



WAIMAKARIRI
DISTRICT COUNCIL

AS BUILT TRUSS LAYOUT REQUIRED –

This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to the
Structure Pre-Roof Pre-Wrap Inspection

Truss “As-Built” Designs may be sent to:
buildinginfo@wmk.govt.nz

BC No: 210889

SITE DETAILS:

29 PEGASUS MAIN STREET

PEGASUS

LEGAL:

LOT 382

**APPROVED BUILDING CONSENT DOCUMENTS AND PLANS
(FULL SET SUPPLIED)**

- ON SITE COPY -

- These plans and specifications must be kept on site during construction, and made available to the building officer on request. Failure to do so will mean an automatic failure of the building inspection and will necessitate re-booking the inspection at the applicant's expense.
- All boundary survey pegs must be located and flagged by the owner before work is commenced.

INSPECTIONS

for bookings or building enquiries

please phone the BUILDING UNIT on:

03 3118906

or

Email inspection bookings to: bcbooking@wmk.govt.nz

- Please refer to your inspection schedule for details of inspections to be carried out.
- 2-3 working day's notice should be given and provision made to allow access.
- The Code Compliance Certificate will be issued once the:
 - Final inspection has been carried out and passed
 - Audit of WDC building consent file has been completed
 - Payment of any outstanding invoices is received

Dial Before You Dig

Safety near underground cables and services

MainPower is committed to providing a safe, secure and reliable electricity supply to all customers.

This fact sheet is designed to inform you about safety around electricity, particularly underground cables.

Working near electricity cables

Serious personal injury can result from damaging underground services during excavation and ground penetration. Supply disruption and repairs can be costly and extremely irritating to customers.

The positions where cables are buried are subject to reasonable tolerance however, the depth of cover may have changed since installation.

It is your responsibility to verify the position and depth of cables before excavation.

Steps to ensure safe digging

- Obtain up-to-date plans from the relevant local authorities.
- Use a cable locator, if possible, to mark-out the underground services before commencing work.
- Practice safe digging procedures.
- The Worksafe Guide for Safety with Underground Services sets out agreed work methods and preferred work practices for the location and excavation of underground services. Download the guide at - <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/underground-services-guide-for-safety-with/underground.pdf>

Underground electricity cables

For copies of plans showing MainPower's electricity cables phone 03 311 8300, weekdays 8am - 5pm or email us at underground.records@mainpower.co.nz.

Please allow 2 working days to receive copies of plans. MainPower may hold some records of privately-owned cables connected to the MainPower network system; contact MainPower in the first instance.

Additional services MainPower can provide if you are planning your digging:

- Mark-out Services: MainPower can trace cables using an electronic locator.
- On-Site Supervision: For difficult work or locations, MainPower can provide on-site safety supervision.

Disclaimer This fact sheet is not an exhaustive list of all safety matters that need to be considered. Whilst care is taken in the preparation of this material, MainPower does not guarantee the accuracy and completeness of the information.

Underground council services

All contractors are reminded of their legal responsibility to take all practicable steps to locate and protect existing services. In the road corridor, service plans and a Corridor Access Request (CAR) permit need to be obtained through the Beforeudig website (www.beforeudig.co.nz). The Beforeudig service helps contractors to determine the location of any underground services before excavating. For service plans on private property, and lateral locations for work on private property that will not extend into any part of the road reserve, contact the Waimakariri District Council's Customer Services team at office@wmk.govt.nz.

Contact MainPower

To report a fault:
0508 60 70 80

For electricity emergencies:
0508 60 70 80

For general enquiries:
www.mainpower.co.nz
info@mainpower.co.nz
03 311 8300 (8am to 5pm, Monday to Friday)

mainpower

Dial before you dig.

Always remember to locate underground cables and services before digging and avoid serious injury, supply disruption and costly repairs. Phone MainPower for cable location advice.

03 311 8300



Think for
Safety's Sake



www.mainpower.co.nz

THINGS YOU SHOULD KNOW ABOUT...

Noisy Heat Pumps

AS THE DISTRICT GROWS WE'RE SEEING MORE HOMES BEING BUILT ON SMALLER SECTIONS.

Smaller sections mean that you need to pay closer attention to products which both eliminate and produce noise.

While a heat pump is not assessed under the Building Consent application, and therefore not checked or signed off under any building inspection, some models produce noise which is deemed excessive under the District Plan.

The onus is upon the individual / landlord to ensure that it complies with your local council's District Plan rules.

BELOW ARE QUESTIONS TO ASK YOURSELF BEFORE INSTALLING A HEAT PUMP:

- **Does your heat pump comply with the permitted noise levels allowed by the Waimakariri District Council?**
i.e. Does the noise produced from your heat pump measure less than 50dBA during the day and less than 40dBA at other times? You may not be allowed to use it if complaints are received.
- **Where are you mounting the unit?**
The level of noise produced by your heat pump will depend upon the size, the location and how it has been fixed /mounted.

It is common sense that heat pumps will produce some noise as they do contain a compressor and fan. However what is regarded as 'acceptable noise' is a personal and subjective opinion.



Please note that if the unit makes a constant penetrating monotone engine noise similar to generators or water heater pumps, then those types of noise may cause significant issues for neighbours who will render the noise 'unreasonable'. Such noise may not even be exceeding the noise levels but will potentially still be rated as 'unreasonable'.

Most noise issues occur when the outdoor unit is located too close to the neighbouring boundary or not raised off the ground.

Noise specifications will be found in the sales brochure, and you are advised to check these prior to purchase and installation.

If you are having a heat pump installed, make sure the installer is trade qualified to install air conditioning units and heat pumps. The installer should be a member of IRHACE.

Have your heat pump installed by a qualified installer.

MORE INFORMATION

Visit waimakariri.govt.nz for more information, or contact Customer Services on 0800 965 468 (0800WMKGOV)

Access Around House Building Sites



It is important when you are building your house that you take care not to damage roads, kerbs, footpaths, street trees, swales and berms.

The Council will be monitoring building sites in subdivisions to make sure that builders have the correct arrangements in place to help avoid damage and to ensure public safety.

In particular:

- **Vehicles accessing the site should only use an approved vehicle crossing**
- **Vehicles should not park on the footpath or berm**
- **Take care unloading plant and materials to protect the road surface**
- **You must ensure no litter encroaches into a public place (road/berm/footpath). Litter includes such items as earth, dirt or stones. An infringement notice up to \$400.00 may be issued to any person or company found in breach of the Litter Act 1979.**

If you need to block footpaths for any reason such as pouring foundations or unloading materials you need to provide alternative access for pedestrians. You need to do this to fulfil the requirements of the Health and Safety in Work Act 2015, and the Code of Practice for Temporary Traffic Management (CoPTTM). As site owner you or your builder are responsible for the health and safety of workers and the general public.

Vehicles are not allowed to be parked on footpaths, berms or swales. The Council will issue parking infringement notices if required.

Thank you for helping to keep our roads and footpaths safe for everyone, and doing what you can to reduce costly damage to new roads, footpaths and berms.

Find out more at waimakariri.govt.nz

Dwellings, Outbuildings, Swimming Pools and Other Works (Not Commercial)

Section 1 Statutory Forms

- **Inspection List – By Council**
- **Building Consent Form (Form 5) – By Council**
- **Code Compliance Application (Form 6) – By Council**
- **Installation & PS3 Forms – By Council**
- **Application Form**
- **LBP Design Certificates**
- **Record of Title or Sales & Purchase Agreement**
- **PIM, Resource Consent – By Council**

PLEASE NOTE

- Although your Consent documentation states 48 hours notice is required, it is not always possible to carry out an inspection within this period.
- If an inspection of the building works is not carried out in accordance with the Inspection Schedule it could affect the issue of the Code Compliance Certificate.

To book inspections ring WDC on
03 311 8906

All inspections are subject to a separate charge.

All re-inspections will be charged and recorded separately even if other inspections are carried out on the same day.

Using engineers & other professionals

If an engineer has been engaged to carry out various site inspections you will need to provide copies of his/her site notices to us and a producer statement, a PS4 from the engineer confirming the building elements designed and inspected by the engineer were completed in accordance with the approved design.

Confirmation of installation of products

We require producer statements, warranties & installation certificates from various installers as a way of confirming products have been installed in accordance with the manufacturer's recommendations. These are commonly required for exterior claddings, wet area tanking, membrane roofing/decking and effluent fields. Energy certificates such as electrical and gas certificates need to be provided too. You will need to provide these to us prior to the issue of the Code Compliance Certificate.

Applying for a Code Compliance Certificate (CCC)

When you are satisfied your project is complete please book a final inspection and complete and sign *form 6*, application for Code Compliance Certificate which is enclosed with your building consent. You should have this form ready for when the building Inspector arrives on site to carry out the final inspection. Please note all outstanding monies must be paid prior to the issue of the CCC.

Grant or refuse a CCC

We are required to make a decision to grant or refuse a CCC if you do not formally apply for a CCC within two years of the granting of the building consent. The date your consent was granted is the date at the bottom of the building consent form. If you do not apply for a CCC or arrange an extension with us within the two year period we may carry out an inspection of the building work. An additional fee applies for this work.

Lapsing of your consent

Your building consent will lapse if building work has not commenced within 12 months after the date of issue of the building consent. The issue date is deemed to be the day you paid for the consent. In saying this we understand things don't always run smoothly so you can apply for a time extension which we may agree to. A fee applies for this.

Site Inspection Sheet

Application

Wayne T Graham, Peter G Johnston C/- Bespoke Architecture PO Box 36224 Merivale Christchurch 8146	No.	BC210889
	Issue date	24 September 2021
	Overseer	Chris Keegan

Project

Description	1100 New (& prebuilt) House, Unit, Bach, Crib, Town Houses BC - New or Relocated Dwelling, Gas Fire or Boiler Unit, New Detached Dwelling, 01 Standard Building Consent(20 W Processing Days)
Intended Life	Indefinite (50+)
Intended Use	Residential Dwelling
Estimated Value	\$568000.00
Location	29 Pegasus Main Street PEGASUS
Legal Description	LOT 382 DP 401487 0.066800 Ha
Valuation No.	2163161024

This inspection sheet and all the approved plans and specifications relating to this building consent are to be available on site during construction. If the documentation required for a particular inspection is not available, this will mean automatic failure of the building inspection and will necessitate re booking the inspection at the applicant's expense.

Please give at least 48 hours notice for the next required inspection.

Work cannot proceed past each step until that step has been inspected and approved.

All inspections listed below are to be inspected by a WDC Building Inspector, an Engineer may also need to be engaged to inspect engineer requirements, this will be noted below.

BC210889
Compacted Hardfill - pre DPM - Engineer to inspect excavation also
PH-Post Holes - Verandah columns
Foundation / Floor Slab - Engineer to inspect also
First Floor Framing -
Structure Pre Roof Pre Wrap -
Membrane - Pre Installation - Internal gutter
Building Wrap & Sill Tape -
Cavity Battens & Flashings (1) - Rusticated Horizontal weatherboard cladding
Cavity Battens & Flashings (2) - Vertical Plumbdek cladding
SA- Shelf angles - Includes veneer lintels
Mid Height Veneer - Brick veneer cladding
Mid Height Cladding - Rusticated Horizontal weatherboard cladding
Sheet Cladding Exterior Early Installation - Vertical Plumbdek cladding
Drains - includes strip drain & sump
Preline & Plumbing - Engineer to inspect also
Prestopping -
Wet Area Tanking -
Final -

Form 5

Building consent

BC210889

Section 51, Building Act 2004

The building

Street address of building: 29 Pegasus Main Street PEGASUS
Legal description of land where building is located: LOT 382 DP 401487 0.066800 Ha
Valuation number: 2163161024
Building name:
Location of building within site/block number:
Level/unit number: 2

The owner

Name of owner: Wayne T Graham and Peter G Johnston
Contact person:
Mailing address: 4 Manuka Street Pegasus 7612
Street address/registered office:
Phone number: Landline: Mobile: 0272311280
Daytime: After hours:
Facsimile number:
Email address: waynegenesis@gmail.com
Website:
First point of contact for communications with the council/building consent authority:
Bespoke Architecture

Building work

The following building work is authorised by this building consent:
TWO STOREY DWELLING WITH GAS FIRE AND ATTACHED GARAGE 29 PEGASUS MAIN STREET
PEGASUS LOT 382 DP 401487
Primary Specified Intended Use: Housing - Detached dwellings
Description of Intended Use: Residential Dwelling

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.

This building consent is subject to the following conditions:

The Building Act 2004, Section 90, states that agents authorised by the building consent authority (the Council) for the purposes of this section 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 the building site; and
- (c) any building.

This building consent is issued with the following advice notes:

All inspections listed must be requested and carried out in accordance with the attached schedule (list) of inspection types. It is advisable to request bookings at least two full working days in advance of the required inspection date. It is the owner's responsibility to ensure all necessary inspections are carried out. Please contact the building consent authority if you are unsure what requires inspection - do not cover or enclose any building work without prior inspection.

Please note that the consent fees allow for a single inspection of construction stages of the project as specified in the inspection schedule. Any extra inspections required will be invoiced and must be paid for before a code compliance certificate is issued.

All boundary survey pegs must be located by discovery or redefinition before work is commenced.

Critical Siting: The owner/applicant/agent will need to supply a Building Location Certificate for this Lot two (2) working days prior to the Structure Pre-roof Inspection.

The certificate shall confirm that the building is wholly contained within the Lot/s to which it relates and meets the District Plan requirements for recession planes and critical finished floor levels (FFL). Verification of the Southern Boundary Recession Plane is required.

Comply with the endorsements on the plan.

The duplicate copy of the approved consent documents and inspection schedule must remain on site during construction.

Engineers site reports are to be kept on site for the review and collection by the building Inspector.

A PS4 construction review will be required from the engineer prior to the issue of a Code Compliance Certificate.

Please note that any material deviation from the approved documents will require a formal application for amendment. Amendments that are not of a material nature can be approved by a Building Officer or Building Inspector by way of the endorsement of the approved consent documentation.

Occupational Health and Safety and the Labour Department to be notified prior to any disturbance of asbestos or hazardous materials on site during demolition or construction.

The electrical certificate shall be provided to the building consent authority prior to issue of Code Compliance Certificate

Your consent is issued subject to manufactures technical information about their products, installation and maintenance is to be as this technical information requires.

Licensed building practitioners records of work shall be provided to the Territorial Authority (TA) / Building Consent Authority (BCA) for foundations, carpentry / primary structure, roof cladding, wall cladding systems, brick & block laying as applicable at the conclusion of the relevant work.

A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the building consent or any further period that the Building Consent Authority may allow. (Time extensions to commence building work after 12 months must be submitted to the Building Consent Authority in writing stating the reason for the request, prior to the lapse date of the consent.

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent. Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years you will need to apply for a time extension*. *fees apply

The certifying drainlayer's registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate.

The plumbing pressure test PS3 & plumbers registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate

The gas certificate shall be provided to the building consent authority prior to issue of Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the roofing/decking membrane prior to issue of Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the Internal wet area membrane prior to issue of Code Compliance Certificate.

A PS3 construction review will be required from the Juralco balustrade system installer prior to the issue of a Code Compliance Certificate.

Compliance schedule

A Compliance Schedule is not required for this building.

Attachments

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

Consented Plans

Consented Specifications

Inspection List

Form 6 Application for Code Compliance



Shirley Cresswell
Building Unit Administrator

On behalf of: Waimakariri District Council

Date: 24 September 2021

BUILDING UNIT

Form 6 Application for Code Compliance Certificate

Under The Building Act 2004, Section 92

Please submit the Application for Code Compliance Certificate, when work has been completed, by emailing to: **ccc@wmk.govt.nz**

Office use only - Date Form 6 received:

1. The Building Consent

Building consent number(s) (BC):

Issued by:

Site address: (number/street/road/township)

2. The Owner - All details must be the legal owner's

PLEASE NOTE - This section is only required to be completed if the owner details have changed from the building consent.

No change to details

Name of owner: (include preferred form of address, e.g. Mr, Mrs, Ms, Miss, Dr, if an individual)

Contact person: (not required if the owner is an individual. Must have a New Zealand address)

Mailing address:

Street address/Registered office: (if different than above)

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

The following evidence of ownership is attached to this application - **not required if details have not changed from the building consent:**

Copy of Record of Title (formerly Certificate of Title) OR Council to provide (additional charge of \$15)
(Current within 1 month of being issued and must include a deposited plan [diagram])

Signed copy of Sales and Purchase Agreement (If Record of Title is not issued)

Other document showing full name of legal owner(s) (e.g. Rates Invoice)

3. Agent - Only required when the application is being made on behalf of the owner

PLEASE NOTE - Authorisation is required from the owner of the property

Name of agent:

Contact person: (not required if the applicant is an individual)

Mailing address:

Street address/Registered office: (if different than above)

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

Relationship to owner: (state details of the authorisation from the owner to make the application on the owner's behalf)

PLEASE NOTE - The Agent will be the first point of contact for communications with the Council/Building Consent Authority regarding this application.

4. Application

The following field must be completed when submitting the Code Compliance Certificate application:

All building work carried out under the Building Consent specified in this form was completed on:

Restricted building work

Did the building work include any restricted building work? Yes No

The Licensed Building Practitioner(s) who carried out or supervised the restricted building work is/are as follows:

Licence class	Name	Licensed building practitioner number (or registration number if treated as being licensed under section 291 of the Building Act 2004)	Particular work carried out or supervised
Foundations			
Carpentry			
Exterior Plasterer			
Bricklayer			
Blocklayer			
Roofer			

Key personnel

Builder

Name: Reg. No.:
 Address:
 Phone No.: Email:

Designer(s)

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying drainlayer

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying plumber

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying gasfitter

Name: Reg. No.:
 Address:
 Phone No.: Email:

Registered electrician

Name: Reg. No.:
 Address:
 Phone No.: Email:

Structural engineer

Name: Reg. No.:
 Address:
 Phone No.: Email:

Specified systems

The following specified systems are contained on the compliance schedule for the building and, in the opinion of the personnel who installed them, are capable of performing to the performance standards set out in the Building Consent. Tick appropriate specified systems below:

There are no specified systems in the building

- | | |
|--|--|
| SS1 Automatic systems for fire suppression | SS12/1 Audio loops |
| SS2 Emergency warning systems | SS12/2 FM Radio and infrared beam transmission systems |
| SS3/1 Automatic door | SS13/1 Mechanical smoke control |
| SS3/2 Access controlled doors | SS13/2 Natural smoke control |
| SS3/3 Interfaced fire or smoke doors or windows | SS13/3 Smoke curtains |
| SS4 Emergency lighting systems | SS14/1 Emergency power systems |
| SS5 Escape route pressurisation systems | S14/2 Signs for SS1-13 |
| SS6 Riser mains | SS15/1 Spoken information to facilitate evacuation |
| SS7 Automatic back-flow prevention | SS15/2 Final exits |
| SS8/1 Passenger carrying lifts | SS15/3 Fire separations |
| SS8/2 Service lifts | SS15/4 Signs for facilitating evacuation |
| SS8/3 Escalator and moving walks | SS15/5 Smoke separations |
| SS9 Mechanical ventilation or air conditioning systems | SS16 Cable cars |
| SS10 Building maintenance units | |
| SS11 Laboratory fume cupboards | |

I request that you issue a Code Compliance Certificate for this work under section 95 of the Building Act 2004.

The Code Compliance Certificate should be sent to: Owner Agent

I wish to receive my certificate in the following format:

PLEASE NOTE - If hard copy, please confirm if you wish to pick it up from the Council or have it posted.

Hard copy: (post) OR (pick-up) OR Email

Terms of trade

I/We understand that:

Fees associated with the Building Consent shall be paid for i.e. development contributions, amendments, additional inspections, and extensions prior to the issue of Code Compliance Certificate.

All other accounts shall be paid by the 20th day of the month following the month in which the invoice is issued.

I/We agree to pay according to these terms for any goods or services you supply to us. Failure to meet these Terms of Trade may result in any credit arrangement being withdrawn with any balance becoming payable within seven days. Should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs whatsoever incurred in the collection of the debt including debt collector's fees and commissions and legal costs, charges and expenses on a solicitor and own client basis will be added to the account and will be payable by me/us.

Application authorisation

By entering your name in the box below you are giving your authority for this application to proceed under Section 92 of the Building Act 2004.

Name:

Date:

I am the: Owner Agent on behalf of, and with the authority of the owner

5. Attachments

The following documents are attached to this application: *(Where applicable)*

Other documents from personnel that carried out the work

Memoranda (records of building work) from licensed building practitioner(s) stating what restricted building work they carried out or supervised

Certificates that relate to the energy work *(e.g. gas and electricity)*

Evidence that the specified systems are capable of performing to the performance standards set out in the building consent

Proof of potability of drinking water from private well, and/or rain water catchment, supply

(Refer to New Zealand Drinking Water Standards 2005)

Important information

All the relevant information on this form is required to be provided under the *Building Act 2004* and/or *Resource Management Act 1991* for the Waimakariri District Council to assess your application. Under these Acts this information has to be made available to members of the public if requested. The information contained in this application may be made available to other units of the Council. You have the right to access the personal information held about you by the Council which can be readily retrieved. You can also request that the Council correct any personal information it holds about you.

Code compliance certificate

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent, the Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years, you will need to apply for a time extension*.

*Fees apply

Inspections

During the process of construction, inspections will be necessary to confirm all work complies with your approved Building Consent documentation. Please phone the Council Building Unit on 03 311 8906 at least **48 hours in advance** of requiring an inspection. Bookings are subject to demand and availability of inspectors, **please be advised that it is not always possible to carry out an inspection within 48 hours.**

The inspections required will be set out in the Building Consent documentation issued by the Council. Failure to have a prescribed inspection carried out may put the issue of the Code Compliance Certificate at risk.

All inspections including re-inspections are subjected to a separate charge, even if carried out on the same day.

Agency

The owner may authorise an agent to submit an application on their behalf.

The Agent will be the first point of contact for all communications with the Council/Building Consent Authority regarding the application for a Code Compliance Certificate under *Section 92 of the Building Act 2004*. They will receive all correspondence and must be authorised by the owner. All amendments require new authorisation.

Fees

All work for the issue of a Code Compliance Certificate will be invoiced and needs to be paid in full as described in *Section 95 of the Building Act 2004* before the Code Compliance Certificate can be issued, refer to [building services fees and charges](#).

Notice to fix

If a Notice to Fix is issued, it will state the building work that must be carried out and will set a timeframe in which this work must be completed. Once the work listed has been completed a further inspection needs to be booked by phoning the Council Building Unit on 03 311 8906.



WAIMAKARIRI
DISTRICT COUNCIL

Private Bag 1005, Rangiora 7440
Ph 03 311 8900, 03 327 6834 Fax 03 313 4432
www.waimakariri.govt.nz

PRODUCER STATEMENT PIPEWORK TESTING

BC No.

Issued by (Plumber):

At (address):

For (Owner):

In respect of the testing of water pipe work prior
to concealment.

I hereby state that I have personally tested the water pipe work installed in the building authorised under this Building Consent by the method indicated hereunder.

By pressurising the pipe work to 1500 kPa for a period of not less than 15 minutes for the hot and cold water supply and checking to see there are no leaks. (NZBC G12/AS1 7.5.1 (a), (b).)

By pressurising the uPVC pipe work to 1.5 times the maximum working pressure for a period of not less than 15 minutes and checking that there are no leaks. (NZBC G12/AS1 7.5.2, NZS 7643).

Max working pressure was:

By pressurising the pipe work to 1500 kPa for a period of not less than 5 minutes and checking to see there are no leaks. (NZBC G12 VM1, AS3500:Part 1.2 1998)

And believe on reasonable grounds that the pipe work has passed that test.

All work complies with the NZBC

I also understand that Waimakariri District Council in accepting this producer statement will be relying on it to issue the Code Compliance Certificate at the completion of the building work.

SIGNATURE OF LICENSED CERTIFYING PLUMBER:

Signature:

Registration Number:

Company Name:

Date:

BUILDING UNIT

Form 2 Application for a Project Information Memorandum and/or Building Consent

Dwellings, Outbuildings, Swimming Pools and Other Works e.g. Septic Tank, Bridge, Retaining Wall, Amendments and Exemptions

Under The Building Act 2004, Sections 33, 45 & Schedule 1, Part 1, Clause 2

BC No.:

1. The Building

Street address (street/road/township): *(for structures that do not have a street address, state the nearest street intersection and the distance and direction from that intersection)*

Legal description of the land where the building is located: *(state legal description as at the date of application and, if the land is proposed to be subdivided, include details of relevant lot numbers and subdivision consent)*

Lot: DP: Valuation Number: Resource Consent:

Building name: *(if applicable)*

Location of building within site/block number: *(include nearest street access)*

Number of levels: Unit/Level No.:

Area: *(total floor area; indicate area affected by the building work if less than the total area)*

Existing: New: Total:

Current lawfully established use: *(include number of occupants per level and per use if more than 1)*

Year building first constructed: *(Approximate date is acceptable, eg 1920's)*

2. The Owner - All details must be the legal owner's

Name of owner: *(include preferred form of address, e.g. Mr, Mrs, Ms, Miss, Dr, if an individual)*

Contact person: *(not required if the owner is an individual. Must have a New Zealand address)*

Mailing address:

Street address/Registered office: *(if different than above)*

Phone number:

Landline: Mobile: Daytime: After hours: Fax:

Email: Website:

The following evidence of ownership is attached to this application:

Copy of Record of Title *(formerly Certificate of Title)* OR Council to provide *(additional charge of \$15)*
(Current within 1 month of being issued and must include a deposited plan [diagram])
 Signed copy of Sales and Purchase Agreement *(If Record of Title is not issued)*

3. Applicant - only required when the applicant is not the owner or the agent e.g. leasee/tenant

PLEASE NOTE - Authorisation is required from the owner of the property.

Name of applicant: *(e.g. leasee/tenant)*

Contact person: *(not required if the applicant is an individual)*

Mailing address:

Street address/Registered office: *(if different than above)*

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

Relationship to owner: *(state details of the authorisation from the owner to make the application on the owner's behalf)*

4. Agent – Only required when the application is being made on behalf of the owner

PLEASE NOTE - Authorisation is required from the owner of the property.

Name of agent:

Contact person: *(not required if the applicant is an individual)*

Mailing address:

Street address/Registered office: *(if different than above)*

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

Relationship to owner: *(state details of the authorisation from the owner to make the application on the owner's behalf)*

PLEASE NOTE - The Agent will be the first point of contact for communications with the Council/Building Consent Authority regarding this application/building work

5. Application

I request that the following (please select one) be issued for the building work described in this Application:

Project Information Memorandum (PIM) only

Building Consent for PIM No:

Building Consent with PIM

Building Consent without PIM *(Compliance Check applies)*

Exemption from the need for B/C

Amendment to Building Consent

(Refer Building Act 2004 Schedule 1, Part 1, Clause 2)

Please Note: Amendments must be authorised by the owner

Building Consent for Above Ground Pool and/or Non-Exempt Small Heated Pool

I wish to receive my approved documentation in the following format:

PLEASE NOTE - If USB or hard copy, please confirm if you wish to pick it up from the Council or have it posted.

☒ Electronically via Sharefile Transfer Portal (You must be set up and registered for this option)

☐ USB: ☐ Post OR ☐ Pick-up

☐ Hard copy (onsite): ☐ post OR ☐ pick-up

PLEASE NOTE - One set of "On-site" hard copy consented documents must be available at all times for inspections.

All consent related invoices/refunds to be billed and sent to:

☒ Owner ☐ Applicant ☐ Agent ☐ Or other (If other, please complete below)

Company name: (if applicable)

Contact person:

Mailing address:

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

PLEASE NOTE - Any refunds are to the receipted name unless written authorisation has been received from the receipted person or company.

Terms of trade

I/We understand that:

Building Consents shall be paid for when the consent is collected/uploaded or if the consent is not collected/uploaded within three months after the date of consent being granted, the work done to date portion i.e. admin and processing costs of the account will be due and payable. The balance of the invoice will be payable when the consent is collected/uploaded.

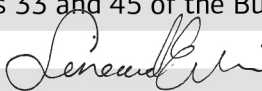
All other accounts shall be paid by the 20th day of the month following the month in which the invoice is issued.

I/We agree to pay according to these terms for any goods or services you supply to us. Failure to meet these Terms of Trade may result in any credit arrangement being withdrawn with any balance becoming payable within seven days. Should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs whatsoever incurred in the collection of the debt including debt collector's fees and commissions and legal costs, charges and expenses on a solicitor and own client basis will be added to the account and will be payable by me/us.

Application authorisation

By entering your name in the box below you are giving your authority for this application to proceed under Sections 33 and 45 of the Building Act 2004.

Name:



Date:

16.06.2021

I am the: ☐ Owner ☐ Applicant on behalf of, and with the authority of the owner

☒ Agent on behalf of, and with the authority of the owner

6. The Project

Description of work (e.g. dwelling, alteration/addition). If an amendment, please provide a complete description of the nature of the amendment.

New 3 bedroom, 2 storey residential dwelling with attached double garage.

Specify the intended use of the building: (e.g. detached dwelling, multi-unit dwelling, show home, sleepout or outbuilding - shed/garage etc.)

Will the building work result in a change of use of this building? Yes No

If Yes, provide details of the new use:

Will hazardous substances be stored in the building? Yes No

Intended life of the building:

Indefinite but not less than 50 years Or specified as years

Is this a staged consent? Yes No

If staged, provide details (e.g. Stage 1 of 3)

List Building Consents previously issued for this building (if any): (i.e. is this project being constructed in stages? Is this consent for a relocated or transportable building?)

Estimated value of the building work on which the building levy will be calculated (incl. GST): (state estimated value as defined in section 7 of the Building Act 2004)

\$

If this is an application to amend a building consent, advise the estimated value of amended building work (incl. GST) \$

Is this in addition to, or reduction from, what was stated with the original application?

Addition Reduction No change

7. Restricted building work

Will the building work include any restricted building work? Yes No

If Yes, provide the following details of all Licensed Building Practitioners who will be involved in carrying out or supervising the restricted building work (if these details are unknown at the time of the application, they must be supplied before the work begins).

Licence class	Name	Licensed building practitioner number (or registration number if treated as being licensed under section 291 of the Building Act 2004)
Foundations		
Carpentry		
Exterior Plasterer		
Bricklayer		
Blocklayer		
Roofer		

Key personnel

Builder

Name: Reg. No.:
 Address:
 Phone No.: Email:

Designer(s)

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying drainlayer

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying plumber

Name: Reg. No.:
 Address:
 Phone No.: Email:

Certifying gasfitter

Name: Reg. No.:
 Address:
 Phone No.: Email:

Registered electrician

Name: Reg. No.:
 Address:
 Phone No.: Email:

Structural engineer

Name: Reg. No.:
 Address:
 Phone No.: Email:

8. Project Information Memorandum - This section is not applicable if this application is for a building consent only

The following matters are involved in the project:

- Subdivision
- Alterations to land contours
- New or altered connections to public utilities
- New or altered locations and/or external dimensions of buildings
- New or altered access for vehicles
- Building work over or adjacent to any road or public place
- Disposal of stormwater and wastewater
- Building work over any existing drains or sewers or in close proximity to wells or water mains
- Registered historic site or place, tick if applicable (only applies where a PIM has not previously been issued for the building work)
- Other matters known to the applicant that may require authorisations from the territorial authority:

Notes

Other notes or comments which you may wish to add, eg: Resource Consents

9. Building consent - This section is not applicable if this application is for a Project Information Memorandum only

The following plans and specifications are attached to this application.

The building work will comply with the Building Code as follows: (Note: if you are not sure what clauses are applicable, consult with your builder, designer or architect)

Clause (Tick relevant clause numbers of Building Code)	Means of compliance (Refer to the relevant compliance document(s) or detail of alternative solution in the plans and specifications)	Waiver/modification required (State nature of waiver or modification of building code required)
B1 Structure		
B2 Durability		
C1-C6 Protection from fire		
D1 Access routes		
D2 Mechanical installations for access		
E1 Surface water		
E2 External moisture		
E3 Internal moisture		
F1 Hazardous agents on site		
F2 Hazardous building materials		
F3 Hazardous substances and processes		
F4 Safety from falling		
F5 Construction and demolition hazards		
F6 Visibility in escape routes		
F7 Warning systems		
F8 Signs		
F9 Means of restricting access to residential pools		
G1 Personal hygiene		
G2 Laundering		
G3 Food preparation and prevention of contamination		
G4 Ventilation		
G5 Interior environment		
G6 Airborne and impact sound		
G7 Natural light		
G8 Artificial light		
G9 Electricity		
G10 Piped services		
G11 Gas as an energy source		
G12 Water supplies		
G13 Foul water		
G14 Industrial liquid waste		
G15 Solid waste		
H1 Energy efficiency		

10. Compliance schedule - This section is not applicable if there are no specified systems or if the application is for a Project Information Memorandum

The specified systems for the building are as follows: *(specified systems are defined in regulations)*

The following specified systems are being altered, added to, or removed in the course of the building work:

There are no specified systems in the building

11. Attachments

The following documents are attached to this application:

Plans and specifications (list under section 9)

Memoranda from licensed building practitioner(s) who carried out or supervised any design work that is restricted building work

Project information memorandum

Development contribution notice

Certificate attached to project information memorandum

Completed relevant application checklist(s) – refer to Appendix

Please continue on the Appendix as follows for further information requested by the Waimakariri District Council.

Appendix - further information requested by the Waimakariri District Council

National Environment Standard (NES)

This section relates to the [National Environmental Standard for Assessing & Managing Contaminants in Soil to Protect Human Health \(NES\)](#).

The NES includes regulations controlling **soil disturbance, change of use, subdivision, and removal/replacement of fuel storage systems** on properties which have been used either now or in the past for a hazardous activity or industry (known as HAIL) that may have resulted in contamination of the soil. The table below determines whether the NES applies to your proposal.

Yes No

Is the application site listed on Environment Canterbury's Listed Land Use Register (LLUR)? www.llur.ecan.govt.nz If **YES**, please include a copy of the LLUR statement with your application.

If the site is not listed on the LLUR, is an activity described on the Hazardous Substances and Industries List (HAIL) currently being undertaken on the piece of land to which this application relates, or is it more likely than not to have ever been undertaken on the land?

The HAIL list is available to view at [Hazardous Activities and Industries List \(HAIL\)](#)

Type of HAIL activity:

If the answer to either of the above questions is YES, then the NES will apply, depending on the type of activity. Please identify whether the application involves the activities below.

PLEASE NOTE - If the answer to both of the previous questions is No, you do not need to answer the remaining questions in this section.

Yes No

Has the property been recently subdivided?

Will the proposed activity involve the disturbance of more than 25m³ of soil (per 500m² of disturbed area)? Volume of soil disturbed:

Will the proposed activity involve the removal of more than 5m³ of soil (per 500m² of disturbed area) from the site? Volume of soil removal:

Does the application involve changing the use of the land to one which, because the land has been subject to a HAIL activity, is reasonably likely to harm human health? (e.g. orchard to a residence)

Does the application involve replacing or removing fuel storage systems or parts of it?

If the answer to any of the above activity questions is also YES, then the NES will apply and you will need to establish whether the proposed activity complies with the NES.

- Changing the land use will require resource consent if the permitted activity requirements of the NES are not complied with. These include provision of a Preliminary Site Investigation carried out by a suitably qualified and experienced practitioner.
- Soil disturbance or removal exceeding the specified volumes require resource consent.
- Removal or replacement of a fuel storage system will require consent if the permitted activity requirements of the NES are not complied with.

Does the proposed activity require resource consent under the NES?

If **YES**, a resource consent is required and with the application an assessment under the NES must be provided. A Detailed Site Investigation may be required.

Vehicle crossing

Is a new vehicle crossing required or an existing crossing altered for this project?

Yes No Resource consent applied for

If yes, please complete and submit the [Vehicle Crossing Application Form](#) and send to office@wmk.govt.nz

Application form

(One copy)

Office use only

These have been provided:

All sections fully completed as applicable to the project
Means of Compliance with NZBC - designer to complete
Provide the correct legal description (Council can help with this)
Provide one copy of the current Record of Title, or Sales and Purchase Agreement
- not more than one month old
Give name and contact numbers of contact person (if not the owner)
State the project location (street address or location details as near as possible if no address)
Application authorised and dated
Agent relationship to owner stated (where applicable)
Certificate/s of design work (LBP)

Bookmarks

PLEASE NOTE - Our current software does not enable us to maintain bookmarks within the consent documents during processing and granting. (This may be reviewed once a software solution becomes available.)

Project Information Memorandum (PIM)

This section must be completed if you are applying for a PIM. **DO NOT** complete this section if a PIM has already been issued. The following documents are attached to this application:

Site plan, Floor plans, Elevations for proposed building (electronic preferred or if hard-copy minimum size A3)
Record of Title, or Sales and Purchase Agreement if Record of Title is not issued. Current Record of Title required (current within one month of application)
Application fee (as per Council Fees and Charges Schedule)

Building consent

This section must be completed if you are applying for a building consent. **DO NOT** complete this section if the Application is for a Project Information Memorandum only.

The following documents are attached to this application:

1 copy - building plans (site plans, floor plans, elevation plans. All plans to be dimensioned, scaled and accurate electronic preferred or if hard-copy minimum size A3)
1 copy of each - specifications, producer statements, truss details (refer below)
1 copy - Record of Title or Sale and Purchase Agreement if Record of Title is not issued. Current Record of Title required (current within one month of application)
Restricted building work - see page 4
Key personnel - see page 5
Building work compliance with the Building Code - see page 7

PLEASE NOTE - Swimming Pool document checklist on the following page to be completed if applicable.

Swimming pools (as applicable)

Office use only

*These have
been provided:*

Site plan, showing location of pool and existing buildings, location of fence, boundaries and existing waterways

Fence construction. Show the height, gates, self-closing device, construction type etc (see "A Guide to Pool Fencing")

Also show how any doors or windows that form part of the fence will comply

Brand and model of pool:

Size of the pool:

Drainage plan. Show discharge point

Producer statement (where applicable)

Installation instructions/manual

Show filling point for pool (tap) and backflow protection

Design basis

(To be completed by the designer)

Please list the following basis for the building design:

Wind zone

Earthquake zone

Snow zone/altitude

Corrosion zone (if applicable)

Building is specifically engineer-designed

Complies with NZS 3604:2011

Both specific design and NZS 3604:2011

Design documents

(One copy)

Weather tightness risk matrix

Truss design layout and Producer Statement

Bracing calculations/plan

H1 Energy efficiency calculations

Site plan

(One copy, electronic preferred or if hard-copy minimum size A3)

Overview of site showing legal boundaries as per current Record of Title

Showing proposed and existing structures (including swimming pools)

Distances to boundaries

Proposed and existing site levels

North point

Utility infrastructure (sewer, water pipelines, septic tanks etc) where applicable

Water races, drains, topographic features

Drainage layout

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Foul water - showing waste pipes, sizes, grades, venting
- Foul water to discharge point
- Storm water - pipe sizes, grades, downpipe locations
- Storm water drain to discharge point

Office use only

These have been provided:

Foundation layout

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Full foundation layout plan
- For timber floors, show all pile layout, pile types and bracing location
- Slab thickenings, shrinkage control joints and reinforcing rebates

Floor plans

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Layout of all floors fully dimensioned. For alterations and/or additions provide both new and existing floor plans
- Doors and window positions and sizes
- Layout of amenity areas (laundry etc)
- Main structural beams that are not shown elsewhere
- Lintel sizes
- HWC location
- Roof space access
- Gas cylinder location
- Room names
- Location of smoke alarms
- Location of heating unit (if applicable)

Exterior elevations

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Elevations of all external walls showing claddings
- Doors and windows showing opening sections
- Show location of solar panels
- Accurate ground levels existing and proposed
- Subfloor ventilation for timber floors
- Show roof bracing on elevations if not shown elsewhere

Cross section and construction details

(One copy to scale usually 1:50 or 1:20 for sections and 1:10 for details - minimum scale, electronic preferred or if hard copy minimum size A3)

- Roof lines, overhangs, floor levels, ground levels
- Major vertical dimensions
- Foundation, wall and roof structure materials
- Upper level decks or balconies over lower level room must be fully detailed including the stormwater disposal and overflow precautions

Stairs, handrails and balustrade showing pitch and head clearances
 Structural connections, posts to footings, beams to posts, trusses or beams to walls
 Component fixing information is to be provided for all structural and framing components
 Foundation and footing details and reinforcing. Show height from finished floor to ground level
 Pile details for timber floors
 Floor bracing details
 Timber grade and treatment
 Damp proof membranes, building papers and insulation systems/materials
 Flashing details and documents
 Roof penetrations
 Shower floor details and wall to shower base junction detail
 Sealing to wet area fixtures
 Water splash prevention
 All other building components that are not otherwise detailed or are unusual in any way

Specification

(One copy)

The specification must be for the project. We will not accept standard specifications unless they relate directly to the building and they cover the project accurately and fully. Multi-choice specifications will not be accepted. A brief accurate specification is usually best.

Provide a written specification to cover all of the trades involved in the project. All materials used in the project are fully specified including fixings of all materials and components

The specification can be written on the drawings as long as all materials are fully covered

Important things to include in your application

(One copy - where relevant)

The chartered professional engineer's Producer Statement

The engineer's monitoring schedule if the engineer chooses to do site monitoring

All structural calculations

Structural details showing connections and details of the components

Solar technical details and plumbing schematic

Log fire and flue installation instructions

If log fire secondhand, engineer's certification required

Current potable water test (current within 18 months)

Effluent disposal design & ECan's copy of the submitted application form or approval

Wastewater system designs when required to be done by a chartered professional engineer such as in a hazard zone

Supporting manufacturer's trade literature and appraisals / certificates included

Geotechnical report

Geotechnical report provided, if applicable. Record report number:

Office use only

Further information required? Yes No

Date/time received:

Officer:

Date/time vetted/accepted:

Officer:

Office use only

Amount paid: \$

Date:

Officer:

Fee paid on application

Deposit invoice sent

Date payment processed:

Receipt:

Officer:

Important information

All the relevant information on this form is required to be provided under the *Building Act 2004* and/or *Resource Management Act 1991* for the Waimakariri District Council to assess your application. Under these Acts this information has to be made available to members of the public if requested. The information contained in this application may be made available to other units of the Council. You have the right to access the personal information held about you by the Council which can be readily retrieved. You can also request that the Council correct any personal information it holds about you.

Application information

a. Project Information Memorandum (PIM):

A PIM will be issued within 20 working days provided all the required information is supplied with the application. Processing time is stopped whenever further information is required and starts again when the correct information is received.

It is not mandatory to apply for a PIM. Applicants can choose not to apply for a PIM when they consider that the information would not be relevant for their building project.

A fee is required to accompany your PIM application (as per Council's Fees and Charges Schedule).

b. Compliance Check:

Where a PIM is not sought, a Compliance Check will be undertaken to ensure your proposal complies with the District Plan.

c. Building Consent (BC):

A Building Consent will be processed within a maximum allowable time of 20 working days provided all the information required has been supplied. Processing time is stopped whenever further information is required and starts again when the correct information is received.

Once the Building Consent has been granted, you will receive notification, which will include an invoice for the fees payable.

Once the fees are paid in full, your Building Consent will be issued. Work must not start until the Building Consent is issued, and any Resource Consent requirements have been resolved.

A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the Building Consent or any further period that the Building Consent Authority may allow.

d. Combined Project Information Memorandum & Building Consent Applications:

Applications for a combined PIM/BC will only be accepted when sufficient information is provided to permit the Building Consent to be processed.

If insufficient information is provided, then further information will be requested, or your application may be returned to you.

e. If the applicant does not own the land, they must provide written approval from the owner to submit this application.

Levies payable

Under the Building Act 2004 s53, s55 s402 Council are authorised to collect levies for the MBIE (*Building Levy Order 2005*) and BRANZ (*Building Research Levy Act 1969*). Levies are only payable on building works where the construction value exceeds a prescribed amount.

[Building Act 2004](#)

[Building Levy Order 2005](#)

[Building Research Levy Act 1969](#)

Fees

The application for a PIM and/or Building Consent must be accompanied by the fees as described in *Sections 33 and 45 of the Building Act 2004*. The work to process a PIM and/or Building Consent will be invoiced and needs to be paid in full before the PIM and/or Building Consent can be granted, refer to [building services fees and charges](#).

Inspections

During the process of construction, inspections will be necessary to confirm all work complies with your approved Building Consent documentation. Please phone the Council Building Unit on 03 311 8906 at least **48 hours in advance** of requiring an inspection. Bookings are subject to demand and the availability of Inspectors, **please be advised that it is not always possible to carry out an inspection within 48 hours**.

The inspections required will be set out in the Building Consent documentation issued by the Council. Failure to have a prescribed inspection carried out may put the issue of the Code Compliance Certificate at risk.

All inspections including re-inspections are subjected to a separate charge, even if carried out on the same day.

Resource consent

Your application will be assessed by the Planning Unit of the Council to determine whether your project complies with the relevant District Plan requirements.

If your application does not comply with District Plan requirements, you will need to either amend your proposal to comply or apply for a Resource Consent. A Certificate will be attached to your Project Information Memorandum to notify that a Resource Consent is required prior to building work commencing. It is recommended that you phone the Planning Unit on 0800 965 468 to discuss the process.

Code compliance certificate

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent, Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years, you will need to apply for a time extension*.

*Fees apply

Agency

The owner may authorise an agent to submit an application on their behalf.

The Agent will be the first point of contact for all communications with the Council/Building Consent Authority regarding this application under *Sections 33 and 45 of the Building Act 2004*. They will receive all correspondence and must be authorised by the Owner. All amendments require new authorisation.

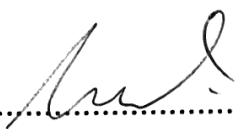


I / We authorise **Bespoke Architecture Ltd** to act as agent on my / our behalf for the PIM / Resource / Building Consent / Exemption to Building consent processes.

Please make all invoices out to.....Genesis Family Trust.....

Building Address.....29 Pegasus Main St, Pegasus

Name.....Wayne Graham..... Date.....9th June 2021.....

Signature..........

Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 30C or section 45, Building Act 2004

The building

Residential Dwelling

Name: Van De Geest Building

Address: 29 Pegasus Main Street, Pegasus (Lot 382, DP 401487)

Identification of design work that is restricted building work

I carried out or supervised the following design work that is restricted building work:

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

Primary structure

Foundations and subfloor framing	()	Foundations are designed by engineer	() Carried out () Supervised	
Walls	(x)	Timber framed walls to NZS 3604:2011	() Carried out (x) Supervised	Arch Plans -Plans -Sections -Details SPEC's
Roof	()	By Truss Manufacturer	() Carried out () Supervised	
Columns and beams	(x)	NZS3604:2011 Lintels Prolam design verandah beams (Arch.) SED design Beams & Lintels	() Carried out (x) Supervised	Arch Plans -Plans -Supporting Docs
Bracing	(x)	Bracing to NZS 3604:2011	() Carried out (x) Supervised	Arch Plans -Plans
Other	()		() Carried out () Supervised	

External moisture management systems

Damp proofing	(x)		() Carried out (x) Supervised	Arch plans -Details SPEC's
Roof cladding or roof cladding system	(x)	PlumbDek Profiled Metal roofing	() Carried out (x) Supervised	Arch plans -Plans -Sections -Details -Elevations SPEC's

Ventilation system (for example, subfloor or cavity)	(x)	<i>Cavity behind wall cladding as per NZBC E2/AS1</i>	() Carried out (x) Supervised	Arch plans -Sections -Details SPEC's
Wall cladding or wall cladding system	(x)	<i>70 Series brick veneer cladding over ventilated cavity. Hempac horizontal rusticated weatherboards over cavity battens. Plumbdek vertical profiled metal cladding over cavity battens.</i>	() Carried out (x) Supervised	Arch plans -Sections -Details -Elevations SPEC's
Waterproofing	(x)	<i>Ardex WPM to showers</i>	() Carried out (x) Supervised	Arch plans -Sections -Details -Elevations SPEC's
Other	()		() Carried out () Supervised	

Fire safety systems

Emergency warning systems,	(x)	<i>Smoke detectors</i>	() Carried out (x) Supervised	Arch plans -Floor Plans
-------------------------------	-----	------------------------	-----------------------------------	-----------------------------------

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

Note: continue on another page if necessary.

Are waivers or modifications of the building code required? () Yes (x) No

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

Clause	Waiver/modification required
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

Issued by

Name: **Vincent Sanders**

LBP or registration number: **111383**

The practitioner is a: ☒ Design LBP ☐ Registered architect ☐ Chartered professional engineer

Mailing address: **PO Box 36224, Merivale, Christchurch 8146**

Street address or registered office: **9 Shirley Road, Mairehau, Christchurch**

Phone number: **03 982 7575** **021 025 09336**

Declaration

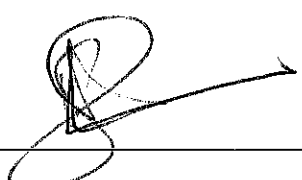
I **Vincent Sanders** [name of practitioner]

certify that the design work that is restricted building work recorded on this form:

(a) complies with the building code; or

(b) complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signed: _____



Date: 16/06/2021

Form 2A

Memorandum from licensed building practitioner: Certificate of design work
Section 45 and Section 30C, Building Act 2004

THE BUILDING

Street address: 29 Pegasus Main Street

Suburb:

Town/City: Pegasus

Postcode:

THE OWNER

Name(s): Van De Geest Building Limited

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies (✓)

(✓)

specialist designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

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

I, Matthew Cusiel ~~carried out~~ / supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is restricted building work		Description	Carried out/ supervised	Reference to plans and specifications
Foundations	(✓)	<i>Ribraft Foundation</i>	Supervised	Refer ENGCO PS1 for details
Columns & Beams	(✓)	<i>Floor & Roof beams</i> <i>Wind Beams</i>	Supervised	Refer ENGCO PS1 for details
Other	(✓)	<i>Framing to support</i> <i>Balustrades</i>	Supervised	Refer ENGCO PS1 for details

ISSUED BY

Name: Matthew Cusiel, CPEng	LBP or Registration number: 161509
The practitioner is a: () Design LBP () Registered architect (✓) Chartered professional engineer	
Design Entity or Company (optional): The Engineering Company Ltd	
Mailing address (if different from below):	
Street address / Registered office: 2/596 Ferry Rd	
Suburb: Woolston	Town/City: Christchurch
PO Box/Private Bag:	Postcode: 8023
Phone number: 03 366 7955	Mobile:
After Hours:	Fax:
Email address: matt.cusiel@engco.co.nz	Website:

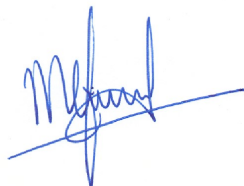
DECLARATION

I Matthew Cusiel *[name of practitioner]*, LBP,

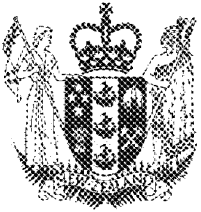
state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

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

Signature:



Date: 14 June 2021



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



Identifier **403972**
Land Registration District **Canterbury**
Date Issued 30 March 2009

Prior References

378433

Estate	Fee Simple
Area	668 square metres more or less
Legal Description	Lot 382 Deposited Plan 401487

Registered Owners

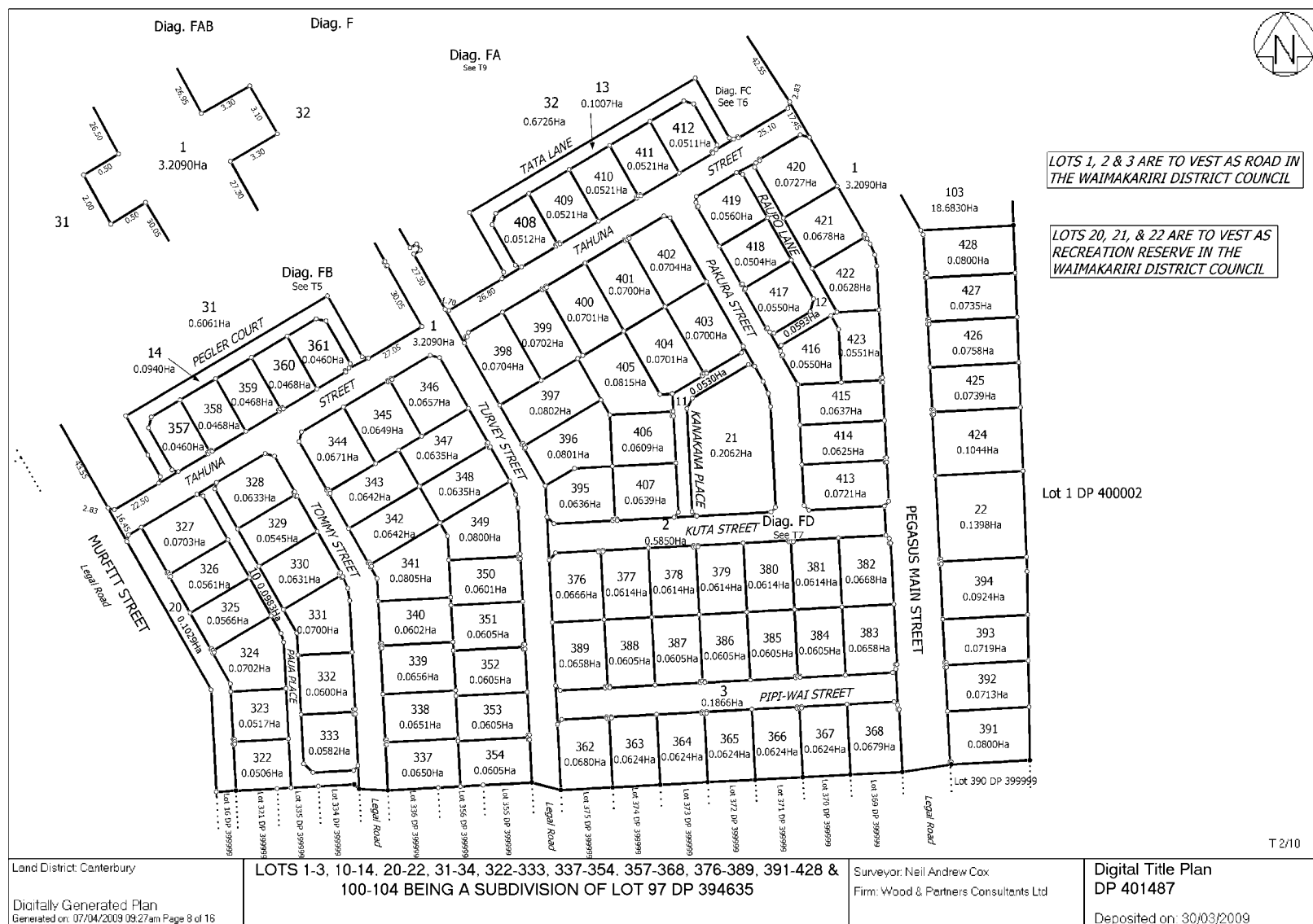
Wayne Thomas Graham and Peter Graeme Johnston

Interests

8117445.8 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 30.3.2009 at 9:05 am

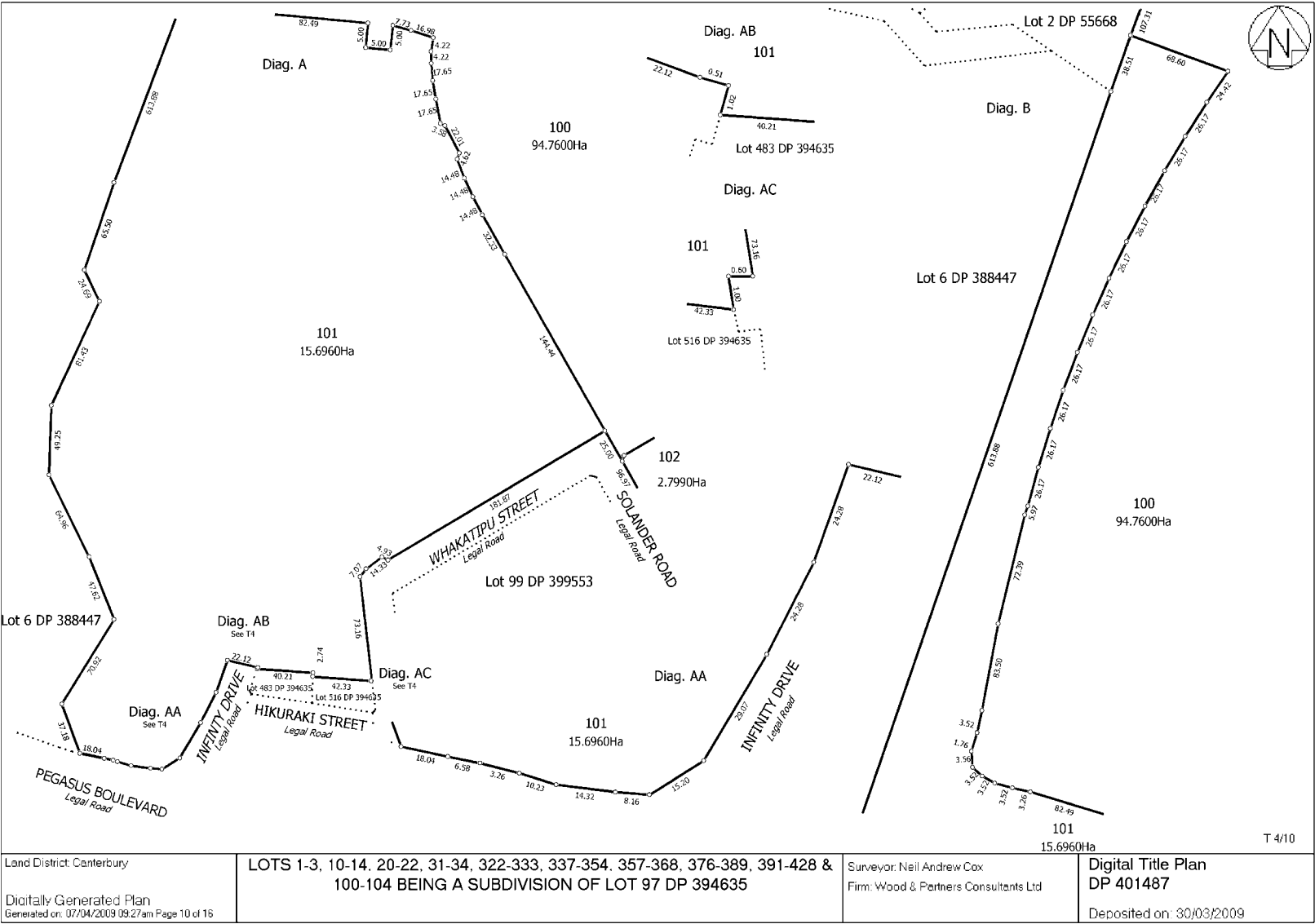
Land Covenant in Easement Instrument 8117445.15 - 30.3.2009 at 9:05 am

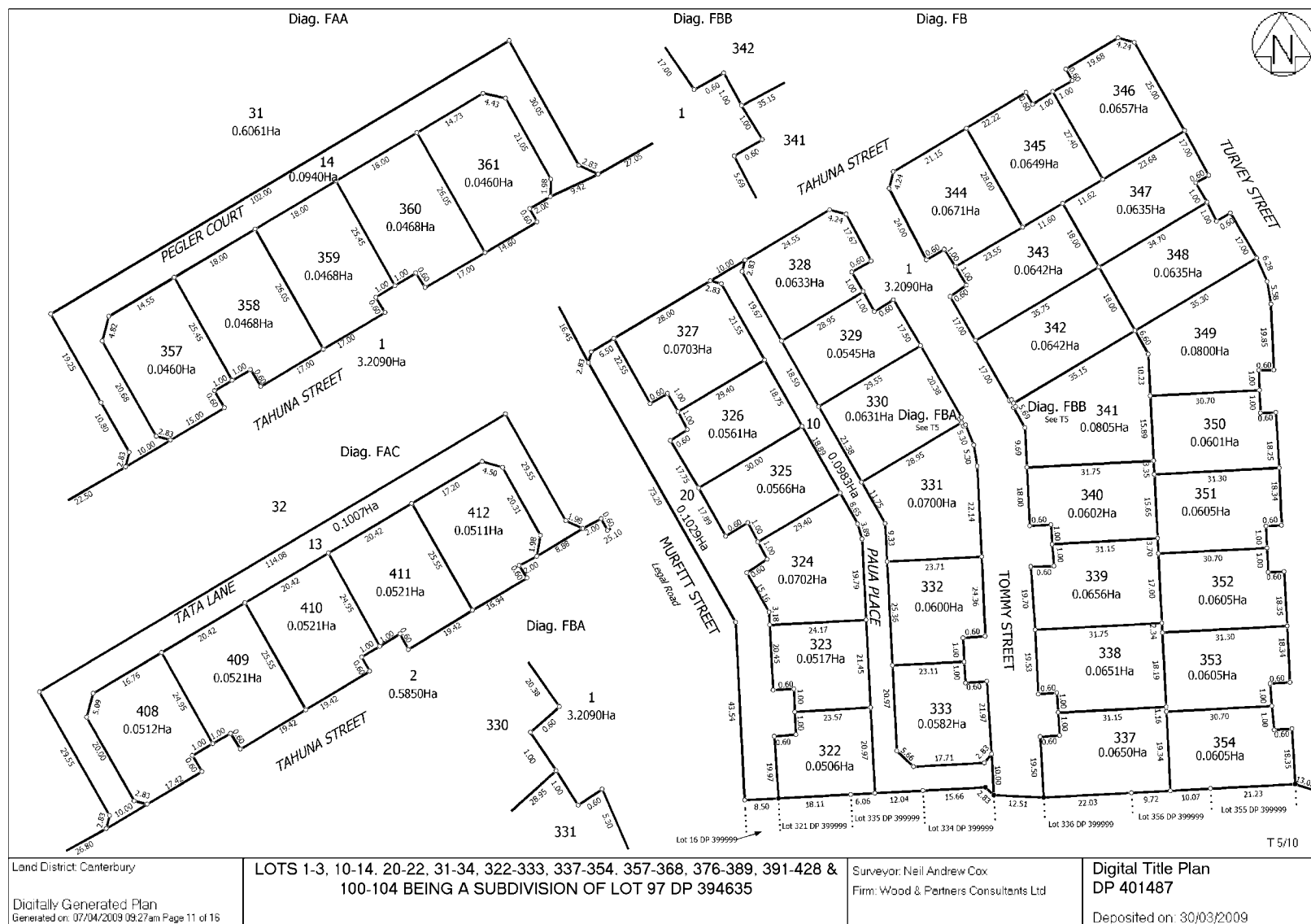






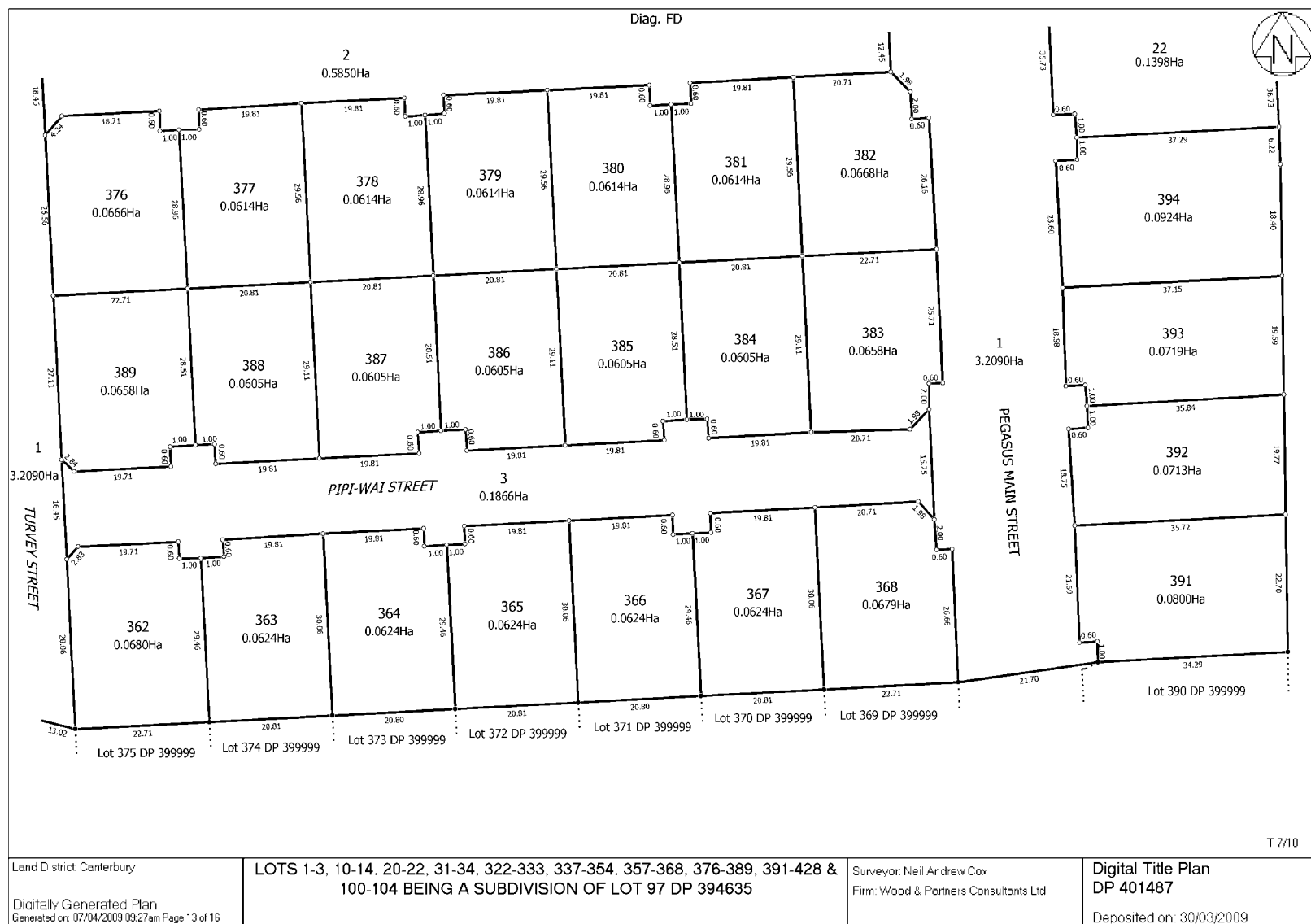
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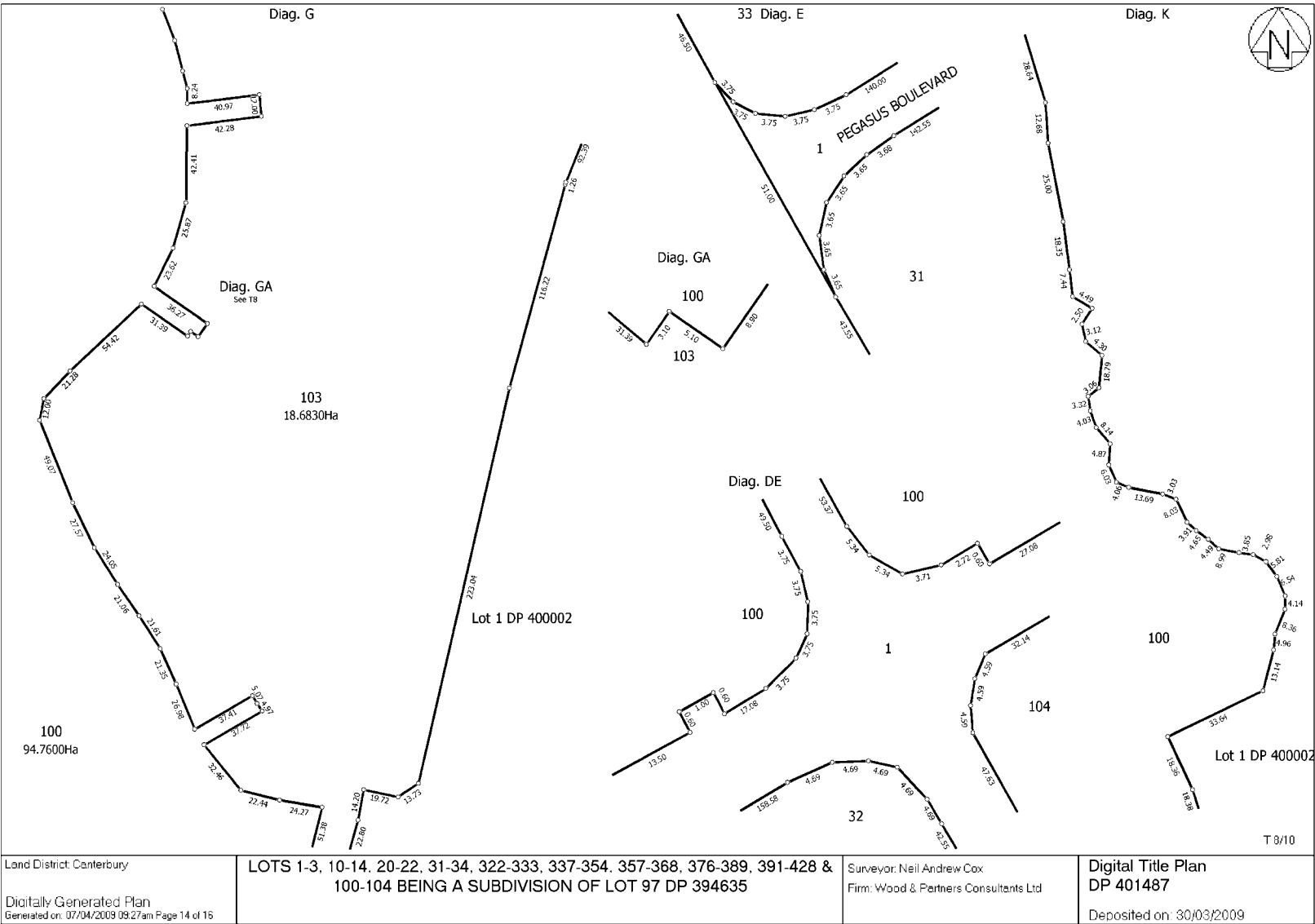


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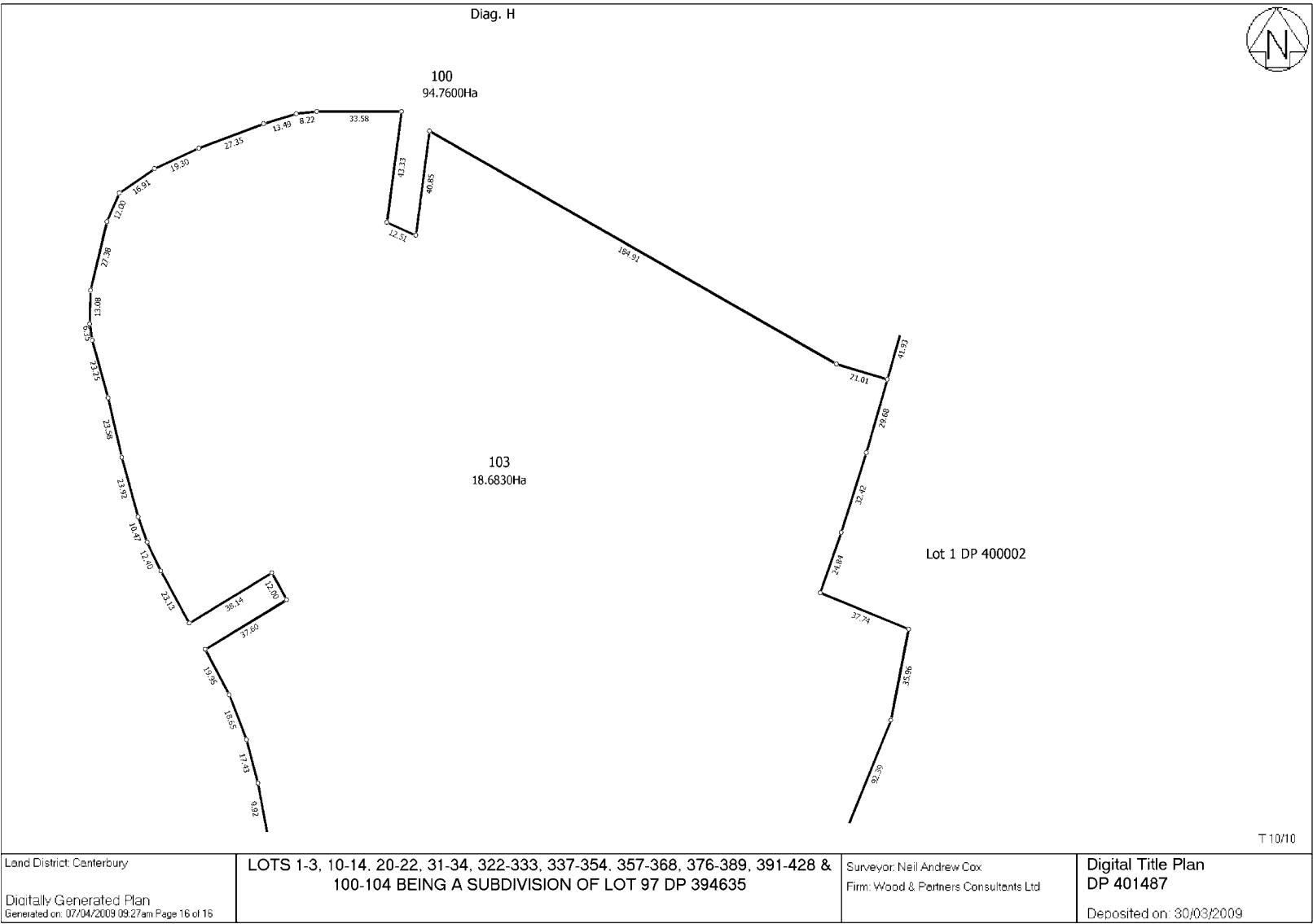
Identifier 403972



Identifier 403972



Identifier 403972





215 High Street
Private Bag 1005
Rangiora 7440
New Zealand

Email: office@wmk.govt.nz
Phone: 0800 965 468
waimakariri.govt.nz

Our Reference: VC Permit N° VC210275

Valuation N°: 2163161024
Property ID: 24699
Legal Description: LOT 382 DP 401487 0.066800 Ha
Building Consent N°:

15 July 2021

Wayne Thomas Graham
C/- Van de Geest Building Limited
8 Tahuna Street
Pegasus 7612

VEHICLE CROSSING PERMIT

Address for Vehicle Crossing: 29 Pegasus Main Street PEGASUS

The vehicle crossing described on your application form has been approved subject to the conditions of this Vehicle Crossing Permit. Your Vehicle Crossing Permit is valid for 12-months, with constructions works to be completed within that time and subject to the crossing being constructed in accordance with Council requirements.

Distance from Left Property Driveway (m): 2.00
Width of Driveway (m): 5.20
Distance from Right Property Driveway (m): 20.00

ADDITIONAL REQUIREMENTS

-

SERVICE PLANS

Please note that it is your Contractor's responsibility to locate all underground services. No services are to be moved without the written permission of the service provider.

When locating services from service plans, your contractor will need to dig for and confirm the exact location of the service. When excavating in the vicinity of any services, your contractor will be held responsible for any damage.

ROAD SAFETY

You and your contractor are both responsible for the safety of this site, including that of pedestrians and other road users. This requires that between initial construction and final surfacing, the Vehicle Crossing be kept in good condition to allow for the safe passage of pedestrians.

At least two days prior to the planned commencement of any construction work, a Temporary Traffic Management Plan must be lodged with the Council. You must have your Temporary Traffic Management Plan approved before commencing any construction work.

(The Temporary Traffic Management Plan is to be completed in accordance with Transit NZ Code of Practice for Temporary Traffic Management – Interim July 2000.) A copy of requirements is included in the Vehicle Crossing Information Pack available from Council Service Centres.

If there is a requirement for public notification (eg road closure), the proposed Temporary Traffic Management Plan must be received 5 days before any advertisement is to be placed.

INSPECTIONS

You are required to notify the Council 2 days prior to excavation to confirm location and make arrangements for consequent inspections.

CONTRACTORS

Anyone carrying out this work must have a minimum of \$1,000,000 Public Liability Insurance, and those carrying out the work need to be qualified to do so under the requirements of the NZ Code of Practice for Temporary Traffic Management.

CONSTRUCTION

- a) The vehicle crossing (entranceway) is to be constructed in accordance with Council specifications, including any Resource Consent conditions (to be addressed in your application) and other requirements listed on this permit from the formed roadway to your property.
- b) **The Vehicle Crossing must be formed to at least top-course stage prior to the commencement of any building work.**
- c) All costs are the responsibility of the owner, including the costs associated with any repair work required as a result of settlement or poor workmanship during a 12-month period of maintenance. A vehicle crossing that does not meet Council specifications will be upgraded at the property owner's cost.
- d) A vehicle crossing constructed without Council inspections will be deemed as an illegal entrance.
- e) You are reminded that stamped concrete, coloured concrete, cobbles and non-standard paving blocks are not permitted.

A Vehicle Crossing Information Pack is available from Council Service Centres. It contains a copy of the Standard Specification for Footpaths, Crossings and Berms (QP-C813-AC), plans for typical urban and rural Vehicle Crossings and other information.

Customer Services Team



WAIMAKARIRI
DISTRICT COUNCIL

215 High Street, Rangiora
Private Bag 1005, Rangiora 7440
Free Phone 0800 965 468
Email office@wmk.govt.nz
waimakariri.govt.nz

APPLICATION TO FORM A VEHICLE CROSSING (ENTRANCEWAY)

Made under Section 335 Local Government Act/Waimakariri District Vehicle Crossings Bylaw 2007

VEHICLE CROSSING No. **VC210275**

NOTE - Council may not accept a Vehicle Crossing Application until title (224c) has been issued for your property.

Journal # 131 578

THE PROPERTY OWNER

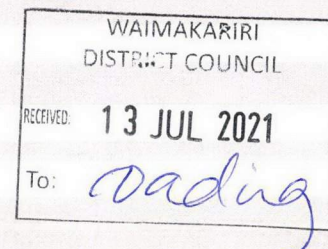
- Owner's name: *Graham Wayne Thomas*
(Company or organisation name if applicable)
- Mailing address: *4 Manuka Street*
- Mobile: Landline: Email:

THE AGENT

- Agent's name: *Van de Grest Building LTD*
(Company or organisation name if applicable)
- Mailing address: *97d Te Hurunui Drive*
- Mobile: Landline: Email: *david@vbuild.co.nz*

THE CONTRACTOR

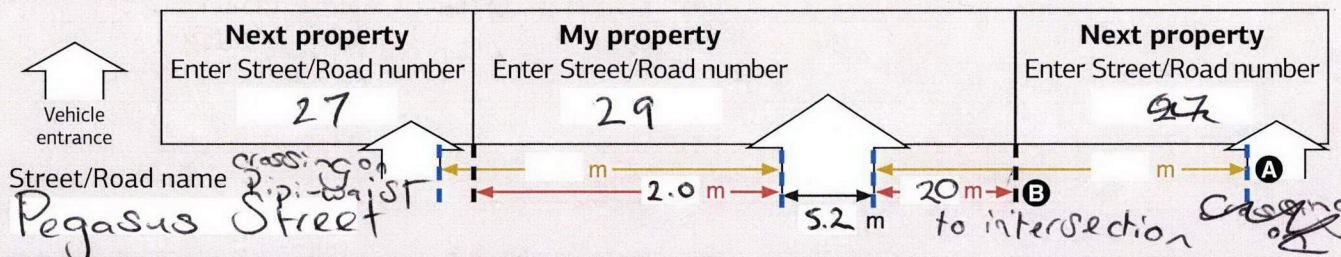
- Contractor's name:
(Company or organisation name if applicable)
- Mailing address:
- Mobile: Landline: Email:



PROPERTY DETAILS OF PROPOSED VEHICLE ENTRANCE

- Site address: *Pegasus 29 Main Street Pegasus*
(Street/Road/Township)
- Legal description:
Lot: *382* DP: *401487* Valuation Number: *2163161024*
- Building/Resource Consent Number: BC: *210889* RC:
- Location Sketch (Please tick type of vehicle crossing):
☒ Residential ☐ Rural ☐ Commercial/Industrial

Please provide both **A** and **B** distance figures where possible.



Using the sketch above, show the location, width of vehicle crossing and distances to the nearest vehicle crossings on the same side of the road. If more relevant (eg. when adjacent vehicle crossings have yet to be formed), please show the distance to the neighbouring boundaries/nearest intersection if beside a corner. **A** = Distance to neighbouring Vehicle Crossing. **B** = Distance to boundaries.

Please also show the location of any trees or services on the sketch above.

NOTE - If a Collector, Strategic or Arterial Road, on-site manoeuvring will need to be provided (District Plan Rule 30.6.1.37) and shown on the Building Consent plans. Email duty.planner@wmk.govt.nz for further information if required.

PAYMENT

14. If sending this application via email, please do not make a payment until you receive an invoice via reply.

☐ Fee of \$160.00 attached

VEHICLE CROSSING INSPECTIONS

- I will notify the Council two working days prior to excavation to confirm location and make arrangements for consequent inspections. Please note a fee of \$80.00 will apply for any failed inspections. To book a Vehicle Crossing Inspection phone 0800 965 468.

DECLARATION

- I will construct a vehicle crossing (entranceway) that complies with any Resource Consent and meets Council specifications from the formed roadway to my property. Between the initial construction and final surfacing of the vehicle crossing, the crossing will be kept in good condition to allow for the safe passage of pedestrians
- I note that stamped concrete, coloured concrete, cobbles and non standard paving blocks are NOT permitted
- I understand that all costs are the responsibility of the property owner and that a vehicle crossing that does not meet Council specifications will be upgraded at the property owner's cost
- I understand that I will be responsible for the costs associated with any repair work required as a result of settlement or poor workmanship during a 12-month period of maintenance.

INFORMATION

- Your permit is valid for 12 months with your vehicle entrance to be completed within that period.
- It is the property owner's responsibility to arrange and pay for the construction of a vehicle entrance.
- A vehicle entrance constructed without Council inspections will be deemed as an illegal entrance.
- A vehicle entrance must be formed to top-course stage prior to the commencement of any building work.
- You or your Contractor will need to fill in a Temporary Traffic Management Plan at least 2 working days before construction, you cannot work on the road or footpath until it has been approved. (If there is a need for public notification eg road closure, then additional notice is required).

A Vehicle Crossing Information Pack is available from Waimakariri District Council Service Centres and website:
<http://www.waimakariri.govt.nz/services/roads-and-transport/driveways-and-vehicle-crossings>
It contains specifications and additional information as well as plans for typical urban and rural vehicle crossings.

OWNER AUTHORISATION

PLEASE NOTE - By entering your name in the box below you are giving your authority for the application to proceed.

Name:

David van de Grint

Date:

13/06/2021

I am the

☐ Owner

☒ Agent

OFFICE USE ONLY

Front Counter

Roading

Plan Admin

CSO - PIMs

Officer

Date

Jennifer Russell

All Okay - meets DP rules

13/7/21

J. Russell

INSPECTION TYPE

Yes

No

Date

Comments

Inspected by

Location

Excavation

Base Course

Final Surfacing
(completed satisfactorily)

Additional Inspection
(completed satisfactorily)

<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			

Date payment processed:

Receipt

Officer:

☐

Fee paid on application

☐

Deposit invoice sent

Section 2

Geotech, Engineer Reports & Conditions PS1 & 2s

- **Calculations**
- **A4 Details**



ENGEO Limited

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Christchurch 8023

PO Box 373, Christchurch 8140, New Zealand

T: +64 3 328 9012 F: +64 3 328 9013

www.engeo.co.nz



Project Number #19242.000.001

Geotechnical Investigation

29 Pegasus Main Street, Pegasus

Submitted to:

Van de Geest Building Ltd

8 Tahuna Street

Pegasus 7612

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

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Appendix 1:	NZGD Logs
Appendix 2:	CPT Logs
Appendix 3:	Liquefaction Analysis Results
Appendix 4:	Lateral Spread Analysis Results
Appendix 5:	Constructure Soil Bearing Investigation

ENGEO Document Control:

Report Title	Geotechnical Investigation - 29 Pegasus Main Street, Pegasus			
Project No.	19242.000.001	Doc ID	01	
Client	Van de Geest Building Ltd.	Client Contact	David Van de Geest	
Distribution (PDF)				
Date	Revision Details/Status	Author	Reviewer	WP
16/09/2021	Issued to Client	DK	NC	JT

1 Introduction

ENGEO Ltd was requested by Van de Geest Building Ltd. to undertake a geotechnical investigation of the property at 29 Pegasus Main Street, Pegasus, (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 13 August 2021 (ENGEO Ref: P2021.002.173_01).

Our scope of work was as follows:

- A desktop study of geotechnical and geological data, including the New Zealand Geotechnical Database (NZGD).
- Site assessment by an experienced ground engineering professional.
- Organisation of a CPT contractor to push two CPTs to a target depth of 15 m.
- Undertake an assessment of the liquefaction and lateral spread potential for the site, using on-site CPT data.
- Preparation of this report outlining our findings on the ground conditions and providing geotechnical recommendations related to the design of foundations to a level suitable for building consent.

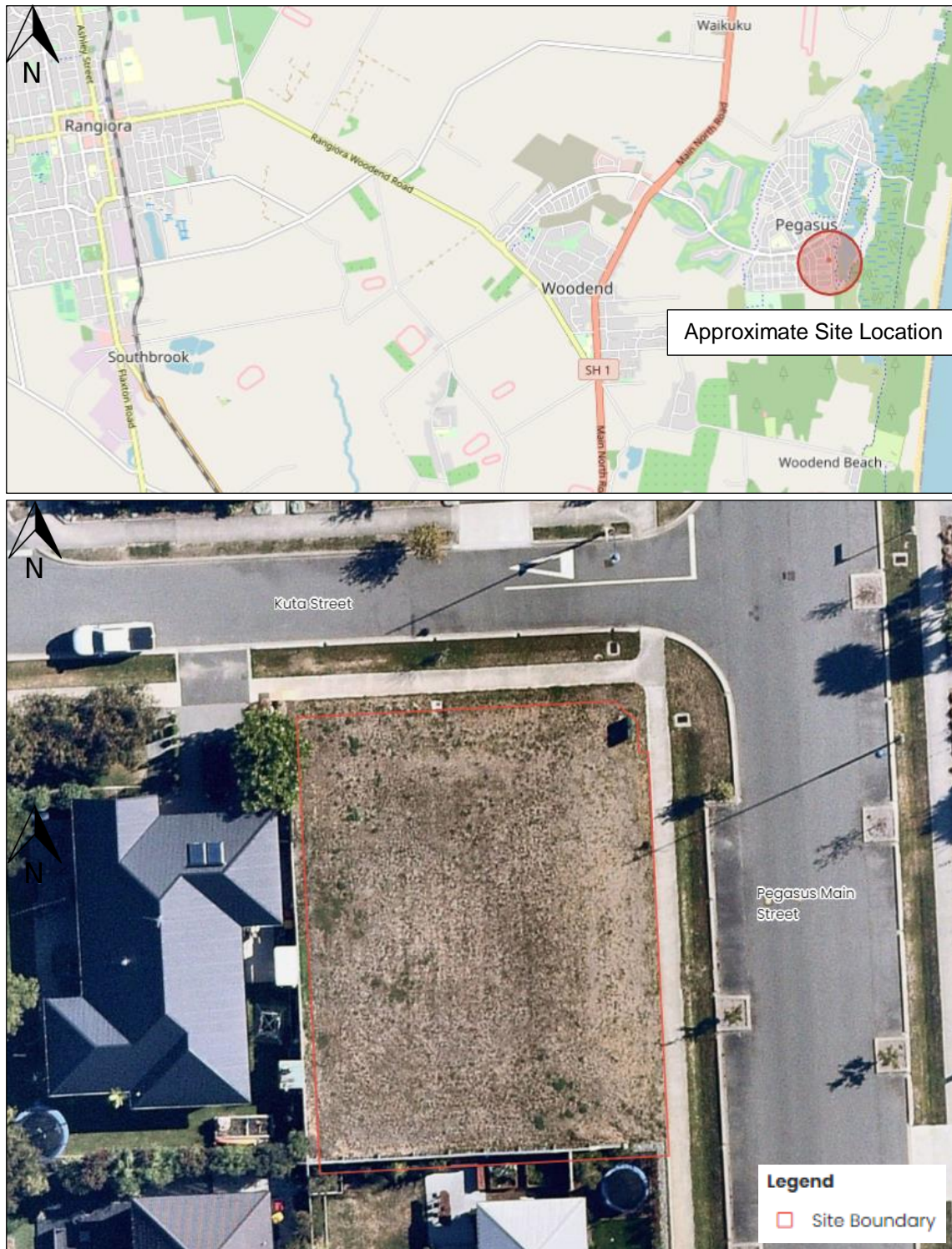
Note, we have excluded shallow testing as this has been completed by Constructure, as such we will not provide a shallow bearing capacity.

2 Site Description

The site at 29 Pegasus Main Street is an undeveloped relatively level site located in Pegasus. It has a legal description of LOT 382 DP 401487 and covers an area of approximately 700 square meters. It is bound to the east by Pegasus Main Street, the north by Kuta Street and by already developed residential properties on all other sides. The nearest waterway is the Te Kōhanga wetlands, located approximately 110 m to the west of the site boundary.

Conceptual design plans received from Bespoke Architecture show that the proposed development for the site will comprise a two storey dwelling with a footprint of 141.7 square meters (Ref: J19341 Sheet No 101).

Figure 1: Site Location Plan



Images sourced from OpenStreetMap and NearMaps. Not to scale.

3 Desktop Review

3.1 Previous Reporting

Earthworks Completion Report

During the subdivision earthworks BECA was the supervision geotechnical engineers. In October 2008 they issued a report titled “Pegasus Stages 4 and 5 – Earthworks Completion Report.” The site at 29 Pegasus Main Street was then known as lot 382, and part of stage 5 earthworks.

Placed fill consisted of site won dune sands from the lake excavations. The fine to medium sand fill at the site was compacted to greater than 95% of its maximum dry density. Compaction quality control consisted of Scala penetrometer testing, proof rolling and Nuclear Density Meter Testing. Filling was typically up to 2 m in depth, but could be up to 5 m in depths in parts of the subdivision.

Earthworks were completed in accordance with NZS 4431:1989.

Post-Earthquake Inspections

United Research Services (URS, now a part of AECOM) completed inspections of the Pegasus area following the September 2010, February 2011 and June 2011 earthquakes.

Walkover assessments of the town concluding following each earthquake that there was “no evidence for earthquake-induced ground damage such as liquefaction, cracking or lateral spreading affecting any of the lots or infrastructure within any of the residential stages.” Minor quantities of liquefaction ejecta was observed in the wetlands to the east of the site following the September 2010 earthquake.

The September 2010 event was inferred to be approximately equivalent to an SLS event for the site, “The M7.1 Canterbury Earthquake of 4 September 2010 is inferred to have caused seismic shaking loads at the site that are similar to those assessed as the 150 year design earthquake.”

It should be noted that the inspections did not include any sub-surface or intrusive work, and were of a visual nature only.

Constructure Soil Bearing Investigation

Constructure completed four Scala penetrometer and two hand augers on 18 November 2020. The hand augers were terminated at a maximum depth of 0.9 m, the Scala penetrometers were terminated at a maximum depth of 1.9 m. The hand augers were logged as having 100 mm of topsoil overlying dark brown silt to between 0.3 and 0.4 m depth, further underlain by sand to the termination of the hand augers. The Scala tests show that the soil profile is generally medium dense to dense, with a consistent drop in strength at 1.0 m depth.

Constructure recommended that the dwelling be supported with a TC2 Option 4 ‘waffle’ slab beneath topsoil at 100 mm depth.

3.2 Geological Mapping

The site has been regionally mapped by GNS Science (Forsyth et al., 2008) to be underlain by stabilised beach or river sand dunes.

3.3 New Zealand Geotechnical Database

We have reviewed the nearby subsurface investigation data available through the New Zealand Geotechnical Database (NZGD) with the purpose of gaining a greater understanding of regional geology. A summary of nearby investigations is provided in Table 1. Logs of the CPTs and hand augers are attached to this report in Appendix 1.

Table 1: Summary of Investigation Data

Identifier	Position Relative to Site	Depth of Exploration	Depth to Groundwater
CPT_125462	50 m southeast	15.1 m	1.3 m
CPT_125467	60 m southeast	7.3 m	1.3 m
CPT_23130	20 m north	6.9 m	-
CPT_23136	25 m north	6.6 m	-
HA-DCP_23125	20 m north	2.7 m	1.8 m
HA-DCP_23127	25 m north	2.7 m	1.6 m

The CPTs to the southwest of the site infer medium dense to dense sand and silty sand until a depth of 15.1 m depth. There is a thin layer of stiff cohesive clay and silty clay located at approximately 2 to 3 m depth. Thin layers of denser material, inferred as sand to gravelly sand, are present between 5.5 and 8.0 m depth (CPT_125467 refused here).

The CPTs to the north are similar, but have an additional layer of firm to stiff cohesive clay and silty clay between 4.2 and 4.6 m depth. Both CPTs meet refusal in inferred gravelly sands between 6.6 and 6.9 m depth.

The hand auger logs encounter 0.3 m of topsoil underlain by sand with a small organic content before reaching practical refusal at 2.7 m depth on dense dune sands. The upper 1.5 m is medium dense to dense, underlain with loose material.

Groundwater was encountered in these investigations between 1.3 in the southeast and 1.8 m depth in the north.

3.4 Groundwater

Regional mapping of groundwater accessed through Canterbury Maps shows that the site is approximately halfway between the 2.5 m and 1.0 m depth contours, indicated that groundwater is located at approximately 1.75 m depth.

3.5 Historic Aerial Photography

We have reviewed historic aerial photographs of the site available through Canterbury Maps (Property Search). Specific dates are not provided for each photograph, however, a date range is provided indicating the timeframe in which they were captured.

These photographs were viewed under the context of identifying changes to landform and structures at the site. We have made the following observations.

- The subdivision earthworks were completed between the 2004 to 2010 and 2010 to 2015 photograph ranges.
- Prior to this the site appears to have been wooded.

4 Site Investigation

ENGEO visited site on 8 September 2021 and made the following observations:

- The building platform was relatively level and grassed, and is slightly raised above street level.

Figure 2: Site Photographs



Photo 1: View of site from corner of Pegasus Main and Kuta Streets, photograph taken 8 September 2021.



Photo 2: View of Te Kōhanga wetlands, photograph taken 8 September 2021.

4.1 CPTs

The CPT probe gathers raw data including cone tip resistance, friction sleeve resistance, and pore water pressure at 1 cm intervals during the test. This information is used to infer the soil type, soil density and water pressure in undisturbed conditions in the ground, and can be used to assess the liquefaction susceptibility of the ground and to calculate geotechnical bearing capacity in the soil.

At our request, Ground Investigation Ltd pushed two CPTs on 8 September 2021 to a target depth of 15 m. The CPTs met practical refusal at 7.3 and 7.0 m depth due to high tip resistance. Standing water was measured at 1.6 m depth. The locations of the CPTs is shown in Figure 3 and the logs are attached to this report in Appendix 2.

4.2 Summary of Subsurface Conditions

A summary of the subsurface conditions encountered on the site is shown in Table 2.

Table 2: Summary of Subsurface Conditions

Depth (m)	Material	Consistency / Density
0 – 0.3	Topsoil	N/A
0.3 – 1.75	Sand and silty sand	Medium dense
1.75 – 3.8	Interbedded clay, silty clay, sandy silt and silty sand	Stiff to very stiff / Medium dense
3.8 – 6.5	Sand and silty sand	Medium dense to dense
6.5 – 8.0	Sand and gravelly sand	Dense to very dense
8.0 – 15.0	Sand and silty sand	Dense

Upper 7 metres interpreted from on-site CPTs, 7 to 15 m depth interpreted from nearby CPT_125462.

Figure 3: Site Testing Plan



Image sourced from NearMaps. Not to scale.

5 Geotechnical Assessment

5.1 Soil Classification

For the purpose of seismic design, we consider the soil classification in line with NZS 1170.5:2004 to be 'Class D – Deep or Soft Soil'.

5.2 Seismic Design Considerations

We have assumed the building will have an importance level of 2. According to NZS 1170.5:2004, Importance Level 2 buildings are required to be designed to resist earthquake shaking with an annual probability of exceedance of 1/500 (i.e. a 500 year return period). This is the Ultimate Limit State (ULS) design seismic loading. It is necessary that buildings are designed to tolerate the ULS deformations without collapse or endangering life. Furthermore, Importance Level 2 buildings should sustain little or no structural damage under a Serviceability Limit State (SLS) design load case, which is based on earthquake shaking with a 25 year return period.

MBIE has issued guidance for ground accelerations that should be used for assessment of liquefaction triggering in Canterbury. For 'Class D' and Importance Level 2 sites, these are 0.13 g for the SLS case and 0.35 g for the ULS case, both for M7.5 events.

5.3 Liquefaction Assessment

5.3.1 Liquefaction Triggering

MBIE guidance module 3 recommends that liquefaction assessment for sites in the Canterbury Earthquake Region takes into consideration three earthquake design load cases as per Table 3.

Table 3: Ground Motions used in the Liquefaction Analysis

Design Case	PGA (g)	Magnitude
SLS Case 1	0.13 g	7.5
SLS Case 2	0.19 g	6.0
ULS	0.35 g	7.5

We have assessed the likelihood of liquefaction triggering and post-liquefaction induced vertical settlement occurring at the site using the on-site CPT data and following the methodology outlined by Boulanger and Idriss (2014) and Zhang et al. (2002). Additionally we have included two nearby CPTs in our assessment, CPT_23130 and CPT_125462.

The main input parameters used in our assessment included the following:

- Three ground motions (2 SLS, and 1 ULS) as outlined in Table 3.
- A probability of liquefaction triggering curve (P_L) of 16% (deterministic curve).
- A soil behaviour type index (I_c) cut-off value of 2.6 to differentiate between soils that are susceptible and non-susceptible to liquefaction.

- The Boulanger and Idriss relationship between fines content and I_c with a fitting parameter (C_{FC}) of 0.0 for the CPT analysis (no soil laboratory testing available for calibration of the parameter).

A groundwater depth of 1.6 m, as measured in the on-site CPTs, was used in the liquefaction assessment. This is consistent with nearby testing.

5.3.2 Liquefaction Assessment Results

Results of our liquefaction assessment indicate that the soil profile contains potentially liquefiable layers under both SLS and ULS conditions.

The liquefaction analysis completed on the on-site CPTs indicates that there are layers of silty sand and sand with high liquefaction potential lying directly below the water table under ULS conditions. Liquefaction primarily occurs between the water table at 1.6 m and 4.0 m depth (excluding several thin layers of finer grained material identified in section 4.2), and between 5.5 and 6.5 m depth.

