINISTRY

Suppliers Details

Name (of New Zealand manufacturer, importer or agent)

Rheem NZ Limited

New Zealand Company Number (if applicable)

1175771

Address

475 Rosebank Road
Avondale
Auckland NZ

Product Details

Product name, type, model and serial numbers (if applicable)

Mains Pressure Electric Hot Water Heater
Model: 31218015

Documents used as the basis for compliance with regulation 69

Wakefield Laboratories Test Report # 20217C
Covering AS/NZS 3350.2.21 Safety of Household and Similar Electrical Appliances Part 2.21 Particular requirement - Storage Water Heater

Declaration

I hereby declare that the above specified fittings or electrical appliances comply with the requirements of Regulation 69 of the Electricity Regulations 1997.

Signature of Authorised Person

Print Name

Chris Wheeler

Position in Organisation

Engineering Manager

Date 29-Oct-2009

Supplier Identification
(as affixed to the product)

Rheem

Reset

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BRANZ Appraised
Appraisal No. 447 [2020]

LINEA™ WEATHERBOARD CAVITY CLADDING



Appraisal No. 447 (2020)

This Appraisal replaces BRANZ Appraisal No. 447 (2010)

BRANZ Appraisals

Technical Assessments of products for building and construction.

James Hardie New Zealand Limited
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BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 Linea™ Weatherboard Cavity Cladding is a cavity-based bevel-back fibre cement weatherboard wall cladding. It is designed to be used as part of an external cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 Linea™ Weatherboard Cavity Cladding consists of Linea™ Weatherboard, which is a bevel-back fibre cement weatherboard, fixed over timber battens to form the cavity. The cladding is finished with a latex paint system.

Scope

2.1 Linea™ Weatherboard Cavity Cladding has been appraised as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Linea Weatherboard Cavity Cladding has also been appraised for weathertightness and structural wind loading when used as an external horizontally fixed wall cladding solution for 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,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.

2.3 Linea™ Weatherboard must only be installed horizontally on vertical surfaces.

2.4 Linea™ Weatherboard Cavity Cladding is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[Note: The Appraisal of Linea™ Weatherboard Cavity Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone.]*

[Note: Linea™ Weatherboard Cavity Cladding can be used to provide fire resistance rated construction, but these aspects have not been assessed by this Appraisal and are outside its scope.]

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Linea™ Weatherboard Cavity Cladding if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Linea™ Weatherboard Cavity Cladding meets the requirements for loads arising from self-weight, earthquake, wind, impact and creep [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See Paragraphs 9.1-9.3.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2. Linea™ Weatherboard Cavity Cladding meets these requirements. See Paragraphs 10.1-10.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Linea™ Weatherboard Cavity Cladding meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Linea™ Weatherboard Cavity Cladding meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 System components and accessories for Linea™ Weatherboard Cavity Cladding supplied by James Hardie New Zealand Limited are:

- **Linea™ Weatherboards** are bevel-back weatherboards with a tongue and groove at each end for jointing. The weatherboards are pre-primed with an acrylic primer on the front face and both edges. Linea™ Weatherboards are 16 mm thick and are available 135 mm, 150 mm and 180 mm wide. All boards are supplied 4,200 mm long. Linea™ Weatherboards are manufactured from a reduced density cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a bevel is cut on the back face of the weatherboards, the front edge at the bottom of the board is chamfered and the ends are tongue and grooved for jointing. Linea™ Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

Accessories

- **Axent™ Trim** - a 16 mm thick fibre cement trim manufactured from a reduced density cellulose fibre cement formulation. Axent™ Trim is pre-primed with an acrylic primer on the front face and both edges, and is available in sizes of 84 mm and 100 mm wide by 2,600 mm long.
- **External and internal corner mouldings** - chromate treated aluminium external box corner, 90° internal corner 'W' mould and 135° internal corner 'W' mould. The mouldings are available in 2,700 mm and 4,000 mm lengths.
- **Corner soakers** - 90° soakers are available for 135 mm, 150 mm and 180 mm Linea™ Weatherboards. The soakers are available in chromate treated aluminium, copper and stainless steel.
- **Cavity vent strip** - uPVC, available in 3,000 mm lengths.
- **Rigid wall underlay** – HomeRAB™ Pre-Cladding, RAB™ Board, plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.

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4.2 System components and accessories used with Linea™ Weatherboard Cavity Cladding which are supplied by the building contractor are:

- **Flexible wall underlay** – building paper complying with NZBC Acceptable Solution E2/AS1 Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible building underlay support** – polypropylene strap at 300 mm centres fixed horizontally and drawn taut, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible building underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *[Note: Mesh and wire galvanising must comply with AS/NZS 4534. Additional vertical battens may also be installed to provide support.]*

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

- **Flexible sill, head and jamb flashing tape** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Cavity battens** - nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to Hazard Class H3.1.
- **Joinery head flashings** - folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- **Planted sill and scribers** - timber treated to Hazard Class H3.1, pre-primed before installation.
- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.

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- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
- **Cavity batten fixings** - 40 x 2.8 mm flathead hot-dip galvanised nails.
- **Linea™ Weatherboard fixings** - 60 x 3.15 mm flathead hot-dip galvanised HardieFlex nails or stainless steel ring shank HardieFlex nails (for concealed nailing in NZS 3604 Wind Zones up to, and including, Very High), 75 x 3.15 mm jolthead hot-dip galvanised nails or stainless steel ring shank nails (for face nailing in NZS 3604 Wind Zones up to, and including, Very High), and 90 x 3.55 mm jolthead hot-dip galvanised nails or stainless steel ring shank nails (for face nailing in the NZS 3604 Extra High Wind Zone and specific design wind pressures up to a maximum design differential ULS of 2.5 kPa).

(Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680).

- **Axent™ Trim fixings** - 60 x 3.15 mm or 75 x 3.15 mm hot-dip galvanised jolthead nails and stainless steel ring shank jolthead nails.
- **Aluminium joinery head flashing** - as supplied by the joinery manufacturer or the contractor.
- **Flashings** - balustrade and parapet cap flashings, and inter-storey joint flashings. Refer to NZS 3604 Section 4, and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.

Paint System Specification

4.3 Paint systems are not supplied by James Hardie New Zealand Limited and have not been assessed, therefore they are outside the scope of this Appraisal.

4.4 All exposed faces, including top edges at sills and all bottom edges of Linea™ Weatherboard, Axent™ Trim and accessories must be finished with at least 2 coats of an exterior grade latex acrylic paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730.

Handling and Storage

5.1 Handling and storage of all materials supplied by James Hardie New Zealand Limited or the building contractor, whether on-site or off-site, is under the control of the building contractor. Linea™ Weatherboards must be stacked flat, off the ground and supported on a level platform. They must be kept dry at all times either by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to edges, ends and surfaces. Weatherboards must always be carried on edge.

5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Linea™ Weatherboard Cavity Cladding. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Design Information

Framing

Timber Treatment

7.1 Timber wall framing behind Linea™ Weatherboard Cavity Cladding must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of a building within the scope limitations of NZS 3604. Buildings or parts of a building outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Studs must be at maximum 600 mm centres in Low, Medium, High and Very High Wind Zones and maximum 400 mm centres for the NZS 3604 Extra High Wind Zone and specifically designed buildings. Nogs must be fitted flush between the studs at maximum 800 mm centres (for studs at 600 mm centres) when a flexible wrap is used. The nogs may be omitted when a rigid air barrier is used.

7.3 Timber framing must have a maximum moisture content of 20% at the time of the cladding application. *(Note: If weatherboards are fixed to framing with a moisture content of greater than 20%, problems may occur at a later date due to excessive timber shrinkage.)*

General

8.1 When Linea™ Weatherboard Cavity Cladding is used for specifically designed buildings up to 2.5 kPa ULS wind pressure, only the weathertightness and structural aspects of the cladding are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.

8.2 Punchings in the cavity vent strip provide a minimum ventilation opening area of 1,000 mm^2 per lineal metre of wall in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 b).

8.3 At ground level, the bottom edge of Linea™ Weatherboards must be kept clear of paved surfaces, such as footpaths, by a minimum of 100 mm and unpaved surfaces by 175 mm in accordance with NZBC Acceptable Solution E2/AS1, Table 18. The ground clearances to finished floor levels as set out in NZS 3604 must be adhered to.

8.4 At balcony, deck or low pitch roof/wall junctions, the bottom edge of Linea™ Weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 50 mm.

8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to, and including, Very High, a rigid underlay must be used for buildings in the Extra High Wind Zone and SED buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and unlined walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the cavity batten fixing lengths must be increased by a minimum of the thickness of the underlay.

8.6 Where Linea™ Weatherboard Cavity Cladding abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Inter-storey Junctions

8.7 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b).

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Structure

Mass

9.1 The mass of the 135 mm wide Linea™ Weatherboard when installed on the wall is 25.7 kg/m^2 at equilibrium moisture content (EMC). The mass of the 150 mm wide board is 24.93 kg/m^2 at EMC and the mass of the 180 mm wide board is 23.92 kg/m^2 at EMC. Linea™ Weatherboard Cavity Cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

9.2 Linea™ Weatherboard Cavity Cladding will resist impacts likely to be encountered in normal residential use. The likelihood of impact damage to the cladding when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers provided for vulnerable areas.

Wind Zones

9.3 Linea™ Weatherboard Cavity Cladding is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa ULS wind pressure where buildings are specifically designed.

Durability

Serviceable Life

10.1 Linea™ Weatherboard Cavity Cladding installations are expected to have a serviceable life of at least 50 years provided the paint coating system is maintained in accordance with this Appraisal to ensure the Linea™ Weatherboards and fixings remain dry in service. Linea™ Weatherboards must be painted within 3 months of fixing.

10.2 Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500 m from the sea including harbours, or 100 metres from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604, Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life in Zone D, Linea™ Weatherboards must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot-dip galvanised steel.

10.3 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Linea™ Weatherboards in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

11.1 Regular maintenance is essential for Linea™ Weatherboard Cavity Cladding installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.

11.2 Annual inspections must be made to ensure that all aspects of the cladding system, including the paint coating system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the sealant or paint coating manufacturer's instructions.

11.3 Regular cleaning (at least annually) of the paint coating surface is recommended to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Paint systems must be re-coated at approximately 7-15 yearly intervals in accordance with the paint manufacturer's instructions.

11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *(Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Linea™ Weatherboard Cavity Cladding.)*

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Fire Affecting Areas Beyond the Fire Source

Vertical Fire Spread

12.1 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

12.2 Linea™ Weatherboards have a peak heat release rate of less than 100 kw/m^2 and a total heat released of less than 25 MJ/m^2. Testing was carried out as per Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of NZBC Acceptable Solution C/AS2, achieving a Type A performance. Linea™ Weatherboards can therefore be used within 1 m of the relevant boundary.

12.3 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

Prevention of Fire Occurring

13.1 Separation or protection must be provided to the Linea™ Weatherboards from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

14.1 Linea™ Weatherboard Cavity Cladding, when installed in accordance with this Appraisal and the Technical Literature will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with NZBC Clause E2.3.5.

14.3 Linea™ Weatherboard Cavity Cladding allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.

14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

14.5 The use of Linea™ Weatherboard Cavity Cladding where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for junctions, penetrations, etc to remain weather resistant.

Internal Moisture

15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

15.2 Linea™ Weatherboard Cavity Cladding is not a barrier to the passage of water vapour, and when installed in accordance with the Technical Literature and this Appraisal will not create or increase the risk of moisture damage resulting from condensation.

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Installation Information

Installation Skill Level Requirements

16.1 All design and building work must be carried out in accordance with the Linea™ Weatherboard Cavity Cladding Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the cladding system. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence class.

System Installation

Building Underlay and Flexible Sill and Jamb Tape Installation

17.1 The selected building underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Linea™ Weatherboard Cavity Cladding system. Flexible building underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid sheathing materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the building underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

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Cavity Battens

17.2 Cavity battens must be installed over the building underlay to the wall framing at maximum 600 mm centres where the studs are at 600 mm centres or at 400 mm centres when studs are at 400 mm centres. The battens must be fixed in place with 40 x 2.8 mm hot-dip galvanised flathead nails at maximum 800 mm centres.

17.3 Where studs are at greater than 400 mm centres, a building underlay support must be installed over the building underlay between the cavity battens at maximum 300 mm centres.

Linea™ Weatherboard Installation

17.4 Linea™ Weatherboards may be cut on-site by power saw. Holes and cut-outs may be formed by drilling a number of holes around the perimeter of the opening required and tapping out the centre with a hammer, or by using a hole saw.

17.5 Linea™ Weatherboards must be dry prior to installation. Before the weatherboards are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement.

17.6 Linea™ Weatherboards must be installed starting at the bottom of the wall. A cant strip (H3.1 treated timber or fibre cement) must be fixed behind the bottom course of weatherboards to ensure the weatherboards are set at the correct angle. The cant strip must be continuous around the perimeter of the building. The bottom course of weatherboards must overhang the bottom plate by a minimum of 50 mm.

17.7 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner, corner soaker. The necessary flashings, including window flashings, must be installed before commencing weatherboard fixing.

17.8 The first course of weatherboards must be full length, i.e. 4,200 mm and commence from an external corner. Jointing of Linea™ Weatherboards is made off the stud using the pre-cut tongue and groove joint. Tongue and groove joints may be located centrally between the studs, but must be no closer than 100 mm to the edge of a stud. A bead of sealant must be applied to the front side of the tongue before the corresponding board is inserted. Subsequent courses of weatherboards must be installed so that the tongue and groove joints are staggered by 600 mm minimum from joints in the previous course.

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17.9 Linea™ Weatherboards must have a minimum lap of 30 mm, and should be set out so as near to a full board as possible will finish under and over windows and doors and at the top of the wall. A storey rod can be used to accurately position weatherboard courses.

17.10 Linea™ Weatherboards must be fixed to each stud using concealed fixings behind the lap of the boards or face nailing, except that face nailing must be provided at all corners and vertical edges of openings.

17.11 Concealed fixing must be carried out using 60 x 2.8 mm hot-dip galvanised or stainless steel Hardieflex nails depending on the location, see Paragraph 10.2. Nails must be fixed 25 mm from the top edge of the board and must be driven flush with the board surface.

17.12 Face nailing must be carried out using 75 x 3.15 mm hot-dip galvanised or stainless steel jolthead nails in NZS 3604 Wind Zones up to, and including, Very High, or 90 x 4.0 mm hot-dip galvanised or stainless steel jolthead nails in the NZS 3604 Extra High Wind Zone and specific design wind pressures up to a maximum design differential ULS of 2.5 kPa, depending on the location, see Paragraph 10.2. Nails must be fixed 15 mm up from the bottom of the board and punched a maximum of 2 mm below the surface of the board. The top board must be pre-drilled for fixing.

17.13 Linea™ Weatherboards can be hand or gun nailed. Nails must not be closer than 25 mm to the end of the board when hand nailing, or closer than 50 mm when gun nailing. *[Note: Gun nailing must only be used for concealed nailing.]*

Aluminium Joinery Installation

17.14 Aluminium joinery and associated head and sill (for direct fixed) flashings must be installed by the building contractor in accordance with the Technical Literature. An 8 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

17.15 After installing the window and door joinery, Axent™ Trim, planted sills and scribers may be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/weatherboard junction.

Inspections

17.16 The Technical Literature must be referred to during the inspection of Linea™ Weatherboard Cavity Cladding installations.

Finishing

17.17 The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. Linea™ Weatherboards and trim must be clean and dry before commencing painting.

Health and Safety

18.1 Cutting of Linea™ Weatherboards must be carried out in well ventilated areas, and a dust mask and eye protection must be worn.

18.2 When power tools are used for cutting, grinding or forming holes, health and safety measures as set out in the Technical Literature must be observed because of the amount of dust generated.

18.3 Safe use and handling procedures for Linea™ Weatherboards and the components that make up the cladding system are provided in the relevant manufacturer's Technical Literature.

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Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for Linea™ Weatherboard Cavity Cladding was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Linea™ Weatherboard Cavity Cladding was tested to E2/VM1 (as contained within NZBC Clause E2, Third Edition, Amendment 5).
- Uniform wind face load tests to simulate wind pressures on 12 mm thick Linea™ Weatherboards were carried out by BRANZ, and the results were used in assessing 16 mm thick Linea™ Weatherboard used in Linea™ Weatherboard Cavity Cladding.
- Cone calorimeter testing to determine the peak rate of heat release and total heat release of Linea™ Weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.

19.2 Linea™ Weatherboards have been tested by a National Association of Testing Authorities [NATA] accredited laboratory in accordance with AS/NZS 2908.2. The results have been reviewed by BRANZ and found to be satisfactory.

19.3 Testing has been carried out by James Hardie New Zealand Limited to determine the modulus of rupture and inter-laminar bond strength of carbonated and non-carbonated Linea™ Weatherboard. The test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

20.1 Weathertightness, structural, fire and durability opinions have been provided by BRANZ technical experts.

20.2 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of Linea™ Weatherboards has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

21.2 The quality of materials, components and accessories supplied by James Hardie New Zealand Limited is the responsibility of James Hardie New Zealand Limited. The quality control system of James Hardie New Zealand Limited has been assessed and registered as meeting the requirements of ISO 9001: 2015.

21.3 Quality on site is the responsibility of the installer.

21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the building underlay, cavity battens, Linea™ Weatherboard and accessories in accordance with the instructions of James Hardie New Zealand Limited.

21.5 Building owners are responsible for the maintenance of Linea™ Weatherboard Cavity Cladding in accordance with the instructions of James Hardie New Zealand Limited.