The CPT data accessed through the NZGD is broadly consistent with this. CPT_23130 to the north of the site has a lower level of liquefaction induced vertical settlements because the fine grained layers are thicker. CPT_125462 to the southeast of the site is the only CPT in the area that pushes through the dense gravelly sand layer. It identifies a further liquefiable layer between 9.2 and 9.7 m depth.

At SLS the liquefiable layers are thinner and vary between the CPTs, resulting in much lower calculated liquefaction induced settlements.

Liquefaction analyses are included in Appendix 4, and calculated settlements are summarised in Table 4.

Table 4: Calculated Liquefaction Settlements

Investigation ID	Depth of Exploration	Calculated Settlements ⁽¹⁾		
		SLS Case 1	SLS Case 2	ULS
CPT01	7.3 m	< 10 mm	15 mm	55 mm
CPT02	7.0 m		15 mm	55 mm
CPT_23130	6.9 m		< 10 mm	20 mm
CPT_125462	15.1 m			55 mm

⁽¹⁾ For an undeveloped site. Settlements beneath buildings are likely to be different.

5.3.3 Liquefaction Assessment Discussion

The results from the liquefaction analysis indicate that the potential for liquefaction induced settlement is in line with TC2 type settlements, outlined by the MBIE to be 0 to 50 mm at SLS and 0 to 100 mm at ULS.

MBIE recommends considering the upper 10 m of the soil profile when conducting a liquefaction assessment. The CPTs used in this liquefaction assessment meet refusal on inferred gravelly sand at 7.0 and 7.3 m depth. We have assessed the remaining 2.7 m of the soil profile using the nearby

CPT_125462. This shows an additional 10 mm of vertical settlement and ULS and negligible amounts at SLS. Therefore the ULS liquefaction induced vertical settlements for the site may be more in the region of 65 mm for an undeveloped site, this is still consistent with TC2 criteria.

As discussed in section 3.1 the September 2010 earthquake was likely close to an SLS level event for the site, and following this there was no evidence of earthquake related ground damage within the Pegasus Township, although we note that minor liquefaction ejecta was observed by URS on the Tūhaitara Trust land to the east of the wetlands following the September 2010 event. The calculated liquefaction severity numbers for each of the CPTs show that there will be little to no expression of liquefaction at SLS and a minor expression of liquefaction at ULS. This matches with what was experienced by the site during the Canterbury Earthquake Sequence for an SLS event. We therefore consider that this liquefaction assessment is reasonable and is generally a good representation of the liquefaction potential at the site.

5.4 Lateral Spread Assessment

Given the proximity of the site to the wetland, we have completed an assessment of lateral spread potential at the site.

The MBIE guidance describes two components of lateral movement: global lateral movement and lateral stretch. Global lateral movement is the total lateral displacement of a point towards a free face while lateral stretch is the difference in global movement between two points at different distances from the free face.

5.4.1 Analysis Parameters

We have estimated global lateral movement occurring at the site using the on-site CPTs, the triggering method outlined by NCEER (Robertson and Wride, 1998) and the deformation estimate by Zhang (2004).

This methodology is based on a database of observed lateral spread events correlated to a factor of safety and relative density from CPTs within the material where lateral spreading may occur. As such, this methodology should be used as an indication of likely displacements rather than to develop definitive estimates of displacement. This method is based on the assumption of soil uniformity, so it does not account for variation in the soil profile between the analysis location and the free face edge.

For the purposes of analysis, the site is considered “Level Ground with a Free Face”. Displacements calculated below twice the free face height were not included in our estimated lateral deformation due to the negligible static shear stress below this depth, as discussed in Chu and Stuart (2009).

We have completed lateral spread analysis considering a free face height of approximately 2.5 m, the approximately difference between the site level and the base of the wetlands, and have calculated the lateral spread at each edge of the proposed building footprint (approximately 110 and 120 m respectively). Our analysis was carried out using both SLS and ULS design ground motions.

5.4.2 Lateral Spread Assessment Results

The analysis predicts negligible lateral stretch across the building footprint at SLS levels, and up to 5 mm at ULS levels. The analysis has calculated that lateral movement at the lakeside edge of the building platform would be up to 10 mm at SLS and 65 mm at ULS.

Lateral spread analyses are included in Appendix 5, and calculated settlements are summarised in Table 5.

Table 5: Lateral Spread Assessment Results

Seismic Loading	Investigation ID	Calculated Lateral Displacements		Lateral Stretch across Building Platform
		110 m from Free Face	120 m from Free Face	
SLS	CPT01	< 10 mm	< 10 mm	0 mm
	CPT02			
ULS	CPT01	35 mm	30 mm	5 mm
	CPT02	65 mm	60 mm	

5.4.3 Lateral Spread Assessment Discussion

This is a simplified model, and as such it generally makes over-conservative predictions. This model relies on a continuous layer of liquefiable soil running across the site to the free face in the wetland. The varied depth and thickness of the fine grained material identified in CPTs pushed on-site and in the surrounding area indicate that this is unlikely to be the case.

Given the model only predicts around 5 mm of lateral stretch across the building platform, we consider that the actual amount of stretch will be small enough that it does not need consideration in foundation design.

6 Geotechnical Recommendations

6.1 CERA Land Classification

Our liquefaction analysis indicates future vertical settlement expectations at the site to be consistent with the criteria for foundations in Technical Category TC2, i.e., predicted ULS and SLS settlements are less than 100 mm and 50 mm respectively.

The predicted lateral stretch across the building footprint is approximately 5 mm at ULS, and thus is likely to meet the TC2 lateral spreading requirements, i.e., predicted lateral stretch is less than 50 mm following a ULS level event.

6.2 Foundation Recommendations

We consider that the most suitable foundation system for supporting the dwelling is a waffle slab (TC2 option 4 as defined by MBIE). Other TC2 foundation options 1 to 3 from part A, section 5.3.1 of the MBIE Guidance document would also be considered suitable for the site from a geotechnical perspective.

We note that Constructure recommend that the foundation system achieve bearing on dark brown silt at 0.1 m depth, and that a geotechnical ultimate bearing capacity of 200 kPa is available at this depth. We consider that this dark brown silt is likely topsoil with a high organic content, foundations should achieve bearing upon the sand encountered in the Constructure logs at approximately 0.3 to 0.4 m depth.

Foundations should be designed to span a length of a least 4 m upon a sudden lack of support, and a cantilevered distance of up to 2 m over settled soil across the building footprint extremities, within deformation limits.

6.3 Additional Considerations

- For concrete slab foundations or foundations that incorporate a gravel raft, all grass and topsoil should be undercut from within the building footprint plus a minimum of 0.5 m beyond the perimeter foundation line.
- All hardfill should consist of AP40 / 65 placed in lifts no greater than 200 mm thick to a minimum of 95% Maximum Dry Density. The degree of compaction for each lift should be tested in accordance with NZS4407:2015 using a nuclear density meter (NDM).
- Foundations should be designed by a Chartered Professional Engineer practising in foundation design.
- We advise that future building work takes into consideration the recommendations of the MBIE guidance.

7 Limitations

- i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Van de Geest Building Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.
- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.
- v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by



Dai Kiddle

Geotechnical Engineer

Report reviewed by



Neil Charters, CMEngNZ (CPEng)

Principal Geotechnical Engineer

8 References

Beca Infrastructure Ltd. (2008). Pegasus Stage 4 and 5 Earthworks Completion Report. Prepared for Pegasus Town Ltd.

Boulanger, R. W., & Idriss, I. M. (2014). CPT and SPT Based Liquefaction Triggering Procedures. University of California, Davis, Ca, Department of Civil and Environmental Engineering.

Constructure. (2020). Soil Bearing Investigation – 29 Pegasus Main Street, Pegasus. Prepared for Landmark Homes Ltd.

Environment Canterbury, Canterbury Maps. Property Information. Retrieved August 2021, from <https://propertysearch.canterburymaps.govt.nz/>

Environment Canterbury, Canterbury Maps. Groundwater Depths and Historic Aerial Photography. Retrieved August 2021, from <https://mapviewer.canterburymaps.govt.nz/>

Forsyth, P., Barrell, D. J., & Jongens, R. (2008). Sheet 16 - Geology of the Christchurch Area 1:250,000. Lower Hutt: Institute of Geological and Nuclear Sciences.

Idriss and Boulanger. (2008). Soil Liquefaction during Earthquakes - EERI Monograph MNO12.

The Ministry of Business, Innovation, and Employment. (2012). Guidance-Repairing and rebuilding houses affected by the Canterbury earthquakes. Christchurch: The Ministry of Business, Innovation, and Employment.

The Ministry of Business, Innovation, and Employment (2016). New Zealand Geotechnical Database. Retrieved August 2021, from <https://www.nzgd.org.nz>

New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment (2016). Geotechnical Earthquake Engineering Practice in New Zealand: Modules 1 to 3.

Standards Association of New Zealand (2004). Structural Design Actions, Part 5: Earthquake Actions – New Zealand, NZS 1170.5:2004. Standards New Zealand, Wellington.

URS, 2010. Pegasus Town Post-earthquake Inspections September 2010. Prepared for Pegasus Town Ltd.

URS, 2011. Pegasus Town Post-earthquake Inspections February 2011. Prepared for Pegasus Town Ltd.

URS, 2011. Pegasus Town Post-earthquake Inspections June 2011. Prepared for Pegasus Town Ltd.

Youd, T. L. (2001). Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils. ASCE Journal of Geotechnical and Geoenvironmental Engineering, 127(10), 817-833.

Zhang, G., Robertson, P. K., & Brachman, R. (2002). Estimating Liquefaction Induced Ground Settlements from the CPT. 39, 1168-1180.

Zhang, G., Robertson, P. K., & Brachman, R. W. (2004, August). Estimating Liquefaction-Induced Lateral Displacements using the Standard Penetration Test of Cone Penetration Test. ASCE Journal of Geotechnical and Geoenvironmental Engineering, 861-871.

We also acknowledge the New Zealand GeoNet project and its sponsors EQC, GNS Science and LINZ, for providing data used in this report.



APPENDIX 1: NZGD Logs



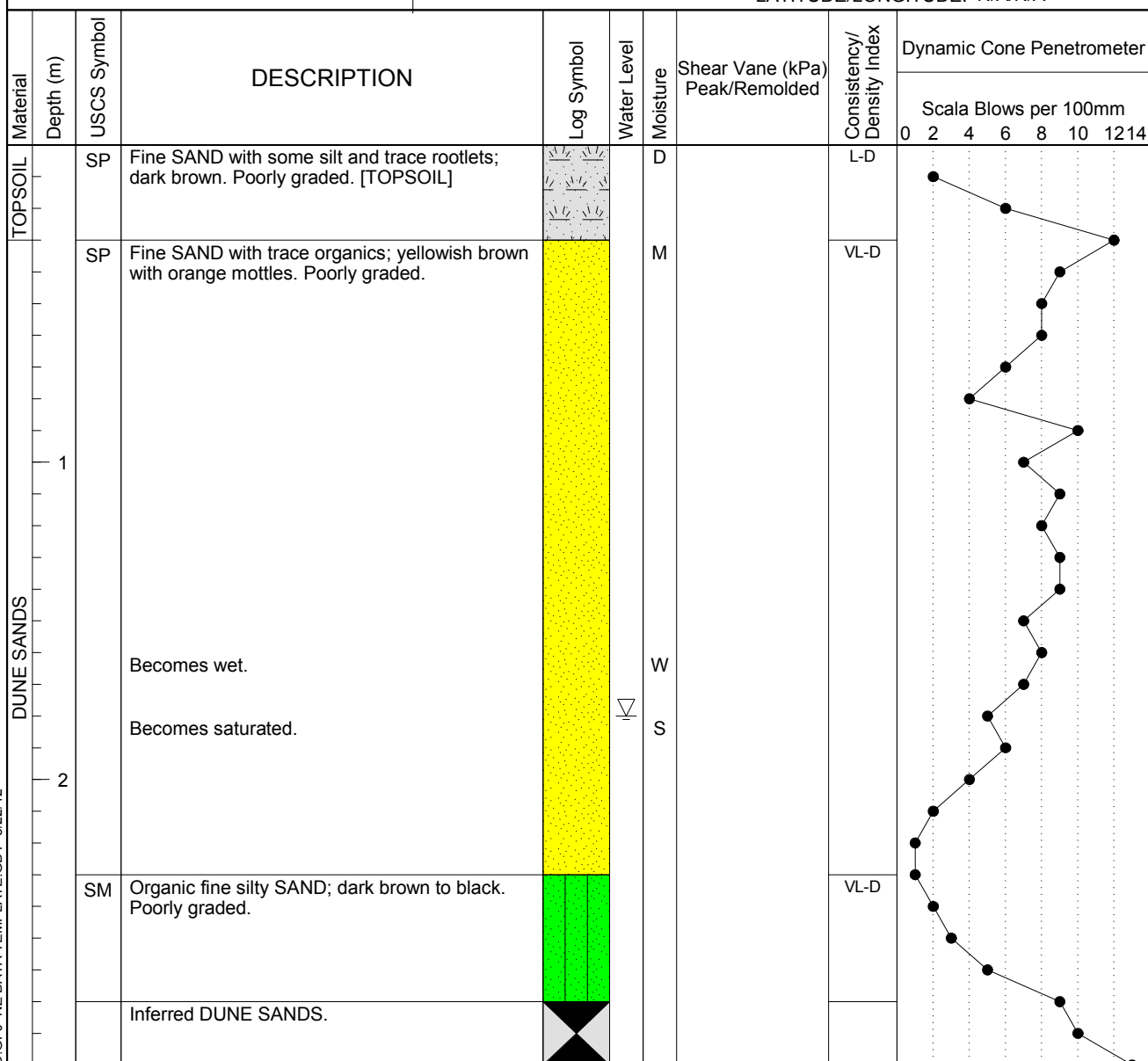
LOG OF BORING HA01

Southern Response

Lot 413 Pegasus Main Street
Pegasus
Client Ref.:D3268393

GEOSCIENCE REF.: 11245
DATE: 17/5/2012
HOLE DEPTH: 2.9 m
HOLE DIAMETER: 50 mm

LOGGED BY: EG/AN
REVIEWED BY: LF
DRILLING METHOD: Hand auger
LATITUDE/LONGITUDE: N/A/N/A



EOH: 2.9
Termination: Practical refusal
Hand auger met practical refusal at 2.7 m depth.
Scala Penetrometer met practical refusal at 2.9 m depth.
Groundwater encountered at 1.8 m depth.
Scala Penetrometer inferred at 2.0 m depth.

LOG-GEOSCIENCE HAND AUGER LOT 413 PEGASUS MAIN ROAD.GPJ NZ DATA TEMPLATE.GDT 5/22/12



LOG OF BORING HA02

Southern Response

Lot 413 Pegasus Main Street
Pegasus
Client Ref.:D3268393

GEOSCIENCE REF.: 11245
DATE: 17/5/2012
HOLE DEPTH: 2.9 m
HOLE DIAMETER: 50 mm

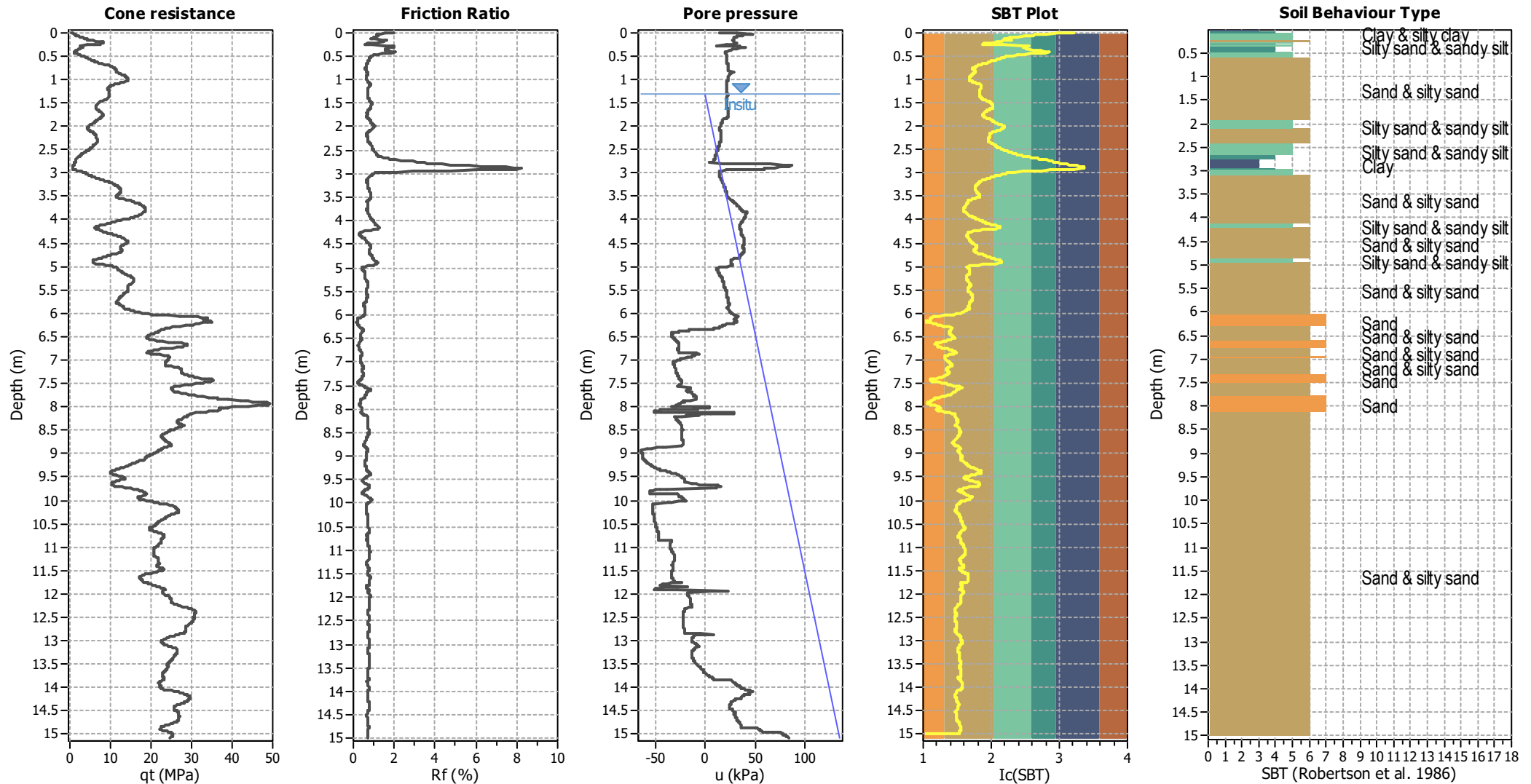
LOGGED BY: EG/AN
REVIEWED BY: LF
DRILLING METHOD: Hand auger
LATITUDE/LONGITUDE: N/A/N/A

Material	Depth (m)	USCS Symbol	DESCRIPTION	Log Symbol	Water Level	Moisture	Shear Vane (kPa) Peak/Remolded	Consistency/ Density Index	Dynamic Cone Penetrometer						
									Scala Blows per 100mm						
									0	2	4	6	8	10	12 14
TOPSOIL		ML	Fine sandy SILT with trace rootlets; dark brown. [TOPSOIL]			M		S-V St							
		SP	Fine SAND with trace organics; grey with orange mottles. Poorly graded.					VL-D							
DUNE SANDS	1														
		SP	Organic fine SAND; dark grey with minor orange mottling. Poorly graded.			S		VL-L							
	2														
		ML	Sandy SILT; dark brown.					H							
			Inferred DUNE SANDS.												

EOH: 2.9
Termination: Practical refusal
Hand auger met practical refusal at 2.7 m depth.
Scala Penetrometer met practical refusal at 2.9 m depth.
Groundwater encountered at 1.6 m depth.
Scala Penetrometer inferred from 2.0 to 2.1 m depth.

LOG-GEOSCIENCE HAND AUGER LOT 413 PEGASUS MAIN ROAD.GPJ NZ DATA TEMPLATE.GDT 5/22/12

CPT basic interpretation plots



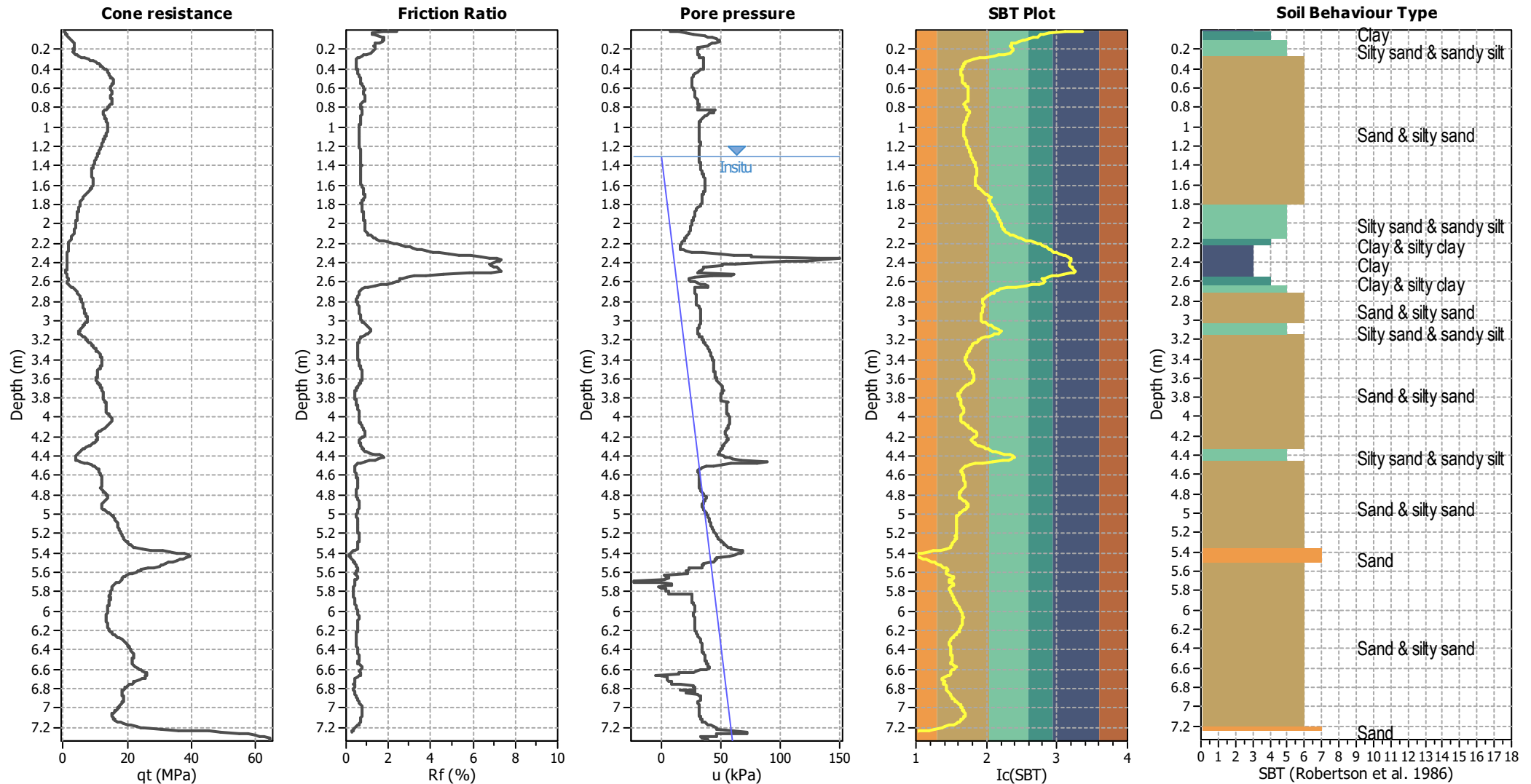
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.30 m	Fill height:	N/A	Limit depth:	10.00 m

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

CPT basic interpretation plots



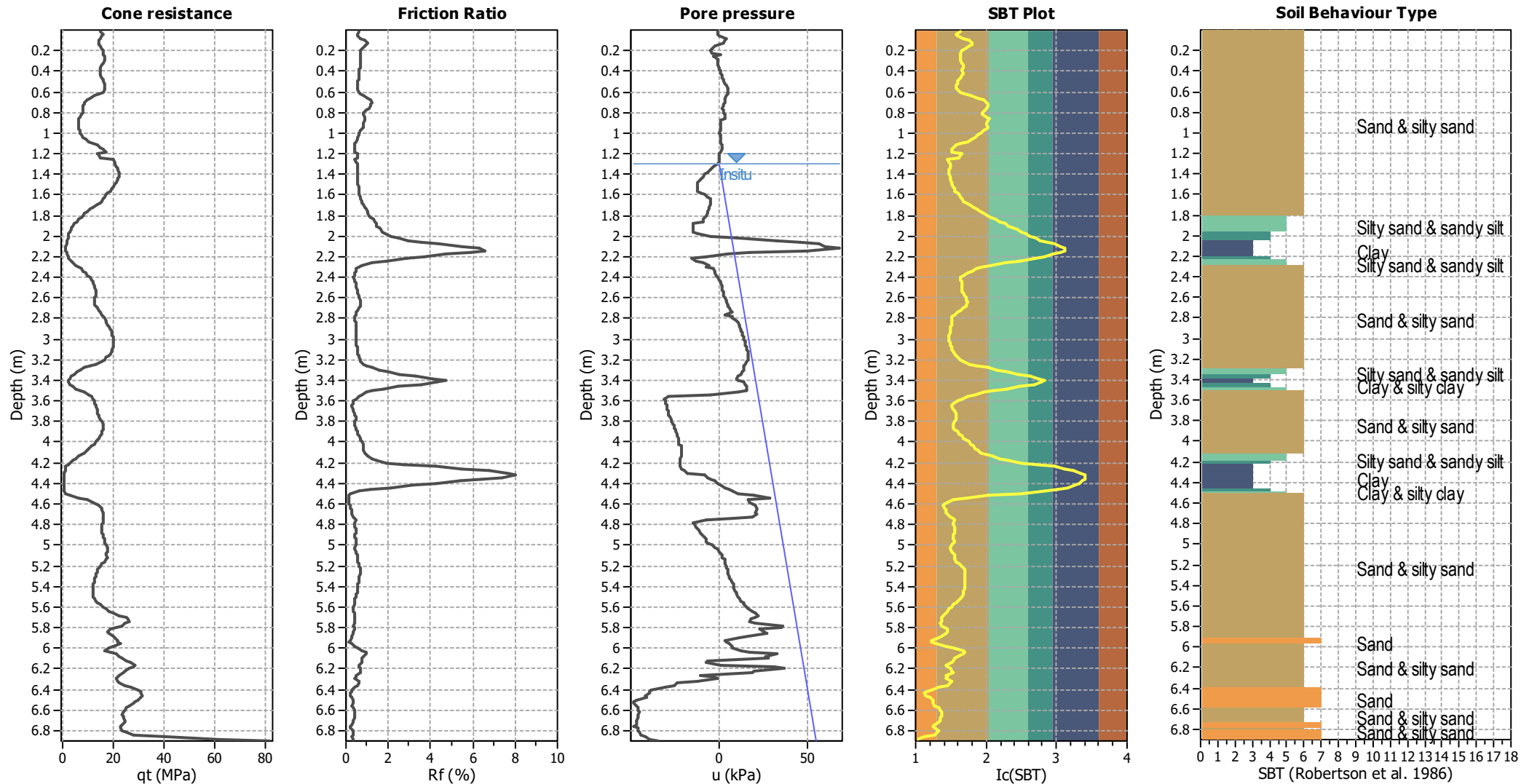
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.30 m	Fill height:	N/A	Limit depth:	10.00 m

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

CPT basic interpretation plots



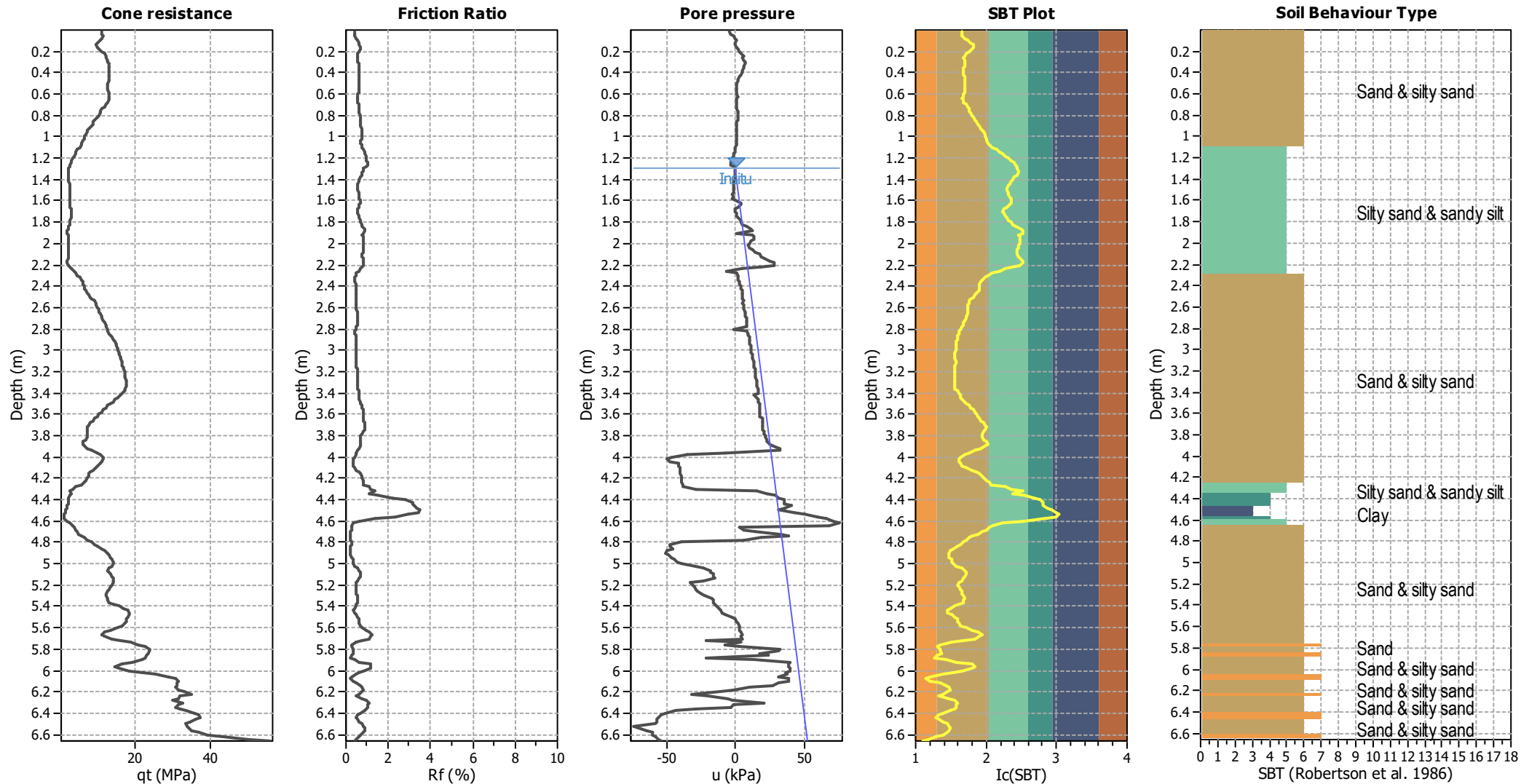
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.30 m	Fill height:	N/A	Limit depth:	10.00 m

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_g applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.30 m	Fill height:	N/A	Limit depth:	10.00 m

SBT legend

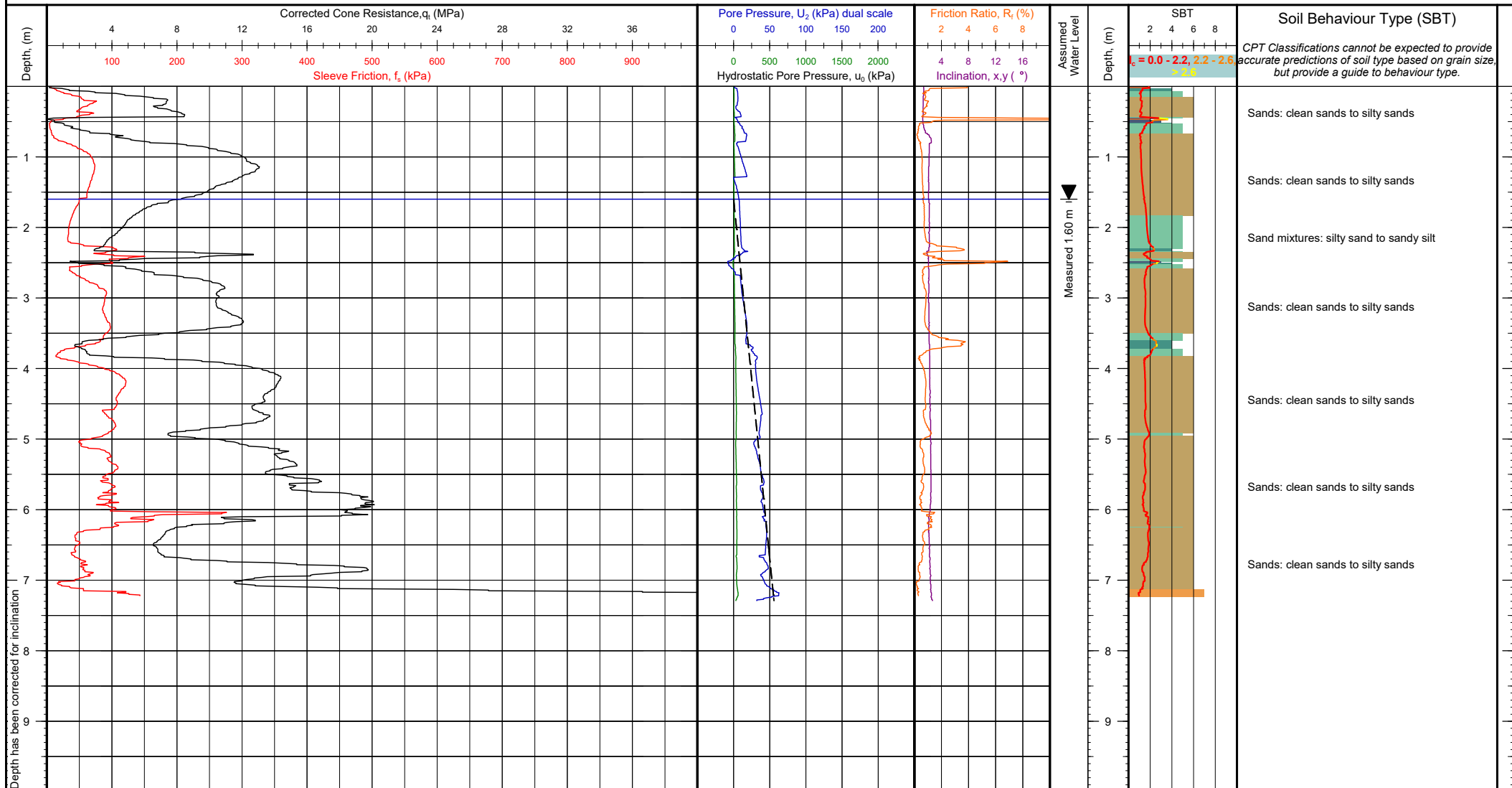
1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained



APPENDIX 2: CPT Logs



CONE PENETRATION TEST (CPT) LOG

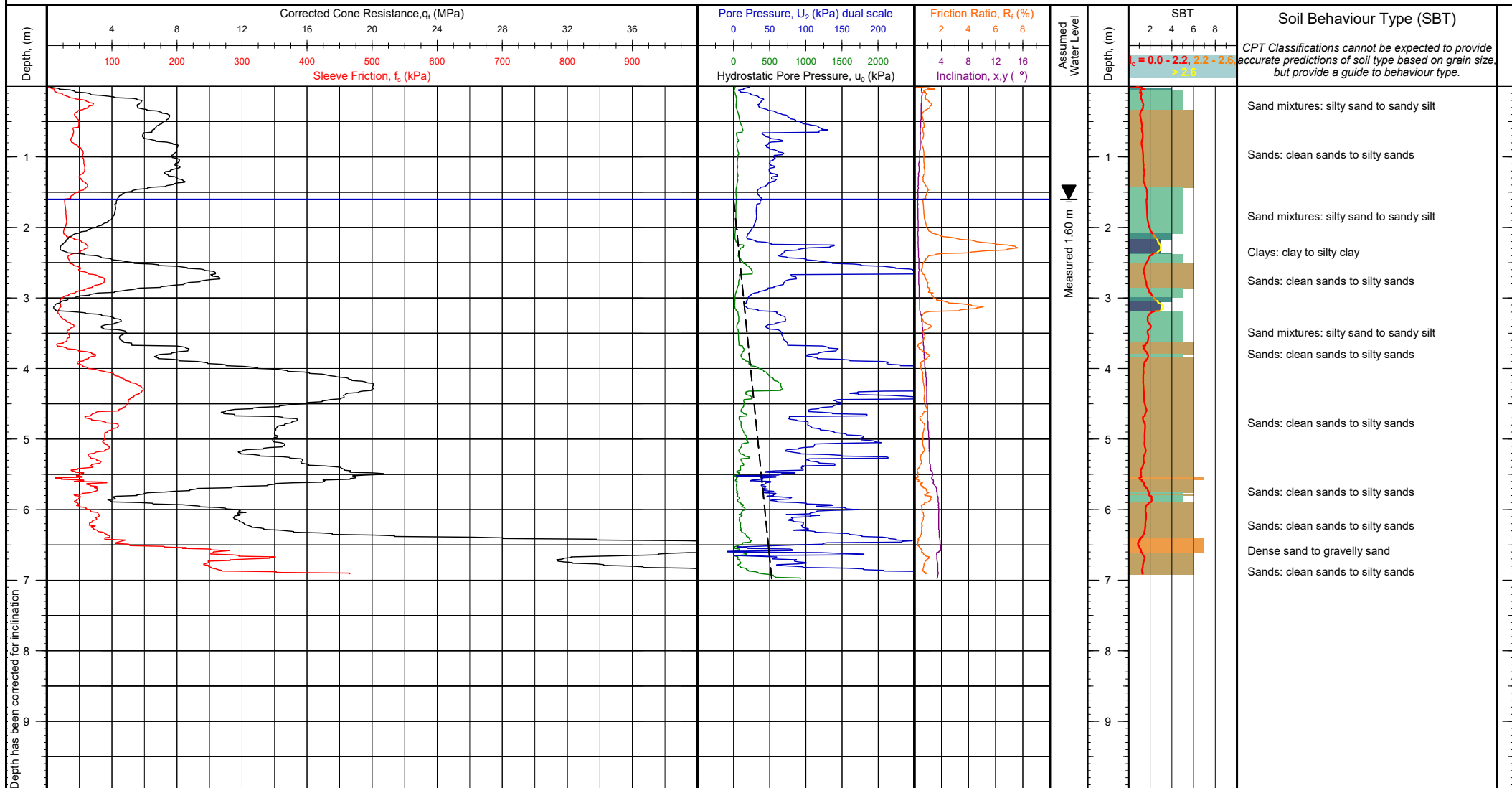


Client: Engeo Project: 29 Pegasus Main Street Location: Pegasus Engineer: Dai Kiddle Contractor: Ground Investigation Ltd	Operator: John Cresswell Cone Ref: MKJ208 Cone Type: 10cm ² Compression Area Ratio: 0.78 Filter Type: u_2	NZTM 2000 N, E (m): 5203943.81, 1575529.62 WGS84 (deg): -43.316945, 172.698225 Location Method: Handheld GPS Surveyor: Termination Reason: High cone end resistance	Elevation (m): Unknown Date of Test: 8/09/2021 Depth (m): 7.29 Pre Drill (m): N/A	Client Reference:
				Test Number: CPT-01 G.I. Job Ref: 211253

Comments:



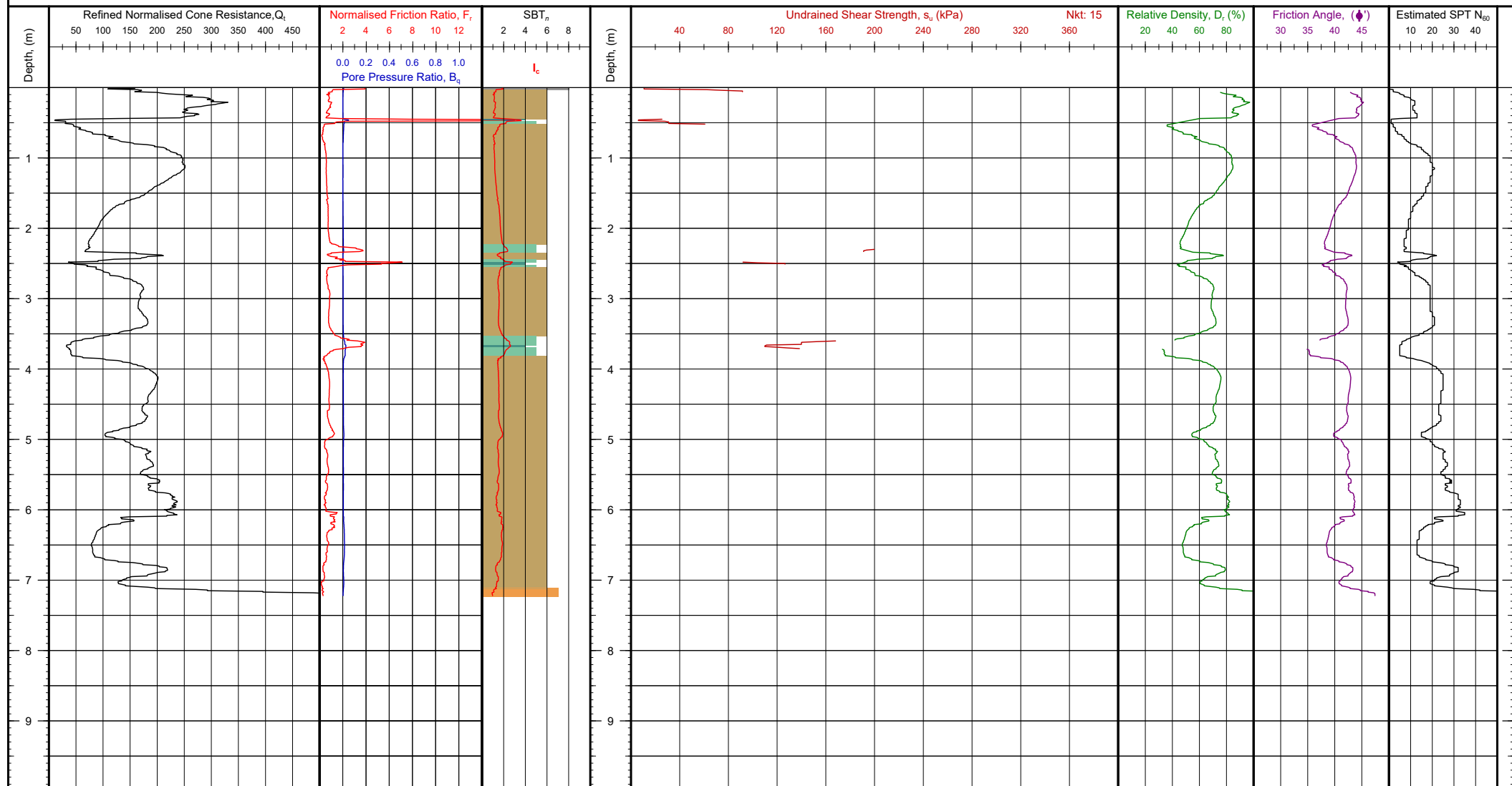
CONE PENETRATION TEST (CPT) LOG



Client: Engeo Project: 29 Pegasus Main Street Location: Pegasus Engineer: Dai Kiddle Contractor: Ground Investigation Ltd	Operator: John Cresswell Cone Ref: MKJ311 Cone Type: 10cm ² Compression Area Ratio: 0.79 Filter Type: u_2	NZTM 2000 N, E (m): 5203964.15, 1575534.33 WGS84 (deg): -43.316762, 172.698284 Location Method: Handheld GPS Surveyor: Termination Reason: High cone end resistance	Elevation (m): Unknown Date of Test: 8/09/2021 Depth (m): 6.98 Pre Drill (m): N/A	Client Reference:
				Test Number: CPT-02 G.I. Job Ref: 211253

Comments:

CPT PARAMETER LOG



Client: Engeo
Project: 29 Pegasus Main Street
Location: Pegasus
Engineer: Dai Kiddle
Contractor: Ground Investigation Ltd

Soil Behaviour Type SBT_n - Robertson et al. 1990

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine grained	6	Sands: clean sands to silty sands
2	Organic: Organic clay/silt, peat	7	Dense sand to gravelly sand
3	Clay: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff silt/clay

Notes and Limitations:

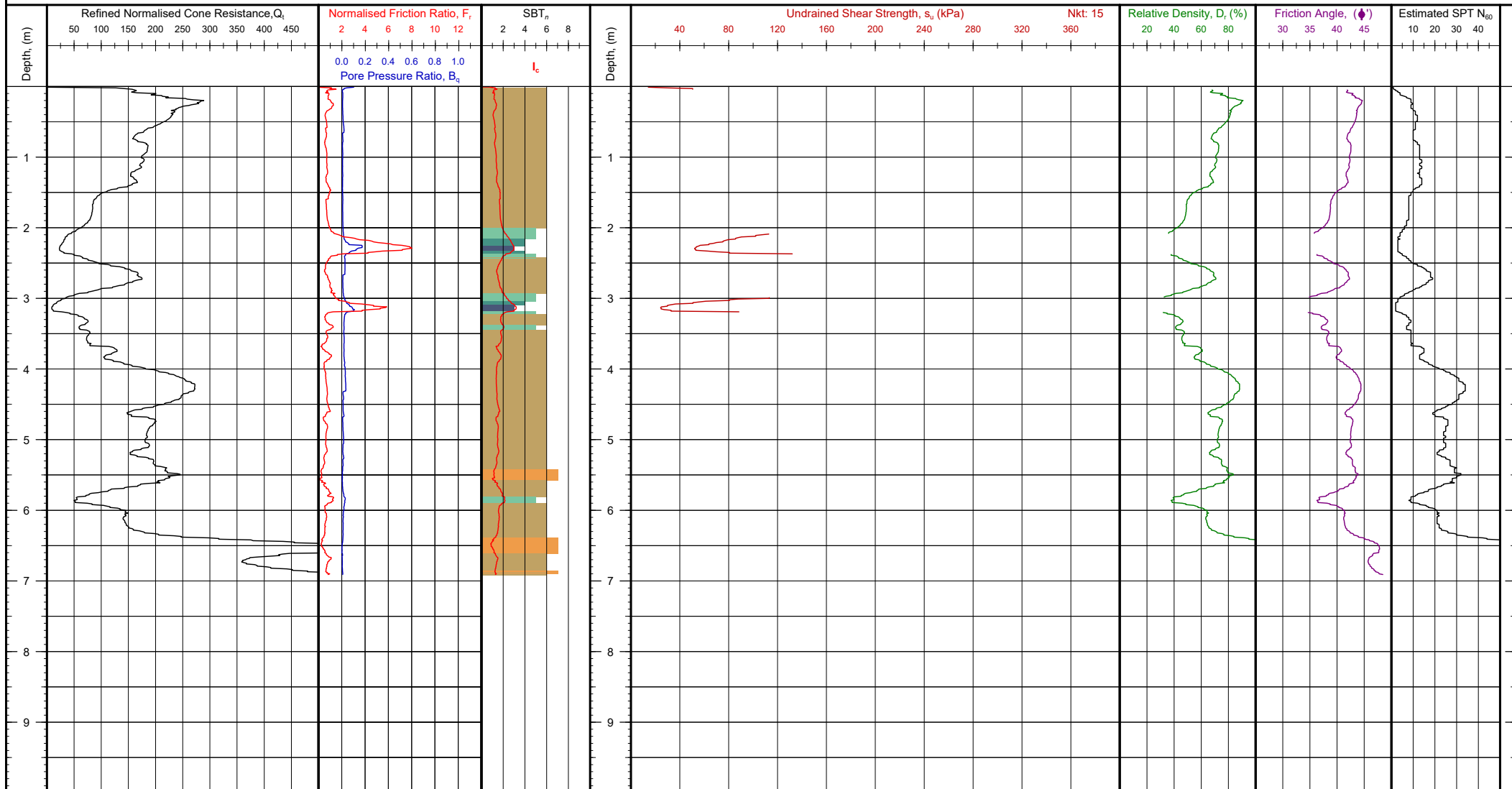
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Client Reference:

Test Number: CPT-01

G.I. Job Ref: 211253

CPT PARAMETER LOG



Client: Engeo
Project: 29 Pegasus Main Street
Location: Pegasus
Engineer: Dai Kiddle
Contractor: Ground Investigation Ltd

Soil Behaviour Type SBT_n - Robertson et al. 1990

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine grained	6	Sands: clean sands to silty sands
2	Organic: Organic clay/silt, peat	7	Dense sand to gravelly sand
3	Clay: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff silt/clay

Notes and Limitations:

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Client Reference:

Test Number: CPT-02

G.I. Job Ref: 211253



CPT ZEROS AND DRIFT

**GROUND
INVESTIGATION**

G.I. Job Ref: 211253

Cone Reference	CPT Name	Push Number	Tip Resistance			Local Friction			Pore Pressure		
			Initial (MPa)	Final (MPa)	Difference (kPa)	Initial (MPa)	Final (MPa)	Difference (kPa)	Initial (MPa)	Final (MPa)	Difference (kPa)
MKJ208	CPT-01	1	16.076	16.143	67.4	0.2641	0.2626	-1.5	2.8206	2.8205	-0.1
MKJ311	CPT-02	1	20.286	20.369	83.4	0.2497	0.2503	0.6	3.0461	3.0440	-2.1

Client: Engeo
Project: 29 Pegasus Main Street

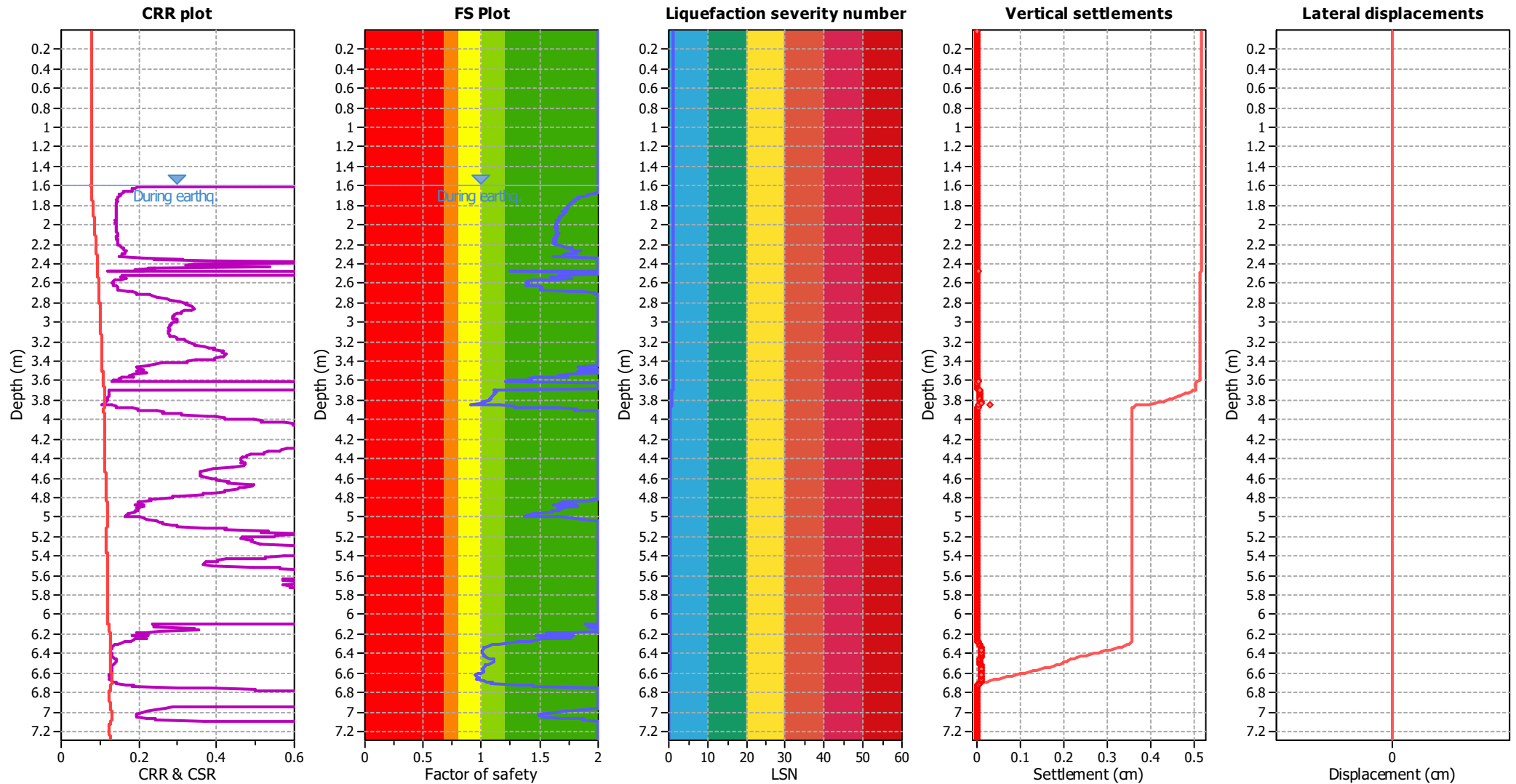
Location: Pegasus
Engineer: Dai Kiddle

Note: Zero difference colour-coded based on application classes following ISO 22476-1:2012. Blue indicates Class 1, green Class 2, orange Class 3 and red Class 4. Grey represents if a test is below Class 4.



APPENDIX 3: Liquefaction Analysis Results

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_g applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

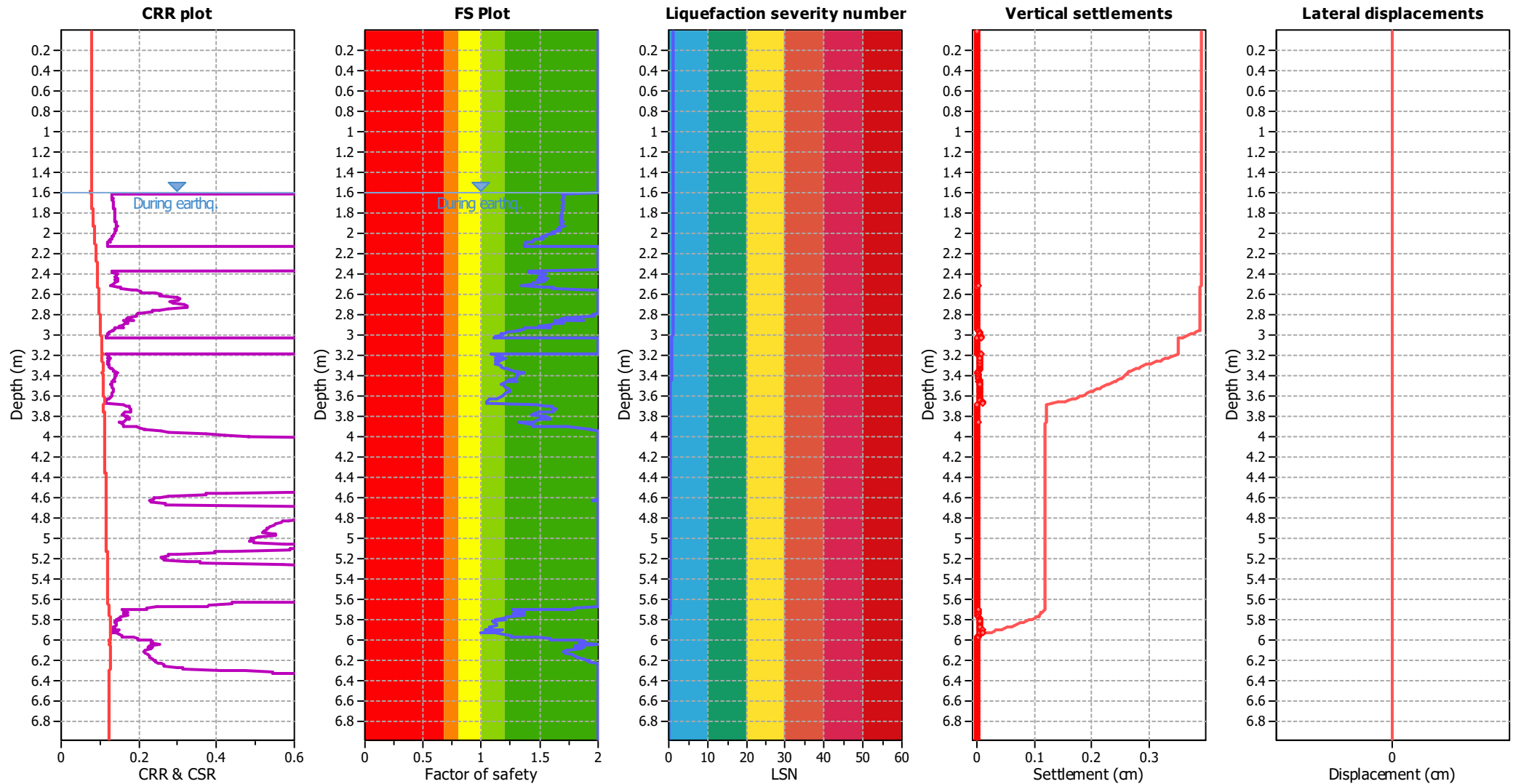
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Dark Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

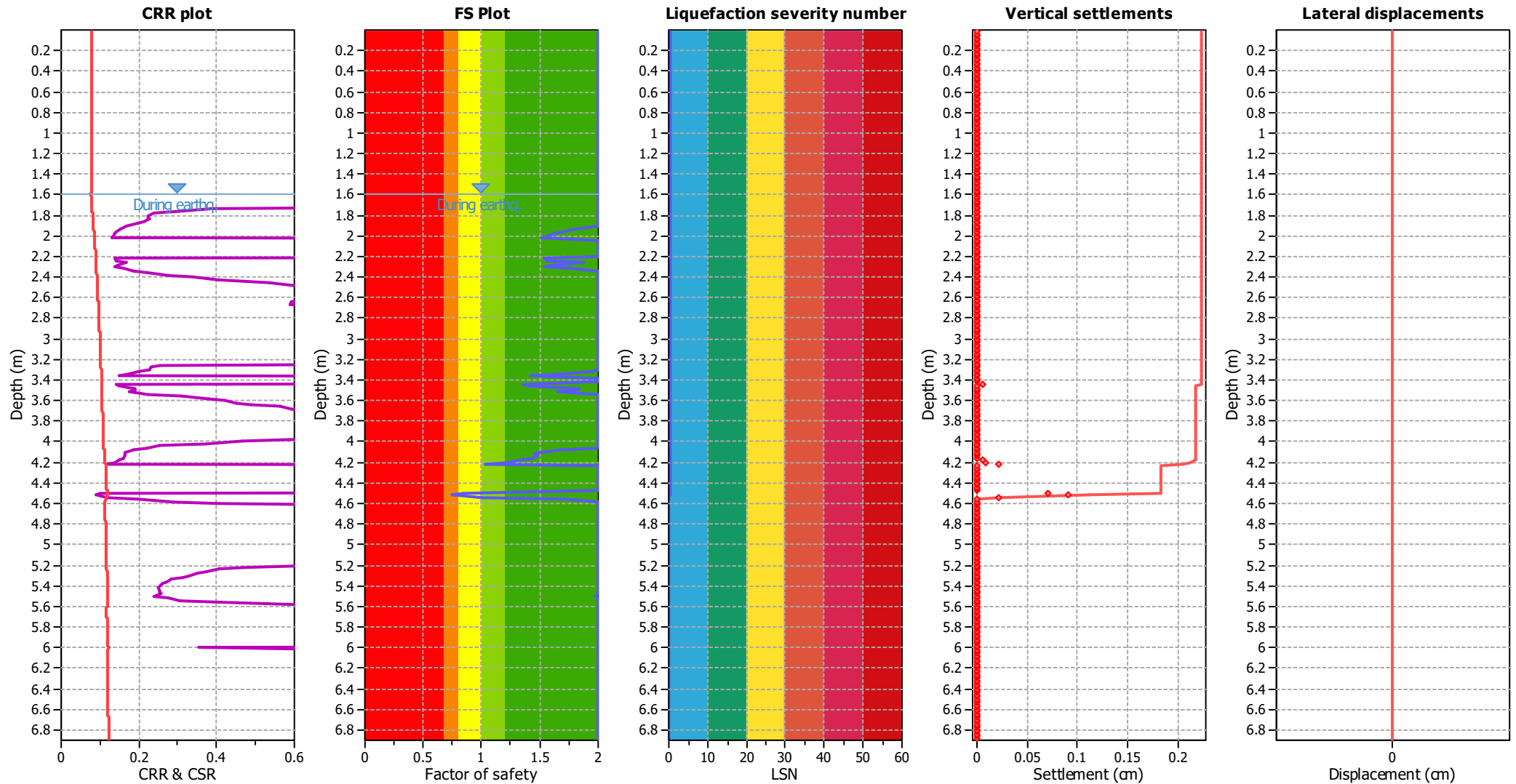
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Green	Moderate expression of liquefaction
Light Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

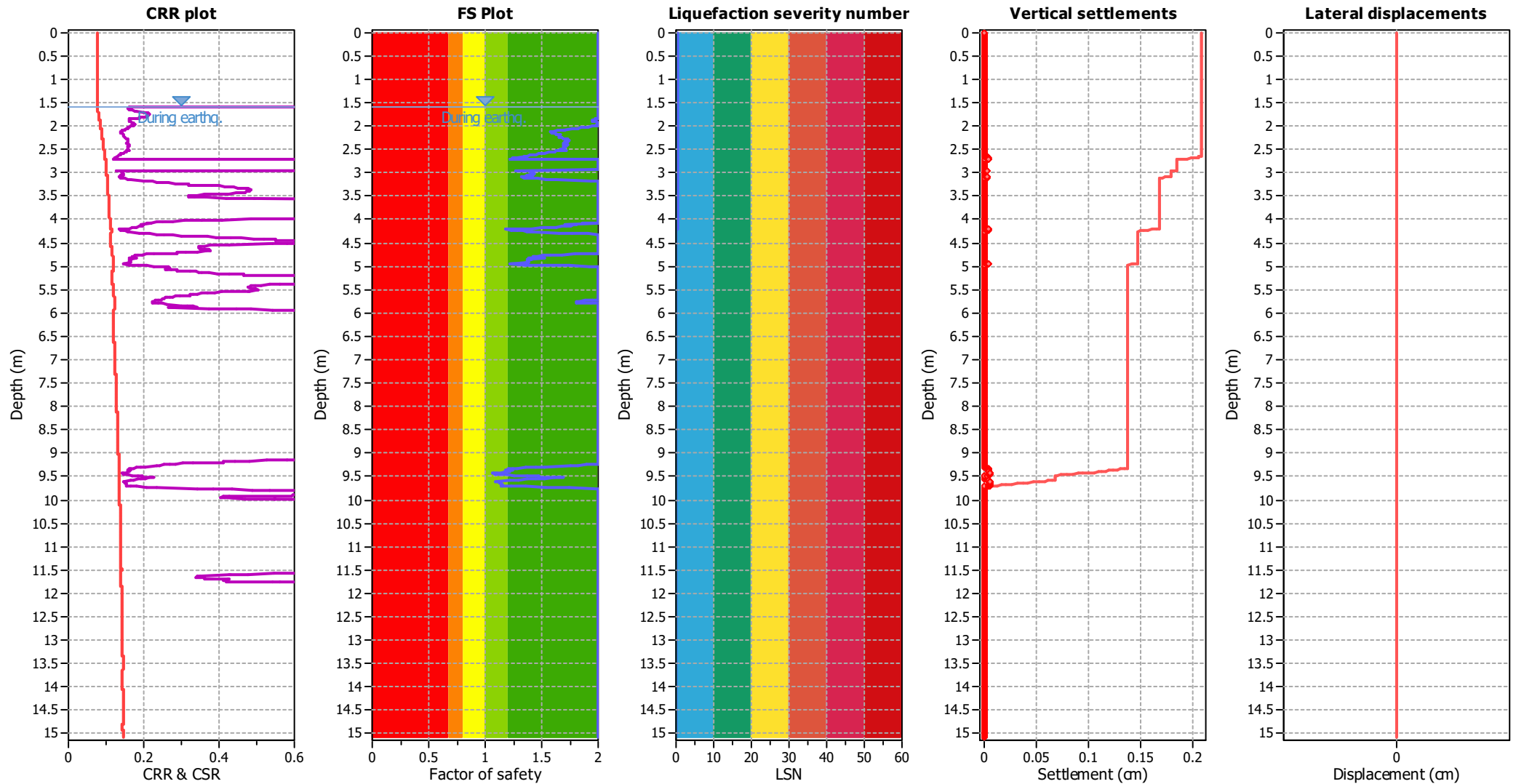
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Light Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

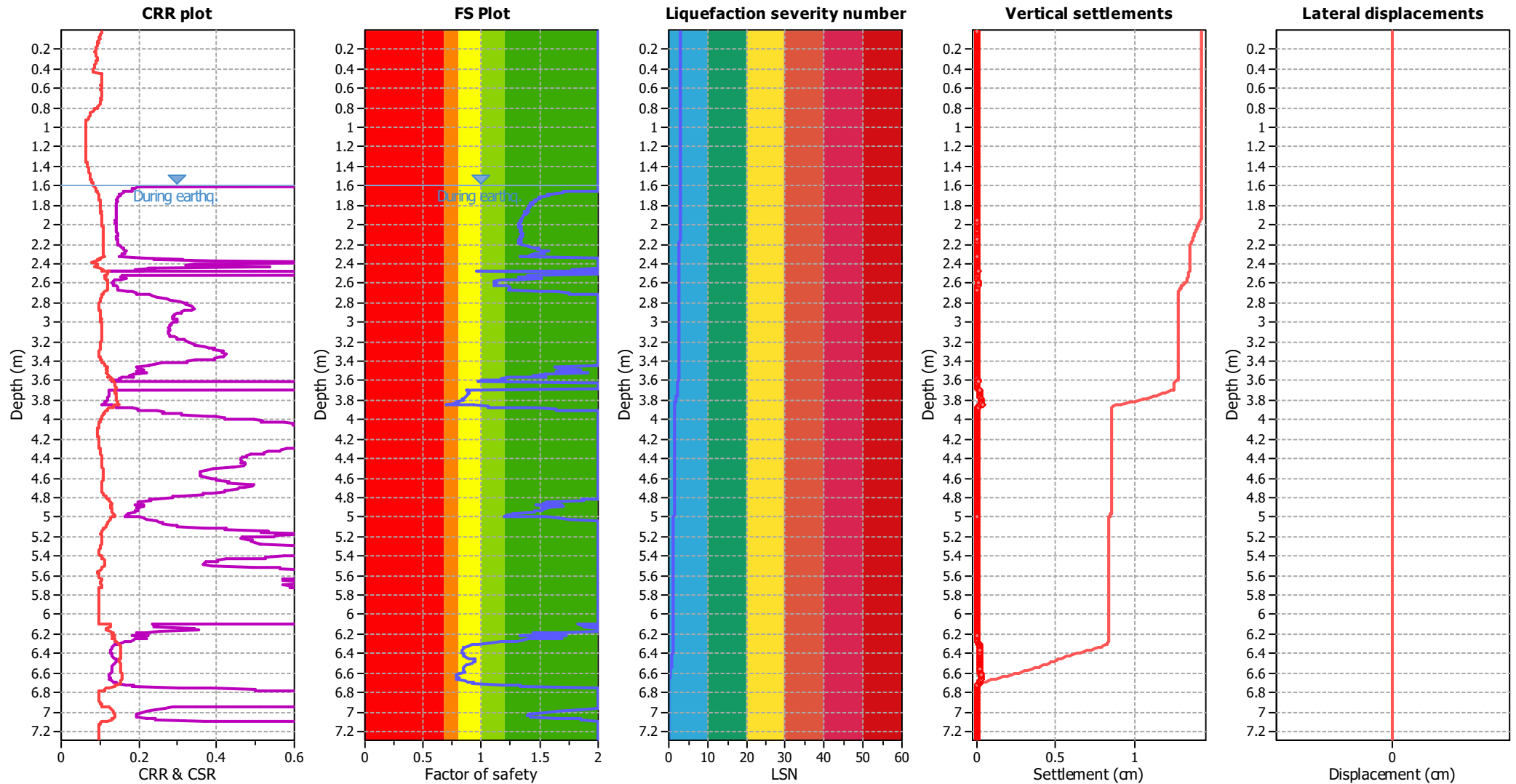
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Dark Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Light Green	Minor expression of liquefaction
Dark Green	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_g applied:	Yes
Earthquake magnitude M_w :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.19	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

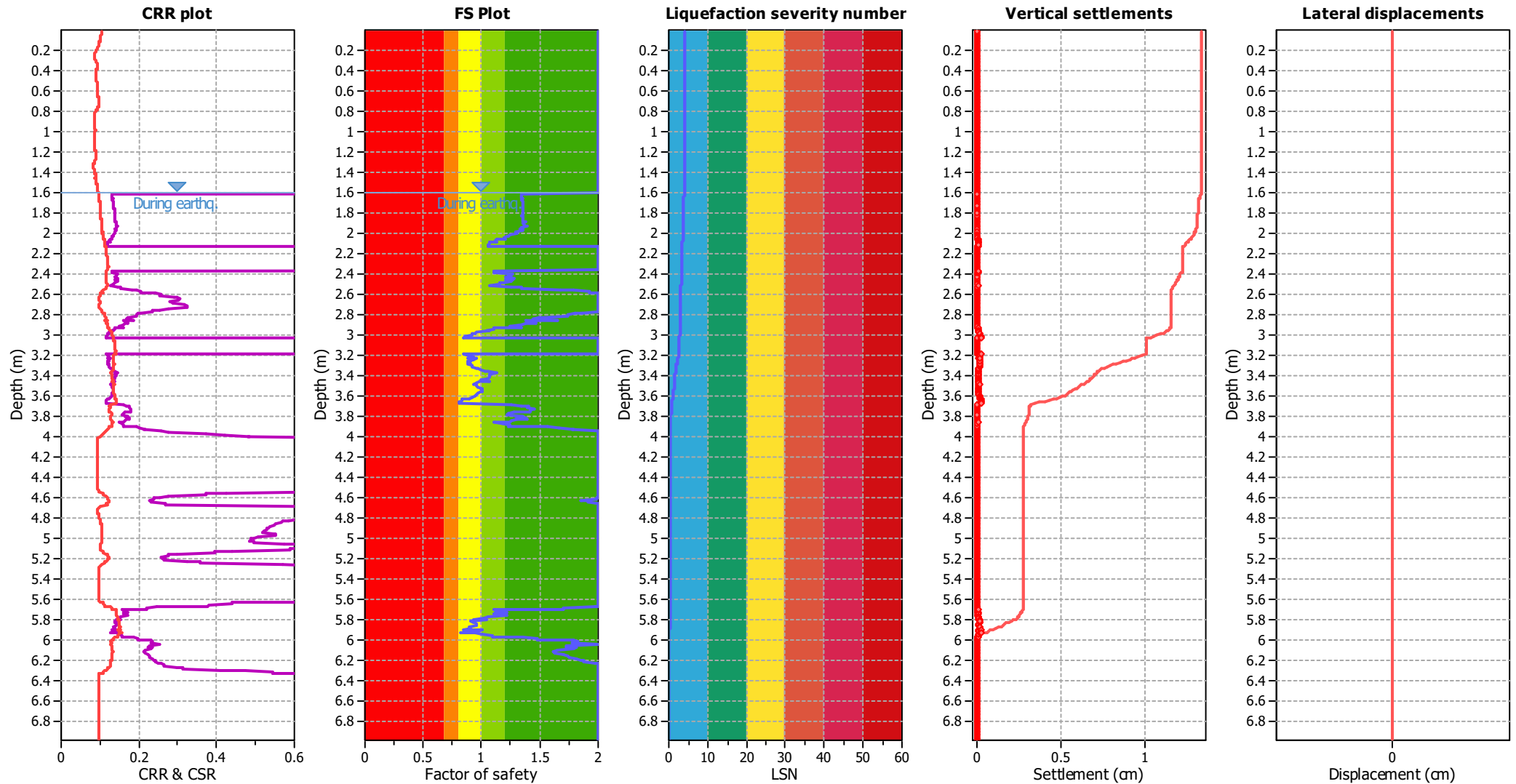
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Dark Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.19	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

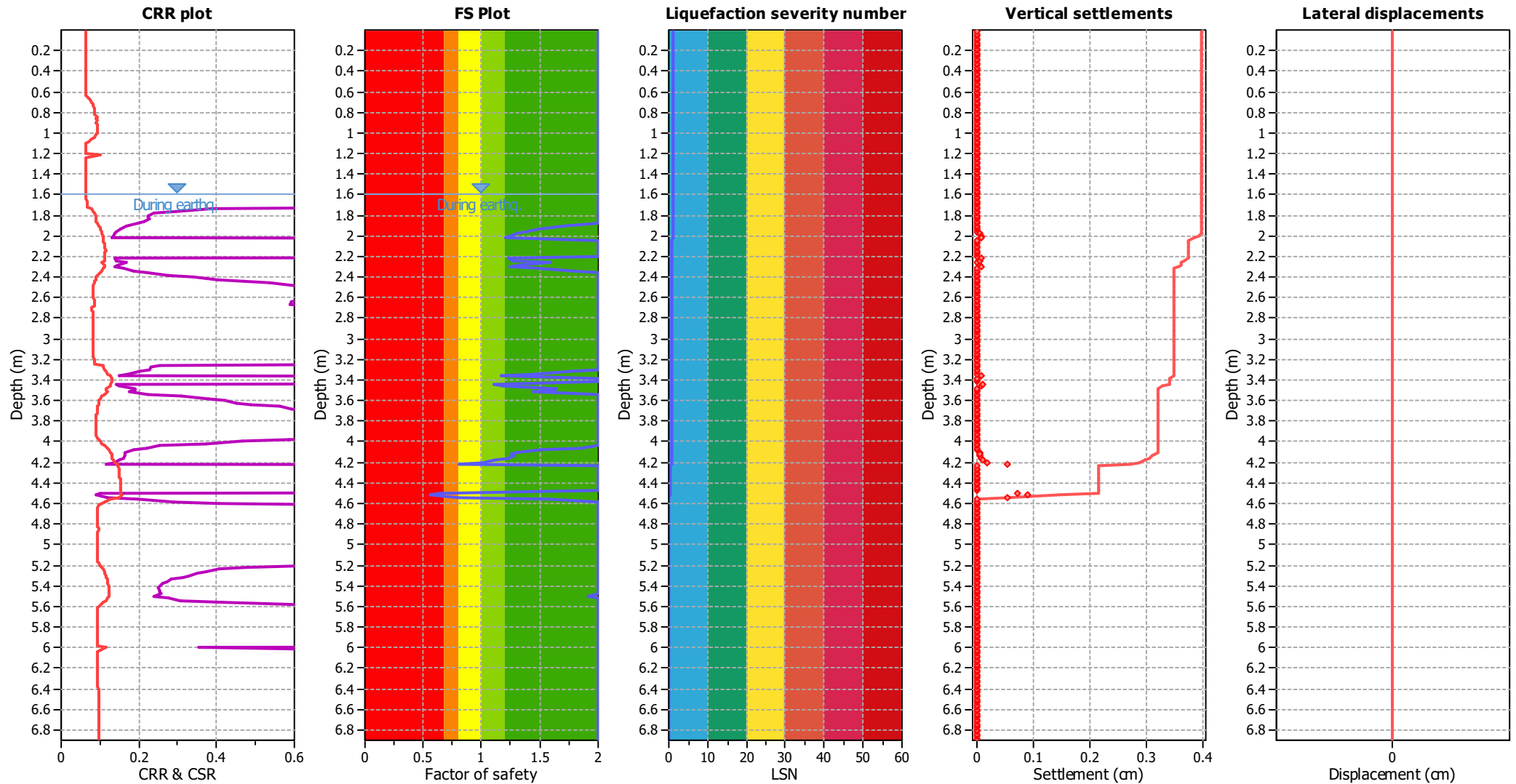
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Light Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.19	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

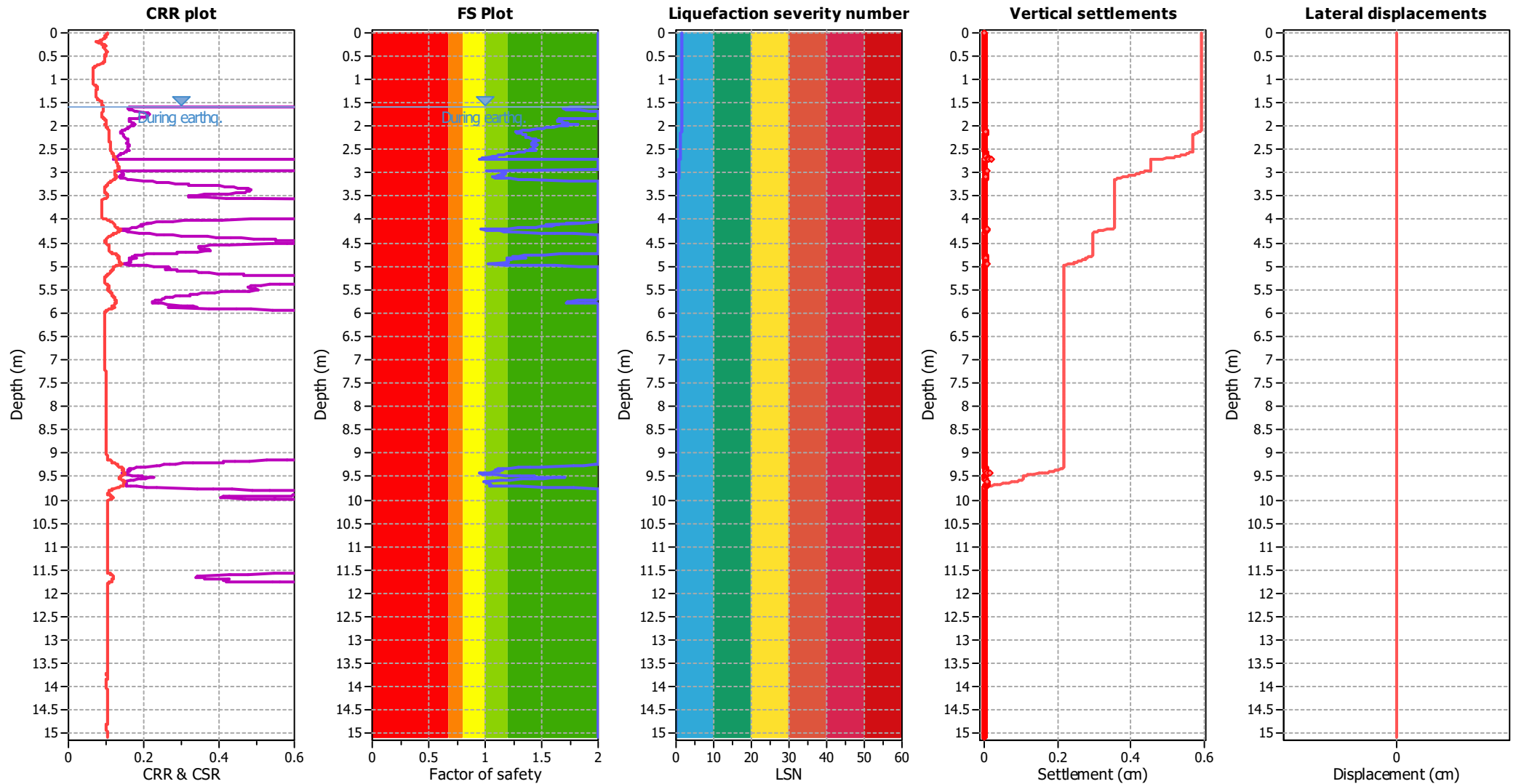
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Green	Moderate expression of liquefaction
Light Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.19	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

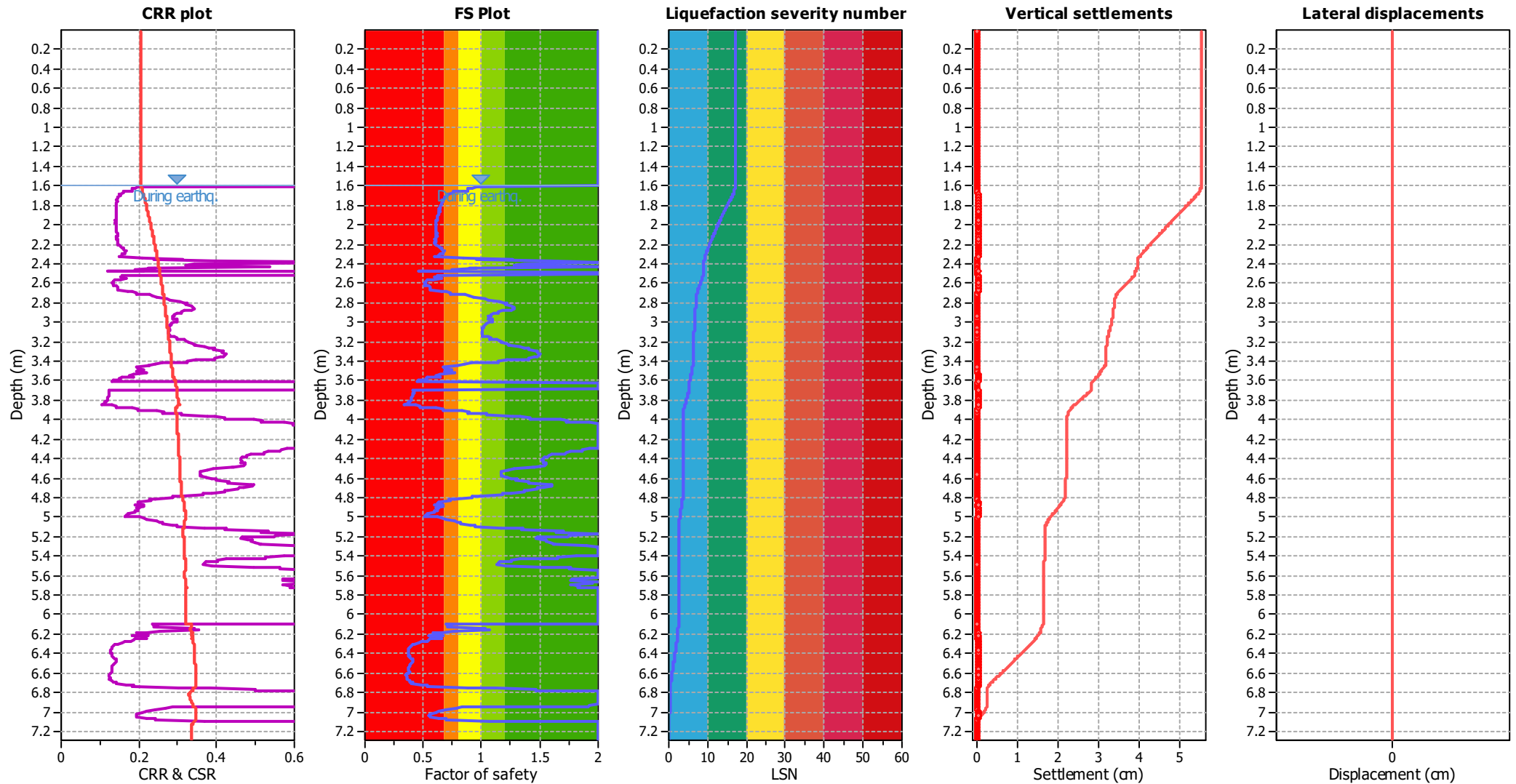
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Dark Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_g applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

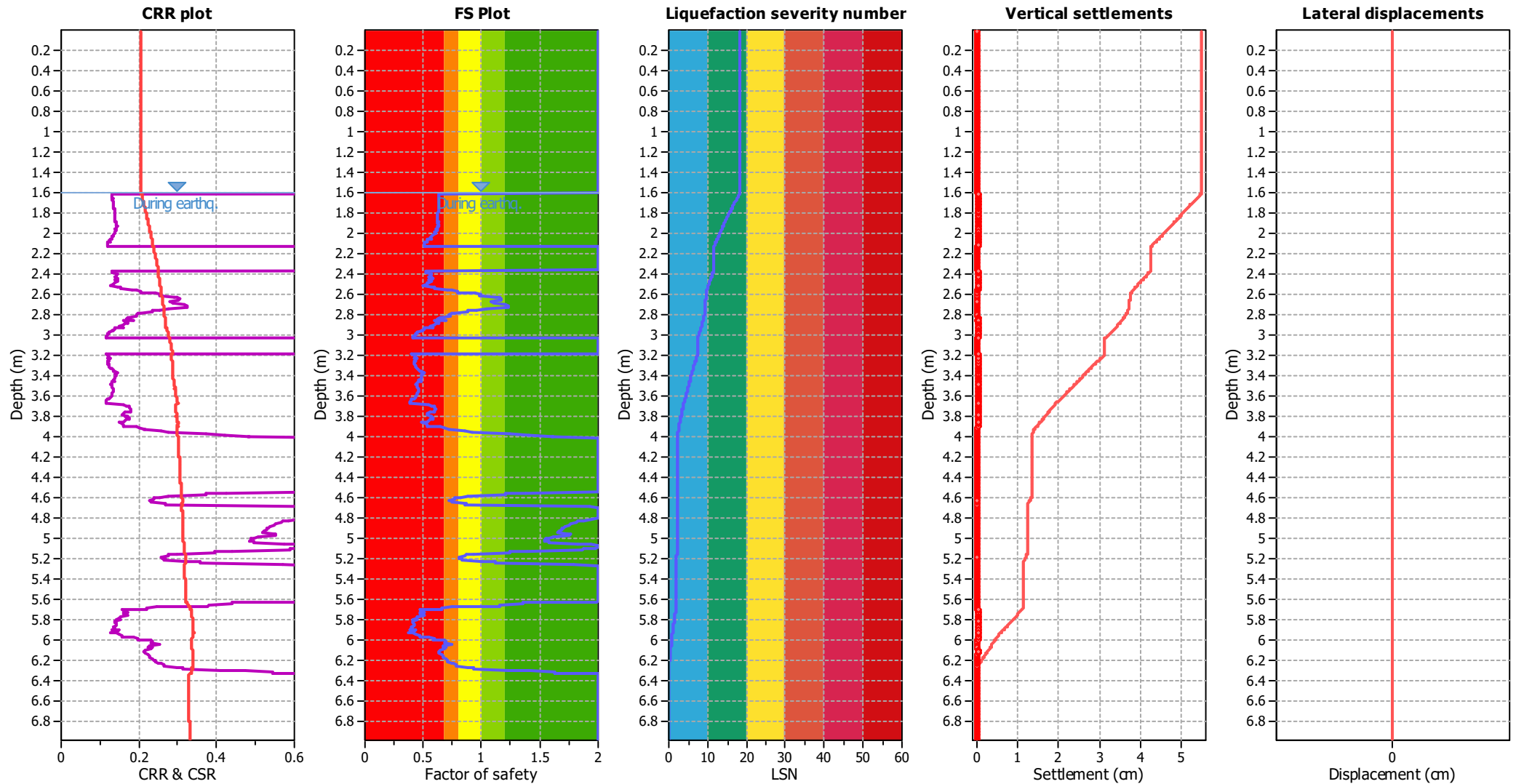
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Blue	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Green	Moderate expression of liquefaction
Blue	Minor expression of liquefaction
Light Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

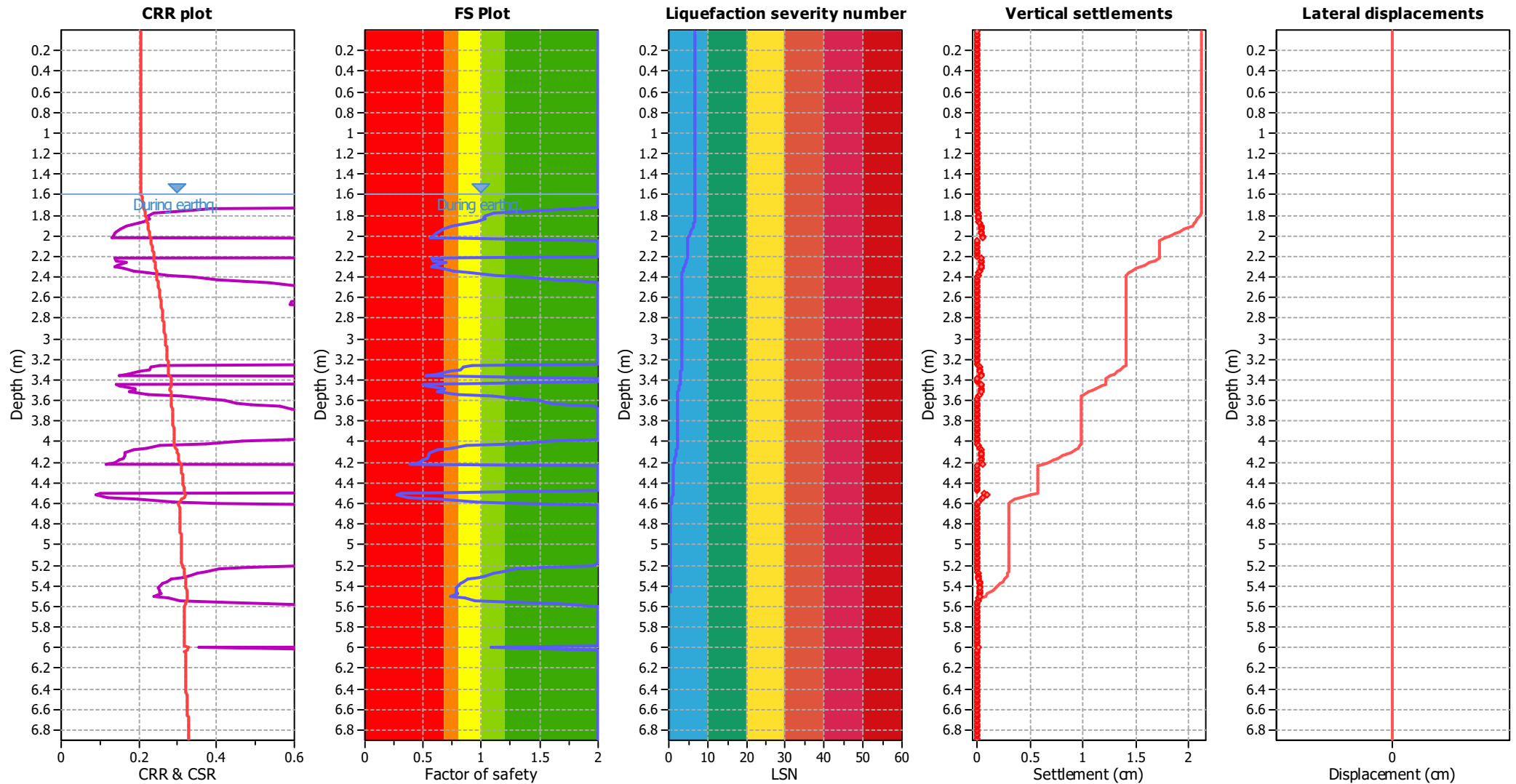
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Light Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _g applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

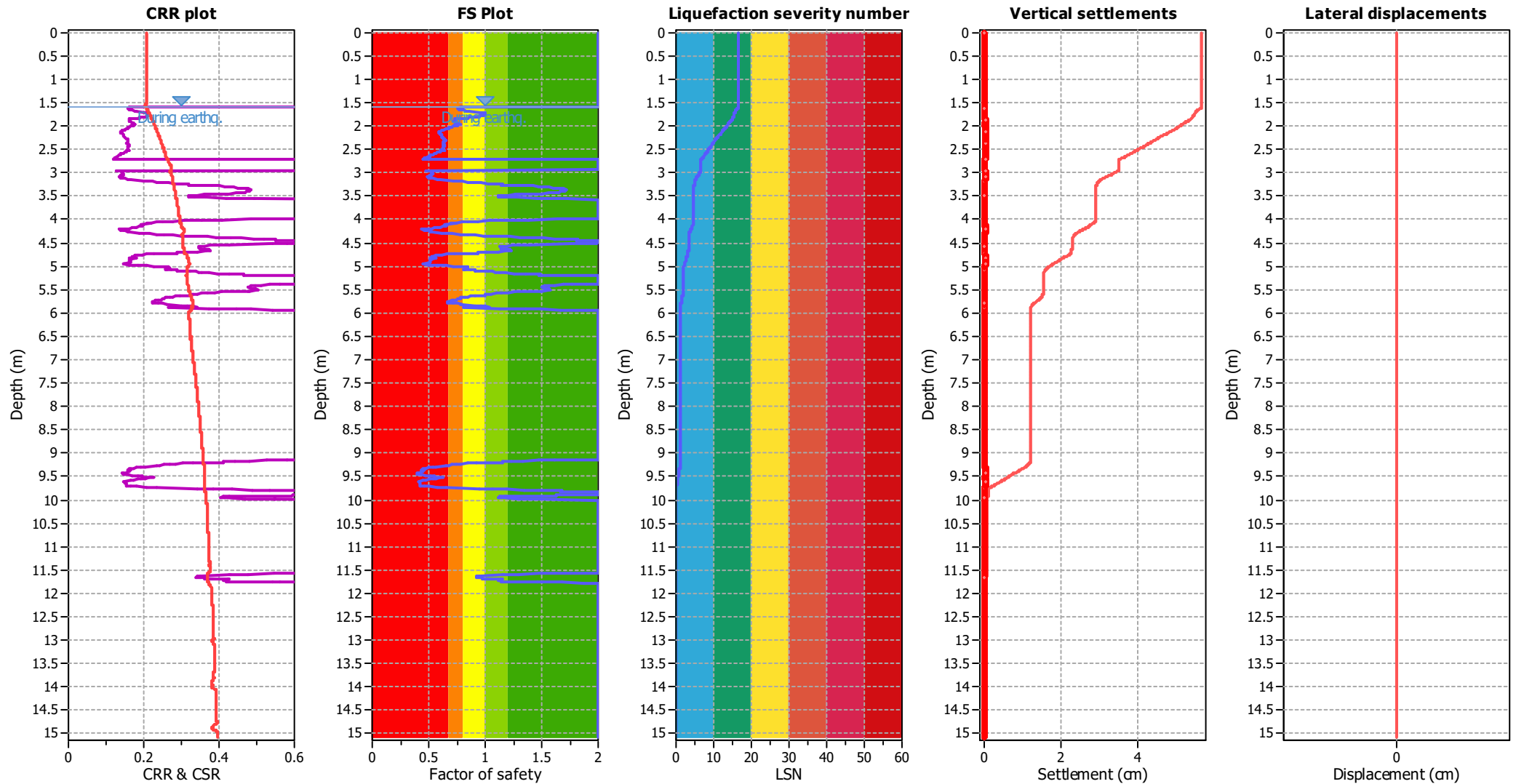
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

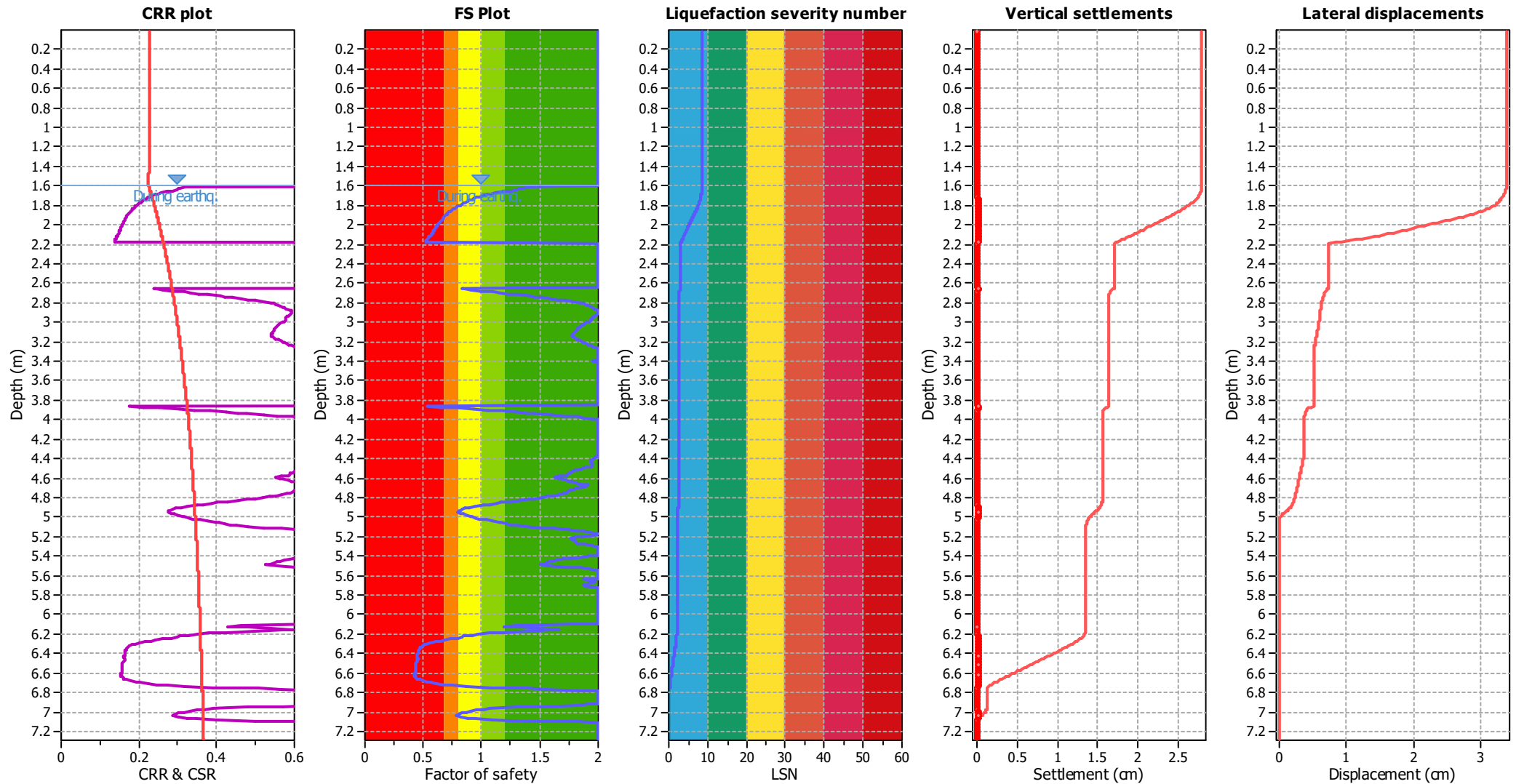
LSN color scheme

Red	Severe damage
Dark Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Light Green	Minor expression of liquefaction
Dark Green	Little to no expression of liquefaction



APPENDIX 4: Lateral Spread Analysis Results

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _s applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

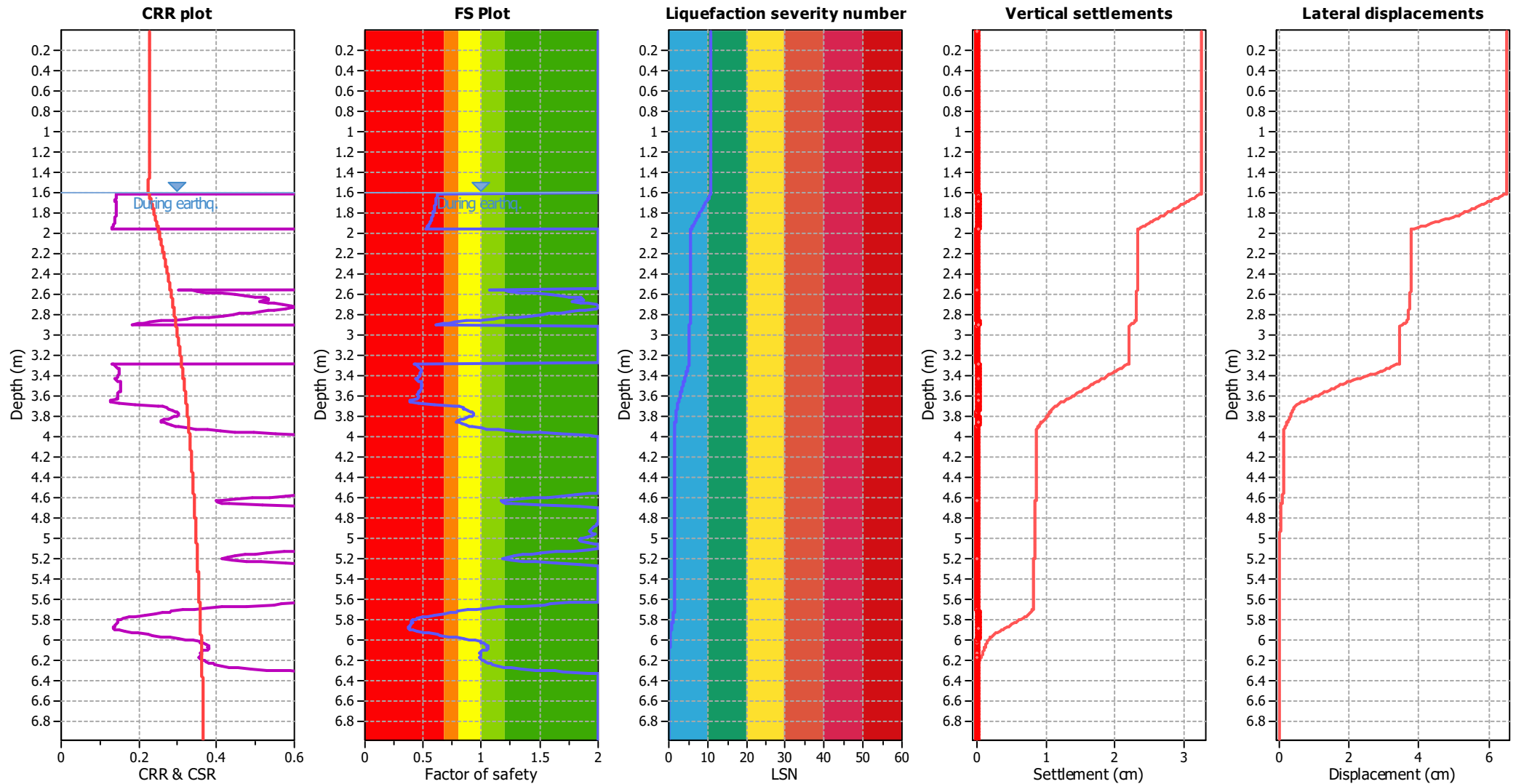
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Dark Red	Severe damage
Red	Major expression of liquefaction
Orange	Moderate to severe exp. of liquefaction
Yellow	Moderate expression of liquefaction
Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

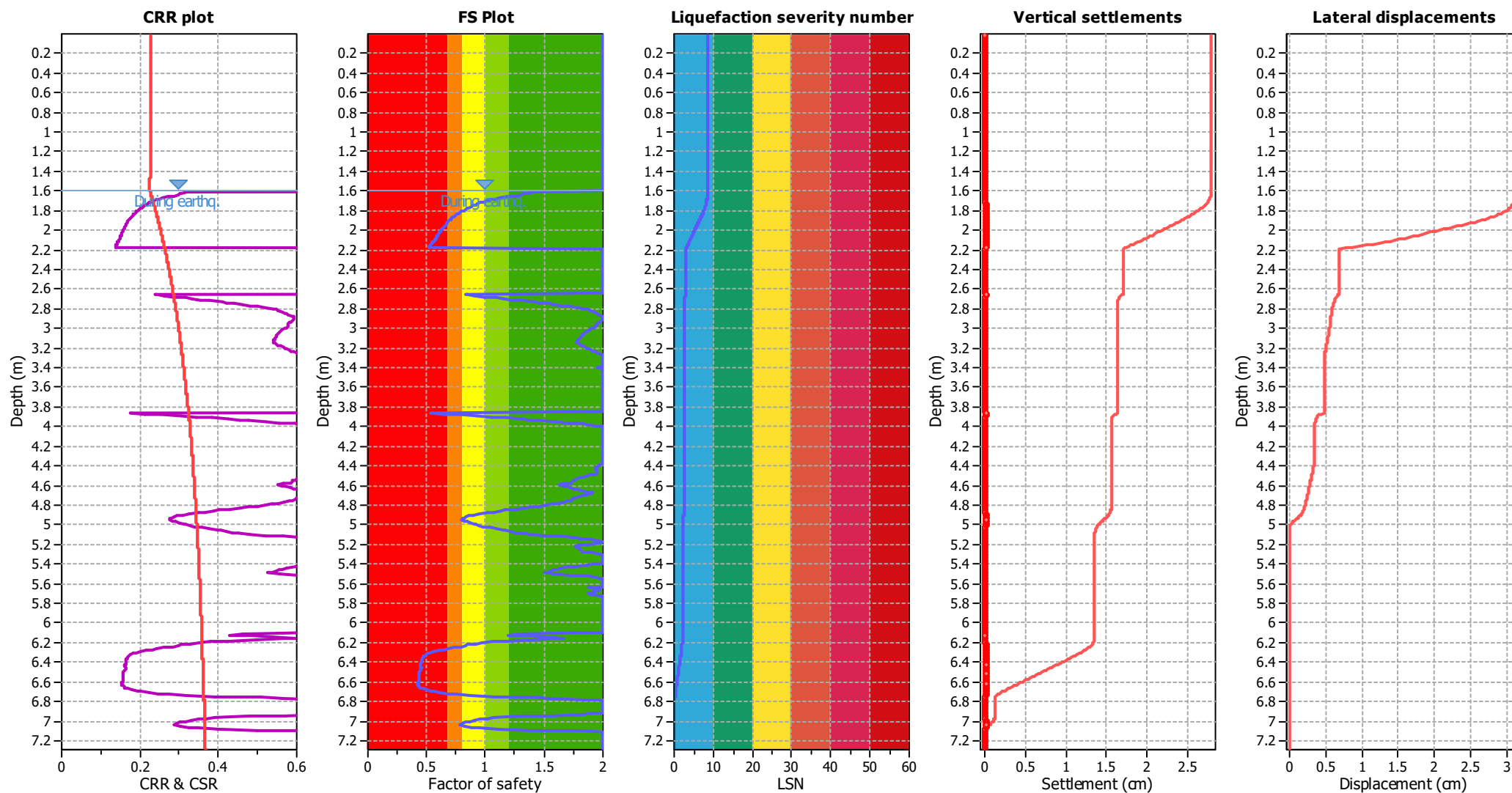
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Light Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _s applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

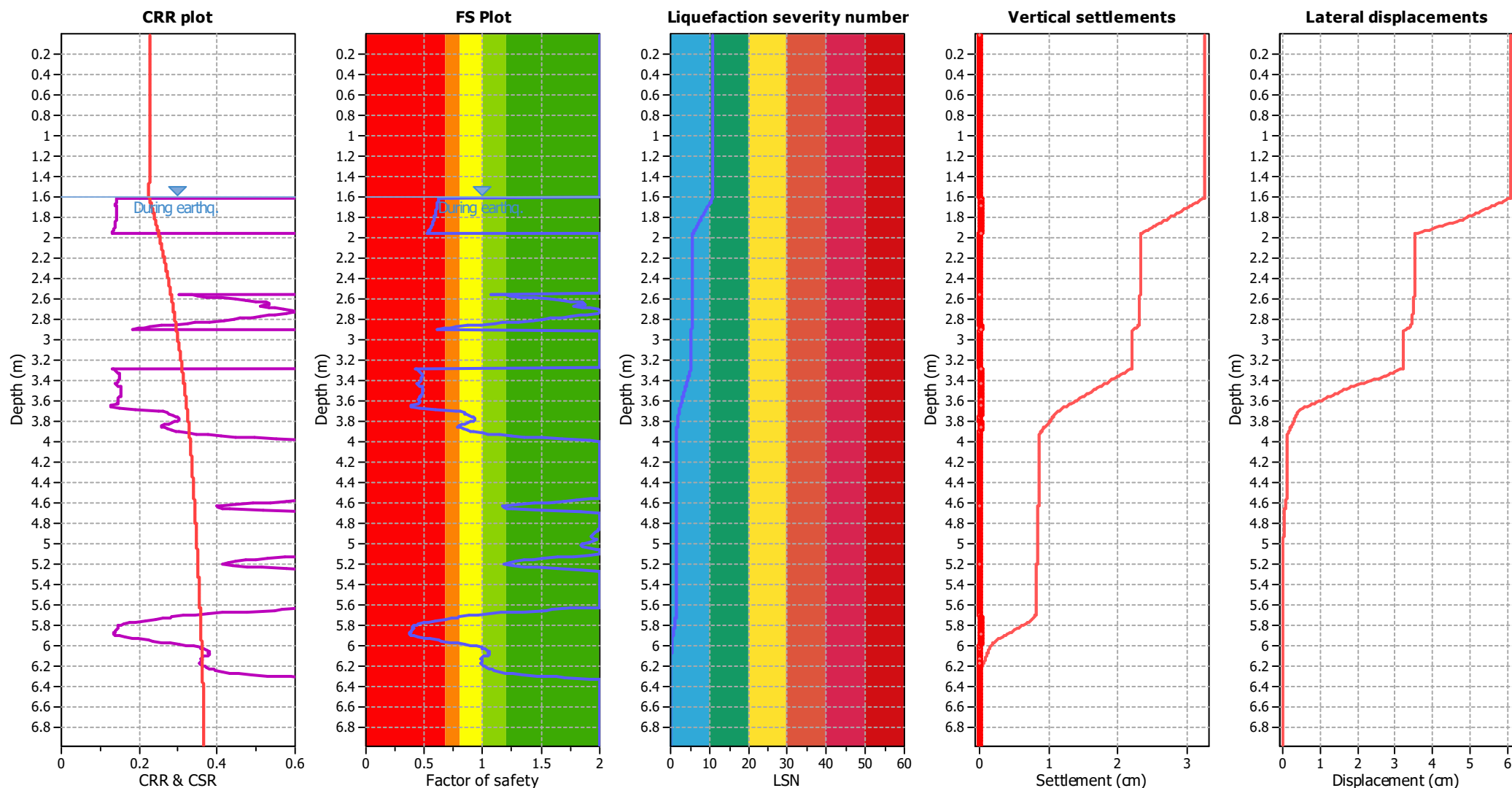
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Green	Moderate expression of liquefaction
Light Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	1.60 m	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.35	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.60 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
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LSN color scheme

Red	Severe damage
Orange	Major expression of liquefaction
Yellow	Moderate to severe exp. of liquefaction
Light Green	Moderate expression of liquefaction
Dark Green	Minor expression of liquefaction
Blue	Little to no expression of liquefaction



APPENDIX 5: Constructure Soil Bearing Investigation



constructure
structural engineering

18 November 2020

11898

C/o Coralie Pollard
Landmark Homes

Email: coralie.pollard@landmarkhomes.co.nz

Dear Coralie,

**SOIL BEARING INVESTIGATION
29 PEGASUS MAIN STREET, PEGASUS**

Testing & Results

We confirm that a soil bearing investigation was completed on 17 November 2020 at the above property and now report as follows.