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Sources of Information

- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2908.2: 2000 Cellulose-cement products - Flat sheet.
- AS/NZS 3837: 1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- AS/NZS 4534: 1998 Zinc and zinc/aluminium-alloy coatings on steel wire.
- AS/NZS 4680: 2006 Hot-dip galvanized [zinc] coatings on fabricated ferrous articles.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 1999 Timber framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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BRANZ

In the opinion of BRANZ, Linea™ Weatherboard Cavity Cladding is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to James Hardie New Zealand Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. James Hardie New Zealand Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by James Hardie New Zealand Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to James Hardie New Zealand Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
02 September 2020

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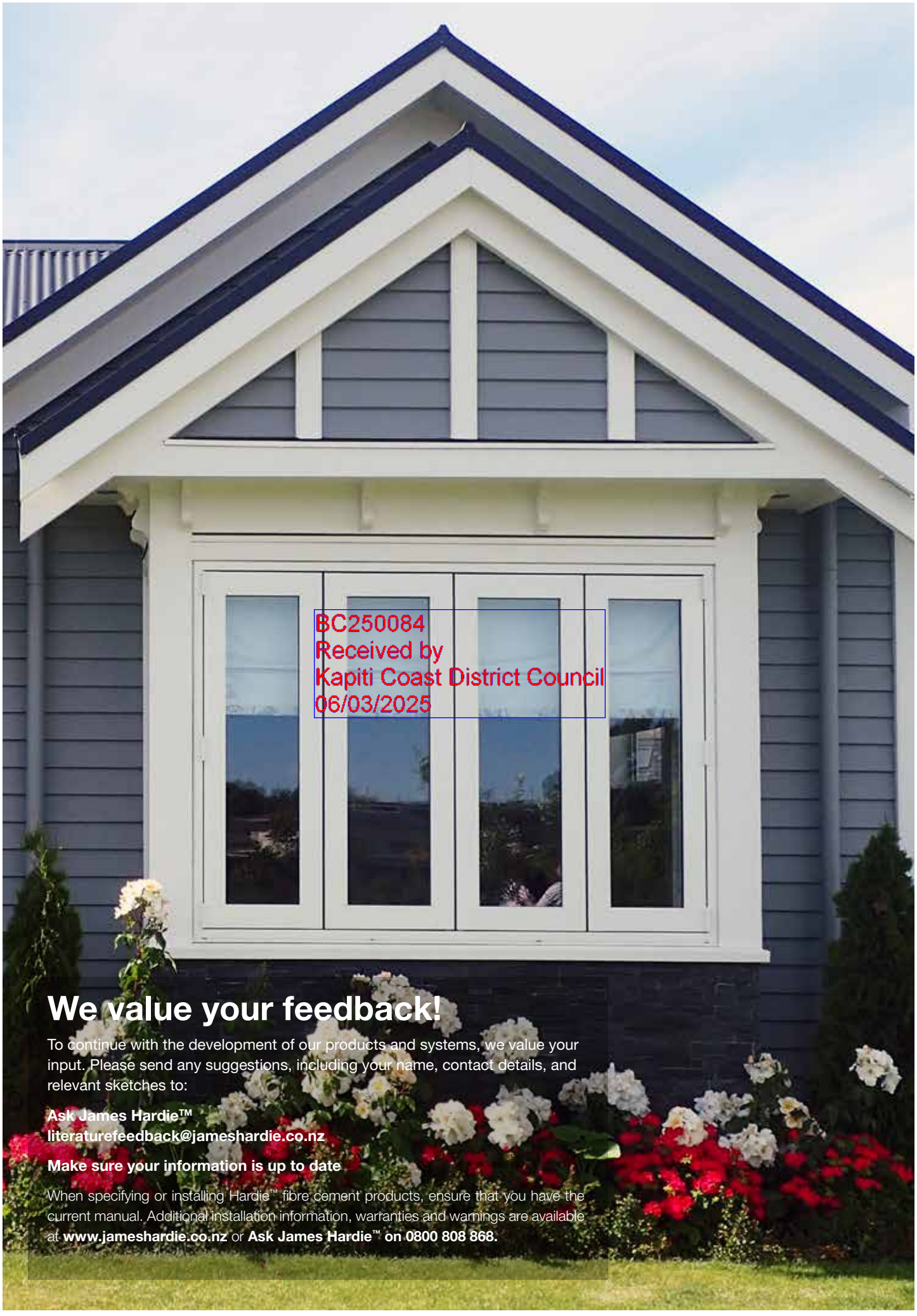
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Linea™ Weatherboard Cavity Fix

Technical Specification

June 2023 New Zealand



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We value your feedback!

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

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

Make sure your information is up to date

When specifying or installing Hardie™ fibre cement 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 150mm and 180mm widths.

James Hardie also has available:

- Hardie™ Axent™ Trim is a 19mm 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 Cladding to Steel Framing Technical Supplement by James Hardie about the installation of Linea™ Weatherboard to steel frame.

Table 1

Linea™ Weatherboard and Hardie™ 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/m² (approx. at EMC)**
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
Hardie™ Axent™ Trim	405260	3000	45	19	Square	N/A	N/A	1.1	N/A
Hardie™ Axent™ Trim	405257	3000	70	19	Square	N/A	N/A	1.6	N/A
Hardie™ Axent™ Trim	405258	3000	89	19	Square	N/A	N/A	2	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, water and proprietary additives. The product is easily identified by the name 'Linea' printed on the back.

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Hardie™ Axent™ Trim is an advanced lightweight cement composite cladding manufactured using a basic composition of Portland cement, ground sand, cellulose fibre, water and proprietary additives. The trims come pre-sealed on all sides, ready for paint..

Linea™ Weatherboard is manufactured in Australia to the 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™ Weatherboard 180mm** • Aluminium	200 long	**301186**
	**External corner soaker 135° for Linea™ Weatherboard 180mm** • Aluminium	200 long	**301178**
	**External corner soaker 90° for Linea™ Weatherboard 150mm** • Aluminium	170 long	**302820**
	**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 extrustion used to create 900 internal corner	2700 long 4000 long	**301184** **305807**
	**Internal 'W' Mould 135°** Etched primed aluminium extrustion used to create 135° internal corner	2700 long	**301183**
	**Hardie™ Corner Under Flashing 50 x 50mm** PVC moulding used as under fashing for internal and external corners	3000 long	**303745**
	**Hardie™ Flex Galvanised nail - 5kg**	60 x 3.15mm	**302784**
	**Hardie™ Flex Stainless steel nail - 5kg**	60 x 3.15mm	**302782**
	**Hardie™ Blade Saw Blade** Diamond tip fibre cement circular saw blade. Spacers not included	4 tooth - 184mm	**300660**
	**Hardie™ Blade 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**

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Table 3

Accessories not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with its Linea™ Weatherboard. 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.

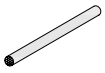
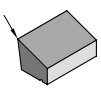
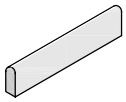
Accessories	Description	Size (mm)	Material/ appearance
	**Flexible Underlay** To comply with Table 23 of E2/AS1		
	D head or RounDrive Nail Gun nail for concealed fixing Linea™ Weatherboard.	60 x 2.87mm 75 x 3.06mm	Hot Dip Galvanised/ Stainless Steel
	Hardie™ Flex Hot Dip Galv. Nails For concealed fixing 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
Dimension to suit 	**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 Scriber** 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.		

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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 3.2kPa (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.

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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 or jameshardie.co.nz for a copy of the certificate.

CODEMARK™
30018

Linea™ Weatherboard cavity fixed cladding also has a BRANZ Appraisal number 447 (2020) available at www.branz.co.nz or www.jameshardie.co.nz.

BRANZ Appraised
Appraisal No.447 [2020]

4 Design

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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 technical specification by James Hardie.. 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 the Linea™ Weatherboard supplied is found to be out of its manufacturing specification.

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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 the 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 resistance ratings up to 60/60/60 when constructed in accordance with the Fire and Acoustic Design Manual by James Hardie. Linea™ Weatherboard must be face fixed for fire rated applications.

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

4.7 Control of External Fire Spread

Linea™ Weatherboard material is classified as 'Type-A' when tested to the requirements of Appendix C7.1.1 of C/AS1 and C/AS2 of NZBC and is suitable for use where 'Non Combustible Material' or ' Limited Combustibility Material' is required for for use in buildings located anywhere in relation to the relevant boundary for building within the scope of C/AS1 or C/AS2.

- Where the upper floors contain sleeping uses or other property as per C/AS2, a horizontal flashed joint must be provided to block the top of lower cavity at each floor or intervals of no greater than 3.5m vertical height. Refer to Figure 38 & 39.
- On buildings greater than 10m in height a RAB™ Board must be used.

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.

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5 Safe Working Practices

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

Hardie™ fibre cement 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)

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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 Hardie™ Blade name 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

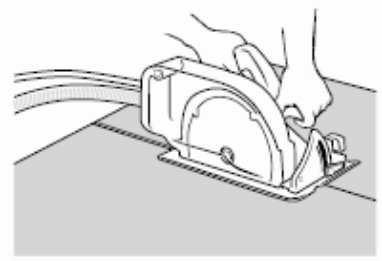
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a Hardie™ Blade Saw Blade (or equivalent) 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.

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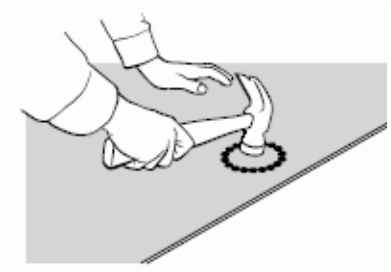
Working Instructions

Hardie™ Blade Saw Blade



The Hardie™ Blade Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of 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

✓ Hardie™ fibre cement products should be off-loaded carefully by hand or by forklift

✓ Hardie™ fibre cement products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

Hardie™ fibre cement 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

Hardie™ fibre cement 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.

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5.2 Tips for Safe and Easy Handling of Linea™ Weatherboard

✕ 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 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

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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 Hardie™ Flex 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 Hardie™ Flex 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 Hardie™ 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™ Weatherboard 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.

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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

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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 the HomeRAB™ Pre-Cladding and RAB™ Board 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 HomeRAB™ Pre-Cladding and RAB™ Board, windows/doors need to be installed with required flashing tapes and seals etc. Refer to HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual for information regarding its installation and to achieve temporary weathertightness.

6.6 Vent Strip

Linea™ 35mm cavity closer vent strip must be installed at the bottom of all walls constructed using the drained and ventilated for cavity construction method. Linea™ 35mm cavity closer vent strip has an opening area of 1000mm^2/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 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:

- 90º corner soaker in aluminium
- 135º corner soaker 180mm aluminium
- Aluminium boxed corners
- Box corners using Hardie™ 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:

- 90º or 135º 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.

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7 Finishes

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

7.1 Preparation and Priming

The Linea™ Weatherboard must be dry before painting. Punch and fill all exposed jolt head 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 sand 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 gaps 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 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 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 quicker. Special paints/coatings are required in certain harsh environments.

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

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

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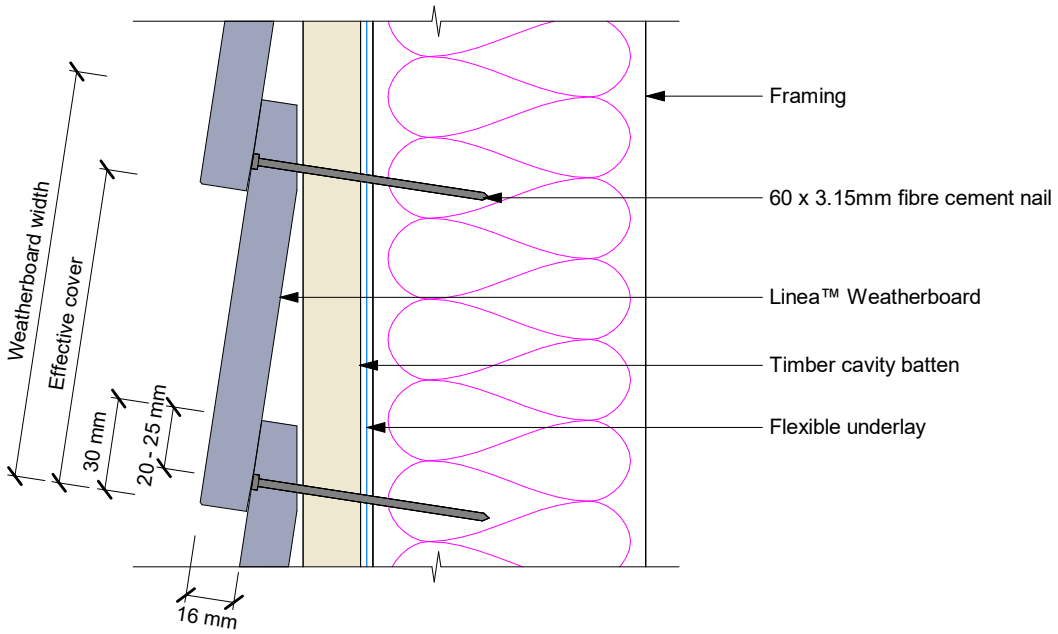
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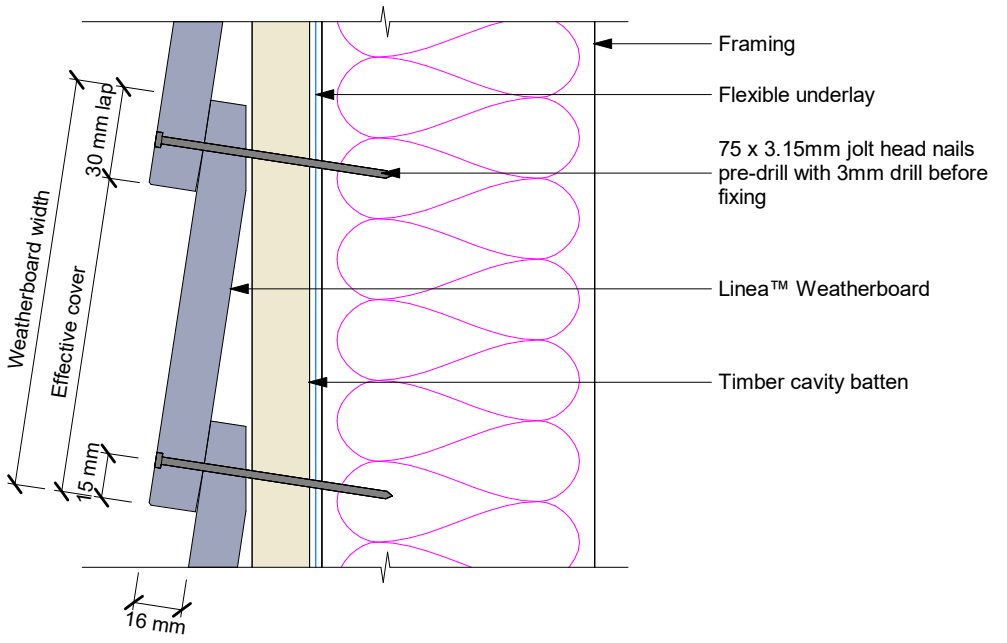
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Figure 1: Weatherboard fixing



Concealed Nailing

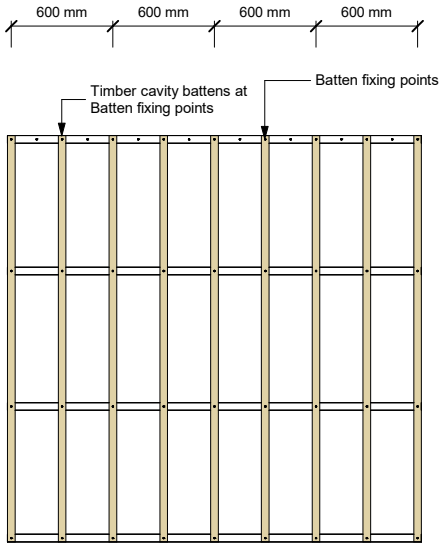
Linea™ Weatherboards to be face fixed at corners and down window and door openings using jolt head nails at 90° to face, punch 2mm below surface and fill. Refer to fixing table 4



Face/Exposed Nailing

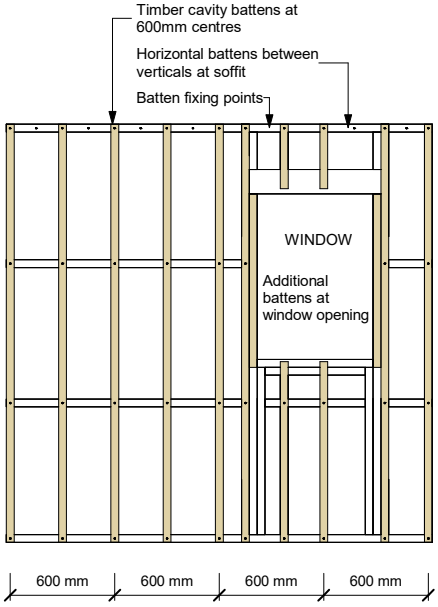
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Figure 2: Batten fixing



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



-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.

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Figure 4: Foundation detail

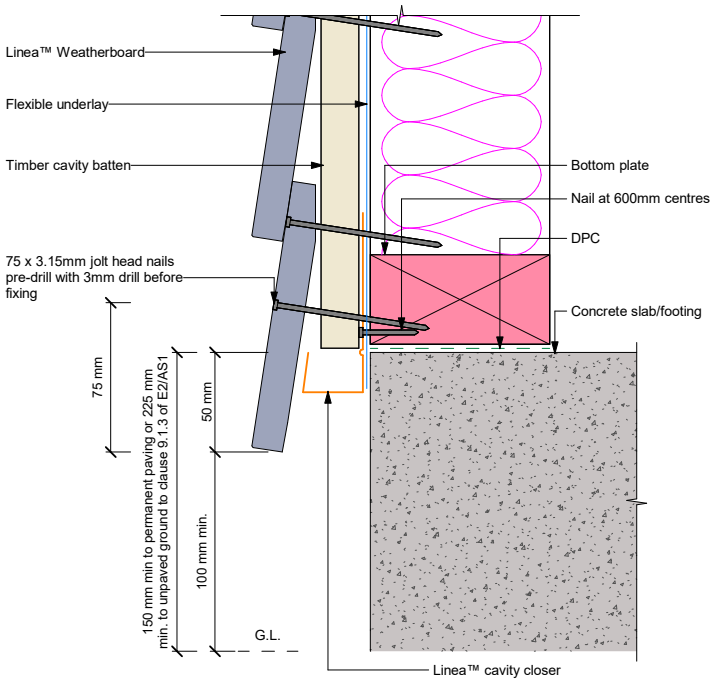
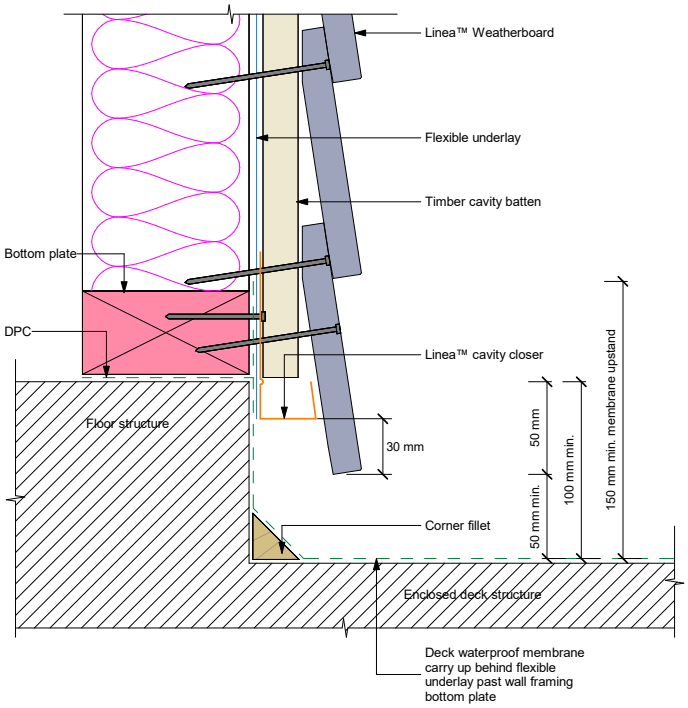