The section is located on the Western side of Pegasus Main Street. The section is a relatively flat, grass covered site.

The investigation consisted of four penetrometer tests and two Hand Augers to determine the underlying soil conditions and allowable bearing capacity. The locations and results of the scala penetrometer tests are recorded on the attached plan and 'soil investigation record' sheets.

The static water table was not encountered in the scala penetrometers at the time of this investigation.

Hand auger at test location '1' and '4' revealed topsoil to approximately 100mm overlying dark brown stony silts over sand. The scala penetrometer results were quite similar in all locations with low bearing capacity at the surface, increasing with depth.

The penetrometer results showed that an ultimate bearing capacity of **200kPa** is available at approximately **100mm** below existing ground level, beneath the topsoil layer.

Other Information Reviewed

The geotechnical report by Geoscience Consulting Ltd. Ref: 11350_4 dated 08 May 2012 has classified the site as TC2 with reference to the MBIE guidance document "Repairing and rebuilding houses affected by the Canterbury earthquakes".

Conclusion

Based on the testing results and other information reviewed, the site does not comply with the "good ground" criteria of NZS3604:2011. Therefore, specific engineering design will be required for foundations onsite.

Cont...

Christchurch Office:
6/75 Peterborough Street, Christchurch 8013
PO Box 21381, Christchurch 8143
Phone 03 365 3243 **Email** cory@constructure.co.nz

Auckland Office:
Suite 2.1, 63 Ponsonby Road, Auckland 1011
PO Box 21381, Christchurch 8143
Phone 09 320 5226 **Email** james@constructure.co.nz



constructure
structural engineering

Cont...

The foundation design should be based on the MBIE Guidance document 'Repairing and rebuilding houses affected by the Canterbury Earthquake, dated December 2012 – section 5'. The site is quite flat and we recommend an enhanced foundation waffle slab – option 4 of this guidance would be appropriate for this site provided that the construction of the dwelling is to NZS3604:2011.

All rubbish, noxious and organic matter as outlined in NZS3604:2011 Clause 3.5.1 should be removed from the building area and the ground brought back up to formation using compacted hardfill if required prior to pouring the foundation slab. An engineer should inspect the foundations at the time of excavation to ensure adequate bearing throughout.

Please note that my recommendations are based on a limited number of penetrometer tests and the nature and continuity of subsoil conditions is inferred. It should be appreciated that actual conditions could vary from the tests results.

Please contact me should any further information be required.

Yours faithfully

Cory Bedford

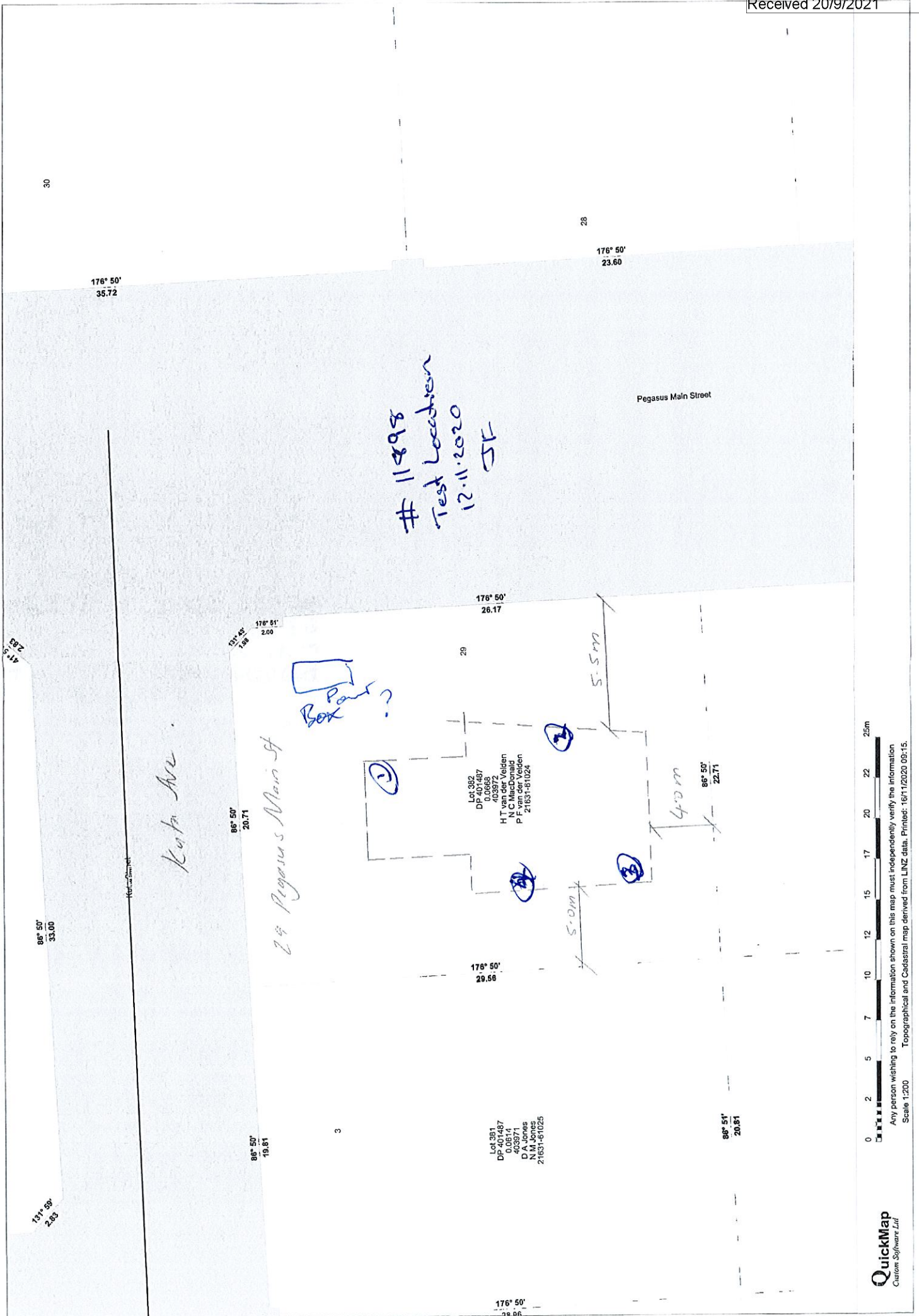
BEng (HONS) CEngNZ CPEng IntPE (NZ)

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PO Box 21381, Christchurch 8143
Phone 09 320 5226 **Email** james@constructure.co.nz





soil investigation record

Project:	29 PEGASUS MAIN STREET, PEGASUS		No.:	1 OF 5
Ref:	11898		Date:	18/11/2020
By:	JF		Checked	CB

Test Location 1			
Depth (m)	Bore Log (Hand Auger)		Scala Penetrometer
	Symbol	Description	(Blows/100mm)
GL		Topsoil	
0.2		Dark Brown Silt	
0.4		Sand	
0.6			
0.8		End of Hand Auger	
1.0			
1.2			
1.4			
1.6			
1.8			
2.0		End	
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			
3.6			
3.8			
4.0			

Notes:

- Refer to attached site plan for location.
- Based on Stockwell, M.J. , 1997: Determination of allowable bearing pressure under small structures, New Zealand Engineering (32:6), dated 15 June 1977, using a factor of safety of three to back calculate the UBC.
- The allowable bearing pressure has been calculated using a factor of safety = 3.
- 100 kPa allowable bearing pressure corresponds to the NZS 3604:2011 requirements for "Good ground".
- 65 kPa allowable bearing pressure corresponds to the MBIE Guidelines requirements for use of foundation options 1-4 (TC2).

Blows/100mm

100 kPa Allowable Bearing Capacity

65 kPa Allowable Bearing Capacity



soil investigation record

Project:	29 PEGASUS MAIN STREET, PEGASUS		No.:	2 OF 5
Ref:	11898		Date:	18/11/2020
By:	JF		Checked	CB

Test Location 2

Depth (m)	Bore Log (Hand Auger)		Scala Penetrometer
	Symbol	Description	(Blows/100mm)
GL			
0.2			
0.4			
0.6			
0.8			
1.0			
1.2			
1.4			
1.6			
1.8			
2.0		End	
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			
3.6			
3.8			
4.0			

Notes:

- Refer to attached site plan for location.
- Based on Stockwell, M.J. , 1997: Determination of allowable bearing pressure under small structures, New Zealand Engineering (32:6), dated 15 June 1977, using a factor of safety of three to back calculate the UBC.
- The allowable bearing pressure has been calculated using a factor of safety = 3.
- 100 kPa allowable bearing pressure corresponds to the NZS 3604:2011 requirements for "Good ground".
- 65 kPa allowable bearing pressure corresponds to the MBIE Guidelines requirements for use of foundation options 1-4 (TC2).

—●— Blows/100mm

— 100 kPa Allowable Bearing Capacity

- - - 65 kPa Allowable Bearing Capacity



soil investigation record

Project:	29 PEGASUS MAIN STREET, PEGASUS		No.:	3 OF 5
Ref:	11898		Date:	18/11/2020
By:	JF		Checked	CB

Test Location 3			
Depth (m)	Bore Log (Hand Auger)		Scala Penetrometer
	Symbol	Description	(Blows/100mm)
GL			<p>Blows/100mm</p> <p>100 kPa Allowable Bearing Capacity</p> <p>65 kPa Allowable Bearing Capacity</p>
0.2			
0.4			
0.6			
0.8			
1.0			
1.2			
1.4			
1.6			
1.8			
2.0		End	
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			
3.6			
3.8			
4.0			

Notes:

- Refer to attached site plan for location.
- Based on Stockwell, M.J. , 1997: Determination of allowable bearing pressure under small structures, New Zealand Engineering (32:6), dated 15 June 1977, using a factor of safety of three to back calculate the UBC.
- The allowable bearing pressure has been calculated using a factor of safety = 3.
- 100 kPa allowable bearing pressure corresponds to the NZS 3604:2011 requirements for "Good ground".
- 65 kPa allowable bearing pressure corresponds to the MBIE Guidelines requirements for use of foundation options 1-4 (TC2).



soil investigation record

Project:	29 PEGASUS MAIN STREET, PEGASUS		No.:	4 OF 5
Ref:	11898		Date:	18/11/2020
By:	JF		Checked	CB

Test Location 4

Depth (m)	Bore Log (Hand Auger)		Scala Penetrometer (Blows/100mm)
	Symbol	Description	
GL		Topsoil	
0.2		Dark Brown Silt	
0.4		Sand	
0.6			
0.8			
1.0		End of Hand Auger	
1.2			
1.4			
1.6			
1.8			
2.0		End	
2.2			
2.4			
2.6			
2.8			
3.0			
3.2			
3.4			
3.6			
3.8			
4.0			

Notes:

- Refer to attached site plan for location.
- Based on Stockwell, M.J. , 1997: Determination of allowable bearing presue under small structures, New Zealand Engineering (32:6), dated 15 June 1977, using a factor of safety of three to back calculate the UBC.
- The allowable bearing pressure has been calculated using a factor of safety = 3.
- 100 kPa allowable bearing pressure corresponds to the NZS 3604:2011 requirements for "Good ground".
- 65 kPa allowable bearing pressure corresponds to the MBIE Guidelines requirements for use of foundation options 1-4 (TC2).

—●— Blows/100mm

— 100 kPa Allowable Bearing Capacity

- - - 65 kPa Allowable Bearing Capacity

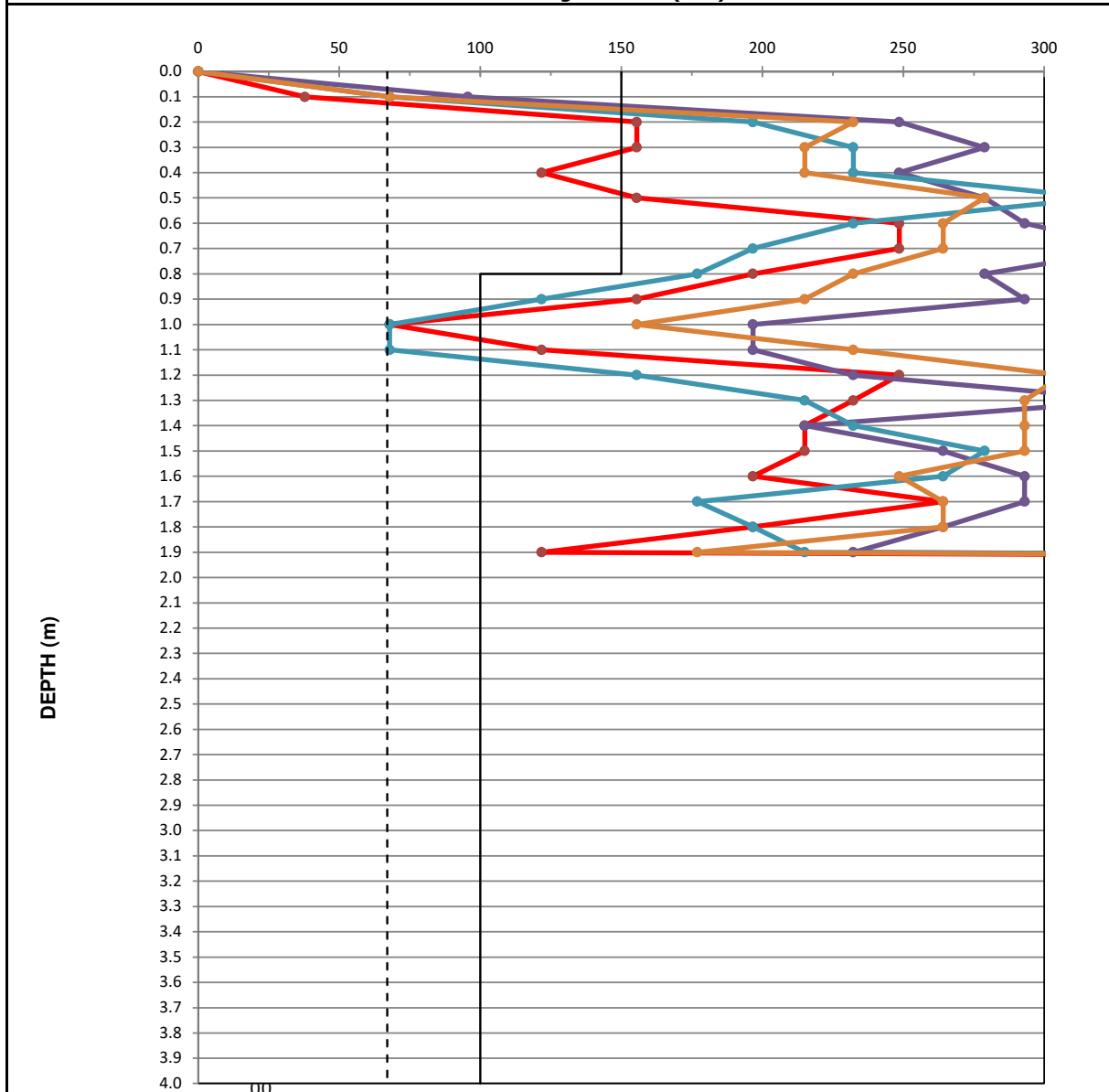


soil investigation record

Project:	29 PEGASUS MAIN STREET, PEGASUS	no.	5 OF 5
Ref:	11898	date	18/11/2020
By:	JF	checked	CB

Scala Penetrometer

Allowable Bearing Pressure (kPa)



Notes:

- Based on Stockwell, M.J. , 1997: Determination of allowable bearing pressure under small structures, New Zealand Engineering (32:6), dated 15 June 1977, using a factor of safety of three to back calculate the UBC.
- The allowable bearing pressure has been calculated using a factor of safety = 3.
- 100 kPa allowable bearing pressure corresponds to the NZS 3604:2011 requirements for "Good ground".
- 65 kPa allowable bearing pressure corresponds to the MBIE Guidelines requirements for use of foundation options 1-4 (TC2).

- Test Location 1
- Test Location 2
- Test Location 3
- Test Location 4
- 100 kPa Allowable Bearing Capacity
- - - 65 kPa Allowable Bearing Capacity



8 May 2012

Pegasus Town Limited
PO Box 68
Woodend
Canterbury 7641

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chris

Attention: Mr Paul Armstrong,

RE: Assessment of DBH Residential TC2 Criteria for Lateral Spreading and Seismic Settlement at Pegasus Town

1 INTRODUCTION

Geoscience Consulting (NZ) Ltd (Geoscience) was requested by Pegasus Town Limited (PTL) to identify areas within Pegasus Town that meet the allowable lateral displacements set out in the revised planning rules for TC2 as a result of an increase to design ground accelerations made following the recent Canterbury earthquakes. In collaboration with ENGEO, we have conducted this study to determine an appropriate lateral spread setback zone from the existing lake and wetland areas based on the revised regulations and guidelines. The purpose of this lateral spread setback zone is to classify development areas that currently meet Department of Building and Housing (DBH) Residential Technical Category TC2, as defined below. This study only covers those areas of Pegasus that have already received Subdivision Consent and been developed. Further work will be undertaken to assess the areas for future development (Stages 10, 12 and 13 and commercial areas), typically around the northern margin of the lake.

1.1 Regulatory Criteria

The Department of Building and Housing (DBH) has divided residential development in the Canterbury region into Technical Categories as follows:

- TC1 ('Grey') where "future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances";
- TC2 ('Yellow') where "minor to moderate land damage from liquefaction is possible in future large earthquakes"; and
- TC3 ('Blue') where "moderate to significant land damage from liquefaction is possible in future large earthquakes".

In addition, the DBH has provided revised guidance for site characterisation based on deformation limits for two different performance categories; serviceability limit state (SLS) for an annual probability of exceedance of 1/25, and ultimate limit state (ULS) for an annual probability of exceedance of 1/500.

Stage 1 Lateral Spread Assessment at Pegasus Town

Technical Category	Ground Deformation Limits			
	Vertical Settlements		Lateral Spread	
	SLS	ULS	SLS	ULS
TC1	15 mm	25mm	nil	nil
TC2	50 mm	100 mm	50 mm	100 mm
TC3	>50 mm	>100 mm	>50 mm	>100 mm

We included the DBH vertical settlement criteria for completeness and because DBH have used vertical settlement as an indicator criteria for liquefaction related damage. Typically, areas with extensive liquefiable soils suffered significant liquefaction related damage including, but not limited to, vertical settlement. Similarly, areas with isolated liquefiable strata did not suffer significant damage or vertical settlements. However it should be recognised that vertical settlement is not the primary subject of this letter and has been addressed in more detail by URS(2012).

2 GEOLOGIC CHARACTERISATION

A series of geotechnical investigations has been performed during the various stages of development and construction. Initial site geotechnical investigations were performed by URS in 1999, 2000 and 2005 and by Beca in 1999 and 2006. The 2005 URS report describes the geomorphic and geologic setting of the site in detail. The site is underlain by dune and interdune marine deposits of the Christchurch Formation. Prior to development, the dunes were up to approximately 5 m in height – the ground has been flattened out by cut and fill earthworks during development of the subdivision.

An additional 23 CPTs were pushed in August 2011, 11 in January 2012 and 70 recently as part of this liquefaction re-assessment. These investigations encountered similar deposits to the original work. The locations of the various CPT points are shown on Figure 1.

The ground conditions at the site typically consist of interbedded sand and silty sand with occasional silt layers. There is generally a surface crust of dry, dense material between 1 and 2 m in thickness, which is related to compaction of the ground surface during subdivision earthworks. Below the crust, the soil strength decreases, before increasing to dense at approximately 6-8 m depth. As shown on the geologic cross sections (Figures 2a and 2b), the thickness and depth of loose soil deposit varies and the layers appear relatively thin and discontinuous. This is to be expected given that the deposits were laid down in dune and fluvial environments, where cross bedding, inclined beds and channels are more prevalent than continuous horizontal soil beds.

3 PREVIOUS GROUND IMPROVEMENT WORK

URS and Beca identified lateral spreading as a result of the lake and wetland excavations as a geological hazard at the site, and recommended ground improvements to mitigate the hazard. Ground improvement has been performed along the lake edge by Bachy Soletanche / Brian Perry Civil (BPC) as a specialty contractor. Initial mitigation test sections were documented by Beca in a report dated September 2008. Based on the effectiveness of different methods in the test section, vibrocompaction was selected for overall site mitigation, performed by BPC and documented by Beca in a report dated March 2009. We understand that ground improvement was performed as a 9 m wide section around the perimeter of the lake. The ground improvements may have a benefit to reducing liquefaction deformations, however without complete information regarding the as-built location and modified soil properties we have not taken this benefit into account in this analysis.

Stage 1 Lateral Spread Assessment at Pegasus Town

4 DESIGN GROUND MOTIONS

The Department of Building and Housing has recently issued guidance for ground accelerations that should be used for assessment of liquefaction triggering in Canterbury. For Site Subsoil Class D and Importance Level 2 buildings, these are 0.13 g for the SLS case and 0.35 g for the ULS case, both for magnitude 7.5 events.

5 OBSERVATIONS OF RECENT SEISMICALLY INDUCED DEFORMATION

5.1 Pegasus

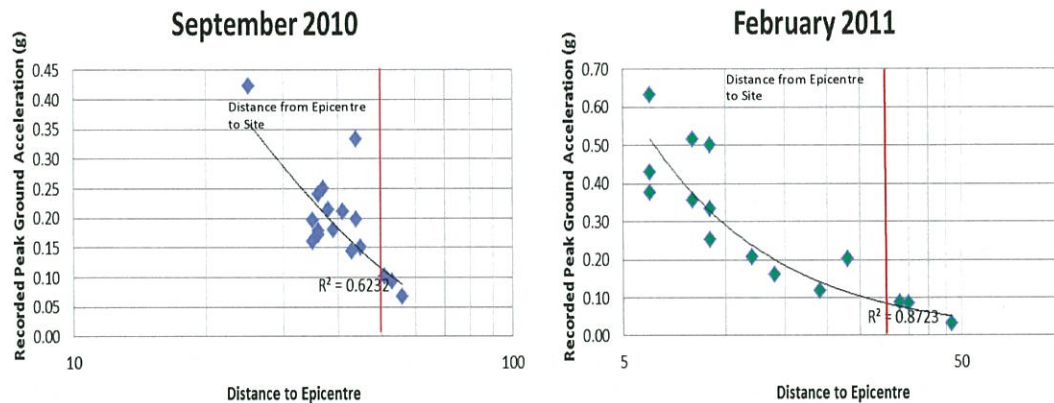
URS completed post-earthquake assessments in September 2010, February 2011 and June 2011 including visual inspections of both developed and undeveloped areas of Pegasus. They have not observed any damage as a result of liquefaction on the site. The most important of these observations relative to lateral spreading potential was the condition of the asphalt paved walkway around the lake. The walkway is a brittle continuous surficial feature and is excellent indicator of lateral movement. The observation that there were no significant cracks or offsets in the pavement strongly support the conclusion that no significant lateral spreading occurred as a result of the September 2010 or February 2011 earthquakes.

URS observed isolated sand boils offsite in the land to the immediate east between the wetland and the beach. Geoscience staff have made many visits to site and concur with the URS assessment that Pegasus has not sustained any surface damage or displacement from liquefaction. While Pegasus has not experienced the revised SLS level accelerations, the September earthquake was close to SLS shaking and therefore we do not expect that Pegasus will sustain significant damage as a result of liquefaction or lateral spreading under SLS level earthquake shaking.

The isolated sand boils observed to the east of the site indicate that the ground in that area liquefied in September. Given the proximity of the sand boils to the site, and the similar geological conditions, it is likely that some of the soils at Pegasus also liquefied at depth. Ishihara (1985) plotted the thickness of non-liquefiable crust against the thickness of liquefiable soil and, based on observations of damage during a number of earthquakes, demonstrated that a 2 m thick crust can prevent the development of sand boils and other signs of liquefaction from reaching the ground surface. It appears that this is what happened in September – the area east of Pegasus is lower lying and does not have a non-liquefiable crust, so sand boils developed. In the town itself, the lots are built on approximately 2 m thickness of crust and sand boils were not formed.

The good performance of the site to date during the Canterbury earthquake sequence needs to be understood in the context of the intensity of shaking experienced on site for these events. To do this we have interpolated PGAs from surrounding recording sites. We have completed an analysis of recorded ground motions against epicentral distance for the September 2010 (magnitude 7.1) and February 2011 (magnitude 6.3) earthquakes. We have analysed ground motions that are publically available from GNS, and removed records from rock or dense gravel sites. The charts below depict the filtered PGA records and their distance to the epicentre along with the distance from the epicentre to the site (red line).

Stage 1 Lateral Spread Assessment at Pegasus Town



The data from September shows a moderate correlation (r^2 value of 0.62) and indicates that the PGA would have been approximately 0.12 g at Pegasus, while the data from February has good correlation ($r^2 = 0.87$) and indicates a site PGA of approximately 0.08 g. These accelerations are somewhat lower than those experienced at the Kaiapoi North School, which is the closest seismometer to Pegasus. This suggests that the site has experienced close to the new revised SLS level shaking from the September and February earthquakes at recorded magnitudes of 7.1 and 6.3, respectively.

However, given the magnitudes and location of the recent earthquakes, the Pegasus site was probably subjected to about 1/3 of the new revised ULS design PGA.

5.2 Christchurch

Extensive liquefaction occurred in September, February and June throughout the weak soil deposits in eastern Christchurch and in Kaiapoi. These areas experienced higher peak ground surface accelerations than the Pegasus site with an average PGA on the order of 0.4 g.

As discussed in "Field Measurements of Lateral Spreading following the 2010 Darfield Earthquake Lateral" by Robertson 2011, spreading occurred in specific areas in close proximity to the rivers and also topographic features such as slope breaks or river terraces.

Typically, areas affected by lateral spreading have been zoned as Red and TC3, but some areas of lateral spreading have occurred in the TC2 zone (up to 100 mm of lateral spread). The Red and TC3 zones typically have extensive deposits of liquefiable soils related to very low energy estuarine and fluvial deposition environments. In our experience, the worst affected areas in Christchurch (i.e. Red and TC3 zones) have up to 25 m of very weak, largely liquefiable sand before reaching dense, non-liquefiable layers, and the liquefiable layers were continuous over large distances. This led to large vertical settlement, significant sand ejecta, and in places, significant lateral spreading due to the very high liquefaction susceptibility of the majority of the soil profile. This is very different to the geological profile at Pegasus as presented in Figures 2a and 2b, which indicates that Pegasus is underlain by discontinuous sand and silt layers with dense soil encountered at approximately 10-15 m depth, and therefore is much less susceptible to liquefaction than the badly affected parts of Christchurch.

Lateral spreading displacements typically decrease exponentially with increasing distance from the waterway and become negligible at distances greater than 100 to 150 m. Greater displacements may be expected where block failures occur, however this is generally associated with greater thicknesses

Stage 1 Lateral Spread Assessment at Pegasus Town

of liquefiable soils (4 to 6 m or greater), or the influence of geomorphic features such as meandering stream channels, neither of which exist at the Pegasus site.

It must be emphasised that the geologies for the worst affected areas in Christchurch were far more susceptible to liquefaction than Pegasus (affected areas of Christchurch where the liquefiable layers were much weaker, thicker, and more continuous).

6 LIQUEFACTION ANALYSES

In addition to the observations described above, we have carried out an analysis of liquefaction and lateral displacement potential under the new SLS and ULS design ground accelerations. We performed an evaluation of liquefaction potential as well as lateral deformation and settlement potential due to volumetric strain using the CPT data from 104 CPTs around the lake and wetland with the software program CLiq (version 1.5) developed by GeoLogismiki. The details of each of these analyses are described in the following sections.

6.1 Liquefaction Triggering

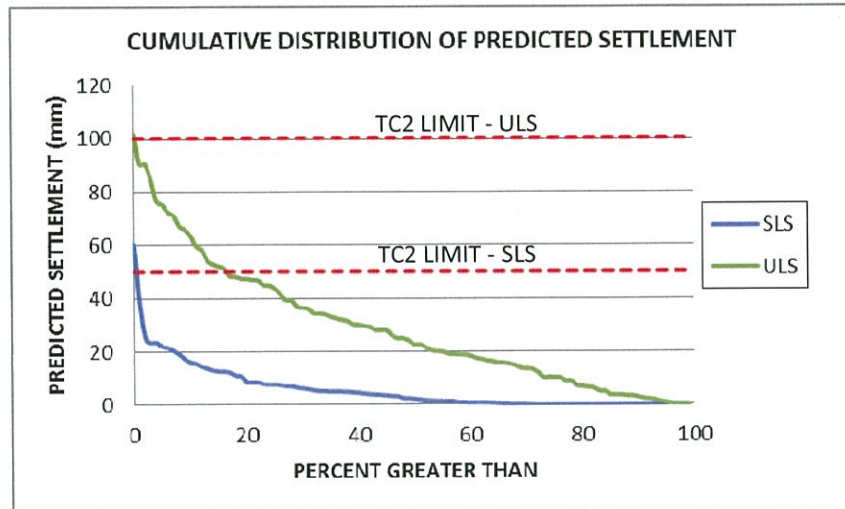
Liquefaction triggering was evaluated by applying the methodologies published by Youd et al. (2001) hereafter referred to as NCEER (National Center for Earthquake Engineering Research) and by Moss (2006), as outlined in the NZGS Guideline For The Identification, Assessment And Mitigation Of Liquefaction Hazards, dated July 2010. The results of these analysis are presented on the attached summary sheets for each CPT. The results are expressed as the factor of safety against liquefaction at corresponding depths and as Liquefaction Potential index (LPI). The LPI is reported on a scale of 0 to 100, and represents liquefaction severity at a specific location as a combination of depth, cumulative thickness of liquefiable intervals, and factor of safety of liquefiable intervals. The LPI scale of liquefaction severity is based on cases of observed liquefaction distress in Japan and California. In general, sand boils appear at $LPI \geq 5$; lateral spreads occur at $LPI \geq 12$ (Holzer, 2003).

The LPIs from all 104 CPTs have been contoured on Figure 3. This shows that the LPI across the site is quite variable but generally low (typically less than 5). More liquefiable areas are identified from a number of CPTs in the south western part of the development and in the centre of the area between the lake and the wetland. The low LPIs, and observation of the individual CPT traces indicate that liquefaction is typically predicted in relatively thin layers (less than 1 m thick) at each CPT as opposed to having widespread liquefiable deposits. There does not appear to be a strong correlation between the locations of liquefiable layers at nearby CPTs, unlike in the eastern suburbs of Christchurch where the layers are very extensive both laterally and vertically. Figures 2a and 2b show the liquefiable layers under ULS loading, and demonstrate that the layers are relatively thin and discontinuous.

6.2 Liquefaction Settlement

We estimated the vertical settlement from volumetric strain from applying the NCEER method (Youd et al, 2001) to the data from the 104 CPT locations under both SLS and ULS seismic loads (see Figure 4 for a graphical representation of vertical settlement under ULS loads). Based on our review of this CPT data, it is our opinion that the predicted settlements are nominally within the ULS limits for TC2, with the exception of CPT 9297_18 (in the south western corner of Pegasus) which predicted 10.2 cm settlement under ULS and 6.0 cm under SLS loads. Given that this is only one CPT out of 104, and it only marginally exceeds the TC2 criteria, we consider it appropriate to state that the dataset meets TC2 settlement criteria. The full dataset is shown in the graph below, which indicates that less than 50 mm of settlement is predicted at ULS, and less than 10 mm at SLS, for approximately 80% of all CPT points.

Stage 1 Lateral Spread Assessment at Pegasus Town



The reported vertical settlements consider only volumetric strain, not ground loss due to ejecta boils. The formation of sand boils has been mitigated by compaction to form a crust over liquefiable deposits.

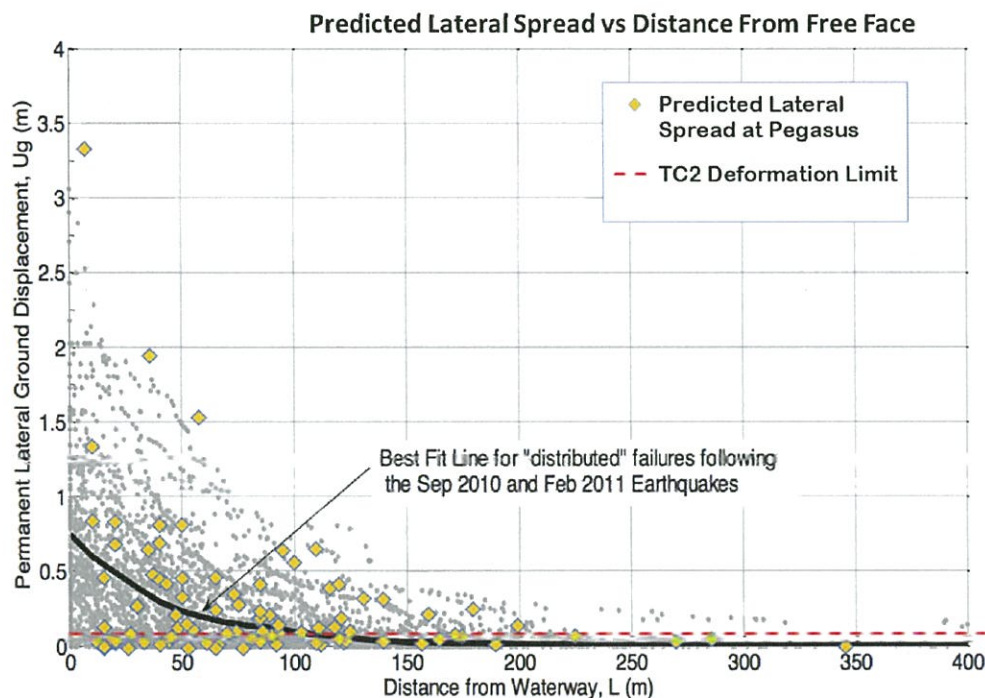
6.3 Lateral Displacement Potential

We used the methodology described by Zhang, Robertson and Brachman (2004) to estimate liquefaction-induced displacement using the CPT test data available for the site. This methodology is based on a database of observed lateral spread events correlated to factor of safety and relative density from CPT tests within the material where spreading occurred. As such, without validation by observed behaviour, this methodology should be used as an indication of likely displacements rather than to develop definitive displacement numbers. The maximum cyclic shear strain, as a function of factor of safety and relative density, was evaluated based on data from Ishihara and Yoshimine (1992) and Seed (1979). Since these relationships are based on laboratory tests on clean sands, fines corrections were applied to the CPT results in accordance with methods described by Youd et al. (2001). The incremental maximum shear strain values were integrated with depth to produce a value that is defined as Lateral Displacement Index (LDI). LDI in itself is intended only as an index of lateral displacement. Actual magnitudes of ground displacements depend on both the LDI and characteristics of the ground geometry. In order to account for the site geometry effects, the referenced investigators examined available case histories and correlated actual lateral displacement, LDI and geometric parameters specific to the site. For the purposes of analysis, the Pegasus site was considered "Level Ground with a Free Face". We considered the maximum free face height (H) to be 8 m, which is the difference in elevation between the building platforms and the lake floor. This is considered relatively conservative as the actual topography consists of a stepped slope from the building platforms to the lake edge reserve, and a gentle slope from the lake edge to the lake floor (see cross sections, Figures 2A and 2B). Using the described methodology, we computed expected lateral displacement at each CPT location using the setback distances obtained from Figure 1. For CPTs located in the area between the lake and the wetland (Stage 11), we considered potential lateral movement towards the wetland as well as towards the lake. This method is based on the assumption of soil uniformity, so

Stage 1 Lateral Spread Assessment at Pegasus Town

does not account for variation in the soil profile between the analysis location and the lake edge. This is a conservative approach as the data suggests that the weak liquefiable layers are discontinuous between CPT locations and therefore the spread potential will be reduced due to not having a continuous weak (liquefied) failure plane.

The predicted lateral deformation of each CPT point versus the horizontal distance to the free face, is plotted in the chart below. As previously discussed, the potentially liquefiable soils at the Pegasus site are discontinuous cross-bedded dune sands, that are generally deposited in discontinuous relatively thin layers. This geologic structure inherently decreases potential lateral spreading magnitudes. Also plotted on the chart is "the best fit line for distributed failures following the September 2010 and February 2011 Earthquakes" as developed by Robinson et al 2012. The actual PGA's which relate to the Robinson data are about the same as the ULS PGA for the Pegasus site. There is excellent agreement between the predicted displacements and those observed for similar conditions and ground motions. For these reasons, we conclude that the Zhang, Robertson and Brachman methodology provides reasonable if not somewhat conservative results for the Pegasus site.



As the graph above shows, lateral spread exceeding the ULS criteria of 10 cm are not predicted at distances greater than about 200 to 250 m inboard of the free face. Robinson's best fit line for distributed failures in Christchurch suggests that 10 cm displacement was not typically exceeded beyond approximately 100 m inboard of the free face.

Additionally, we have investigated lateral displacement at the site using limit equilibrium coupled with a sliding block model. We evaluated both circular failure surfaces and well as block or planar surfaces. Analysis using circular failure surfaces results in deformations relatively close to the free face, whereas block failures unrealistically calculated a decreasing factor of safety with increased distance from the free face. Based on the sensitivities of the model to the site geometry of relatively flat

Stage 1 Lateral Spread Assessment at Pegasus Town

surfaces and short free face, it is our opinion that a limit equilibrium/sliding block model is not appropriate at this site to model small magnitude lateral deformations. The 2008 Idriss and Boulanger EERI report supports our concerns with relying upon this method:

"Sliding block models are a crude approximation of the deformation processes that occur as a consequence of liquefaction. The underlying assumptions of rigid-plastic shear resistance and slip along a discrete sliding surface have little resemblance to the actual deformation mechanisms in most situations. Lateral spreading problems are particularly challenging, with additional complications arising from the low levels of driving shear stress beneath mildly sloping ground and the sensitivity of analytical results to the assumed residual shear strengths. For these and other reasons, it is not very common to use sliding block models for lateral spreading problems."

7 CONCLUSIONS

Analysis of the ground motions recorded throughout Canterbury in the September and February earthquakes suggests that Pegasus Town has already experienced shaking approximately equal to the SLS design ground motion. No liquefaction damage was observed in the town as a result of this shaking, and it is likely that future SLS events would similarly not result in land damage.

The geological setting at Pegasus is such that extensive, continuous liquefiable layers have not been identified and are not expected. Our analysis of liquefaction susceptibility on 104 CPTs around the township indicates that the liquefiable layers are relatively thin (typically less than 1 m) and discontinuous, as shown on the geological cross sections. This geology is not considered to be high risk for lateral spreading because the continuous weak failure surfaces that are necessary for large magnitude and extents of lateral spreading to occur are unlikely to develop.

The geology at Pegasus is quite different from the badly affected areas in Christchurch and Kaiapoi and not expected to suffer as much damage even at the revised ULS level of shaking. The affected areas of Christchurch had significantly more extensive, thicker and weaker liquefiable layers.

The predicted settlements at ULS and SLS are generally within the DBH TC2 criteria. One CPT point out of 104 analysed slightly exceeds the limit (by <5% at ULS and 15% at SLS), and at least 80% of the CPTs predict less than 50% of the maximum allowable settlement for TC2 classification. Based on this, we expect that the degree of land damage that may be expected at Pegasus in a future large earthquake is "minor to moderate" as defined by the DBH.

We have also computed lateral displacement for each CPT location using a case study based method, and compared this to observations of lateral spreading recorded in Christchurch. The predicted values compare well with the observed values and suggest that a setback of approximately 200 to 250 m from the free face is suitably conservative. Figure 5A shows our estimated lateral deformations for the SLS case, and Figure 5B shows our estimated lateral deformations for the ULS case as well as our proposed setback zone between 200 m and 250m from the lake and wetland edges, and considers the geological setting, observations from Christchurch and the uncertainty inherent in the case study based analysis.

We consider that development outside the proposed setback zone may proceed in accordance with the TC2 guidelines published by the DBH in November 2011. Areas within the setback zone may not meet TC2 requirements.

8 LIMITATIONS

- (i) This report has been prepared for the use of our client, Pegasus Town Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project

Stage 1 Lateral Spread Assessment at Pegasus Town

brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

- (ii) Assessments made in this report are based on the ground conditions indicated from published sources, site inspections and subsurface investigations described in this report based on accepted normal methods of site investigations. Variations in ground conditions may exist between test locations and therefore have not been taken into account in the report.
- (iii) This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on 03 328 9012 if you require any further information.

For and on behalf of Geoscience Consulting (NZ) Ltd,



Joe Gray, PE CA, (USA)

Project Geotechnical Engineer



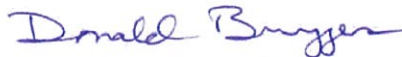
Neil Charters, BSc (Hons), ME (Dist)

Associate Geotechnical Engineer



Matt Wiley, BSc, MSc (Hons)

Principal Engineering Geologist



Donald Bruggers, PE, GE CA, (USA)

Principal Engineer



Dr. Kevin McManus, PhD, CPEng

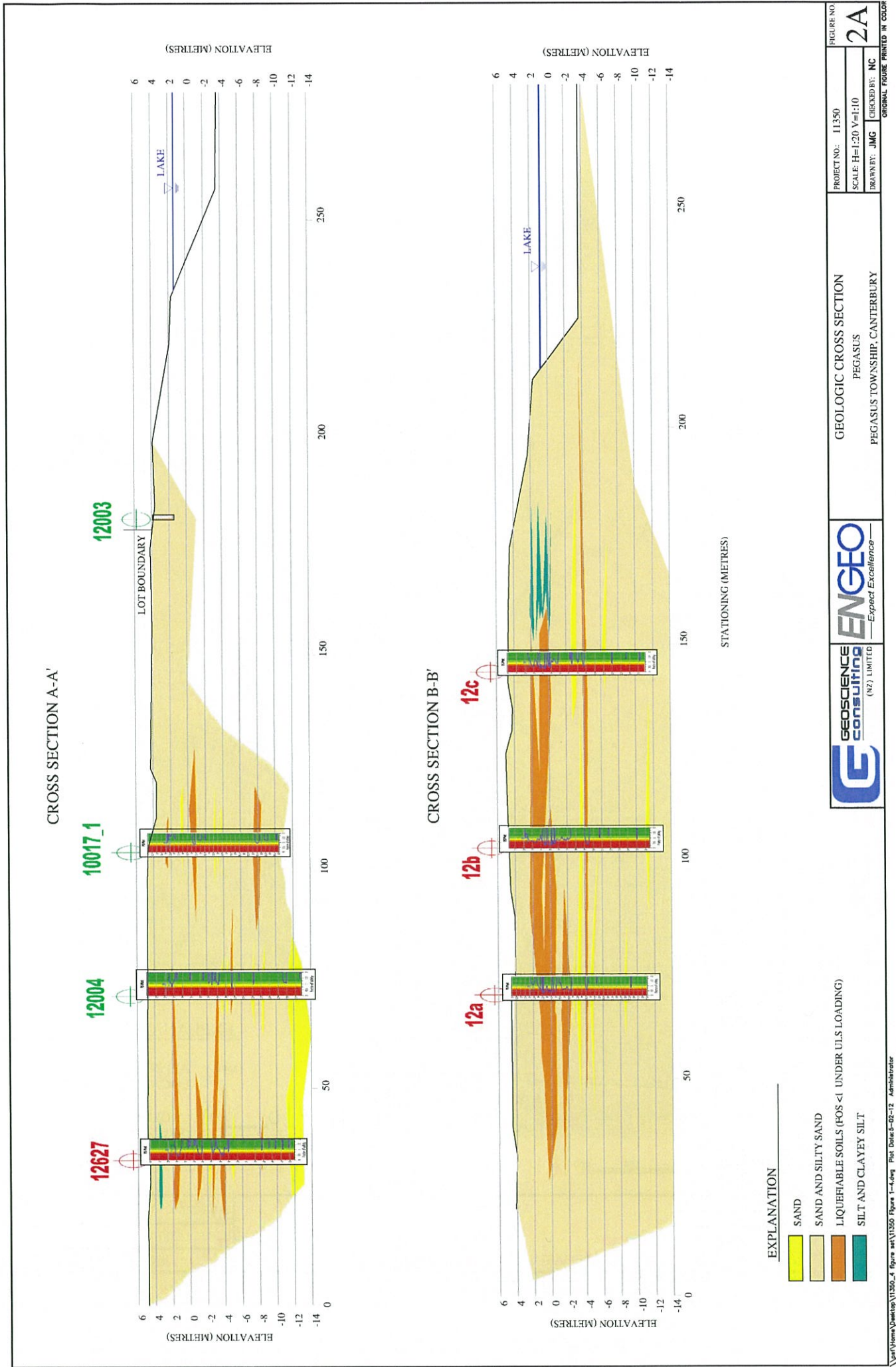
Consultant Geotechnical Engineer

TECHNICAL REFERENCES

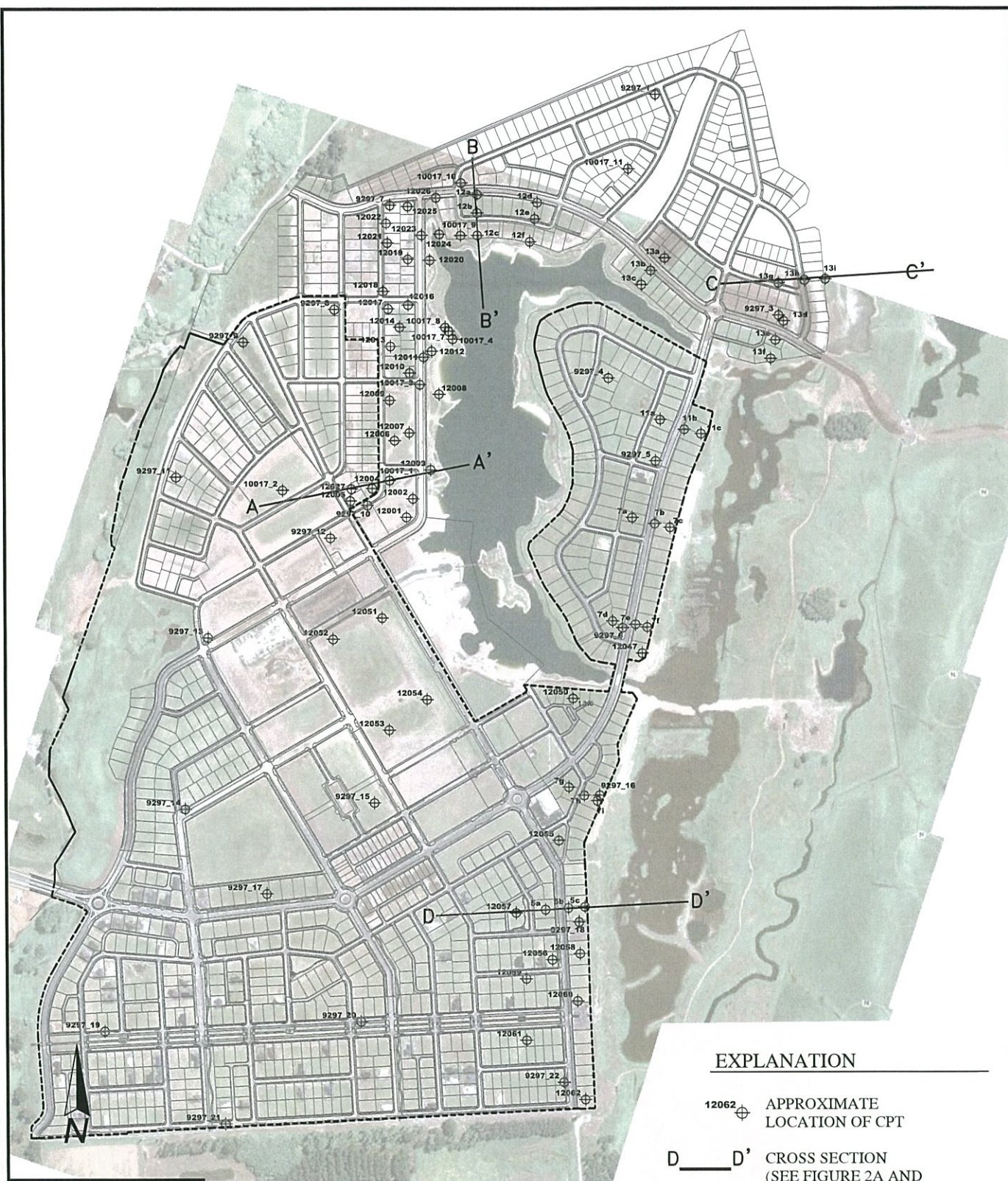
- Ishihara, K., (1985). "Stability of natural deposits during earthquakes", in Proceedings, *11th International Conference on Soil Mechanics and Foundation Engineering*, San Francisco, A. A. Balkema, Rotterdam, pp. 321–376.
- Ishihara, K. (1996). "Soil behavior in earthquake geotechnics." *The Oxford Engineering Science Series*, No. 46.
- Ishihara, R. and Yoshimine, M. (1992). "Evaluation of Settlements in Sand Deposits Following Liquefaction During Earthquakes, Soils and Foundations." pp. 173-188.

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- Makdisi, F. I., and Seed, H. B. (1978). "Simplified procedure for estimating dam and embankment earthquake-induced deformations." *J. Geotech. Eng. Div., Am. Soc. Civ. Eng.* 104(GT7), 849–867.
- Robertson, P. K., and Wride, C. E. (1998). "Evaluating cyclic liquefaction potential using the cone penetration test." *Canadian Geotech. J.* 35(3), 442–459.
- Robinson, K., Cubrinovski, M., Kailey, P. and Orense, R. (2011) Field Measurements of Lateral Spreading following the 2010 Darfield Earthquake. *Auckland, New Zealand: 9th Pacific Conference on Earthquake Engineering*, 14-16 Apr 2011.
- Seed, R. B., Cetin, K. O., Moss, R. E. S., Kammerer, A., Wu, J., Pestana, J., Riemer, M., Sancio, R. B., Bray, J. D., Kayen, R. E., and Faris, A. (2003). "Recent advances in soil liquefaction engineering: A unified and consistent framework." Keynote presentation, *26th Annual ASCE Los Angeles Geotechnical Spring Seminar*, Long Beach, Calif.
- Youd et al. (2001). "Liquefaction resistance of soils." Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops. on Evaluation of Liquefaction Resistance of Soils. *ASCE J. of Geotech. and Geoenvironmental. Eng.* 127 (10), 817-833.
- Youd, T.L., Hansen, C.M., and Bartlett, S.F. (2002). "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement." *ASCE J. of Geotech. and Geoenvironmental. Eng.* 128 (12), 1007-1017.
- Zhang, G., Robertson, P. K., and Brachman, R. W. I. (2004). "Estimating Liquefaction-Induced Lateral Displacements Using the Standard Penetration Test or Cone Penetration Test." *ASCE J. of Geotech. and Geoenvironmental. Eng.* August 2004, 861-871.



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EXPLANATION

12062  APPROXIMATE
LOCATION OF CPT

D — D' CROSS SECTION
(SEE FIGURE 2A AND
2B)



0 100 200

SITE PLAN
PEGASUS
PEGASUS TOWNSHIP, CANTERBURY

PROJECT NO.: 11350

SCALE: 1:200

DRAWN BY: JMG

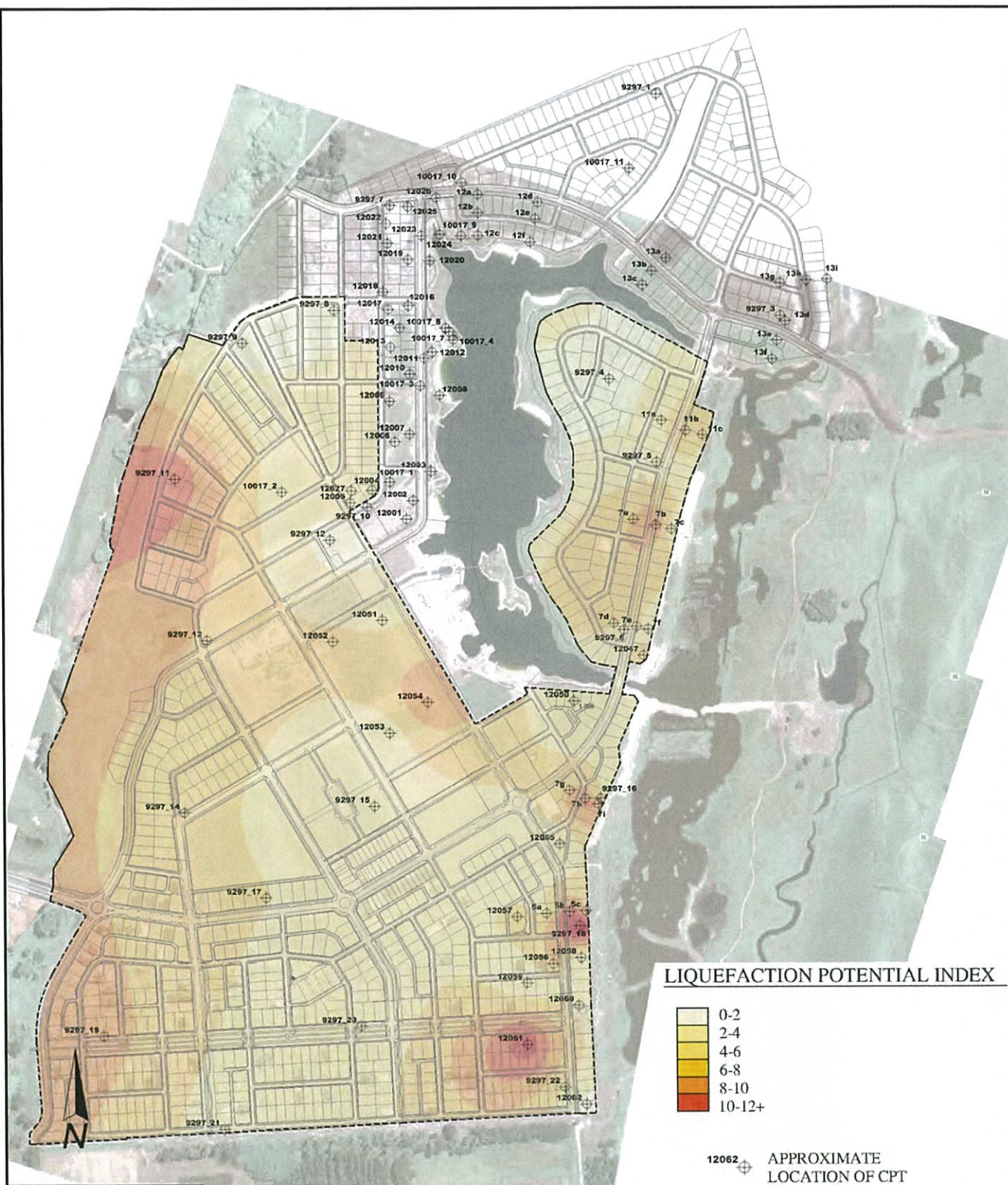
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FIGURE NO.

1

ORIGINAL FIGURE PRINTED IN COLOR

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0 100 200



LIQUEFACTION POTENTIAL INDEX (ULS CASE)
PEGASUS
PEGASUS TOWNSHIP, CANTERBURY

PROJECT NO.: 11350

SCALE: 1:200

DRAWN BY: JMG

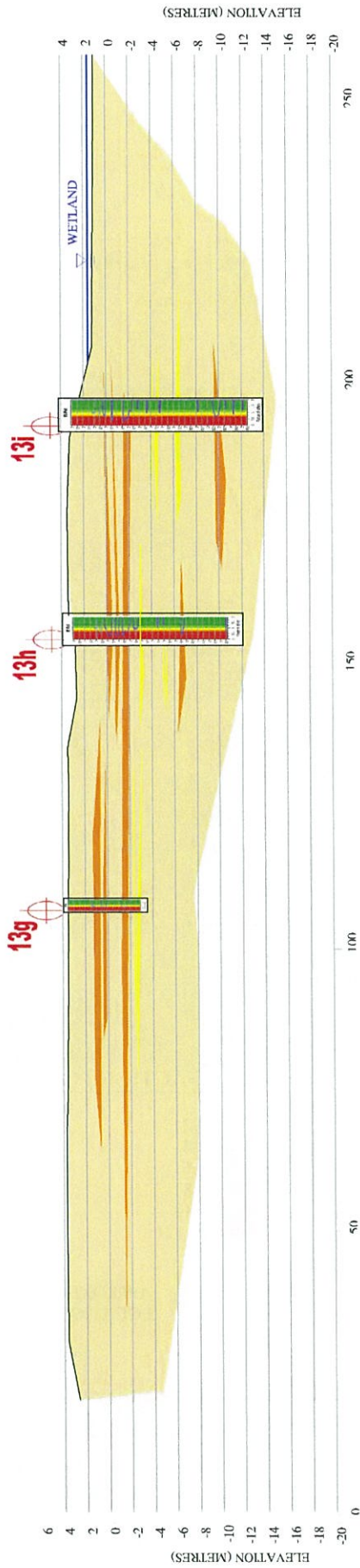
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FIGURE NO.

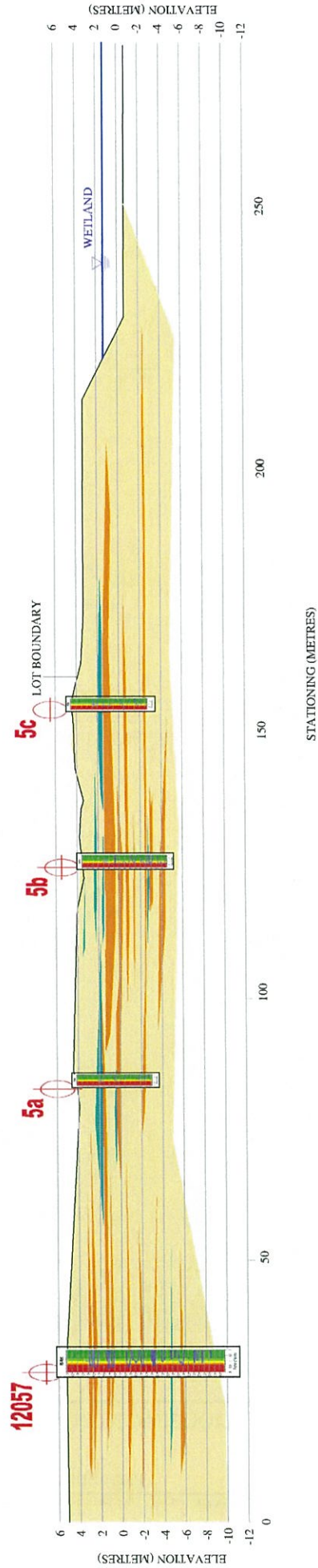
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ORIGINAL FIGURE PRINTED IN COLOR

CROSS SECTION C-C'





CROSS SECTION D-D'

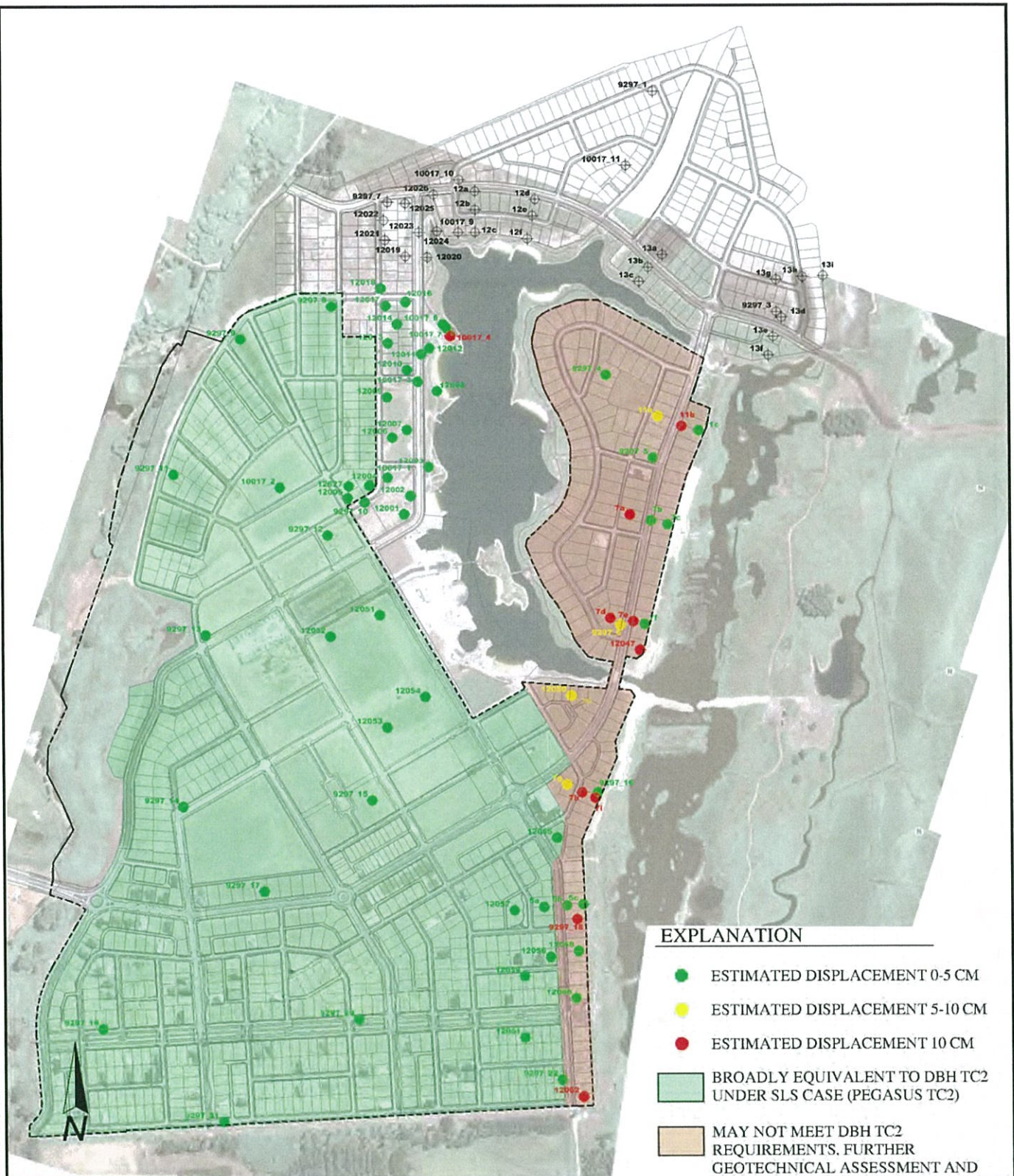


EXPLANATION

- SAND
- SAND AND SILTY SAND
- LIQUEFIABLE SOILS (FOS <1 UNDER ULS LOADING)
- SILT AND CLAYEY SILT

		GEOLOGIC CROSS SECTION		FIGURE NO.
		PEGASUS		2B
PEGASUS TOWNSHIP, CANTERBURY		PROJECT NO.: 11350	CHECKED BY: NC	ORIGINAL FIGURE PRINTED IN COLOR
		SCALE: H=1:20 V=1:10		
		DRAWN BY: JMG		

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EXPLANATION

- ESTIMATED DISPLACEMENT 0-5 CM
- ESTIMATED DISPLACEMENT 5-10 CM
- ESTIMATED DISPLACEMENT 10 CM
- BROADLY EQUIVALENT TO DBH TC2 UNDER SLS CASE (PEGASUS TC2)
- MAY NOT MEET DBH TC2 REQUIREMENTS. FURTHER GEOTECHNICAL ASSESSMENT AND SOME GROUND IMPROVEMENT MAY BE REQUIRED IN SOME AREAS



ESTIMATED LATERAL DISPLACEMENT UNDER SLS CASE PEGASUS PEGASUS TOWNSHIP, CANTERBURY

PROJECT NO.: 11350

SCALE: 1:200

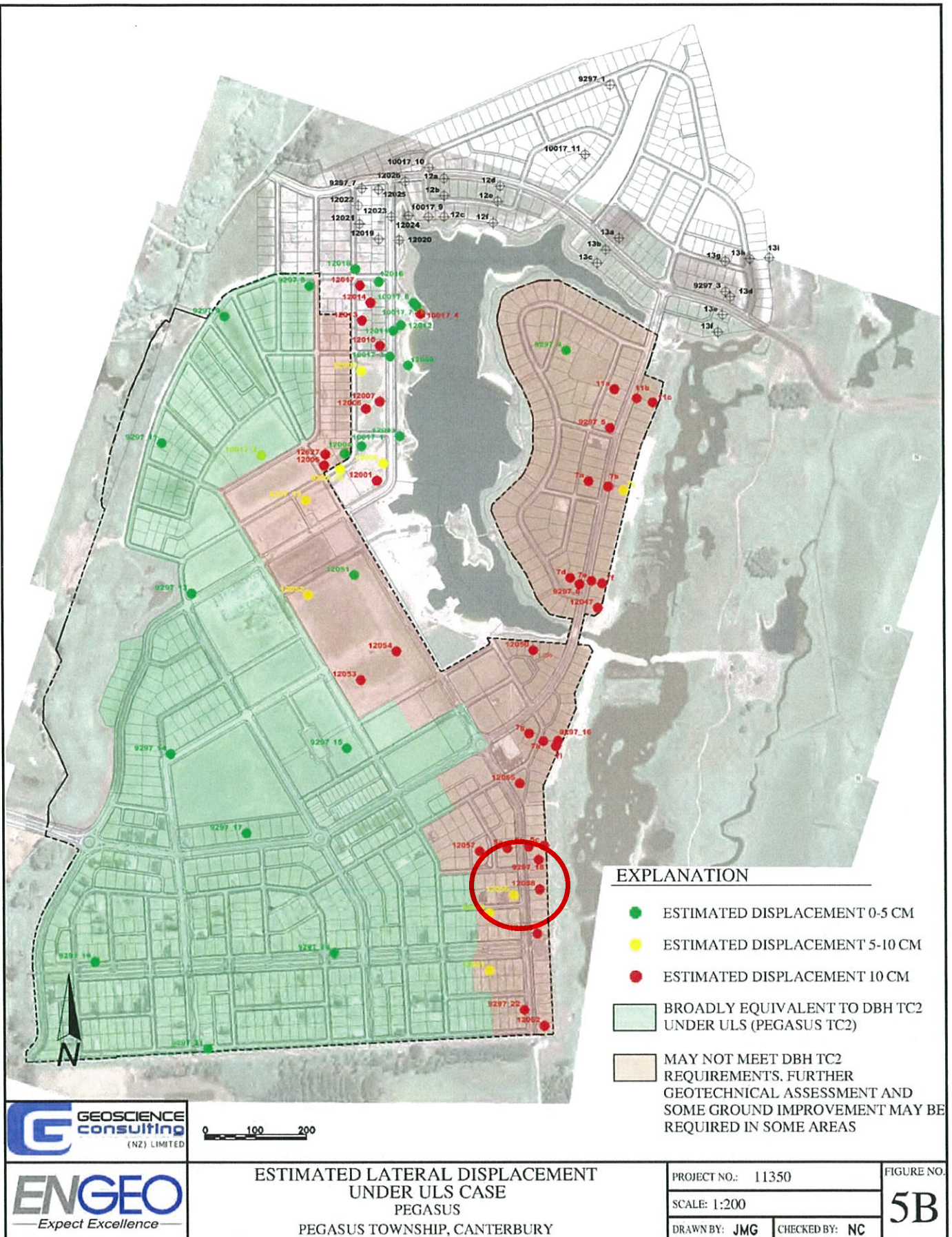
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FIGURE NO.

5A

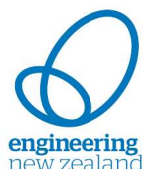
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0 100 200

\\pf\Home\Desktop\11350_4 figure set\11350 Figure 1-4.dwg Plot Date: 5-08-12 Administrator

ORIGINAL FIGURE PRINTED IN COLOR



New Zealand
Institute of Architects
Incorporated



Building Code Clause(s) **B1**

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: The Engineering Company Ltd (ENGCO)

(Design Firm)

TO: Van De Geest Building Limited

(Owner/Developer)

TO BE SUPPLIED TO: Waimakariri District Council

(Building Consent Authority)

IN RESPECT OF: New Residential Dwelling

(Description of Building Work)

AT: 29 Pegasus Main Street

(Address)

Town/City: Pegasus

(Address)

LOT 382

DP 401487

SO

We have been engaged by the owner/developer referred to above to provide:

Enhanced TC2 Ribraft slab design for MBIE loss of bearing cases & Pad foundations for the attached verandah
Design of Floor & Roof beams outside the scope of NZS3604, framing restraint for balustrades & wind beams around the stairwell

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1** of the Building Code for:

☐ All or ☒ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **VM1/VM4** or
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule

The proposed building work covered by this producer statement is described on the drawings titled:

Please see attached addendum and numbered Please see attached addendum ;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions Please see attached addendum
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☒ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, Matthew Cusiel am: ☒ CPEng 161509 # ☐ Reg Arch #
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: BE(hons), CMEngNZ, CPEng

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

The Design Firm is a member of ACENZ: ☐

SIGNED BY: Matthew Cusiel (Signature)...

(Name of Design Professional)

ON BEHALF OF The Engineering Company Ltd (ENGCO) Date: 14.06.2021
(Design Firm)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.
THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, ENGINEERING NEW ZEALAND AND NZIA



ENGCO
Consulting Engineers

ADDENDUM TO PRODUCER STATEMENT – PSI – DESIGN

ISSUED BY:	The Engineering Company Ltd <small>(Design Firm)</small>
TO BE SUPPLIED TO:	Waimakariri District Council <small>(Building Consent Authority)</small>
IN RESPECT OF:	New Residential Dwelling <small>(Description of Building Work)</small>
AT:	29 Pegasus Main Street, Pegasus <small>(Address)</small>

ENGCO has been engaged by **Van De Geest Building** to provide the structural design of the work listed on the PS1 & shown on Engco's drawings titled, "New House – 29 Pegasus Main St, Pegasus" & Engco's Sketches titled, "29 Pegasus Main Street, Pegasus".

Sheet		Rev	Date
S1-S7	Ribraft Foundations	-	08.06.2021
S2.00	General Notes	B	14.06.2021
S2.01	Mid-Floor Structural Plan	B	14.06.2021
S2.02	Roof Structural Plan	B	14.06.2021
S2.11	Structure Details	B	14.06.2021
S2.12	Structure Details	B	14.06.2021
S2.13	Structure Details	B	14.06.2021
S2.14	Structure Details	B	14.06.2021
S2.15	Structure Details	B	14.06.2021
S2.16	Structure Details	B	14.06.2021

In respect of the requirements of Clause(s) B1 of the Building Code for **part only** (as specified in the attachments to this statement) of the proposed building work.

On behalf of the Design Firm, and subject to:

- (i) The design has been prepared in accordance with the information given in the geotechnical report by Geoscience Consulting NZ Limited – dated 8 May 2012, ref I1350_4 & the Soil Bearing Investigation Report by Constructure Structural Engineering – dated: 18 November 2020, ref. No: I1898 and in accordance with the MBIE guidance document. The Engineering Company Ltd holds no responsibility for seismic induced damage sustained beyond the limits of the MBIE Guidance recommendations.
- (ii) Engco shall be responsible for conducting the structural inspections required in order to issue a PS4 on completion, in accordance with the attached inspection schedule.
- (iii) All proprietary products meeting their performance specification requirements.

I, Matthew Cusiell, am a Chartered Professional Engineer, CPEng#161509, and am a Member of Engineering New Zealand. The Engineering Company Ltd holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

Signed by Matthew Cusiell, BE(hons), CMEngNZ, CPEng, IntPE
on behalf of The Engineering Company Ltd, Unit 2, First Floor, 596 Ferry Rd, Woolston, Christchurch

(signature)

Date: 14 June 2021

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chris

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000.



LOCATION 29 Pegasus Main Street, Pegasus

Schedule of Engineering Inspections	
Inspection Stage	Purpose of Inspection
Excavation	Confirm soil conditions
Foundation Prepour – one per pour	Confirm steel content, cover and workmanship
Pre-Pine	Confirm beam sizes & fixings, Bracing hold downs and Diaphragm fixings

Frequency of inspections is based on construction monitoring level CM2 and can vary on sequencing, contractor ability, quality control and workmanship of previous inspections.

Design Engineer: Josh Watkins

Signature:

It is the contractor's responsibility to notify **The Engineering Company Ltd** 48 hours (**office@engco.co.nz**) before engineering inspections are required. The total number of inspections will depend upon the construction methodology and staging. Additional inspections from those listed above may be required upon conditions found on site. See also, local territorial authority requirements for construction monitoring.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



1.0 Project Description & Construction
New Two Storey house in Pegasus Light clad trussed roof Light Upper floor wall cladding, Half & half Light/ Heavy wall cladding on the ground floor Timber framed midfloor
1.1 Location
29 Pegasus Main Street, Pegasus
2.0 Specific Engineering Elements (Covered by PS-1)
Engco responsible for the following items; a. Ribraft Foundation for TC2 loss of bearing conditions b. Floor and Roof beams (outside the scope of NZS3604) c. Wind Beams around Stairwell d. Framing that supports the glass balustrade (Balustrade and fixing by others)
3.0 Foundation Description
TC2 ribraft designed to withstand the loss of bearing (LOB) load cases as defined in MBIE guidance, 2m LOB to the perimeter and 4m internal LOB.
4.3 Environmental Loads
a. Wind Load 0.94kPa baseline (39.7m/s, NZS 3604 Classification –High) b. EQ Loads EQ Zone 2 (NZS3604), Site Subsoil Class D c. Snow Loads 0.63kPa (3deg. pitch, 10m elevation)
5.0 Means of Compliance
a. Foundations – VM1/VM4 (NZS1170, NZS3101, MBIE Guidance) b. Beams – VM1 (NZS1170, NZS3404, NZS3603) c. Balustrade framing – VM1 (NZS1170, NZS3603)
6.0 Designers Notes
All other items not listed to NZS3604:2011 by architect

Engco Consulting
Simply Supported Beam Spreadsheet



Job: 29 Pegasus Main Road
Beams: Garage Door Lintel - GD01
Description: Supports trusses (3.15m) and brick parapit cladding (1.05m) - 4.9m span

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Beam Geometry & Material Properties

Span =	4900 mm	Section =	PFC	E =	205 GPa	ϕ =	0.9
Trib Width =	3150 mm		200PFC	f_y , flange =	300 MPa	S_s/S_u =	0.374
Material =	Steel	I =	$19.1 \times 10^6 \text{ mm}^4$	f_y , web =	320 MPa	W_s/W_u =	0.676049383
Beam Weight =	0.22 kN/m	Ze =	$221 \times 10^3 \text{ mm}^3$	Aw =	1200 mm ²		

Beam Use (short-term, long-term & combination factors from table 4.1)		ψ_s	ψ_L	ψ_c
Roof beam	UDL	0.7	0	0
All other roofs	Point Load	1	0	0

Uniformly distributed Loads

	Area Load	Line Load	Combined UDL
G =	0.40 kPa	1.6 kN/m	3.06 kN/m
Q =	0.25 kPa	0.0 kN/m	0.79 kN/m
Su =	0.63 kPa	0.0 kN/m	1.98 kN/m
Wu (uplift) =	-1.10 kPa	0.0 kN/m	-3.47 kN/m

Concentrated Loads

	Point Load	Distance from end
G =	0.0 kN	500 mm
Q =	0.0 kN	
Su =	0.0 kN	
Wu (uplift) =	0.0 kN	

Serviceability Load Combinations: Deflection checks

SLS Cases	UDL	pt. load	Deflections	Limits	Reactions
G	3.06 kN/m	0.00 kN	5.87 mm	Span/835	G = 7.50 kN
Q	0.79 kN/m	0.00 kN	1.51 mm	Span/3246	Q = 1.93 kN
Ws	-2.34 kN/m	0.00 kN	-4.49 mm	Span/1091	Su = 4.86 kN
Ss	0.74 kN/m	0.00 kN	1.42 mm	Span/3444	Wu (uplift) = -8.49 kN
G + $\psi_s Q$	3.61 kN/m	0.00 kN	6.92 mm	Span/708	
G + Ws (up)	0.72 kN/m	0.00 kN	1.37 mm	Span/3564	
G + Ss + $\psi_c Q$	3.80 kN/m	0.00 kN	7.29 mm	Span/672	
1kN Vibration check	Only req. for floor beams			Good	

Ultimate Load Combinations: Strength checks - Assumes beam is fully restrained & full web shear capacity of unstiffened web is available

ULS Cases	UDL	pt. load	M*	V*	$\phi M_n (\phi f_y Z_e)$	$\phi V_n (\phi 0.6 f_y A_w)$
1.35G	4.13 kN/m	0.00 kN	12.4 kNm	10.1 kN	59.67 kNm	207.36 kN
1.2G + 1.5Q	4.85 kN/m	0.00 kN	14.6 kNm	11.9 kN	59.67 kNm	207.36 kN
0.9G + Wu	-0.71 kN/m	0.00 kN	-2.13 kNm	-1.7 kN	59.67 kNm	207.36 kN
1.2G + Su + $\psi_c Q$	5.66 kN/m	0.00 kN	17.0 kNm	13.9 kN	59.67 kNm	207.36 kN
G+0.4Q	3.37 kN/m	0.00 kN	10.1 kNm	8.3 kN	59.67 kNm	207.36 kN

Designer notes

Beam Required: 200PFC
Brick weight = 0.19kN/m ² per 10mm thickness (NZS1170.1) - 70 series veneer = 1.33kPa (Allow 1.5kPa)

Engco Consulting
Timber Post Design Spreadsheet



Job: 29 Pegasus Main Road
Post:
Description:

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Column Geometry & Material Properties

Length =	2460 mm	depth =	140 mm	I =	20.6x10 ⁶ mm ⁴	φ =	0.8
Spacing =	300 mm	breadth =	90 mm	E =	6.7 GPa	A =	12600mm ²
Dry or Wet?	Dry	# of elements =	2	fb =	14.0 MPa	k2 (creep) =	2
Material =	SG8			fs =	3.8 MPa		
Loaded flange restraint length =	800 mm			fc =	18.0 MPa	Ss/Su =	0.374
Unloaded flange restraint length =	2460 mm			ft =	6.0 MPa	Ws/Wu =	0.676049383

X End constraint	Pinned-Pinned	(refer to table)	k10 x =	1.00			
Y End constraints	Pinned-Pinned	(refer to table)	k10 y =	1.00			
Lax =	2460 mm		S2 =	17.57			
Lay =	800 mm		S3 =	8.89			
One edge continuously restrained?	no	(Cl. 3.3.3.2)	k8 x =	0.79	k8 (positive bending) =	1.000	
			k8 y =	1.00	k8 (negative bending) =	1.000	

Post Use (short-term, long-term & combination factors from table 4.1)		ψ_s	ψ_L	ψ_c
Roof support	UDL	0.7	0	0
All other roofs	Point Load	1	0	0

Uniformly distributed Loads on face of member

	Area Load	Line Load	Combined UDL
Wu =	0.85 kPa	0.0 kN/m	0.26 kN/m

Point loads to top of post

	Point Load	Eccentricity	
G =	7.5 kN	45 mm	
Q =	1.9 kN		
Su =	4.9 kN		
Wu (uplift) =	-8.5 kN		

Allow beam to bear on column face

Serviceability Load Combinations: Deflection checks

SLS Cases	UDL	Deflections	Limits
Ws	0.17 kN/m	0.60 mm	Span/ 4126
			Span/ 150

Ultimate Load Combinations: Strength checks

ULS Cases	UDL	N*	M*	V*	k1
1.35G	-	10.12 kN	0.46 kNm	-	0.6
1.2G + 1.5Q	-	11.89 kN	0.54 kNm	-	0.8
1.2G + Su + ψcQ	-	13.86 kN	0.62 kNm	-	0.8
0.9G + Wu	0.26 kN/m	-1.74 kN	0.27 kNm	0.31 kN	1
G+0.4Q	-	7.50 kN	0.34 kNm	-	1
	Mitek Type F	4.00 kN			

ULS Cases	φNnx	φNny	φNn	φMn	φVn	Combined Action Checks	
1.35G	85.84 kN	108.86 kN	85.84 kN	1.98 kNm	-	0.35	0.15
1.2G + 1.5Q	114.45 kN	145.15 kN	114.45 kN	2.63 kNm	-	0.31	0.12
1.2G + Su + ψcQ	114.45 kN	145.15 kN	114.45 kN	2.63 kNm	-	0.36	0.15
0.9G + Wu	60.48 kN	60.48 kN	60.48 kN	3.29 kNm	25.54 kN	0.05	0.00
G+0.4Q	143.06 kN	181.44 kN	143.06 kN	3.29 kNm	-	0.15	0.05

Designer notes

Post Required: 140 x 90 SG8

Engco Consulting
Simply Supported Beam Spreadsheet



Job: 29 Pegasus Main Road
Beam: Floor beam above breakfast bar
Description: Supports Floor joists (2.3m), Iron Wall cladding (3.5m) & Trusses via framing (3.3m) - Spans 3.75m

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Beam Geometry & Material Properties

Span =	3740 mm	depth =	300 mm	I =	202.5x10 ⁶ mm ⁴	φ =	0.8
Trib Width =	3320 mm	width =	90 mm	E =	13.2 GPa	k ₂ (creep) =	2
Dry or Wet?	Dry	# of elements =	2	fb =	48.0 MPa	k ₂₄ =	0.838
Material =	LVL13	Beam Weight =	0.12 kN/m	fs =	4.6 MPa	Ss/Su =	0.374
Top flange restraint length =	2400 mm			k _g (positive bending) =	0.977	Ws/Wu =	0.676049383
Bottom flange restraint length =	2400 mm			k _g (negative bending) =	0.977		

Beam Use (short-term, long-term & combination factors from table 4.1)

	UDL	ψ _s	ψ _L	ψ _c
Roof beam		0.7	0	0
All other roofs	Point Load	1	0	0

Uniformly distributed Loads

	Area Load	Line Load	Combined UDL
G =	0.40 kPa	2.6 kN/m	4.01 kN/m
Q =	0.25 kPa	3.5 kN/m	4.30 kN/m
Su =	0.63 kPa	0.0 kN/m	2.09 kN/m
Wu (uplift) =	-1.10 kPa	0.0 kN/m	-3.65 kN/m

Concentrated Loads

	Point Load	Distance from end
G =	0.0 kN	500 mm
Q =	0.0 kN	
Su =	0.0 kN	
Wu (uplift) =	0.0 kN	

Serviceability Load Combinations: Deflection checks

SLS Cases	Effective UDL	pt. load	Deflections	Limits	Reactions
k2G	8.01 kN/m	0.00 kN	7.64 mm	Span/ 490	G = 7.49 kN
Q	4.30 kN/m	0.00 kN	4.09 mm	Span/ 914	Q = 8.03 kN
Ws	-2.47 kN/m	0.00 kN	-2.35 mm	Span/ 1589	Su = 3.91 kN
Ss	0.78 kN/m	0.00 kN	0.75 mm	Span/ 5016	Wu (uplift) = -6.83 kN
k2G + ψ _s Q	11.02 kN/m	0.00 kN	10.50 mm	Span/ 356	
k2 (G + ψ _L Q)	8.01 kN/m	0.00 kN	7.64 mm	Span/ 490	
k2G + Ws (up)	5.55 kN/m	0.00 kN	5.29 mm	Span/ 708	
k2G + Ss + ψ _c Q	8.80 kN/m	0.00 kN	8.38 mm	Span/ 446	
Vibration check					Only req. for floor beams

k₂ for roof beams
% of dead load applied before ceiling linings?
0% **k₂ = 2.0**

Ultimate Load Combinations: Strength checks

ULS Cases	UDL	pt. load	M*	V* (reactions)	k ₁	φMn	φVn
1.35G	5.41 kN/m	0.00 kN	9.46 kNm	10.12 kN	0.6	25.46 kNm	39.74 kN
1.2G + 1.5Q	11.25 kN/m	0.00 kN	19.67 kNm	21.04 kN	0.8	33.94 kNm	52.99 kN
1.2G + Su + ψ _c Q	6.90 kN/m	0.00 kN	12.06 kNm	12.90 kN	0.8	33.94 kNm	52.99 kN
0.9G + Wu	-0.05 kN/m	0.00 kN	-0.08 kNm	-0.09 kN	1	-42.43 kNm	66.24 kN
G+0.4Q	5.73 kN/m	0.00 kN	12.06 kNm	12.90 kN	1	42.43 kNm	66.24 kN

Hold Down fixing: **Mitek Type G** 7.50 kN

Designer notes

Beam Required: 300 x 90 LVL13
Floor weight: G = 0.5kPa x 2.3m = 1.15kN/m Q = 1.5kPa x 2.3m = 3.45kN/m
Wall Cladding weight = 0.4kPa x 3.5m = 1.4kN/m

Engco Consulting
Timber Post Design Spreadsheet



Job: 29 Pegasus Main Road
Post:
Description:

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Column Geometry & Material Properties

Length =	2460 mm	depth =	140 mm	I =	20.6x10 ⁶ mm ⁴	φ =	0.8
Spacing =	300 mm	breadth =	90 mm	E =	6.7 GPa	A =	12600mm ²
Dry or Wet?	Dry	# of elements =	2	fb =	14.0 MPa	k2 (creep) =	2
Material =	SG8			fs =	3.8 MPa		
Loaded flange restraint length =	800 mm			fc =	18.0 MPa	Ss/Su =	0.374
Unloaded flange restraint length =	2460 mm			ft =	6.0 MPa	Ws/Wu =	0.676049383

X End constraint	Pinned-Pinned	(refer to table)	k10 x=	1.00			
Y End constraints	Pinned-Pinned	(refer to table)	k10 y=	1.00			
Lax=	2460 mm		S2=	17.57			
Lay=	800 mm		S3=	5.44			
One edge continuously restrained?	yes	(Cl. 3.3.3.2)	k8 x=	0.79	k8 (positive bending) =	1.000	
			k8 y=	1.00	k8 (negative bending) =	1.000	

Post Use (short-term, long-term & combination factors from table 4.1)		ψ_s	ψ_L	ψ_c
Roof support	UDL	0.7	0	0
All other roofs	Point Load	1	0	0

Uniformly distributed Loads on face of member

	Area Load	Line Load	Combined UDL
Wu =	0.00 kPa	0.0 kN/m	0.00 kN/m

Point loads to top of post

	Point Load	Eccentricity	
G =	7.5 kN	45 mm	
Q =	8.0 kN		
Su =	3.9 kN		
Wu (uplift) =	-6.8 kN		

Allow beam to bear on column face

Serviceability Load Combinations: Deflection checks

SLS Cases	UDL	Deflections	Limits
Ws	0.00 kN/m	0.00 mm	#DIV/0!
			Span/ 150

Ultimate Load Combinations: Strength checks

ULS Cases	UDL	N*	M*	V*	k1
1.35G	-	10.12 kN	0.46 kNm	-	0.6
1.2G + 1.5Q	-	21.04 kN	0.95 kNm	-	0.8
1.2G + Su + ψcQ	-	12.90 kN	0.58 kNm	-	0.8
0.9G + Wu	0.00 kN/m	-0.09 kN	0.00 kNm	0.00 kN	1
G+0.4Q	-	7.49 kN	0.34 kNm	-	1
Mitek Type F		4.00 kN			

ULS Cases	φNnx	φNny	φNn	φMn	φVn	Combined Action Checks	
1.35G	85.84 kN	108.86 kN	85.84 kN	1.98 kNm	-	0.35	0.15
1.2G + 1.5Q	114.45 kN	145.15 kN	114.45 kN	2.63 kNm	-	0.54	0.27
1.2G + Su + ψcQ	114.45 kN	145.15 kN	114.45 kN	2.63 kNm	-	0.33	0.14
0.9G + Wu	60.48 kN	60.48 kN	60.48 kN	3.29 kNm	25.54 kN	0.00	0.00
G+0.4Q	143.06 kN	181.44 kN	143.06 kN	3.29 kNm	-	0.15	0.05

Designer notes

Post Required: 140 x 90 SG8

Engco Consulting
Simply Supported Beam Spreadsheet



Job: 29 Pegasus Main Road
Beam: Floor trimmer over hall / bedroom
Description: Supports wall framing (3.2m) & nominal roof/ floor loads - Spans 2.65m

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Beam Geometry & Material Properties

Span =	2650 mm	depth =	240 mm	I =	103.7x10 ⁶ mm ⁴	φ =	0.8
Trib Width =	400 mm	width =	90 mm	E =	6.7 GPa	k2 (creep) =	2
Dry or Wet?	Dry	# of elements =	2	fb =	14.0 MPa		
Material =	SG8	Beam Weight =	0.10 kN/m	fs =	3.8 MPa	Ss/Su =	0.374
Top flange restraint length =	2400 mm			k _g (positive bending) =	0.998	Ws/Wu =	0.676049383
Bottom flange restraint length =	2400 mm			k _g (negative bending) =	0.998		

Beam Use (short-term, long-term & combination factors from table 4.1)

	UDL	ψ _s	ψ _L	ψ _c
Floor beam		0.7	0.4	0.4
Residential & domestic	Point Load	1	0.4	0.4

Uniformly distributed Loads

	Area Load	Line Load	Combined UDL
G =	0.90 kPa	1.3 kN/m	1.74 kN/m
Q =	1.75 kPa	0.0 kN/m	0.70 kN/m
Su =	0.63 kPa	0.0 kN/m	0.25 kN/m
Wu (uplift) =	-1.10 kPa	0.0 kN/m	-0.44 kN/m

Concentrated Loads

	Point Load	Distance from end
G =	0.0 kN	500 mm
Q =	0.0 kN	
Su =	0.0 kN	
Wu (uplift) =	0.0 kN	

Serviceability Load Combinations: Deflection checks

SLS Cases	Effective UDL	pt. load	Deflections	Limits	Reactions
k2G	3.48 kN/m	0.00 kN	3.22 mm	Span/ 824	G = 2.30 kN
Q	0.70 kN/m	0.00 kN	0.65 mm	Span/ 4095	Q = 0.93 kN
Ws	-0.30 kN/m	0.00 kN	-0.27 mm	Span/ 9637	Su = 0.33 kN
Ss	0.09 kN/m	0.00 kN	0.09 mm	Span/ 30417	Wu (uplift) = -0.58 kN
k2G + ψ _s Q	3.97 kN/m	0.00 kN	3.67 mm	Span/ 722	
k2 (G + ψ _L Q)	4.04 kN/m	0.00 kN	3.73 mm	Span/ 710	
k2G + Ws (up)	3.18 kN/m	0.00 kN	2.94 mm	Span/ 901	
k2G + Ss + ψ _c Q	3.85 kN/m	0.00 kN	3.56 mm	Span/ 744	
1kN Vibration check			0.56 mm	<1mm	Good

Ultimate Load Combinations: Strength checks

ULS Cases	UDL	pt. load	M*	V* (reactions)	k1	φMn	φVn
1.35G	2.35 kN/m	0.00 kN	2.06 kNm	3.11 kN	0.6	5.79 kNm	26.27 kN
1.2G + 1.5Q	3.14 kN/m	0.00 kN	2.75 kNm	4.16 kN	0.8	7.73 kNm	35.02 kN
1.2G + Su + ψ _c Q	2.62 kN/m	0.00 kN	2.30 kNm	3.47 kN	0.8	7.73 kNm	35.02 kN
0.9G + Wu	1.13 kN/m	0.00 kN	0.99 kNm	1.49 kN	1	9.66 kNm	43.78 kN
G+0.4Q	2.02 kN/m	0.00 kN	2.30 kNm	3.47 kN	1	9.66 kNm	43.78 kN

Hold Down fixing: **Mitek Type G** 7.50 kN

Designer notes

Beam Required: 240 x 90 SG8

Engco Consulting
Simply Supported Beam Spreadsheet



Job: 29 Pegasus Main Road
Beam: Floor trimmer over bedroom
Description: Supports floor trimmer 1, wall framing (3.2m), roof (3.5m) & floor (half span only, 2.3m) - Spans 3.