Figure 5: Enclosed Deck



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Figure 6: Jointing off stud

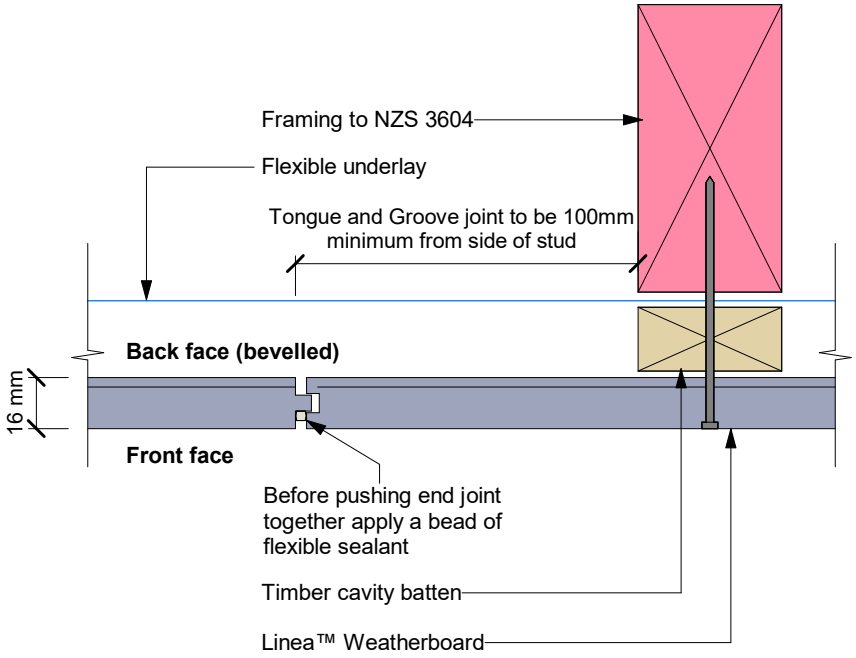
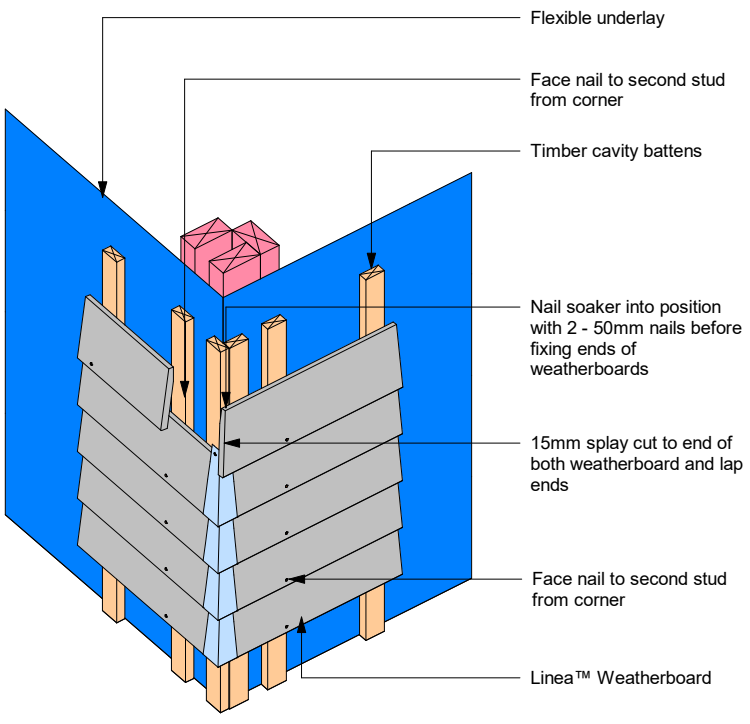


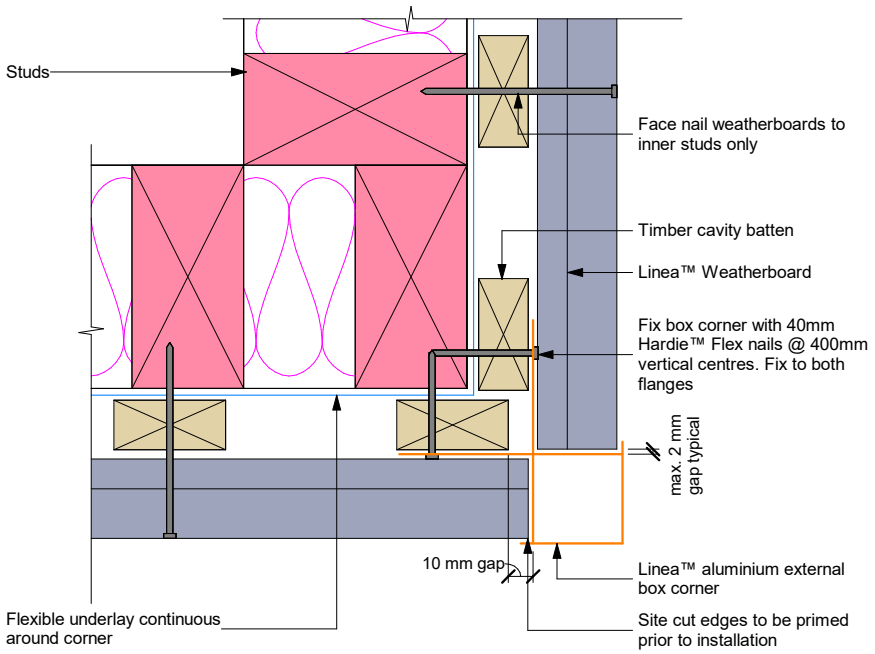
Figure 7: External corner soaker

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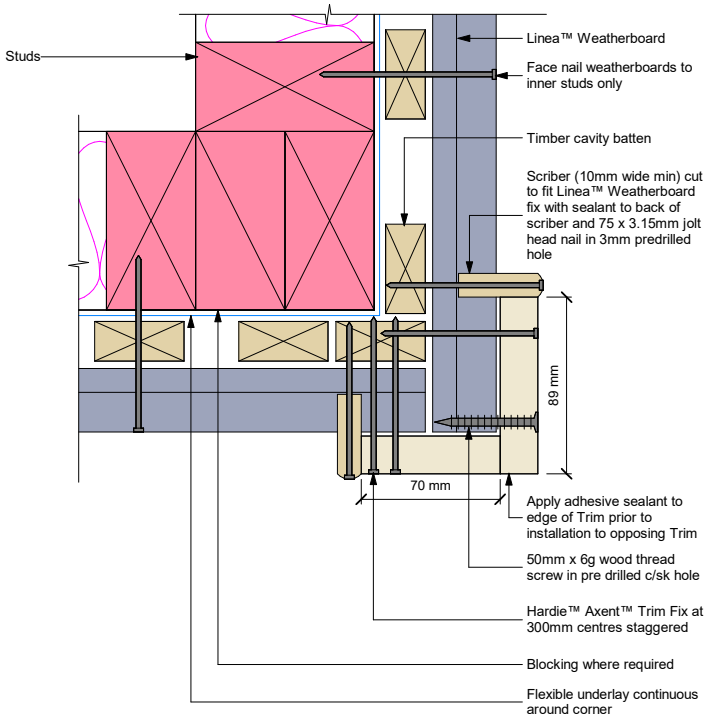
Figure 8: Aluminium box corner



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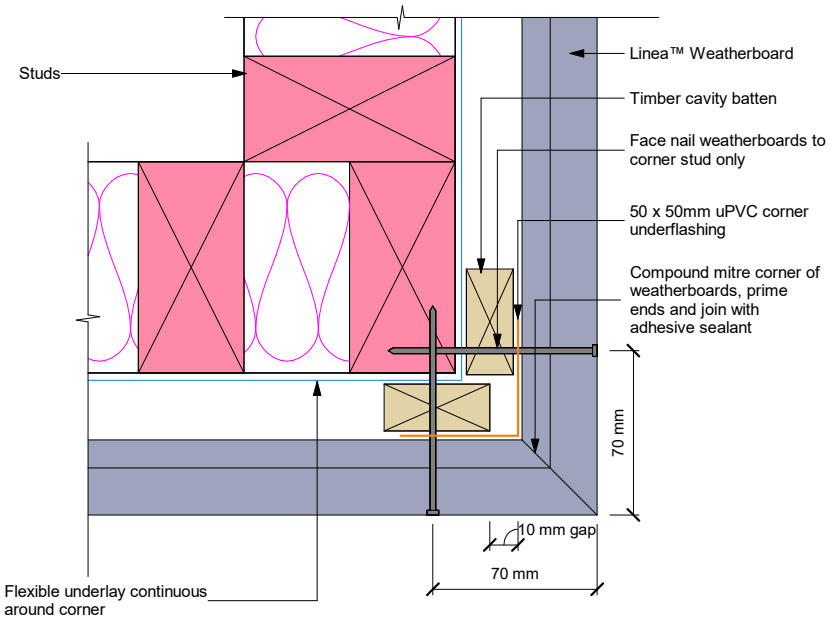
Note: Site cut edges to be primed