Job No: 21008.083
Date: 14/06/2021
Designer: JW

Beam Geometry & Material Properties

Span =	3100 mm	depth =	300 mm	I =	202.5x10 ⁶ mm ⁴	φ =	0.8
Trib Width =	3500 mm	width =	90 mm	E =	13.2 GPa	k2 (creep) =	2
Dry or Wet?	Dry	# of elements =	2	fb =	48.0 MPa	k ₂₄ =	0.838
Material =	LVL13	Beam Weight =	0.12 kN/m	fs =	4.6 MPa	Ss/Su =	0.374
Top flange restraint length =	2400 mm			k _g (positive bending) =	0.977	Ws/Wu =	0.676049383
Bottom flange restraint length =	2400 mm			k _g (negative bending) =	0.977		

Beam Use (short-term, long-term & combination factors from table 4.1)	UDL	ψ _s	ψ _L	ψ _c
Floor beam		0.7	0.4	0.4
Residential & domestic	Point Load	1	0.4	0.4

Uniformly distributed Loads

	Area Load	Line Load	Combined UDL
G =	0.40 kPa	2.4 kN/m	3.95 kN/m
Q =	0.25 kPa	3.5 kN/m	4.33 kN/m
Su =	0.63 kPa	0.0 kN/m	2.21 kN/m
Wu (uplift) =	-1.10 kPa	0.0 kN/m	-3.85 kN/m

Concentrated Loads

	Point Load	Distance from end
G =	2.3 kN	1450 mm
Q =	0.9 kN	
Su =	0.3 kN	
Wu (uplift) =	-0.6 kN	

Serviceability Load Combinations: Deflection checks

SLS Cases	Effective UDL	pt. load	Deflections	Limits	Reactions
k2G	7.91 kN/m	4.61 kN	4.62 mm	Span/ 671	G = 7.36 kN
Q	4.33 kN/m	0.93 kN	2.16 mm	Span/ 1435	Q = 7.20 kN
Ws	-2.60 kN/m	-0.39 kN	-1.26 mm	Span/ 2457	Su = 3.60 kN
Ss	0.82 kN/m	0.12 kN	0.40 mm	Span/ 7754	Wu (uplift) = -6.28 kN
k2G + ψ _s Q	10.94 kN/m	5.54 kN	6.20 mm	Span/ 500	
k2 (G + ψ _L Q)	11.37 kN/m	5.35 kN	6.35 mm	Span/ 488	
k2G + Ws (up)	5.31 kN/m	4.22 kN	3.36 mm	Span/ 923	
k2G + Ss + ψ _c Q	10.46 kN/m	5.11 kN	5.89 mm	Span/ 527	
1kN Vibration check			0.23 mm	<1mm	Good

Ultimate Load Combinations: Strength checks

ULS Cases	UDL	pt. load	M*	V* (reactions)	k1	φMn	φVn
1.35G	5.34 kN/m	3.11 kN	8.79 kNm	9.93 kN	0.6	25.46 kNm	39.74 kN
1.2G + 1.5Q	11.23 kN/m	4.16 kN	16.65 kNm	19.62 kN	0.8	33.94 kNm	52.99 kN
1.2G + Su + ψ _c Q	8.68 kN/m	3.47 kN	13.06 kNm	15.30 kN	0.8	33.94 kNm	52.99 kN
0.9G + Wu	-0.29 kN/m	1.49 kN	0.80 kNm	0.34 kN	1	42.43 kNm	66.24 kN
G+0.4Q	5.68 kN/m	2.68 kN	13.06 kNm	15.30 kN	1	42.43 kNm	66.24 kN

Hold Down fixing: **Mitek Type G** 7.50 kN

Designer notes

Beam Required: 300 x 90 LVL13



ENGCO
Consulting Engineers

Job No:

Project:

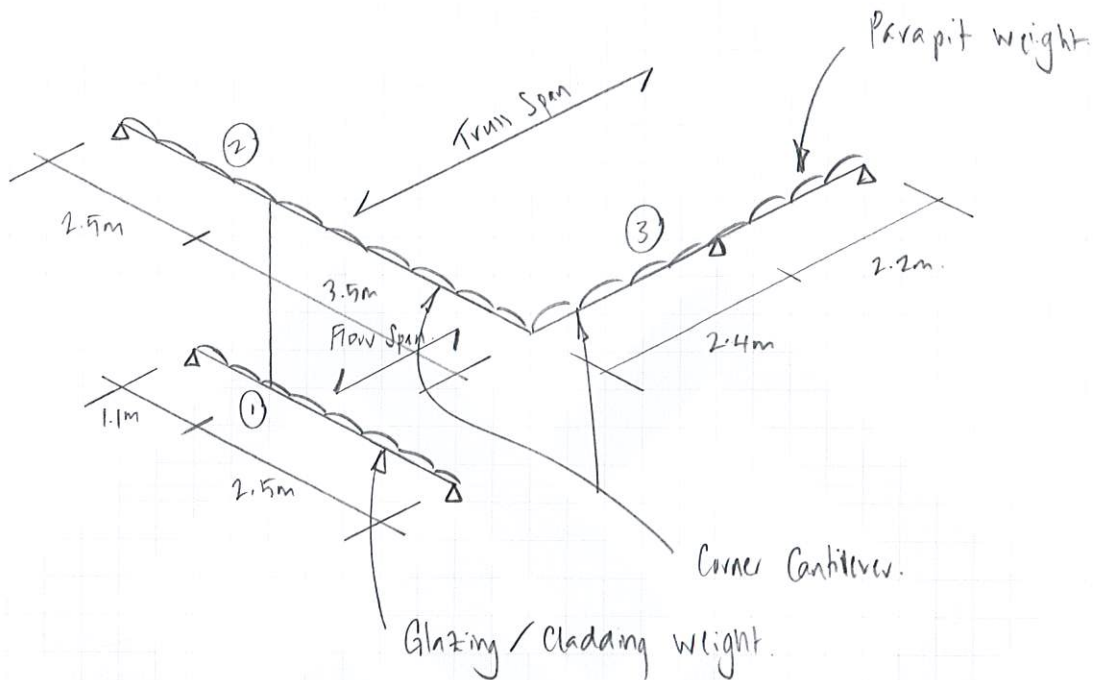
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By:

Canthilever Corner Beams.



loads:

B1 - $G_{wall} = 2.4m \times 0.4 kPa$
 $= 0.96 kN/m$
 $G_{balustrade} = 1.0m \times 0.4 kPa$
 $= 0.4 kN/m$
 $G_{flow} = 2.3m \times 0.5 kPa$
 $= 1.15 kN/m$
 $G_{all} = 2.3m \times 1.5 kPa$
 $= 3.45 kN/m$

B2 - $G_{parapit} = 1.0m \times 0.4 kPa$
 $= 0.4 kN/m$
 $G_{roof} = 2.3m \times 0.4 kPa$
 $= 0.92 kN/m$
 $G_{solar} = 2.3m \times 0.25 kPa$
 $= 0.58 kN/m$
 $S_n = 2.3m \times 0.63 kPa$
 $= 1.45 kN/m$
 $W_n = 2.3m \times -1.10 kPa$
 $= -2.53 kN/m$

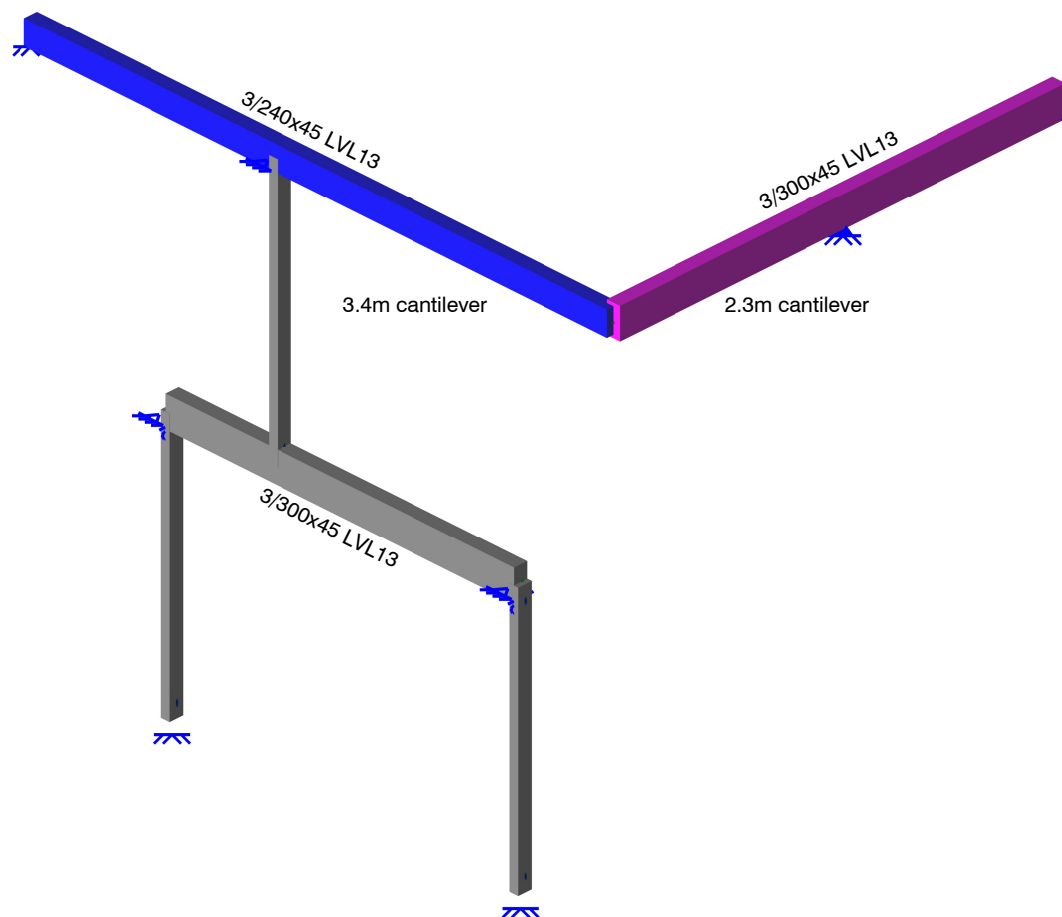
B3 - $G_{parapit} = 0.4 kN/m$



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Designer: Date: Monday, June 14, 2021 7:38 AM, Page: 1



Viewpoint (45,30)

Materials:

1 LVL13

2 SG8 (2-3)

Sections:

1 300x135

2 240x135

3 300x135

10 140x90

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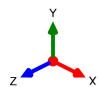
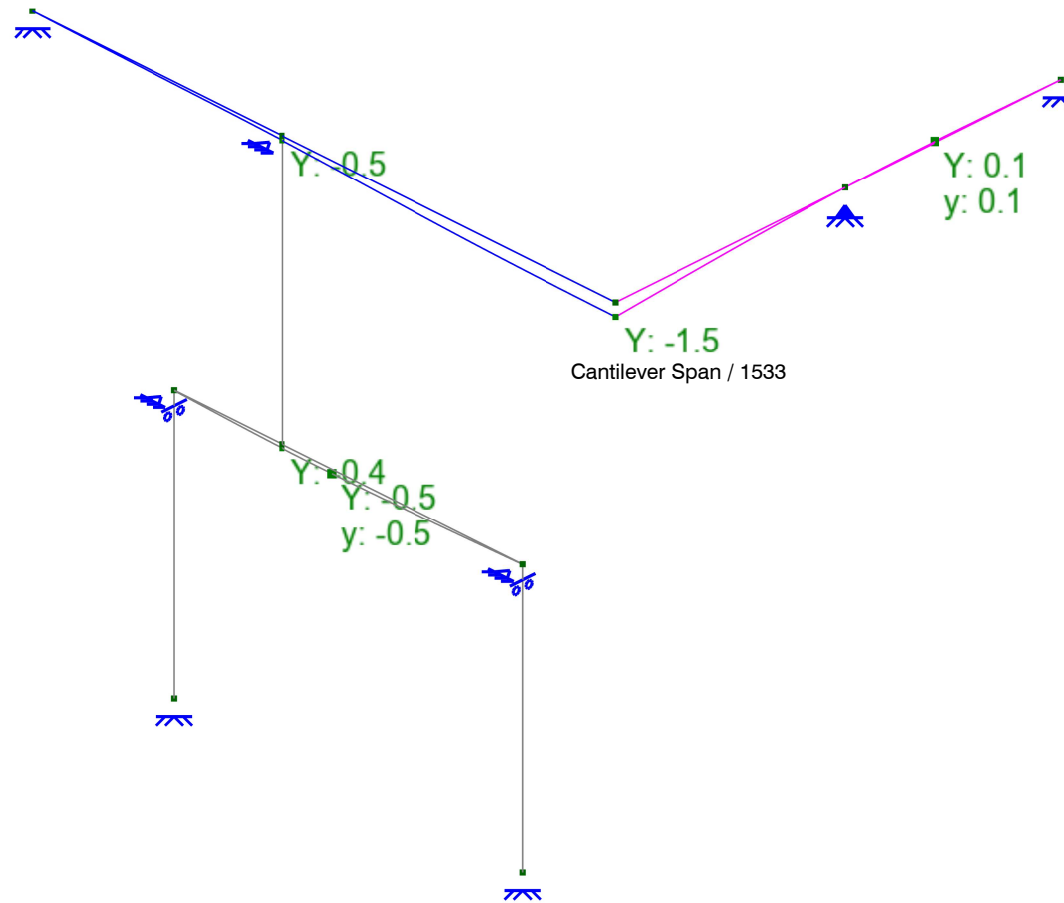
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Designer: Date: Monday, June 14, 2021 7:40 AM, Page: 1



Load case 52

52 Ss



Viewpoint (45,30), Displacements

Materials:		Sections:	
1	LVL13	1	300x135
2	SG8 (2-3)	2	240x135
		3	300x135
		10	140x90

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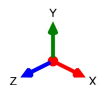
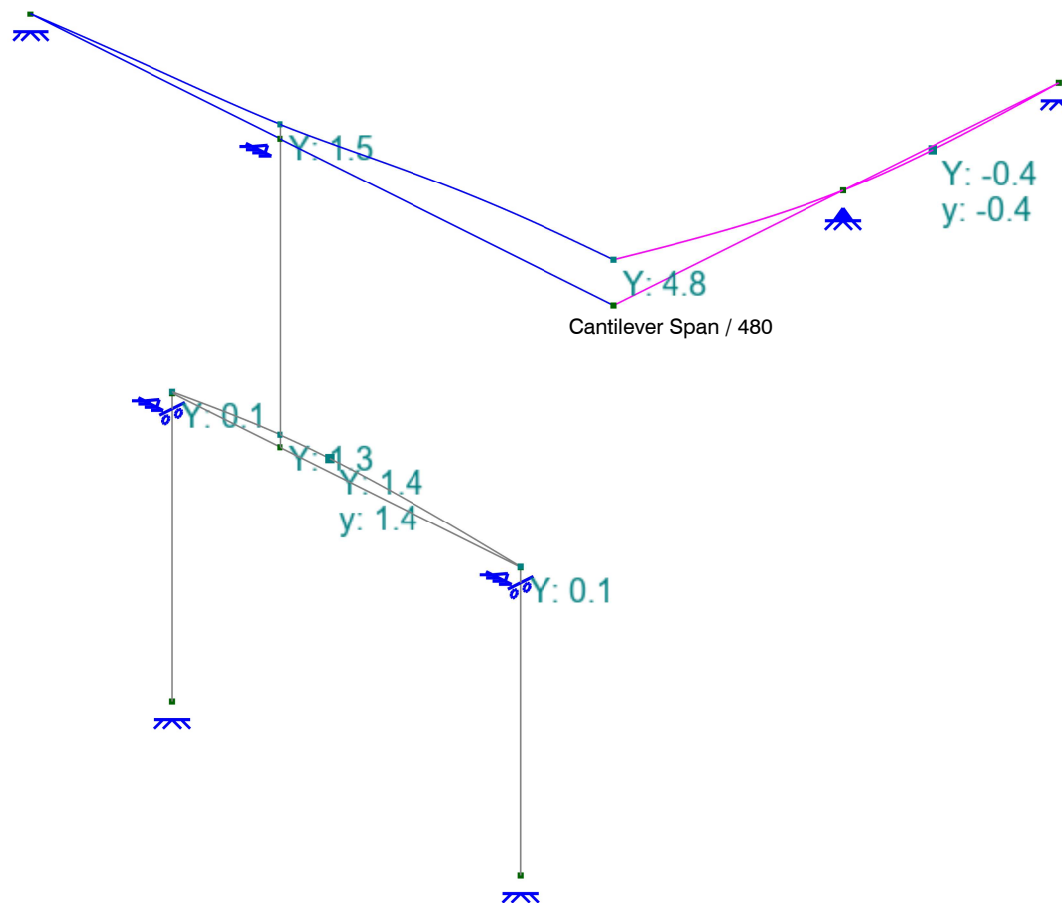
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Designer: Date: Monday, June 14, 2021 7:40 AM, Page: 1



Load case 53

53 Ws



Viewpoint (45,30), Displacements

Materials:

1 LVL13

2 SG8 (2-3)

Sections:

1 300x135

2 240x135

3 300x135

10 140x90

SPACE GASS 14.00 - THE ENGINEERING COMPANY LTD T/AS: ENGCO

Path: C:\Users\JoshWatkins\...\4 Engineering\21008.083-CornerCantileverBeams

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Load cases 71-74

(1) ULS

71 1.35G

72 1.2G+1.5Q

73 1.2G+Su+0.4Q

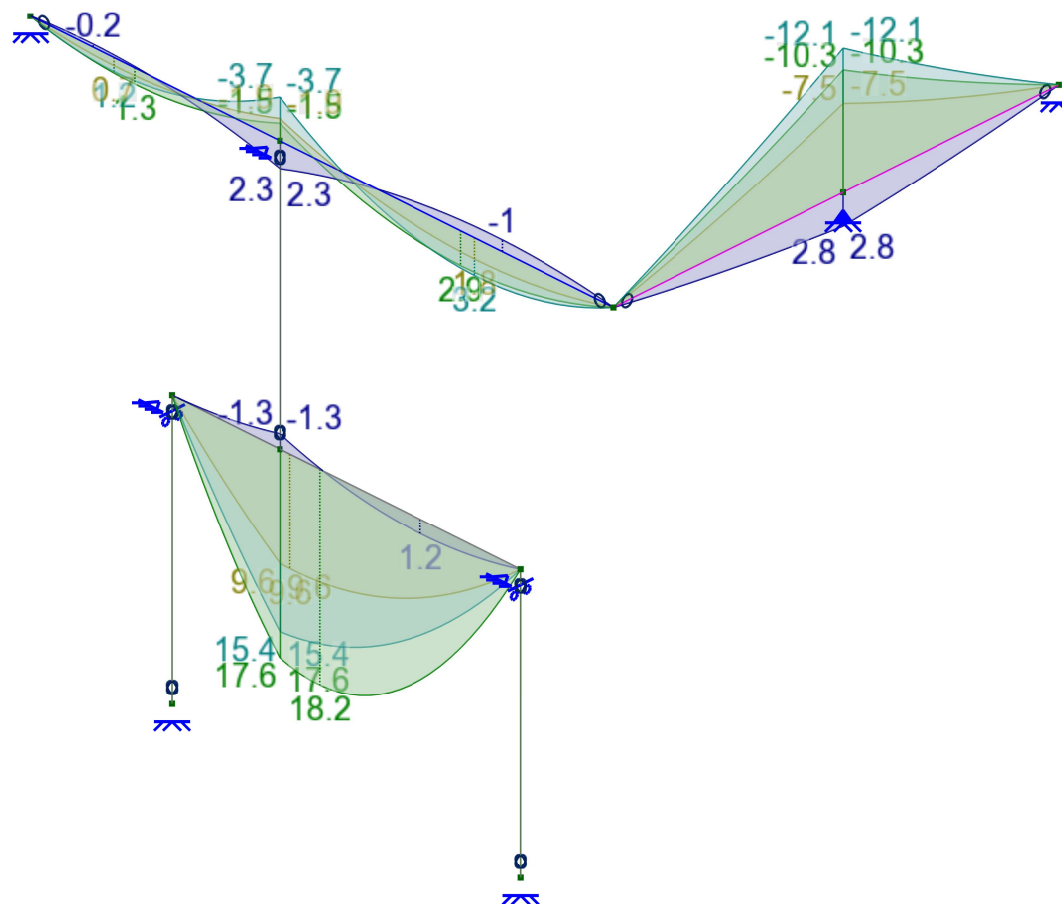
74 0.9G+Wu

3/300x45 LVL13

$0.8 \times 0.8 \times 1.0 \times 0.83 \times 48\text{MPa} \times (300^2 \times 135/6)\text{mm}^3 = 51.6\text{kNm}$

3/240x45 LVL13

$0.8 \times 0.8 \times 1.0 \times 0.86 \times 48\text{MPa} \times (240^2 \times 135/6)\text{mm}^3 = 34.2\text{kNm}$



Viewpoint (45,30), Moments

Materials:

1 LVL13

2 SG8 (2-3)

Sections:

1 300x135

2 240x135

3 300x135

10 140x90



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Stairwell wind beams.

3.75m span (running parallel to stairs).

Trib height = $5.33m / 2$
= 2.7m.

$W_u = 0.85 kPa$

$W_s = 0.57 kPa$

$$M^k = (2.7m \times 0.85 kPa) \times 3.75^2 / 8$$

$$= 4.03 kNm$$

240 x 90 beam spanning about weak axis.

$$I_M = 0.8 \times 1.0 \times 1.0 \times 35 mPa \times (90^2 \times 240 / 6) mm^3$$

$$= 9.0 kNm$$

⇒ 240 by 90 ok.

$$\Delta = \frac{5 \times (2.7m \times 0.57 kPa) \times 3.75^4}{384 \times 9.5 GPa \times 14.6 \times 10^6 mm^4}$$

$$= 28.8 mm$$

= span / 130

⇒ No good.

Try 240 x 135 GL beam.

$$I_M = 0.8 \times 1.0 \times 1.0 \times 22 mPa \times (135^2 \times 240 / 6) mm^3$$

$$= 12.8 kNm$$

$$\Delta = \frac{5 \times (2.7m \times 0.57 kPa) \times 3.75^4}{384 \times 10.0 GPa \times 49.2 \times 10^6 mm^4}$$

$$= 8.0 mm$$

$$= span / 468$$

⇒ 240 x 135 GL

2.05m span : 240 x 90 Igl.

$$M^k = 1.21 kNm$$

$$I_M = 0.8 \times 1.0 \times 1.0 \times 14 mPa \times (90^2 \times 240 / 6) mm^3$$

$$= 3.6 kNm$$

$$\Delta = \frac{5 \times (2.7m \times 0.57 kPa) \times 2.05^4}{384 \times 5.4 GPa \times 14.6 \times 10^6 mm^4}$$

$$= 4.8 mm$$

$$= span / 455$$

⇒ 240 x 90 Igl





Job No:

Project:

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Internal Balustrade

Glass barrier top mounted to floor structure (design by others).

Floor structure design by Engco.

$$\begin{aligned} \text{Loads:} \quad & \text{Top rail } q = 0.75 \text{ kN/m} \quad \text{or} \quad 0.6 \text{ kN} \\ & \text{Infill } q = 1.0 \text{ kPa} \quad \text{or} \quad 0.5 \text{ kN} \end{aligned}$$

By inspection top rail loading critical.

$$\begin{aligned} \text{Moment:} \quad & (1.5 \times 0.75 \text{ kN/m}) \times 1.05 \text{ m} \\ & = 1.18 \text{ kNm/m} \end{aligned}$$

$$\begin{aligned} \text{Gravity:} \quad & 1.2 \times (0.4 \text{ kPa} \times 1.0 \text{ m}) + 1.5 \times 0.75 \text{ kN/m} \\ & = 1.6 \text{ kN/m} \end{aligned}$$

Balustrade fixed into blocking between floor joists.

- vertical loads supported via skew nails.
- moment restrained by C/C brackets.

$$\begin{aligned} \text{Skew nails:} \quad & V^* = 1.6 \text{ kN/m} \times 0.4 \text{ m} / 2 \\ & = 0.32 \text{ kN} \end{aligned}$$

$$(4) \quad 90 \times 3.15 \text{ nail} \quad (\text{min})$$

$$\phi V = 1.62 \text{ kN.}$$

⇒ ok.

CPC brackets

$$\begin{aligned} M^* &= 1.18 \text{ kNm/m} \times 0.4 \text{ m} / 2 \\ &= 0.24 \text{ kNm.} \end{aligned}$$

push / pull between brackets (spaced 20mm apart).

$$\begin{aligned} N^*_{\text{cleat}} &= 0.24 \text{ kNm} / 0.2 \text{ m} \\ &= 1.18 \text{ kN} \end{aligned}$$

$$\text{CPC40:} \quad Q_k = 4.0 \text{ kN.}$$

$$\begin{aligned} \phi N_k &= 0.7 \times 0.8 \times 4.0 \\ &= 2.24 \text{ kN} \\ &(\phi M = 0.45 \text{ kNm}) \end{aligned}$$



Project: Van De Geest Building Ltd
 Job No: 21008.083
 Date: APRIL 2021
 Page: 1



TC2 Ribraft Slab – Design Notes

29 Pegasus Main Street, Pegasus

1. Geotechnical Reference:

See Soil Bearing Investigation Report by **Constructure Structural Engineering** – dated **18 November 2020**, ref **I1898**

Report Synopsis:

- Slab required for TC2 conditions.
- Report suggests 200kPa ult. bearing capacity is available 100mm below the surface.

2. TC2 Design Considerations:

Enhanced TC2 ribraft slabs are specifically engineered to meet the intent of Part A, Section 5.4 to the MBIE Dec 2012 “Guidance” (Version C) document, that is to provide resistance against potential loss of bearing under the slab due to liquefaction induced settlement of the founding soil, the slab must:

- Be robust enough to cope with 2.0m of loss of bearing around the edges and 4m at any point across the internal point of the slab.
- Capable of coping with 100mm of ULS settlement and be easily repairable
- Pads shall be tied to slabs where the geotechnical report identifies lateral spread potential and shall be detailed so that any damage from differential settlement is easily repairable.

3. Slab Design:

Steel fibre reinforcement (SFR) has been added to the concrete primarily to meet the shear strength requirements. A spreadsheet is used to calculate the neutral axis depth in accordance with NZS3101 – appendix to section C5, so that the section flexural capacity can be calculated with various steel configurations. The value “a” is adjusted until the internal section actions balance (i.e. $C = T$). Once the neutral axis is known by iteration, the section strength can be determined. The section capacities for the five critical load cases are attached.

4. Design Load Cases:

These are described on the following pages. Essentially these cover the worst case scenarios of the loss of bearing requirements required to be considered by section 5.4 of the MBIE “Guidance” document.

- LC 1 = Cantilevering of slab 2m at edge
- LC 2 = Cantilevering of edge beam 2m at corners
- LC 3 = Edge beam spanning a 4m internal loss of bearing
- LC 4 = Internal slab spanning 4m loss of bearing with a LB wall and beam in the centre
- LC 5 = Internal beam with 4m loss of bearing supporting a LB wall.

These load cases are described on the following pages, 2 & 3.

5. House Description:

The proposed house is a two storey timber framed building with a light clad trussed roof and typically light weight wall cladding with part of the lower wall cladding being heavy weight.



TC2 Ribraft Slab –‘Loss of bearing’ Load Cases 1 & 2

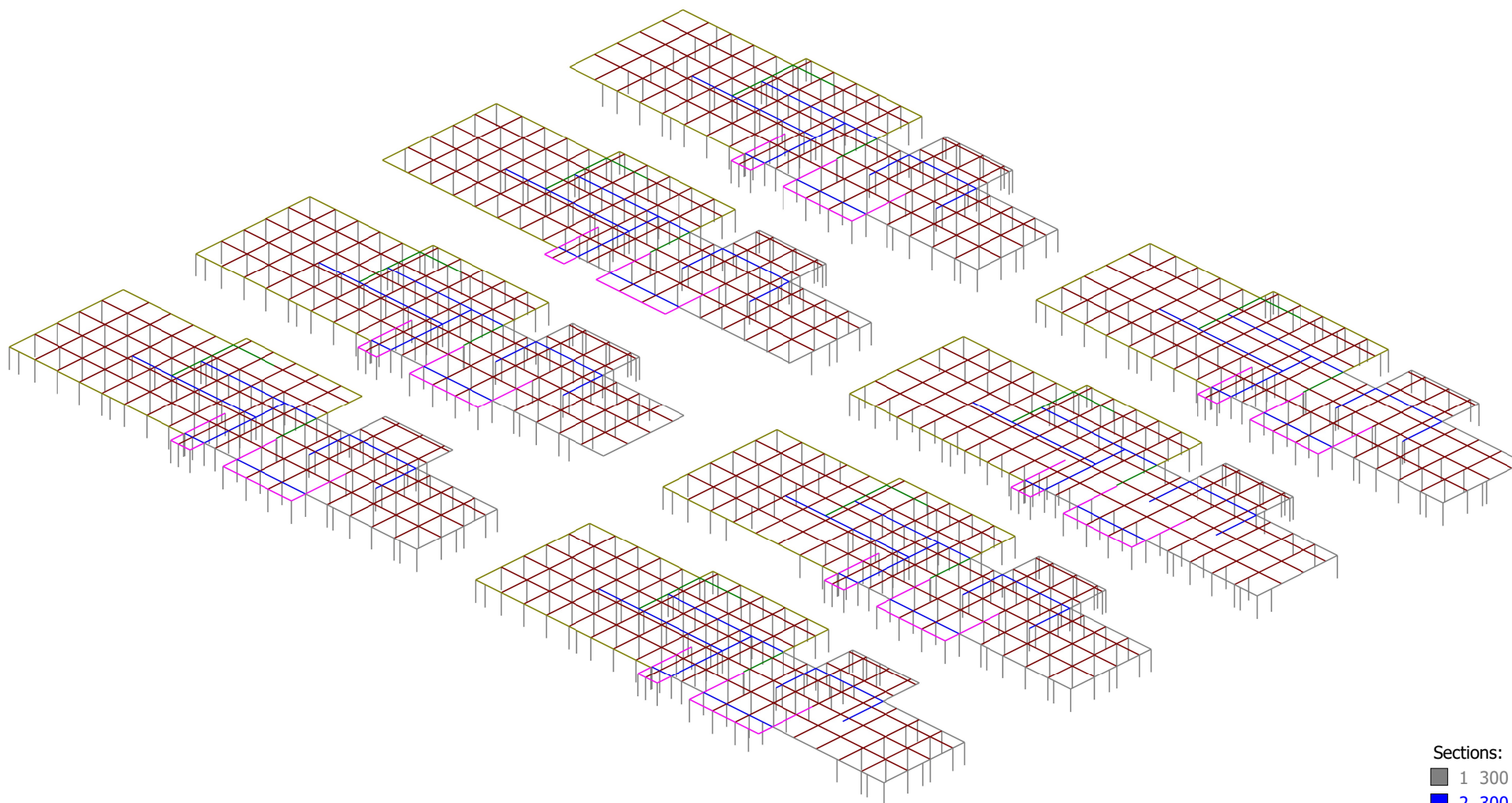


TC2 Ribraft Slab –‘Loss of bearing’ Load Cases 3, 4 & 5

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Designer: Date: Monday, June 14, 2021 8:49 AM, Page: 1



Viewpoint (45,30)

Sections:

- 1 300 Edge
- 2 300 Internal
- 3 200 Wide
- 4 100 Ribs
- 5 420 Edge
- 6 420 Internal

Materials:

- 1 AS-CONC2009-25
- 100 Section 100

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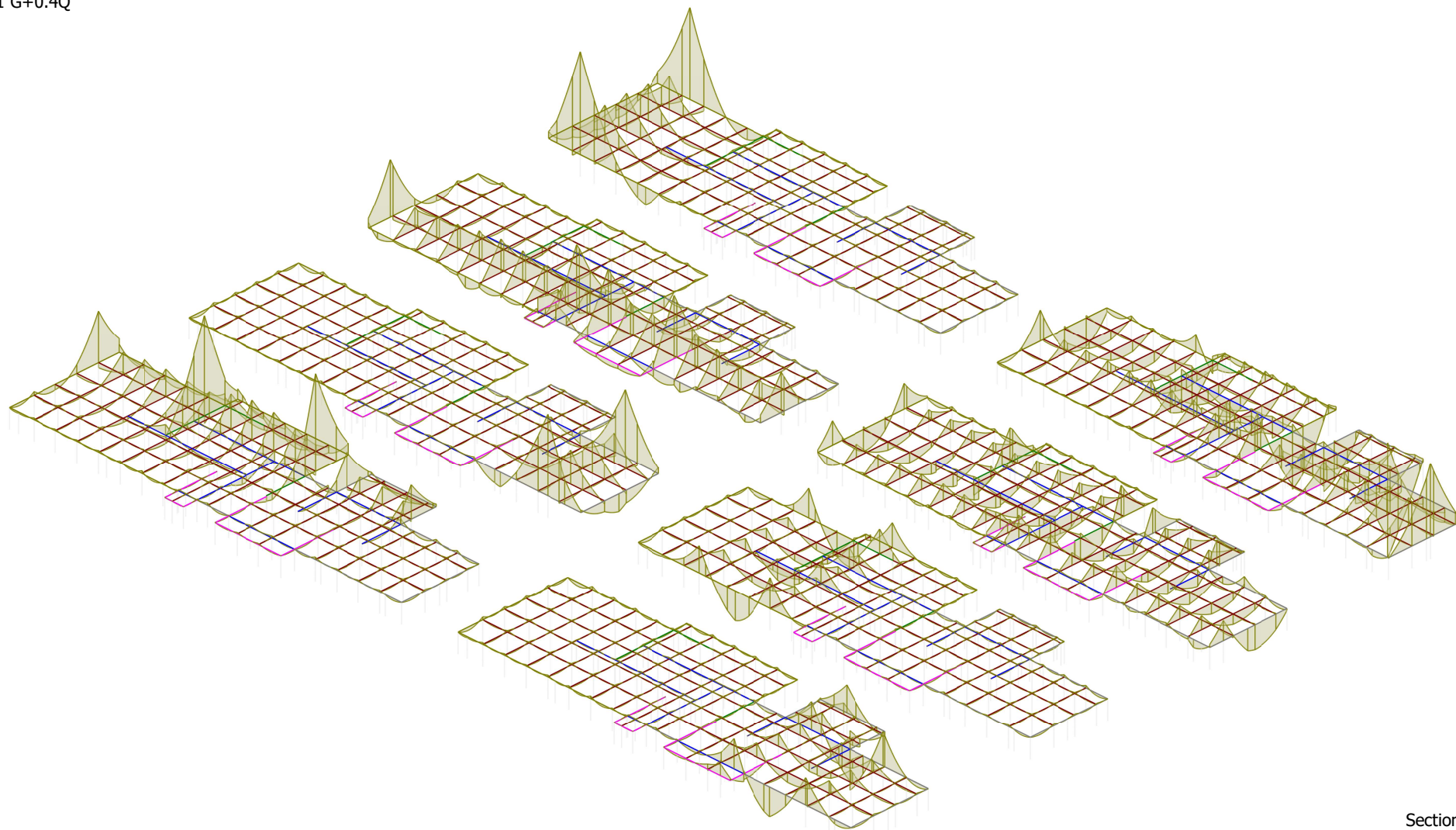
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Load case 21

21 G+0.4Q



Viewpoint (45,30), Moments

Sections:

- 1 300 Edge
- 2 300 Internal
- 3 200 Wide
- 4 100 Ribs
- 5 420 Edge
- 6 420 Internal

Materials:

- 1 AS-CONC2009-25

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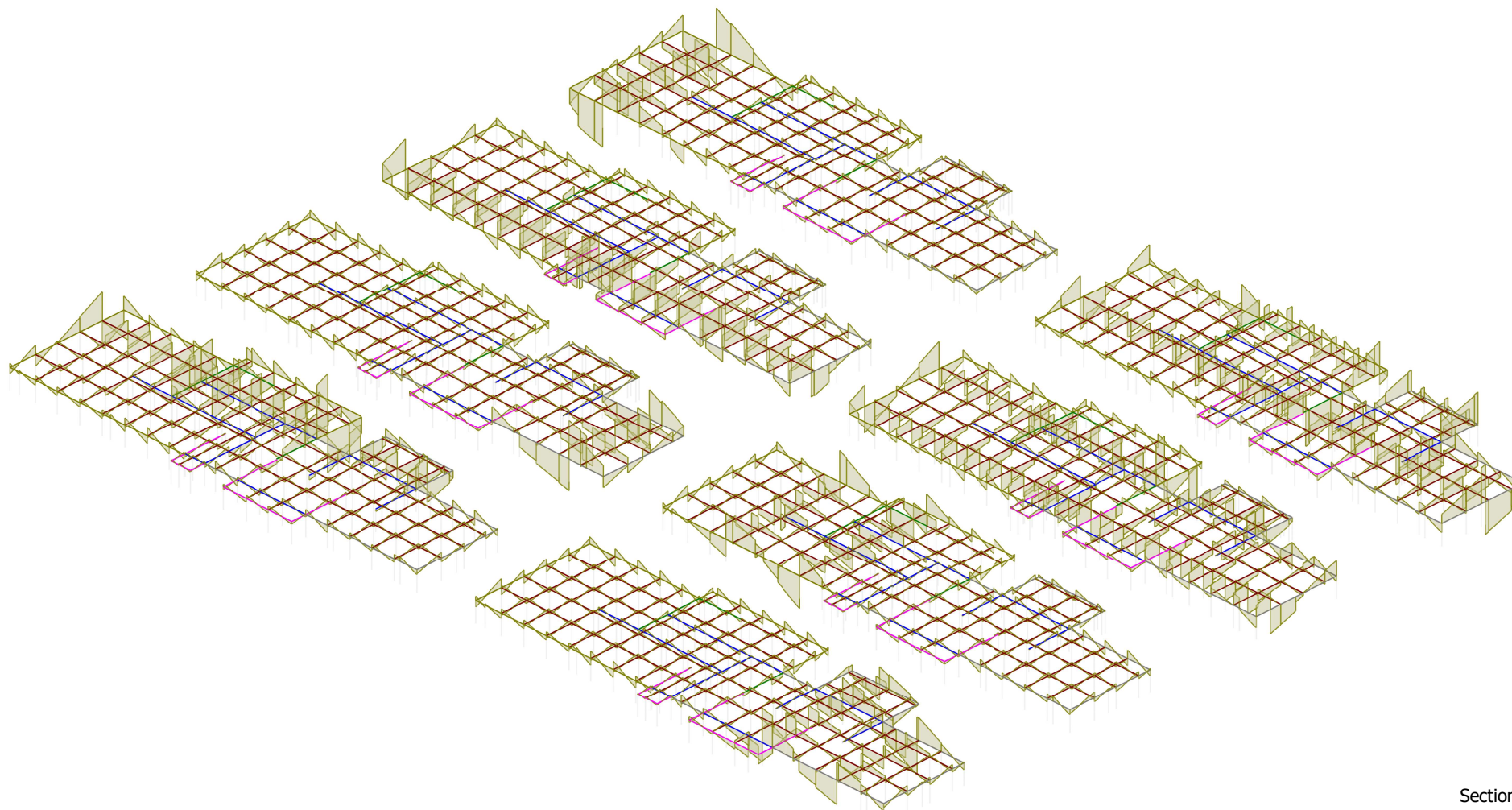
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Load case 21

21 G+0.4Q



Viewpoint (45,30), Shears

Sections:

- 1 300 Edge
- 2 300 Internal
- 3 200 Wide
- 4 100 Ribs
- 5 420 Edge
- 6 420 Internal

Materials:

- 1 AS-CONC2009-25

SPACE GASS 14.00 - THE ENGINEERING COMPANY LTD T/AS: ENGCO

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MEMBER FORCES AND MOMENTS (kN,kNm)

----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21

and All Members

and Sections 1 - 300Edge

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
2492	21	0.00	29.78*	0.00	0.37	0.00	-38.09
2206	21	0.00	-26.93#	0.00	-0.55	0.00	-16.03
1225	21	0.00	22.69	0.00	10.08*	0.00	-17.25
2205	21	0.00	-9.62	0.00	-4.87#	0.00	-2.16
1293	21	0.00	15.93	0.00	2.88	0.00	36.52*
696	21	0.00	-24.11	0.00	0.37	0.00	-38.09#

MEMBER FORCES AND MOMENTS (kN,kNm)

----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21

and All Members

and Sections 2 - 300Internal

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
3557	21	0.00	26.30*	0.00	0.89	0.00	-14.08
358	21	0.00	-22.60#	0.00	0.38	0.00	-28.10
3734	21	0.00	-0.09	0.00	4.83*	0.00	-1.47
1242	21	0.00	-1.86	0.00	-3.32#	0.00	-0.78
1250	21	0.00	-18.64	0.00	-3.06	0.00	27.29*
445	21	0.00	-17.47	0.00	0.38	0.00	-30.64#

MEMBER FORCES AND MOMENTS (kN,kNm)

----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21

and All Members

and Sections 5 - 420Edge

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
978	21	0.00	45.89*	0.00	3.87	0.00	-45.53
131	21	0.00	-32.23#	0.00	-0.94	0.00	-48.02
913	21	0.00	10.66	0.00	6.46*	0.00	-3.69
21	21	0.00	12.40	0.00	-5.51#	0.00	-5.10
1282	21	0.00	6.24	0.00	1.44	0.00	26.93*
131	21	0.00	-32.23	0.00	-0.94	0.00	-48.02#

MEMBER FORCES AND MOMENTS (kN,kNm)
----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21
and All Members
and Sections 6 - 420Internal

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
1047	21	0.00	28.26*	0.00	0.06	0.00	-46.85
936	21	0.00	-32.67#	0.00	-3.04	0.00	-46.87
947	21	0.00	5.23	0.00	4.74*	0.00	-3.75
936	21	0.00	-27.75	0.00	-3.04#	0.00	-12.43
1248	21	0.00	-14.97	0.00	-0.01	0.00	24.88*
936	21	0.00	-32.67	0.00	-3.04	0.00	-46.87#

MEMBER FORCES AND MOMENTS (kN,kNm)
----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21
and All Members
and Sections 3 - 200Wide

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
2488	21	0.00	26.61*	0.00	-0.11	0.00	-29.78
443	21	0.00	-24.57#	0.00	-0.52	0.00	-5.50
451	21	0.00	-20.10	0.00	0.73*	0.00	-23.65
2140	21	0.00	-4.43	0.00	-1.07#	0.00	3.64
1549	21	0.00	-8.89	0.00	-0.04	0.00	7.22*
453	21	0.00	-22.93	0.00	-0.11	0.00	-29.78#

MEMBER FORCES AND MOMENTS (kN,kNm)
----- (*=Maximum, #=Minimum)

Envelope = Load Cases 21
and All Members
and Sections 4 - 100Ribs

Memb	Load Case	Axial Force	Y-Axis Shear	Z-Axis Shear	X-Axis Torsion	Y-Axis Moment	Z-Axis Moment
1068	21	0.00	21.19*	0.00	0.03	0.00	-18.47
1412	21	0.00	-23.28#	0.00	-0.01	0.00	-7.80
444	21	0.00	14.98	0.00	0.86*	0.00	-4.72
1488	21	0.00	3.25	0.00	-0.50#	0.00	2.70
1322	21	0.00	-0.54	0.00	0.05	0.00	9.00*
1200	21	0.00	-15.68	0.00	-0.01	0.00	-18.49#

ENGCO Consulting - Steel fibre reinforced (SFR) Ribraft slabs calculator to NZS3101 - Appendix C5A

EDGE BEAM - 300mm wide with flange outstand on one side

Contract: Van De Geest Building

Location: 29 Pegasus Main Road, Pegasus

Date: 2-Jun-21

File: 21008.083

Member actions:
(from Microstran model)

M*-ve: 38.10 kNm

M*+ve: 36.5 kNm

V*: 29.80 kN

RED CELLS FROM PREVIOUS INPUT

INPUT CELLS IN BLUE

1. Member and reinforcing details (see design notes)

Section details				fibre details				sectional properties					
f'c	25	Mpa	As,mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag =	160000	mm ²
b.eff	700	mm	As,mesh eff	102	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top =	162.50	mm
df	100	mm	Mesh name:	SE-62							Act top =	88750	mm ²
bw	300	mm				kh =	0.653				Act Bottom =	71250	mm ²
h	400	mm											
d'	35	mm (from top of slab)											
d	350	mm (from top of slab)											
flange reo	328	mm ²	Mesh/2-H12			fy	500	MPa	As(min) flange =	84.3	from C5A-19 of NZS3101		min. reinf
web reo	226	mm ²	2-H12			fy	500	MPa	As(min) rib =	67.7	assumes pure bending		

2. Rib Bending strength - flange in tension (hogging)

a=	32.06	mm		c=	37.7	
(adjust "a" so C = T)						
			T (reo) =	164.10	kN	
			T (fibre) =	40.27	kN	
C=	204.37	kN	T (Total) =	204.37	kN	
fibre stress profile						moments (about centre of compression block)
σ2 (at c=)	0.441		fibre flange	3.75		
at flange junction	0.281		fibre web	4.06		
σ3 (at reo)	0.241		reo	57.27		
			total	65.08		
M*-ve =	38.1		ΦMn,-ve	55.3	kNm	OK

3. Rib Bending strength - flange in compression (sagging)

a=	10.89	mm		c=	12.8	
(adjust "a" so C = T)						check less than : 100
			T (reo) =	113.00	kN	
			T (fibre) =	48.96	kN	
C=	161.96	kN	T (Total) =	161.96	kN	
fibre stress profile						moments (about centre of compression block)
σ2 (at c=)	0.441		fibre flange	1.27		
at flange junction	0.389		fibre web	4.96		
σ3 (at reo)	0.241		reo	38.93		
			total	45.16		
M*+ve=	36.5		ΦMn,+ve	38.4	kNm	OK

4. Rib Shear Strength

shear strength of hogging section						shear strength of sagging section (N.A. for this load case)					
pw=	0.00300		kf=	1.2857143		n=	3		pw	0.00215	
Vb=	54.74	kN	(kf must be less than:)			(n lesser of:)			Vb=	48.05	kN
Vfd	20.77	kN	k1	1.76		n1	3		Vfd	19.91	kN
Φ Vc	56.6	kN				n2	9.00		Φ Vc	51.0	kN
Vb1	54.74	(=0.7+10pw).sqrt(f'c).dbw)							Vb1	48.05	
vb2	93.08								vb2	89.25	
											OK

EDGE BEAM SOLUTION

300mm wide edge beam with SE-62 Mesh/2-H12 top & 2-H12 bottom - 100mm slab over 300mm pod with 25Mpa SFR concrete

ENGCO Consulting - Steel fibre reinforced (SFR) Ribraft slabs calculator to NZS3101 - Appendix C5A

INTERNAL BEAM - 300mm wide with flange outstand on both sides

Contract: Van De Geest Building Location: 29 Pegasus Main Road, Pegasus Date: 2-Jun-21 File: 21008.083
 Member actions: M*-ve: 30.70 kNm M*+ve: 27.3 kNm V*: 26.30 kN
 (from Microstran model)

RED CELLS FROM PREVIOUS INPUT

INPUT CELLS IN BLUE

1. Member and reinforcing details (see design notes)

Section details				fibre details				sectional properties					
f'c	25	Mpa	As,mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag =	170000	mm ²
b.eff	800	mm	As,mesh eff	117	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top =	155.88	mm
df	100	mm	Mesh name:	SE-62							Act top =	96765	mm ²
bw	300	mm				kh =	0.653				Act Bottom =	73235	mm ²
h	400	mm											
d'	35	mm (from top of slab)											
d	350	mm (from top of slab)											
flange reo	343	mm ²	Mesh/2-H12			fy	500	MPa	As(min) flange =	91.9	from C5A-19 of NZS3101		min. reinf
web reo	226	mm ²	2-H12			fy	500	MPa	As(min) rib =	69.6	assumes pure bending		

2. Rib Bending strength - flange in tension (hogging)

a=	33.44	mm	c=	39.3	
(adjust "a" so C = T)					
			T (reo) =	171.40	kN
			T (fibre) =	41.81	kN
C=	213.21	kN	T (Total) =	213.21	kN
fibre stress profile					
σ2 (at c=)	0.441		moments (about centre of compression block)		
at flange junction	0.281		fibre flange	4.28	
σ3 (at reo)	0.241		fibre web	4.05	
			reo	59.69	
			total	68.02	
M*-ve =	30.7		ΦMn,-ve	57.8	kNm
					OK

3. Rib Bending strength - flange in compression (sagging)

a=	9.76	mm	c=	11.5	
(adjust "a" so C = T)					
			check less than : 100		
			T (reo) =	113.00	kN
			T (fibre) =	52.97	kN
C=	165.97	kN	T (Total) =	165.97	kN
fibre stress profile					
σ2 (at c=)	0.441		moments (about centre of compression block)		
at flange junction	0.388		fibre flange	1.47	
σ3 (at reo)	0.241		fibre web	4.97	
			reo	39.00	
			total	45.43	
M*+ve=	27.3		ΦMn,+ve	38.6	kNm
					OK

4. Rib Shear Strength

shear strength of hogging section						shear strength of sagging section (N.A. for this load case)					
pw=	0.00313		kf=	1.2857143		pw	0.00215				
Vb=	55.47	kN	(kf must be less than:)			Vb=	48.05	kN			
Vfd	20.77	kN	k1	1.76		Vfd	19.91	kN			
Φ Vc	57.2	kN				Φ Vc	51.0	kN			
			n=	3							
			(n lesser of:)								
			n1	3							
			n2	9.00							
Vb1	55.47	(=0.7+10pw).sqrt(f'c).dbw)				Vb1	48.05				
vb2	93.08					vb2	89.25				
											OK

INTERNAL BEAM SOLUTION

300mm wide edge beam with SE-62 Mesh/2-H12 top & 2-H12 bottom - 100mm slab over 300mm pod with 25Mpa SFR concrete

ENGCO Consulting - Steel fibre reinforced (SFR) Ribraft slabs calculator to NZS3101 - Appendix C5A

INTERNAL BEAM - 420mm wide with flange outstand on both sides

Contract: Van De Geest Building Location: 29 Pegasus Main Road, Pegasus Date: 2-Jun-21 File: 21008.083
 member actions: M*-ve: 48.10 kNm M*+ve: 26.90 kNm V*: 45.90 kN
 (from Microstran model)

RED CELLS FROM PREVIOUS INPUT

INPUT CELLS IN BLUE

1. Member and reinforcing details (see design notes)

Section details				fibre details				sectional properties						
f'c	25	Mpa	As,mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag =	206000	mm ²	
b.eff	800	mm	As,mesh eff	117	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top =	172.33	mm	
df	100	mm	Mesh name:	SE-62				Act top =				110379	mm ²	
bw	420	mm					kh =	0.653				Act Bottom =	95621	mm ²
h	400	mm												
d'	35	mm (from top of slab)												
d	350	mm (from top of slab)												
check minimum reinforcement requirement													min. reinf	
flange reo	343	mm ²	Mesh/2-H12			fy	500	MPa	As(min) flange =	104.9	from C5A-19 of NZS3101		OK	
web reo	339	mm ²	3-H12			fy	500	MPa	As(min) rib =	90.8	assumes pure bending		OK	

2. Rib Bending strength - flange in tension (hogging)

a=	25.30	mm	c=	29.8	
(adjust "a" so C = T)					
		T (reo) =	171.40	kN	
		T (fibre) =	54.45	kN	
C=	225.85	kN	T (Total) =	225.85	kN
fibre stress profile					moments (about centre of compression block)
σ2 (at c=)	0.441		fibre flange	4.33	
at flange junction	0.280		fibre web	5.82	
σ3 (at reo)	0.241		reo	60.39	
			total	70.53	
M*-ve = 48.1		φMn,-ve	60.0	kNm	OK

3. Rib Bending strength - flange in compression (sagging)

a=	13.57	mm	c=	16.0	
(adjust "a" so C = T)					check less than : 100
		T (reo) =	169.50	kN	
		T (fibre) =	61.11	kN	
C=	230.61	kN	T (Total) =	230.61	kN
fibre stress profile					moments (about centre of compression block)
σ2 (at c=)	0.441		fibre flange	1.41	
at flange junction	0.390		fibre web	6.91	
σ3 (at reo)	0.241		reo	58.18	
			total	66.50	
M*+ve= 26.9		φMn,+ve	56.5	kNm	OK

4. Rib Shear Strength

shear strength of hogging section					shear strength of sagging section (N.A. for this load case)				
pw=	0.00224		kf=	1.2040816	n=	3	pw	0.00231	
Vb=	70.80	kN	(kf must be less than:)		(n lesser of:)		Vb=	68.40	kN
Vfd	27.23	kN	k1	1.76	n1	3	Vfd	26.11	kN
Φ Vc	73.5	kN			n2	12.60	Φ Vc	70.9	kN
Vb1	70.80	(=0.7+10pw).sqrt(f'c).dbw)			Vb1	68.40			
vb2	130.31				vb2	124.95			

ENGCO Consulting - Steel fibre reinforced (SFR) Ribraft slabs calculator to NZS3101 - Appendix C5A

INTERNAL BEAM - 420mm wide with flange outstand on both sides

Contract: Van De Geest Building Location: 29 Pegasus Main Road, Pegasus Date: 2-Jun-21 File: 21008.083
 Member actions: M*-ve: 46.90 kNm M*+ve: 24.9 kNm V*: 32.70 kN
 (from Microstran model)

RED CELLS FROM PREVIOUS INPUT

INPUT CELLS IN BLUE

1. Member and reinforcing details (see design notes)

Section details				fibre details				sectional properties					
f'c	25	Mpa	As,mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag =	206000	mm ²
b.eff	800	mm	As,mesh eff	117	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top =	172.33	mm
df	100	mm	Mesh name:	SE-62							Act top =	110379	mm ²
bw	420	mm				kh =	0.653				Act Bottom =	95621	mm ²
h	400	mm											
d'	35	mm (from top of slab)											
d	350	mm (from top of slab)											
flange reo	343	mm ²	Mesh/2-H12			fy	500	MPa	As(min) flange =	104.9	from C5A-19 of NZS3101		min. reinf
web reo	339	mm ²	3-H12			fy	500	MPa	As(min) rib =	90.8	assumes pure bending		

2. Rib Bending strength - flange in tension (hogging)

a=	25.31	mm		c=	29.8	
(adjust "a" so C = T)						
			T (reo) =	171.40	kN	
			T (fibre) =	54.45	kN	
C=	225.85	kN	T (Total) =	225.85	kN	
fibre stress profile						
σ2 (at c=)	0.441		moments (about centre of compression block)			
at flange junction	0.280		fibre flange	4.33		
σ3 (at reo)	0.241		fibre web	5.82		
			reo	60.39		
			total	70.53		
M*-ve =	46.9		ΦMn,-ve	60.0	kNm	OK

3. Rib Bending strength - flange in compression (sagging)

a=	13.57	mm		c=	16.0	
(adjust "a" so C = T)						
			check less than : 100			
			T (reo) =	169.50	kN	
			T (fibre) =	61.11	kN	
C=	230.61	kN	T (Total) =	230.61	kN	
fibre stress profile						
σ2 (at c=)	0.441		moments (about centre of compression block)			
at flange junction	0.390		fibre flange	1.41		
σ3 (at reo)	0.241		fibre web	6.91		
			reo	58.18		
			total	66.50		
M*+ve=	24.9		ΦMn,+ve	56.5	kNm	OK

4. Rib Shear Strength

shear strength of hogging section						shear strength of sagging section (N.A. for this load case)					
pw=	0.00224		kf=	1.2040816		n=	3		pw	0.00231	
Vb=	70.80	kN	(kf must be less than:)			(n lesser of:)			Vb=	68.40	kN
Vfd	27.23	kN	k1	1.76		n1	3		Vfd	26.11	kN
Φ Vc	73.5	kN				n2	12.60		Φ Vc	70.9	kN
Vb1	70.80	(=0.7+10pw).sqrt(f'c).dbw)				Vb1	68.40				
vb2	130.31					vb2	124.95				OK

INTERNAL BEAM SOLUTION

420mm wide edge beam with SE-62 Mesh/2-H12 top & 3-H12 bottom - 100mm slab over 300mm pod with 25Mpa SFR concrete

EDGE BEAM - 200mm wide with flange outstand on one side

Contract: Van De Geest Building		Location: 29 Pegasus Main Road, Pegasus		Date: 2-Jun-21	File: 21008.083
Member actions: (from Microstran model)	M*-ve: 29.80 kNm	M*+ve: 7.2 kNm	V*: 26.60 kN		
	RED CELLS FROM PREVIOUS INPUT	INPUT CELLS IN BLUE			

Section details				fibre details				sectional properties					
f'c	25	Mpa	As,mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag =	120000	mm ²
b.eff	600	mm	As,mesh eff	88	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top =	150.00	mm
df	100	mm	Mesh name:	SE-62							Act top =	70000	mm ²
bw	200	mm				kh =	0.653				Act Bottom =	50000	mm ²
h	400	mm											
d'	35	mm (from top of slab)											
d	350	mm (from top of slab)											
flange reo	314	mm ²	Mesh/2-H12			fy	500	MPa	As(min) flange =	66.5	from C5A-19 of NZS3101		min. reinf
web reo	226	mm ²	2-H12			fy	500	MPa	As(min) rib =	47.5	assumes pure bending		

a= 43.53 mm (adjust "a" so C = T)	c= 51.2	
	T (reo) = 156.80 kN	
	T (fibre) = 28.21 kN	
C= 185.01 kN	T (Total) = 185.01 kN	
fibre stress profile	moments (about centre of compression block)	
σ_2 (at c=) 0.441	fibre flange 3.17	
at flange junction 0.283	fibre web 2.61	
σ_3 (at reo) 0.241	reo 53.82	
	total 59.59	
M*-ve = 29.8	$\Phi M_{n,-ve}$ 50.7 kNm	OK

a=	11.78	mm	c=	13.9	
(adjust "a" so C = T)			check less than :	100	
			T (reo) =	113.00	kN
			T (fibre) =	37.22	kN
C=	150.22	kN	T (Total) =	150.22	kN
fibre stress profile			moments (about centre of compression block)		
σ2 (at c=)	0.441		fibre flange	1.08	
at flange junction	0.390		fibre web	3.30	
σ3 (at reo)	0.241		reo	38.88	
			total	43.26	
M*+ve= 7.2			ΦMn,+ve	36.8	kNm
					OK

shear strength of hogging section				shear strength of sagging section (N.A. for this load case)			
pw=	0.00430	kf=	1.4285714	pw	0.00323		
Vb=	41.23 kN	(kf must be less than:)		Vb=	35.80 kN		
Vfd	15.38 kN	k1	1.76	Vfd	14.75 kN		
Φ Vc	42.5 kN	n1	3	Φ Vc	37.9 kN		
		n2	6.00				
Vb1	41.23	(=0.7+10pw).sqrt(f'c).dbw)		Vb1	35.80		
vb2	62.05			vb2	59.50		
						V* = 26.6	
						Φ Vc = 37.9	
							OK

EDGE BEAM SOLUTION	200mm wide edge beam with SE-62 Mesh/2-H12 top & 2-H12 bottom - 100mm slab over 300mm pod with 25Mpa SFR concrete
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ENGCO Consulting - Steel fibre reinforced (SFR) Ribraft slabs calculator to NZS3101 - Appendix C5A

RIB - 100mm wide with flange outstand on both sides

Contract: Van De Geest Building member actions: M*-ve: 18.50 kNm Location: 29 Pegasus Main Road, Pegasus M*+ve: 9.00 kNm Date: 2-Jun-21 File: 21008.083 V*: 23.30 kN (from Microstran model)

RED CELLS FROM PREVIOUS INPUT

INPUT CELLS IN BLUE

1. Member and reinforcing details (see design notes)

Section details				fibre details				sectional properties			
f'c	25	Mpa	As, mesh/m	146	mm ²	fr1	1.5	MPa	modifier	0.45	Ag = 110000 mm ²
b.eff	800	mm	As, mesh eff	117	mm ²	fr4	1	MPa	modifier	0.37	N.A. depth from top = 104.55 mm
df	100	mm	Mesh name:	SE-62							Act top = 80455 mm ²
bw	100	mm				kh =	0.653				Act Bottom = 29545 mm ²
h	400	mm									
d'	35	mm (from top of slab)									
d	350	mm (from top of slab)									
flange reo	230	mm ²	Mesh/H12			fy	500	MPa	check minimum reinforcement requirement		min. reinf
web reo	113	mm ²	H12			fy	500	MPa	As(min) flange = 76.4	from C5A-19 of NZS3101	OK
									As(min) rib = 28.1	assumes pure bending	OK

2. Rib Bending strength - flange in tension (hogging)

a=	64.36	mm	c=	75.7	
(adjust "a" so C = T)					
			T (reo) =	114.90	kN
			T (fibre) =	21.87	kN
C=	136.77	kN	T (Total) =	136.77	kN
fibre stress profile			moments (about centre of compression block)		
σ2 (at c=)	0.441		fibre flange	4.11	
at flange junction	0.286		fibre web	1.20	
Flange capacity beyond tee beam				2.18	
σ3 (at reo)	0.241		reo	38.24	
			total	45.73	
M*-ve = 18.5			ΦMn,-ve	38.9	kNm
					OK

3. Rib Bending strength - flange in compression (sagging)

a=	5.60	mm	c=	6.6	
(adjust "a" so C = T)					
			check less than : 100		
			T (reo) =	56.50	kN
			T (fibre) =	38.74	kN
C=	95.24	kN	T (Total) =	95.24	kN
fibre stress profile			moments (about centre of compression block)		
σ2 (at c=)	0.441		fibre flange	1.53	
at flange junction	0.386		fibre web	1.67	
σ3 (at reo)	0.241		reo	19.62	
			total	22.81	
M*+ve= 9			ΦMn,+ve	19.4	kNm
					OK

4. Rib Shear Strength

shear strength of hogging section					shear strength of sagging section (N.A. for this load case)				
pw=	0.00630		kf=	1.5		pw	0.00323		
Vb=	24.27	kN	(kf must be less than:)			Vb=	17.90	kN	
Vfd	8.08	kN	k1	1.76		Vfd	7.74	kN	
Φ Vc	24.3	kN				Φ Vc	19.2	kN	
			n=	3					
			(n lesser of:)						
			n1	3					
			n2	3.00					
Vb1	24.27	(=0.7+10pw).sqrt(f'c).dbw)				Vb1	17.90		
vb2	31.03					vb2	29.75		
									OK

RIB SOLUTION

100mm wide rib with SE-62 Mesh/H12 top & H12 bottom - 100mm slab over 300mm pod with 25Mpa SFR concrete

NAME: Van De Geest Building

ADDRESS: 29 Main St Pegasus

DATE: 09/06/21 CONSENT AUTHORITY: Waimakariri District Council



THIS PS1 DOES NOT CONSTITUTE A SITE SPECIFIC REVIEW BY THE ENGINEERING COMPANY BELOW AND IS ONLY APPLICABLE FOR STANDARD FIXINGS AND DESIGN PARAMETERS AS DETAILED IN THE RELEVANT MANUAL



Building Code Clause(s) **B1, B2, F2, F4**

PRODUCER STATEMENT – PS1 – DESIGN

ISSUED BY: Lautrec Technology Group Ltd
(Design Firm)

TO: Juralco Aluminium Building Products
(Owner/Developer/Client)

TO BE SUPPLIED TO: Building Consent Authorities within New Zealand Author Number: 140404
(Building Consent Authority)

IN RESPECT OF: Juralco Edgetec Infinity Balustrade system

AT: Any location in New Zealand within the limits of this document
(Address)

We have been engaged by the owner/developer referred to above to provide: Specific Engineering Design of Structural components only in respect of the requirements of clauses: B1 Structure; B2 Durability; F2 Hazardous building materials; F4 safety from falling of the Building Code for

☐ All or ☒ Part only (as specified in the report attached to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

- ☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment: B1/VM1; B2; NZS1170; NZS1664.1:1997; NZS 3404:1997; NZS3603:1993; NZS4223.3
- ☐ Alternative solution as per the attached schedule

The proposed building work covered by this producer statement is described in the attached report titled: "Juralco Edgetec Infinity PS1 Report rev0", together with the Juralco product manual "Juralco Edgetec Infinity Balustrade system, issue 4/20". Referenced within the report, and other documents set out in the report.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions: Adequate Supporting Structure by others
- (ii) All proprietary products meeting their performance specification requirements.

I believe on reasonable grounds that:

- a) The balustrade system, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code, and that
- b) The persons who have undertaken the design have the necessary competency to do so.

I also recommend the following level of construction monitoring/observation:

Project specific PS3 issued by Juralco system installer on completion of the installation.

☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) Or ☒ as per agreement with owner/developer (Architectural)

I, Kevin Brown am: ☒ CPEng 140404 #

(Name of Design Professional)

☐ Reg Arch .#

I am a Member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: BE; CMEngNZ; CPEng; IntPe(NZ); MBA.

☒ The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

☒ The Design Firm is a member of ACENZ.

SIGNED BY Kevin Brown ON BEHALF OF Lautrec Technology Group Ltd
(Design Firm)

Signature: [Signature] Date: 8.4.20

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, IPENZ AND NZIA

PRODUCER STATEMENT PS1

October 2013 (Reissued October 2017)

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



PO Box 35 377 | 34a Constellation Drive
Browns Bay | Rosedale
Auckland 0753 | Auckland 0632
Ph (09) 479-7028
Email: engineer@ncl.co.nz
www.ncl.co.nz

Our Ref: 20553

Friday, October 11, 2019

Dear Sir/Madam,

RE: B2 COMPLIANCE - JURALCO INFINITY BALUSTRADE SYSTEM

You have requested a Producer Statement for Design-PS1 for Clause B2 of the Building Code – Structural Durability.

We are not able to provide this because there is no effective verification method for B2 contained within the Building Code.

As these balustrade systems can be installed in a variety of settings, including internal and exposed environments, it is not deemed practical to specify durability requirements for the sub structure.

Timber treatments, mild steel corrosion protection coatings, concrete and masonry covers are therefore up to the building designer to specify in accordance with the relevant recognised standards.

However we can confirm that for the structure elements shown in our documentation:

Connections

Stainless steel fixings have been specified throughout in accordance with NZ Building Code B2/AS1 acceptable solution NZS3604.

Aluminium

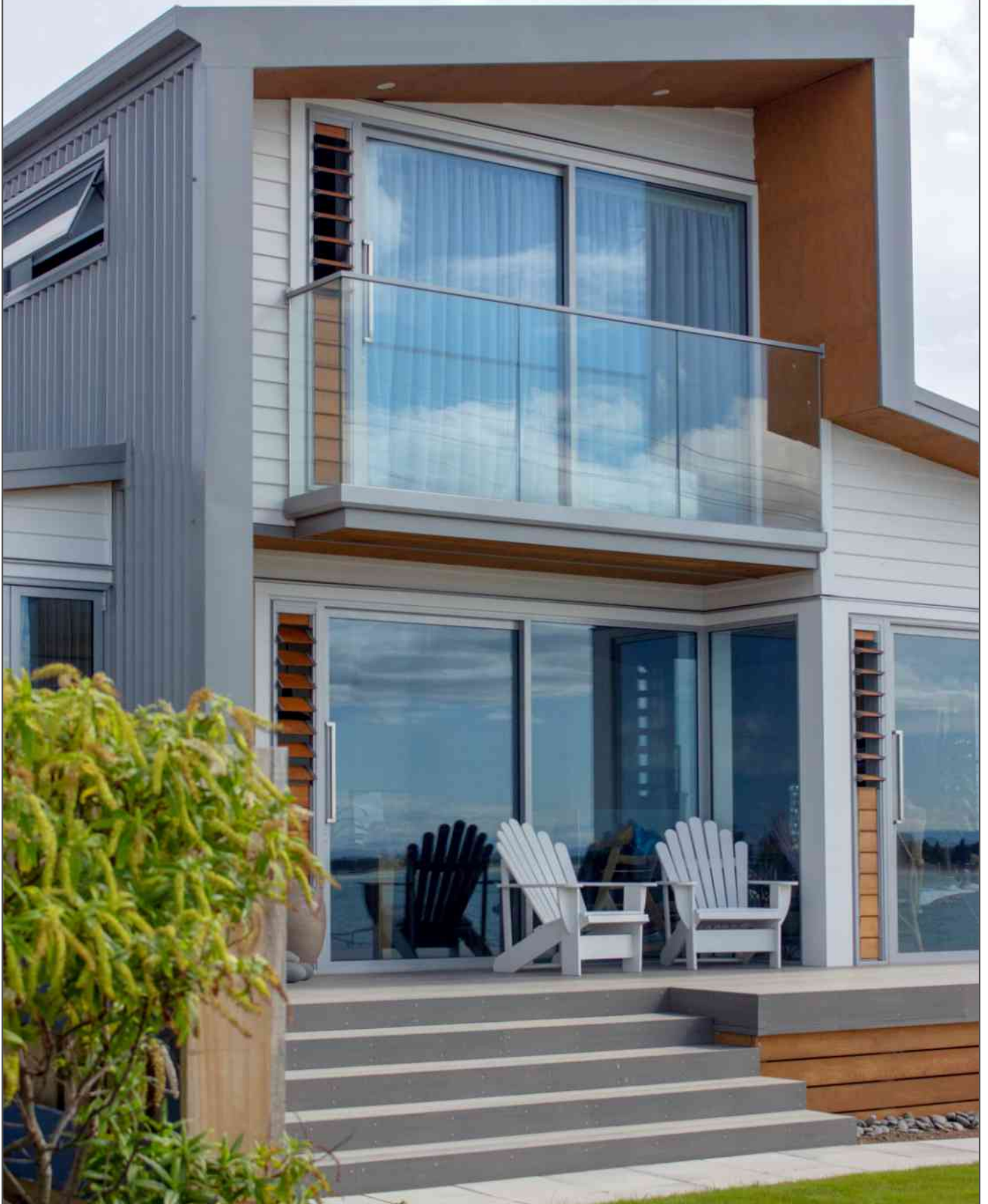
Aluminium has been provided in accordance with NZS1664, and all aluminium components are powder coated in house by Juralco. We note that this is on a time to first maintenance basis.

We trust this provides the information that you are seeking.

Yours faithfully,

A blue ink signature of Jade Vaotogo, consisting of a stylized 'J' and 'V' followed by a horizontal line.

Jade Vaotogo



Juralco Aluminium Building Products Ltd designs and distributes specialist aluminium joinery systems through a national network of franchised fabricators and agents. For more than 25 years we have been at the forefront of specialist aluminium door and window products suitable for New Zealand joinery and building methods. Our comprehensive product range includes security and insect screens, balustrades and gates, shutters and awnings, shower screens, wardrobe doors and organisers and internal doors.

The Juralco Edgetec® Infinity Balustrade system is designed for Frameless Glass, from 12mm to 17.52mm, either Top or Faced fixed and for Residential or Commercial use. An Interlinking Top Rail (depending on Glass type) must be used.

The system is extremely versatile and can be made in a range of configurations to suit most modern architectural requirements.

The Infinity Semi Frameless Glass system features heavy duty internal clamps at regular intervals all covered by continuous cover extrusions front and back, giving a streamlined minimal look. For Top or Face fixing.

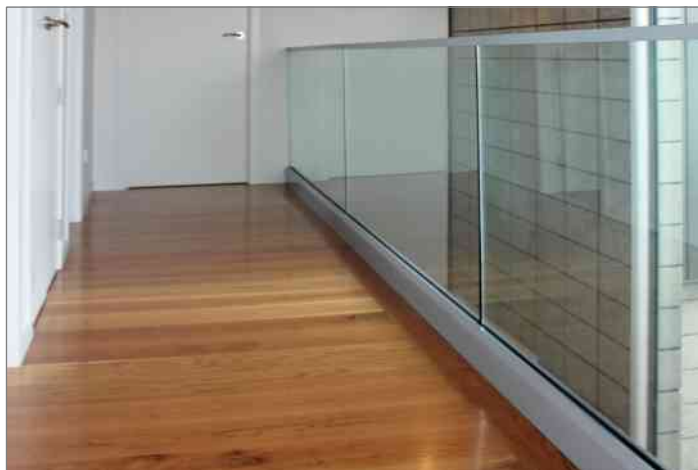
- Juralco Edgetec® Infinity Balustrade System
- Glass Panels from 12mm Toughened Safety Glass to 17.5mm SentryGlas®
- Tested to NZ standard NZS4203 and NZS1170
- Conforms to NZS 4223.3.2016
- Top Interlinking Rail to conform to NZS 4223.3.2016
- Clamps spaced at 400mm - 500mm centres depending on the application and Glass type
- Simple installation. Allows horizontal and vertical glass adjustment.



Top Fix System + Interlinking Top Rail



Top Fix System + SentryGlas. Interlinking Top rail not required



Top Fix System + Interlinking Top Rail



Face Fix System + Interlinking Top Rail

Juralco Edgetec® Infinity Balustrade Patent #NZ 630364
All pages © Copyright Juralco Aluminium Building Products Ltd, 2020

Complies With AS/NZS 1170:2002, NZS 4223.3.2016, NZ Building Code B1, B2, F2, F4 and F9

Infinity Balustrade is for Domestic and Residential Occupancy types A, A Other and C3 and for Commercial Occupancy Types B, E, A Other and C3
Occupancy Types as per AS/NZ 1170.1.2002. Not suitable for Commercial C1/C2, C5 and D applications

Code	Type of Occupancy for part of the building or structure	Specific Uses	Glass
A	Domestic and Residential activities	All areas within or serving exclusively one dwelling including stairs, landings etc, but excluding external balconies and edges of roofs.	Residential, 12mm Toughened Glass, 15.2 mm Laminated or 13.52mm SentryGlas®
B, E	Offices and work areas not included elsewhere including storage areas.	Light access stairs and gangways not more than 600mm wide Fixed platforms, walkways, stairways and ladders for access Areas not susceptible to overcrowding in office and institutional buildings; also industrial and storage building.	Commercial, 15mm Toughened Glass, 17.2 mm Laminated or 17.52mm SentryGlas®
A Other, C3	Areas without obstacles for moving people and not susceptible to over crowding	Stairs, landings, external balconies, edges of roofs etc.	Residential or Commercial as detailed above

Note 1 All for 12mm or 15mm Toughened, 15.2mm or 17.2mm Laminated and 13.52mm or 17.52mm SentryGlas® . All edges polished.

Note 2 Juralco Balustrade Systems building code compliance documentation requires all balustrade installations are to be completed in accordance with the requirements of our authorised installer certification.

Note 3 Frameless Glass Balustrades must conform to NZS 4223.3.2016
See individual Layout pages for conformance details

masterspec partner
Section 4852JB

Note 4 The Dulux powder coating warranty period is conditional upon the Balustrade being maintained in accordance with the Dulux 'Care and Maintenance Instructions'. See Page 5 for warnings concerning Coastal conditions.
Contact your balustrade installer for a copy of the Care and Maintenance procedure.

Index

Heading	Pages	Description. Use the Bookmarks List to jump to selected pages
Specifications	4	Juralco standard specification sheet and Powder coating recommendations
All Sections Below for Face Fix only		
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Mountings	13 - 25	Shows Mounting details, all for Face Fixed. Timber (p13-22), Steel (p23-24) and Concrete (p25)
Installation	26	Face Fix recommended Installation guide.
All Sections below for Top Fix only		
Configurations	27 - 28	Shows typical elevation layouts for Residential and Commercial for all glass types
General	29	Shows Infinity Clamp Cross section and all details
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Mountings	32 - 35	Shows Mounting details, all for Top fixed. Timber (p31), Steel (p32-33) and Concrete (p34)
Installation	36	Top Fix recommended Installation Guide
Glass Top Edge - Safety		
Top Interlinking Rails	37 - 42	Shows Rectangular and Round Interlinking Rails (p37-40) and SS Interlinking Rail (p41)
	43 - 45	Shows various End brackets + Attaching details to Walls or Posts
General		
EDGE End Posts	46	Shows Glass Panels attaching to an EDGE End Post
Stiffener Brackets	47	Shows Fixed and Adjustable Glass Stiffener Brackets
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Surface Care	51 - 53	Instructions for the care of Powder coated, Glass and Stainless Steel surfaces.



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Juralco Edgetec® Infinity Balustrade System

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Juralco Aluminium Building Products Ltd (JABP)
Specifications for Juralco Edgetec® Infinity Balustrade System

1. Scope

- This specification details the documents the Juralco Infinity Balustrade System refers to in relation to the New Zealand Building Code, the manufacturer's documents, products used in the System, requirements in relation to fixing and surface finishing.

2. NZBC Compliance

- The Juralco Infinity Balustrade System has been reviewed by Lautrec Technology Group Ltd to demonstrate compliance with the structural requirements of the New Zealand Building Code and NZS 1170 : 2002 occupancy A, B, E, A Other and C3, NZS 3604 Low, Medium, High, Very High and Extra High Wind Zones, to a maximum ULS wind load of 2.5kPa
- The Structural Engineering design includes the requirements of B1 Structure, B2 Durability, F2 Hazardous material and F4 Safety from falling, all from the Building Code.
- Verification Method B1 / VM1, B2/AS1, F4 / AS1
- All glass used in the Juralco Infinity Balustrade System must conform to AS/NZS 2208. Complies with NZS 4223.3.2016
- Separation of dissimilar materials (as relates to B2 compliance) have been reviewed.
For other combinations refer to NZS 3604:2011 Section 2.3.3 Separation and Section 4 Durability

3. Manufacturer's Documents

- The Juralco Infinity Balustrade System manual details all extrusions and components used for the fabrication and installation/fixing of the system.
- A Producer Statement 1(Design) is available.
Copies of the above documents are available from:
Juralco Aluminium Building Products Ltd
48 Bruce McLaren Rd, Henderson, Auckland
Phone 09 478 8018 Fax 09 478 7883 Email specify@juralco.co.nz
- Any deviation from the standard fabrication or installation/fixing must be accompanied by a site specific PS1 with site specific calculations and drawings

4. Products

- Only extrusions, components and hardware supplied by or specified by JABP may be used in the Juralco Infinity System
- Aluminium extrusions, components and hardware – unless specified are manufactured to 6060 T5 specifications
- Stainless Steel components, hardware, fixings – all components to 304 or 316 grade
- Glass - all glass used in the Juralco Infinity Balustrade System must conform to the specifications as listed in the Juralco Infinity manual with each panel conforming to AS/NZS 2208 as confirmed by the Safety Stamp detailing the manufacturer's description and licence number.

5. Surface Finishing

- Juralco Aluminium Building Products Ltd is a Dulux Registered Applicator site, registration number 2101.
JABP uses only Dulux branded powder coating materials
- Unless specified otherwise, Dulux Duralloy® powder coating systems are used for properties greater than 100 metres from high tide level where AAMA 2603 performance is required
- Dulux Duratec® powder coating systems must be used for all properties greater than 10 metres and up to 100 metres from high tide level where AAMA 2604 performance is required
- Dulux Duralloy® has a 10 year film and colour integrity warranty, Dulux Duratec® has a 20 year film and colour integrity warranty

6. Installation and Fixing

- The Juralco Infinity Balustrade System must only be installed in accordance with the Juralco Infinity Balustrade System manual
- Any deviation from that specified in the Juralco Infinity manual must only be in accordance with the site specific PS1 with site specific calculations and drawings listing the non standard details
- The Juralco Infinity Balustrade System must only be fabricated/installed by a Juralco approved fabricator
- Upon completion of the installation the fabricator must supply the Council with a PS3 (Construction)

Important instructions for Powder Coatings near Salt Water

The standard Dulux powder coating system used by Juralco is Duralloy® and is suitable for installations greater than 100 metres from high tide level and for buildings up to 3 stories above ground. Use Duratec® for installations between 10 and 100 metres from high tide level and for prestigious residential and commercial developments. For all other applications contact Juralco for alternative systems.

Note - Powder coated prices listed in Juralco price books are for the standard Duralloy® system. If the Duratec® system is required it must be specified upon placement of the order and will incur a surcharge – Duratec® prices on application.

Important instructions for Powder Coating - Attachment to structures

An EPDM or similar material spacer must be used to separate powder coated aluminium items from all timber, concrete and steel structures. Failure to do so can lead to the chemicals in the structure affecting the powder coating layer on the aluminium.

Powder Coating Warranty

The Dulux powder coating warranty period is conditional upon being maintained in accordance with the Dulux 'Care and Maintenance Instructions'. Contact your installer for a copy (or download from Dulux) of the Care and Maintenance instructions or refer to the back page of this manual.

Typical Layouts - Face Fix

Infinity Glass Clamps Face Fix + Interlinking Rail

Glass must have a minimum strength of 100Mpa
All edges polished

Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension load per Face fixing = 20kN

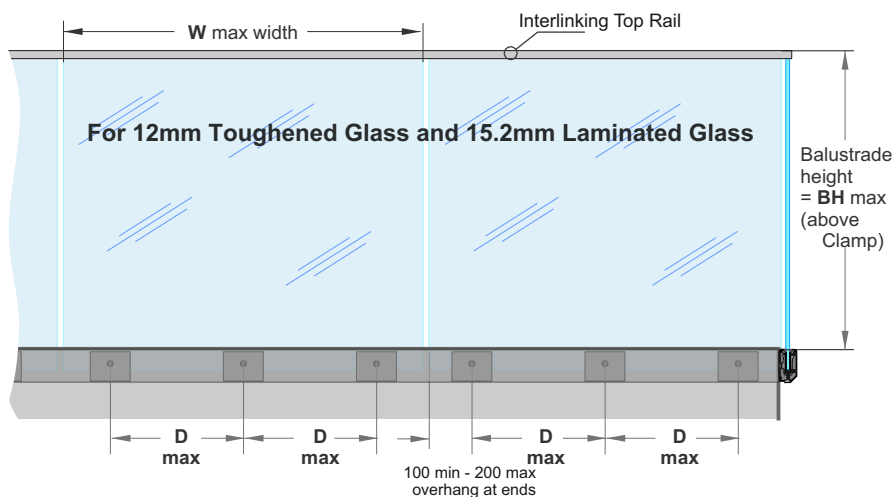
Residential & Domestic only
Occupancy types A, A Other and C3
For 12mm Toughened Glass only

- D max 500mm.
- BH max 1200mm
- W max 1900mm

For 15.2mm Laminated Glass only

- D max 500mm.
- BH max 1150mm
- W max 1900mm

Note: See individual Mounting pages for construction options



Exceeds the wind loading for all Wind Zones up to **and Including Very High Wind Zone** as set out in NZS 3604:2011

Refer to the Interlinking Top Rail page for conformance to NZS 4223.3.2016.

Infinity Glass Clamps Face Fix + Interlinking Rail

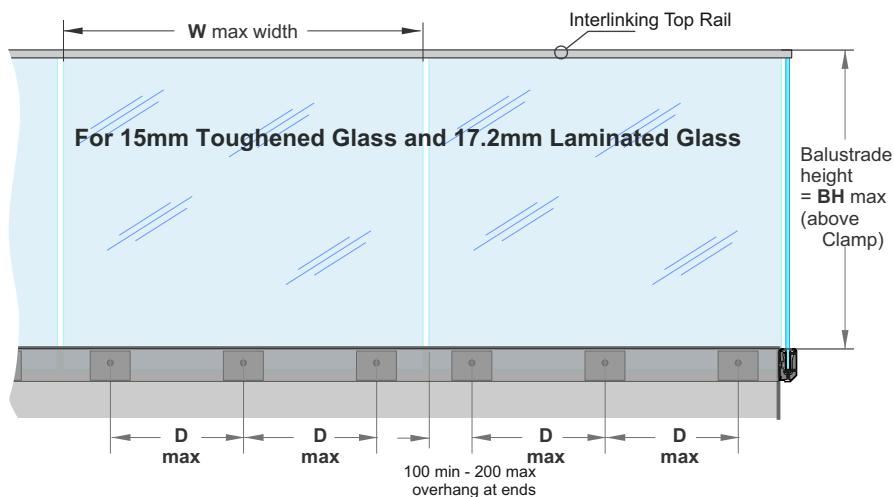
Glass must have a minimum strength of 100Mpa
All edges polished

Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension load per Face fixing = 23kN

Commercial Occupancy types B, E, and C3 only
All for 15mm Toughened Glass or 17.2mm Laminated Glass

- D max 400mm
- BH max 1300mm
- W max 1600mm

Note: See individual Mounting pages for construction options



Exceeds the wind loading for all Wind Zones up to **and Including Extra High Wind Zone** as set out in NZS 3604:2011

Refer to the Interlinking Top Rail page for conformance to NZS 4223.3.2016.

Infinity Glass Clamps Face Fix

POOL FENCING only

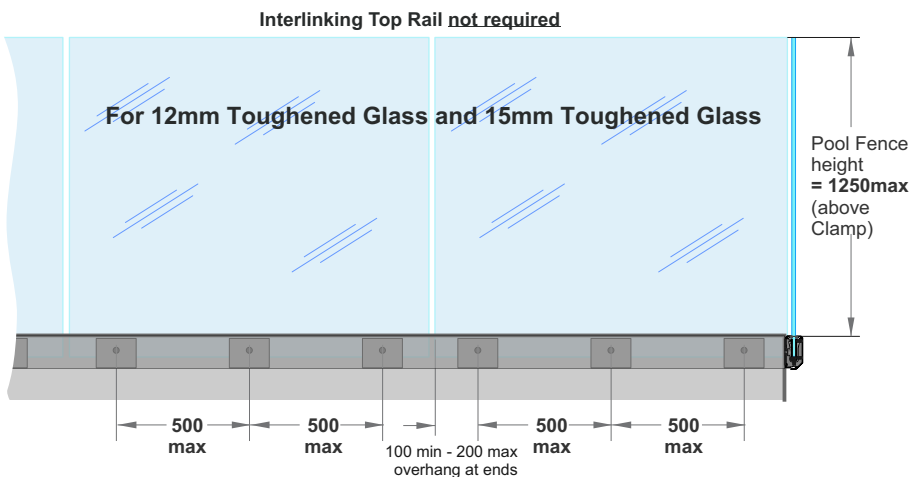
Glass must have a minimum strength of 100Mpa
All edges polished

Clamp spacings
Min - 2 x clamps. Max - 4-5 x clamps
Panel width 2000mm max

Max Tension load per Face fixing = 27kN

Applies to Swimming Pools as of Jan 2017, complies with the Building Code clause F9 and section 162C of the Building Act.

Applies to Pool Fences not protecting a fall of 1.0m or more



12mm Toughened - **Very High Wind Zone.**

15mm Toughened - **Extra High Wind Zone**

Note: See individual Mounting pages for construction options

Typical Layouts - Face Fix

Infinity Glass Clamps Face Fix + Stiffener Brackets

Glass must have a minimum strength of 100Mpa
All edges polished
Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension load per Face fixing = 20kN

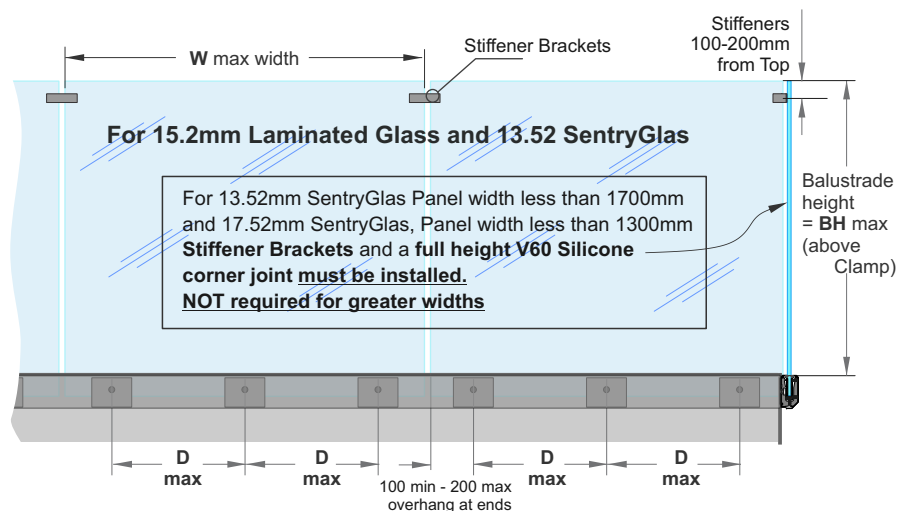
Residential & Domestic only Occupancy types A, A Other and C3 For 15.2mm Laminated Glass only

- D max 500mm.
- BH max 1150mm
- W max 1900mm

For 13.52mm SentryGlas only

- D max 350mm.
- BH max 1050mm
- W max - none for SG

Note: See individual Mounting pages for construction options



Exceeds the wind loading for all Wind Zones up to **and including Very High Wind Zone** as set out in NZS 3604:2011

Refer to the Stiffener Bracket pages for conformance to NZS 4223.3.2016.

Infinity Glass Clamps Face Fix + Stiffener Brackets

Glass must have a minimum strength of 100Mpa
All edges polished
Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension load per Face fixing = 23kN

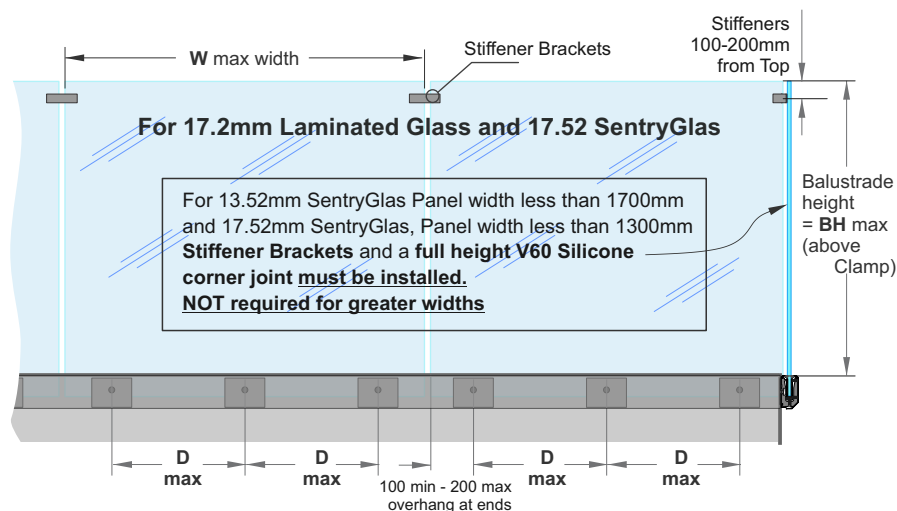
Commercial Occupancy types B, E, and C3 only For 17.2mm Laminated Glass only

- D max 400mm
- BH max 1300mm
- W max 1600mm

For 17.52mm SentryGlas

- D max 350mm
- BH max 1200mm
- W max - none for SG

Note: See individual Mounting pages for construction options



Exceeds the wind loading for all Wind Zones up to **and including Extra High Wind Zone** as set out in NZS 3604:2011

Refer to the Stiffener Bracket pages for conformance to NZS 4223.3.2016.

SentryGlas® Glass Layers and Thickness Orientation

Glass Thickness (mm)	Inner Layer of Glass thickness (mm) Deckside	Interlayer thickness(mm) and Type	Outer Layer Glass thickness (mm)
13.52	6	1.52 SentryGlas®	6
17.52	8	1.52 SentryGlas®	8

Refers to previous page. Laminated Glass Layers and Thickness Orientation

Glass Thickness (mm)	Inner Layer of Glass thickness (mm) Deckside	Interlayer thickness(mm) and Type	Outer Layer Glass thickness (mm)
15.2	8	1.2EVA	6
17.2	8	1.2EVA	8



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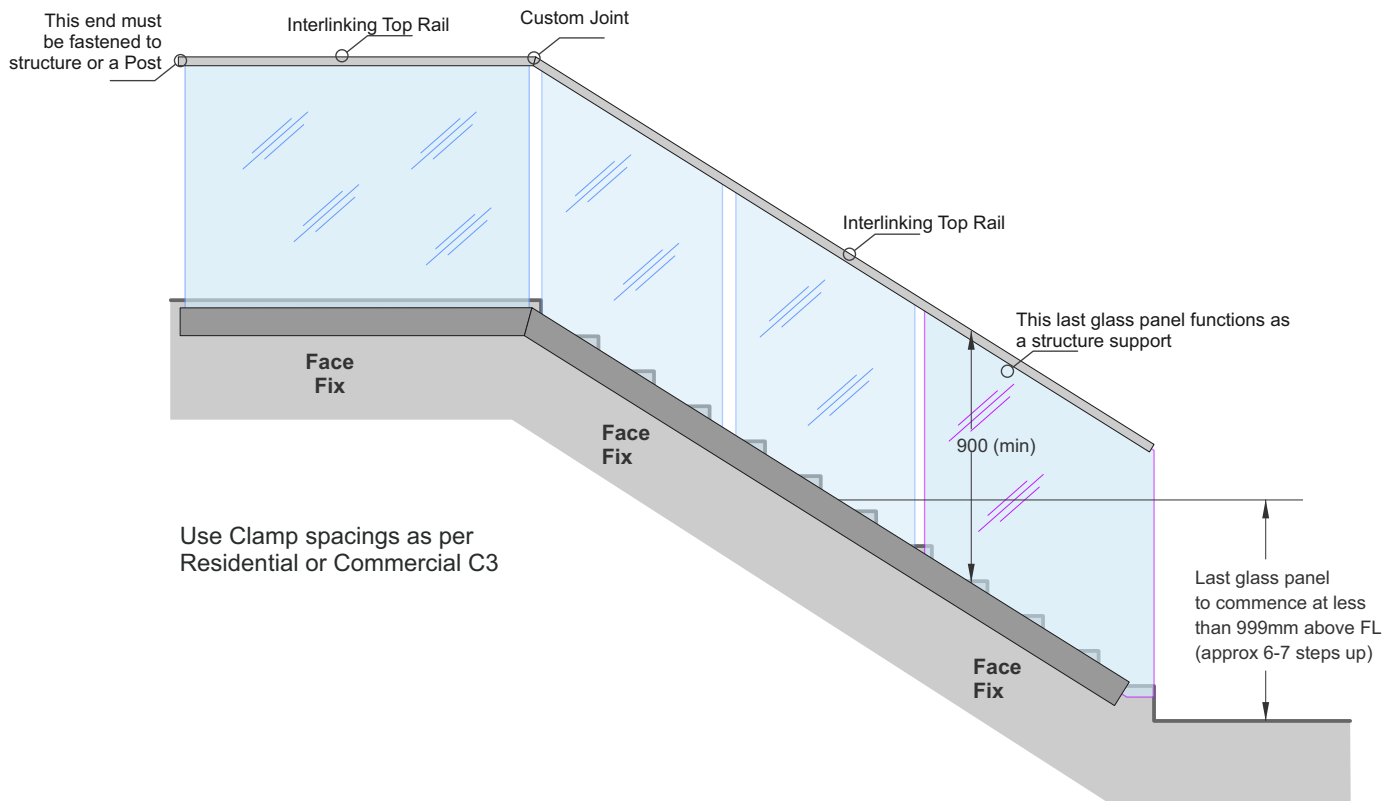
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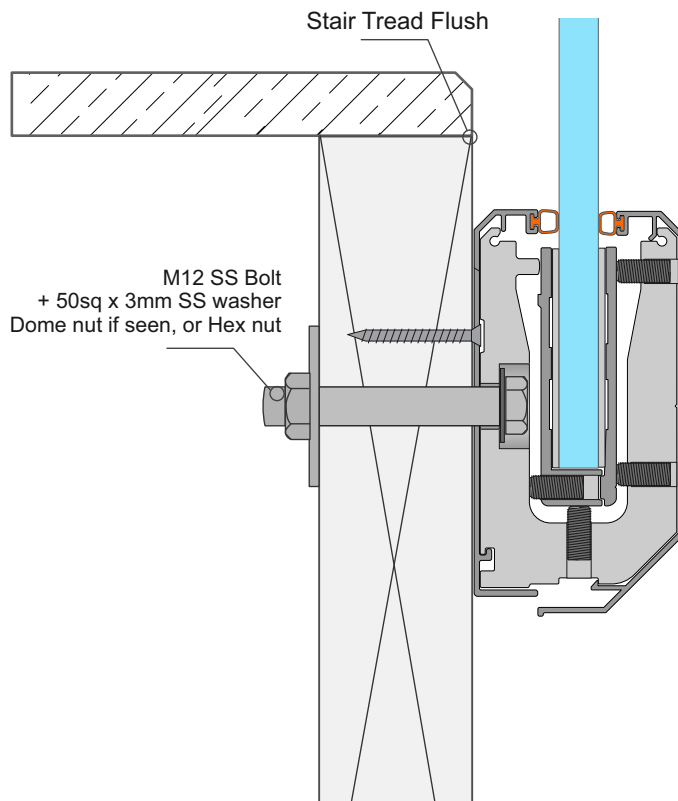
**Infinity, Stairs
Face Fix**

Stair structure to be designed by others to resist Balustrade actions as per NZS1170.1 Table 3.3



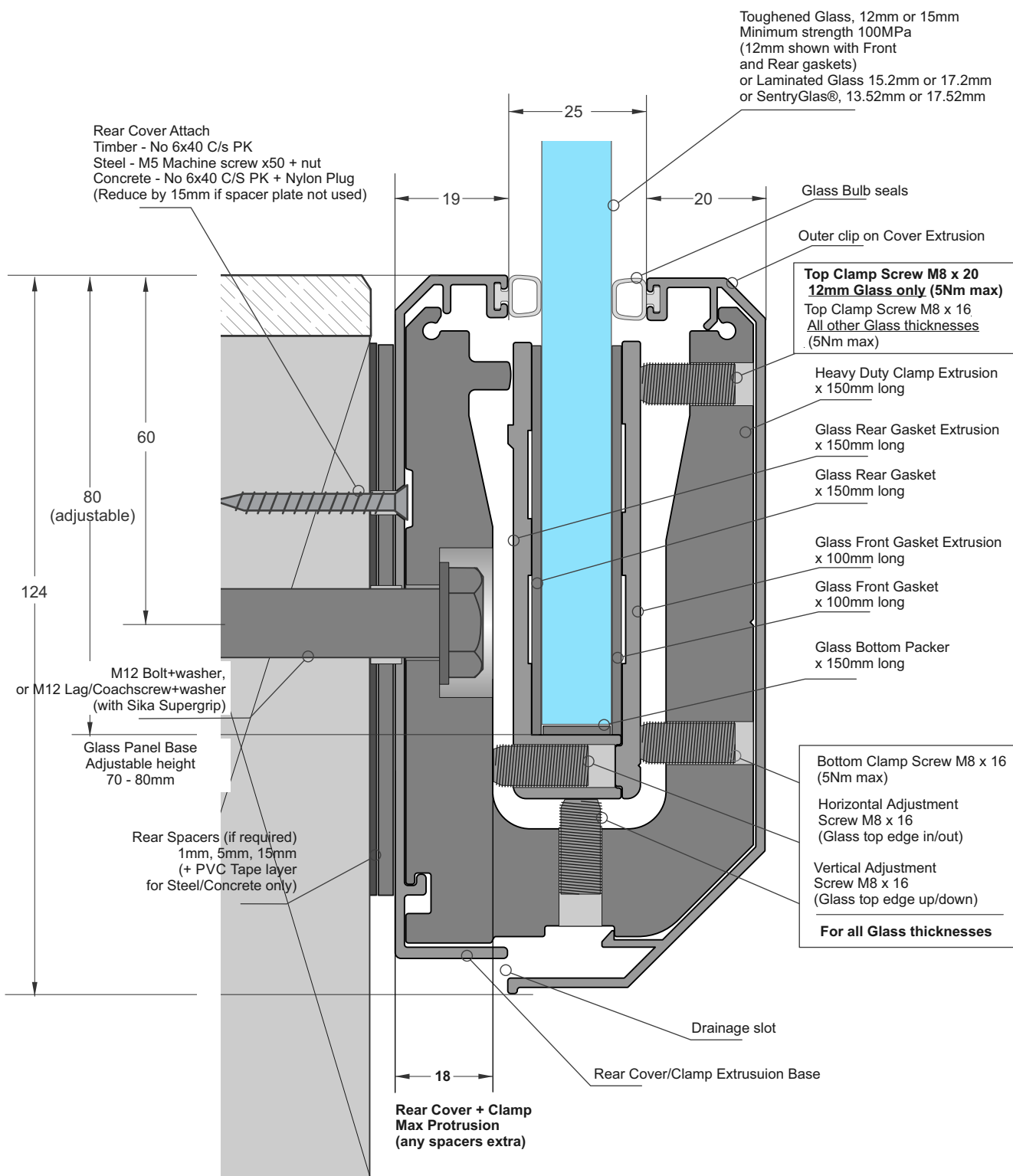
**Infinity Balustrade - Face fix only
Stair Stringer Detail**

Stair structure to be designed by others to resist Balustrade actions as per NZS1170.1 Table 3.3
For Internal use only, Residential Type A



**Infinity Glass Clamp
Face Fix
(12mm Glass Shown)**

The Infinity Balustrade Clamp comes as a kit;
Clamp Extrusion, Front and Rear Gasket Extrusions
Gaskets, Glass bottom Packer and all adjusting screws.
(M12 Fastener not included)



Elevation showing the Main Features



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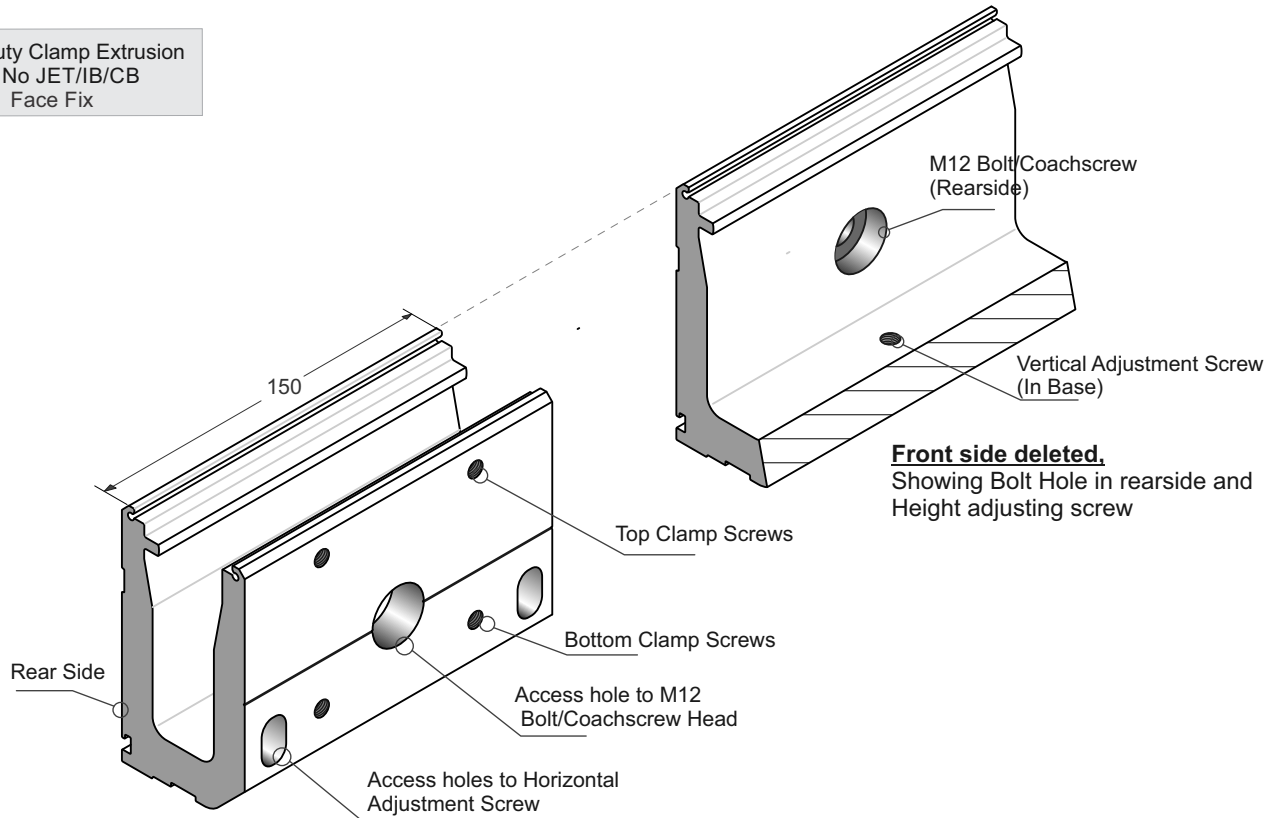
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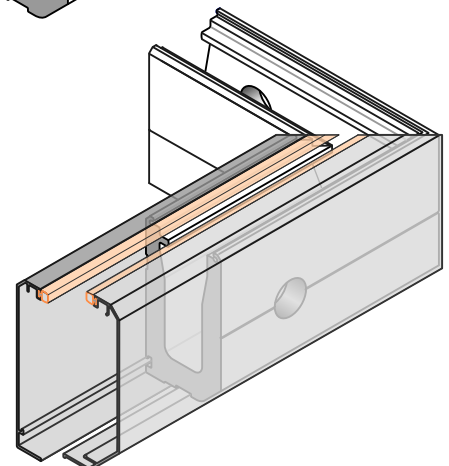
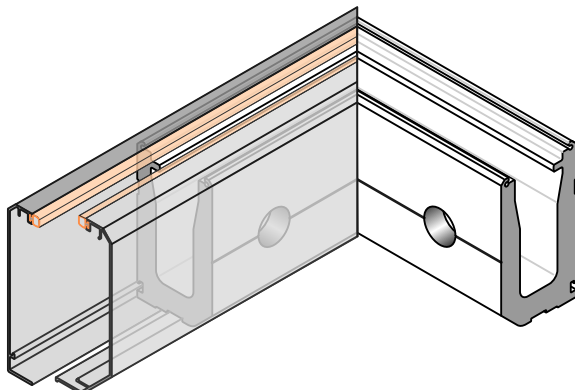
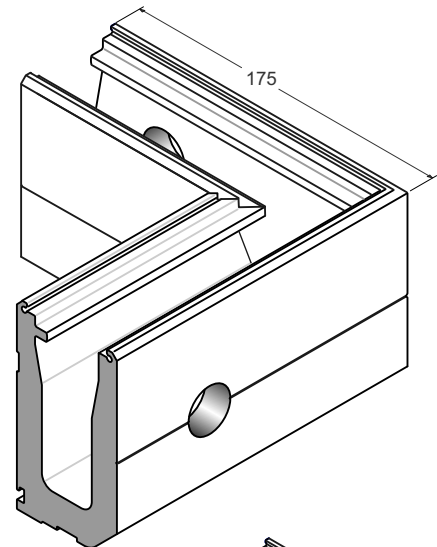
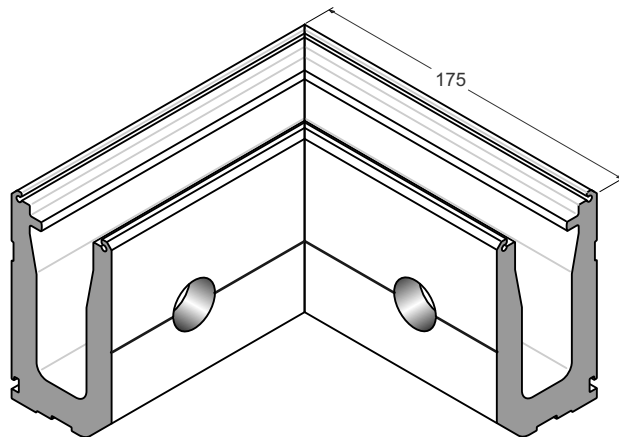
Heavy Duty Clamp Extrusion
Part No JET/IB/CB
Face Fix

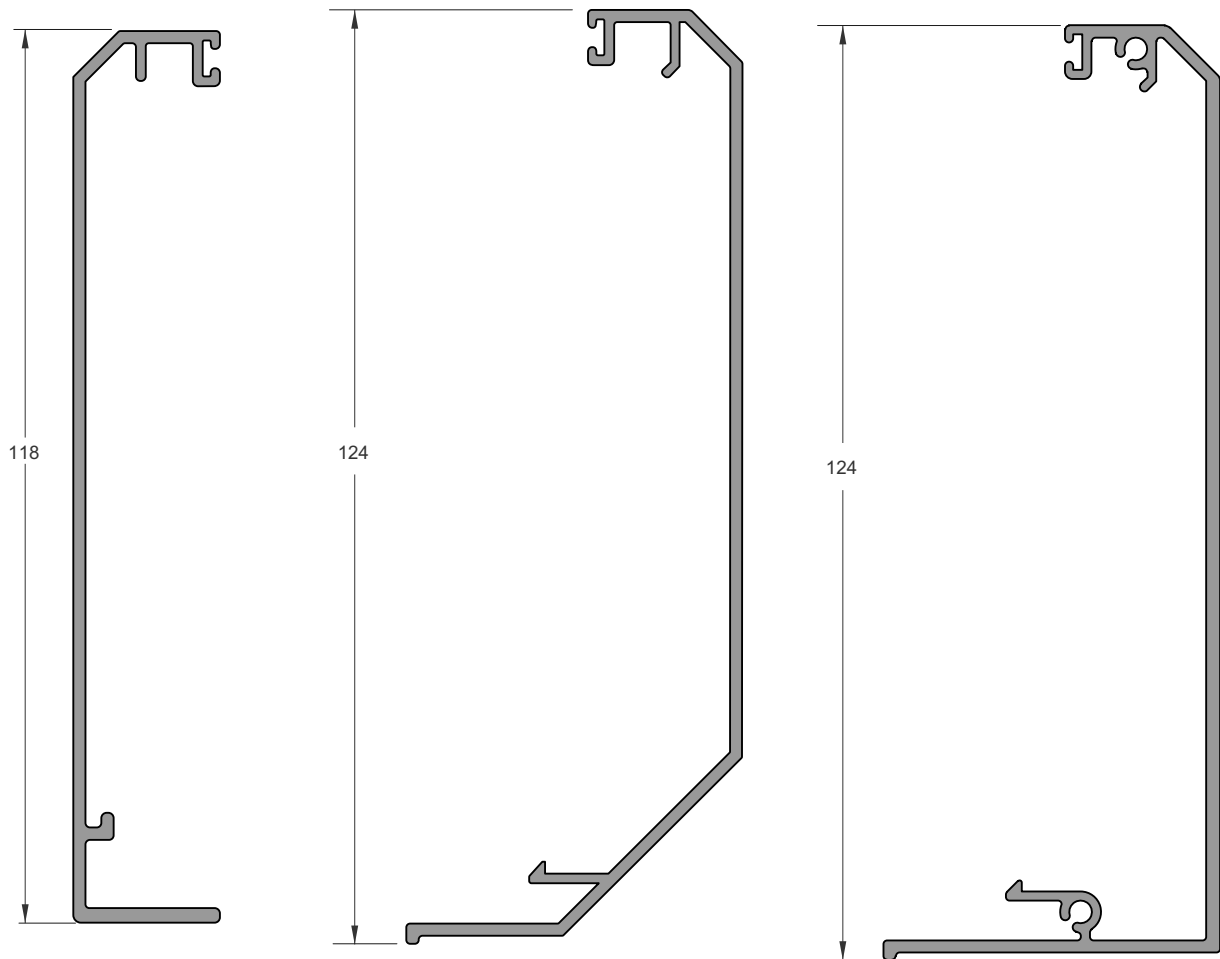


Heavy Duty Clamp Extrusion
90deg Internal Corner
Part No JET/IB/INCNRBLK
Face Fix

Note: These corners are used only
to align the mitered Rear and Front cover corners.
They are not supplied with Glass Clamps
or adjusting screws

Heavy Duty Clamp Extrusion
90deg External Corner
Part No JET/IB/EXCNRBLK





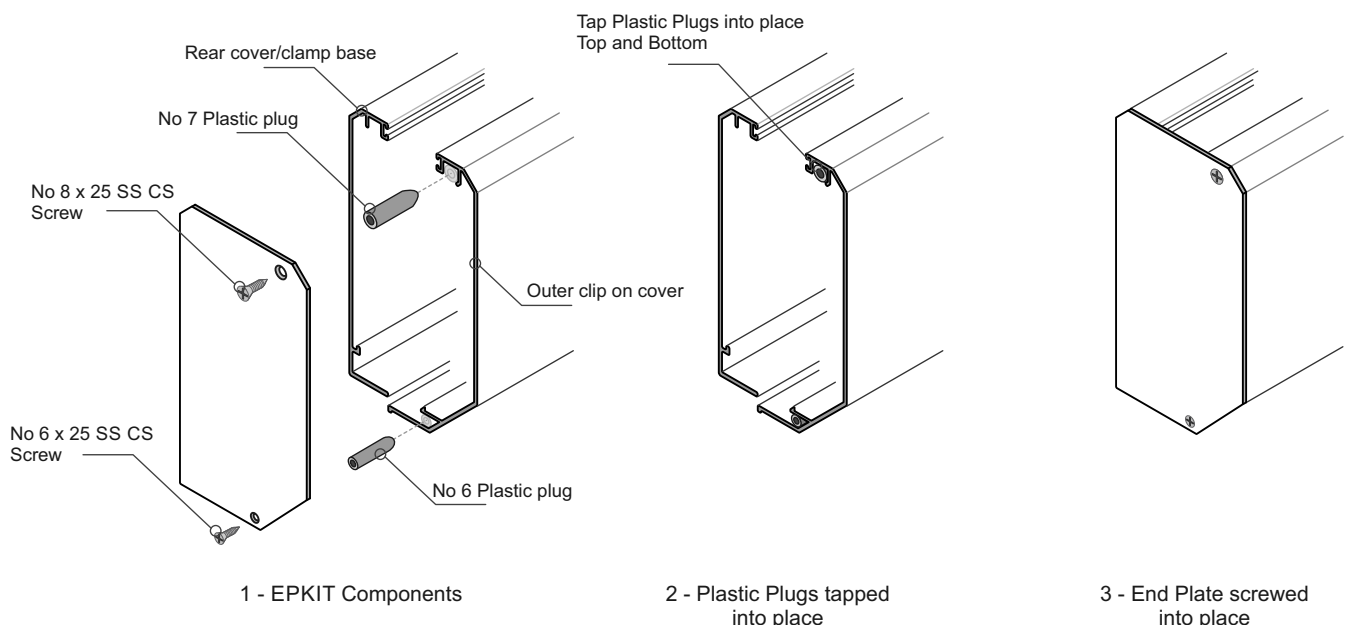
REAR COVER/CLAMP BASE
PART NO JET/IB/IC

OUTER CLIP ON COVER
PART NO JET/IB/OC

FLAT OUTER CLIP ON COVER
PART NO JET/IB/FOC

End Plate Fastening
with JET/IB/EPKIT
Face Fix

Note: Exactly the same procedure
for the Flat Cover



1 - EPKIT Components

2 - Plastic Plugs tapped
into place

3 - End Plate screwed
into place



Extrusion End Plate
Part No JET/IB/EPKIT



Kit Includes
No7 Plastic plug + 8g x 25 SS CS Screw
No 6 Plastic plug + 6g x 25 SS CS Screw

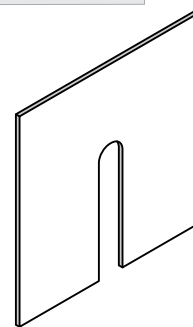
Flat Cover End Plate
Part No JET/IB/FEP



For Flat Outer Cover - Kit Includes
No7 Plastic plug + 8g x 25 SS CS Screw
No 6 Plastic plug + 6g x 25 SS CS Screw

Rear Spacer Plate
100 wide x 94 deep

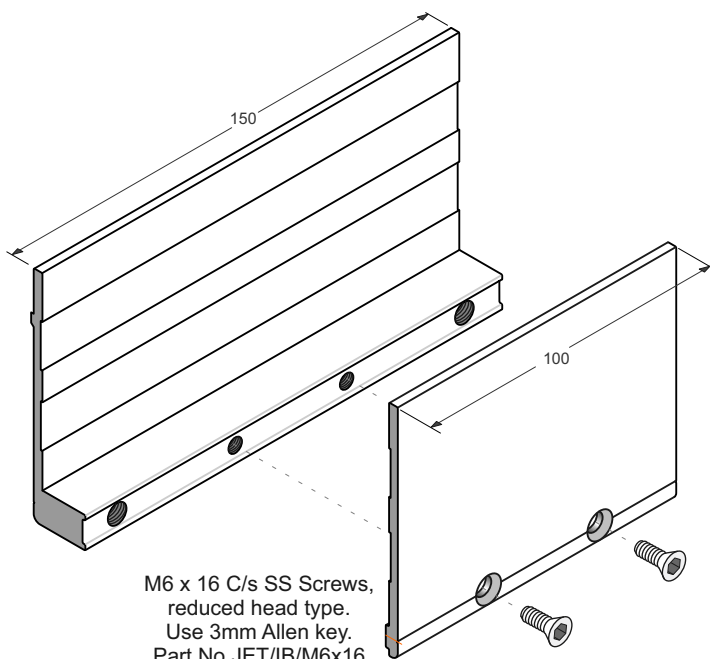
Use only
if required



1mm thick Plate - Part No JET/IB/CSP/1.0
5mm thick Plate - Part No JET/IB/CSP/5.0

Glass Gasket Extrusions
Front and Rear

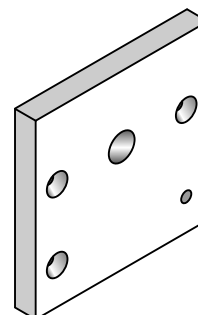
Front 100 wide, Part No JET/IB/GS/12
Rear 150 wide, Part No JET/IB/GS/15



M6 x 16 C/s SS Screws,
reduced head type.
Use 3mm Allen key.
Part No JET/IB/M6x16

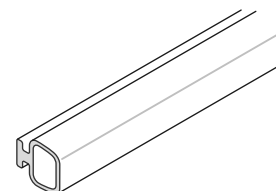
Rear Spacer Plate 15mm
Part No JET/IB/CSP/15

For use on
Timber Decks

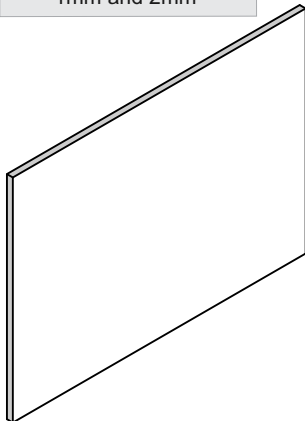


100 wide x 94 high x 15mm thick

Glass Bulb Seal
Part No JET/IB/CVRBLB250



Glass Gaskets
1mm and 2mm



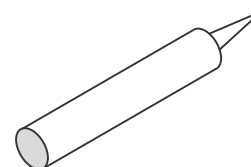
Gasket Schedule

12mm Toughened	Use 2 x 2mm Gaskets
13.2mm Laminated	
13.52mm SentryGlas	
15mm Toughened	Use 2 x 1mm Gaskets
17.2mm Laminated	
17.52mm SentryGlas	

Gasket 2mm Thick	Front 100 wide, Part No JET/IB/GGF2 Rear 150 wide, Part No JET/IB/GGR2
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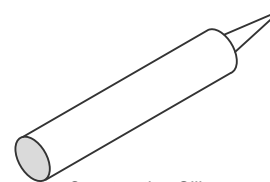
Gasket 1mm Thick	Front 100 wide, Part No JET/IB/GGF1 Rear 150 wide, Part No JET/IB/GGR1
---------------------	---

SIKA Supergrip 2hr
Part No JEC SUPERGRIP



For All Coachscrews fixings

Rhodorsil V60 Clear Silicone
Part No H/RTV419098



Construction Silicone

Approved Timber Construction Options

Face Fix into **Double Joist**

M12 SS Bolts or Threaded Rod - All Wind Zones

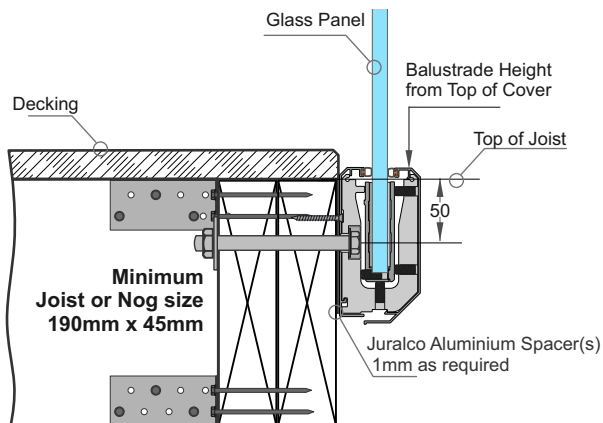
M12 SS Lagscrews - All Wind Zones

M12 SS Coachscrews - Up to and Incl

Very High Wind Zone only

Note: All Lag/Coachscrews 90mm min

Screw engagement into Joists



1 - Attach Directly to Double or Triple Joists using 1mm alignment Spacers

Approved Timber Construction Options

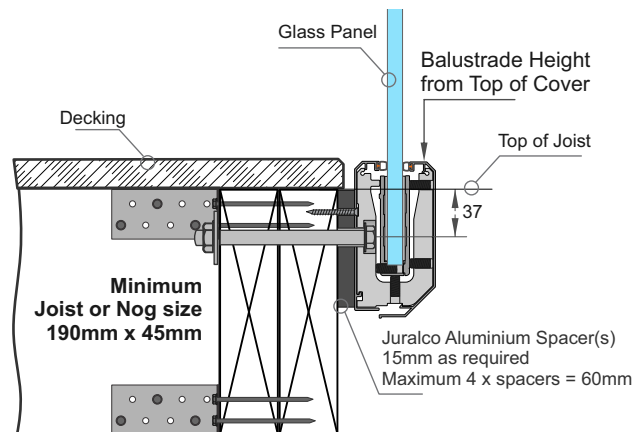
Face Fix into **Triple Joist**

M12 SS Bolts or Threaded Rod - All Wind Zones

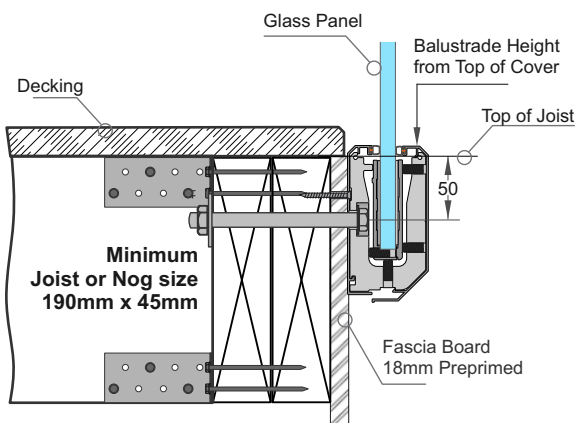
M12 SS Coachscrews - All Wind Zones

Note: All Coachscrews 130mm min

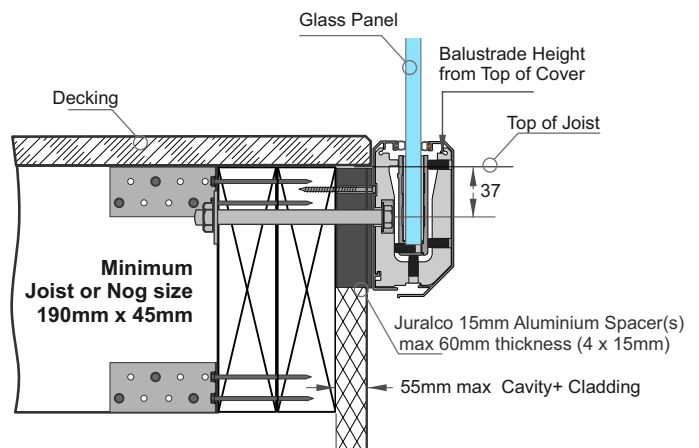
Screw engagement into Joists



2- Attach Directly to Double or Triple Joists using 15mm Spacers.

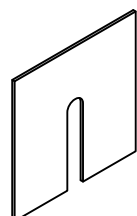


3 - Attach Directly to a Fascia then Double or Triple Joists using 1mm alignment Spacers

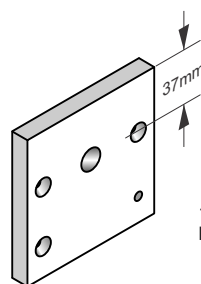


4 - Attach through Cavity Wall to Double or Triple Joists using 15mm Spacers (60mm max)

Rear Spacer Plates
94 high x 100 wide



1mm thick Plate
Part No JET/IB/CSP/1.0
5mm thick Plate
Part No JET/IB/CSP/5.0



15mm thick Plate
Part No JET/IB/CSP/15

Complies with NZS3604:2011 - Double Boundary Joists

Typical FACE Fix to Timber - M12 SS Lag/Coachscrew

Very High Wind Zone

- Residential A, A Other and C3 only

Lag/Coachscrew attach

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350

Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only

Lag/Coachscrew attach

Extra High Wind Zone
Pool Fence only

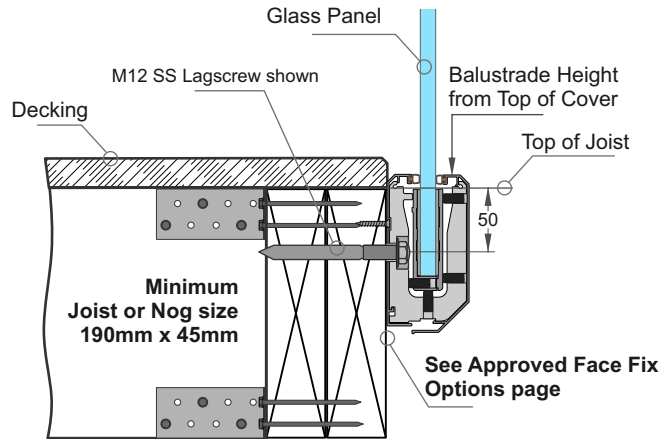
Lagscrew attach only

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

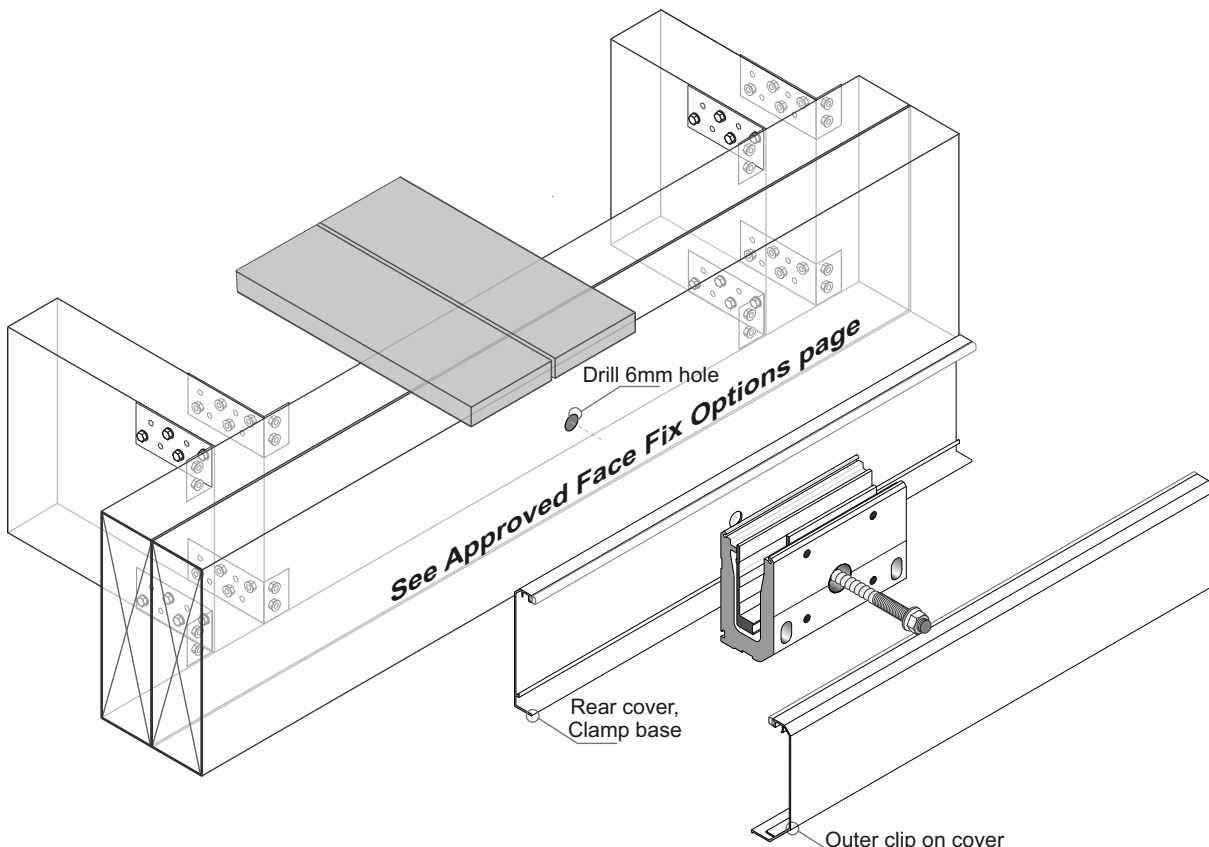
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Predrill a 6mm dia Hole for Lag/Coachscrew
- 3 - Bond all screws with SIKa Supergrip to full depth
- 4 - Lag/Coachscrews 90mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Double Boundary Joists

Typical FACE Fix to Timber - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Lag/Coachscrew attach

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350

Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only

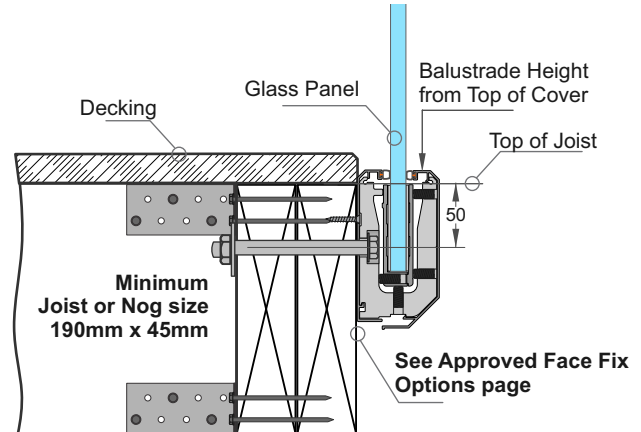
Lag/Coachscrew attach

Extra High Wind Zone
Pool Fence only

Lagscrew attach only

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

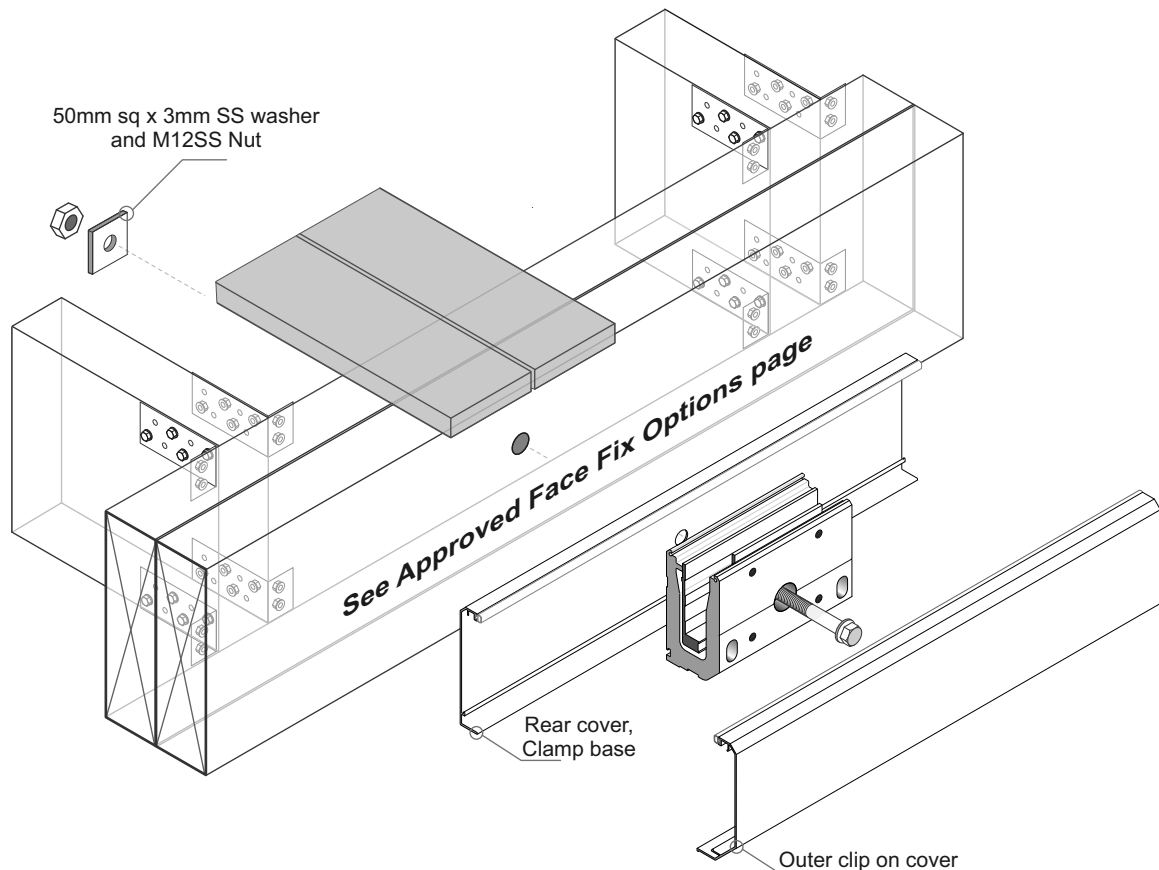


General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - For Face Fix details see the Approved Face fix Options page
- 3 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Double Boundary Joists

Typical Hidden FACE Fix to Timber - M12 SS Lag/Coachscrew

Very High Wind Zone

- Residential A, A Other and C3 only

Lag/Coachscrew attach

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350

Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only

Lag/Coachscrew attach

Extra High Wind Zone
Pool Fence only

Lagscrew attach only

Applies to Pool Fences not protecting a fall of 1.0m or more

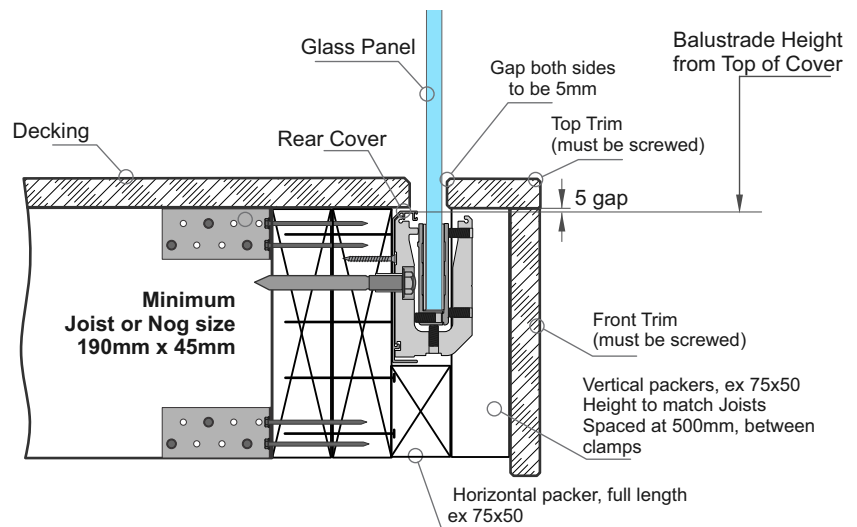
Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

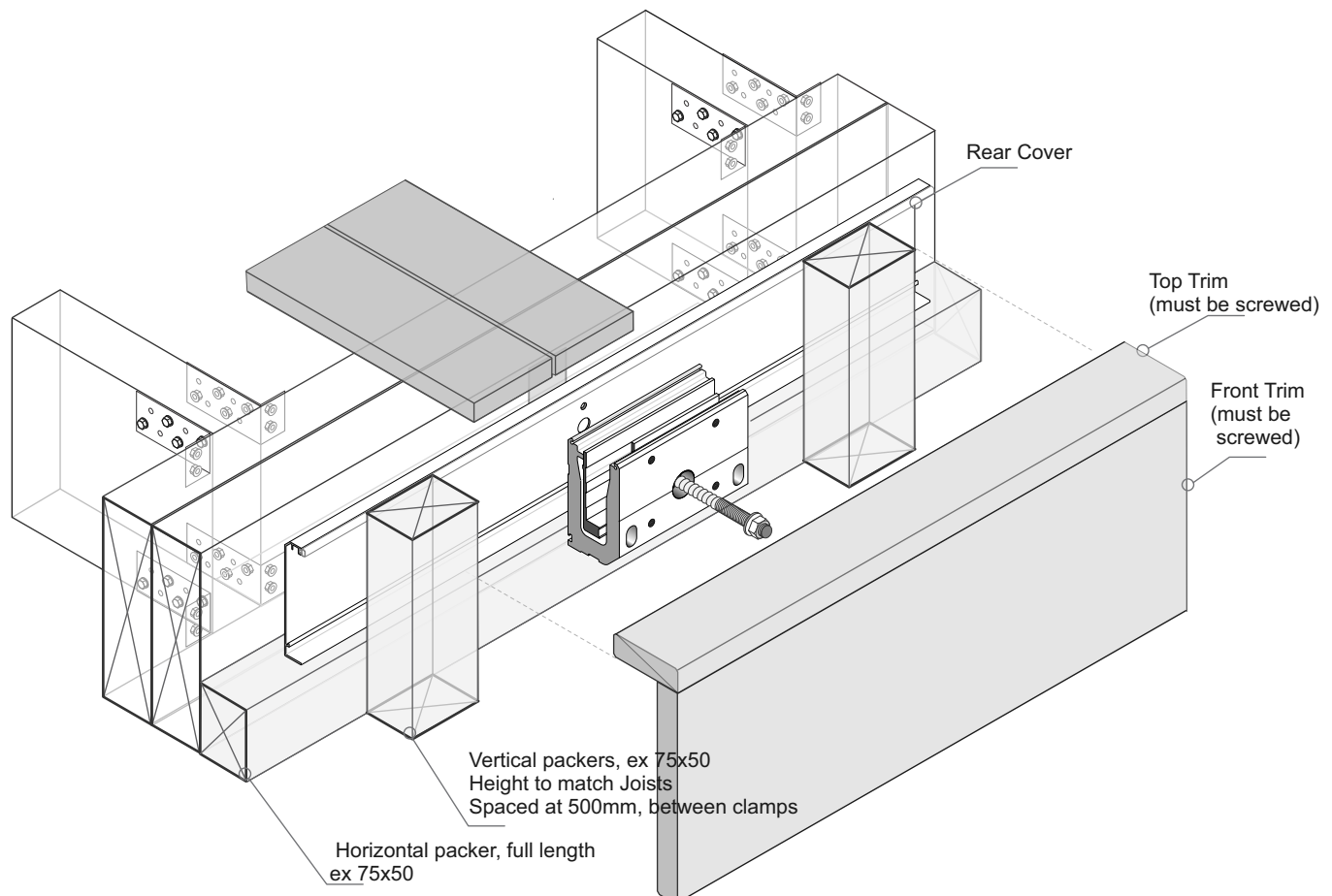
Important Note.

No Front Cover used, Back cover only



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Predrill a 6mm dia Hole for Lag/Coachscrew
- 3 - Bond all screws with SIKa Supergrip to full depth
- 4 - Lag/Coachscrews 90mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Double Boundary Joists

Typical FACE Fix through a cavity into Timber - M12 SS Lag/Coachscrew

Very High Wind Zone

- Residential A, A Other and C3 only

Lag/Coachscrew attach

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350

Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only

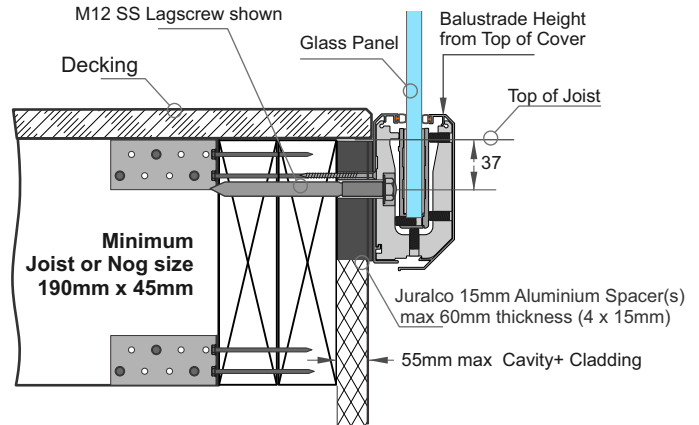
Lag/Coachscrew attach

Extra High Wind Zone
Pool Fence only

Lagscrew attach only

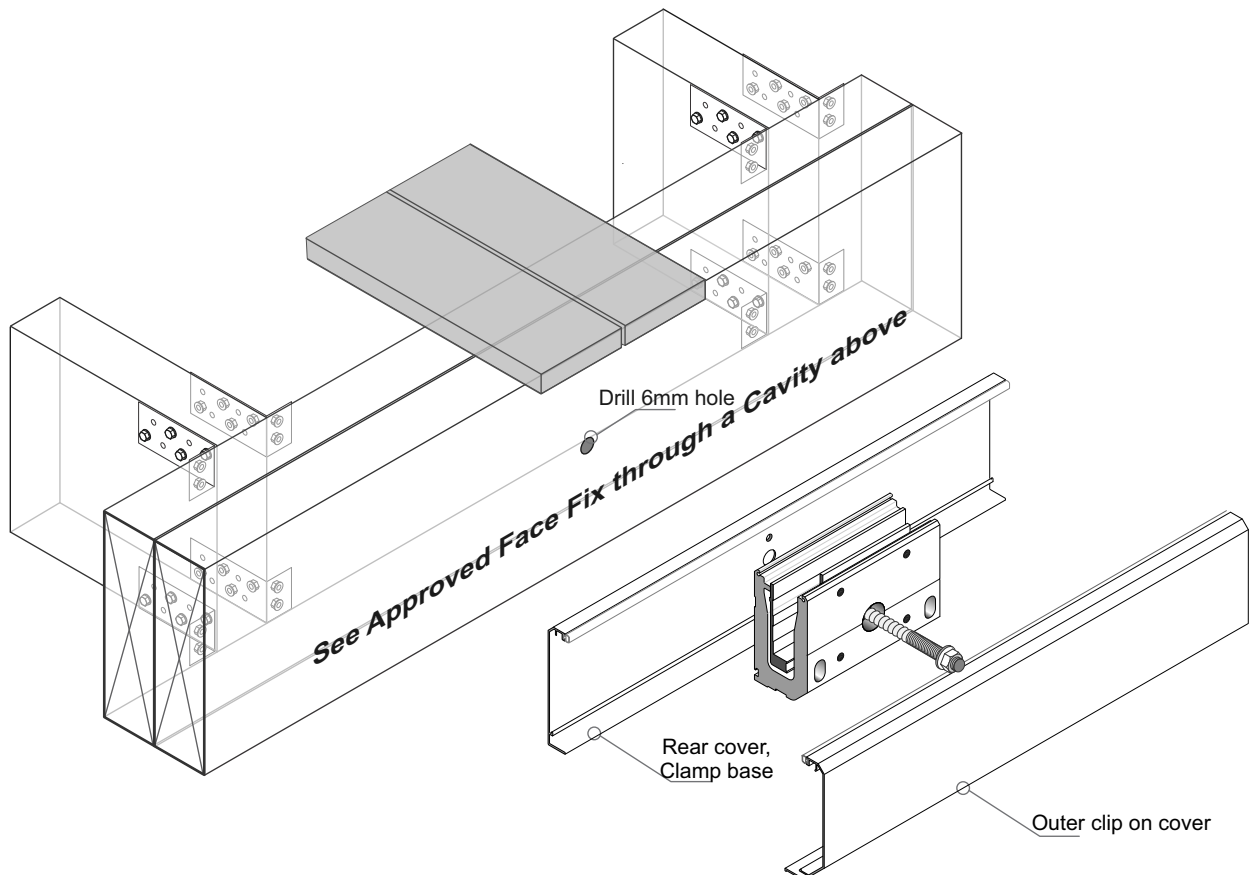
Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Pre-drill a 6mm dia Hole for Lag/Coachscrew
- 3 - Bond all screws with SIKa Supergrip to full depth
- 4 - Lag/Coachscrews 90mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Triple Boundary Joists

Typical FACE Fix to Timber - M12 SS Coachscrew

Extra High Wind Zone
- Commercial B, E and C3 only
Coachscrew attach OK

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
17.52SG	1200	350

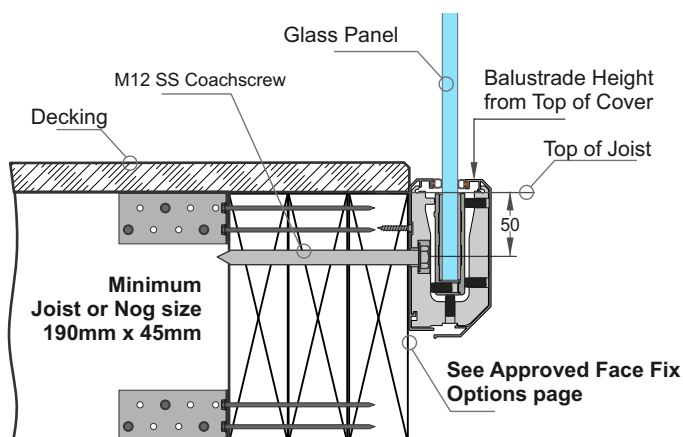
Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only
Coachscrew attach OK

Extra High Wind Zone
Pool Fence only
Coachscrew attach OK

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

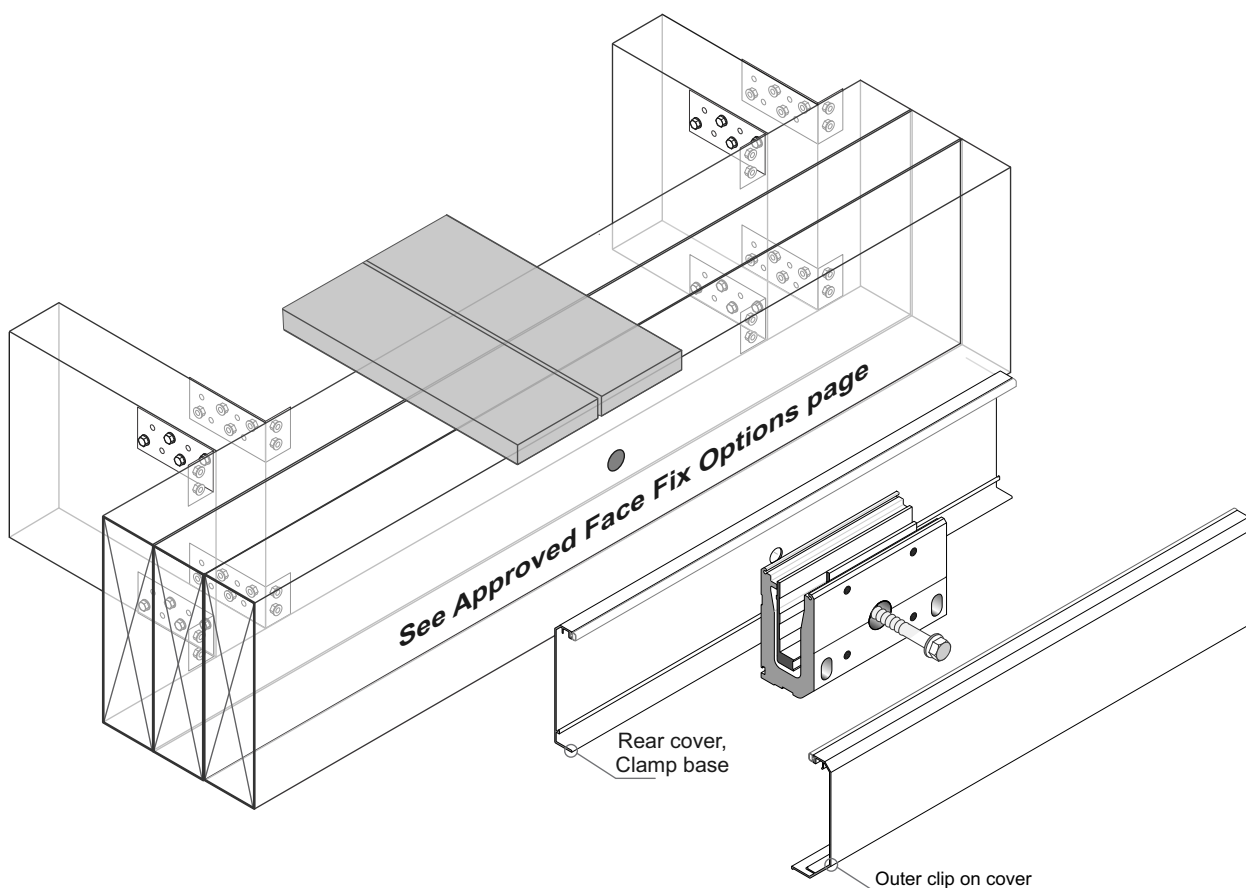


General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Coachscrews 130mm min screw engagement into joists
- 3 - Bond all coachscrews with SIKa Supergrip to full depth
- 4 - For Face Fix details see the Approved Face fix Options page
- 5 - All fixings must be Stainless Steel



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Complies with NZS3604:2011 - Double Boundary Joists

Typical FACE Fix to Timber - M12 SS Bolt or M12 SS Threaded Rod

Extra High Wind Zone
- Commercial B, E and C3 only

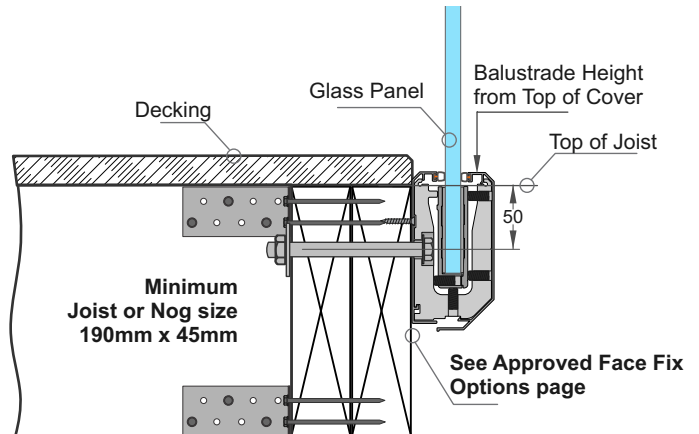
Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
17.52SG	1200	350

Very High Wind Zone Pool Fence only **Extra High Wind Zone Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

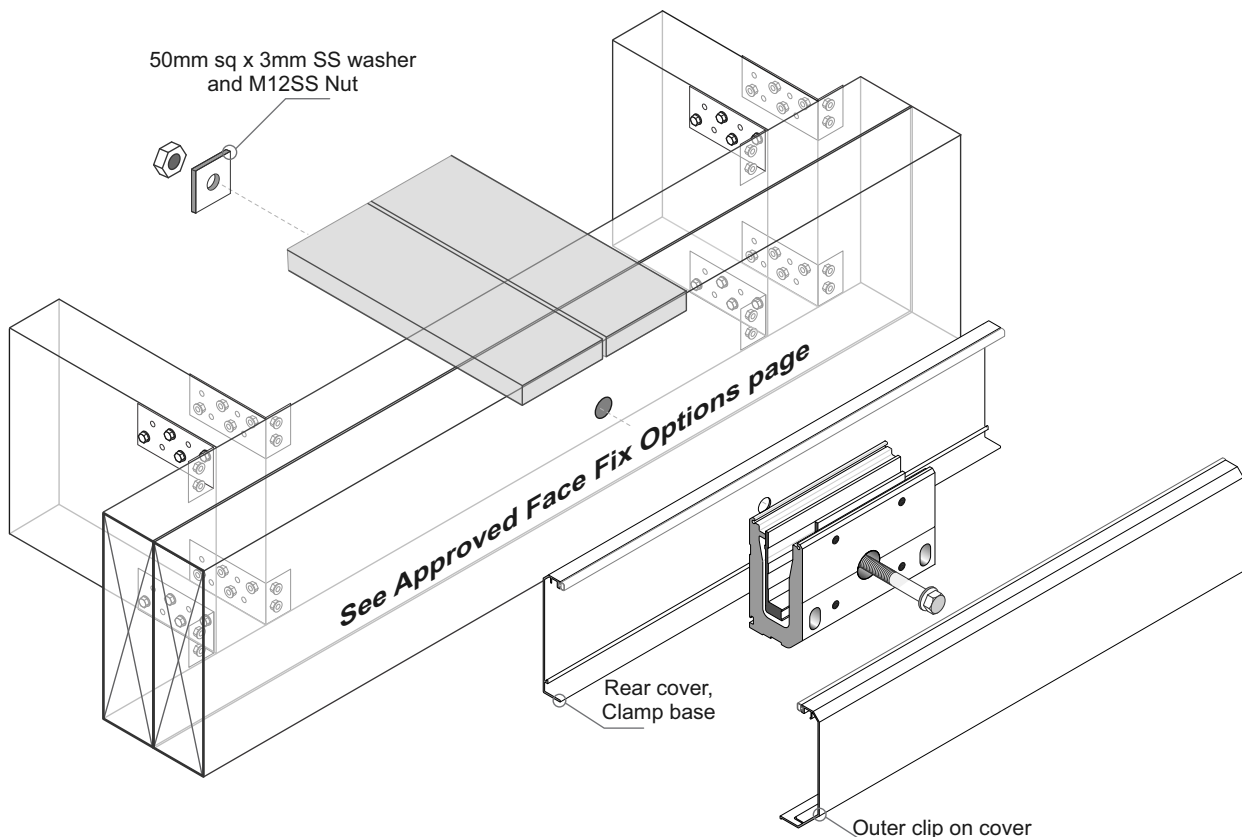


General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - For Face Fix details see the Approved Face fix Options page
- 3 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Double Boundary Joists

Typical FACE Fix through a Cavity into Timber - M12 SS Bolt or M12 SS Threaded Rod

Extra High Wind Zone
- Commercial B, E and C3 only

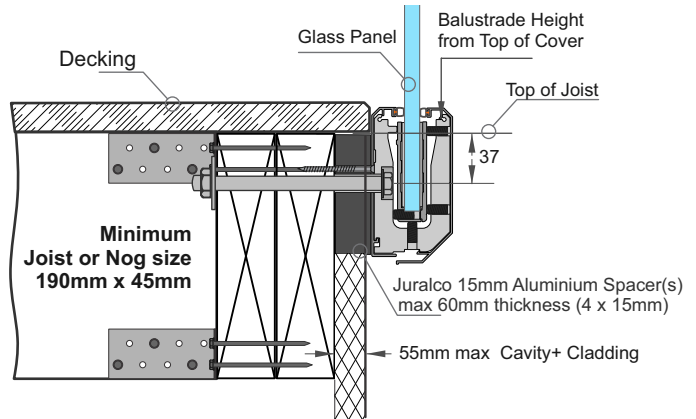
Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
17.52SG	1200	350

Very High Wind Zone Pool Fence only **Extra High Wind Zone Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

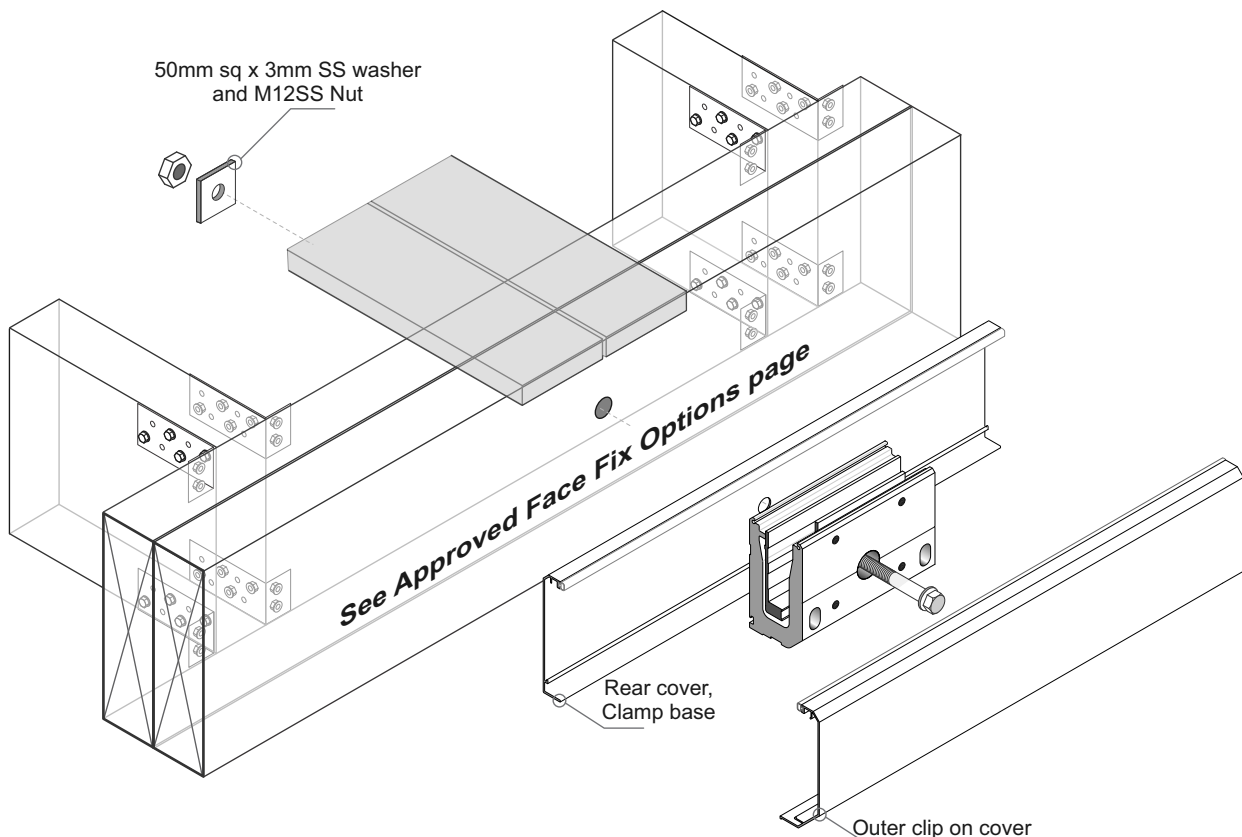


General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - For Face Fix details see the Approved Face fix Options page
- 3 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Triple Boundary Joists

Typical Hidden FACE Fix to Timber - M12 SS Coachscrew

Extra High Wind Zone
- Commercial B, E and C3 only
Coachscrew attach OK

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
17.52SG	1200	350

Note:
These attach comments apply to this page only

Very High Wind Zone
Pool Fence only
Coachscrew attach OK

Extra High Wind Zone
Pool Fence only
Coachscrew attach OK

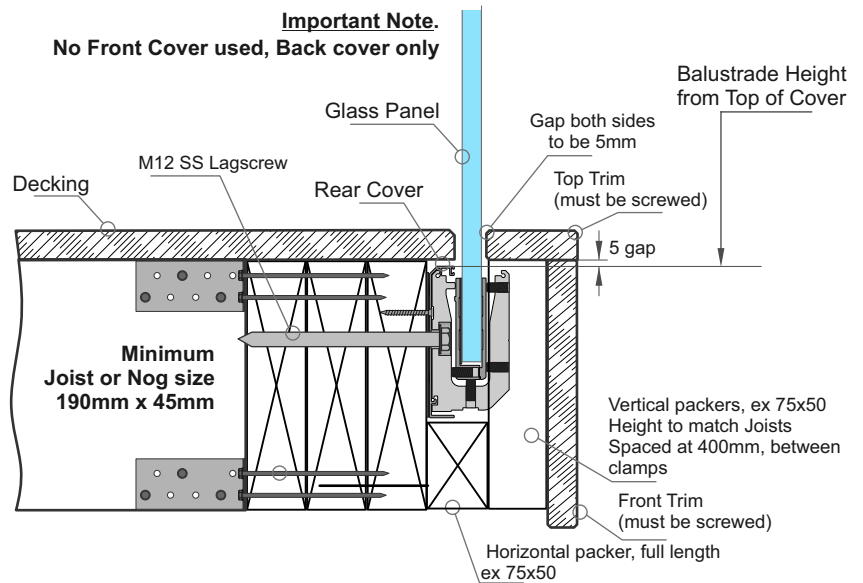
Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

General Notes:

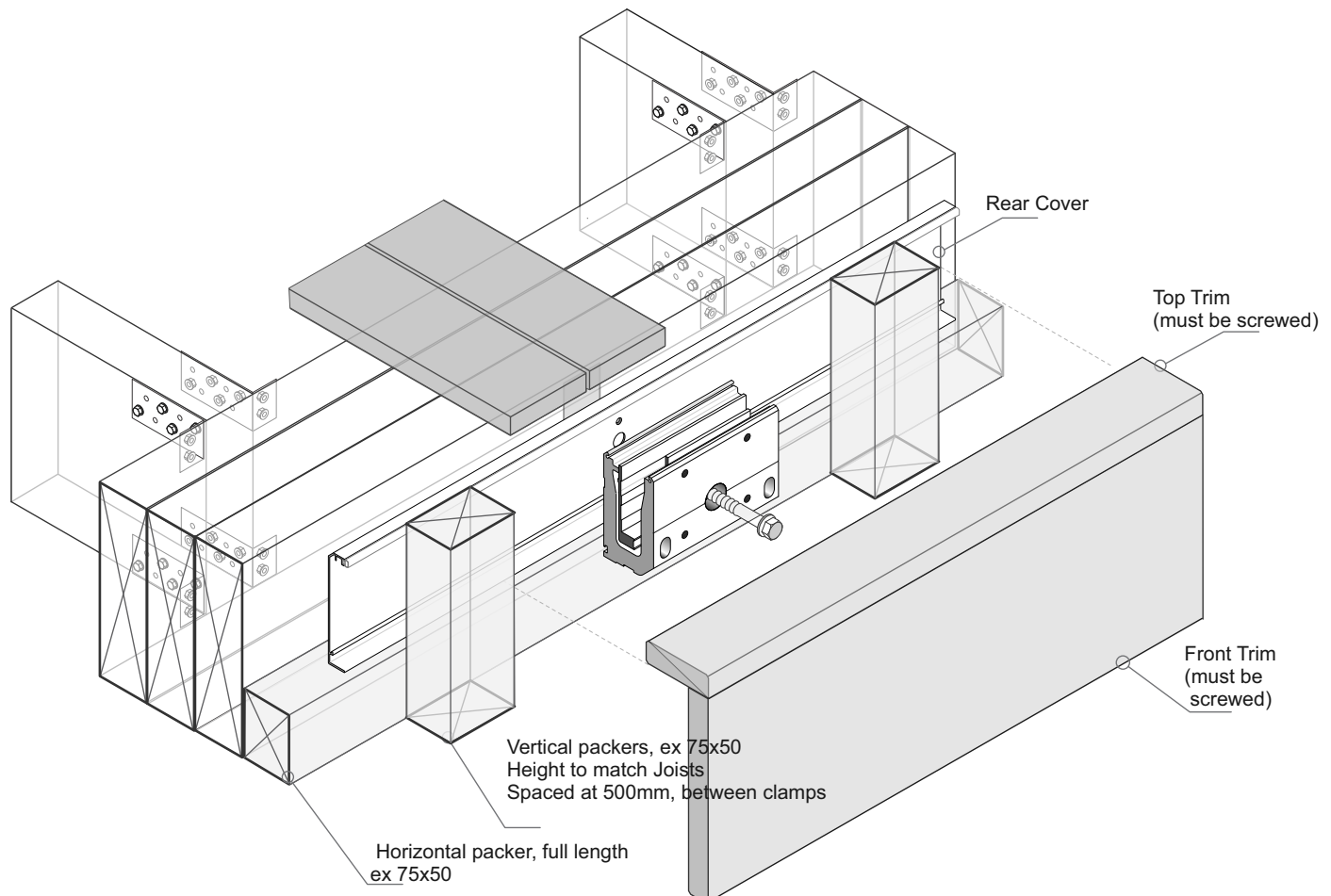
- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)

Important Note.
No Front Cover used, Back cover only



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Predrill a 6mm dia Hole for Coachscrew
- 3 - Bond all screws with SIKA Supergrip to full depth
- 4 - Coachscrews 130mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Complies with NZS3604:2011 - Triple Boundary Joists

Typical FACE Fix through a Cavity into Timber deck - M12 SS Coachscrew

Extra High Wind Zone
- Commercial B, E and C3 only
Coachscrew attach OK

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
17.52SG	1200	350

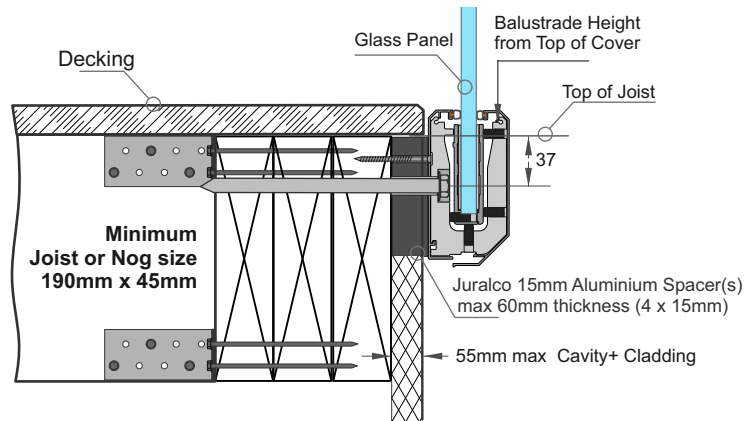
Note:
These attach comments apply to this page only

Very High Wind Zone Pool Fence only
Coachscrew attach OK

Extra High Wind Zone Pool Fence only
Coachscrew attach OK

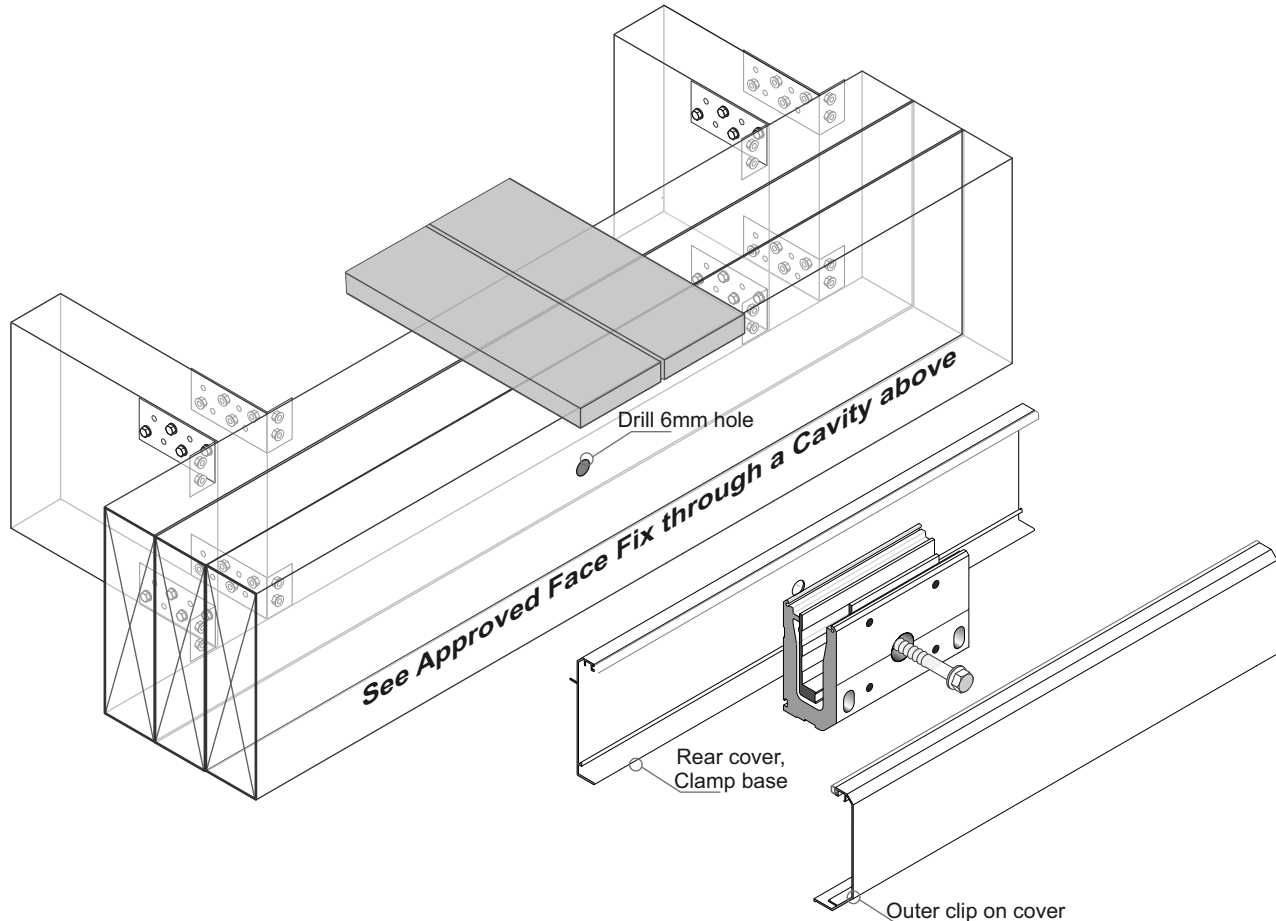
Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Predrill a 6mm dia Hole for Coachscrew
- 3 - Bond all screws with SIKa Supergrip to full depth
- 4 - Coachscrews 130mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Typical FACE Fix to Steel - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

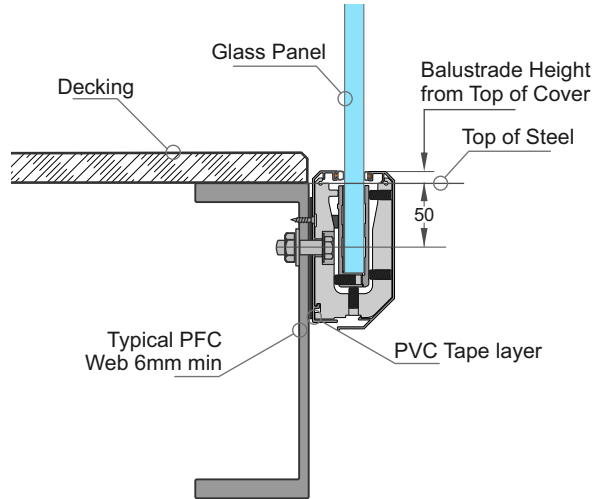
Very High Wind Zone Pool Fence only	Extra High Wind Zone Pool Fence only
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Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

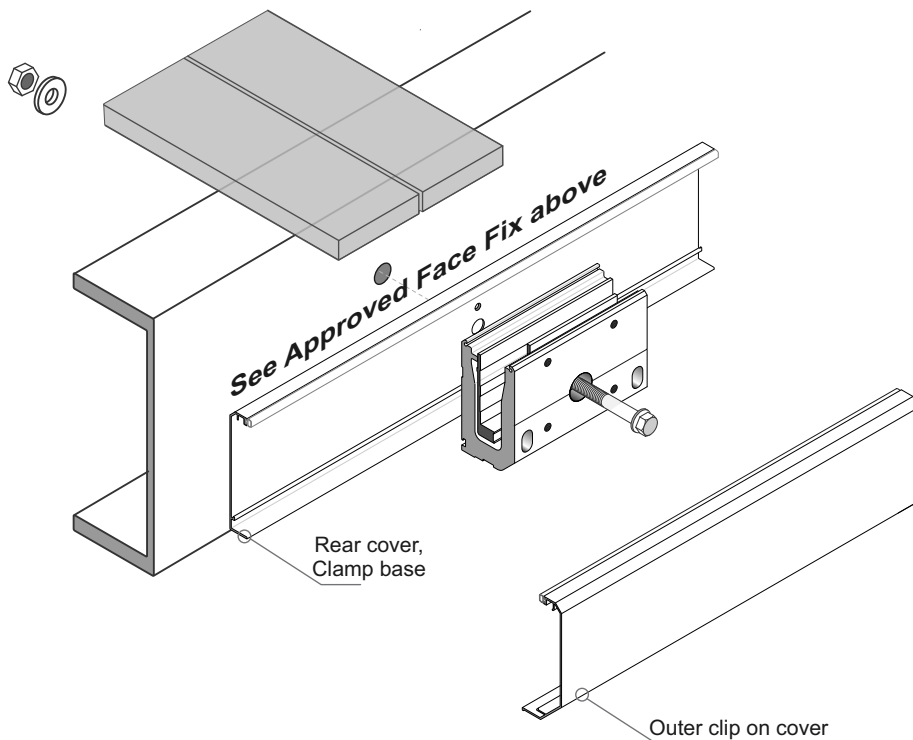
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate load
- 2 - A PVC tape layer must be placed between the Rear cover and Steel
- 3 - All fixings must be Stainless Steel



Typical FACE Fix to Steel, Wooden Packers - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

**Very High Wind Zone
Pool Fence only**

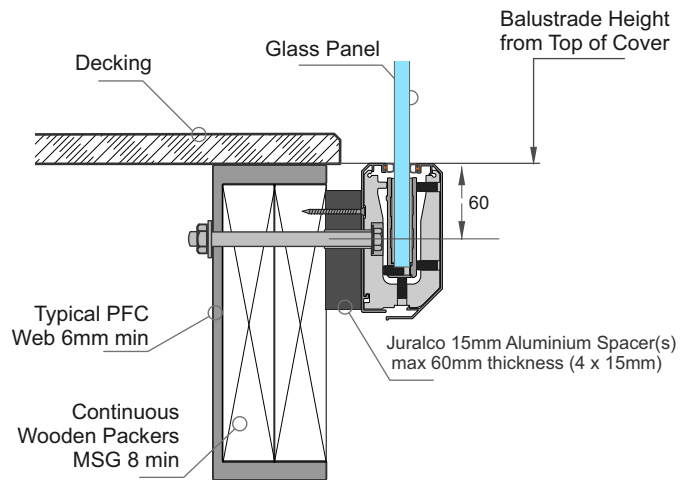
**Extra High Wind Zone
Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

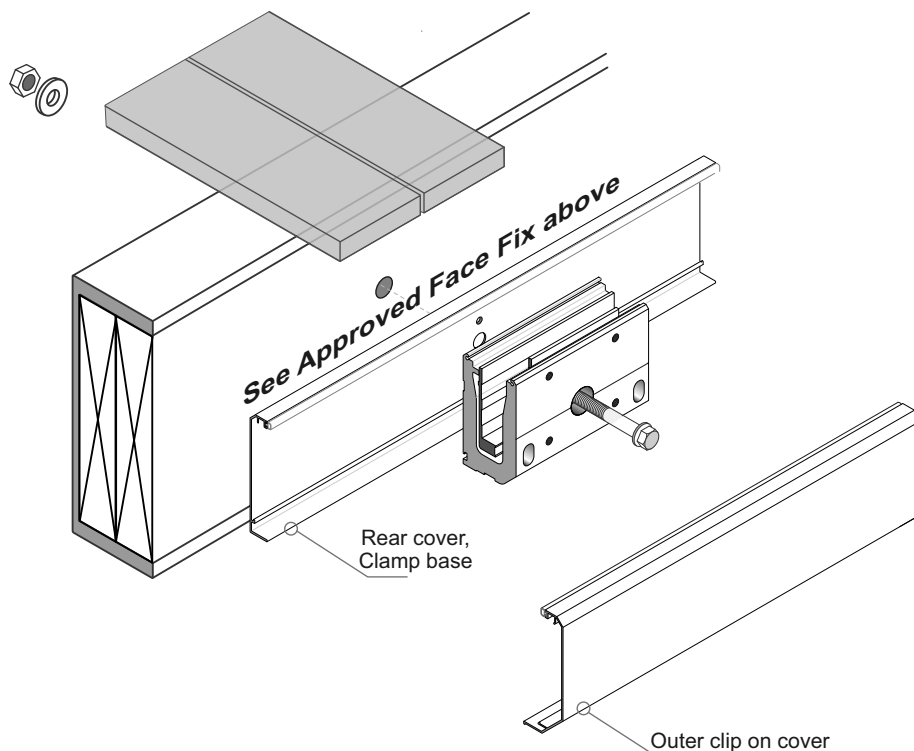
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - All fixings must be Stainless Steel



Typical FACE Fix to Steel, Wooden Packers - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

**Very High Wind Zone
Pool Fence only**

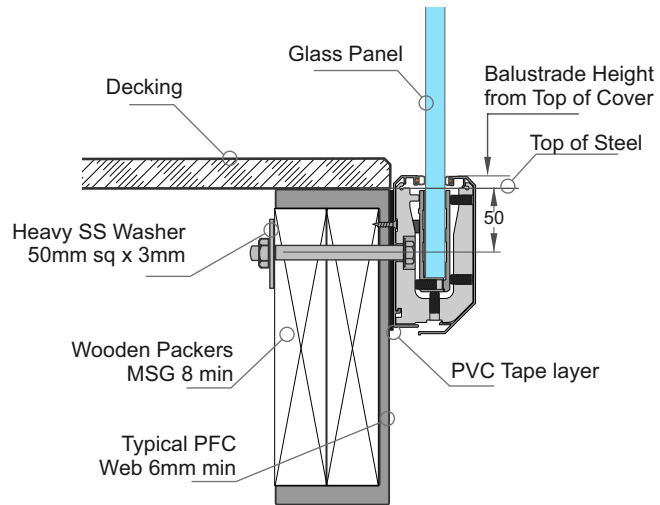
**Extra High Wind Zone
Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

General Notes:

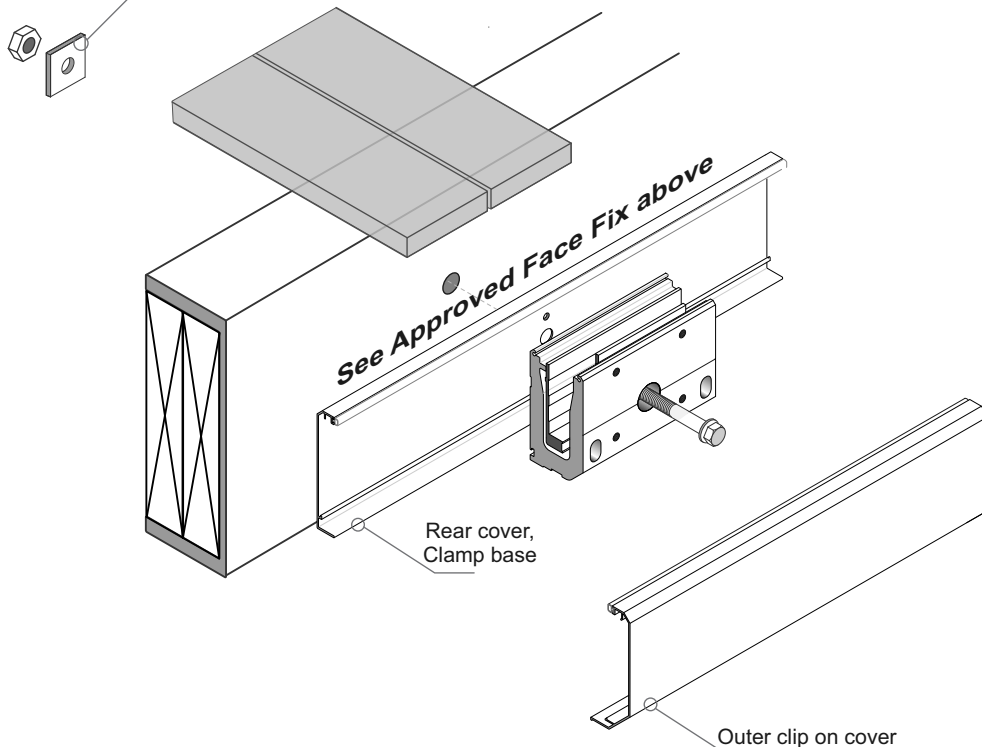
- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - An PVC tape layer must be placed between the Rear cover and Steel
- 3 - All fixings must be Stainless Steel

50mm sq x 3mm SS washer and M12SS Nut



Typical FACE Fix to Concrete - M12 SS Threaded Rod Stud

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500
15 T	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

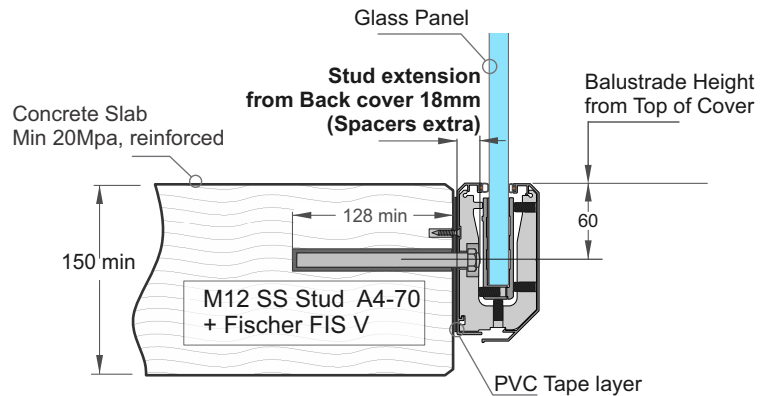
Very High Wind Zone	Extra High Wind Zone
Pool Fence only	Pool Fence only

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500
15T	1250	500

General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - A PVC Tape Layer between Clamp and Concrete
- 3 - All fixings must be Stainless Steel



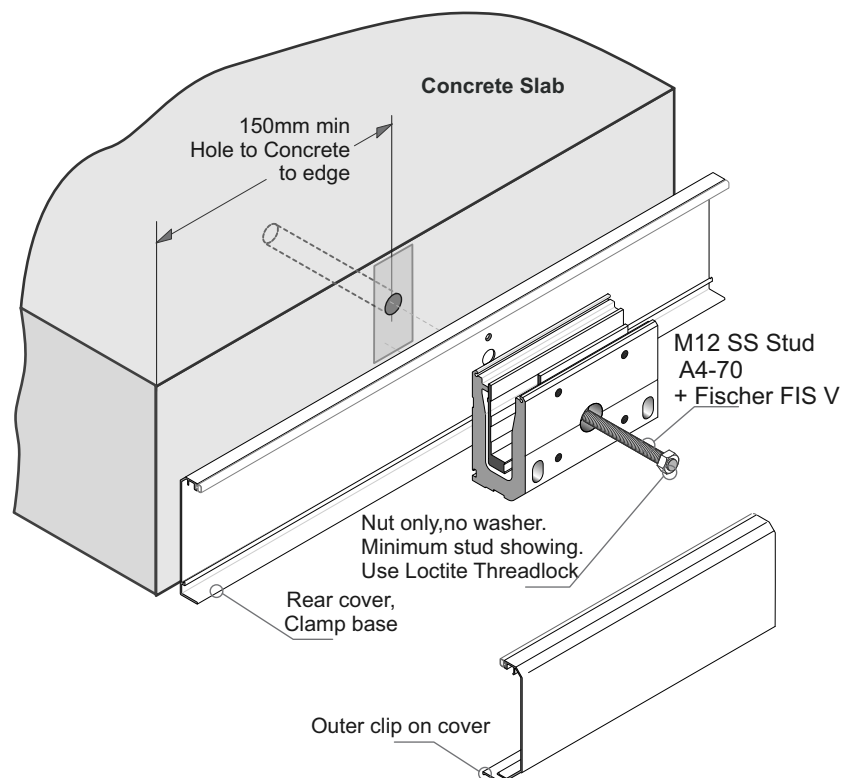
Installation details Fischer FIS V

Thread diameter	M 12
Drill hole diameter	= 14 mm
Drill hole depth	= 128 mm
Anchorage depth	= 120 mm
Drilling method	Hammer drilling

Drill hole cleaning
4 times blowing,
4 times brushing,
4 times blowing

No borehole cleaning required in case of using a hollow drill bit, e.g. fischer FHD.

Installation type	Push-through installation
Maximum torque	T _{inst,max} = 40.0 Nm
Socket size	19 mm
Total fixing thickness, max	t _{fix} = 8 mm
Volume of resin per drill	12 ml/6 scale divisions

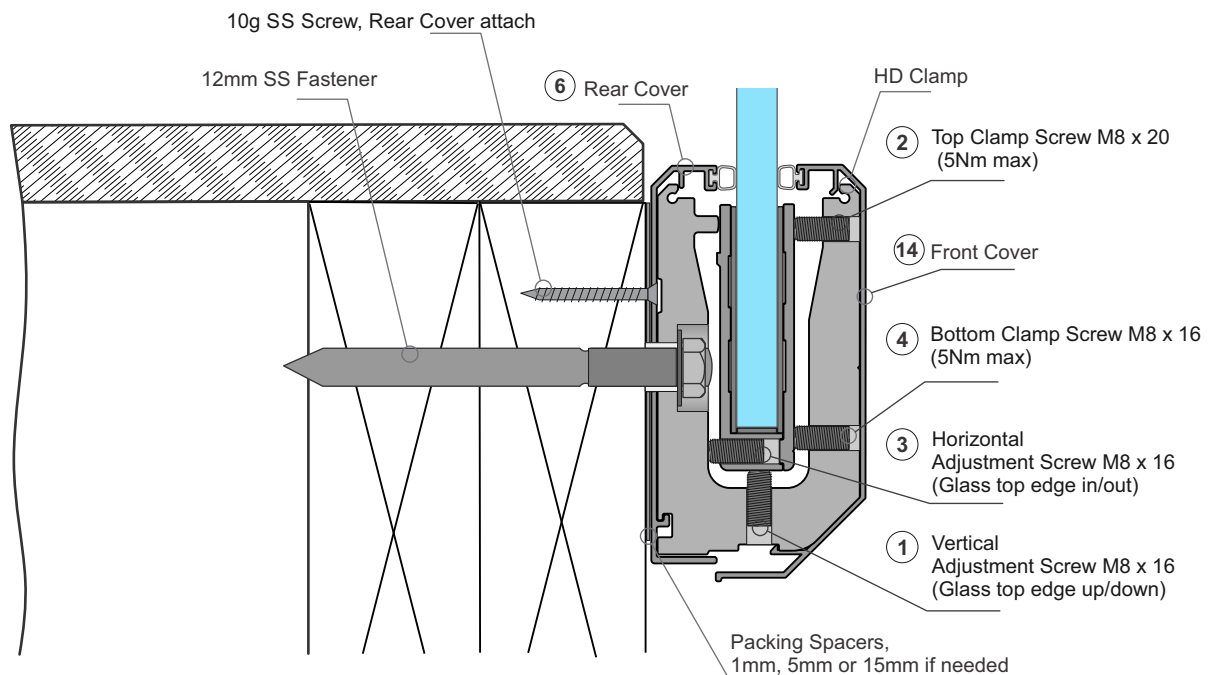


Infinity Balustrade Face Fix Installation procedure on Boundary Joists

- 1 - Attach a 15mm Spacer Plate to the boundary joist at each end of the balustrade section.
 - 2 - Run string line between these two Spacers Plates on the top edge of the Spacers.
 - 3 - Mark out position of intermediate Spacer Plates (will be the same spacing as the Heavy Duty clamps) and screw to joists using 10g SS Screws. EPDM or rubber membrane between Timber and Spacer
Use clamp spacings as listed on fixing details. Note that glass joins are usually made at the HD clamps.
 - 4 - Run string line between the spacers on the front face. This will determine if the joists are warped.
Calculate the position and quantity of JET/IB/CSP 1.0mm thick Packing spacers to packout the 15mm Spacer Plates as necessary. Do not fit at this stage.
 - 5 - Temporarily fit Rear cover and mark out position of 12.5mm holes for 12mm coach screw/Lac screw /bolts. Drill holes. Fit bulb seal on back cover.
 - 6 - Fit Rear cover and HD clamps in position with the 12mm fasteners. Prior to tightening up fit the 1.0mm Packing spacers as previously determined between any 15mm Spacers Plates and the Rear cover extrusion.
Tighten up the 12mm fasteners, while ensuring the Rear Cover is plumb.
-
- 7 - Mark out position of Glass clamps on glass to match position of HD clamps and tighten on glass.
 - 8 - Fit glass into position on HD clamps.
-
- 9 - Adjust the Vertical height grub screw on the bottom of the HD clamp to ensure the top edges of the glass panels are level
 - 10 - Lightly nip the top 2 grub screws on the HD clamp to hold the glass vertical.
 - 11 - Adjust the 4 lower grub screws on the HD clamp and Glass clamp assemblies for top edge Horizontal alignment
 - 12 - When glass panels are in the correct position tighten top and bottom clamp screws on HD clamp (5.0Nm max)
-
- 13 - Cut Front cover to length and fit bulb seal
 - 14 - Clip Front cover on
 - 15 - Fit End plate kits as required (note: 2 different size plastic plugs and screws)
-

Fitting Stages 1-6 to get HD Clamp Plumb, both Vertical and Horizontal

Fitting Stages 9-11 to get Glass Plumb, both Vertical and Horizontal



Typical Layouts - Top Fix

Infinity Glass Clamps Top Fix + Interlinking Rail

Glass must have a minimum strength of 100Mpa
All edges polished

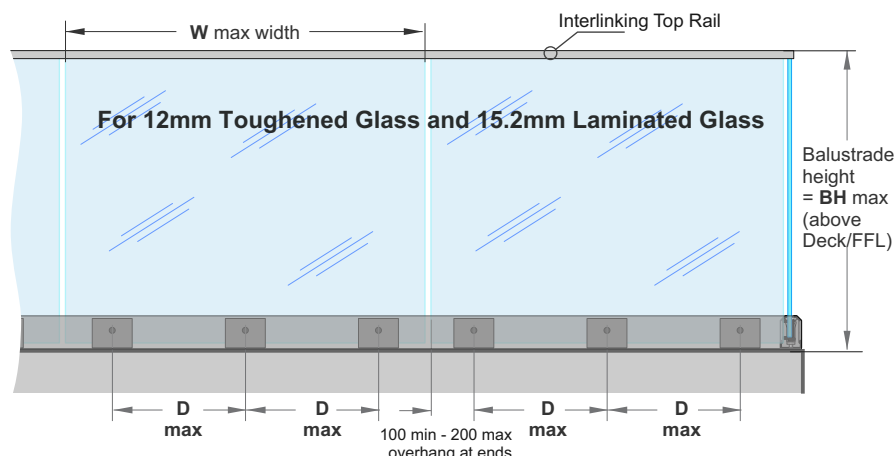
Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension per Top Fixing = 20kN

Residential & Domestic only Occupancy types A, A Other and C3 For 12mm Toughened Glass only

- D max 500mm.
- BH max 1200mm
- W max 1900mm

For 15.2mm Laminated Glass only

- D max 500mm.
- BH max 1150mm
- W max 1900mm



Exceeds the wind loading for all Wind Zones up to **and Including Very High Wind Zone** as set out in NZS 3604:2011

Refer to the Interlinking Top Rail page for conformance to NZS 4223.3.2016.