Figure 9: Boxed corner



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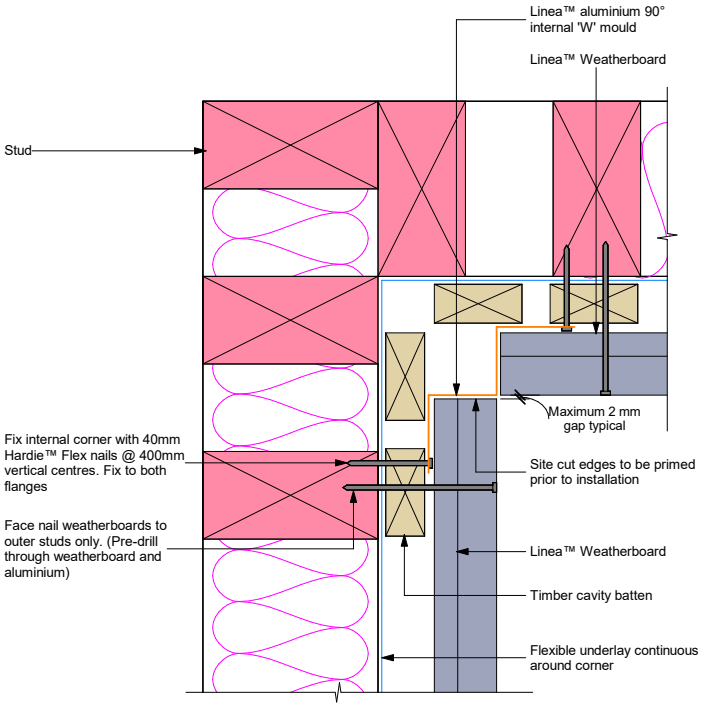
Figure 10: Mitre corner



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

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Figure 12: Internal 135 º aluminium ‘W’ mould corner

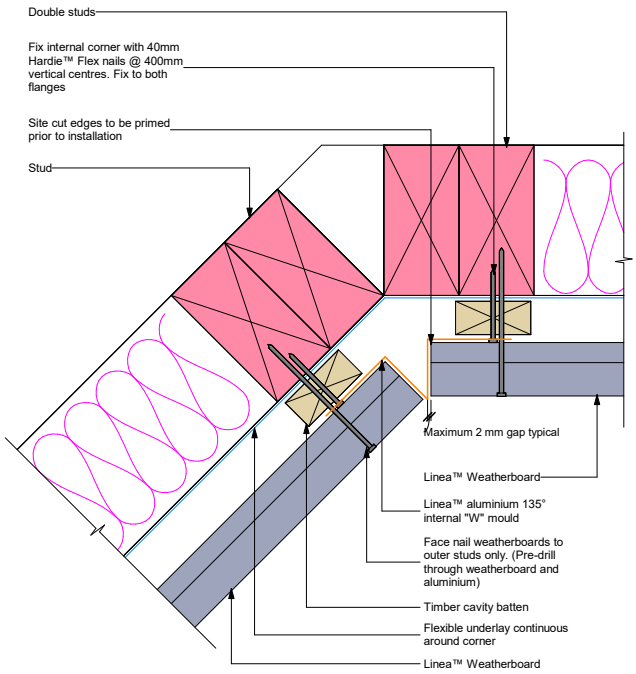
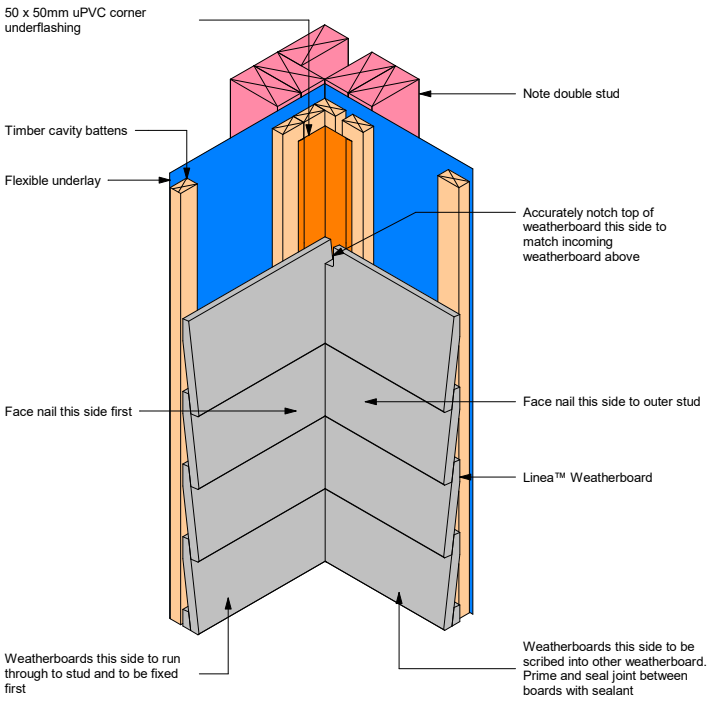
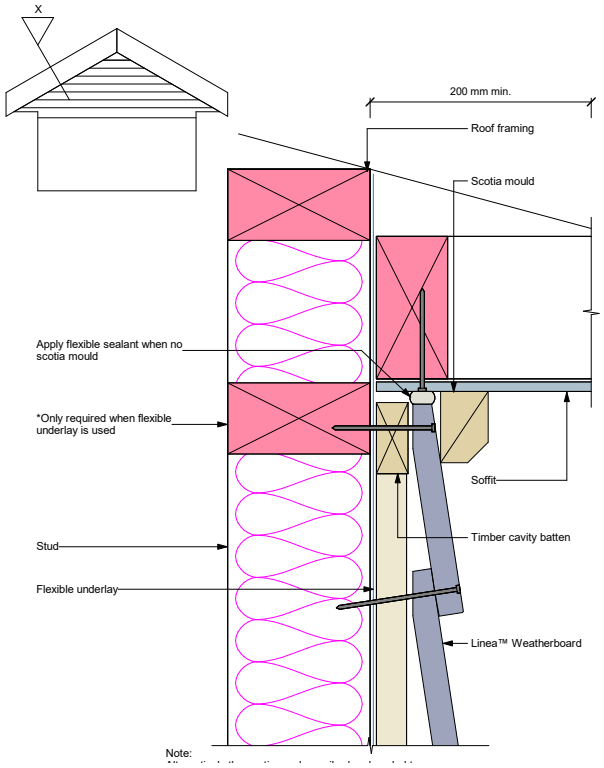


Figure 13: Internal corner joint flashing



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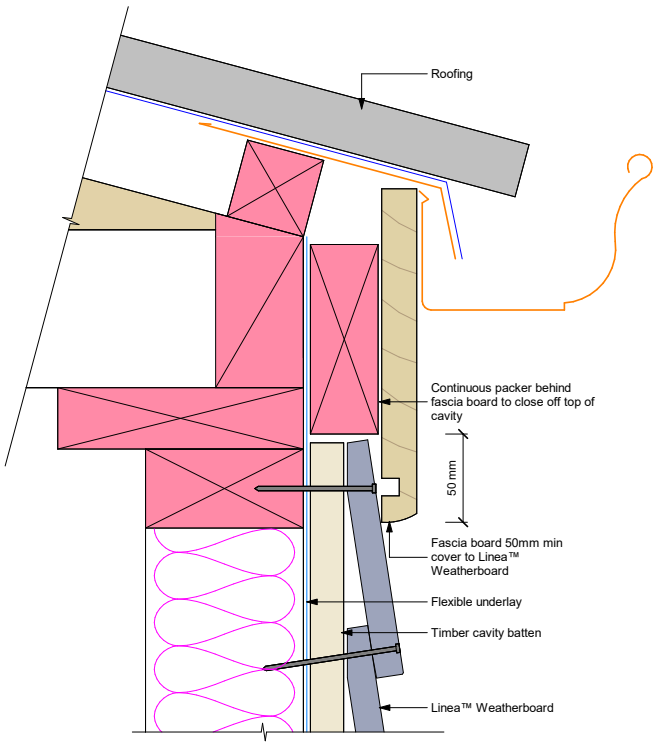
Figure 14: Wall to soffit junction 'X'



Note:
Alternatively the scotia can be scribed and sealed to Linea™ Weatherboard and the soffit lining

For soffits more than 200mm the Linea™ Weatherboard can be neat cut and silicone sealed to angle of soffit

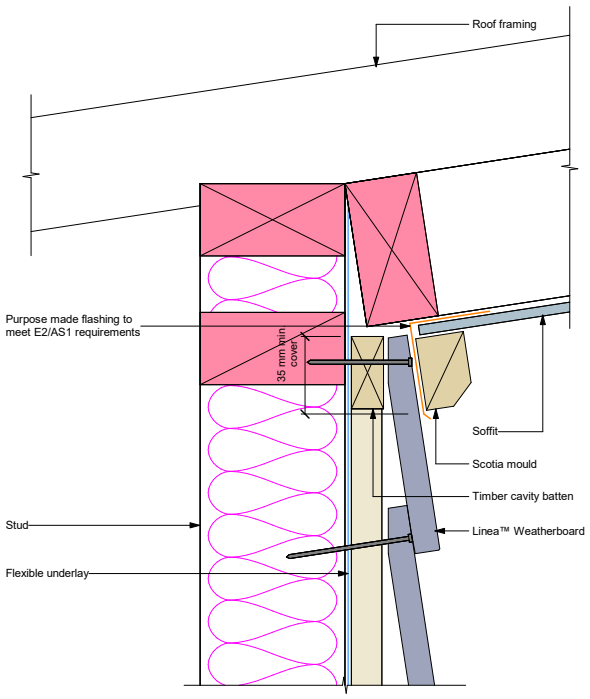
Figure 15: Nil soffit detail



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Figure 16: Sloping soffit and wall junction