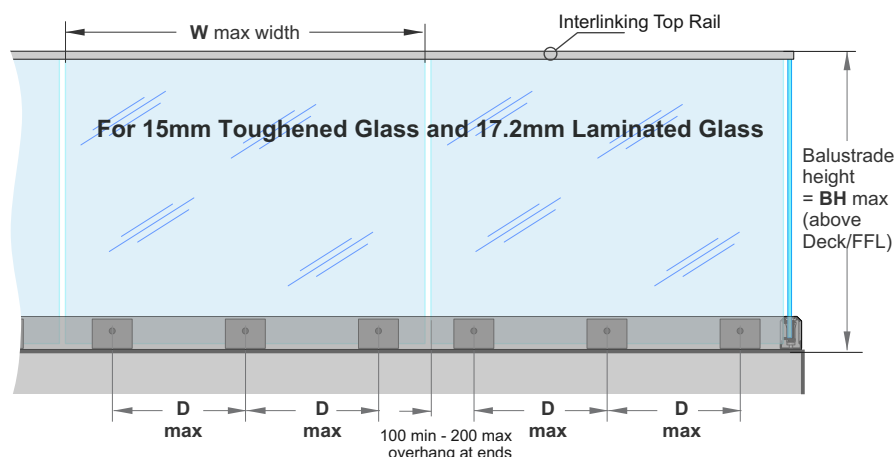
Infinity Glass Clamps Top Fix + Interlinking Rail

Glass must have a minimum strength of 100Mpa
All edges polished

Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension per Top Fixing = 20kN

Commercial Occupancy types B, E, and C3 only All for 15mm Toughened Glass or 17.2mm Laminated Glass

- D max 400mm
- BH max 1300mm
- W max 1600mm



Exceeds the wind loading for all Wind Zones up to **and Including Extra High Wind Zone** as set out in NZS 3604:2011

Refer to the Interlinking Top Rail page for conformance to NZS 4223.3.2016.

Infinity Glass Clamps Top Fix

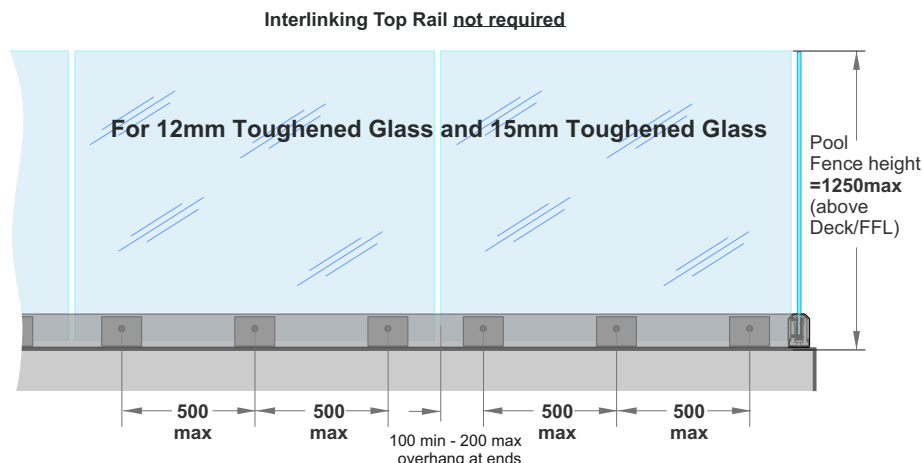
POOL FENCING only

Glass must have a minimum strength of 100Mpa
All edges polished

Clamp spacings
Min - 2 x clamps. Max - 4-5 x clamps
Panel width 2000mm max
Max Tension per Top Fixing = 20kN

Applies to Swimming Pools as of Jan 2017, complies with the Building Code clause F9 and section 162C of the Building Act.

Applies to Pool Fences not protecting a fall of 1.0m or more



12mm Toughened - **Very High Wind Zone**. 15mm Toughened - **Extra High Wind Zone**

Typical Layouts - Top Fix

Infinity Glass Clamps Top Fix + Stiffener Brackets

Glass must have a minimum strength of 100Mpa
All edges polished

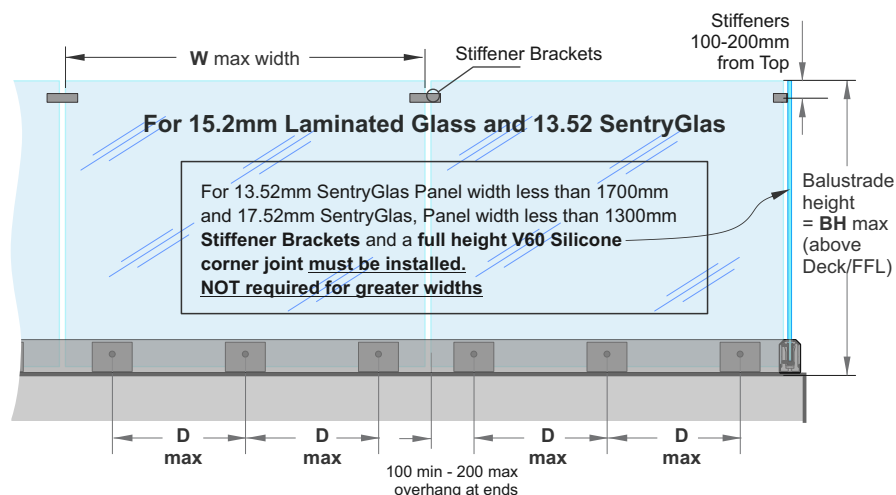
Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension per Top Fixing = 20kN

Residential & Domestic only Occupancy types A, A Other and C3 For 15.2mm Laminated Glass only

- D max 500mm.
- BH max 1150mm
- W max 1900mm

For 13.52mm SentryGlas only

- D max 350mm.
- BH max 1050mm
- W max - none for SG



Exceeds the wind loading for all Wind Zones up to **and Including Very High Wind Zone** as set out in NZS 3604:2011

Refer to the Stiffener Bracket pages for conformance to NZS 4223.3.2016.

Infinity Glass Clamps Top Fix + Stiffener Brackets

Glass must have a minimum strength of 100Mpa
All edges polished

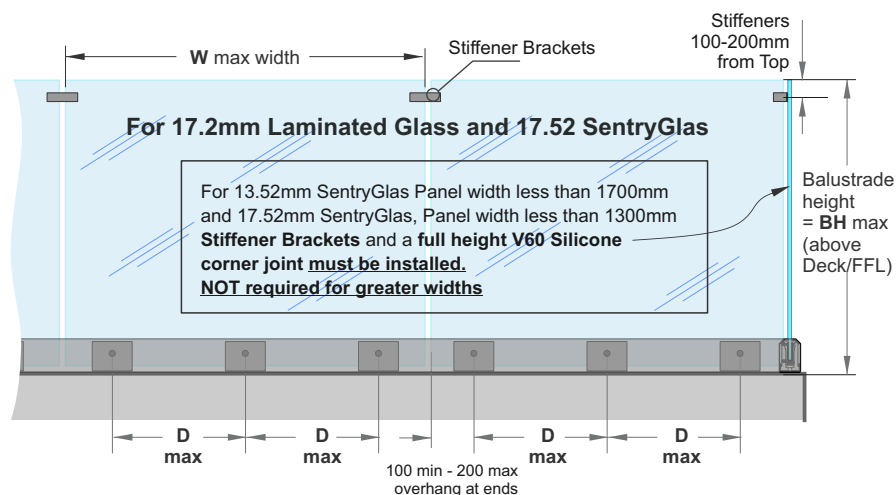
Clamp spacings
Min - 2 x clamps
Max - 4-5 x clamps
Max Tension per Top Fixing = 20kN

Commercial Occupancy types B, E, and C3 only For 17.2mm Laminated Glass only

- D max 400mm
- BH max 1300mm
- W max 1600mm

For 17.52mm SentryGlas

- D max 350mm
- BH max 1200mm
- W max - none for SG



Exceeds the wind loading for all Wind Zones up to **and Including Extra High Wind Zone** as set out in NZS 3604:2011

Refer to the Stiffener Bracket pages for conformance to NZS 4223.3.2016.

SentryGlas® Glass Layers and Thickness Orientation

Glass Thickness (mm)	Inner Layer of Glass thickness (mm) Deckside	Interlayer thickness(mm) and Type	Outer Layer Glass thickness (mm)
13.52	6	1.52 SentryGlas®	6
17.52	8	1.52 SentryGlas®	8

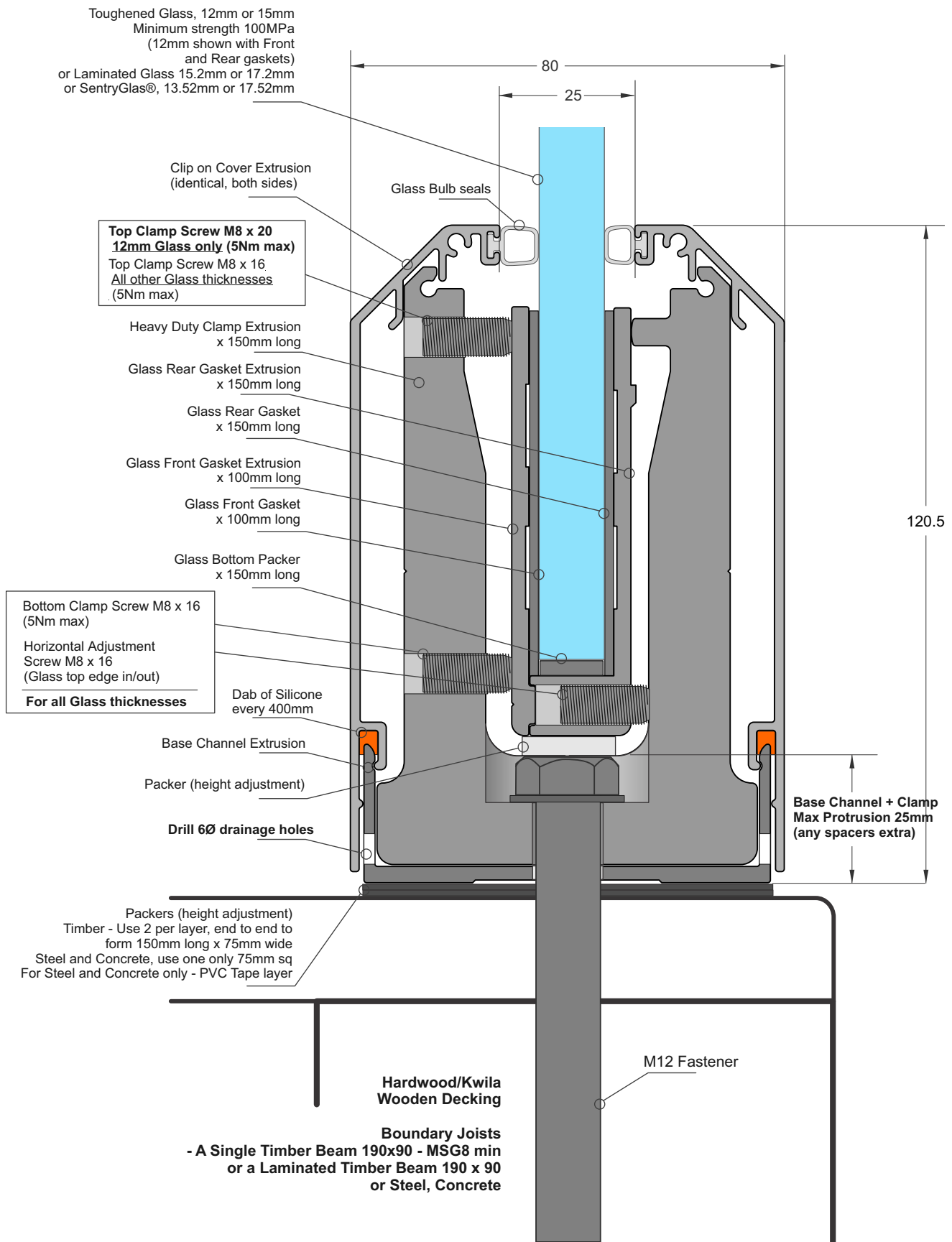
Refers to previous page. Laminated Glass Layers and Thickness Orientation

Glass Thickness (mm)	Inner Layer of Glass thickness (mm) Deckside	Interlayer thickness(mm) and Type	Outer Layer Glass thickness (mm)
15.2	8	1.2EVA	6
17.2	8	1.2EVA	8



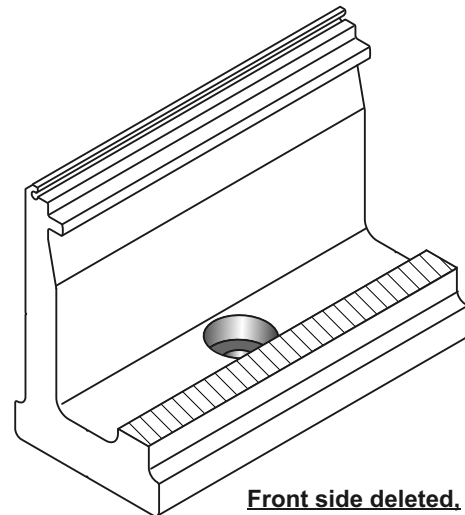
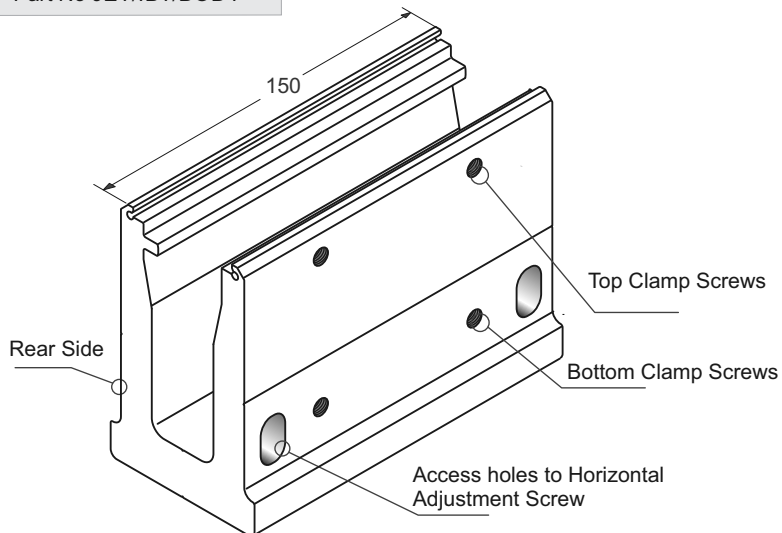
**Infinity Glass Clamp
Top Fix
(12mm Glass Shown)**

The Infinity Balustrade Clamp comes as a kit;
Clamp Extrusion, Front and Rear Gasket Extrusions
Gaskets, Glass bottom Packer and all adjusting screws.
(M12 Fastener not included)



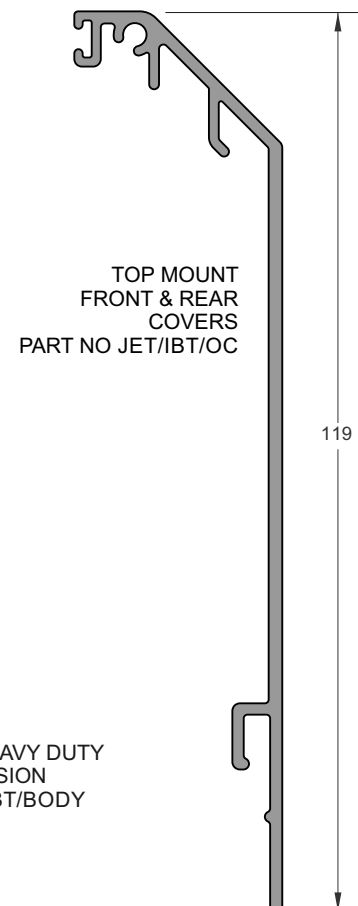
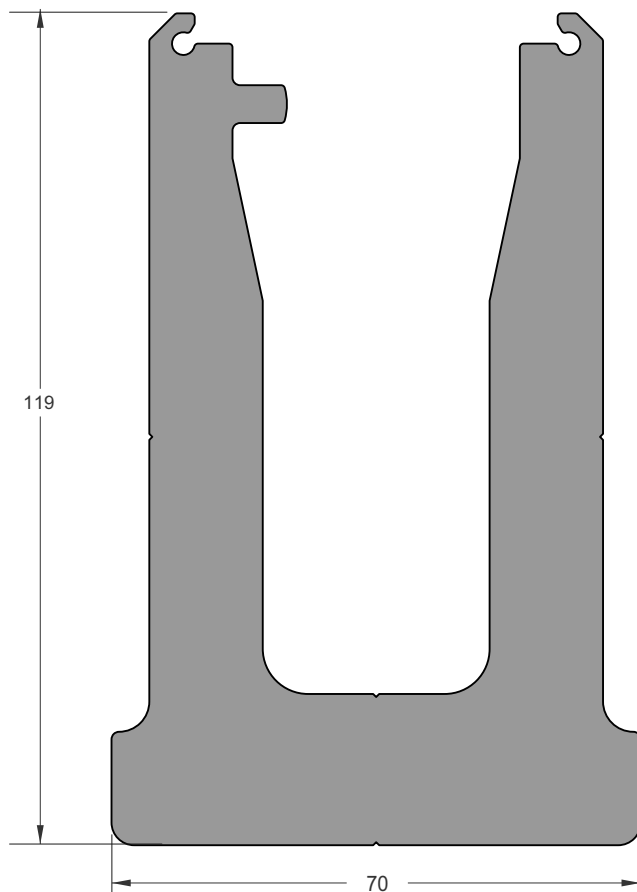
Elevation showing the Main Features

Heavy Duty Clamp Extrusion
Part No JET/IBT/BODY



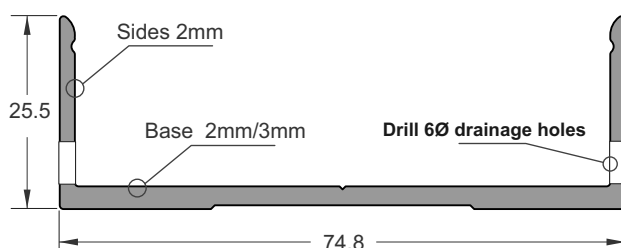
Cover and Base Extrusion

Front and Back Cover Extrusions Identical



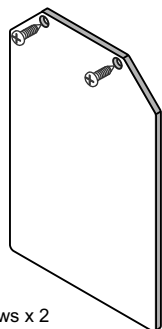
TOP MOUNT
FRONT & REAR
COVERS
PART NO JET/IBT/OC

TOP MOUNT HEAVY DUTY
CLAMP EXTRUSION
PART NO JET/IBT/BODY



TOP MOUNT
BOTTOM CHANNEL
EXTRUSION
PART NO JET/IBT/BC

Top Mount End Plate
Part No JET/IBT/EP

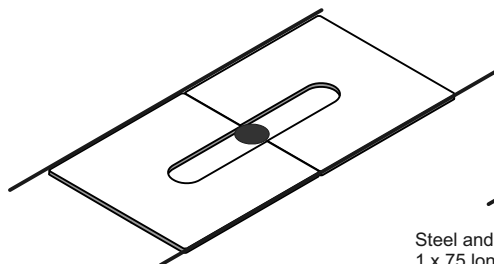


Attach Screws x 2
No 8 x 25 SS Panhead

Bottom Spacer Plates

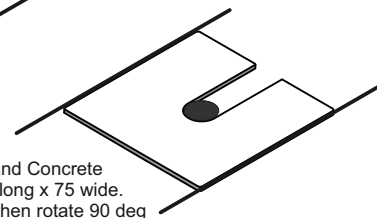
Packers (height adjustment)

- Timber - Use 2 per layer, end to end to form 150mm long x 75mm wide
- Steel and Concrete, use one only 75mm sq



Timber
2 x 75 long x 75 wide

1mm thick Plate - Part No JET/IBT/BSP1

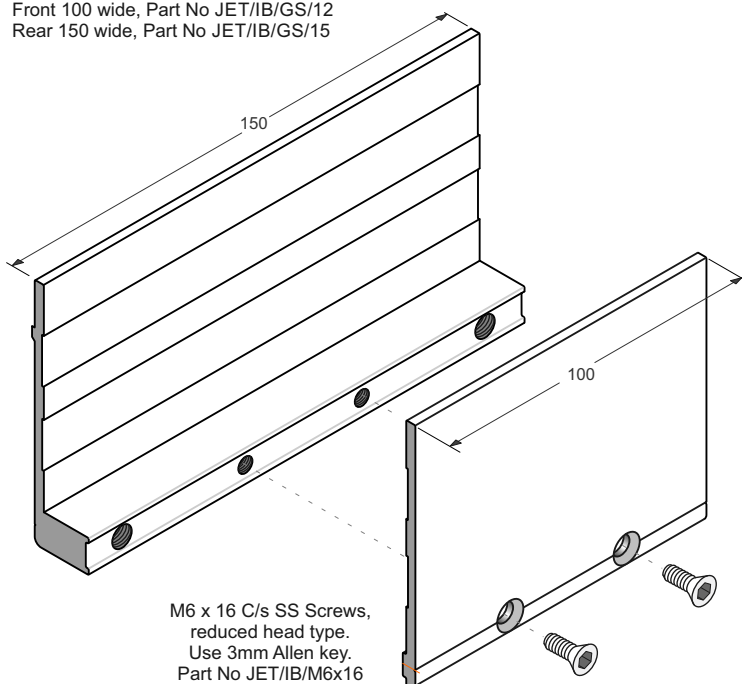


Steel and Concrete
1 x 75 long x 75 wide.
Insert then rotate 90 deg

5mm thick Plate - Part No JET/IBT/BSP5

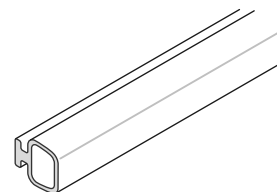
Glass Gasket Extrusions
Front and Rear

Front 100 wide, Part No JET/IB/GS/12
Rear 150 wide, Part No JET/IB/GS/15

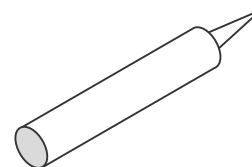


M6 x 16 C/s SS Screws,
reduced head type.
Use 3mm Allen key.
Part No JET/IB/M6x16

Glass Bulb Seal
Part No JET/IB/CVRBLB250

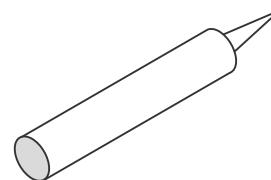


SIKA Supergrip 2hr
Part No JEC SUPERGRIP



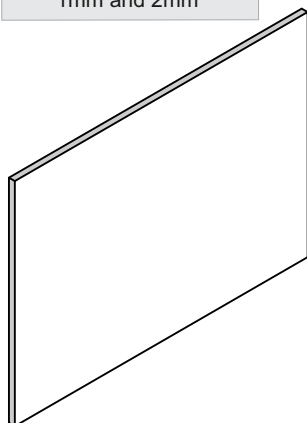
For All Coachscrews fixings

Rhodorsil V60 Clear Silicone
Part No H/RTV419098



Construction Silicone

Glass Gaskets
1mm and 2mm



Gasket Schedule

12mm Toughened	Use 2 x 2mm Gaskets
13.2mm Laminated	
13.52mm SentryGlas	
15mm Toughened	Use 2 x 1mm Gaskets
17.2mm Laminated	
17.52mm SentryGlas	

Gasket 2mm Thick	Front 100 wide, Part No JET/IB/GGF2 Rear 150 wide, Part No JET/IB/GGR2
---------------------	---

Gasket 1mm Thick	Front 100 wide, Part No JET/IB/GGF1 Rear 150 wide, Part No JET/IB/GGR1
---------------------	---



Complies with NZS3604:2011 - Boundary Joist

Typical TOP Fix to Timber - M12 SS Coachscrew

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

**Very High Wind Zone
Pool Fence only**

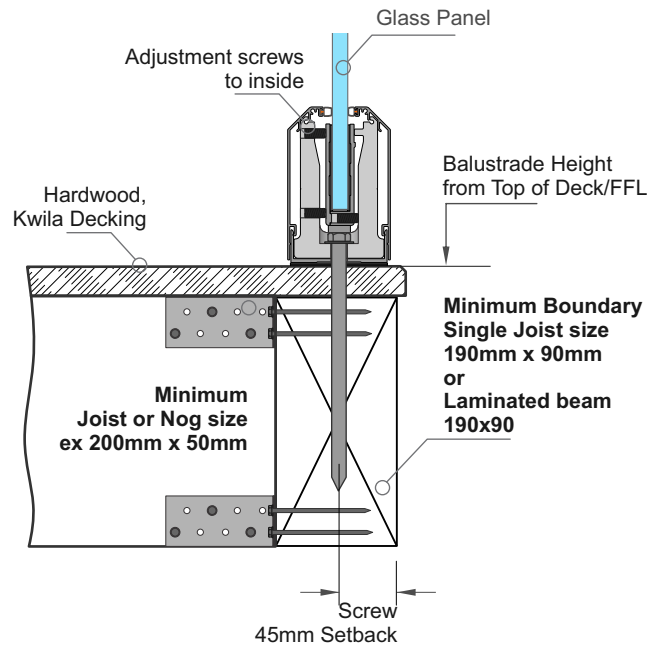
**Extra High Wind Zone
Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

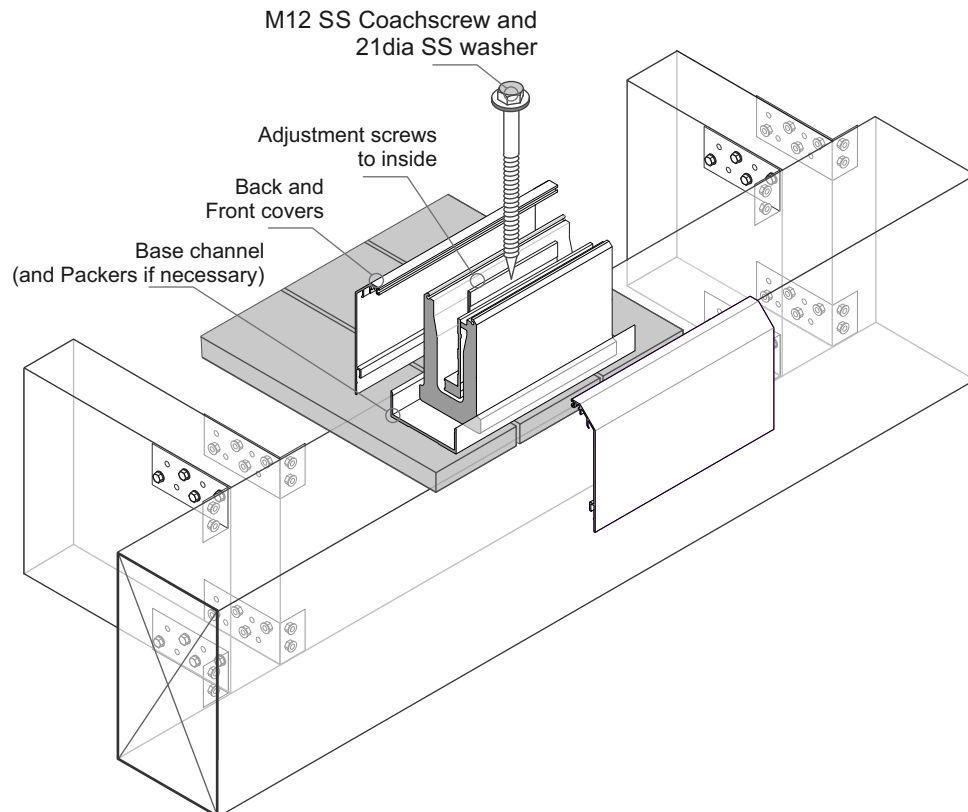
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - Predrill a 6mm dia Hole for Coachscrew
- 3 - Bond all screws with SIKa Supergrip to full depth
- 4 - Coachscrews 130mm min screw engagement into joists
- 5 - For Face Fix details see the Approved Face fix Options page
- 6 - All fixings must be Stainless Steel



Typical TOP Fix to Steel + Timber Deck - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

**Very High Wind Zone
Pool Fence only**

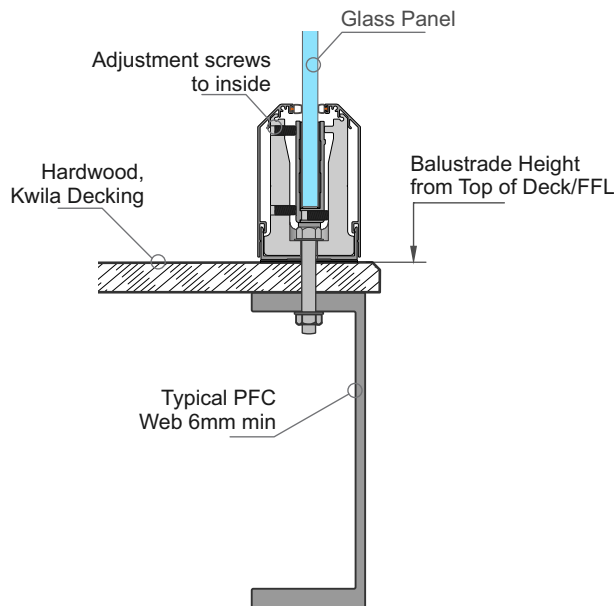
**Extra High Wind Zone
Pool Fence only**

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

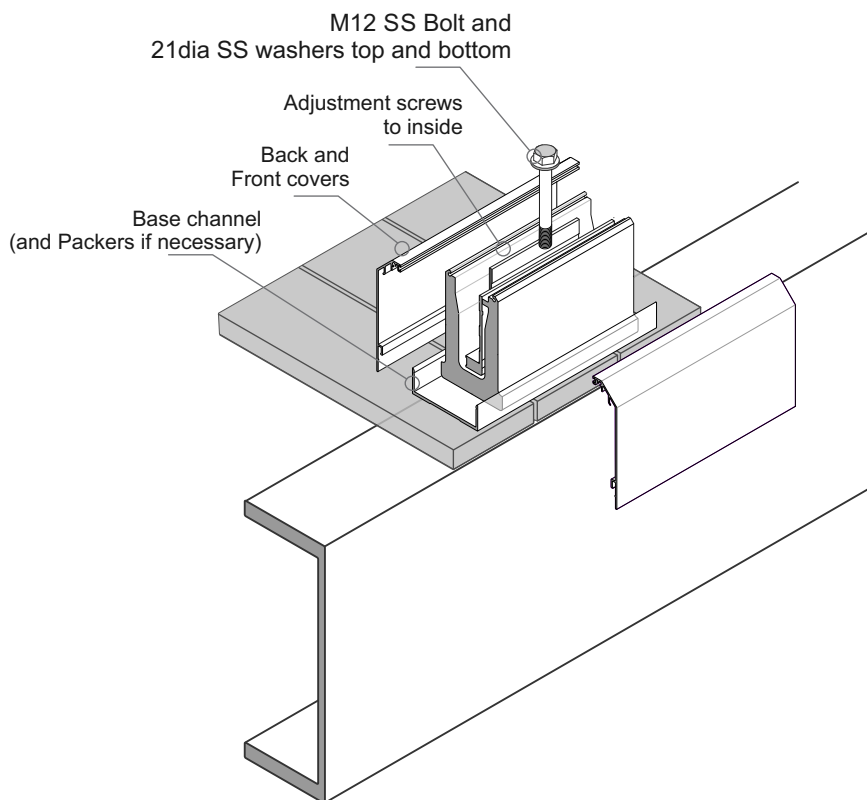
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - All fixings must be Stainless Steel



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Juralco Edgetec® Infinity Balustrade System

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Typical TOP Fix directly to Steel - M12 SS Bolt or M12 SS Threaded Rod

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

Very High Wind Zone Pool Fence only

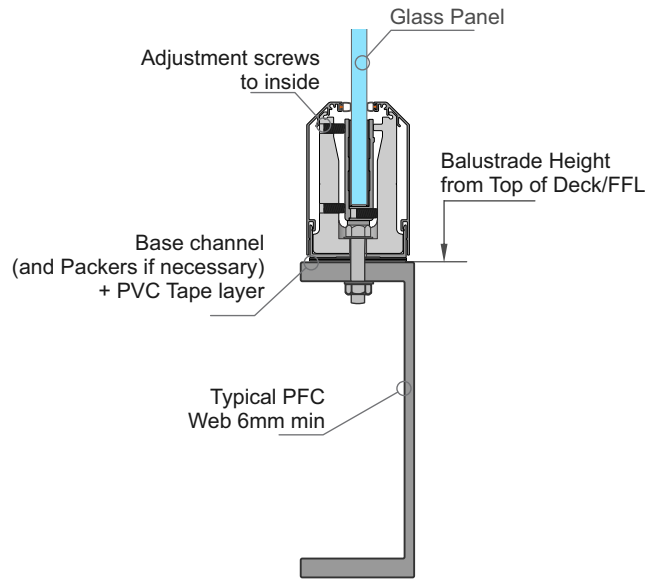
Extra High Wind Zone Pool Fence only

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

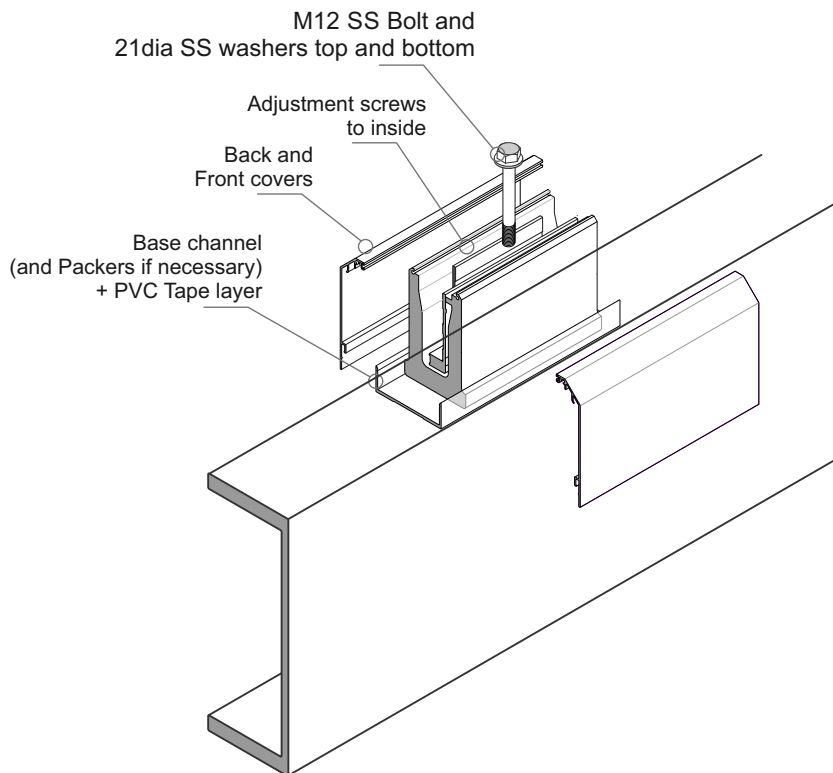
General Notes:

- 1 - Glass thickness, mm
Glass type T= Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - An PVC, Rubber or Foam Tape layer must be installed between the Base Channel and Steel
- 3 - All fixings must be Stainless Steel



Typical TOP Fix to Concrete - M12 SS Threaded Rod Stud

Very High Wind Zone

- Residential A, A Other and C3 only

Extra High Wind Zone

- Commercial B, E and C3 only

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
12 T	1200	500	15.2L	1150	500
15 T	1300	400	17.2L	1300	400

Glass Thickness, Type	Balustrade Height (max)	Clamp Spacing (max)
13.52SG	1050	350
17.52SG	1200	350

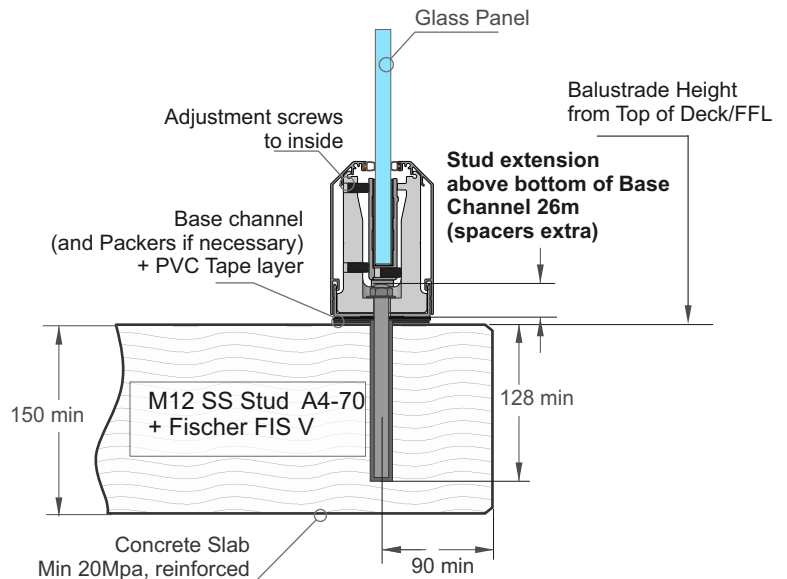
Very High Wind Zone Pool Fence only	Extra High Wind Zone Pool Fence only
--	---

Applies to Pool Fences not protecting a fall of 1.0m or more

Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)	Glass Thickness, Type	Fence Height (max)	Clamp Spacing (max)
12T	1250	500	15T	1250	500

General Notes:

- 1 - Glass thickness, mm
Glass type T = Toughened, L = Laminated, SG = SentryGlas
- 2 - All measurements mm
- 3 - Refer to Elevations for Min/Max Panel widths and the use of Top Interlinking Rails (T and L only) or Stiffener Brackets (L and SG only)



Important Installation Notes:

- 1 - A Project engineer must ensure the structure can support the appropriate loads
- 2 - An PVC Tape layer must be installed between the Base Channel and Concrete
- 3 - All fixings must be Stainless Steel



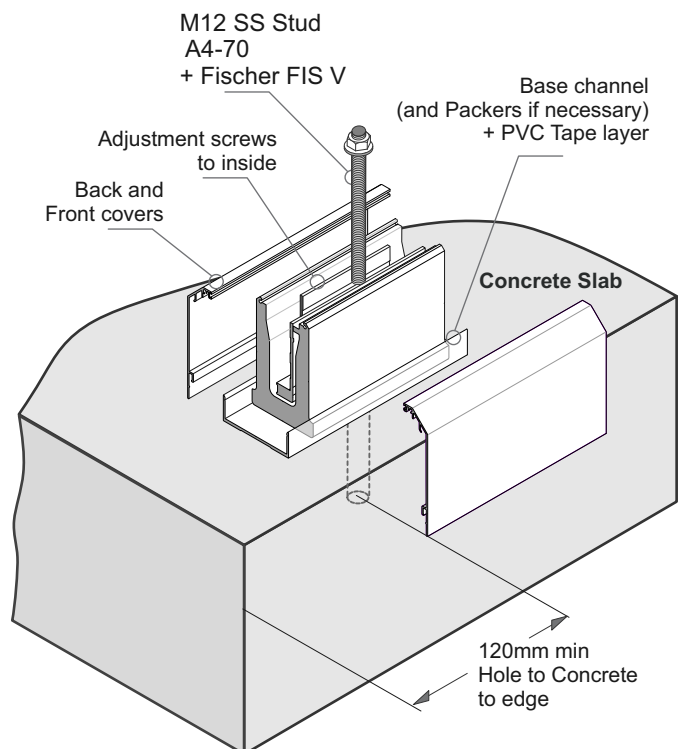
Installation details Fischer FIS V

Thread diameter	M 12
Drill hole diameter	= 14 mm
Drill hole depth	= 128 mm
Anchorage depth	= 120 mm
Drilling method	Hammer drilling

Drill hole cleaning
4 times blowing,
4 times brushing,
4 times blowing

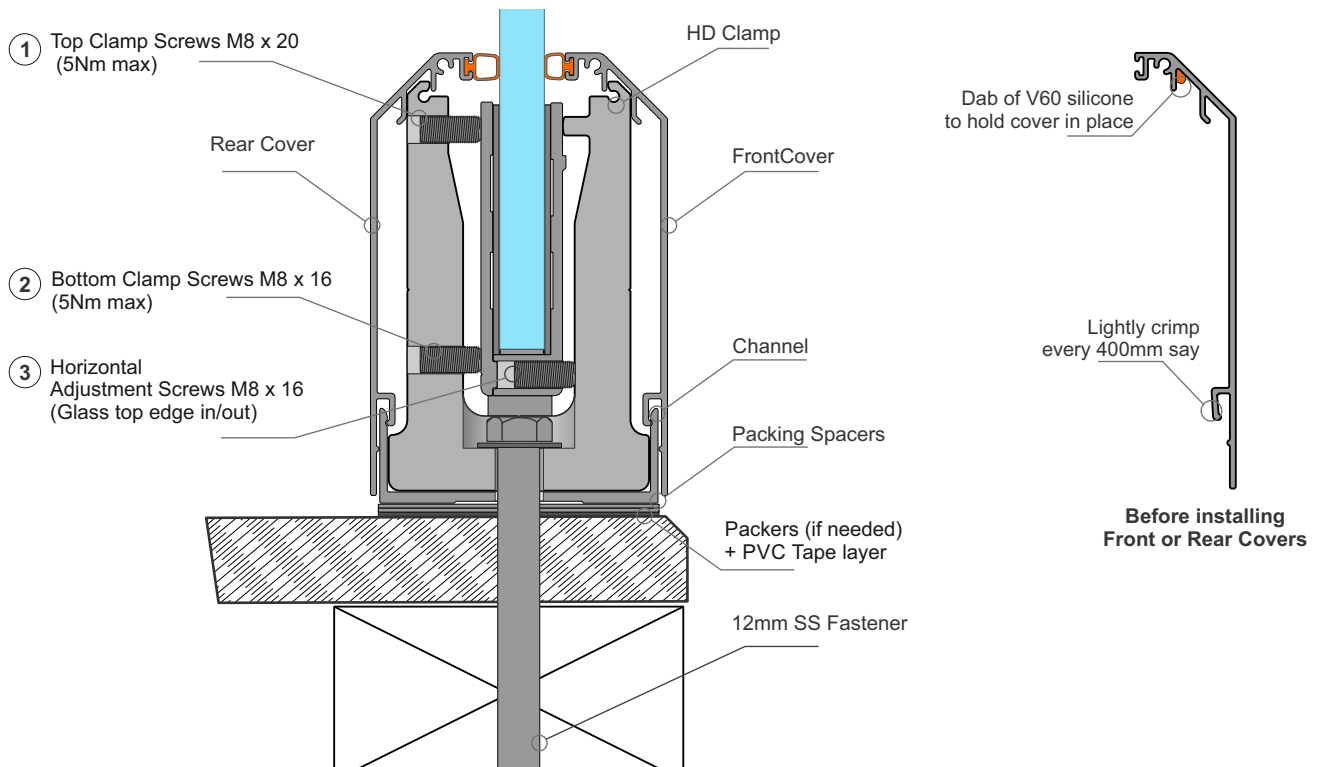
No borehole cleaning required in case of using a hollow drill bit, e.g. fischer FHD.

Installation type	Push-through installation
Maximum torque	$T_{inst,max} = 40.0 \text{ Nm}$
Socket size	19 mm
Total fixing thickness, max	$t_{fix} = 8 \text{ mm}$
Volume of resin per drill	12 ml/6 scale divisions

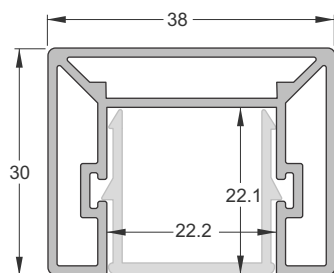


Infinity Balustrade Top Fix Installation procedure using 1 or 5mm Spacer Plates on a Deck

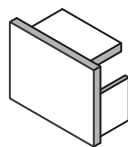
- 1 - Mark out attachment points on Channel section, after site measure up.
Predrill say 14mm dia at attach points and No8 C/S in between
 - 2 - Place a nail at C/L of each end of channel run. Attach string line. Place Channel on deck. Lightly screw in position with No8 C/s screws
 - 3 - Measure vertical height to deck at ea attach point. Calculate spacers needed to bring channel level. See the different spacer layout for Timber decks as opposed to Steel or concrete.
 - 4 - Set heights with spacers, including an PVC Tape layer to Deck. Tighten No8 screws to firmly locate channel on deck.
Channel should now be firm and level.
 - 5 - At corners the channel should be chamfered, to provide a neat join.
 - 6 - Pre drill Deck for appropriate fastener, through channel. Vacuum or blow away debris.
 - 7 - Place HD Clamps in place (adjust screws to inside). Fine tune spacers. Fasten all down very firmly.
For Coachscrews into Timber, Sika Supergrip to full depth.
 - 8 - Place Front cover in place, incl bulb seal. Lightly crimp bottom tag, and a dab of V60 silicone at top.
Corners should be neatly chamfered
-
- 9 - Fit Glass panels into position. As the channel is level, there are no provision for Glass vertical adjustment
 - 10 - Lightly nip the top 2 grub screws on the HD clamp to hold the glass vertical.
 - 11 - Adjust the 4 lower grub screws on the HD clamp and Glass clamp assemblies for top edge Horizontal alignment
 - 12 - When glass panels are in the correct position tighten top and bottom clamp screws on HD clamp (5.0Nm max)
 - 13 - Install Rear cover incl bulb seal. Lightly crimp bottom tag, and a dab of V60 silicone at top.
Corners should be neatly chamfered
 - 14 - Fit End plates as required



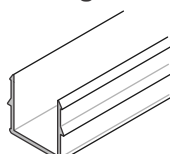
Juralco Edgetec® Infinity Balustrade System
Interlinking Top Rail conforming to NZS 4223.3.2016
and Building Code Clause B1.3.4



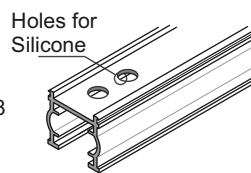
Interlinking Top Rail Extrusion
 Part No JET/220/5.8
 Also showing Infill Clip, for use in between Glass Panels



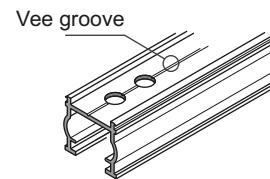
Interlinking Top Rail End Cap
 Part No JET 37



Infill Clip
 Part No JET/215/5.8



Interlinking Top Rail Gasket for 12 mm Toughened Glass
 Part No JET/Gasket 12/2.9



Interlinking Top Rail Gasket for 15 mm Toughened Glass
 Part No JET /Gasket 15/2.9

This page applies to 12mm and 15mm Toughened Glass only

Application Notes:

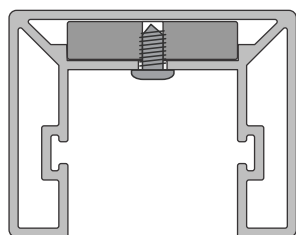
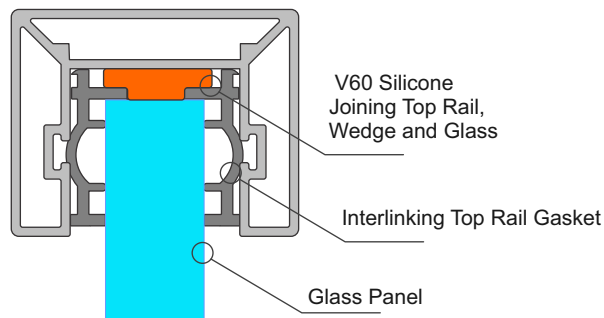
- Cut short lengths of Gasket (50mm) and place say every 700mm.
- Cut/adjust Interlinking rail to correct dimensions, test in place.
- Remove all, install full cut lengths of Gasket to glass top edge

- Assemble Top Rail + Joiners and suitable End plates

- Place blobs of V60 silicone in every Gasket hole
- Then place Top Rail extrusion + Joiners and End plates in place clipping firmly to Gasket
- Tape all down, wait 24 hrs to fully bond. Clean up.

Note: Ends must be attached to structure or post,
 - Joins must have a suitable joiner plate

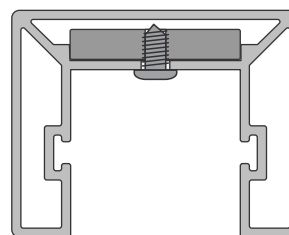
12mm Glass and Gasket shown



Joiners both 22.5 x 5mm Aluminium

Joiners: (After cutting extrusions to length)

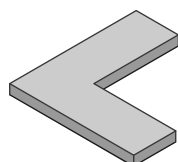
- With Joiner in place, spot drill from below for position
- Drill out to joiner to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive screws
- Both ends must be attached.
- Joins, where required must be at the end of Glass Panels



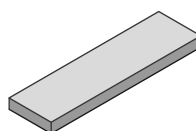
End Plate Tabs all 22.5 x 4mm SS.

End Plates: (After cutting extrusions to length)

- With End Plate in place, spot drill from below for position
- Drill out to SS tab to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive Screw
- End Plate must be securely attached to Post or structure.

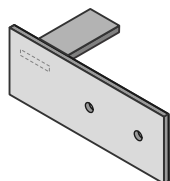


Interlinking Top Rail Corner Joiner
 75x75x5mm
 Part No JET 31

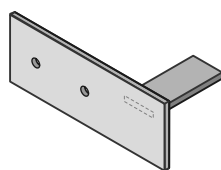


Interlinking Top Rail Straight Joiner
 80x22.8x5mm
 Part No JET 30

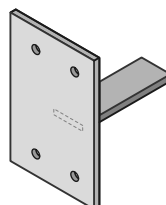
Joiners both 22.5 x 5mm Aluminium



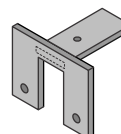
Interlinking Top Rail Wall type End Plate
 SS. 120x45mm
 Part No JET 40LH



Interlinking Top Rail Wall type End Plate
 SS. 120x45mm
 Part No JET 40RH



Interlinking Top Rail Wall type End Plate
 SS. 100x65mm
 Part No JET 41



Interlinking Top Rail End Bracket
 SS. 60mm x 46mm
 Part No JET 42

All for attaching to Posts or Structures



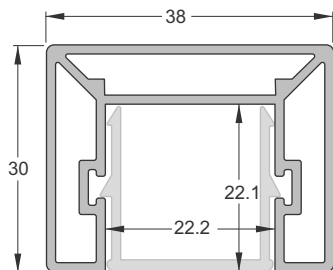
JURALCO

www.juralco.co.nz ph (09) 478 8018

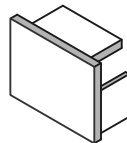
Juralco Edgetec® Infinity Balustrade System

Issue 4/20
 Page 37

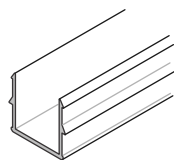
Juralco Edgetec® Infinity Balustrade System
Interlinking Top Rail conforming to NZS 4223.3.2016
and Building Code Clause B1.3.4



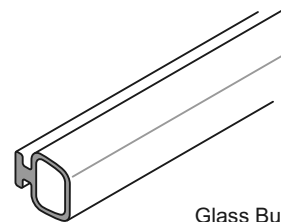
Rectangular Interlinking Top Rail
 Part No JET/220/5.8
 Also showing Infill Clip, for
 use in between Glass Panels



Interlinking Top
 Rail End Cap
 Part No JET 37



Infill Clip
 Part No JET/215/5.8



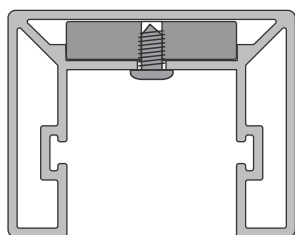
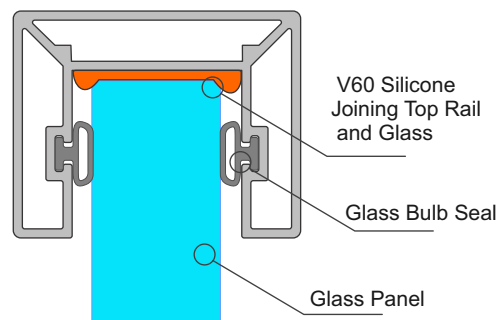
Glass Bulb Seal
 Part No JET/IB/CVRBLB250

**This Page applies to 15.2mm and 17.2mm
 Laminated Safety Glass only**

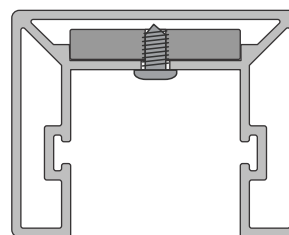
Application Notes:

- Assemble Top Rail + Joiners and suitable End plates
- Place Full lengths of Bulb seal in place.
- Place blobs of V60 silicone along top edge of Glass at similar spacings to Gasket on previous page.
- Then place Top Rail extrusion and bulb seals firmly onto Glass.
- Tape all down, wait 24 hrs to fully bond. Clean up.

Note: Ends must be attached to structure or post,
 - Joins must have a suitable joiner plate



Joiners both 22.5 x 5mm
 Aluminium



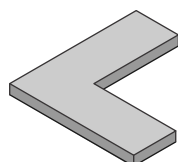
End Plate
 Tabs all 22.5 x 4mm SS.

Joiners: (After cutting extrusions to length)

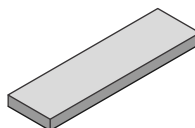
- With Joiner in place, spot drill from below for position
- Drill out to joiner to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive screws, 2 x ea side of joint
- Both ends must be attached.
- Joins, where required must be at the end of Glass Panels

End Plates: (After cutting extrusions to length)

- With End Plate in place, spot drill from below for position
- Drill out to SS tab to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive Screw, 2 per plate.
- End Plate must be securely attached to Post or structure.

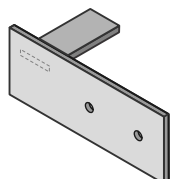


Interlinking Top Rail
 Corner Joiner
 75x75x5mm
 Part No JET 31

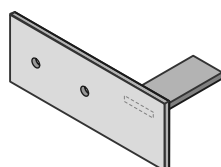


Interlinking Top Rail
 Straight Joiner
 80x22.8x5mm
 Part No JET 30

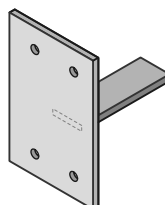
Joiners both 22.5 x 5mm Aluminium



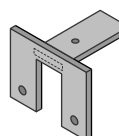
Interlinking Top Rail
 Wall type End Plate
 Rectangular type
 120x45mm, SS
 Part No JET 40LH



Interlinking Top Rail
 Wall type End Plate
 Rectangular type
 120x45mm, SS
 Part No JET 40LH

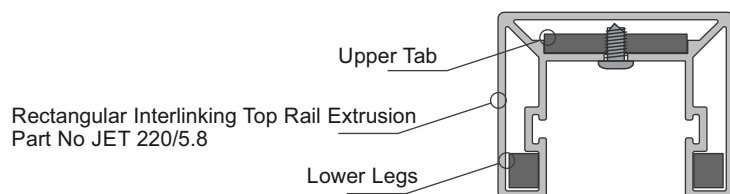


Interlinking Top Rail
 Wall type End Plate
 Rectangular type
 100x65mm, SS
 Part No JET 41



Interlinking Top Rail
 Wall type End Plate
 Rectangular type
 60x46mm, SS
 Part No JET 42

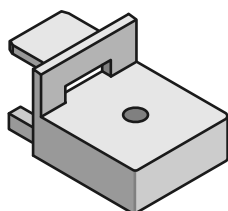
All for attaching to
 Posts or Structures



Swivel Kits: (After cutting extrusions to length)

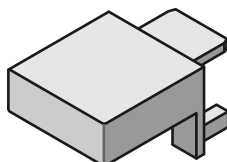
- With Swivel in place, spot drill from below for position
- Drill out Swivel to 3mm dia, extrusion to 4mm dia
- Use No6 x 1/4in SS ST Pan sq drive Screw
- Both sides must be attached.
- Join together with the M6 x 20 C/S SS Screw

Interlinking Top Rail
Horizontal Fixed
90 deg Connector
Part No JET 45A

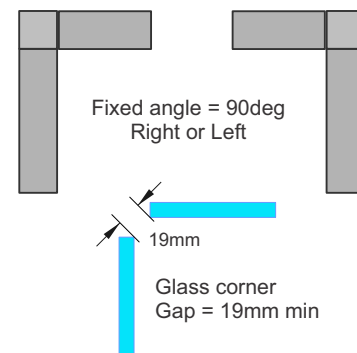
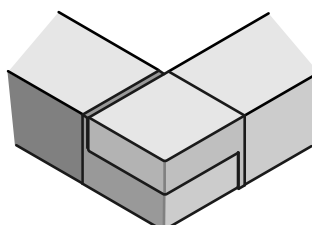


M6 x 25 C/S
SS machine screw

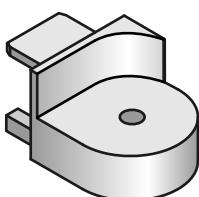
Interlinking Top Rail
Horizontal Fixed
90 deg Connector
Part No JET 45B



Rectangular Interlinking Top Rail
Horizontal Fixed 90deg Kit
Part No JET220/90deg Corner Kit
(JET 45A and B + screw)

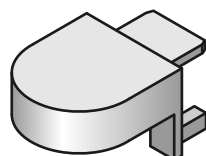


Interlinking Top Rail
Horizontal 0 - 90deg
Swivel Connector
Part No JET 46A

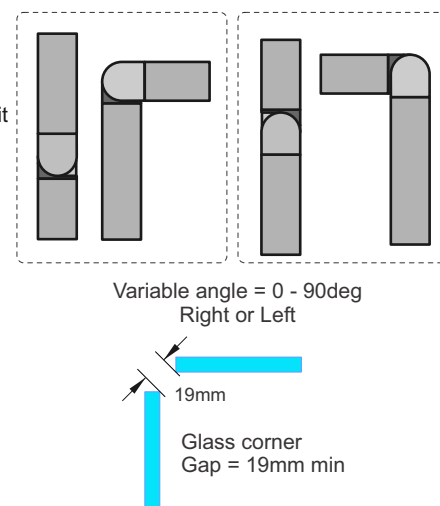
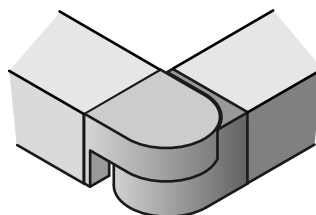


M6 x 25 C/S
SS machine screw

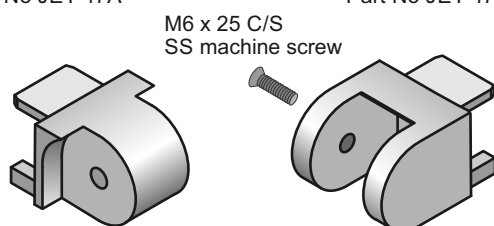
Interlinking Top Rail
Horizontal 0 - 90deg
Swivel Connector
Part No JET 46B



Rectangular Interlinking Top Rail
Horizontal 0 - 90 deg Right/Left
Swivel Connector Kit
Part No JET220/Horizontal Adj Corner Kit
(JET 46A and B + screw)

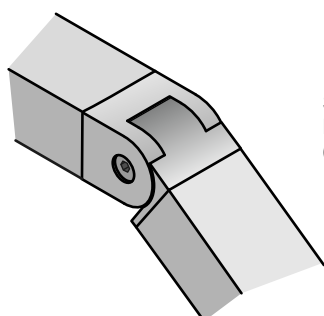
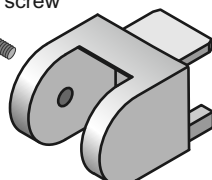


Interlinking Top Rail
Vertical 35deg up
to 35 deg down
Swivel Connector
Part No JET 47A

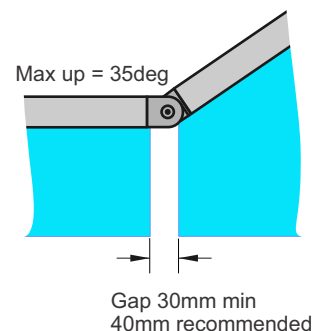
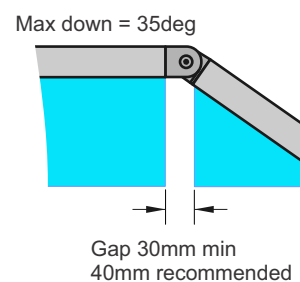


M6 x 25 C/S
SS machine screw

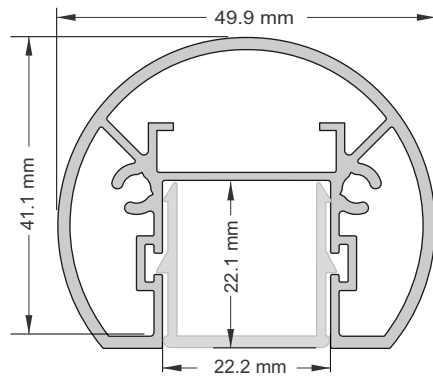
Interlinking Top Rail
Vertical 35deg up
to 35 deg down
Swivel Connector
Part No JET 47B



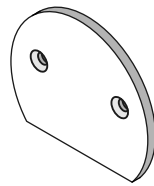
Interlinking Top Rail 35 deg down
Swivel Connector Kit
Part No JET220/Vertical Adj Corner Kit
(JET 47A and B + screw)



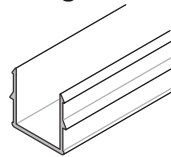
Juralco Edgetec® Infinity Balustrade System
Round Interlinking Top Rail conforming to NZS 4223.3.2016
and Building Code Clause B1.3.4



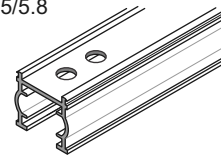
Round Interlinking Top Rail Extrusion
 Part No JET/211/5.8
 Also showing Infill Clip, for
 use in between Glass Panels



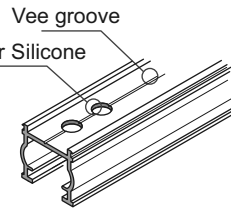
Round Interlinking
 Top Rail End Cap
 Part No JET/231



Infill Clip
 Part No JET/215/5.8



Interlinking Top Rail Gasket
 for 12 mm Toughened Glass
 Part No JET /Gasket 12/2.9



Interlinking Top Rail Gasket
 for 15 mm Toughened Glass
 Part No JET /Gasket 15/2.9

**This page applies to 12mm and 15mm
 Toughened Glass only**

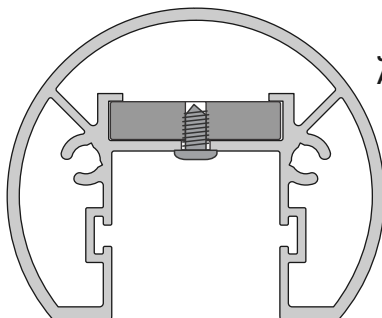
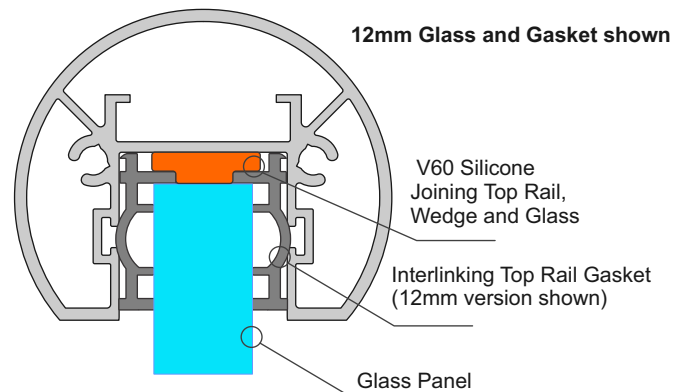
Application Notes:

- Cut short lengths of Gasket (50mm) and place say every 700mm.
- Cut/adjust Interlinking rail to correct dimensions, test in place.
- Remove all, install full cut lengths of Gasket to glass top edge

- Assemble Top Rail + Joiners and suitable End plates

- Place blobs of V60 silicone in every Gasket hole
- Then place Top Rail extrusion + Joiners and End plates in place clipping firmly to Gasket
- Tape all down, wait 24 hrs to fully bond. Clean up.

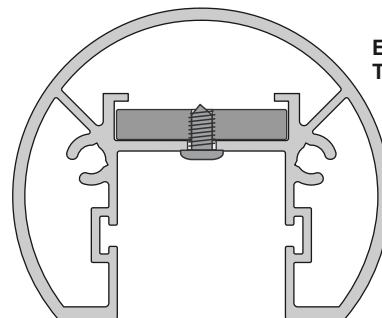
Note: Ends must be attached to structure or post,
 - Joins must have a suitable joiner plate



**Joiners both 22.5 x 5mm
 Aluminium**

Joiners: (After cutting extrusions to length)

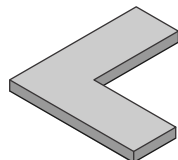
- With Joiner in place, spot drill from below for position
- Drill out to joiner to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive screws
- **Both ends must be attached.**
- Joins, where required must be at the end of Glass Panels



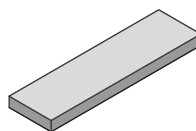
**End Plate
 Tabs all 22.5 x 4mm SS.**

End Plates: (After cutting extrusions to length)

- With End Plate in place, spot drill from below for position
- Drill out to SS tab to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive Screw
- End Plate must be securely attached to Post or structure.

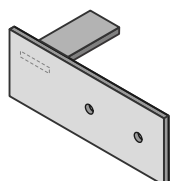


Interlinking Top Rail
 Corner Joiner
 75x75x5mm
 Part No JET 31

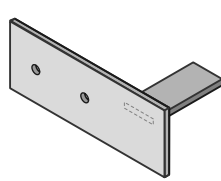


Interlinking Top Rail
 Straight Joiner
 80x22.8x5mm
 Part No JET 30

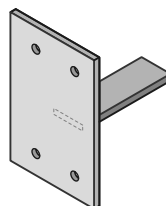
Joiners both 22.5 x 5mm Aluminium



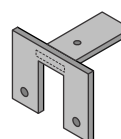
Interlinking Top Rail
 Wall type End Plate
 SS. 120x45mm
 Part No JET 40LH



Interlinking Top Rail
 Wall type End Plate
 SS. 120x45mm
 Part No JET 40RH



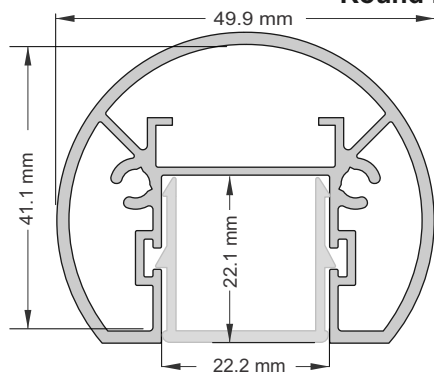
Interlinking Top Rail
 Wall type End Plate
 SS. 100x65mm
 Part No JET 41



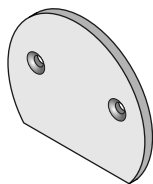
Interlinking Top Rail
 End Bracket
 SS. 60mm x 46mm
 Part No JET 42

**All for attaching to
 Posts or Structures**

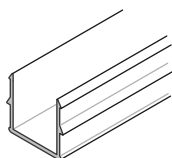
Juralco Edgetec® Infinity Balustrade System
Round Interlinking Top Rail conforming to NZS 4223.3.2016
and Building Code Clause B1.3.4



Round Interlinking Top Rail
 Part No JET/211/5.8
 Also showing Infill Clip, for
 use in between Glass Panels

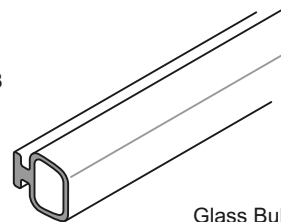


Round Interlinking
 Top Rail End Cap
 Part No JET 231



Infill Clip
 Part No JET/215/5.8

**This Page applies to 15.2mm and 17.2mm
 Laminated Safety Glass only**

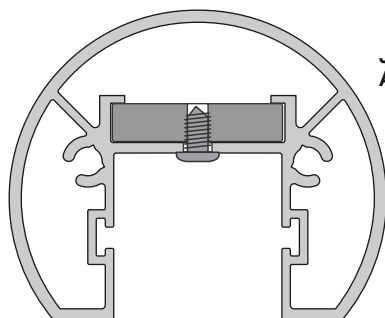
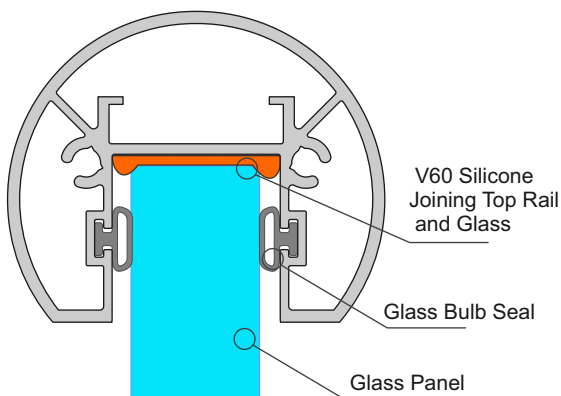


Glass Bulb Seal
 Part No JET/IB/CVRBLB250

Application Notes:

- Assemble Top Rail + Joiners and suitable End plates
- Place Full lengths of Bulb seal in place.
- Place blobs of V60 silicone along top edge of Glass at similar spacings to Gasket on previous page.
- Then place Top Rail extrusion and bulb seals firmly onto Glass.
- Tape all down, wait 24 hrs to fully bond. Clean up.

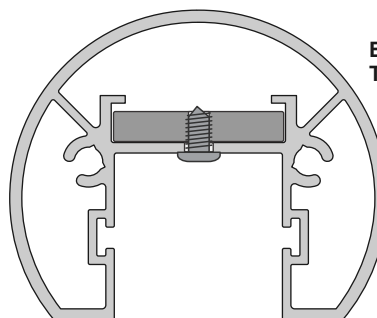
Note: Ends must be attached to structure or post,
 - Joins must have a suitable joiner plate



**Joiners both 22.5 x 5mm
 Aluminium**

Joiners: (After cutting extrusions to length)

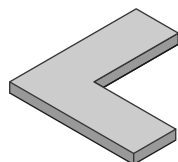
- With Joiner in place, spot drill from below for position
- Drill out to joiner to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive screws, 2 x ea side of joint.
- Both ends must be attached.
- Joins, where required must be at the end of Glass Panels



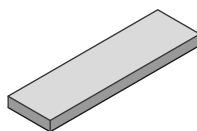
**End Plate
 Tabs all 22.5 x 4mm SS.**

End Plates: (After cutting extrusions to length)

- With End Plate in place, spot drill from below for position
- Drill out to SS tab to 3mm dia, extrusion to 4mm dia
- Use No 6 x 1/4in SS ST Pan sq drive Screw, 2 per plate
- End Plate must be securely attached to Post or structure.

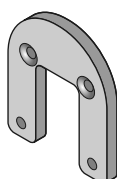


Interlinking Top Rail
 Corner Joiner
 75x75x5mm
 Part No JET 31

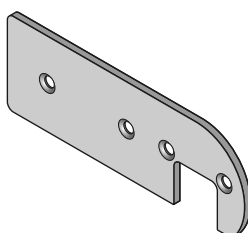


Interlinking Top Rail
 Straight Joiner
 80x22.8x5mm
 Part No JET 30

Joiners both 22.5 x 5mm Aluminium



Interlinking Top Rail
 Wall type End Plate
 Circular type
 58x50x5mm, Al
 Part No JET 232

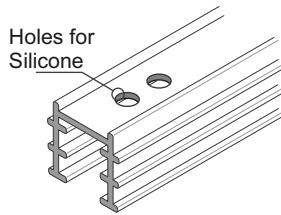


Interlinking Top Rail
 Wall type offset End Plate
 Circular type
 42x120x3mm, Al
 C/s both sides = RH or LH
 Part No JET 233

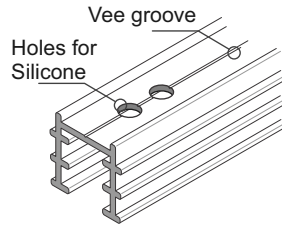
**All for attaching to
 Posts or Structures**

Juralco Edgetec® Infinity Balustrade System
SS Interlinking Top Rail conforming to NZS 4223.3.2016
and Building Code Clause B1.3.4

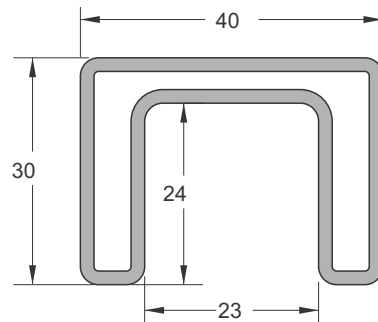
This page applies to 12mm and 15mm Toughened Glass and 15.2mm and 17.2mm Laminated Glass only



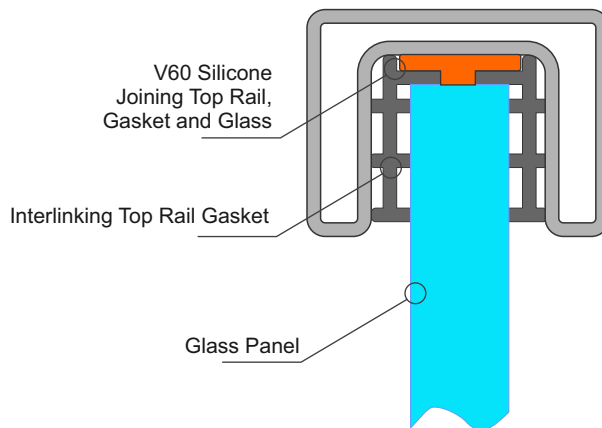
SS Interlinking Top Rail
12mm Glass Gasket
Part No JET/430GT/12/2.9



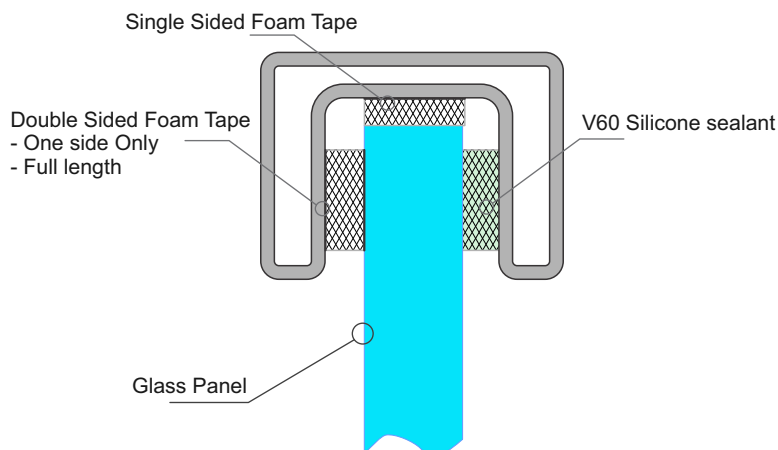
SS Interlinking Top Rail
15mm Glass Gasket
Part No JET/430GT/15/2.9



SS INTERLINKING TOP RAIL
Part No JET/430/PSS/5.8



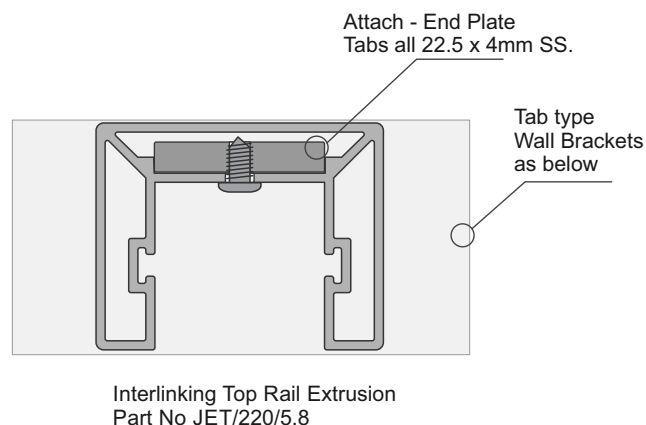
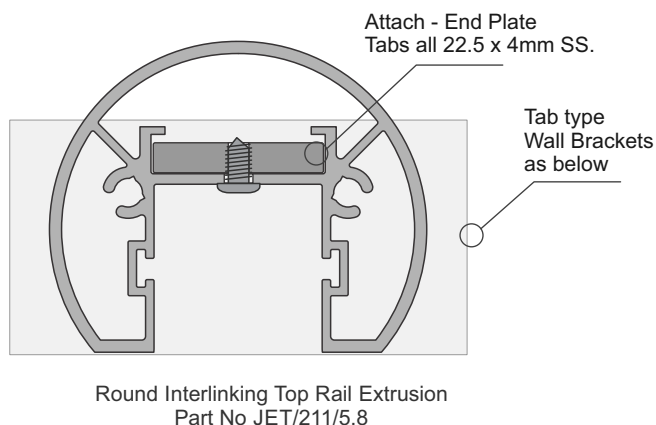
Use Gasket for 12mm and 15mm Toughened Glass



Use Foam Tape for 15.2mm and 17.2mm Laminated Glass

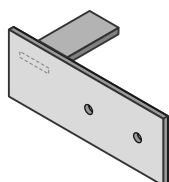
Juralco Edgetec® Infinity Balustrade System

Interlinking Top Rail End Bracket Attachments

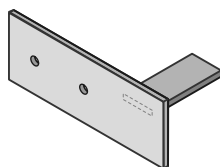


Applies to these Interlinking Top Rails

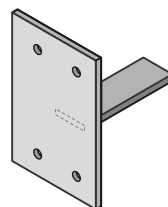
Interlinking Top Rail End Bracket Options - Both types above - Tab attach Type



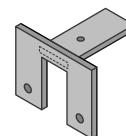
Interlinking Top Rail
Wall type End Plate
SS. 120x45mm
Part No JET 40LH



Interlinking Top Rail
Wall type End Plate
SS. 120x45mm
Part No JET 40RH

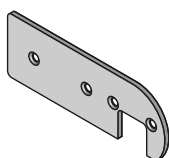


Interlinking Top Rail
Wall type End Plate
SS. 100x65mm
Part No JET 41



Interlinking Top Rail
End Bracket
SS. 60mm x 46mm
Part No JET 42

Interlinking Top Rail End Bracket Options - Round Type only - Attach into Screw ports



Interlinking Top Rail
Wall type offset End Plate
Round Rail type only
120x42x3mm, Al
C/s both sides = RH or LH
Part No JET 233



Interlinking Top Rail
Wall type End Plate
Round Rail type only
50x58x5mm, Al
Part No JET 232

General Notes:

- All fixings to be Stainless Steel
- EPDM layer between Structure and Bracket
- ULS Point load N* = 0.9kN, inwards, outwards or down and in tension

Note : Fixing to Steel

- use 2 off 10g SS TEK Screws or M6 SS Bolts
- Steel 2mm min thickness
- Steel 300MPa minimum
- 15mm min distance to any Edges

Note : Fixing to Timber Wall

- use 2 off 8g SS Screws, 35mm min into studs.
- use Sika Supergrip 2hr
- 30mm min distance to Horizontal Edge
- If Weatherboard use suitable predrilled Wedge
- Timber stud wall to be designed and detailed in accordance with NZ3603 or NZ3604

Note : Fixing to Juralco EDGE Post

- use 2 off 8g x 25 SS PK Screws

Note : Fixing to Concrete Wall

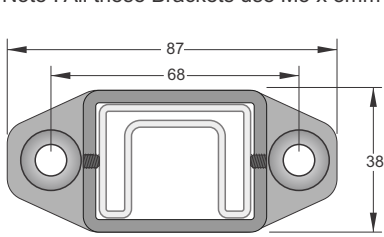
- use 2 off M6 x70 SS Screw Anchors
- Solid Concrete min 20Mpa
- Block wall Concrete filled/Reinforced
- 140mm min Wall thickness
- 70mm min distance to Horizontal Edge
- 100mm min distance to Vertical Edge
- Blockwork wall must be corefilled /reinforced and is to be designed and detailed in accordance with NZ4230 or NZ4229



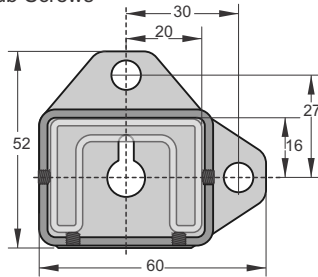
Juralco Edgetec® Infinity Balustrade System
SS Interlinking Top Rail Connectors

Juralco Frameless Glass Balustrade System
Polished SS Interlinking Rail - Fixing to Wall or End Post

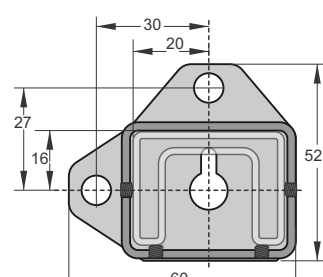
Note : All these Brackets use M5 x 8mm SS Grub Screws



WALL BRACKET 2 FIX SS2205
 Part No JET436/PSS
 87mm x 37mm x 25mm deep



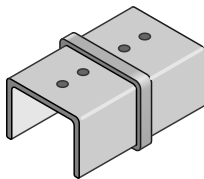
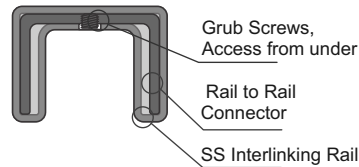
WALL BRACKET 2 FIX - RH SS2205
 Part No JET437/RH/PSS
 52mm x 60mm x 33mm deep



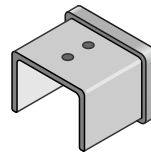
WALL BRACKET 2 FIX - LH SS2205
 Part No JET437/LH/PSS
 52mm x 60mm x 33mm deep

Juralco Frameless Glass Balustrade System
Polished SS Interlinking Rail - Rail Connections

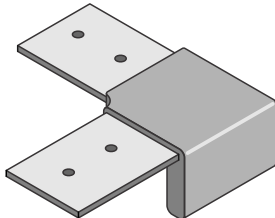
Note : All these Brackets use M5 x 6 SS Grub Screws.
 If necessary these holes must be Drilled + tapped M5, as shown.
 The under side of the Interlinking Rail must be drilled
 M6/7 to match M5 tapped holes positions, for access to Grub screws
 - Joins, where required must be at the end of Glass Panels



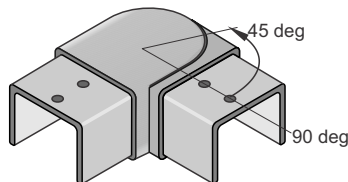
180deg INLINE JOINER SS2205
 Part No JET431/PSS
 60mm x 40mm x 30mm deep



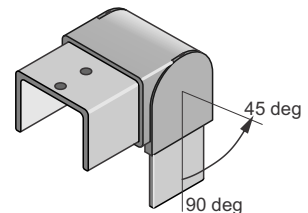
END CAP SS2205
 Part No JET432/PSS
 33mm x 40mm x 30mm deep



90deg JOINER SS2205
 Part No JET433/PSS
 95mm x 95mm x 30mm deep

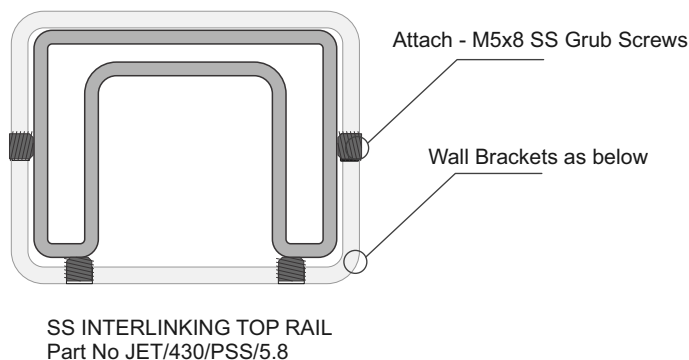


90 - 45 deg HORIZONTAL JOINER SS2205
 Part No JET434/PSS
 70mm x 70mm x 30mm deep



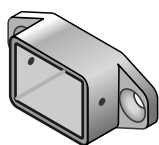
90 - 45 deg ADJUSTABLE VERTICAL JOINER SS2205
 Part No JET435/PSS
 60mm x 60mm x 40mm wide

Juralco Edgetec® Infinity Balustrade System
Interlinking Top Rail End Bracket Attachments

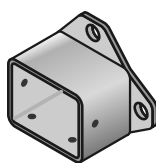


Applies to this Interlinking Top Rail

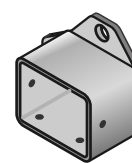
Interlinking Top Rail End Bracket Options



Wall Bracket 2205
 Part No JET/436/PSS
 87mm x 37mm x 25mm deep



Wall Bracket RH 2205
 Part No JET/437/RH/PSS
 52mm x 60mm x 33mm deep



Wall Bracket LH 2205
 Part No JET/437/LH/PSS
 52mm x 60mm x 33mm deep

General Notes:

- All fixings to be Stainless Steel
- EPDM layer between Structure and Bracket
- ULS Point load $N^* = 0.9\text{kN}$, inwards, outwards or down and in tension

Note : Fixing to Steel

- use 2 off 8g SS TEK Screws or M6 SS Bolts
- Steel 2mm min thickness
- Steel 300MPa minimum
- 15mm min distance to any Edges

Note : Fixing to Timber Wall

- use 2 off 8g SS Screws, 35mm min into studs.
- use Sika Supergrip 2hr
- 30mm min distance to Horizontal Edge
- If Weatherboard use suitable predrilled Wedge
- Timber stud wall to be designed and detailed in accordance with NZ3603 or NZ3604

Note : Fixing to Juralco EDGE Post

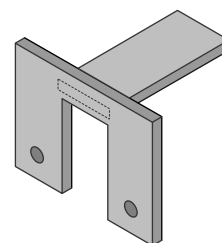
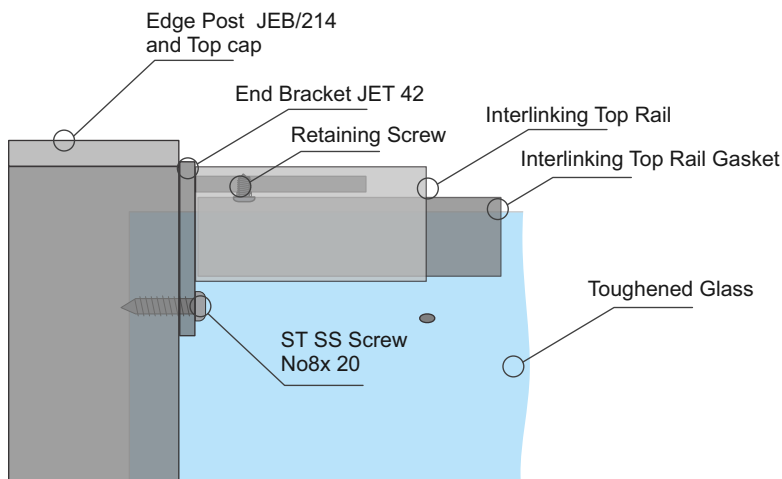
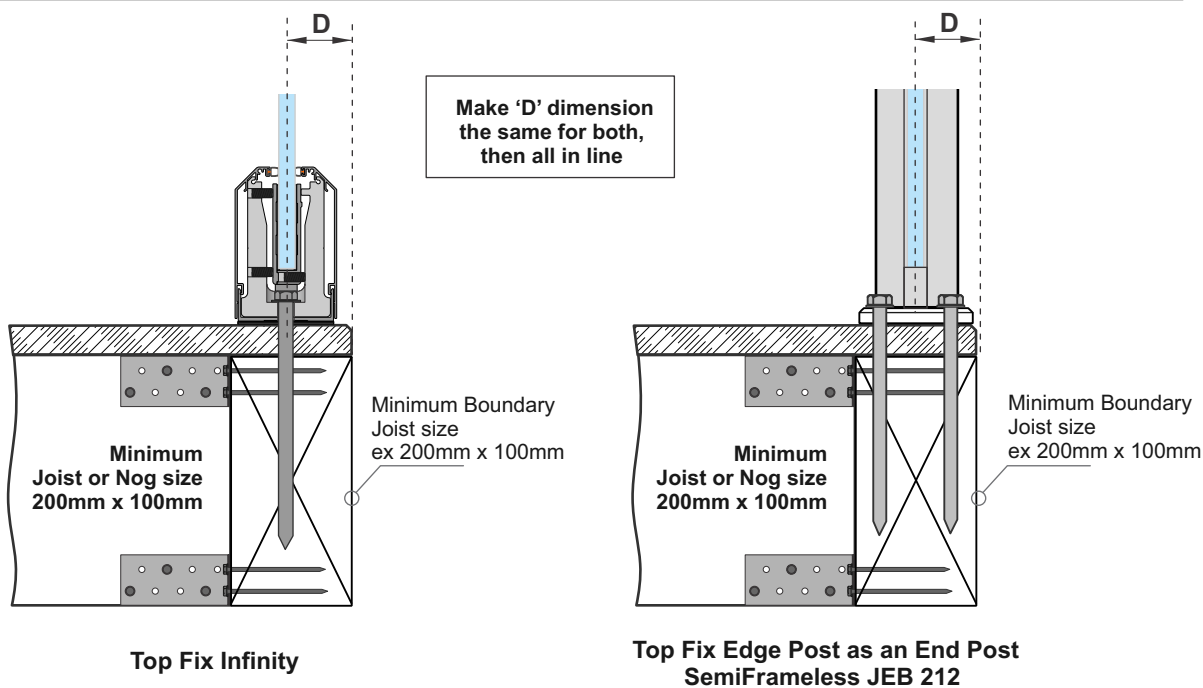
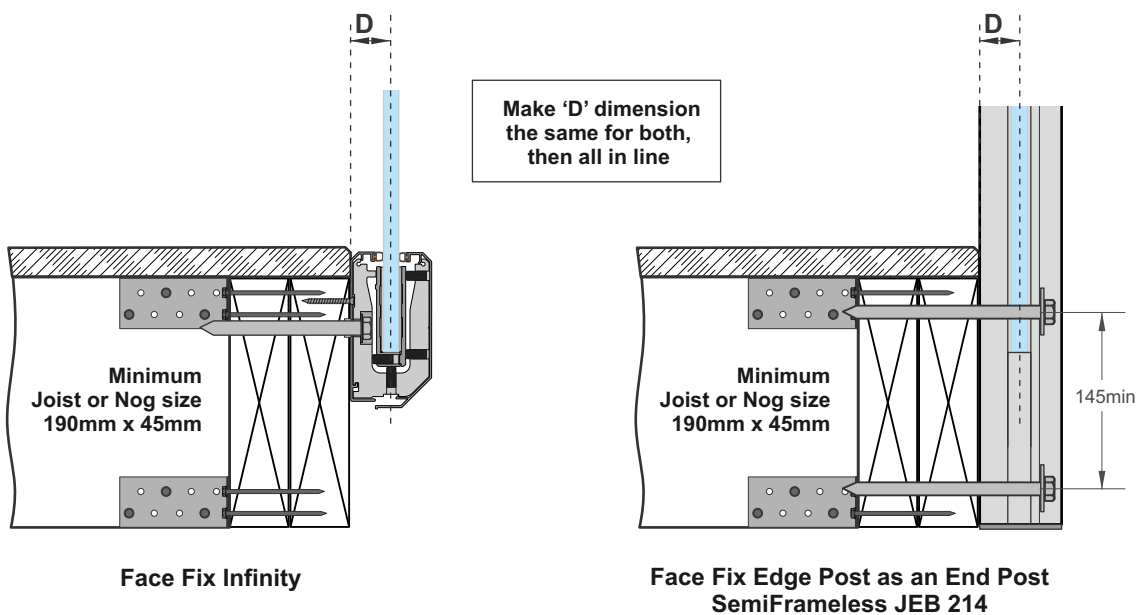
- use 2 off 8g x 25 SS PK Screws

Note : Fixing to Concrete Wall

- use 2 off M6 x70 SS Screw Anchors
- Solid Concrete min 20Mpa
- Block wall Concrete filled/Reinforced
- 140mm min Wall thickness
- 70mm min distance to Horizontal Edge
- 100mm min distance to Vertical Edge
- Blockwork wall must be corefilled /reinforced and is to be designed and detailed in accordance with NZ4230 or NZ4229



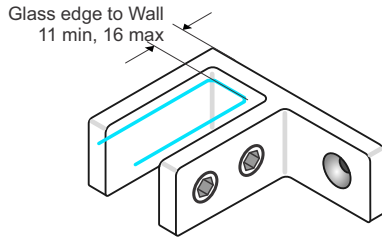
Interlinking Top Rail conforming to NZS 4223.3.2016 and Building Code Clause B1.3.4
For attaching to a Edge balustrade Post where Wall fixing not suitable



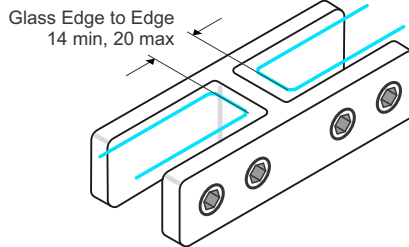
Juralco Edgetec® Infinity Balustrade System
Glass Stiffener Brackets

Top Edge, Frameless
Glass Stiffeners
12mm - 15.2mm Glass

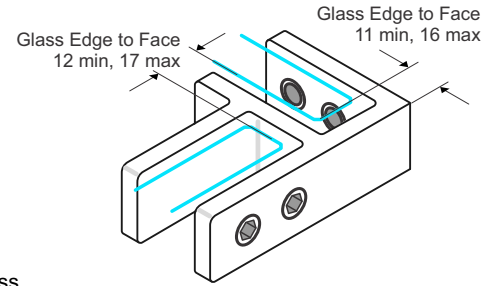
- For Laminated or SentryGlass only. Not for Toughened Glass. No Holes in Glass required.
- Install 200mm max from Glass Top edge
- Supplied as a kit, with screws, a variety of Gaskets and a SS clamp Plate
- Duplex 2205 SS construction. Polished, Satin or Powder coat SCC Finishes



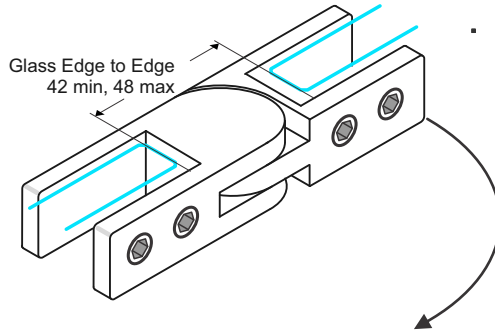
90 Deg Glass to Wall
75x505x25mm
Part No JET72/PSS
Part No JET72/SSS
Part No JET72



180 Deg Glass to Glass
70x34x25mm
Part No JET71/PSS
Part No JET71/SSS
Part No JET71



90 deg Glass to Glass
65x55x25mm
Part No JET70/PSS
Part No JET70/SSS
Part No JET70

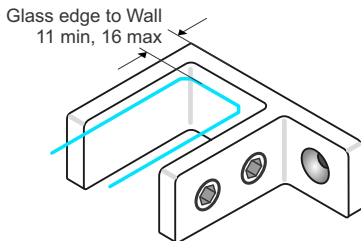


90 - 180 Deg
Adjustable Glass to Glass
135x34x25mm
Part No JET73/PSS
Part No JET73/SSS
Part No JET73

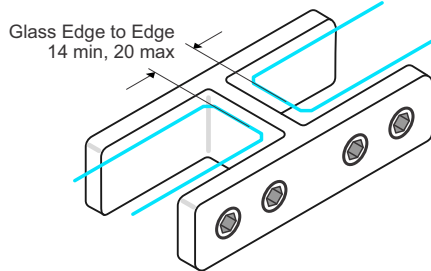
Series 70 Glass Stiffener Brackets, Gaskets, Plates			
Thickness	Green Pack	Yellow Pack	Steel Plate
12mm	0	2	1
13.52mm	2	0	1
15, 15.2mm	2	0	1

Top Edge, Frameless
Glass Stiffeners
17.2mm - 17.52mm Glass

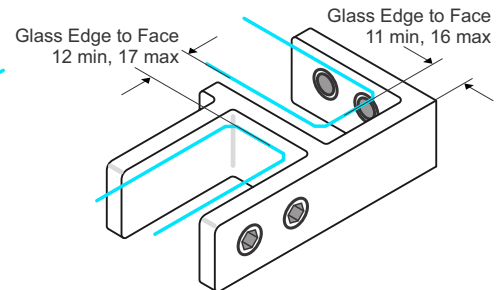
- For Laminated or SentryGlass only. Not for Toughened Glass. No Holes in Glass required.
- Install 200mm max from Glass Top edge
- Supplied as a kit, with screws, a variety of Gaskets and a SS clamp Plate
- Duplex 2205 SS construction. Polished, Satin or Powder coat SCC Finishes



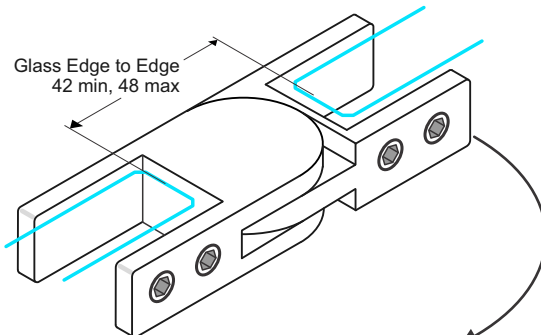
90 Deg Glass to Wall
65x55x25mm
Part No JET82/PSS
Part No JET82/SSS
Part No JET82



180 Deg Glass to Glass
103x39x25mm
Part No JET81/PSS
Part No JET81/SSS
Part No JET81



90 deg Glass to Glass
88x55x25mm
Part No JET80/PSS
Part No JET80/SSS
Part No JET80



90 - 180 Deg Adjustable
Glass to Glass
145x39x25mm
Part No JET83/PSS
Part No JET83/SSS
Part No JET83

Series 80 Glass Stiffener Brackets, Gaskets, Plates			
Thickness	Green Pack	Yellow Pack	Steel Plate
17.2, 17.52mm	0	2	1

Juralco Edgetec® Infinity Balustrade System

Handrails

STANDARD HANDRAIL
Part No JEB/222/5.8

RECTANGULAR
HANDRAIL
Part No JEB/216/5.8

AEROFOIL HANDRAIL
Part No JEB/217/5.8

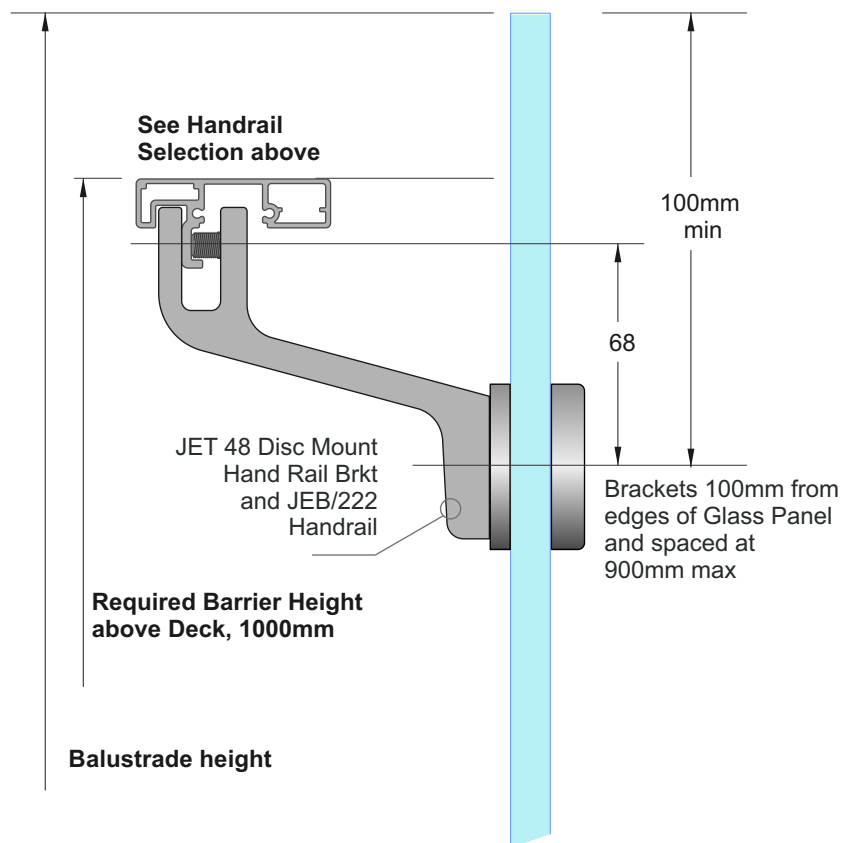
HALF ROUND HANDRAIL
Part No JEB/209/5.8

CIRCULAR HANDRAIL
Part No JEB/221/5.8

ROUND HANDRAIL Part No JEB/223/5.8
and ROUND HANDRAIL MINI CLIP Part No JEC38

All these from the EDGE Balustrade manual

Standard Handrail (JEB 222 shown) + JET 48 Disc Mount Brackets, Deck side mount



Frameless Glass Systems



JURALCO

www.juralco.co.nz ph (09) 478 8018

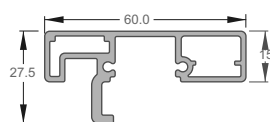
Juralco Edgetec® Infinity Balustrade System

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Page 48

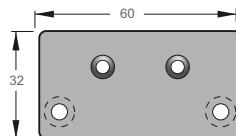
Handrail End Plates for Attaching to a Structure or Edge Deck mounted Post

End Caps for Handrails, Wall or Edge Post attach for JEB 222, 217, 209, 216 and 221 Handrails

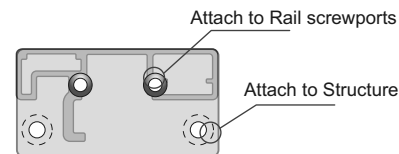
End Caps
all ex 3mm Aluminium



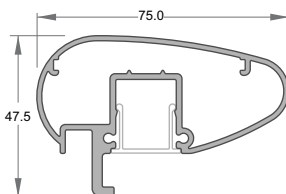
HANDRAIL
Part No JEB/222/5.8



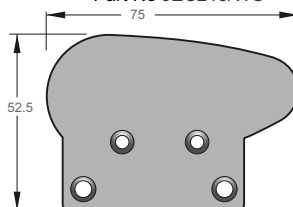
HANDRAIL
WALL ATTACH END PLATE
Part No JEC215/WC



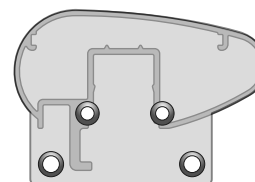
For RH and LH



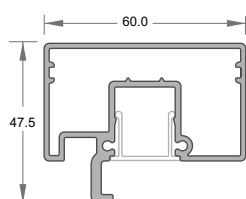
AEROFOIL HANDRAIL
Part No JEB/217/5.8



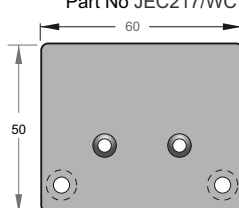
HANDRAIL
WALL ATTACH END PLATE
Part No JEC217/WC



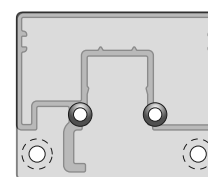
For RH and LH



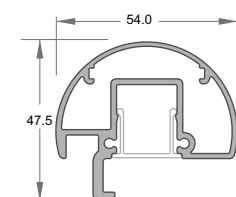
RECTANGULAR
HANDRAIL
Part No JEB/216/5.8



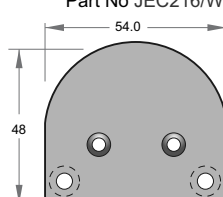
HANDRAIL
WALL ATTACH END PLATE
Part No JEC216/WC



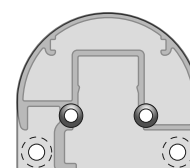
For RH and LH



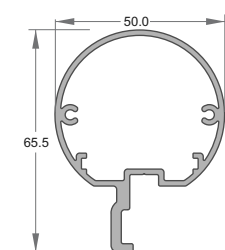
HALF ROUND HANDRAIL
Part No JEB/209/5.8



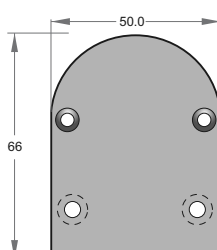
HANDRAIL
WALL ATTACH END PLATE
Part No JEC209/WC



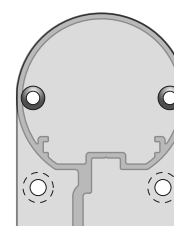
For RH and LH



CIRCULAR HANDRAIL
Part No JEB/221/5.8



HANDRAIL
WALL ATTACH END PLATE
Part No JEC221/WC



For RH and LH

General Notes: - All fixings to be Stainless Steel. - EPDM layer between Structure and End Cap
- ULS Point load N* = 0.9kN, inwards, outwards or down and in tension

Note : Fixing to Steel

- use 2 off 8g SS TEK Screws or M6 SS Bolts
- Steel 2mm min thickness
- Steel 300MPa minimum
- 15mm min distance to any Edges

Note : Fixing to Timber Wall

- use 2 off 8g SS Screws, 35mm min into studs.
- use Sika Supergrip 2hr
- 30mm min distance to Horizontal Edge
- If Weatherboard use suitable predrilled Wedge
- Timber stud wall to be designed and detailed in accordance with NZ3603 or NZ3604

Note : Fixing to Juralco EDGE Post

- use 2 off 8g x 25 SS PK Screws

Note : Fixing to Concrete Wall

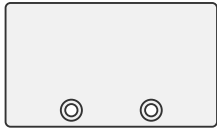
- use 2 off M6 x70 SS Screw Anchors
- Solid Concrete min 20Mpa
- Block wall Concrete filled/Reinforced
- 140mm min Wall thickness
- 70mm min distance to Horizontal Edge
- 100mm min distance to Vertical Edge
- Blockwork wall must be corefilled /reinforced and is to be designed and detailed in accordance with NZ4230 or NZ4229

Juralco Edgetec® Infinity Balustrade System

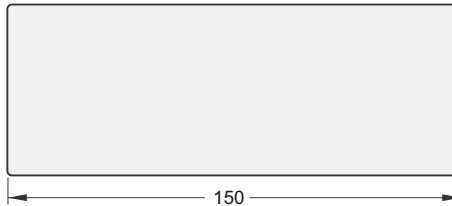
Handrail Components

Rectangular Handrails and 75mm Aerofoil - End Cap, Straight and 90deg corners

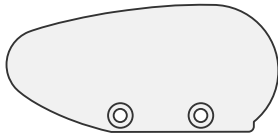
All ex 3mm Aluminium



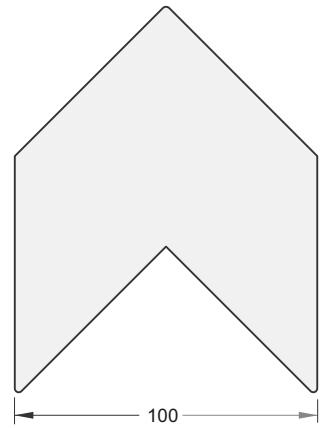
Rectangular End Cap
Part No JEC 03
Can be used as RH or LH



Rectangular and 75mm Aerofoil Inline Joiner
Use 56.5 x 3 flat bar JA/189/5.0
Use No6 x 1/4in SS pan sq drive screws, 2 ea side of joint



75mm Aerofoil End Cap
Part No JEC 11
Available as RH or LH



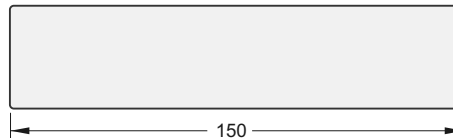
Rectangular and 75mm Aerofoil
90deg Corner Joiner Part No JEC 01

Round and Circular Handrail, End Cap, Straight and 90deg corners

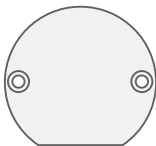
All ex 3mm Aluminium



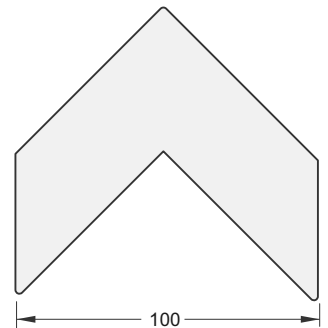
Round End Cap
Part No JEC 06
Can be used as RH or LH



Round Inline Joiner
Use 34.0 x 3 flat bar JA/188/5.0



Circular End Cap
Part No JEC 208
Can be used as RH or LH



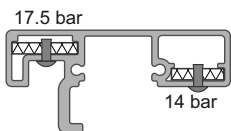
Round 90deg Corner Joiner
Part No JEC 04

Standard Handrail End Cap, Straight 135 deg and 90deg corners

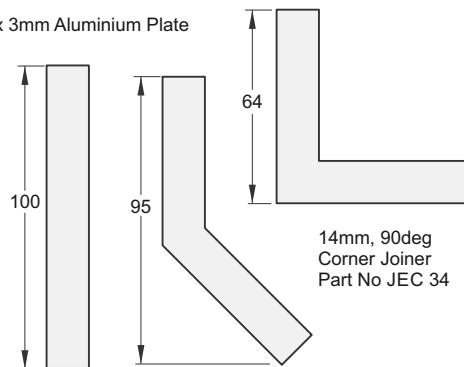
All ex 3mm Aluminium Plate



Standard Handrail End Cap
Part No JEC 18
Can be used as RH or LH



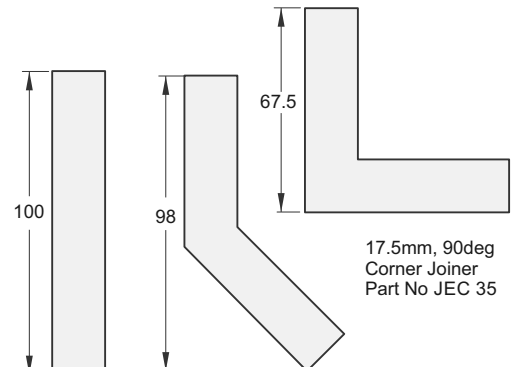
Use 2 x Rivets to each end of each Bar



14mm
Straight Joiner
Part No JEC 32

14mm, 135deg
Corner Joiner
Part No JEC 36

14mm, 90deg
Corner Joiner
Part No JEC 34



17.5mm
Straight Joiner
Part No JEC 33

17.5mm, 135deg
Corner Joiner
Part No JEC 37

17.5mm, 90deg
Corner Joiner
Part No JEC 35

Glass Cleaning and Maintenance

Glass Care and Maintenance

Architectural glass products must be properly cleaned during the construction period so visual and aesthetic clarity are maintained. Because glass can be permanently damaged if improperly cleaned, glass producers and fabricators recommend strict compliance with the following procedures.

First, determine whether the glass is clear, tinted or reflective. Surface damage is more noticeable on reflective glass compared with the other glass products. If the reflective coated surface is exposed, either on the exterior or interior, special care must be taken when cleaning, as scratches can result in coating removal and a visible change in light transmittance. Cleaning tinted and reflective glass in direct sunlight should be avoided. Cleaning should begin at the top of the building and continue to the lower levels.

Commence cleaning by soaking the glass surfaces with clean water and a soap solution to loosen dirt or debris. Then, using a mild, non-abrasive commercial window washing solution, uniformly apply the solution to the glass surfaces with a non-abrasive applicator and follow with a squeegee to remove all of the cleaning solution from the glass surface.

Ensure that no metal parts of the cleaning equipment touch the glass surface and that no abrasive particles are trapped between the glass and the cleaning materials. All water and cleaning solution residue should be dried from the window gaskets, sealants and frames.

Scratches and Metal Scrapers

Scratches can occur from hard pointed objects or poor handling, but most often occurs from the careless removal of foreign matter from the glass surface.

Mortar splatter and paint are common offenders and efforts to remove after hardening almost always lead to surface damage. It is essential that the foreign materials are removed before they harden. Better still, if construction work continues after glazing, that the glazed areas are protected by adhesive plastic films or suitable tarpaulins or covers.

One of the common mistakes made by non-glass trades people, including glass cleaning contractors, is the use of razor blades or other metal scrapers on a large portion of the glass surface. Using large blades to scrape a window clean carries considerable risk of causing damage to the glass.

The glass industry, fabricators, distributors and installers neither condones nor recommends any scraping of glass surfaces with metal blades or knives. Such scraping usually permanently damages or scratches the glass surfaces. When paint or other construction materials cannot be removed with normal cleaning procedures, a new 25mm razor blade may have to be used. The razor blade should be used on small spots only. Cleaning should be done in one direction only. Never scrape in a back and forth motion as this could trap particles under the blade that could scratch the glass.

Blades or scrapers can dislodge "pickup" on toughened glass. There are fine particles of glass that are fused on to the surface during toughening. Once dislodged they can scratch the glass.

Glass Cleaning, Do's and Don'ts

DO NOT..

- Do Not - Use Scrapers of any type or size on a Glass surface
- Do Not - Leave building dirt or residues to remain on Glass for a period of time.
- Do Not - Begin cleaning glass until you have identified the surface type.
- Do Not - Clean Glass surfaces in direct sunlight.
- Do Not - Allow dirty water or cleaning residues to remain on the Glass.
- Do Not - Begin cleaning before rinsing off a loose residues.
- Do Not - Use abrasive cleaning solutions, materials or solvents.
- Do Not - Allow metal parts of the cleaning equipment to come in contact with the Glass.
- Do Not - Trap abrasive particles between the cleaning material and the Glass.

DO...

- Clean glass promptly when dirt or building residues appear.
- Determine glass surface type.
- Exercise special care when cleaning coated surfaces.
- Avoid cleaning glass surfaces in direct sunlight.
- Start cleaning at the top of a building, then continue to lower levels.
- Soak the glass surface in a clean soapy solution before cleaning.
- Use a mild non abrasive commercial cleaner.
- Use a squeegee to remove all cleaning solution.
- Try your procedures on a small window and check.
- Caution other trades re the care and protection of the glass surfaces.

**Residues of surface grit may be present from the toughening production process.
These grit particles must not be dragged across the surface.
NEVER use Metal Scrapers**

All above reprinted with permission from Metro Glass Tech

Powder Coating Care and Maintenance

Powder Coating Installation Care

Warning re use of solvents:

- In some cases strong solvents are recommended for thinning various types of paints and also for cleaning up mastics and sealants.
- These can be harmful to the extended life of the powder coated surface, and must not be used for cleaning purposes.
- It is important to note that the damage will not be visible immediately and may take up to 12 months to develop.

If paint splashes or sealants and mastics need to be removed then the following may be safely used:
Methylated Spirits, Ethyl Alcohol, Isopropanol or preferably a mild detergent in warm water.

Joinery Protection during Installation:

All the activity on a construction site means that your powder coated items may get knocked or scratched, splattered with mortar, plaster, textured coating or paint during the later stages of construction.

Please ensure that all powder coated articles are masked or covered at this time. It is far easier to prevent accidents than to try and correct them. Should your joinery receive mortar or paint splashes see that these are removed before cure and follow the instructions contained in this brochure.

Typical sticker used to warn other trades of the need to protect and mask off powder coated joinery (applies to anodised joinery also)

"IMPORTANT ALL TRADES"
This valuable aluminium joinery will suffer permanent damage from: plaster, mortar and paint splashes - Protect if splashes occur - Immediately wash down joinery with water or meths - Do not allow splashes to harden! ~ Do not use solvents! - Do not remove this label until final clean completed.

This photograph display damage that has occurred on site, post installation. The photo of the masked joinery displays clear signs of damage that could have occurred were it not masked. Please ensure that your joinery is protected right through the entire construction process.



Powder Coating Maintenance

External - Maintenance Program:

To extend the life of external powder coated articles and to comply with warranty requirements for powder coated aluminium joinery, a simple, regular maintenance program must be implemented.

The effects of ultra violet light, atmospheric pollution, dirt, grime and airborne salt deposits will all accumulate over time and must be removed or surface staining and weathering will occur, leading to an unsightly appearance.

For external coatings, cleaning should take place every six months. In areas where pollutants are more prevalent, such as beachfront houses and industrial or geothermal areas, then a cleaning program should be carried out on a more frequent basis ie. every one to three months.

Fences or Balustrades in close proximity to swimming pools must be washed down every six months, to clean off chlorine and salt deposits.

Cleaning your powder coating:

1. Carefully remove any loose surface deposits with a wet sponge.
2. Use a soft brush (non abrasive) and a mild household detergent (do not use solvents) in warm water, remove dust, salt and other deposits.
3. Rinse off with clean fresh water.



Restoring weathered or scratched surfaces:

Repair of Scuffed or Scratched surfaces

Dulux Spray Cans are available in all colour card colours.

Repair of Small Scratches or Chips.

Dulux Dabsticks are ideally suited for the repair of small scratches.

Dabsticks may not be available in all colour card colours.

Repair of Weathered areas .

Dulux Gloss Up is a light to medium cutting cream ideally suited for gloss restoration and has been specifically designed for this purpose. Gloss Up contains no waxes or silicone and is a one step system.



Contact Dulux Powder Coatings , ph 0064 9 441 8244

Juralco Edgetec® Infinity Balustrade System
Stainless Steel Care and Maintenance

Care and Maintenance of Stainless Steel

Introduction

Stainless steels are selected for applications where their inherent corrosion resistance, strength and aesthetic appeal are required. However, dependent on the service conditions, stainless steels will stain and discolour due to surface deposits and so cannot be assumed to be completely maintenance-free. In order to achieve maximum corrosion resistance and aesthetic appeal, the surface of the stainless steel must be kept clean. Provided the grade of stainless steel and the surface finish are correctly selected, and cleaning schedules carried out on a regular basis, good performance and long service life will result.

For the correct selection of a Stainless Steel grade, with respect to Location, see Table below.

Factors affecting maintenance

Surface contamination and the formation of deposits on the surface of the stainless steel must be prevented. These deposits may be minute particles of iron or rust generated during construction. Industrial and even naturally occurring atmospheric conditions can produce deposits which can be equally corrosive, e.g. salt deposits from marine conditions.

Working environments can also provide aggressive conditions such as heat and humidity in swimming pool buildings. These conditions can result in surface discolouration of stainless steels and so maintenance on a more frequent basis may be required.

Modern processes use many cleaners, sterilizers and bleaches for hygienic purposes. Proprietary solutions, when used in accordance with makers' instructions, should be safe but if used incorrectly (e.g. warm or concentrated), may cause discolouration or corrosion on stainless steels. Strong acid solutions are sometimes used to clean masonry and tiling of buildings. These acids should never be used where contact with metals, including stainless steel, is possible. If this happens, the acid solution must be removed immediately, followed by dilution and rinsing with clean water.

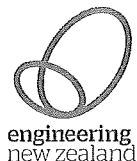
Maintenance programme

With care taken during fabrication and installation, cleaning before 'hand-over' should not present any problems. More attention may be required if the installation period has been prolonged or hand-over delayed. Where surface contamination is suspected, immediate cleaning after site fixing should avoid problems later.

The frequency of cleaning is dependent on the application. This may vary from once to four times a year for external applications, Recommendations on cleaning frequencies in architectural applications are shown below.

Cleaning frequency

Reccommended Cleaning for various grades of Stainless Steel		
Location	304 Grade	316 Grade
Surbarban or Rural	Clean at 6-12mth intervals or as necessary	
Industrial or Urban	Clean at 3-6mth intervals	Clean at 6-12mth intervals
Coastal or Marine	Not recommended	



New Zealand
Institute of Architects
Incorporated



Building Code Clause(s) **B1, F2, F4**

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: **P&P CONSULTING ENGINEERS LIMITED**

(Design Firm)

TO: **MERIT GLASS LTD**

(Owner/Developer)

TO BE SUPPLIED TO: **AUCKLAND COUNCIL**

(Building Consent Authority)

IN RESPECT OF: **FRAMELESS GLASS BALUSTRADE & STAIRWELL SUPPORTED BY DOUBLE DISCS & CAPPING RAIL**

(Description of Building Work)

AT: **Various Sites in Auckland**

(Address)

Town/City: **Auckland**

(Address)

LOT

DP

SO

We have been engaged by the owner/developer referred to above to provide:

STRUCTURAL DESIGN

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1, F2, F4** of the Building Code for:

☐ All or ☒ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule.

The proposed building work covered by this producer statement is described on the drawings titled:

GLASS BALUSTRADE SUPPORTED BY DOUBLE DISC and numbered **17/261 DoubleDisc.ds, ENG 01 TO.04**
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions **REFER TO NOTES ON CALCULATIONS & DRAWINGS**
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☒ as per agreement with owner/developer (Architectural)

I, **MR PARMIL PRAKASH** am: ☒ CPEng **251801** # ☐ Reg Arch #
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: **B.E. (CIVIL), CPENG**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000*.
The Design Firm is a member of ACENZ: ☐

SIGNED BY **MR PARMIL PRAKASH** (Signature)
(Name of Design Professional)

ON BEHALF OF **P&P CONSULTING ENGINEERS LIMITED** Date: **22/03/2021**
(Design Firm)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.
THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, ENGINEERING NEW ZEALAND AND NZIA

P & P CONSULTING ENGINEERS LTD

Civil and Structural Engineering

Mr P. Prakash (Director)
B.E. (Civil), CPeng, MIPENZ
Mr J. Dela Cruz
B.E. (Civil), GIPENZ
Mr H. Yin
B.E. (Civil), GIPENZ
Dr. H.D.W. FENDALL (Consultant)
B.E. (Civil) Hons., Ph.D., CPeng, MIPENZ

6A Montel Avenue,
Henderson,
AUCKLAND, 0612
Ph. & Fax 09-836-1853
pamil@pnpltd.co.nz
joel@pnpltd.co.nz
hansen@pnpltd.co.nz

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

B2 COMPLIANCE

You have requested a Producer Statement for Design-PS1 for Clause B2 of the Building Code – Structural Durability.

We are not able to provide this because there is no effective verification method for B2 contained within the Building Code.

However we can confirm that for the structural elements shown on our documentation:

Timber

Timber treatment has been selected in accordance with Table 1A of B2/AS1.

Concrete

Concrete cover have been selected in accordance with NZS3101:2006, Part 1 Section 3.

Mild Steel

Steel protection has been specified in accordance with the "Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings" AS/NZS3212. We Note that this is on a time to first maintenance basis.

We trust this provides the information that you are seeking.

Yours faithfully,



Mr P Prakash
Director
P & P Consulting Engineers Limited

P & P CONSULTING ENGINEERS LTD

Civil and Structural Engineering

Mr P. Prakash (Director)
B.E. (Civil), CPEng, MIPENZ
Mr J. Dela Cruz
B.E. (Civil), GIPENZ
Mr M. Ormeno
B.E. (Civil)
Dr. H.D.W. FENDALL (Consultant)
B.E. (Civil) Hons., Ph.D., CPEng, MIPENZ

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AUCKLAND, 0612
Ph. & Fax 09-836-1853
parmil@pnpltd.co.nz
joel@pnpltd.co.nz
miguel@pnpltd.co.nz

Ref: 17/261 DoubleDisc.ds
21 December 2017

MERIT GLASS LTD

CANTILEVER GLASS BALUSTRADES SUPPORTED BY DOUBLE DISCS

DESIGN CALCULATIONS SUMMARY

INDEX	PAGE
1. <u>Producer Statement - Design</u>	1
2. <u>Occupancy Types</u>	2
The balustrade has been tested to comply with domestic barriers serving one or more dwelling including balcony edges (occupancy types A & C3 of AS/NZS 1170).	
3. <u>Test Results</u>	3
Refer SGS test results on pages 3 – 5. 12 mm toughened glass is assessed to be sufficient for max. height 1.13 m from centre of top disc to top of glass. Glass to have continuous top rail (50 x 1.5 CHS or 25x21 RHS rail).	
4. <u>Wind Load Assessment</u>	6
The balustrade is sufficient for up to "Very High" wind zone.	
5. <u>Fixings</u>	6
Refer to summary drawing ENG 01 to ENG 04.	
6. <u>Interlinking Rail</u>	7
Use 50.8 OD x 1.5 mm thick CHS rail or 25x21 RHS rail.	
7. <u>Summary</u>	9
Refer summary sketch drawing ENG 01 to ENG 04.	

Notes:

1. Any parts of the structure which are not covered by the specific design included with these calculations must comply either with the New Zealand Building Code or specific design as detailed by others. Any exceptions to this should be referred back to this Design Office.
2. The above calculations include structural work for which a Building Consent must be obtained prior to building. It is the Owner's responsibility to obtain all necessary consents.
3. It is assumed that the strength and stiffness of the substrate is sufficient to adequately resist the balustrade loads – this must be confirmed for each installation situation.
4. This design assumes that all the specified members are suitably protected from excess moisture in accordance with Section E1, E2 and E3 of the Building Code. All timber, steelwork, bolts and fasteners to be corrosion protected in accordance with the requirements of NZS 3604:2011 Chapter 4, Durability.



B1,B2, F2, F4

Building Code Clause(s).....

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: P&P CONSULTING ENGINEERS LIMITED
(Design Firm)

TO: MERIT GLASS LIMITED
(Owner/Developer)

TO BE SUPPLIED TO: VARIOUS COUNCILS
(Building Consent Authority)

IN RESPECT OF: FRAMELESS GLASS BALUSTRADE SUPPORTED BY DOUBLE DISCS & CAPPING RAILS.
(Description of Building Work)

AT: VARIOUS ADDRESSES
(Address)

LOT DP SO
We have been engaged by the owner/developer referred to above to provide STRUCTURAL DESIGN

services in respect of the requirements of
(Extent of Engagement)

Clause(s) B1, B2, F2, F4 of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

- ☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment B1/VM1 or
(verification method / acceptable solution)
☐ Alternative solution as per the attached schedule.

The proposed building work covered by this producer statement is described on the drawings titled FRAMELESS GLASS
BALUSTRADE SUPPORTED BY DOUBLE DISCS and numbered 17/261/double disc.ds, ENG 01 TO ENG 04
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions REFER TO NOTES ON CALCULATIONS & DRAWINGS
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, MR. P PRAKASH am: ☒ CPEng 251801 #
(Name of Design Professional)

☐ Reg Arch #

I am a Member of : ☒ IPENZ ☐ NZIA and hold the following qualifications: B.E. (Civil), CPEng
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

The Design Firm is a member of ACENZ: ☐

SIGNED BY MR. P PRAKASH ON BEHALF OF P&P CONSULTING ENGINEERS LTD.
(Design Firm)

Date 21 DECEMBER 2017 (signature) *APK*

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.

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MERIT GLASS LTD

ASSESSMENT OF TESTING OF CANTILEVER GLASS BALUSTRADES

CARRIED OUT ON 25/10/2016 BY SGS LTD

USING DOUBLE DISC SUPPORT SYSTEM

2. OCCUPANCY TYPES - DOMESTIC & RESIDENTIAL ONLY

The glass and support channel was tested to comply with the following domestic load cases taken from AS/NZS 1170.1:2002 and the DBH Practice Advisory 10:

Occupancy Type	Refer Table 3.3 of AS/NZS 1170:	Maximum Design Loads		
A, C3 (Residential Only)	Domestic Barriers for One or More Dwellings including Balcony Edges (NOT subject to Over Crowding)	0.75 kN/m (75 kg/m)	0.6 kN (60 kg) Anywhere	1 kPa (100 kg/m ²) Infill

3. TEST RESULTS

As noted above, the test loads were determined from Table 3 of AS/NZS 1170:2002

First glass sample had a failure at point load at top edge, hence further two samples were tested which passed. Refer to test results attached on pages 3 -5

Based on above testing, 12 mm toughened safety glass is sufficient for the occupancy types noted above.

Deflection:

Take allowable deflection as height / 30.

In this case, the height = 1130 mm (above upper row of fixing)

Hence, allowable deflection = 37 mm

From the test results, the deflection at serviceability loads are summarised below:

SLS load	Deflection
0.6 kN at corner	22.2 mm
1.2 kN UDL	33.5 mm

As can be seen, the deflections are within the normal acceptable limits



SGS New Zealand Ltd, NDT & Materials Testing
22 Vestey Drive, P.O Box 12-356, Penrose, Auckland
Tel: (64-9) 634 3637 Fax: (64-9) 634 6728
Email: NZ_Industry@sgs.com Web: www.sgs.com

File Ref: INZ 56135

Page 1 of 2

TEST REPORT No.: INZ56135-01

Client: Merit Glass Ltd
Order No.: TBA
Sample Description: Glass Balustrade System
Identification: Not specified
Material Specification: As listed below
Tested in accordance with: Client instruction, referencing AS/NZS 4223.3:2016

Test: Load versus displacement testing of glass balustrade system.

Method: Three glass panels were installed in line with designated fixings on SGS's glass balustrade test frame, consisting of the following components, and tested in accordance with Chester Consultants Ltd instruction (Fig.1).

Glass Panel – 12mm toughened laminated glass 2050mm long by 1260mm high
Glass Fixing – 50mm diameter stainless steel standoff
Rail – 50mm diameter stainless steel tube with 16mm wide recess

Results:

Location	Loading Type	Load (kg)		Hold Time (mins)		Displacement (mm)		Comments
		Target	Actual	Target	Actual	Maximum	Permanent	
A	Point	80	80	15	15	13.7	0.2	Nil fracturing of glass
B	Point	80	80	15	15	13.9	0.2	Nil fracturing of glass
C	Point	80	80	15	15	3.5	0	Nil fracturing of glass
D	Point	240	240	15	15	42.1	0.6	Nil fracturing of glass
E	Point	240	240	15	0.2	41.0		Top rail came off glass panels
E ₁	Point	120	120	15	15	22.2	0.3	Nil fracturing of glass
Top Rail	Line	235	235	15	15	33.5	0.1	Nil fracturing of glass
Whole Pane	Infill	592	592	15	15	13.2	0.1	Nil fracturing of glass

- Note: 1. Displacement sensor positioned 40mm below point / line load and midpoint of panel for distributed load.
2. All fixings installed on steel structure with testing conducted on centre panel.
3. Line load applied to top rail.

Acceptance Criteria: Report findings

Tested by: G. Schoutens Date: 25-Oct-16

Checked by: N. Woods Date: 25-Oct-16

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 14 days only.

INZF109



SGS New Zealand Ltd, NDT & Materials Testing
22 Vestey Drive, P.O Box 12-356, Penrose, Auckland
Tel: (64-9) 634 3637 Fax: (64-9) 634 6728
Email: NZ_industry@sgs.com Web: www.sgs.com

File Ref: INZ 56135

Page 1 of 2

TEST REPORT No.: INZ56135-02

Client: Merit Glass Ltd
Order No.: TBA
Sample Description: Glass Balustrade System
Identification: Not specified
Material Specification: As listed below
Tested in accordance with: Client instruction, referencing AS/NZS 4223.3:2016

Test: Load versus displacement testing of glass balustrade system.

Method: Three glass panels were installed in line with designated fixings on SGS's glass balustrade test frame, consisting of the following components, and tested in accordance with Chester Consultants Ltd instruction (Fig.1).

<i>Glass Panel</i>	–	12mm toughened laminated glass 2050mm long by 1260mm high
<i>Glass Fixing</i>	–	50mm diameter stainless steel standoff
<i>Rail</i>	–	25mm x 20mm stainless steel channel with 14mm recess

Results:

Location	Loading Type	Load (kg)		Hold Time (mins)		Displacement (mm)		Comments
		Target	Actual	Target	Actual	Maximum	Permanent	
A	Point	80	80	15	15	17.0	0.1	Nil fracturing of glass
B	Point	80	80	15	15	16	0.2	Nil fracturing of glass
C	Point	80	80	15	15	3.6	0	Nil fracturing of glass
D	Point	240	240	15	15	50.1	0.3	Nil fracturing of glass
E	Point	240	240	15	15	46.8	0.3	Nil fracturing of glass
Top Rail	Line	235	235	15	15	35.4	0.2	Nil fracturing of glass
Whole Pane	Infill	592	592	15	15	13.7	0	Nil fracturing of glass

- Note: 1. Displacement sensor positioned 40mm below point / line load and midpoint of panel for distributed load.
2. All fixings installed on steel structure with testing conducted on centre panel.
3. Line load applied to top rail.

Acceptance Criteria: Report findings

Tested by: G. Schoutens Date: 25-Oct-16

Checked by: N. Woods Date: 25-Oct-16

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 14 days only.

INZF109



SGS New Zealand Ltd, NDT & Materials Testing
22 Vestey Drive, P.O Box 12-356, Penrose, Auckland
Tel: (64-9) 634 3637 Fax: (64-9) 634 6728
Email: NZ_industry@sgs.com Web: www.sgs.com

File Ref: INZ 56135

Page 2 of 2

TEST REPORT No.: INZ56135-01

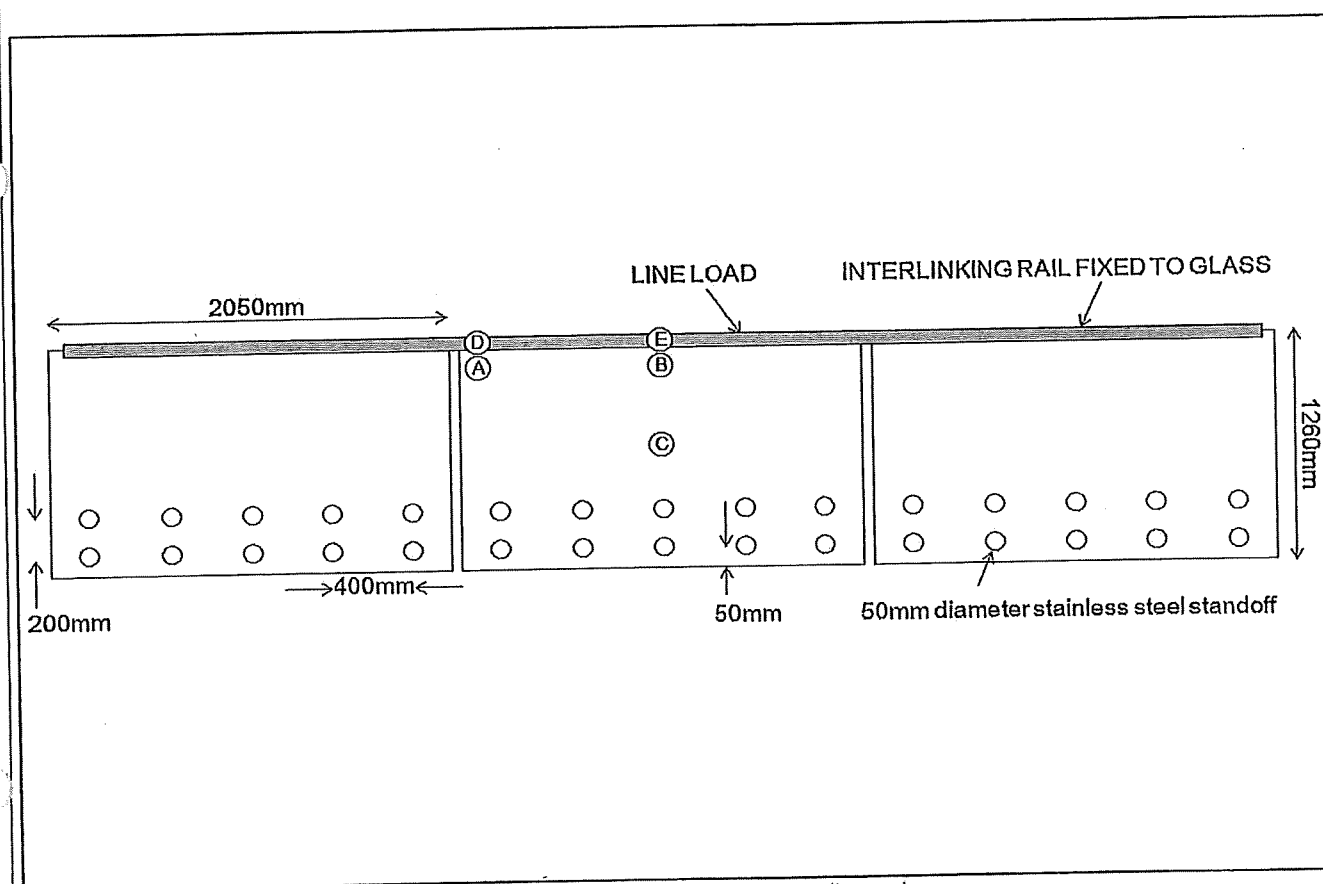


Figure 1 - Loading locations and base dimensions

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 14 days only.

INZF109

4. WIND LOAD ASSESSMENT

6

The maximum infill load was 592 kg over 2.05 m x 1.26 m panel

Pressure = 2.29 kPa

External pressure coefficient say = 1.3

Hence Max. Pressure = 1.76 kPa

Hence the galss is suitable for "VERY HIGH" wind zone ($q_u = 1.5 \text{ kPa}$)

5. FIXINGS

The fixing of the discs is via pairs of bolts or screws at nominally 400 mm centres.

The fixings are 120 mm apart vertically. Hence the maximum tensile load to the top fixing is:

$$\begin{aligned} \text{Line Load} &= 0.75 \text{ kN/m} \times 1.5 \times 0.9 / 0.12 \times 0.4 \text{ m spacing} \\ &= 3.4 \text{ kN at ULS load} \end{aligned}$$

$$\begin{aligned} \text{Wind} &= 1.5 \times 1.3 \times 0.5 \times 1.13^2 / 0.12 \times 0.4 \\ &= 4 \text{ kN} \end{aligned}$$

Anchor Type
To Concrete

M10 Dynabolts

$$\begin{aligned} \text{Capacity} &= 24.4 \times 0.88 \times 0.8 \\ &= 17.1 \text{ kN} \end{aligned}$$

Hence, OK at 400 mm crs

M10 Chemset Anchors to Concrete

$$\begin{aligned} \text{Capacity} &= 15.9 \times 0.87 \\ &= 13.83 \text{ kN} \end{aligned}$$

Hence, OK at 400 mm crs

M10 G4.6 Bolts to Steel Members

$$\begin{aligned} \text{Capacity} &= 0.8 \times 240 \text{ MPa} \times 78.5 \text{ mm}^2 \\ &= 15.0 \text{ kN} \end{aligned}$$

Hence, OK at 400 mm crs

M10 bolts to timber

$$\begin{aligned} \text{Capacity is controlled by bearing on } 50 \text{ mm} \times 50 \text{ mm square washers} \\ &= 0.7 \times 0.8 \times 5.3 \text{ MPa} \times 50^2 \\ &= 7.4 \text{ kN} \end{aligned}$$

Hence, OK at 400 mm crs

M10 Coach Screws to Timber

$$\begin{aligned} \text{Capacity} &= 0.7 \times 0.8 \times 107 \text{ N/mm} \times 0.7 \text{ (wet)} \times 80 \text{ mm embedment} \\ &= 3.4 \text{ kN} \end{aligned}$$

Hence, OK at 400 mm crs

$$\begin{aligned} \text{Hence, maximum spacing of Anchors} &= 400 \text{ mm} \times 3.4 \text{ kN} / 4 \text{ kN} \\ &= 340 \text{ mm} \quad (\text{or } 400 \text{ for dry timber}) \end{aligned}$$

P & P CONSULTING ENGINEERS LTD Civil and Structural Engineering 6A Montel Avenue, Henderson ph: 836-1853	Project: <u>Balustrade (GLS)</u>	Job No.	Sheet of
	Designed: H. Yin		Date

6. Camping rail

three glass panels, each panel 2.0 m maximum

Say if middle glass panel failure, then horizontal load will transfer to side glass pane (critical)

or side glass pane failure the horizontal load will transfer to wall framing structure & middle glass panel (not critical)

check top rail member

Hence the horizontal load transfer to top rail

$$UDL^* = 0.25 \text{ kN/m} = 25 \text{ kg/m} \quad \text{or} \quad 0.35 \text{ kN/m} = 35 \text{ kg/m}$$

$$P^* = 0.6 \text{ kN} = 60 \text{ kg}$$

From SAS Test report (File Ref: INZ 56135-01 & INZ 56135-02)

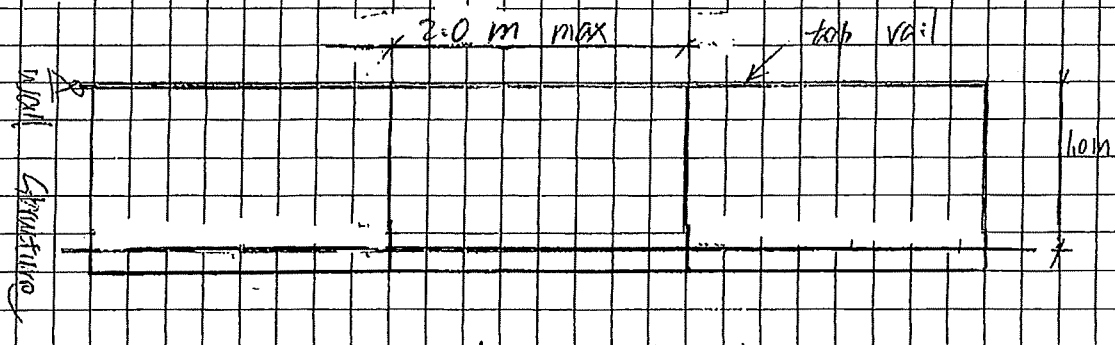
top rail can take 235 kg along 2 m

$$\text{So top rail UDL capacity} = 235 \text{ kg} / 1.33 = 176 \text{ kg/m} > UDL^* = 35 \text{ kg/m} \quad (\text{OK})$$

top rail can take 240 kg at middle point

$$\text{So top rail point load capacity} = 240 \text{ kg} / 1.33 = 180 \text{ kg} > P^* = 60 \text{ kg} \quad (\text{OK})$$

Hence top rail 25mm x 25mm steel member & 50mm dia SAS steel's strength and connection are satisfactory.



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Civil and Structural Engineering
6A Montel Avenue, Henderson ph: 836-1853

Project: Ballastroad (SLs)
Designed: H. Yin

Job No.

Sheet of

Date

Check end connection to Building

Two 2x2x2 corners. Capacity = $0.3 \times (2.14 \times 0.3 \times 2) = 2.1 \text{ kN}$

Design load = $0.35 \text{ kN/m} \times 1.0 \times 2.0 \text{ m} / 2 = 0.35 \text{ kN}$, Hence (OK)

or use 1x1x1x1 corner screw with 30 mm penetration
1x1x1x1 corner screw Capacity = $0.3 \times 0.3 \times (0.5 \times 30 \text{ mm} \times 2.14 \text{ MPa} \times 3 \text{ mm})$
= $2.02 \text{ kN} > \text{Design load (OK)}$

Check bottom fixing

$R^* = 0.35 \text{ kN/m} \times 2 \text{ m} / 2 = 0.35 \text{ kN}$

$M^* = 0.35 \text{ kN} \times 1.0 = 0.35 \text{ kN.m}$

$T^* = 0.35 \text{ kN/m} \times 1.20 \text{ m} / 2 = 3.1 \text{ kN}$

shared by two fixings

Anchor types

M10 Dymabolts into concrete with 30 mm embedment

① M10 Bolts chemset into concrete with 30 mm embedment

$\phi T_n^{\text{Dymabolt}} = 13.1 \text{ kN} > \phi T_n^{\text{chemset}} = 13.33 \text{ kN} > T^* \text{ (OK)}$

② M10 A4-6 Bolts to steel member

$\phi T_n = 15.0 \text{ kN} > T^* \text{ (OK)}$

③ M10 Bolts with 50x50x3 washer to timber

$\phi T_n = 7.4 \text{ kN} > T^* \text{ (OK)}$

④ M10 Coach screws with 30 mm penetration into wet timber or 30 mm into dry timber.

$\phi T_n^{\text{wet}} = 3.4 \text{ kN} > T^* \text{ (OK)}$ $\phi T_n^{\text{dry}} = 4.8 \text{ kN} > T^* \text{ (OK)}$

7. SUMMARY

In summary, the panel & fixings tested conform to the following:

LOADS:

Live Load: For Domestic Occupancy types A and C3 (residential only) of AS/NZS 1170:2002, Table 3.3

Wind Load: VERY HIGH as per NZS 3604, or 50 m/s Ultimate Limit State wind speed

GLASS:

Thickness: 12 mm Toughened Grade A with continuous capping rail.

Max Height: 1.13 m from the centre of upper row of fixings

Provide 50.8 OD x 1.5 mm CHS interlinking rails or 25x21mm RHS interlinking rails.

FIXINGS:

Pairs of 48 mm diameter discs at 120 mm vertical spacing

Fixing of channel to substrate to comprise any of the following:

Pairs of M10 Dynabolts at 400 mm centres

Pairs of M10 Chemset anchors (Maxima spin capsules or Epcon C6 series) at 400 mm centres

Pairs of M10 G4.6 bolts to steel member at 400 mm centres

Pairs of M10 bolts to timber (with 50 mm x 50 mm square washers) at 400 mm centres

Pairs of M10 coachscrews at 340 mm centres with 80 mm minimum embedment into wet timber.

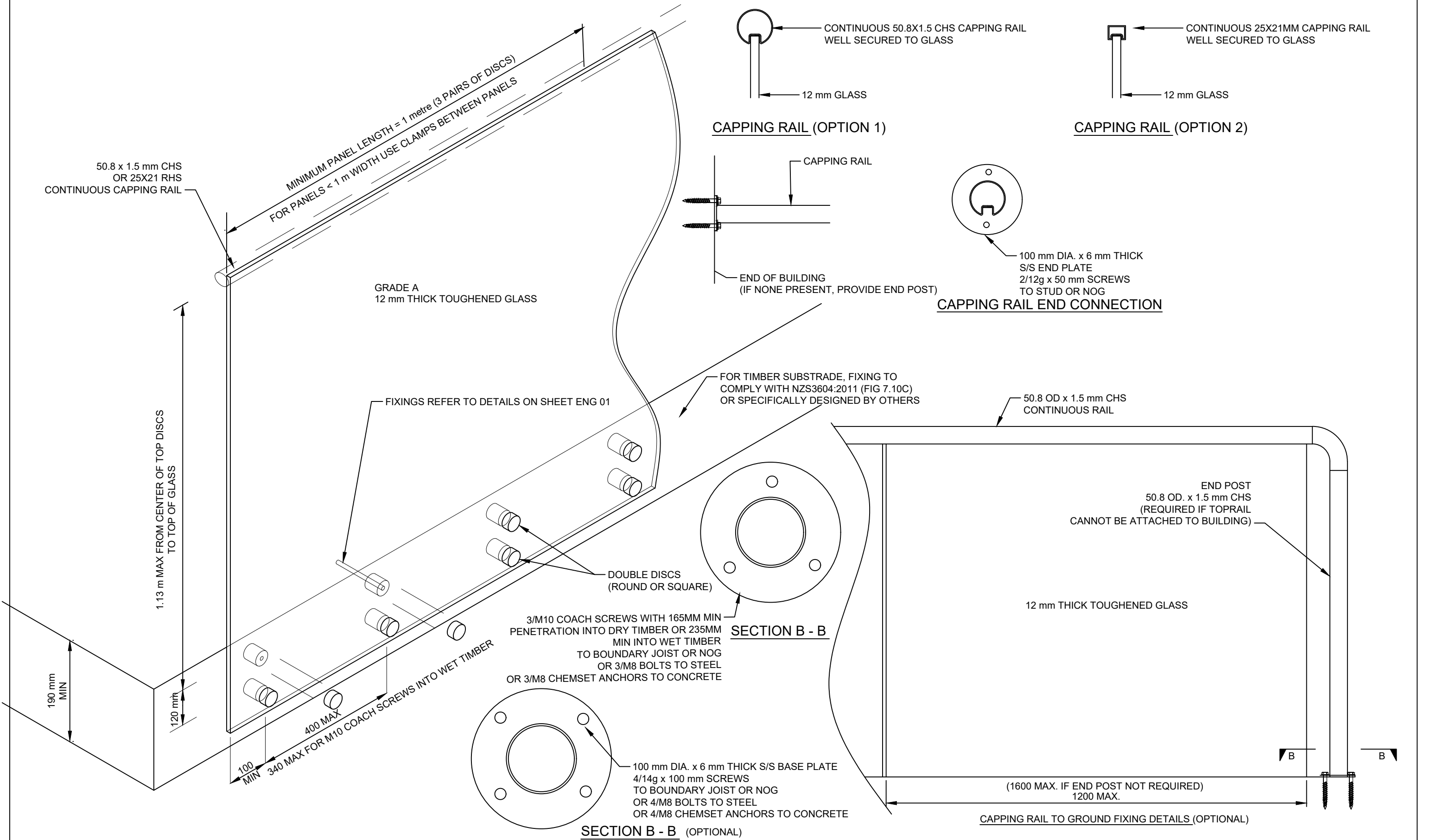
Pairs of M10 coachscrews at 400 mm centres with 80 mm minimum embedment into dry timber.

Notes:

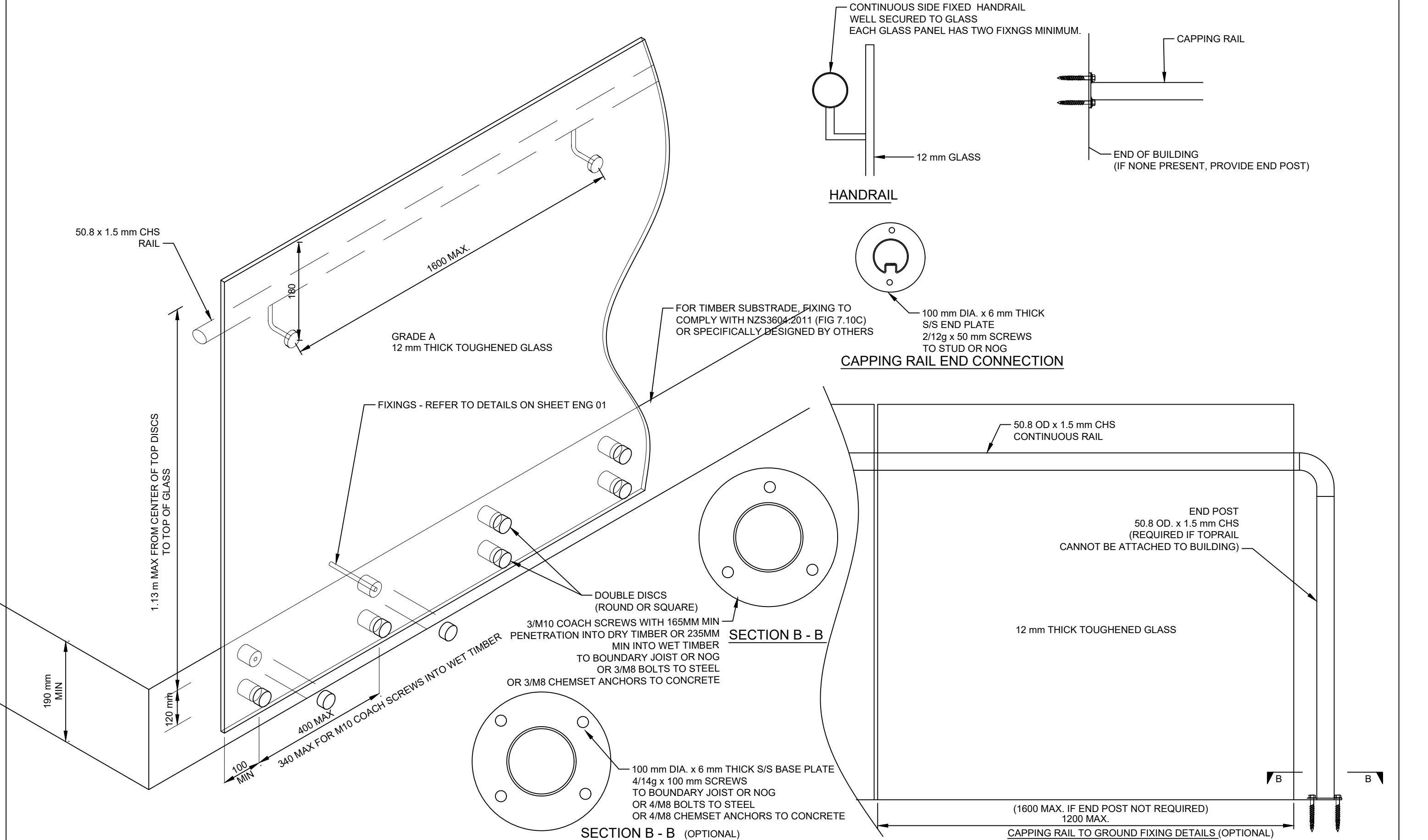
1. It is assumed that the strength and stiffness of the substrate is sufficient to adequately resist the balustrade loads - this must be confirmed for each installation situation.
2. The fixings must comply with the durability requirements on the Building Code - refer Section 4 "Durability" of NZS 3604:2011. The "Design Life" is at least 15 years.

Refer to attached summary drawing (ENG 01 to ENG 04).

FRAMELESS GLASS BALUSTRADES SUPPORTED BY DOUBLE DISCS



FRAMELESS GLASS BALUSTRADES SUPPORTED BY DOUBLE DISCS



P & P CONSULTING ENGINEERS LTD

Civil and Structural Engineering
 6A Montel Avenue, Henderson ph: 836-1853

MERIT GLASS LTD FRAMELESS GLASS BALUSTRADES

DOUBLE DISC SYSTEM

Scales 1:10 (A3)

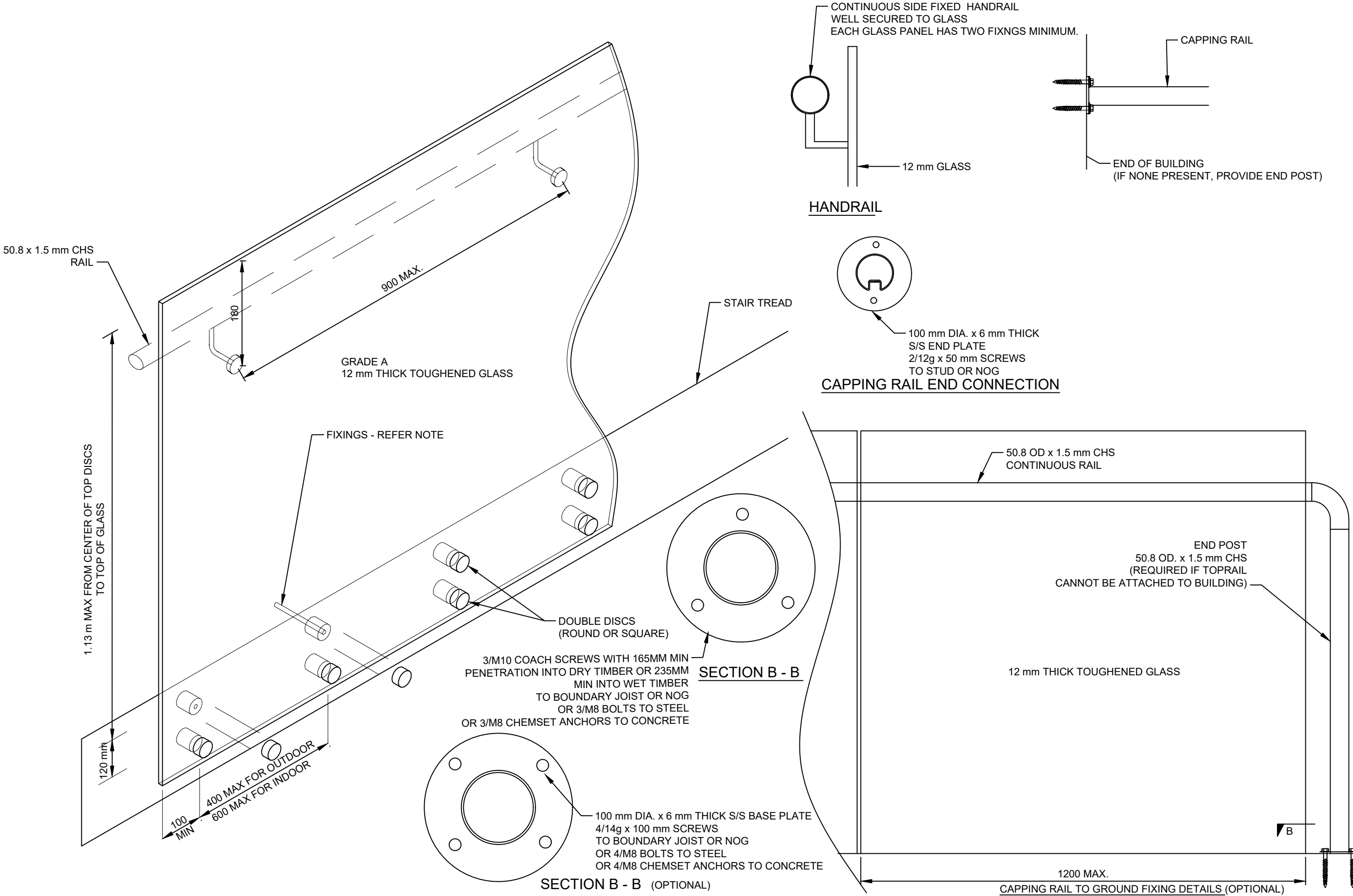
Drawn HY

Date 04-10-17

Project 15/136

Sheet ENG 03

FRAMELESS GLASS BALUSTRADES SUPPORTED BY DOUBLE DISCS



Section 3

Truss Details & Bracing Details

See page 206 and 207

- Manufacturers bracing instruction and construction documentation
- Design IT Calcs
- Hyspan etc.

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Build" designs shall be sent to
buildinginfo@wmk.govt.nz



Date: 22 April 2021
Fabricator: VIP Frames & Trusses
Job Name: Van De Geest Building
 New House
 29 Main Street Pegasus

-- AS BUILT TRUSS LAYOUT REQUIRED --
 This must be received by the Building Unit
 AT LEAST 10 WORKING DAYS PRIOR to
 the Structure Pre-Roof Pre-Wrap inspection.
 Truss "As-Built" designs shall be sent to
 buildinginfo@wmk.govt.nz

Building Consent No: 210889
 (Provided by relevant Consenting Authority at time of Consent application)

E-MAILED

We have been engaged to provide the trusses and frames for the above project.
 To allow completion of the consent application we have supplied the following information.

- (a) Truss Layout and Producer Statement.
- (b) Any slab thickening requirements detailed.
- (c) All truss loaded lintels that are either inside or outside the requirements of NZS3604:2011.
- (d) All roof bracing details as required by NZS3604:2011.

On advice from the building project owner, the structure will be designed under the following parameters:

Wind Zone	<u>High</u>	Altitude	<u>100m</u>
		Snow (Open Ground Load)	<u>0.900 kPa</u>
Roof Material	<u>Longrun</u>	Snow (Basic Roof Load)	<u>0.378 kPa</u>

Treatment Definition:

External Walls - H1.2 Treated
Internals Walls - H1.2 Treated
Trusses - H1.2 Treated

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 BC210889 21/09/2021 ChrisK

We can advise that the following will be provided at the time of truss manufacture to both the building owner and your office:

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

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

Acknowledgement of this letter, along with the Building Consent number, is required by our company as soon as possible.

Council Contacts:

Consents Officer: **C Keegan 00679 9397693**

Email #:

Phone:

Please forward to:

VIP Frames & Trusses
 65-67 Wickham Street
 Ph (03) 389 8200

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

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

www.mitek.nz.co.nz

MiTek 20/20 Engineering 4.7.346.0

Printed: 06:00:16 22 Apr 2021

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

ISSUED BY: **MiTek New Zealand Limited**

TO: **VIP Frames & Trusses**

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 **91101** 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, 22 April 2021



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

WAIMAKARIRI DISTRICT COUNCIL
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Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Job: 91101

CONSENT ISSUED BC210889 - Page 234 of 160

BC210889

Description:
Building Consent No.:
MiTek 20/20 Engineering 4.7.346.0

MiTek New Zealand Limited

Site:
29 Main Street
Pegasus

Phone:

Printed: 06:00:16 22 Apr 2021

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **VIP Frames & Trusses**, 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: ~MSGx45 H1.2

Pitch: 3.000 deg

Nominal Overhang: 120 mm

Roof

Ceiling

Wind

Material: Longrun Iron
Dead Load: 0.210 kPa
Restraints: 900 mm centres
Live Load: Qur = 0.250 kPa
Qc = 1.100 kN

Material: Gib Board 13mm
Dead Load: 0.200 kPa
Restraints: 600 mm centres
Live Load: Qc = 1.400 kN

Area: High (44.0 m/s)
Pressure Coeff: Cpe = varies; Cpi = -0.30, 0.20
Snow
Location: Pegasus (N4) at 100 m
Open Ground Load: 0.900 kPa
Basic Roof Load: 0.630 kPa

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

MiTek® Truss List

Legend: * = detail only, ? = input only, ~~xxx~~ = 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)
T1	1	6280	3.000	900	T10	1	6760	3.000	900
T2	6	6280	3.000	900 LB	T11	4	6760	3.000	900
T3	1	6980	3.000	900	T12	1	4740	3.000	900
T4	5	6980	3.000	900	T13	1	4740	3.000	900
T5	1	2450	3.000	900					
T6	1	2450	3.000	900					
T8	1	4740	3.000	900					
T9	7	4740	3.000	900					

Total quantity : 30

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The computer design input has been carried out by:

Signed: 

Date: ...Thursday, 22 April 2021....

Name of Detailer: Michael Lim

Qualifications and Title: Detailer

On behalf of: VIP Frames & Trusses

Job: 91101

Consent Issued BC210889 - Page 235 of 460

BC210889

Description:
Building Consent No.:
MiTek 20/20 Engineering 4.7.346.0

MiTek New Zealand Limited

Phone:

Printed: 06:00:27 22 Apr 2021

TRUSS FIXING SELECTION REPORT - Characteristic Loads

Fixings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data)

MiTek® Truss List

Legend: * = detail only, ? = input only, Txx = failed design, Ø = non certified, Unmarked trusses = designed successfully

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	----- Fixing ----- Qty Selected
T1	1	6280	I	1.278	0.603	Wide	No fixing selected
			N	1.794	0.587	Wide	No fixing selected
			J	3.421	1.685	Wide	No fixing selected
			K	3.006	1.511	Wide	No fixing selected
			M	3.812	1.932	Wide	No fixing selected
T2	6	6280	I	6.549	3.228	Cross	6 CT400
			N	6.752	3.096	Cross	6 Pair of Wire Dog Staples
T3	1	6980	I	3.330	1.610	Cross	1 Pair of Wire Dog Staples
			N	3.077	1.240	Cross	1 Pair of Wire Dog Staples
			K	8.319	4.183	Cross	1 CT400
T4	5	6980	I	3.330	1.610	Cross	5 Pair of Wire Dog Staples
			N	3.077	1.240	Cross	5 Pair of Wire Dog Staples
			K	8.319	4.183	Cross	5 CT400
T5	1	2450	E	2.683	1.279	Cross	1 Pair of Wire Dog Staples
			G	2.599	1.162	Cross	1 Pair of Wire Dog Staples
T6	1	2450	E	0.911	0.379	Wide	No fixing selected
			G	1.304	0.506	Wide	No fixing selected
			F	3.072	1.555	Wide	No fixing selected
T8	1	4740	I	4.998	2.296	Cross	1 Pair of Wire Dog Staples
			B	5.118	2.363	Cross	1 Pair of Wire Dog Staples
T9	7	4740	F	5.118	2.362	Cross	7 Pair of Wire Dog Staples
			I	4.998	2.296	Cross	7 Pair of Wire Dog Staples
T10	1	6760	N	4.703	2.149	Cross	1 Pair of Wire Dog Staples
			H	1.225	0.536	Wide	No fixing selected
			J	1.526	0.830	Wide	No fixing selected
			I	6.677	3.281	Wide	No fixing selected
T11	4	6760	I	7.036	3.473	Cross	4 CT400
			O	7.042	3.322	Cross	4 CT400
T12	1	4740	F	5.118	2.362	Cross	1 Pair of Wire Dog Staples
			I	4.998	2.296	Cross	1 Pair of Wire Dog Staples
T13	1	4740	F	1.583	0.562	Wide	No fixing selected
			I	1.596	0.558	Wide	No fixing selected
			G	3.254	1.652	Wide	No fixing selected
			H	3.683	1.886	Wide	No fixing selected

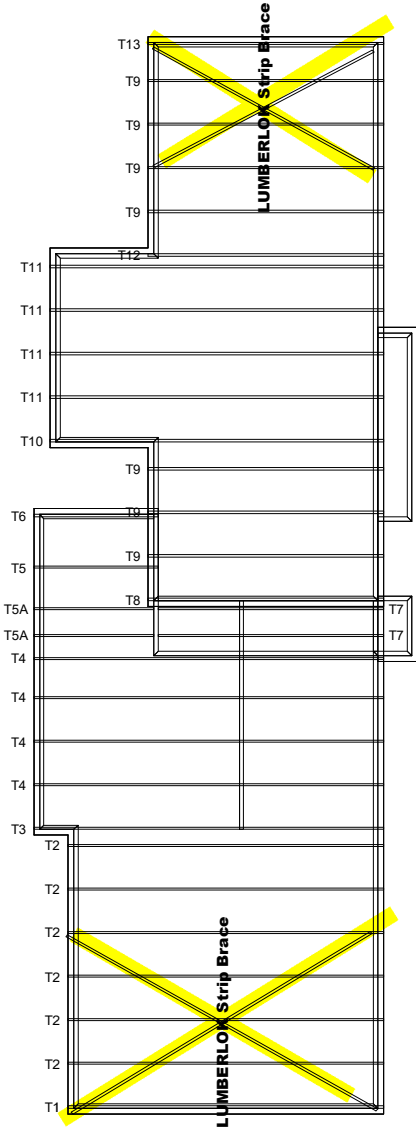
Fixing List

Qty	Selected Fixing
20	CT400
39	Pair of Wire Dog Staples
15	No fixing selected

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Note:

- 1) Fixings have been selected based on loading only. Please check that selected fixings are practical for each situation and that appropriate nailing can be applied on site.
- 2) Fixings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data) with down and uplift characteristic loads of at least the values shown for each joint.



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BC210889

VIP *Frames & Trusses*
CHRISTCHURCH | AUCKLAND

65 Wickham St,
PO Box 19-765,
Christchurch

91 Adams Drive,
Pukekohe,
Auckland

0800 PRENAIL
(0800 7736245)

JOB No **91101**

Client: Van De Geest Builders

Job Name: New House

Address: 29 Main Street
Pegasus

Pitch: 3.000

Roof Material: Longrun Iron

Soffit Overhang: 0

Wind Area: High

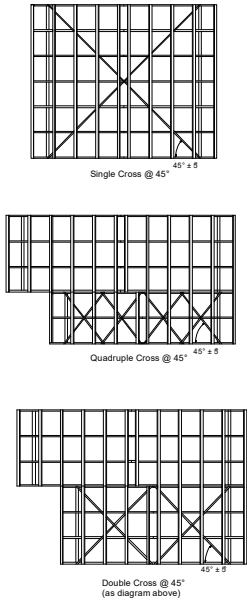
Snow Load: 0.630

Trusses And Rafters At 900 Centres
Unless Stated Otherwise

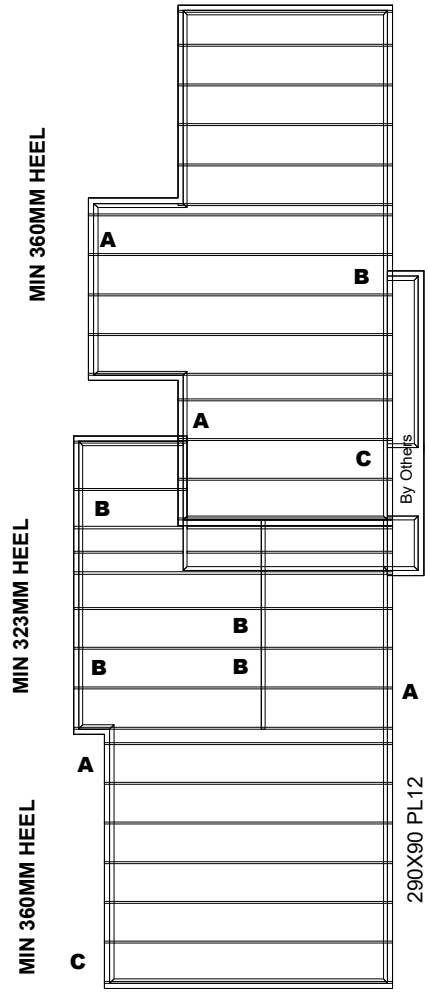
DRAWN BY Michael Lim

DATE 22 Apr,2021 PAGE 1 of

Roof Bracing Details



NOTES:
Refer to:
Lumberlok roof bracing brochure
07/2006



= Internal load bearing wall (Individual point loads of trusses under 10kN)

Architect / Engineer to confirm all top floor loads are transferred to foundation / slab below
All Other lintels / beams by architect / engineer
All walls shown are considered load bearing
The lintels & Fixings sized in this truss design are prelim only -
Fabricating Detailer MUST confirm lintel min size or bigger at detailing stage based off consented plans before detailing for fabrication
Fabricating Detailer MUST confirm lintel Fixings min size or bigger at detailing stage based off consented plans before detailing for fabrication

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VIP*Frames & Trusses*
CHRISTCHURCH | AUCKLAND

65 Wickham St,
PO Box 19-765,
Christchurch

91 Adams Drive,
Pukekohe,
Auckland

0800 PRENAIL
(0800 7736245)

JOB No 91101

Client: Van De Geest Builders
Job Name: New House
Address: 29 Main Street
Pegasus

Pitch: 3.000
Roof Material: Longrun Iron
Soffit Overhang: 0
Wind Area: High
Snow Load: 0.630

Trusses And Rafters At 900 Centres
Unless Stated Otherwise

DRAWN BY Michael Lim

DATE 22 Apr,2021 | PAGE 1 of

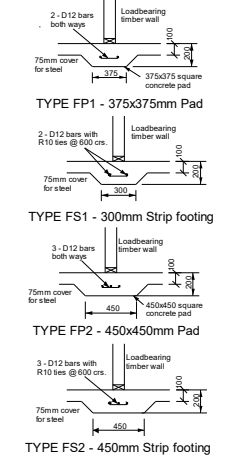
These lintels have been sized as per the GANGLAM and FLITCH BEAM selection manuals as provided by MiTek NZ Ltd.

HYSPAN lintels have been sized as per the HYSPAN selection charts.

Unless otherwise stated all lintels are as per NZS3604 2011

LINTEL	SIZE	
A	2/90x45	MSG8
B	2/140x45	MSG8
C	2/190x45	MSG8
D	2/240x45	MSG8
E	2/290x45	MSG8
F		

Slab Thickening Details





Reference
J19341

Certificate Number
TZ5uWNxanM

PROLAM SUMMARY

06 May 2021

Graham Residence

29 Pegasus Main Street, Pegasus

1. Verandah Posts (Bracing)

a) Verandah Roof posts

PLP12H5-125PP

(Visual)

Post Height	2.4 m	Building Type	House
Roof Height	3.0 m	EQ Zone (NZS3604)	Zone Two
Total Roof Length	5.6 m	Subsoil Class (NZS1170.5)	C
Total Roof Width	3.1 m	Wind Zone	High
Roof Attached to House	Yes	Snow Zone	N4
Roof Pitch	3.0 °	Site Elevation	3
		Wet in Service	Yes
		Roof Type	Light (0.25 kPa)
		Ceiling Type	Standard (0.15 kPa)
Member Depth	112 mm	Capacity Ratio	2.7
Member Width	112 mm	Rigidity Ratio	1
Bracing Posts Required	18	Critical Load Combination	Ws
Post Footing Depth	0.9 m	Foundation Loading	1.9 kN
Footing Diameter	0.45 m	Uplift Restraint	-0.5 kN
Deflection at Top of Post	16.6 mm (Horizontal)	Total Bracing Demand	137 BU
		Single Post Capacity	8 BU

Notes Footing is sized for resisting bracing loads only. Requirements for resisting uplift will need to be calculated separately - Section 9 in NZS3604 gives tables for the uplift force and volume of concrete required for posts.

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Reference
J19341

BC210889
Certificate Number
TZ5uWNxanM

2. Verandah Beam

a) VERANDAH BEAMS

PLVL12H3-250125

(Visual)

Beam Span	5.4 m	Building Type	House
Supported Roof Span	3.0 m	Wind Zone	High
Eaves Width	0.0 m	Snow Zone	N4
Roof Pitch	3.0 °	Site Elevation	3
		Wet in Service	No
		Roof Type	Light (0.25 kPa)
		Ceiling Type	Standard (0.15 kPa)
Member Depth	240 mm	Capacity Ratio	3.1
Member Width	112 mm	Rigidity Ratio	1.1
Residual Deflection	<1 mm	Critical Load Combination	1.2G + Su + psi_cQp
Absolute Deflection	11.2 mm	Support Reaction	4.1 kN
Uplift Restraint Required	3.9 kN		

Notes Residual deflection is long term deflection below horizontal after pre-camber, absolute deflection is maximum beam movement.

PRODUCER STATEMENT



Tasman Consulting Engineers Limited has been engaged by Prowood Limited to provide design services as used for the Prolam on-line calculator.

This producer statement covers the design of the member(s) as above for the input parameters shown utilising the Prowood products listed (substitution is not permitted). The design has been carried out using sound and widely accepted engineering principles to the requirements of AS/NZS1170:2002, NZS3603:1993 and with reference to NZS3604:2011.

I believe on reasonable grounds that the above design will meet the requirements of clause B1/VM1 of the New Zealand Building Code Documents.

David King

28 April 2021 (2.0.9)

David King

ME(civil) CMEngNZ CPEng(no 145511) IntPE(NZ)

For Tasman Consulting Engineers, PO Box 3631, Richmond, NELSON 7050

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Selection Charts

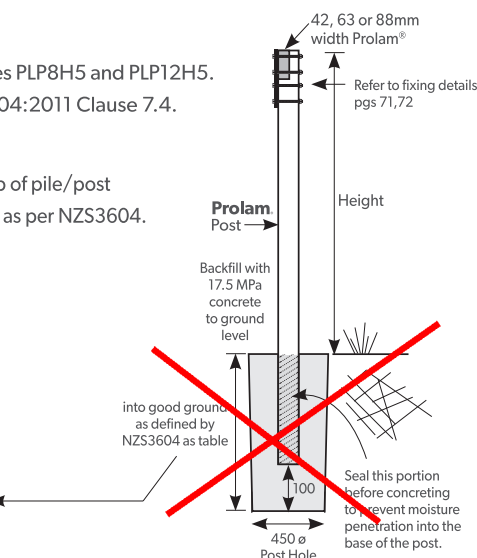
Table 14

Bracing units for Prolam® Posts. For use as Deck Piles PLP8H5 and PLP12H5. Piles supporting timber deck constructed to NZS 3604:2011 Clause 7.4.

Deck Pile Bracing Units

Prolam post height measured from top of concrete to top of pile/post
Piles rated at 120 * BU's are equivalent to an anchor pile as per NZS3604.

Prolam Post Deck Pile	Pile/Post Height (m)	Bracing Units	Bearer / pile connection	Min footing depth @ 450 dia (m)
PLP8H5-150 135x135	0.75	120 *	12 kN Kit	1.2
	1.00	53	6 kN Kit	1.1
	1.20	30	6 kN Kit	1.0
	1.50	19	6 kN Kit	1.0
	1.80	13	6 kN Kit	0.9
	2.10	10	6 kN Kit	0.9
PLP12H5-150 135x135	0.74	120 *	12 kN Kit	1.2
	1.00	63	6 kN Kit	1.2
	1.20	44	6 kN Kit	1.1
	1.50	28	6 kN Kit	1.1
	1.80	19	6 kN Kit	1.0
	2.10	14	6 kN Kit	1.0
PLP8H5-200 180x180	1.00	120 *	12 kN Kit	1.3
	1.20	95	12 kN Kit	1.2
	1.50	60	6 kN Kit	1.2
	1.80	40	6 kN Kit	1.2
	2.10	30	6 kN Kit	1.2
	2.40	24	6 kN Kit	1.2
PLP12H5-200 180x180	1.20	120 *	12 kN Kit	1.4
	1.50	89	12 kN Kit	1.4
	1.80	62	6 kN Kit	1.3
	2.10	45	6 kN Kit	1.3
	2.40	34	6 kN Kit	1.3
	2.70	27	6 kN Kit	1.3
PLP8H5-250 220x220	1.60	120 *	12 kN Kit	1.3
	1.80	95	12 kN Kit	1.3
	2.10	70	12 kN Kit	1.2
	2.40	54	6 kN Kit	1.2
	2.70	42	6 kN Kit	1.2
	3.00	34	6 kN Kit	1.2



See engineers design

PLP12H5-250 220x220	1.80	120 *	12 kN Kit	1.5
	2.10	101	12 kN Kit	1.5
	2.40	77	12 kN Kit	1.4
	2.70	61	6 kN Kit	1.4
	3.00	49	6 kN Kit	1.4
	3.30	41	6 kN Kit	1.4
	3.60	34	6 kN Kit	1.4
	3.90	29	6 kN Kit	1.4
	4.20	25	6 kN Kit	1.4
	4.50	21	6 kN Kit	1.4
PLP8H5-300 260x260	2.25	120 *	12 kN Kit	1.4
	2.40	105	12 kN Kit	1.4
	2.70	80	12 kN Kit	1.3
	3.00	65	12 kN Kit	1.3
	3.30	55	12 kN Kit	1.3
	3.60	47	12 kN Kit	1.3
	3.90	40	6 kN Kit	1.3
	4.20	34	6 kN Kit	1.3
	4.50	29	6 kN Kit	1.3
	4.80	25	6 kN Kit	1.3
PLP12H5-300 260x260	2.70	120 *	12 kN Kit	1.5
	3.00	97	12 kN Kit	1.5
	3.30	80	12 kN Kit	1.4
	3.60	67	6 kN Kit	1.4
	3.90	57	6 kN Kit	1.4
	4.20	49	6 kN Kit	1.4
	4.50	43	6 kN Kit	1.4
	4.80	38	6 kN Kit	1.4
	5.10	33	6 kN Kit	1.4
	5.40	29	6 kN Kit	1.4

These span tables apply only to Prolam products

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Selection Charts

Table 15

Bracing units for Prolam® Posts. Verandah Posts PLP8H5 and PLP12H5 Treated.

Verandah Bracing Units

Prolam Post - Height measured from top of concrete to top of Post. Confirm post/post fixing from uplift requirements. Minimum 6kN fixing for posts rated under 60 bracing units. Minimum 12kN fixings for posts rated 60 bracing units and over.

Prolam Post Verandah Posts	Post Height (m)	Bracing Units	Min post depth @ 450 dia (m)	Prolam Post Verandah Posts	Post Height (m)	Bracing Units	Min post depth @ 450 dia (m)
PLP8H5-125 112x112	1.8	10	0.9	PLP8H5-250 220x220	2.1	110	1.4
	2.1	7	0.9		2.4	85	1.4
	2.4	5	0.9		2.7	65	1.4
PLP8H5-150 135x135	1.8	21	1.2		3.0	55	1.4
	2.1	16	1.2		3.3	45	1.4
	2.4	12	1.2		3.6	35	1.4
PLP12H5-150 135x135	2.7	9	1.2	PLP12H5-250 220x220	2.1	120	1.6
	1.8	31	1.1		2.4	120	1.6
	2.1	23	1.1		2.7	110	1.6
	2.4	17	1.1		3.0	95	1.5
	2.7	13	1.0		3.3	80	1.5
	3.0	11	1.0		3.6	55	1.5
PLP8H5-200 180x180	1.8	60	1.4	PLP8H5-300 260x260	2.4	120	1.5
	2.1	50	1.4		2.7	120	1.5
	2.4	35	1.4		3.0	110	1.5
	2.7	30	1.4		3.3	85	1.5
	3.0	30	1.4		3.6	75	1.5
	3.3	15	1.4		3.9	64	1.5
PLP12H5-200 180x180	3.6	12	1.4	PLP12H5-300 260x260	2.4	120	1.6
	1.8	82	1.4		2.7	120	1.6
	2.1	72	1.4		3.0	120	1.6
	2.4	55	1.3		3.3	120	1.6
	2.7	44	1.3		3.6	108	1.6
	3.0	35	1.3		3.9	92	1.6
	3.3	29	1.2				
	3.6	24	1.2				

Footing Size:

88 x 88, 112 x 112 & 135 x 135 – 900 deep x 450 diameter } 2 / M12 Bolts - Verandah beam
180 x 180 – 1200 deep x 450 diameter } to post connection

1 kN = 20 Bu's. Linear interpolation between the bracing values given is permitted for intermediate heights

Note: Bracing units have been determined from the lateral load required to give a maximum deflection at the top of the post of $H/240$.

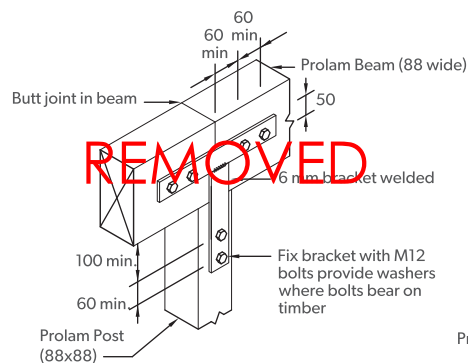
These span tables apply only to Prolam products



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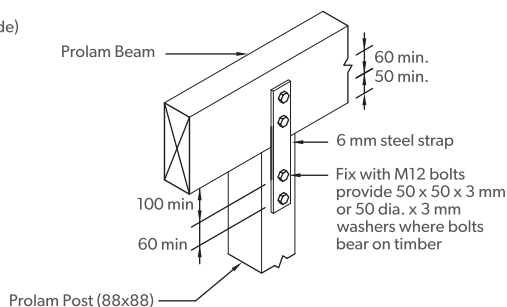
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Prolam® Post Fixings



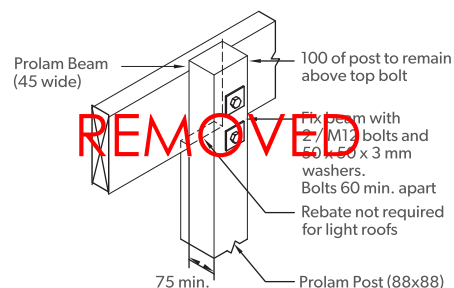
NOTE -
(1) Capacity 12.2 kN for 1 bracket.
(2) Capacity 25.5 kN for 2 brackets.

(A)



NOTE -
(1) Capacity 6.8 kN for 1 bracket.
(2) Capacity 13.7 kN for 2 brackets.

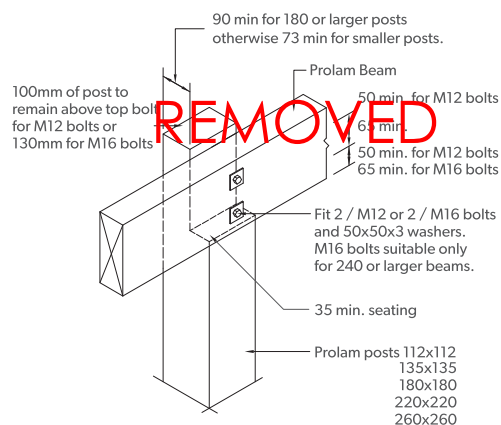
(B)



NOTE -
Capacity 6.8 kN.

(C)

Unless otherwise stated, all dimensions are in mm.



BEAM FIXING

(D)

Uplift capacity
2 / M12 bolts – 7.8 kN
2 / M16 bolts – 12.0 kN



EzyBrace® Systems

Specification and installation manual

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CBI 5113

AUGUST 2016

NATIONAL SUPPORT

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GIB® HELPLINE

0800 100 442

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

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners¹
- Encourages more even bracing distribution throughout the building.

¹ Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

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

NEW — GIBFIX® FRAMING SYSTEM

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



BRANZ Appraised
Appraisal No.928 [2016]

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SYSTEM SUMMARY

GIB EzyBrace® Systems — August 2016

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

USE ONLY THE CURRENT SPECIFICATION

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

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

PATENTS

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

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraliner®	GIB Braceline/ Noiseline®	GIB Aqualiner®	GIB Toughliner®	GIB Fyreliner®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.

Note 2 The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.

Note 3 Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.



Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

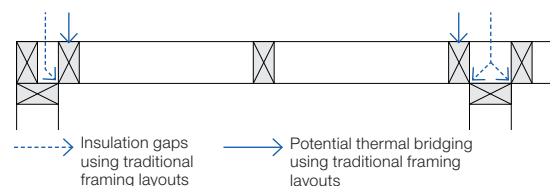
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

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

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

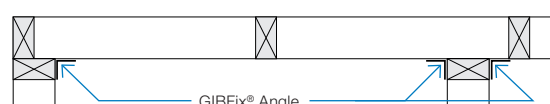
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFix® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners!
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.



Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

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

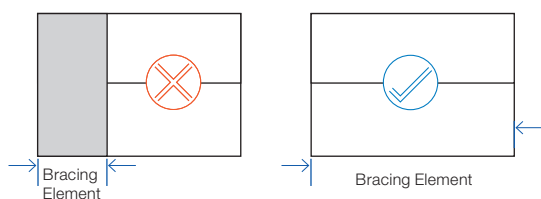


Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

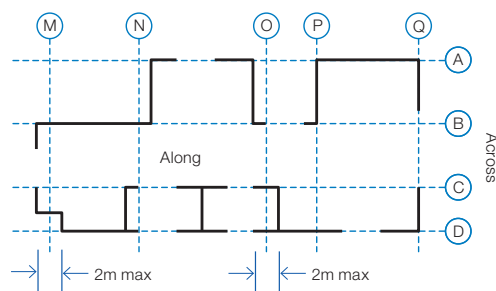
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 'rules' are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- 'N' stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)

Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.



Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum

bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check.

Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

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

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

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

193 OK 196 OK

312 OK 302 OK

157 OK 157 OK

389 OK 389 OK

449 OK 449 OK

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

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

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

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

480 OK 360 OK

300 OK 180 OK

320 OK 240 OK



Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET

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

Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.

- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW

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

GIB EzyBrace® PLUS

File Home

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

GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

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

Building Specification

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

Building Location

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

Bracing Units required for Wind

	Along	Across
Single Level	682	960

Bracing Units required for Earthquake

	Along & Across
Single Level	177



GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For further design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

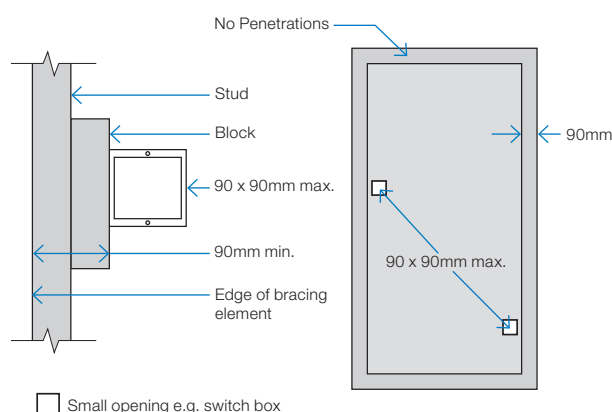
SMALL OPENINGS

Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

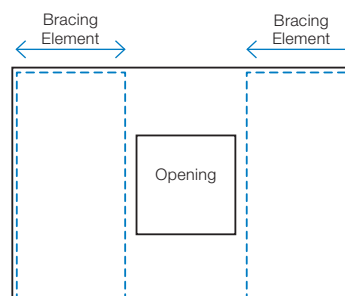
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS





Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

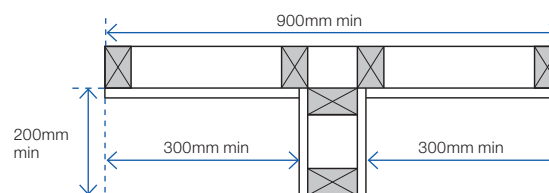
Guidelines for intersection walls

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

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

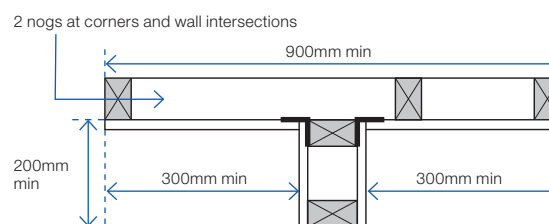
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



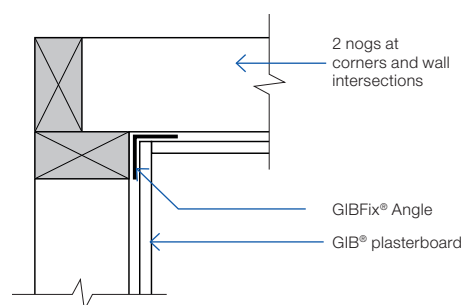
GEB002

FIGURE 13: WALL INTERSECTION (GIBFix® FRAMING SYSTEM)



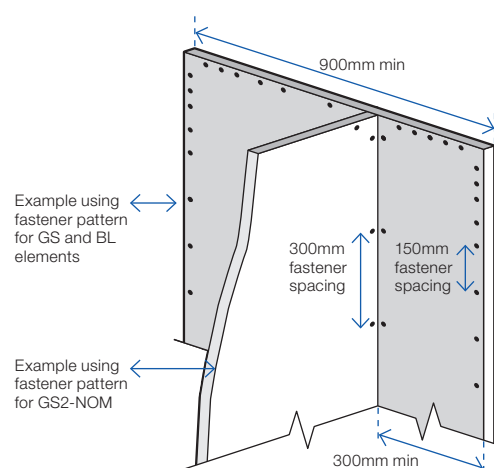
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFix® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.



Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR – EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR – INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

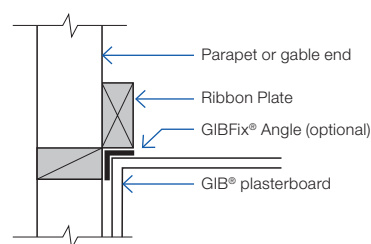
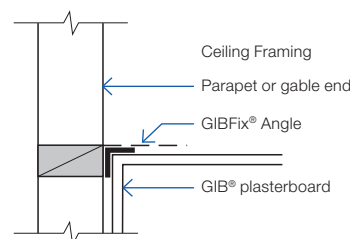


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

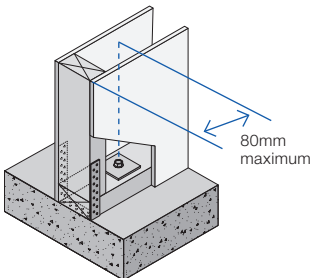
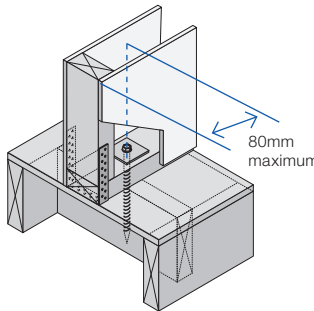
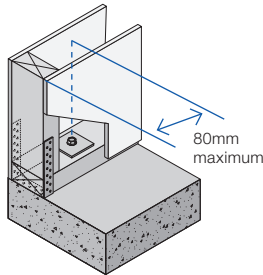
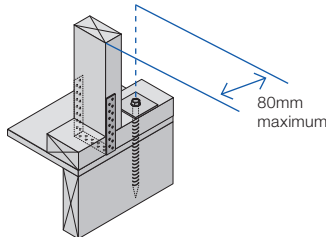
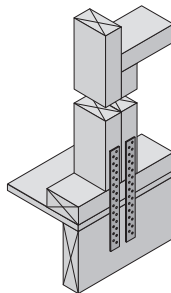
Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition:
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.



Bracing strap installation

Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and

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

Concrete floor		Timber floor	
<p>400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.</p>			
Internal wall			
			
GEB004		GEB005	
External wall			
			
GEB006		GEB007	
<p>Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.</p>		<p>2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.</p>	
			
		GEB008	
Hold-down fastener requirements			
Concrete floor		Timber floor	
<p>A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.</p>		<p>12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element</p>	

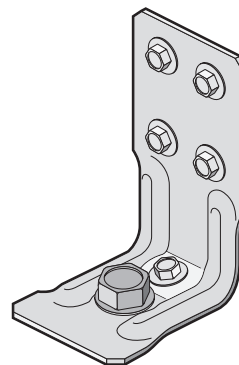


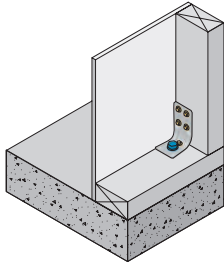
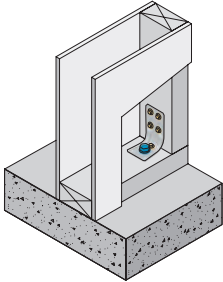
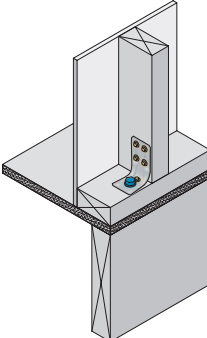
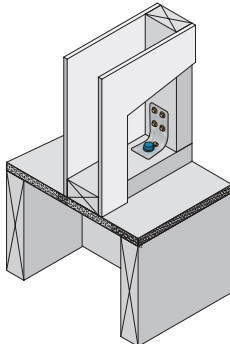
GIB HandiBrac® installation

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

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

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



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



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

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

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

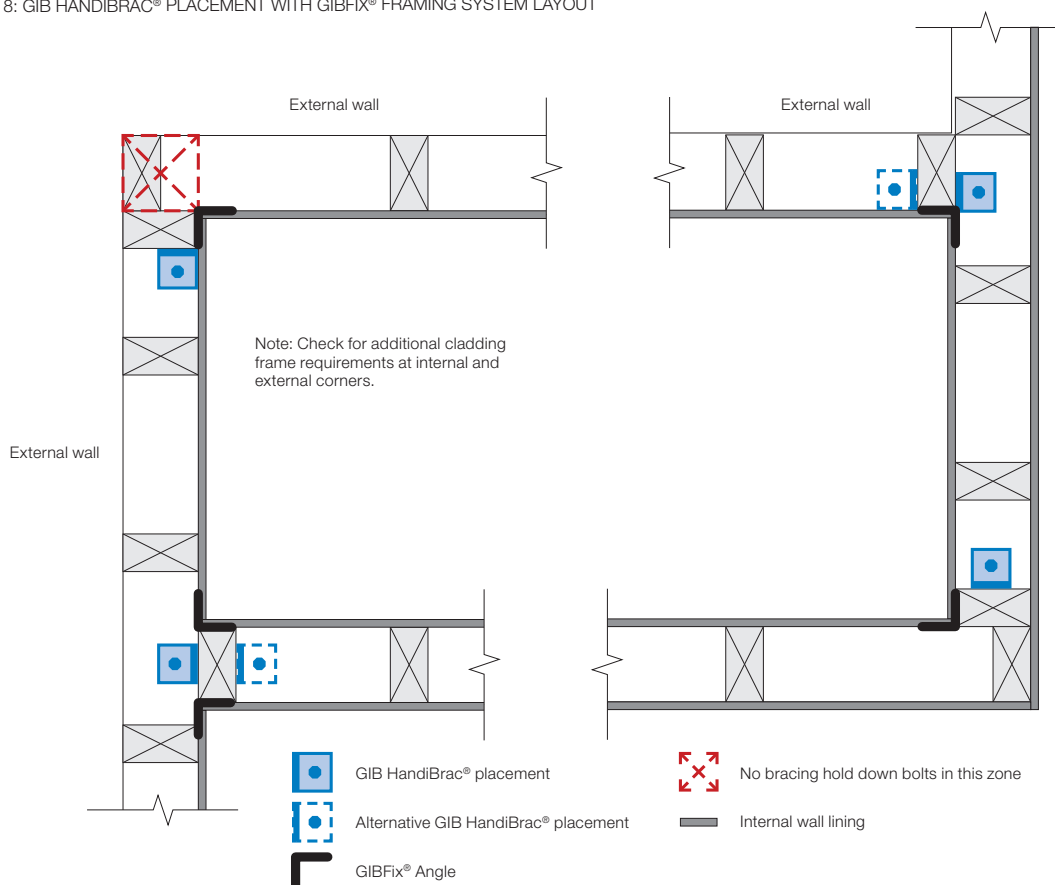
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

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

TIMBER FLOORS

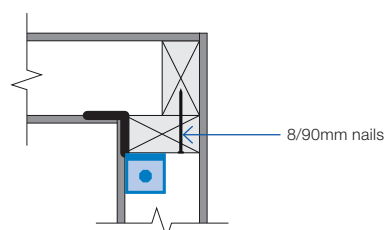
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

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



GEB013

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



GEB014



Ceiling diaphragms

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

Limitations for GIB® plasterboard ceiling diaphragms

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

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

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

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

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

FIGURE 20: PROTRUSIONS AND CUTOUTS

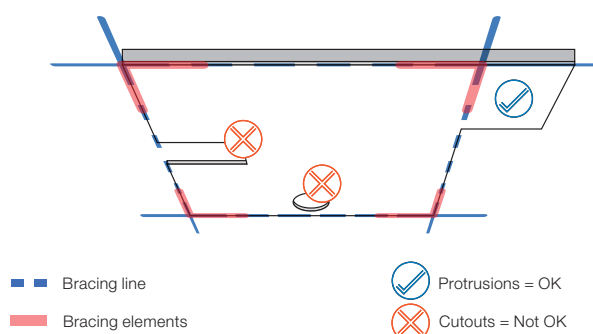


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

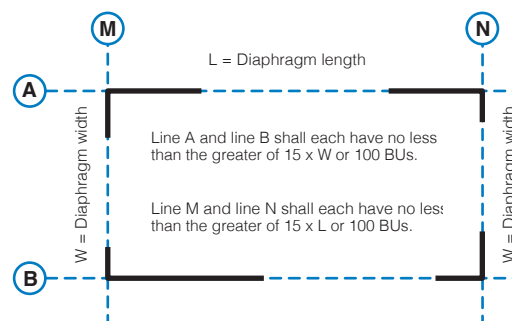


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS

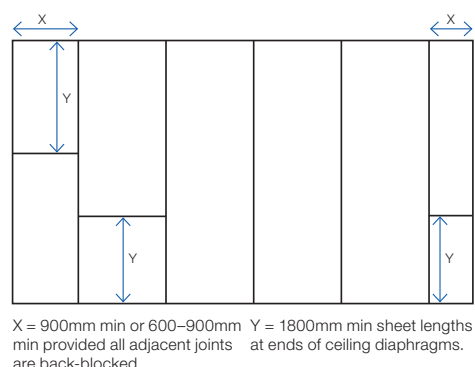
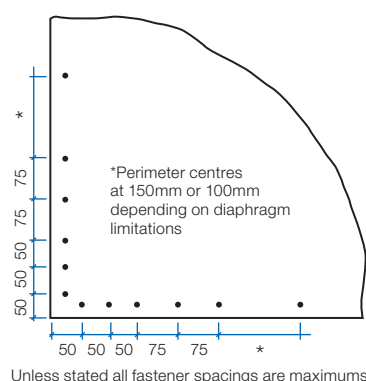


FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



GEB015



Ceiling battens in ceiling diaphragms

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

Battens shall be spaced at a maximum of:

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

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

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

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

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

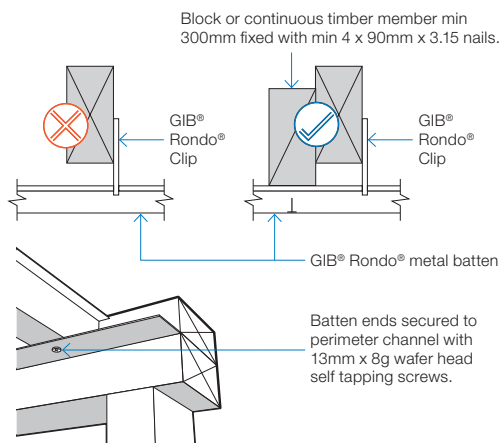
For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

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

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

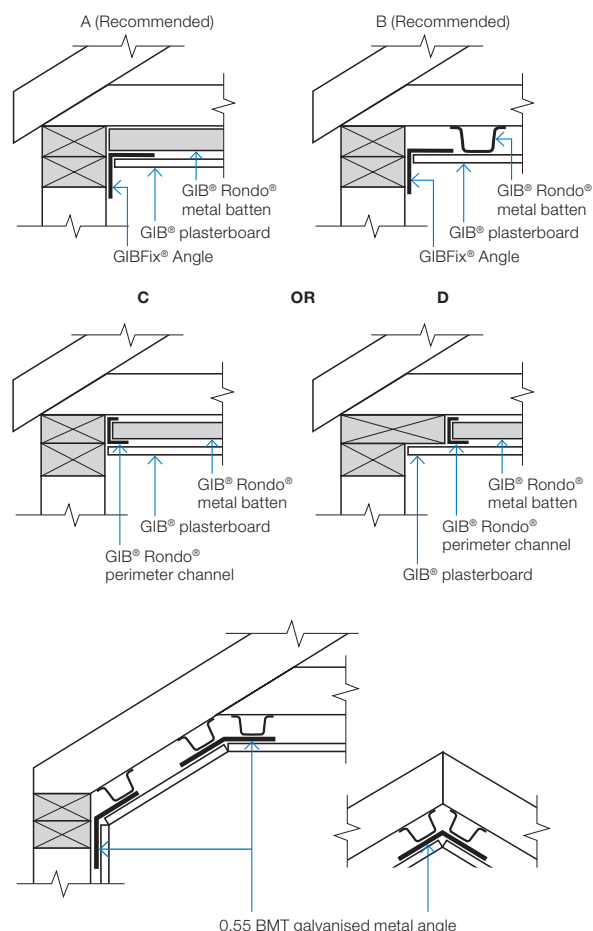
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



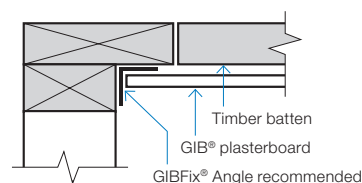
GEB016

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



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018



Openings in ceiling diaphragms

SMALL OPENINGS

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

LARGE OPENINGS

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

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

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

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

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

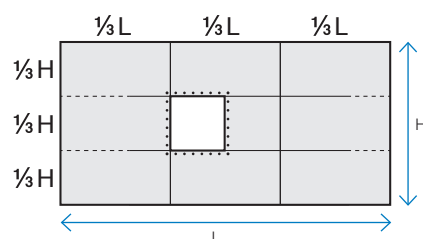
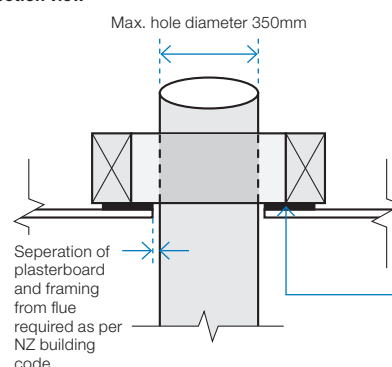


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view

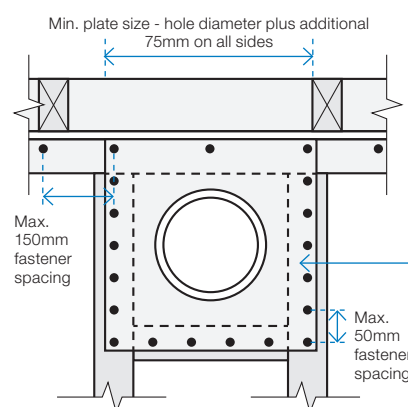


Steel plate
0.55 BMT
Galvanised sheet
Max. opening
350mm diameter.
Installed prior to
GIB® plasterboard.