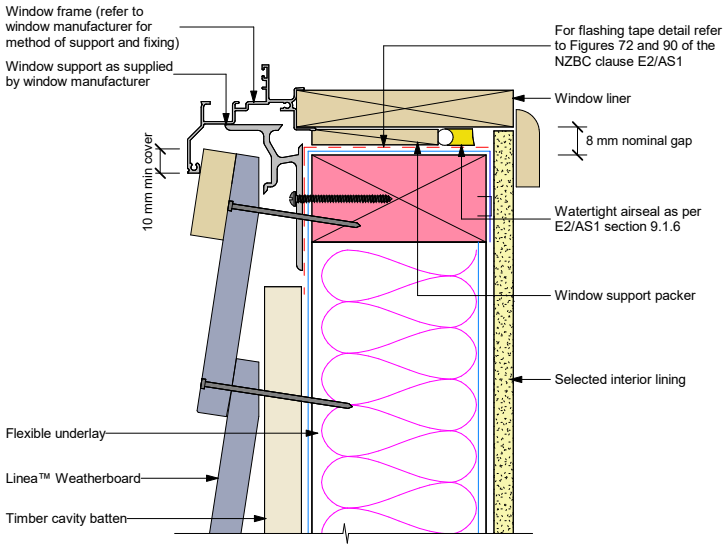
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Note: Site cut edges to be primed

Figure 17: Window and door sill

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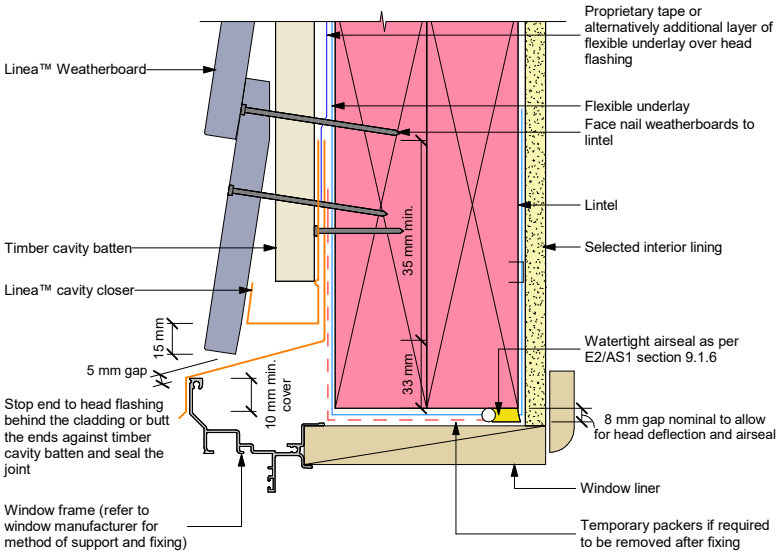


General notes for materials selection
1. Flexible underlay must comply with acceptable solution E2/AS1
2. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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

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Figure 18: Window head

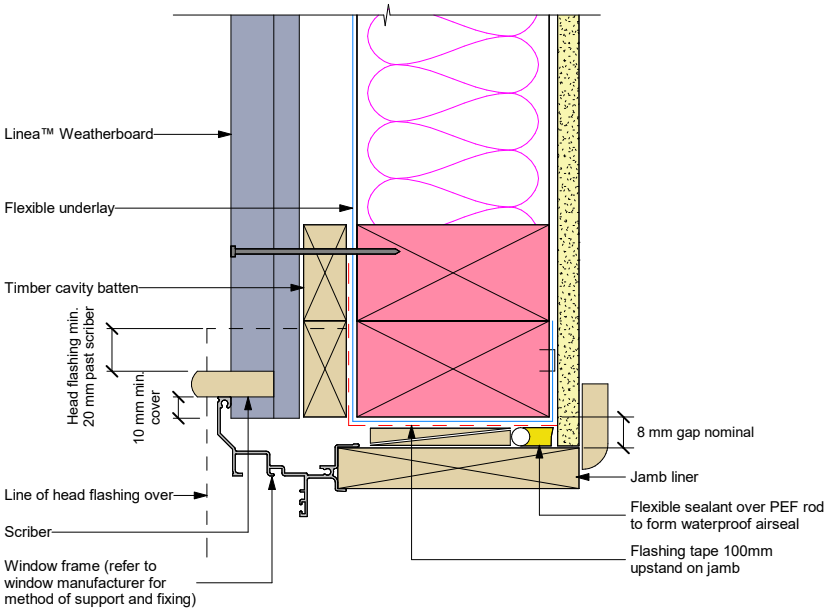


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Note:
- Sealant must be installed between head flashing and window flange in VH and EH wind zones and SED pressures
- Alternatively, the head flashings can be formed with stop ends as per E2/AS1
- Refer to Figure 22 for sealing end battens to head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

Figure 19: Window jamb

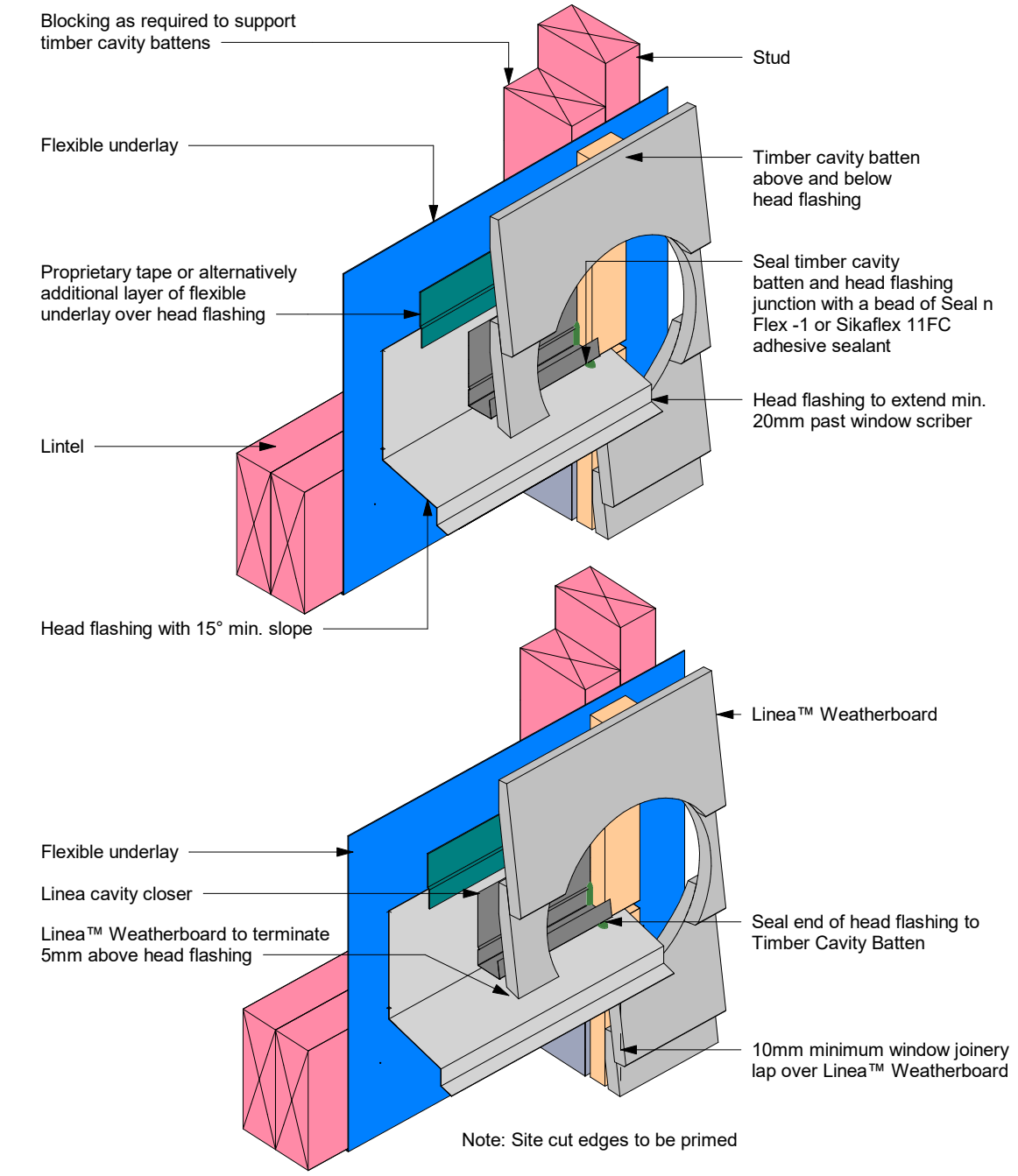


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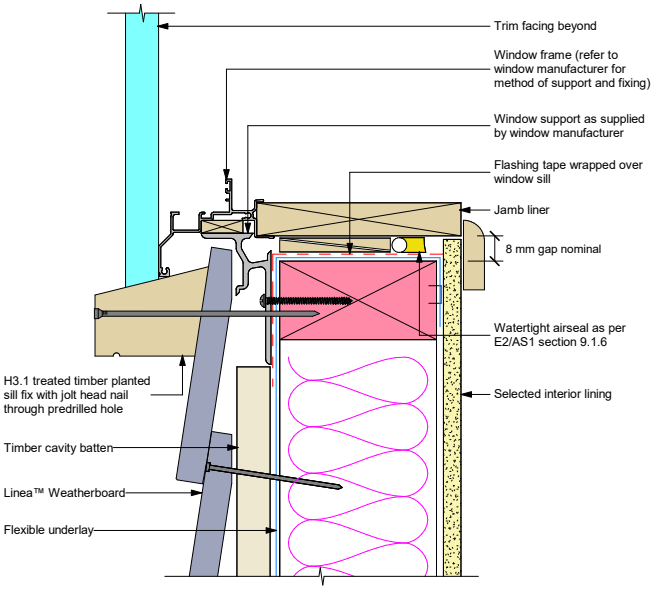
Figure 20: Window head stop end



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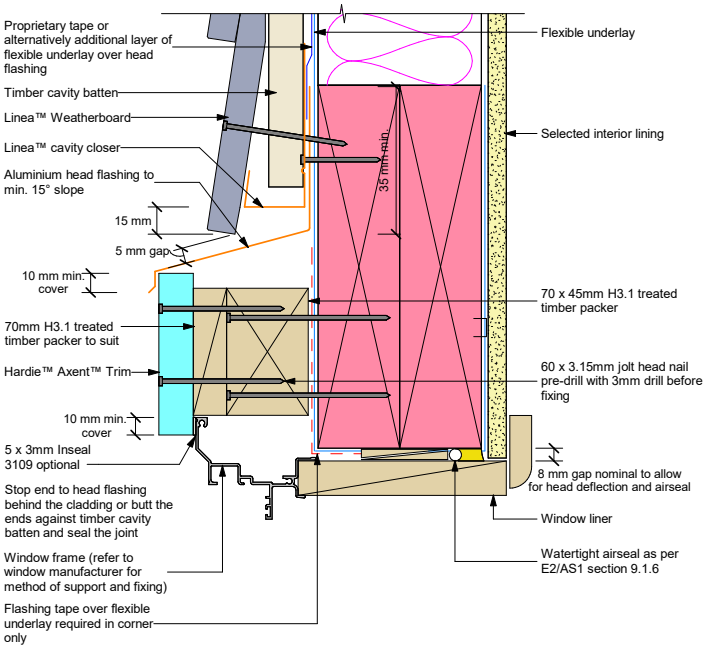
Figure 21: Window sill with facing



General notes for materials selection
1. Flexible underlay must comply with acceptable solution E2/AS1
2. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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

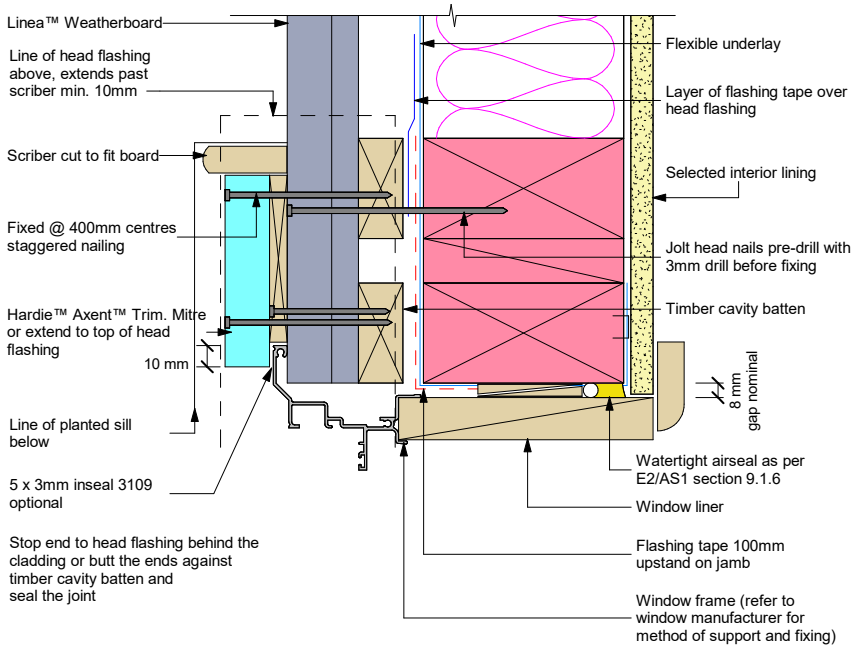
Figure 22: Window head with facings



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

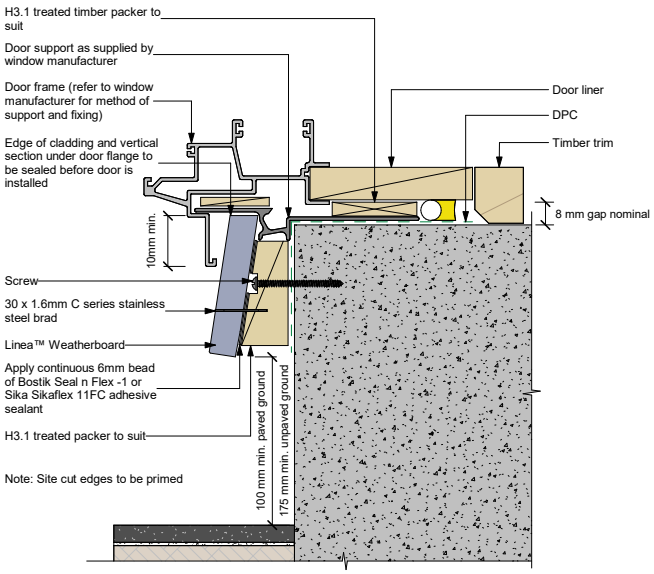
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Figure 23: Window jamb with facings



Note:
- Site cut edges to be primed

Figure 24: Door sill support detail

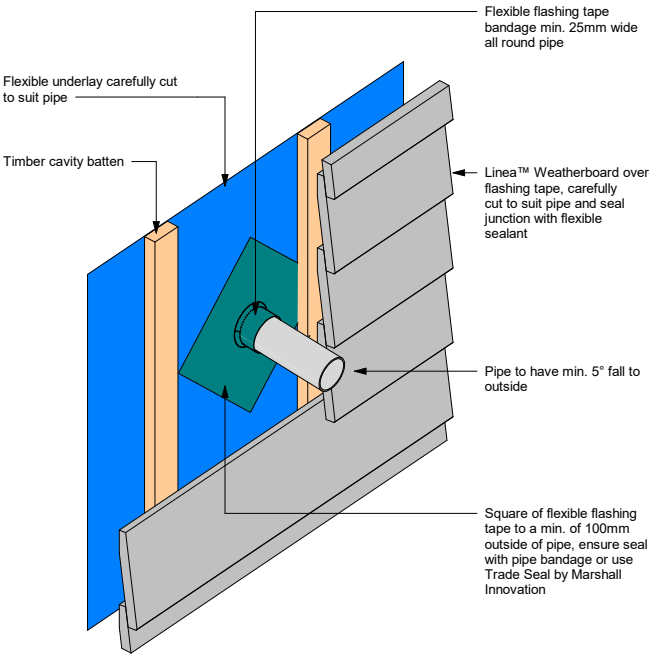


Refer to the manufacturer or supplier for technical information for these materials

General notes for materials selection
1. Flexible underlay must comply with acceptable solution E2/AS1
2. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact
3. Linea™ Weatherboard to have sealed butt joint over batten at each corner of opening

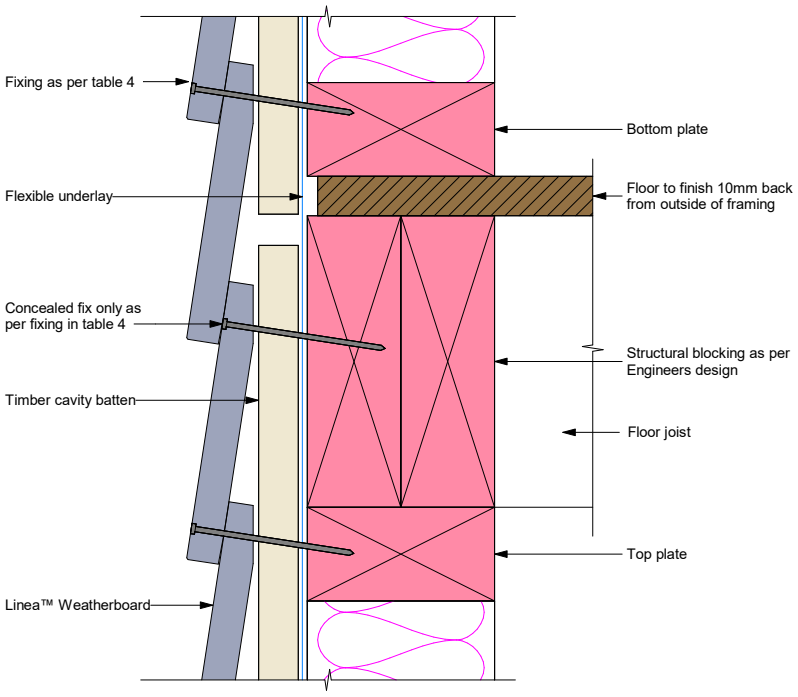
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Figure 25: Pipe penetration



Note: Site cut edges to be primed

Figure 26: Continous cladding over joist



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