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

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.

Plan view



Plasterboard ceiling not shown in plan view



Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

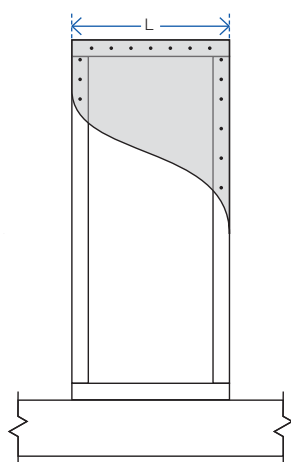
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

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

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

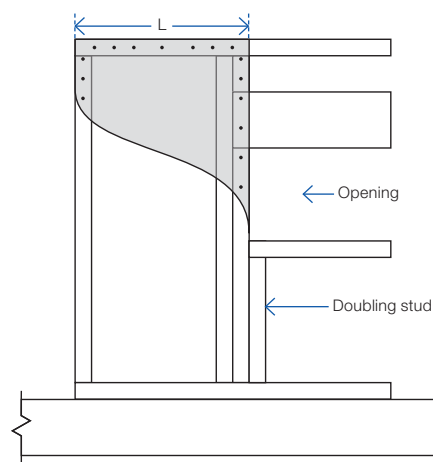
Fastener spacings and diagram scales shown in Figures 29-32 are indicative only. Refer to p.23-30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



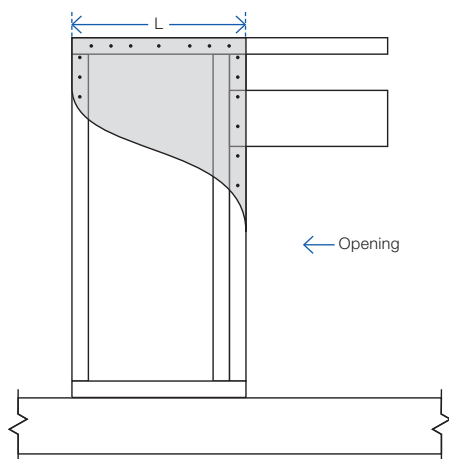
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



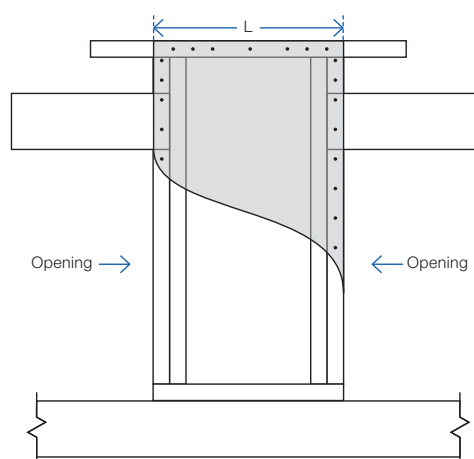
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



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

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



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



Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

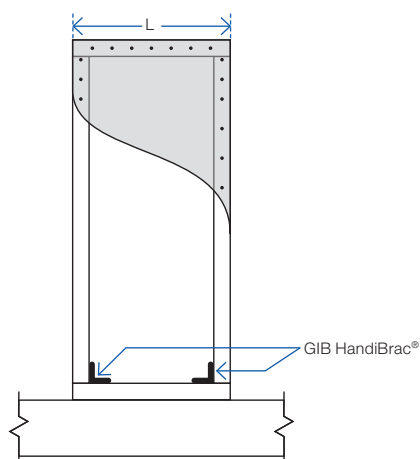
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34–36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB Handibrac® bolt.

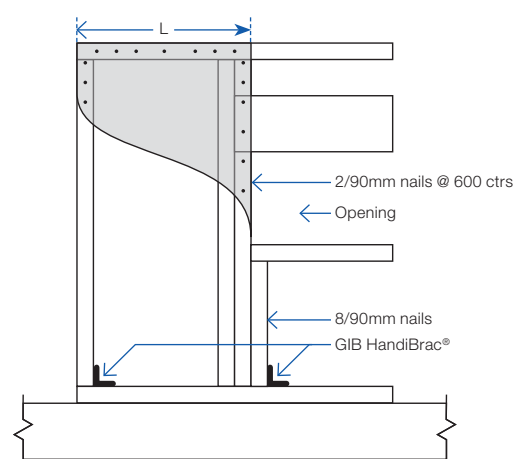
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



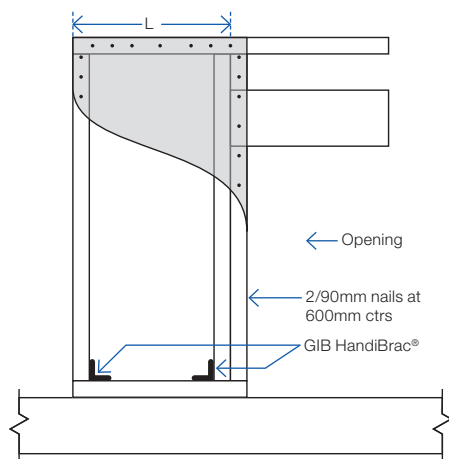
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



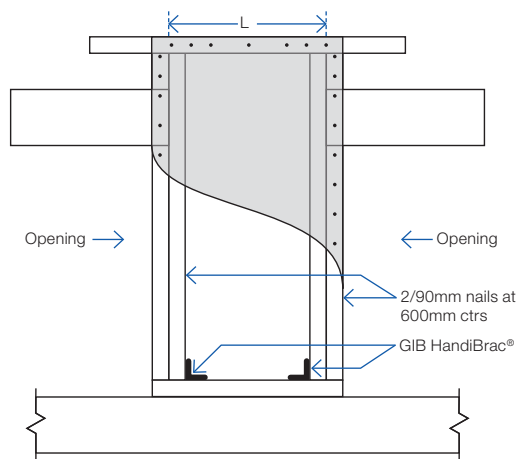
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

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

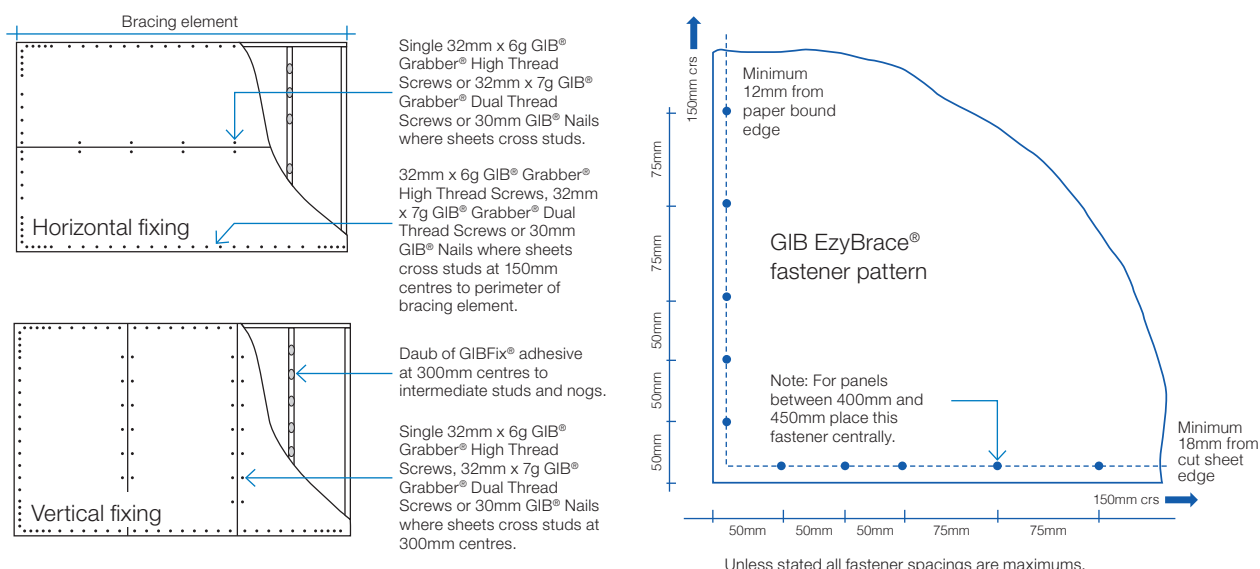
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

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.



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



GIB EzyBrace® Systems specification GS2-NOM

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

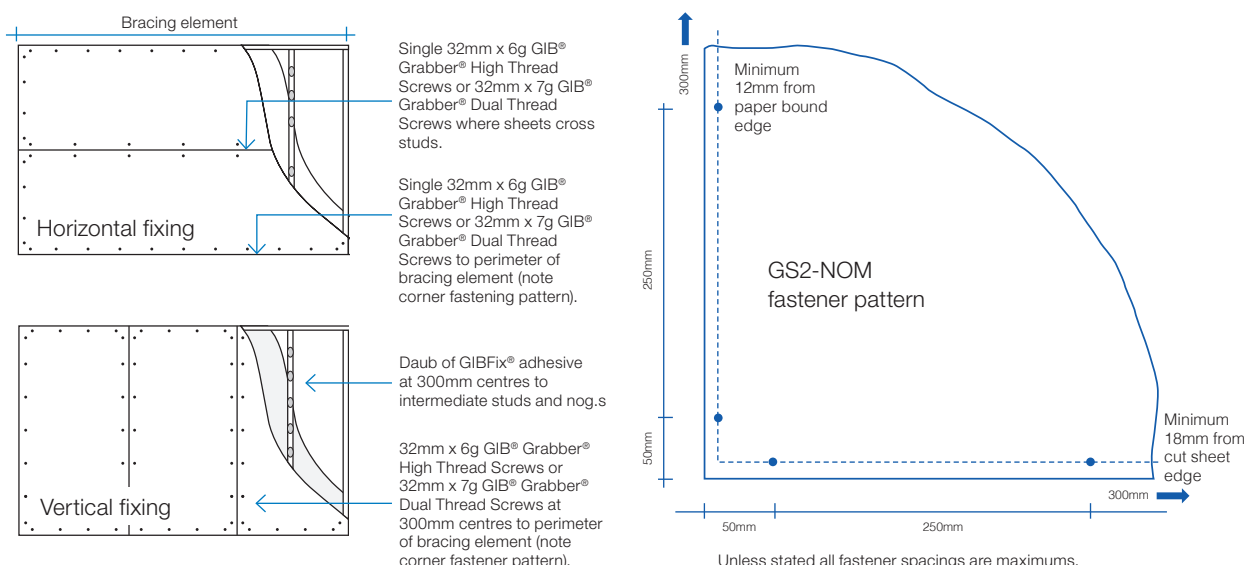
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

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

JOINTING

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



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



GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

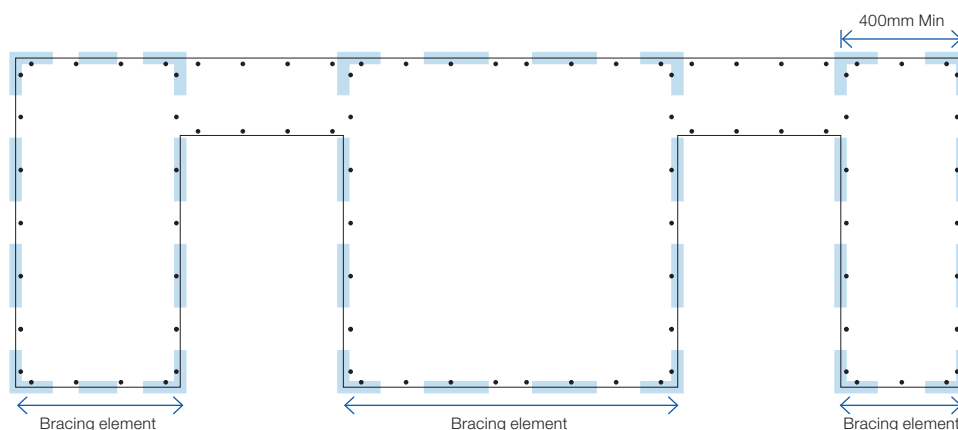
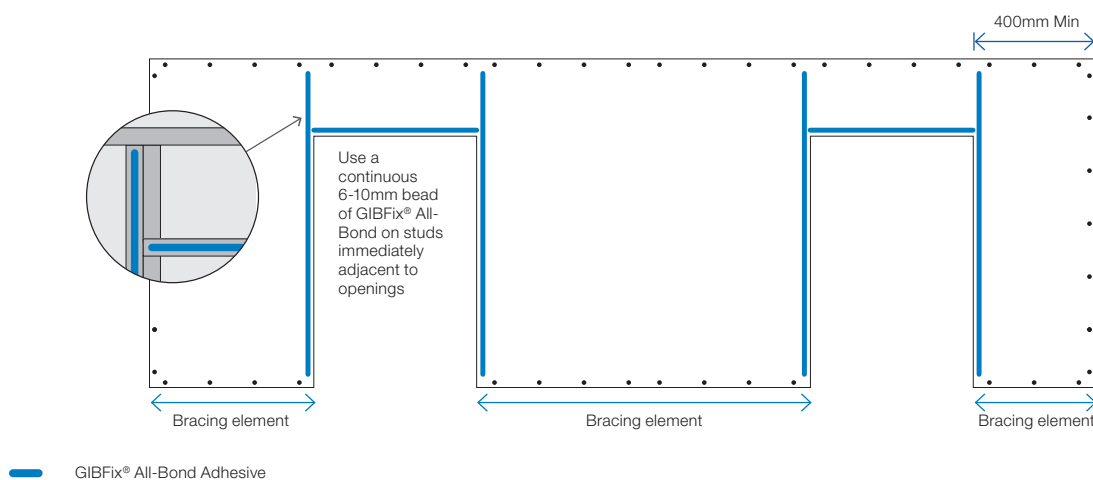
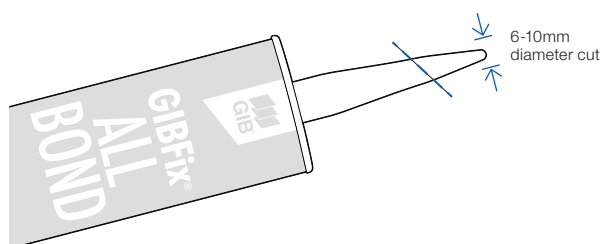


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE





GIB EzyBrace® Systems specification GS2-N

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber Floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

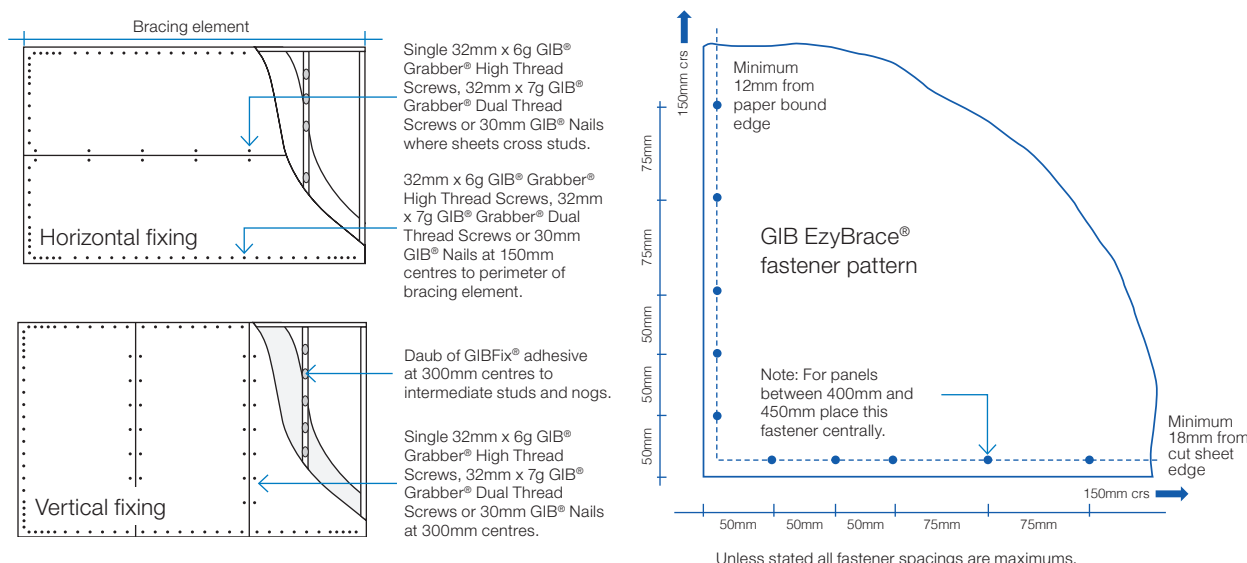
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

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

JOINTING

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



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



GIB EzyBrace® Systems specification GSP-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

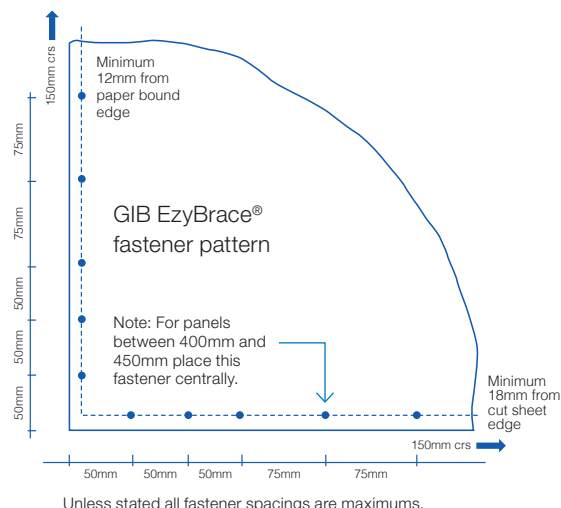
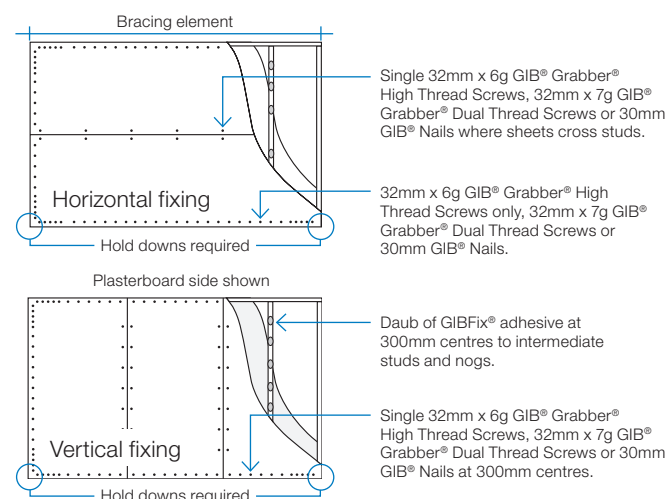
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

Fastener centres

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

JOINTING

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



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



GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

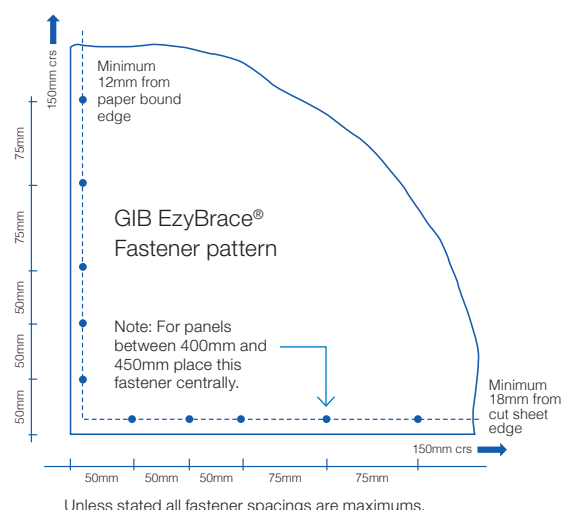
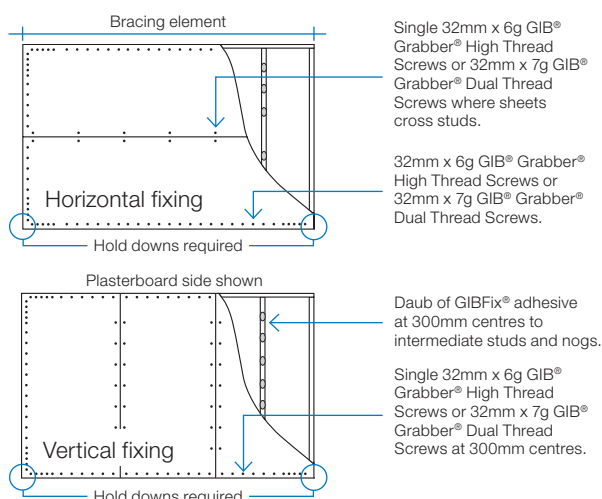
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

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

JOINTING

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



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



GIB EzyBrace® Systems specification BLG-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

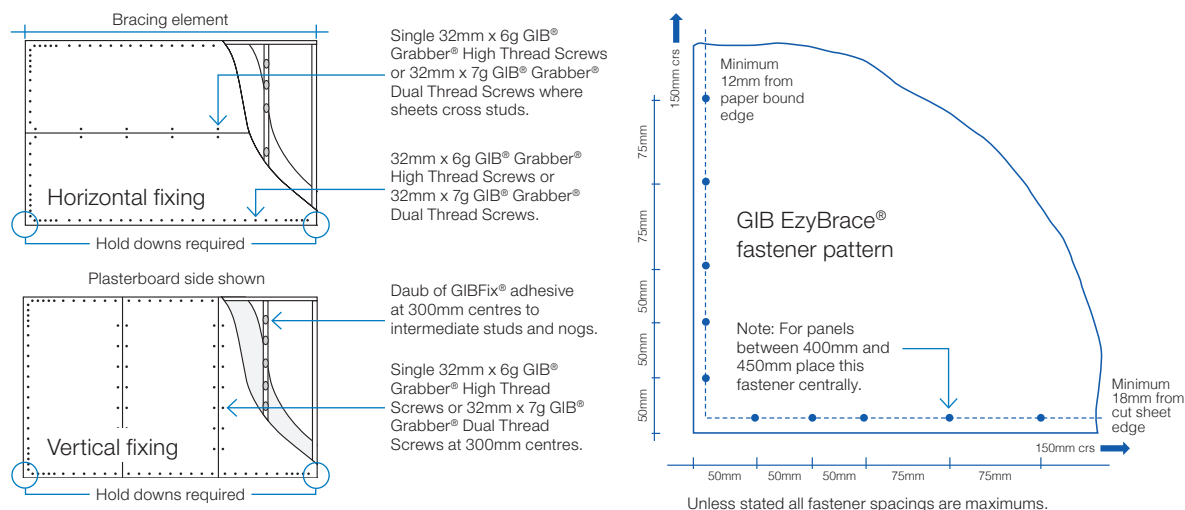
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

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

JOINTING

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



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



GIB EzyBrace® Systems specification BLP-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

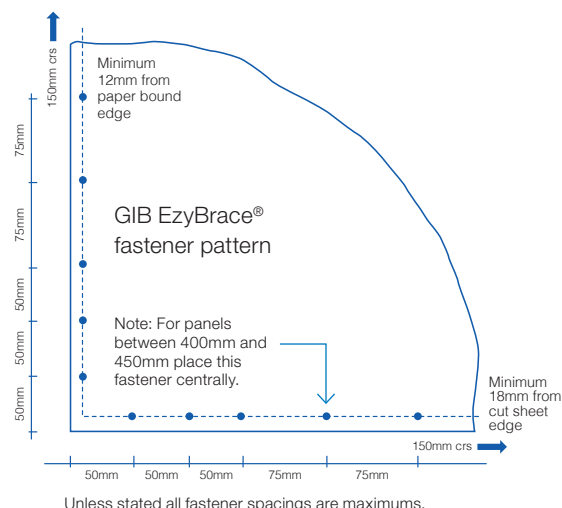
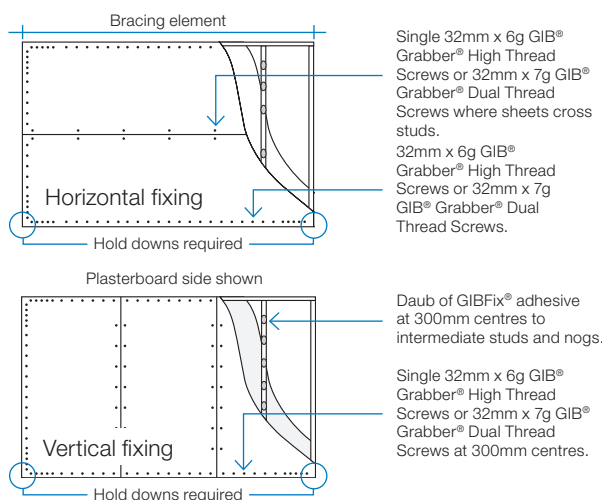
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread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

Fastener centres

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

JOINTING

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



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



Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERT}™

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

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

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

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

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

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

TRADEMARKS

The names GIB®, GIB Fyrelime®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyrelime®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

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



FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

Section 4

H1 Calculations

Risk Matrix on page 301 and 302

BRANZ NZS 4218:2009 Schedule Method Compliance Summary



Refer to NZS 4218:2009 for the full requirements, definitions, and measurement details

Date

Address

Designer

Climate Zone ☐ Zone 1 ☐ Zone 2 ☒ Zone 3

Wall Construction Type

☒ Any wall type (Table 2)

☐ Solid Timber (Table 3)

☐ High Thermal Mass (Table 4)

☐ Mix of wall constructions above (Clause 4.1.5)

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Measured Areas	m ²
Total Vertical Glazing area	53.37m ²
Total Wall Area (includes glazing and doors)	220.44m ²
Total E, S, W Glazing area	47.18m ²
Total E, S, W Wall area	179.13m ²
Total Skylight area	N/A
Total Roof Area (includes skylights). Not required if no skylights	N/A

Eligibility (if any No, ineligible for Schedule method)	Calculation	
%Total Vertical Glazing area ÷ Total Wall Area ≤30%	24.2% YES	Yes / No
%Total E, S, W Window area ÷ Total E, S, W Wall Area ≤30%	26.3% YES	Yes / No
Total Skylight area ≤1.5 m ² or 1.5% of total roof area	N/A	Yes/ No /NA
Area of decorative glazing and louvres ≤3m ²	N/A	Yes/ No /NA

NOTES:

- Record the relevant information for each building element in the following table
- For elements with two or more details (e.g. different framing spacing, cladding type, insulation etc) record on separate rows
- Specify the insulation product including type, brand, product name and nominal thickness
- Reference the source for each construction R-value (e.g. the relevant page from the House Insulation Guide, BRANZ Appraisal)
- For glazing R-values refer to Appendix C of NZS 4218:2009
- Supply copies of any relevant product specifications or literature
- If any heated floor, wall, ceiling then higher R-values are required. See Table 1

Section 5

Specifications

Bespoke Architecture

SPECIFICATION

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

GRAEME RESIDENCE

Project Specification

29 PEGASUS MAIN STREET, PEGASUS, CHRISTCHURCH, New Zealand

Project Ref: J19341

Printed: 27 July 2021



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

masterspec

Specification built using Masterspec software
Project ID: 226191 - 223893

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masterspec

Verified spec ID: **236262-223893**

This specification has been produced using Masterspec software and completed on 27/07/2021.
Scan to verify or go to masterspec.co.nz/verify

1220 PROJECT

1 GENERAL

This general section describes the project including:

- A description of the work
- Design construction safety
- Principal's Health & Safety matters
- Site description, features and restrictions
- Design parameters for design by contractor
- Archaeological discovery

1.1 READ ALL SECTIONS TOGETHER

Read all general sections together with all other sections.

1.2 DESCRIPTION OF THE WORK

Single storey residential dwelling with attached triple garaging.

1.3 RESTRICTED BUILDING WORK

This project includes Restricted Building Work.

Design Construction Safety

1.4 DESIGN CONSTRUCTION SAFETY

The project designers are unaware of unusual or atypical features, which a reasonably experienced contractor may not be aware of, that may present a hazard or risk during a typical construction process. The Contractor is still required to undertake its own assessment, to determine if they consider there are any further safety matters and provide for these in carrying out the construction of the work.

1.5 PRINCIPAL'S SITE HEALTH AND SAFETY PLAN

Obtain a copy of the principal's site health and safety plan.

Site

1.6 SITE

The site consists of: Site is an empty site with power & water & telecom connection from right of section from the street
As shown on drawing: Site plan (sheet 101)

1.7 LEGAL DESCRIPTION

The site of the works, the street address and the legal description are shown on the drawings.

1.8 SITE FEATURES

Rural site with moderate contours falling to flood prone area to south-east of site. Existing formed driveway off creamery road.

Site environment - Durability

1.9 EXPOSURE ZONE

The exposure zone is to [NZS 3604](#), Section 4 Durability, 4.2 Exposure zones and [NZBC E2/AS1](#).
The site zone is: C

Site environment - Wind

1.10 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN

The design wind pressures are to [NZS 3604](#), Table 5.4 Determination of wind zone, up to and including Extra High Wind Zone.
Building wind zone High (refer to [NZS 3604](#), table 5.4)

Site environment - Seismic

1.11 EARTHQUAKE ZONE - NON SPECIFIC DESIGN

The zone is to [NZS 3604](#), Section 5 Bracing design, 5.3 Earthquake bracing demand.
The earthquake zone 2
is:

Archaeological discovery

1.12 REPORT FINDING ANY ANTIQUITIES AND ITEMS OF VALUE

Report the finding of any fossils, antiquities and other items of value, to the Contract Administrator.
All to remain undisturbed until approval is given for removal.

Pre-1900, items or evidence of human activity on the site, come under the [Heritage New Zealand Pouhere Taonga Act 2014](#). If such items or evidence is discovered work must stop immediately and the Contract Administrator must be notified immediately. The site may be classified as an Archaeological Site under the Act, and the Contract Administrator or Owner must contact the Heritage New Zealand for authority to proceed.

Post-1900 items remain the property of the owner, pre-1900 items may remain the property of the owner or the Crown subject to what is found.

1232 INTERPRETATION & DEFINITIONS

1 GENERAL

This general section relates to definitions and interpretation that are used in this specification.

Definitions

1.1 DEFINITIONS

Hold point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may not proceed on that particular part until the contract administrator and any other nominated person has advised that work can continue. A notice period of 2 Working Days is required unless stated otherwise.
Notification point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may continue and the contract administrator and any other nominated person may choose whether or not they wish to witness the particular work being carried out. A notice period of 2 Working Days is required unless stated otherwise.
Product:	A thing or substance produced by natural process or manufacture.
Proprietary:	Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
Provide and fix:	"Provide" or "fix" or "supply" or "fix" if used separately mean provide and fix unless explicitly stated otherwise.
Required:	Required by the documents, the New Zealand Building Code or by a statutory authority.
Review:	Review by the contract administrator and other consultants is for general compliance only. Review does not remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Neither can the review be construed as authorising departures from the contract documents.
Working day:	Working day means a calendar day other than any Saturday, Sunday, public holiday or any day falling within the period from 24 December to 5 January, both days inclusive, irrespective of the days on which work is actually carried out.
Workplace:	Workplace means the place where work is being carried out, or is customarily carried out, for a business or undertaking including any place where a worker goes, or is likely to be, while at work (under Health and Safety at Work Act 2015).

1.2 PERSONNEL

Principal:	The person defined as "Principal" in the conditions of contract.
Contractor:	The person contracted by the principal to carry out the contract.
Contract administrator:	The person appointed by the principal to administer the contract on the principal's behalf. Where no person has been appointed by the principal, it means the principal or the principal's representative.

1.3 ABBREVIATIONS

The following abbreviations are used throughout the specification:

AAMA	American Architectural Manufacturers Association
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
ASTM	American Society for Testing and Materials
AWCINZ	Association of Wall and Ceiling Industries of New Zealand Inc.
BCA	Building Consent Authority
BRANZ	Building Research Association of New Zealand
BS	British Standard
COP	Code of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
HERA	Heavy Engineering Research Association
LBP	Licensed Building Practitioner
MBIE	Ministry of Business, Innovation and Employment
MPNZA	Master Painters New Zealand Association Inc
NZBC	New Zealand Building Code
NZS	New Zealand Standard
NZS/AS	Joint New Zealand/Australian Standard
NZTA	New Zealand Transport Agency
NUO	Network Utility Operator
OSH	Occupational Safety and Health
PCBU	Person Conducting a Business or Undertaking (under Health and Safety at Work Act 2015)
RBW	Restricted Building Work
SARNZ	Scaffolding and Rigging New Zealand Inc
SED	Specific Engineering Design
TA	Territorial Authority
TNZ	Transit New Zealand (Transit New Zealand is now New Zealand Transport Agency NZTA - some specifications are still prefixed TNZ)

1.4 DEFINED WORDS

Words defined in the conditions of contract, New Zealand Standards, or other reference documents, to have the same interpretation and meaning when used in their lower case, title case or upper case form in the specification text.

1.5 WORDS IMPORTING PLURAL AND SINGULAR

Where the context requires, words importing singular only, also include plural and vice versa.

1232S1 EXPLANATION OF SCHEDULE SECTIONS

1 GENERAL

This general section provides an explanation of schedule sections and their relationship to general sections and work sections. Specific schedule sections contained within this specification are also identified.

1.1 EXPLANATION OF SCHEDULE SECTIONS

A schedule section identifies work sections that contain common requirements, as identified in the title of the schedule section. For example 1235S1 SCHEDULE OF SHOP DRAWINGS identifies work sections that have requirements for shop drawings. Details of the requirements are contained in the identified work sections with additional requirements contained in the general section 1235 SHOP DRAWINGS.

Some schedule sections are identified by the 4 digit CBI (Co-ordinated Building Information) number of the general section that they relate to, followed by the letter "S" followed by a numeral (1-9). The numeral allows for multiple schedule sections to be associated with the same general section.

Other schedule sections that do not share a common CBI number with a general section, have their own unique 4 digit CBI number, followed by the letter "S" followed by a numeral. These schedule sections contain additional subject content relating to the schedules and the identified work sections.

1.2 SCHEDULE SECTIONS

The following Schedule sections are contained within the specification:

- 1270S1 Schedule of Samples & Prototypes
- 1270S2 Schedule of Spares & Maintenance Products

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	Structural design actions - Wind loads
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 NZ	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe NZ	Good Practice Guidelines - Excavation Safety
WorkSafe NZ	Scaffolding in New Zealand - Good Practice Guidelines

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

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
- 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

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

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

1.1 SCHEDULE SECTION

Refer to 1270S1 SCHEDULE OF SAMPLES & PROTOTYPES for work sections contained in this specification that have requirements for samples and prototypes.

Refer to 1270S2 SCHEDULE OF SPARES & MAINTENANCE PRODUCTS for work sections contained in this specification that have requirements for spares and maintenance products.

Quality control and assurance

1.2 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.

1.3 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.

1.4 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

1.5 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.

1.6 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.

1.7 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.

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.

1.8 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.

1.9 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.

1.10 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.

1.11 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.

1.12 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.

1.13 SMOKE FREE REQUIREMENTS

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

1.14 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.

Set-out and tolerances

1.15 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.

1.16 DATUM

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

1.17 SET-OUT

Set out the work to conform with the drawings.

1.18 USE OF SET-OUT INSTRUMENTS

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

1.19 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.

1.20 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.

Execution

1.21 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.

1.22 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.

1.23 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.

1.24 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.

1.25 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.

1.26 MINIMISE DELAYS DUE TO WEATHER

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

Defective or damaged work

1.27 DEFECTIVE OR DAMAGED WORK

Repair defective, damaged and marked elements, or replace them where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Refer to individual work sections for any special requirements.

Hot work - fire safety

1.28 HOT WORK

Generally, to [NZS 4781](#) Code of Practice for Safety in Welding and Cutting, includes but not limited to: Welding; flame cutting; disc cutting; grinding; bitumen blowers; blow lamps; brazing; burning off; soldering; use of hot air guns.

Note - where the standard refers to the use of asbestos, alternative fire-resistant materials are to be used.

1.29 COMBUSTIBLE MATERIAL

Manage fire risk to adjacent combustible materials by isolating hot work at a safe distance away, or store combustible materials away from fire hazards. Additional precautions may be necessary if combustible material cannot be separated from hot work, refer to [NZS 4781](#), 6.1.4.

1.30 HOT WORK PERMIT

A hot work permit, issued by the main contractor, is required when it is not possible to isolate hot work from adjacent fire hazards. Refer to example in [NZS 4781](#), Appendix A.

1.31 FIRE SYSTEMS

Fire systems should remain operational where possible while welding or cutting work is performed. Where required, shield fire systems to [NZS 4781](#) clause 6.4.

1.32 DURING SUSPENDED WORK

Maintain a fire watch at least 30-minutes after hot works are suspended e.g. during lunch breaks or overnight, to [NZS 4781](#), clause 6.2.7.

For hot works in confined spaces, prevent potential ignition of flammable gases, to [NZS 4781](#) clause 6.5.

Qualifications

1.33 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.

1.34 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.

1.35 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.

1.36 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.

1.37 QUALIFICATIONS WORKERS – INDUSTRY QUALIFICATION REQUIREMENTS

Where workers and / or supervisors of work are required to be trained / licensed / certified or similar under industry rules or contractual requirements, they must have a current qualification before they start the work and maintain currency until their part of the work has been completed. Refer to individual work sections for details.

1.38 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.

1.39 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

1.40 NEW PRODUCTS

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

1.41 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.

1.42 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.

1.43 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.

1.44 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.

1.45 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.

1.46 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.47 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

1.48 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.

1.49 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.

1.50 OTHER SAMPLE REQUIREMENTS

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

Prototypes

1.51 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.

1.52 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.

1.53 PROTOTYPES - GENERAL

Refer to the 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

1.54 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

1.55 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.

1.56 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

1.57 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.

Completion

1.58 SPECIAL REQUIREMENTS

Refer to individual work sections for any special completion requirements.

1.59 LEAVE WORK

Leave work to the standard required for the following procedures.

1.60 COMPLETION - TESTS & CERTIFICATION

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

1.61 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.

1.62 COMPLETE ALL SERVICES

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

1.63 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.
- Clean out service ducts and accessible concealed spaces.
- Clean out all gutters and rainwater heads.
- 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 scrapers that may damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings.
- Clean out the interior of all cabinetry.
- Wash down external concrete including driveways and concrete masonry. Take care when waterblasting to not cause damage to the surface or allow water to enter the building.
- Remove rubbish and building material from the area immediately adjacent to the contract works.

1.64 CLEANING BY COMMERCIAL CLEANER

In addition to cleaning carried out by the contractor, use a commercial cleaning company to clean the whole of the interior of the building, including all appliances, equipment, fittings, surfaces and finishes to leave it without any blemish. Cleaning to include:

- Clean and wash down all external surfaces to remove dirt, debris and marking.
- Clean all interior surfaces including cabinetwork, joinery, sanitary and hardware items.
- Clean all floor finishes.
- Clean and polish all glass, both sides. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal scrapers that may damage the glass.

Commissioning

1.65 SPECIAL REQUIREMENTS

Refer to individual work sections for any special commissioning requirements.

1.66 MOVING PARTS

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

1.67 COMMISSIONING - TESTS & CERTIFICATION

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

1.68 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.

1.69 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

1.70 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.

Defects period submissions

1.71 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

1.72 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.

1270S1 SCHEDULE OF SAMPLES & PROTOTYPES

1 GENERAL

This schedule section identifies work sections in the specification that have requirements for:

- The submission of samples
- The submission of prototypes for review
- The provision and testing of prototypes

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1270 CONSTRUCTION
- Identified Work Sections

Samples

1.2 SAMPLES

There are no work section requirements.

1.3 SAMPLES - ADDITIONAL ITEMS

Refer to separate documentation for sample requirements not contained within this specification.

Prototypes

1.4 PROTOTYPES - REVIEW

There are no work section requirements.

1.5 PROTOTYPES - TESTING

There are no work section requirements.

1.6 PROTOTYPES - ADDITIONAL ITEMS

Refer to separate documentation for prototype requirements not contained within this specification.

1270S2 SCHEDULE OF SPARES & MAINTENANCE PRODUCTS

1 GENERAL

This schedule section identifies work sections in the specification that have requirements for spares and maintenance products.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1270 CONSTRUCTION
- Identified Work Sections

Spares & maintenance products

1.2 SPARES & MAINTENANCE PRODUCTS

There are no work section requirements.

1.3 SPARES & MAINTENANCE PRODUCTS - ADDITIONAL ITEMS

Refer to separate documentation for sample requirements not contained within this specification.

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

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 NZ](#) [Good Practice Guidelines - Excavation Safety](#)

1.2 SITE SAFETY

Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

1.3 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.

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 NZ](#), [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 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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 1604.4	Specification for preservative treatment - Laminated veneer lumber (LVL)
AS/NZS 1604.5	Specification for preservative treatment - Glue laminated timber products
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 1604.5, 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's design properties.

Treatment to NZS 3640 and AS/NZS 1604.4.

2.4 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.

2.5 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL

H3.1 or H3.2 Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Temporary fix battens before being fixed into the framing with the cladding fixings.

To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

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 SCREWS

Wood screws to the requirements of NZS 3604, 2.4 Fastenings and Fabrication, and section 4, **Durability**, and of the type, number and form required for each screw application to NZS 3604, sections 6 - 10.

2.9 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.

2.10 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.

2.11 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.

2.12 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).

2.13 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

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, noggs, 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 WALLS

Frame to required loading and bracing complete with lintels, sills and noggs, all fabricated and fastened to [NZS 3604](#), section 8, **Walls**.

3.7 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**.

3.8 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**.

3.9 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.10 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.11 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

4161T THERMAKRAFT UNDERLAYS, FOILS, DPC, DPM, & TAPES

1 GENERAL

This section relates to the application of **Thermakraft Ltd**, DPC, DPM, Wall & Roof Underlays, Foils, Flashing Tapes, 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:

NZMRM New Zealand Metal Roofing Manufacturers Inc.

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

1.2 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 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:

Thermakraft product manual and technical data sheets.

BRANZ Appraisal 329 - Supercourse 500™ Damp-Proof Course and Concealed Flashing

BRANZ Appraisal 611 - James Hardie Rigid Air Barriers

BRANZ Appraisal 651 - Thermakraft Covertex™ 407 Roof and Wall Underlay

BRANZ Appraisal 695 - Watertight Plus™ Wall Underlay

BRANZ Appraisal 743 - Thermakraft Covertex 405™ Roof and Wall Underlay

BRANZ Appraisal 878 - Thermakraft Aluband™ Window Flashing Tape

BRANZ Appraisal 912 - Thermakraft 220™ Synthetic Wall Underlay

BRANZ Appraisal 917 - Thermakraft Covertex 403™ Roof and Wall Underlay

BRANZ Appraisal 942 - OneSeal™ Multi-Fit Pipe and Cable Penetration Seals

BRANZ Appraisal 943 - Thermakraft Covertex 401™ Roof Underlay

BRANZ Appraisal 962 - The Thermakraft One Wrap System™

BRANZ Appraisal 1000 - Thermakraft Thermabar 397™ Light Diffusing Reflective Underlay

BRANZ Appraisal 1029 - Thermakraft Ausnet™ Hexagonal Wire Mesh

BRANZ Appraisal 1104 - Thermaflex Orange™ Concrete Underlay

BRANZ Appraisal 1122 - Thermaflash™ Flashing Tape

Code Mark Certificate 30069 - Thermakraft Covertex 403™ Absorbent Breathable Roof Underlay

Code Mark Certificate 30030 - Thermakraft Covertex 405™ Absorbent Breathable Roof Underlay

Code Mark Certificate 30028 - Thermakraft Covertex 407™ Absorbent Breathable Roof Underlay

Code Mark Certificate 1002 - Thermakraft Watertight Plus™ Wall Underlay

Manufacturer/supplier contact details

Company: Thermakraft Ltd

Web: www.thermakraft.co.nz

Email: info@thermakraft.co.nz

Telephone: 0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Ltd warrant performance of products if design and installation comply with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft™ Product Warranty available on request.

Requirements

1.5 INSTALLATION SKILL LEVELS

Installers to be experienced in the installation of Thermakraft™ products and familiar with Thermakraft™ technical literature and the related documents listed in this design i.e. [NZMRM CoP](#) NZ Metal Roof and Wall Cladding Code of Practice.

1.6 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.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified materials, or associated products, components or accessories.

Compliance information

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Applicators approval certificate from the manufacturer / importer / distributor
- Manufacturer / supplier warranty
- Installer / applicator warranty
- Producer Statement - Construction from the applicator / installer
- Producer Statement - Construction Review from an acceptable suitably qualified person
- Other information required by the BCA in the Building Consent Approval documents.

Quality control and assurance

2 PRODUCTS

Materials

Damp Proof Course

2.1 SUPERCOURSE 500™ DPC

Supercourse 500™, high-impact polyethylene film to [AS/NZS 2904](#) and embossed on both sides. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings around doors and windows and to [BRANZ Appraisal 329](#). Refer to SELECTIONS for type of joining tape.

Damp Proof Membrane

2.2 THERMATHENE BLACK™ DPM (MEDIUM DUTY)

Thermathene Black™, a minimum of 250 microns polyethylene film. Complies with [NZS 3604](#), 7.5.4, Damp-proof membrane, to [NZBC E2/AS1](#). Refer to SELECTIONS for type of joining tape.

Roof underlays

Roof underlays - bituminous, self-supporting

2.3 THERMAKRAFT 215™ BITUMINOUS ROOF UNDERLAY

Thermakraft 215™, bituminous self-supporting roof underlay to [NZS 2295](#).

Joining tape

2.4 WHITE GENERAL PURPOSE TAPE™

Thermakraft White General Purpose Tape™ is a medium duty acrylic tape is commonly used on synthetic underlays, damp proof and for sealing edges of vapour control layers. NOT to be used as a flashing tape. Suitable for joining and sealing underlays, foils and membranes.

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 GENERAL REQUIREMENTS

Design application and installation of Thermakraft Building products to [NZBC E2/AS1](#), BRANZ Appraisals, Thermakraft Technical Literature and Industry Codes of Practice.

Application generally

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Application DPC

3.5 DPC TO LOSP/CCA TREATED TIMBER

Lay Supercourse 500™ DPC under LOSP or CCA treated bottom plate of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.6 DPC TO TIMBER / STEEL

Lay Supercourse 500™ under the bottom plate of all timber / steel framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.
Refer to SELECTIONS for type.

3.7 DPC TO MASONRY AND BRICK VENEER

Lay Supercourse 500™ along based of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

Application - DPM

3.8 DPM TO CONCRETE FLOOR

Lay DPM under concrete floor substrate over sand blinding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier. Tape all joints and penetrations with Thermakraft™ White General Purpose Tape™ 60mm.

Application - roof underlay

3.9 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixings. Lay underlay to avoid excessive dishing between purlins. When used vertically, limit individual runs to 10 metres for bituminous underlays. Do not lay vertically on roof pitches under 10° without support.

Horizontally lay across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations and avoid prolonged exposure by installing the roof immediately.

Completion

3.10 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.thermakraft.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

41711B IBS RIGIDRAP RIGID AIR BARRIER SYSTEM

1 GENERAL

This section relates to the use of **RigidRAP®** as a rigid air barrier system and bracing element in both residential and commercial timber framed buildings.

1.1 RELATED WORK

Refer to the appropriate timber frame section for timber framing.

1.2 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:

IBS	Independent Building Supplies Limited
OSB3	Oriented Strand Board (consisting of three cross-oriented layers)
PEFC	Programme for the Endorsement of Forest Certification
FSC	Forest Stewardship Council
RAP	Rigid air panel

The following definitions apply specifically to this section:

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCE DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZS 1170.5	Structural design actions - Earthquake actions
AS/NZS 1170.2	Structural design actions - Wind actions
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber Structures Standard
NZS 3604	Timber-framed buildings
EN 300:2006	Oriented strand boards (OSB). Definitions, classifications and specifications

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

IBS RigidRAP Installation Details - dwg, pdf or jpg format
 IBS RigidRAP® Product Specification
 IBS RigidRAP® Maintenance & Warranty
 IBS RigidRAP® Design & Installation Guide (Oct 2020 V2.0)
 CodeMark™ Product Certificate CM70035
 IBS RigidRAP® PASS V1 (Product Assurance Supplier Statement)

Manufacturer/supplier contact details:

Company: Independent Building Supplies Limited
 Web: www.ibs.co.nz
 Email: info@ibs.co.nz
 Telephone: 0800 367 759

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
50 years For IBS RigidRAP®

- Provide this warranty on the manufacturer/supplier standard form (if unavailable, 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

Installers to be experienced, competent trades people familiar with the **RigidRAP®** materials and techniques specified. Installation must be carried out, or supervised by, a Licensed Building Practitioner.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the **RigidRAP®** specified systems, components or associated products listed in this section.

Compliance information

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Manufacturer's / supplier's warranty
- Producer Statement - Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance - Wind

1.9 DESIGN PARAMETERS, WIND

Design the installation to the manufacturer's requirements in accordance with CodeMark™ certificate CM70035 and as appropriate for the project wind design stated in the general section 1220 PROJECT.

RigidRAP® installed as bracing

1.10 BRACING SYSTEM

Provide braced wall systems using the **RigidRAP®** bracing system to meet the requirements of [NZS 3604](#) Section 5, **Bracing design**. Refer to drawings and bracing ID schedule for location and type.

Building wind zone HIGH (refer to [NZS 3604](#), table 5.4)
Earthquake zone: 2 (refer to [NZS 3604](#) figure 5.4)

Buildings or parts of buildings beyond the scope of [NZS 3604](#) must be to specific design - the **RigidRAP®** 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 specifically designed to [NZS 3603 Timber Structures Standard](#).

2 PRODUCTS

Materials

2.1 IBS RIGIDRAP®

Used as a rigid air panel (RAP), certified to CodeMark™ certificate CM70035, panels are faced with a BRANZ appraised laminated synthetic building wrap. Low formaldehyde emitting, 8mm thick, 3-layered, flat pressed panels of oriented strands (OSB3 micro veneers) are sourced from PEFC/FSC certified forests and bonded with synthetic resin. The OSB is manufactured by Swiss Krono to EN 300 and certified to EN 13986.

IBS **RigidRAP®** meets the requirements of [NZBC E2/AS1](#), Table 23.

Available in sheet sizes:

- 2440mm x 1196mm x 8mm
- 2745mm x 1196mm x 8mm
- 3050mm x 1196mm x 8mm

Components - Generally

2.2 FIXINGS

To [NZS 3604](#), Table 4.3.

Application:	Zone:	Minimum nail length:
Rigid air barrier (not used as bracing)	Zone B & C (all zones where 15 years durability is required)	30mm x 2.5mm galvanized clouts, D or round head
Rigid air barrier (not used as bracing)	Zone D & E	Type 304 Stainless Steel, Gauge 8 x 25mm Surefix screws or 45mm x 2.5mm stainless steel nails annular grooved

Application:	Zone:	Minimum nail length
Structural wall bracing	Zone B & C	30mm x 2.5mm galvanized clouts, D or round head
Structural wall bracing	Zone D & E	Type 304 Stainless Steel, Gauge 8 x 25mm Surefix screws or 45mm x 2.5mm stainless steel nails annular grooved

2.3 PVC FLASHINGS

PVC horizontal and PVC cavity closure flashings or acceptable flashings to [NZS 3604](#) and IBS **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0). A proprietary 'Z' flashing must be installed at mid-floor level where **RigidRAP®** is used above a single storey.

2.4 FLEXIBLE SEALING TAPE

Self-adhesive joint sealing tape minimum of 50mm wide to be approved for use with IBS **RigidRAP®** and installed to tape manufacturer's specifications and installation instructions. If all joints are taped in accordance with IBS **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0), additional building wrap is not required.

IBS approved joint-sealing tapes:

- Marshall Innovations SUPER-STICK Building Tape®
- Pro ClimaTescon Extoria
- Techno Insulation FlameFlash™
- Techno Insulation Watertight®
- 3M™ All Weather Flashing Tape
- Masons 40 Below
- Dristud Cool Tape
- Frame Protection System Euroband S 60

Components - Bracing

2.5 BRACING HOLD-DOWN CONNECTORS

GIB HandiBrac® hold-down brackets manufactured by MiTek™ NZ complete with mechanical fastener with a minimum 15kN uplift capacity for concrete floors and 150mm x 12mm dia galvanized coach screw for timber floors.

2.6 BRACING STRAPS

Mild steel galvanized steel straps to suit application, 25mm x 1.0mm. Nail-on type to the requirements of [NZS 3604](#), section 4, **Durability**, and of the number and type required for each particular application to [NZS 3604](#), sections 6-10.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

Store panels horizontally on squared bearers or gluts, at 800mm centres maximum. Do not store directly on the ground. Remove strapping and shrink wrap immediately upon arrival at the installer's storage area or on site.

Protect from direct exposure to the weather in a well ventilated area.

Reject and replace goods that are damaged or will not provide the required finish.

Provide a 48 hour acclimatisation period to adjust to site conditions before fixing.

3.2 ROUTINE MATTERS

Refer to the general section 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.

Moisture content: 20% maximum in use

3.4 WALL FRAMING

Kiln dried timber framing (maximum moisture content 18%) sizes and set outs to [NZS 3604](#) with stud and nog centres and timber widths to **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0). Treatment to [NZBC B2/AS1](#) and [NZS 3602](#).

Installation - Generally

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 FASTENERS

Fasten in accordance with CodeMark™ certificate CM70035 and **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0) -

- Bracing element - 150mm centres around perimeter and 300mm centres on intermediate supports of each sheet
- Rigid air barrier - 300mm centres around perimeter and 300mm centres on intermediate supports of each sheet.

3.7 SUPPORT EDGES AND JOINTS

Fully support edges and joints as per **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0).

3.8 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 to [NZBC E2/AS1](#), 9.1.5 and 9.1.6.

Required preparatory work includes the following:

- Materials lapped in a way that water tracks down to the exterior face of the **RigidRAP®** rigid air barrier.
- Underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations.

3.9 CUT EDGES

Seal cut edges with tape or a waterproof product to prevent moisture ingress.

Installation - Rigid Air Barrier

3.10 FIXING RIGIDRAP SHEETS - RAP

For wind zones up to and including Extra High, fix in accordance with [NZS 3604](#) and **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0). Allow a minimum of 4mm at panel joints to accommodate movement.

3.11 JOINT SEALING

Seal vertical joints, internal and external corners, penetrations and around windows with minimum 50mm wide self-adhesive sealing tape to **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0). Dust out joints before applying the tape. Horizontal joints to be sealed with a proprietary 'Z' flashing or 150mm wide self-adhesive sealing tape. Refer to list of IBS approved sealing tape.

Installation - Structural Wall Bracing Element

3.12 FIXING RIGIDRAP SHEETS - BRACING

Fix in accordance with [NZS 3604](#) and **RigidRAP®** Design & Installation Guide (Oct 2020 V2.0). Ensure that:

- Required hold down, strapping, angles, or bolts are in place, and that framing centres are correct.
- GIB HandiBrac® hold-down connections are fixed 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 of the bracing element, bottom plates are fixed to the requirements of [NZS 3604](#).
- Bottom plate fixing - M12 hold down bolts with 50mm x 50mm x 3mm washers when using strap brace method. Hold down bolts provided with system when using GIB HandiBrac® method.

3.13 BRACING SYSTEM 1 - RIGIDRAP 300MM X 2400MM WALL USING GIB HANDIBRAC®

Panel size - 300mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
Tested on a concrete floor with M12 hold down bolts

3.14 BRACING SYSTEM 2 - RIGIDRAP 400MM X 2400MM WALL USING GIB HANDIBRAC®

Panel size - 400mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
Tested on a concrete floor with M12 hold down bolts

3.15 BRACING SYSTEM 3 - RIGIDRAP 600MM X 2400MM WALL USING GIB HANDIBRAC®

Panel size - 600mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts, 8 x 25mm stainless steel Surefix screws or 45mm x 2.5mm stainless steel nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
Tested on a concrete floor with M12 hold down bolts

3.16 BRACING SYSTEM 4 - RIGIDRAP 1200MM X 2400MM WALL USING GIB HANDIBRAC®

Panel size - 1200mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
Tested on a concrete floor with M12 hold down bolts

3.17 BRACING SYSTEM 5 - RIGIDRAP 2400MM X 2400MM WALL USING GIB HANDIBRAC®

Panel size - 2400mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
Tested on a concrete floor with M12 hold down bolts

3.18 BRACING SYSTEM 6 - RIGIDRAP 1200MM X 2400MM WALL

Panel size - 1200mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
No hold down brackets

3.19

BRACING SYSTEM 7 - RIGIDRAP 400MM X 2400MM WALL USING GIB HANDIBRAC® AND GIB® BOARD

Panel size - 400mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
GIB® Standard 10mm board on inside face of stud framing
Tested on a concrete floor with M12 hold down bolts

3.20

BRACING SYSTEM 8 - RIGIDRAP 600MM X 2400MM WALL USING GIB HANDIBRAC® AND GIB® BOARD

Panel size - 600mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts, 8 x 25mm stainless steel Surefix screws or 45mm x 2.5mm stainless steel nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
GIB® Standard 10mm board on inside face of stud framing
Tested on a concrete floor with M12 hold down bolts

3.21

BRACING SYSTEM 9 - RIGIDRAP 1200MM X 2400MM WALL USING GIB HANDIBRAC® AND GIB® BOARD

Panel size - 1200mm x 2400mm
Wall Construction:
90mm x 45mm MSG8 studs (600mm centres), plates
8mm RigidRAP® board one side, 30mm x 2.5mm dia galvanized clouts or 45mm x 2.5mm s/s annular grooved nails at 150mm centres around the perimeter
GIB HandiBrac® hold down brackets fixed to each end of studs and to bottom plate with concrete hold downs to manufacturer's specifications
GIB® Standard 10mm board on inside face of stud framing
Tested on a concrete floor with M12 hold down bolts

Completion & Commissioning

3.22 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused and temporary materials and elements from the site.

3.23 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Tape over any damage to the paper.

3.24 COMPLETION MATTERS

Refer to the general section 1270 CONSTRUCTION for completion requirements and, if required, commissioning requirements.

4 SELECTIONS

For further details on selections go to www.ibs.co.nz

Substitutions are not permitted to the following **RigidRAP®** product, or associated components, unless stated otherwise.

4221HH HERMPAC HORIZONTAL WEATHERBOARD CLADDING SYSTEM

1 GENERAL

This section relates to the supply and fixing of Hermpac Horizontal cladding:

- Rusticated weatherboards
- Cavity batten systems
- Proprietary flashing systems

1.1 RELATED WORK

Refer to painting sections for finishes to weatherboard cladding.

1.2 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:

FSC®	Forest Stewardship Council®
COC	Chain of Custody
PEFC	Programme for the Endorsement of Forest Certification
CSA	Canadian Standards Association (International Standards)
SFI	Sustainable Forestry Initiative

Documents

1.3 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 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
BRANZ BU 582	Structurally fixed cavity battens

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

[Hermpac Construction Drawings](#)

Hermpac Bevelback & Rebated Bevelback Weatherboard Cavity System Installation Specifications

Hermpac Bevelback & Rebated Bevelback Weatherboard Direct Fix System Installation Specifications

Quality Assurance Checklist - Hermpac Bevelback and Rebated Bevelback Weatherboard Cavity System

Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System Installation Specifications

Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Direct Fix System Installation Specifications

Quality Assurance Checklist - Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

[Hermpac Standard and Custom Profiles](#)

[Hermpac Profile Portfolio](#)

[Hermpac Grade descriptions](#)

[Hermpac Nail fixings](#)

[Hermpac Legal and / or Sustainable Certification](#)

[Hermpac Product Technical Statement](#)

[Machinecoat - Flood Coat Inundation versus Spray Application](#)

Maintenance of selected Wood Oil / Oil Based Stain finishes

[BRANZ Appraisal 524](#) - Cavity Batten System

[BRANZ Appraisal 658](#) - Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System

[BRANZ Appraisal 663](#) - Hermpac Bevelback and Rebated Bevelback Weatherboard Cavity System

CodeMark Certificate of Conformity for Hermpac Rusticated, Splaycut and Multi-Splay

Weatherboard Cavity System Certificate Number [GM-CM30037-RevI](#)

CodeMark Certificate of Conformity for Hermpac Bevelback & Rebated Bevelback Weatherboard

Cavity System Certificate Number [GM-CM30038-RevI](#)

Cavity System Certificate Number [GM-CM30036-RevG](#)

Hermpac Pacific Limited - [FSC](#) Licence No [FSC-C102539](#), Certificate Code SGS-COC-008082, expires 30 Nov 2024

Hermpac Pacific Limited - [PEFC](#) Forestry Sustainable Certificate Code SGS-[PEFC](#)/COC-1212, expires 23 Nov 2021.

Manufacturer/supplier contact details

Company: **Hermpac Ltd**

Contacts: Kyle Deans - 021 771 857, kyle.deans@hermpac.co.nz
Carmen Hansen - 027 809 4588, carmen@hermpac.co.nz

Web: www.hermpac.co.nz

Email: technical@hermpac.co.nz

Telephone: 09 421 9840 Auckland
04 586 9674 Wellington
03 341 2163 Christchurch

Requirements

Performance

1.5 FIXINGS, WIND

Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by [NZS 3604](#).

1.6 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations. To [NZBC B2/AS1](#) Durability and [NZBC E2/AS1](#) External moisture.

2 PRODUCTS

Materials

2.1 WESTERN RED CEDAR

Hermpac Canadian Coastal Western Red Cedar (*Thuja plicata*) harvested from the sustainable managed forests of British Columbia, Canada. Hermpac Western Red Cedar is supplied from forest sources, certified legal and sustainable under one or more independent third party verified certification systems ([PEFC](#), [CSA](#), [SFI](#) or [FSC](#)).

2.2 HORIZONTAL WEATHERBOARDS

Weatherboards to Hermpac profiles, Lap and Rebate details to BRANZ BU 411 and general design to the [NZS 3617](#), species and grading to [NZS 3602](#), table 2, reference 2A.1, Requirements for wood-based building components to achieve a 15-year durability performance. Weatherboards in lengths relative to profile selection and application, with all unsound and open split knots excluded by cross cut removal prior to fixing into position.

Acceptable Solution is limited to the following types of weatherboards and their derivatives:

- Horizontal Standard Rusticated and Hermpac Custom Profiles

A selection of the above profiles are also available in Western Red Cedar Finger-Joint (CEDARONE) and AshinDura™, pre-primed and undercoated, sanded and/or de-nibbed/buffed between coats.

2.3 COVER BOARDS, MOULDINGS AND SCRIBERS

To Hermpac profiles as detailed, with species and grading to [NZS 3602](#), but with all unsound and open split knots excluded by cross cut removal prior to fixing into position. To [NZS 3602](#), table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance.

2.4 WALL UNDERLAYS

For flexible wall underlays, rigid wall underlays and rigid air barriers, refer to the appropriate separate section(s).

2.5 RADIATA PINE EXTERIOR CAVITY WALL BATTENS - STRUCTURALLY FIXED

Radiata Pine H3.1 or H3.2 battens, minimum 20mm thickness, width and height to match timber framing studs. Structurally fix Radiata Pine cavity battens to BRANZ BU 582, part 4.2. To [NZS 3602](#), table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.6 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Aluminium, PVC or stainless-steel cavity closure strip, punched with 3mm - 5mm holes or slots to provide a minimum ventilation opening area of 1000mm² per lineal metre of wall. Length and width to suit cavity. To [NZBC E2/AS1](#): clause 9.1.8.3 and figure 66.

Components

2.7 NAILS, SILICON BRONZE

Hermpac Crown, Rose or Flat Head, Annular Grooved Silicon bronze fixings to [NZBC E2/AS1](#) Table 24. Refer to [Hermpac Construction Drawings](#) for fixing details and to SELECTIONS for fixing sizes.

2.8 NAILS, STAINLESS STEEL

Hermpac Crown, Rose or Flat Head, Annular Grooved Grade 316 Stainless steel fixings to [NZBC E2/AS1](#) Table 24. Refer to [Hermpac Construction Drawings](#) for fixing details and to SELECTIONS for fixing sizes.

2.9 JOLT HEAD NAILS, STAINLESS STEEL

Hermpac Jolt Head, Annular Grooved Grade 316 Stainless Steel fixings to [NZBC E2/AS1](#) Table 24. Refer to [Hermpac Construction Drawings](#) for fixing details and to SELECTIONS for fixing sizes.

2.10 CLINCH NAILS, STAINLESS STEEL

Hermpac Proprietary 40 x 2.0mm, 50 x 2.0mm and 27 x 2.0mm Clinch Nail, Annular Grooved Grade 316 Stainless Steel.

2.11 FLASHINGS

To [NZBC E2/AS1](#), 4.0 Flashings. Material, grade and colour as detailed and scheduled and to [NZBC E2/AS1](#); Table 21: Compatibility of materials in contact and Table 22: Compatibility of materials subject to run-off. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

2.12

SOAKERS, STAINLESS STEEL / COLORSTEEL ZINCALUME / ALUMINIUM / ETCH PRIMED ALUMINIUM

To [NZBC E2/AS1](#), 4.0 Flashings. Machine folded stainless steel/zinc coated steel sheet to profile of weatherboard and mitred corner joints. To [NZBC E2/AS1](#); Table 21: Compatibility of materials in contact and Table 22: Compatibility of materials subject to run-off. Ensure that materials used for soakers are compatible with adjacent materials and fixings, cladding materials and fixings.

2.13 SOAKERS, COPPER

To [NZBC E2/AS1](#), 4.0 Flashings. Machine folded half-hard copper sheet to profile of weatherboard and mitred corner joints. To [NZBC E2/AS1](#); Table 21: Compatibility of materials in contact and table 22: Compatibility of materials subject to run-off. Ensure that materials used for Soakers are compatible with adjacent materials and fixings and cladding materials and fixings.

Finishes

2.14 SITE APPLICATION OF OIL / OIL BASED STAINS & PAINTS

Coating applications to manufacturers specifications. All Hermpac weatherboards and mouldings must be coated with a specified coating system on all six sides prior to installation. Refer to SELECTIONS.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to [NZBC E2/AS1](#): 3.0 Weathertightness risk factors, and 9.0 Wall claddings, 9.1.8 Drained cavities and 9.4 Timber weatherboards.

3.2 STORAGE

Take delivery of Hermpac timber products, dry, unmarked and undamaged from freight and handling (Grade characteristics excluded). Stack Hermpac weatherboards flat and true, clear of the ground by a minimum of 150mm and supported on dry, clean timber bearers at maximum 900mm centres. Keep weatherboards dry at all times, either by storing within an enclosed building, or when stored externally place an additional secondary cover on the plastic wrapping. Care must be taken to avoid damage to weatherboard edges and surfaces.

3.3 SUBSTRATE

Before starting fixing ensure that the substrate conforms with [NZS 3604](#), section 2, table 2.1, Timber framing tolerances and the requirements of [NZS 3604](#), section 6, Foundation and subfloor framing, and [NZBC E2/AS1](#), 9.4 Timber weatherboards, governing support for timber board cladding.

Application - preparation

3.4 SITE STAINING - WOOD OIL/OIL STAIN FINISH

If not pre-finished before delivery, prepare and coat all faces and edges with one coat of premium wood oil or oil stain to coating manufacturers specifications, immediately the block stack is opened. Open stack each board to dry with the back facing down, ensuring faces remain well finished, untouched and unblemished. Once dry, place boards in fillet stack, laid flat and true, until fixed. Keep dry and undamaged.

Apply a second coat to the boards once they have been installed. Coating time frames for oils/stains will vary. Check time frame requirements for the second coat with the coating manufacturer.

Application - horizontal cladding over cavity battens

3.5 RADIATA PINE BATTEN DRAINED CAVITY - STRUCTURALLY FIXED

Install 20mm minimum thickness drained cavity to [NZBC E2/AS1](#): 9.0 Wall claddings, where required. The Radiata Pine battens are permanently fixed using grade 304 Hermpac stainless steel Hex head screws ensuring minimum 25mm penetration into framing or as per BRANZ BU582 Structurally fixed cavity battens.

3.6 CAVITY CLOSER / VERMIN PROOFING

Refer to Hermpac Cavity System Installation Specification. 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). Use cavity spacers where fixing is required between cavity battens.

3.7 PENETRATIONS

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 to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

[Hermpac Construction Drawings](#) call for a compressible bond breaker closed cell PVC foam seal to NZBC E2/AS1 9.1.10.7.

3.8 SETOUT

Use a string line, laser or mechanical device to set out all nailing that will be visible in the finished work. Align all nailing accurately in straight lines. Refer to relevant Hermpac Installation Specification and Construction Drawings to establish correct angle of nail and consistent, accurate placement relative to visible edge of board.

Application - fixing

3.9 FIXING - OIL/STAIN FINISH

Install level, true to line and face, to [NZBC E2/AS1: 9.4](#) Timber weatherboards. Double coat all cut ends before fixing. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. Finish the heads of Hermpac Crown, Rose and Flat head nails flush onto and not into the board surface. Do not over drive the nail head and crush the timber surface beneath and surrounding the nail.

3.10 FIXING/FINISH - WIND ZONE

Hermpac Western Red Cedar, DuraLarch™ or AshinDura™ weatherboards fixed with Hermpac Crown, Rose and Flat Head nails are limited to use in [NZS 3604](#) Wind Zones up to and including Extra High studs are at maximum 600mm centres.

Hermpac Western Red Cedar weatherboards fixed with jolt head nails are limited to use in [NZS 3604](#) Wind Zones up to and including Medium when studs are at maximum 600mm centres, and [NZS 3604](#) Wind Zones up to and including Very High when studs are at maximum 400mm centres.

Hermpac DuraLarch™ and AshinDura™ weatherboards fixed with jolt head nails are limited to use in [NZS 3604](#) Wind Zones up to and including Extra High when studs are at maximum 600mm centres.

Refer to [Hermpac Construction Drawings](#) for fixing details and to SELECTIONS for fixing sizes.

3.11 FIXING RUSTICATED, SPLAYCUT & MULTI-SPLAY WEATHERBOARDS

Install level, true to line and face, to [NZBC E2/AS1: 9.4](#) Timber weatherboards. Single nail weatherboards to every fixing point, clear of the adjacent lapped board. Nails to be driven in with a slightly upward slope. Line nails vertically across the boards. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. Refer to [Hermpac Construction Drawings](#) for accurate weatherboard fixing information.

Using a Hermpac specialty clinch nail, prior to the next row of Rusticated, Splaycut or Multi-Splay boards being fixed alongside (studs at maximum 600mm centres) and at a position hard up against but not into the hidden lap board edge at every fixing point, restrain the hidden lap tongue by driving the clinch nail into the frame so that the clinch head settles flush into the weatherboard's surface.

The clinch nail head must not sit proud of the timber surface nor prevent the correct separation of each adjacent row of boards.

Refer to [Hermpac Construction Drawings](#) and Installation Specification for external and internal corner construction and fixing details.

3.12 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to [NZBC E2/AS1](#).

3.13 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.14 REPLACE

Replace all damaged or marked elements.

3.15 LEAVE

Leave work to the standard required for following procedures.

3.16 REMOVE

Remove all debris, unused materials and elements from the site.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise. Contact technical@hermpac.co.nz for assistance or more information.

4239 SOFFIT CLADDING

1 GENERAL

This section relates to the supply and fixing of cladding to the underside of exterior soffits, verges and eaves and includes:

- Fibre cement sheet
- Joints

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
AS/NZS 1604.3	Specification for preservative treatment - Plywood
AS/NZS 2269.0	Plywood - structural - Specifications
AS/NZS 1170.2	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
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits

Warranties

Requirements

1.2 QUALIFICATIONS

Workers / Installers / applicators to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 HEALTH AND SAFETY

Comply with all manufacturer/supplier and WorkSafe New Zealand requirements for health and safety.

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

2 PRODUCTS

Fibre cement soffit cladding

2.1 FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to [AS/NZS 2908.2](#). Refer to SELECTIONS.

2.2 NAILS - GALVANIZED

Hot-dip galvanized nails for fibre cement sheet as required by Manufacturer's / supplier's documents. Refer to SELECTIONS.

2.3 NAILS - STAINLESS STEEL

316 Stainless steel nails for fibre cement sheet as required by Manufacturer's / supplier's documents. Refer to SELECTIONS.

2.4 SCREWS - STAINLESS STEEL

Stainless steel screws for fibre cement sheet as required by Manufacturer's / supplier's documents. Refer to SELECTIONS.

Fibre cement soffit cladding - Components

- 2.5 SOFFIT JOINTERS
Extruded uPVC jointer.

Fibre cement - Accessories

- 2.6 FLASHING TAPES
Single sided medium density closed cell PVC foam tape, with pressure sensitive acrylic adhesive on one side of tape. Tape thickness and width to manufacturer's technical literature.
- 2.7 SEALANT
Facade sealant or similar. Refer to the sheet manufacturer's technical literature for selection and use requirements.
- 2.8 SEALER
For jointed systems, seal all sheet edges prior to fixing.

Timber profiles

3 EXECUTION

Conditions

- 3.1 STORAGE FIBRE CEMENT
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage, cover to keep dry until fixed.
- 3.2 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage. Reject all product with damaged faces or edges
- 3.3 SUBSTRATE
Do not commence work until the substrate is of the standard required for the specified finish; 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 soffits are fixed.
- 3.4 SEAL FIBRE CEMENT SHEET EDGES
Seal site cut sheet edges prior to installation. Seal sheet edges around penetrations.
- 3.5 PENETRATIONS
Form small holes to accommodate penetrations through the soffit as per the method detailed in the sheet manufacturer's technical literature.

Install fibre cement sheets

- 3.6 SHEET LAYOUT
All sheet edges must be supported by framing and/or rebates in fascia and barge boards.
- 3.7 INSTALL SOFFIT CLADDING - JOINTERS AND CAPPING MOULDS
Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Ensure all edges and joints are fully supported. Insert uPVC jointers and capping moulds to manufacturer's requirements. Fix sheets complete with jointers and capping moulds. Refer to manufacturer's installation manual and SELECTIONS.
- 3.8 INSTALL SOFFIT CLADDING - EXPRESSED JOINTS
Cut sheets dry using score and snap method or hand guillotine. Ensure all edges and joints are fully supported. Install in seal sealing strip to framing at expressed joint locations. Fix sheets complete with required gap to form expressed joint detail. Refer to manufacturer's installation manual and SELECTIONS.
- 3.9 FIBRE CEMENT CLADDING FASTENER - SIZE AND LAYOUT
Fix sheets to framing using fixings and fixing methods as nominated in SELECTIONS. Fix to manufacturer's requirements.

3.10 SEALANTS - FIBRE CEMENT

Application and use of sealants to manufacturer's instructions. Check with sealant manufacturer prior to coating over sealants.

3.11 PAINTING - FIBRE CEMENT

Refer to painting section/s for protective coating system.

Install timber profiles

3.12 EXECUTION

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).

3.13 TIMBER TRIM

Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely and true to line and face, fully nailed. For paint finish prime joint edges before fixing, otherwise seal them without runs onto any exposed face.

3.14 NAILING, PAINT FINISH

Punch nails and patch prime external trim being painted, before stopping as specified under painting preparation.

3.15 NAILING, CLEAR FINISH

Punch nails flush with the face of external trim being stained or clear finished.

Completion

3.16 COMPLETE

Ensure the work is complete with all components, accessories, finishings and trim properly installed so the soffit cladding system is completely weathertight.

3.17 REPLACE

Replace all damaged or marked elements.

3.18 LEAVE

Leave work to the standard required for following procedures.

3.19 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4241S STEEL & TUBE PROFILED METAL WALL CLADDING

1 GENERAL

This section relates to the supply and fixing of **Steel & Tube** profiled metal wall cladding complete with accessories.

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 abbreviations apply specifically to this section:

BMT Base metal thickness
NZMRM New Zealand Metal Roofing Manufacturers Inc.

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1 External moisture
AS/NZS 1170.2 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/pre painted sheet metal products for interior/exterior building applications - Performance requirements
AS 3566 Self-drilling screws for the building and construction industries
NZS 3604 Timber-framed buildings
NZMRM CoP New Zealand Metal Roofing Manufacturers Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

Steel & Tube's literature, including:
NZ Steel: Specifiers and Builders Guide
NZ Steel: Installers Guide
Product Technical Statements
Design Solutions

Copies of the above literature are available from Steel & Tube

Web: www.steelandtube.co.nz
Email: info@steelandtube.co.nz
Telephone: Freephone 0800 333 247

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty in accordance with published supplier's guidance on materials, environments and building types:

15 years minimum For perforation
15 years minimum For coating

- Provide warranties on Steel & Tube's standard **Warranty Plus** format.
- Commence the warranty from the date of installation.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide a material manufacturer/supplier warranty:

5 years Workmanship
From: Date of installation

- Provide warranties on Steel & Tube's standard **Warranty Plus** warranty form
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Steel & Tube products, or associated components and products.

1.8 QUALIFICATIONS

Cladding Installers shall be experienced, competent installers familiar with Steel & Tube products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP. Carry out work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone HIGH (refer to [NZS 3604](#), table 5.4)

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters and [NZMRM CoP](#). Refer to Steel & Tube Roofing Solutions Product Guide for the selected profile. Allow for specific loadings at corners and the periphery of the cladding, where localised pressure factors apply. Fixing pattern to also take into account fixing method and girt/frame spacing.

Performance - General

1.11 CO-ORDINATE

Set cladding to vertical plumb lines and maintain verticality. Set all exposed fixings with horizontal string lines. Carefully set out sheets with side laps away from the main line of sight, and with the widths of end sheets the same. Check during fixing to eliminate creep or spread and to keep fastenings in line.

1.12 SPREAD OF FIRE

To [NZBC C/AS1](#), 5.4 **Exterior surface finishes**, [NZBC C/AS2](#), 5.8 **External cladding systems** or [NZBC C/VM2](#).

1.13 PERFORMANCE

Install roofing material and associated flashings and accessories to form a weather tight and durable system.

2 PRODUCTS

Materials

2.1 PRE-FINISHED ALUMINIUM

5005 or 5052 alloy H34 or H36 temper to suit application.

2.2 FASTENERS GENERALLY

Minimum Category 5 and durability not less than the roofing material being fixed. Screw fasteners to be head stamped identifying the manufacturer and class.

2.3 FIXING SCREWS

To AS 3566. Screws appropriate to the cladding material and the supporting structure, as required by **Steel & Tube** and with a durability no less than the material fixed. Screws into timber to penetrate by minimum 30mm.

2.4 RIVETS

Sealed aluminium, minimum diameter 4mm for use with zinc coated, zinc/aluminium coated or aluminium cladding.

Components

2.5 FLASHINGS GENERALLY

Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings. Where flashings are required but are not detailed, design to **Steel & Tube's** approved design solutions.

2.6 FLASHINGS

To **NZBC E2** /AS1, 4.0 **Flashings**.

Formable grade 0.55 BMT for galvanized, aluminium/zinc-coated and pre-painted steel, and 0.90 for aluminium (or 0.7mm for small aluminium flashings) to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.7 WALL AND PARAPET FLASHINGS

To **NZBC E2**/AS1, 4.0 **Flashings**.

Supplied by the cladding manufacturer to match or to suit the cladding.

2.8 EXTERIOR CAVITY WALL BATTENS

Refer to timber framing sections. For drained or non-drained cavities

2.9 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Perforated uPVC or aluminium trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

Brand/Type: Vent Perf.

2.10 CLOSURE STRIPS

Non-bituminous compressible, profiled foam strips to fit the sheet profile, or pre notched perforated metal closures.

Brand/Type: Ecofoam

Accessories

2.11 WIRE NETTING

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 WALL UNDERLAY

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.13 SEALANT

Steel & Tube neutral curing silicone or MS polymer sealant and used as directed.

2.14 LAP SEALING TAPE

Closed cell self adhesive Trimseallap tape.

2.15 SEPARATION STRIP - TIMBER CAVITY BATTENS

PVC tape or similar as a separator between the timber battens and metal cladding. Ensure separator is slightly wider than the batten.

3 EXECUTION

Conditions

3.1 INSPECTION

Inspect the wall framing and supporting structure to ensure that it is complete and fully braced ready for cladding.

3.2 STORAGE

Stack cladding and accessories on clean, level areas of the site and protect from mechanical damage, wind damage and contamination. Loosely cover dry sheeting, with any wet sheeting fillet or cross stack to allow air to circulate. Remove strippable protective film, if applied, prior to prolonged exposure to sunlight.

3.3 FRAMING TIMBER MOISTURE

For transverse flashings the framing moisture content to be a maximum of 18%.. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.4 HANDLING

Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage.

3.5 SEPARATION

Isolate dissimilar materials 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. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanized and aluminium/zinc-coated metals.

Application

3.6 SET-OUT

Set cladding to vertical plumb lines and maintain verticality. Set all exposed fixings with horizontal string lines. Carefully set out sheets with side laps away from the main line of sight, and with the widths of end sheets the same. Check during fixing to eliminate creep or spread and to keep fastenings in line.

3.7 AVOID END LAPS

End laps are not permitted, except where specifically detailed.

3.8 FIXING GENERALLY

Install and fix in accordance with the [NZMRM CoP](#). Use only screws as specified by **Steel & Tube**. Paint colour matched fixings and accessories before installation.

3.9 FIX UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC.

3.10 INSTALL DRAINED CAVITY

Refer to timber framing sections for installation of drained cavities. Ensure horizontal battens are castellated or proprietary draining type like Cavibat. Install cavity closer/vermin proofing at base of wall, open horizontal (or raking) junctions and over openings (windows, meters etc).

3.11 PENETRATIONS

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 to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.12 MARKING AND CUTTING

Cut only by shearing tools. Do not use black lead pencils for marking Zinalume®, galvanized, Colorsteel® or Colorcote® products.

3.13 FIX SHEETS

Fix sheets in place using the fastening system specified by **Steel & Tube** making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet. Where battens are installed fasten cladding through battens to primary structure. Ensure fixings penetrate 30mm into primary timber structure.

3.14 INSTALL FLASHINGS

Flash to penetrations, cap corners and edges, using sealant and rivets to detail, to **Steel & Tube's** requirements and to [NZBC E2/AS1](#).

3.15 COMPLETE

Ensure the work is complete with all flashings, finishing and trim properly installed so the cladding system is completely weathertight.

3.16 SEPARATION

Separate metal sheeting from CCA treated timber with wall underlay or other suitable isolation material.

Completion

3.17 REPLACE

Replace all damaged or marked elements.

3.18 LEAVE

Leave this work complete with all necessary flashings and capping all properly installed as the work proceeds so the finished cladding is completely weathertight.

3.19 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.steelandtube.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Coating system

Cladding

4.1 STEEL & TUBE - PLUMBDEK, LOW RIB TRAPEZOIDAL CLADDING

BMT/material: 0.40bmt
Framing material: Timber

4261 BRICK VENEER CLADDING

1 GENERAL

This section relates to clay brickwork as a veneer cladding.
It includes:

- Standard brick veneer cladding

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:

CB&PMA	New Zealand Clay Brick & Paver Manufacturer's Association
NZMTA	New Zealand Masonry Trades Association
BBFNZ	Brick and Blocklayers Federation of New Zealand

The following definitions apply specifically to this section:

Proprietary Two Storey Brick Veneer System Proprietary system for two storey clay brick veneer construction as contained in [BRANZ Appraisal 690](#) - Two Storey Brick Veneer System.

Proprietary Stack Bonded Brick Veneer System Proprietary system for stack bonded clay brick veneer construction as contained in [BRANZ Appraisal 1045](#) - Stack Bonded Brick Veneer 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 B1/AS3	Structure
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry construction - Wall ties
AS/NZS 2699.3	Built-in components for masonry construction - Lintels and shelf angles (durability requirements)
AS/NZS 2918:2001	Domestic solid fuel burning appliances - Installation
NZS 3103	Sands for mortars and plasters
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: materials and workmanship
SNZ HB 4236	Masonry veneer wall cladding
AS/NZS 4455.1	Masonry units, pavers, flags and segmental retaining wall units - Masonry units
BRANZ Appraisal 690	Two Storey Brick Veneer System
BRANZ Appraisal 1045	Stack Bonded Brick Veneer System
BRANZ	Good practice guide: Masonry veneer
CB&PMA TB1	Design Note TB1 Two Storey Clay Brick Veneer Construction - Made Easy
CB&PMA TB2	Design Note TB2 Specification For The Stack Bond Brick Veneer System
ASTM D6134	ASTM D6134 / D6134M-07(2019)e1, Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems

Requirements

1.3 QUALIFICATIONS

Bricklayers to be experienced, competent and familiar with the materials and the techniques specified.

All work to be installed or supervised by a Registered Master Mason or Licensed Building Practitioner (LBP): Licensed for Bricklaying and Blocklaying 1: Brick/masonry Veneer. RBW must be supervised by an LBP.

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Compliance information

1.5 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Producer Statement - Construction from the installer of proprietary brick veneer systems.
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.6 DESIGN PARAMETERS - NON SPECIFIC DESIGN - EARTHQUAKE

Design the installation to the seismic parameters of [NZS 4210](#) Masonry construction: materials and workmanship.
Refer to SELECTIONS for details.

1.7 COMPLIANCE - STANDARD BRICK VENEER SYSTEM

Brickwork to comply with [SNZ HB 4236](#) Masonry veneer wall cladding.

2 PRODUCTS

Materials

2.1 CLAY BRICKS

To [AS/NZS 4455.1](#).

2.2 VERMIN PROOFING

Either:

- Proprietary plastic weephole vents built into open perpend.
- Galvanized hexagon 10 mm mesh of 1 mm diameter steel wire 100 mm wide, complete with galvanized steel staples. Fix across base of cavity if gaps in veneer exceed 13 mm.

2.3 FLASHING - HEAD & SILL

To [NZBC E2/AS1](#) either:

- 2 ply asphaltic pliable waterproofing membrane to [AS/NZS 2904](#).
- 1.5 mm butyl rubber to [ASTM D6134](#).
- 0.5 mm pliable polyethylene to [AS/NZS 2904](#).
- Proprietary self-adhesive flexible flashing tape to [AS/NZS 2904](#).

2.4 FLASHING - JAMB

To [NZBC E2/AS1](#) either:

- 2 ply asphaltic pliable waterproofing membrane to [AS/NZS 2904](#).
- 0.5 mm pliable polyethylene to [AS/NZS 2904](#).
- Proprietary self-adhesive flexible flashing tape to [AS/NZS 2904](#).

2.5 DAMP-PROOF COURSE (DPC)

To [NZBC E2/AS1](#) either:

- 2 coats bitumen-based paint to [AS/NZS 2904](#).
- 1.0 mm min. bituminous sheet or heavy kraft strip laminate (saturated and coated with bitumen) to [AS/NZS 2904](#).
- 1.0 mm min. butyl rubber to [ASTM D6134](#).

2.6 DAMP-PROOF MEMBRANE (DPM)

0.25 mm min. polythene or polyethylene sheet to [AS/NZS 2904](#).

Components - general

2.7 SILLS

Refer to SELECTIONS for type.

Components - standard brick veneer

- 2.8 LINTELS
Steel lintel angles over openings to [AS/NZS 2699.3](#).
- 2.9 WALL TIES
To [AS/NZS 2699.1](#). Metal ties screw fixed to framing.
- 2.10 REINFORCEMENT
Galvanized wire joint reinforcement. Refer to SELECTIONS for type.

Accessories

- 2.11 SAND FOR MORTAR
To [NZS 3103](#). Chloride levels not to exceed 0.04% by dry weight of sand.
- 2.12 MORTAR
Composed of Portland cement, sand and water with an admixture to the provisions of [NZS 4210](#): 2.2 Mortar. Obtain written approval of admixture being used. Obtain written approval if intending to use hydrated lime in the mortar.
- 2.13 MORTAR COLOUR
Add mineral oxide pigment conforming to requirements of [NZS 4210](#), clause 2.2.2.2(f).
- 2.14 ADMIXTURES
To [NZS 4210](#).
- 2.15 WATER
Clean, fresh and free from excess alkali, salt, silt and organic materials.

3 EXECUTION

Conditions

- 3.1 DELIVERY, STORAGE AND HANDLING
To [NZS 4210](#) for aggregates, cement, bricks and reinforcement.
Take delivery of materials and goods and store on site and protect from weather or damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.
- 3.2 PRE-INSTALLATION / APPLICATION REQUIREMENTS - CONCRETE BASE
Check vertical and horizontal alignment. Any discrepancies exceeding the permitted tolerances shall be corrected before units are laid.
- 3.3 TIMBER FRAMING - STANDARD BRICK VENEER
Check timber framing stud spacing is in accordance with [NZS 3604](#).
- 3.4 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the brick veneer. Required preparatory work includes the following:
 - brick veneer wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
 - brick veneer neatly finished off to all sides of openings
 - installation of flashings (those required to be installed prior to installation of penetrating elements).
- 3.5 MEASURE MATERIALS
Measure materials for mortar accurately by weight or volume using suitably calibrated equipment.
- 3.6 WET WEATHER
Keep bricks dry at all times prior to laying. Protect the top row of uncompleted brick walls. Protect freshly laid brickwork during interruption through rain and at completion of each day's work. Protect brickwork for a minimum of 6 hours.

3.7 COLD WEATHER CONSTRUCTION

When air temperature is below 5°C take the precautions required by [NZS 4210: 2.18](#) Cold weather construction.

3.8 HOT WEATHER CONSTRUCTION

When air temperature is above 25°C or there is a drying wind, or lower temperatures, take the precautions required by [NZS 4210: 2.19](#) Hot weather construction.

3.9 KEEP FACE WORK CLEAN

Keep clean during erection and until completion of the contract works. Turn back scaffold boards at night and during heavy rain. Do not rub face work to remove stains.

Installation - general

3.10 STANDARDS AND TOLERANCES

To [NZS 4210](#), table 2.2 Maximum tolerances.
Refer to the general section CONSTRUCTION for general requirements.

3.11 COLOUR MIXING

Check all bricks delivered to site for colour variation, prior to commencing work. Ensure bricks are thoroughly blended from several pallets to ensure an even colour spread throughout the work.

3.12 UNIFORMITY

Carry up work with no portion more than 1500 mm above another at any time, raking back between levels.

3.13 BONDING

Lay bricks to the required bonding in the various locations. Refer to SELECTIONS/drawings.

3.14 PROVIDE WEEPHOLES

Provide weepholes at the bottom of cavities and cells to [SNZ HB 4236](#) and [NZBC E2/AS1, 9.2.6, Cavities](#), and as necessary to drain moisture to the outside air. Provide vent gap at the top of the veneer.

3.15 INSTALL VERMIN PROOFING

Either:

- Proprietary plastic weephole vents built into open perpend.
- Fold and staple one edge of the mesh to the substrate, with the mesh sloping down towards the veneer. Set the other edge into the mortar joint by half the thickness of the veneer or 50 mm, whichever is less.

3.16 CAVITY VENTILATION

Ventilate to outside air with top and bottom openings to the requirements of [SNZ HB 4236](#) and [NZBC E2/AS1, 9.2.6, Cavities](#). Seal cavity off from roof space.

3.17 CAVITY BRICKWORK BELOW GROUND

Fill all cavities below finished grade with concrete. Place a continuous damp-proof course within the first three mortar joints above ground. Seal the face of all brickwork below ground.

3.18 FORM OPENINGS

Unless detailed otherwise form openings to typical details from BRANZ Masonry veneer - Good practice guide.

3.19 SEPARATION JOINTS

Provide for wall movements of veneer with control joints to [NZS 4210: 2.10](#) Methods of controlling wall movements. Weatherproof as necessary.

3.20 FORM REVEALS

Form lintels, jambs and sills as detailed complete with flashings and all ready for following work.

3.21 HEAD FLASHINGS

Provide a flexible flashing extending 200 mm beyond ends of the opening and sloping to weepholes over all openings in cavity walls, in accordance with [E2/AS1, 9.2.4, Flashings](#).

3.22 JAMB FLASHINGS

Provide a flexible flashing to jambs of openings in cavity walls, fully lapped with horizontal damp-proof courses at head and sill, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.23 SILL FLASHINGS

Provide a flexible flashing under jointed sills, turned up at back and ends, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.24 REBATE DAMP PROOFING

Provide damp-proof course to stepped rebates supporting brick veneer in accordance with E2/AS1, 9.2.5, **Foundation support and damp-proofing**.

Installation - standard brick veneer

3.25 INSTALL LINTELS

Fit lintel angles to openings, sized to [NZBC E2/AS1, 9.2.9, Openings in masonry veneer](#) Table 18E and placed to [NZBC E2/AS1, 9.2.9, Openings in masonry veneer](#).

3.26 CAVITY WIDTH

No cavity width less than 40 mm or more than 75 mm.

3.27 PLACE WALL TIES

Place wall ties to: -

- [NZS 4210: 2.9.5](#) Tie anchorage, cover and fixing; and
- [NZS 4210: 2.9.6](#) Placing of ties
- [NZS 4210: 2.9.7](#) Tie classification and spacing
- [NZBC E2/AS1, 9.2.7, Wall ties](#), for requirements, spacing, embedment, placement and materials

At unsupported edges and at all openings through veneered walls or non-grouted cavity walls, wall ties to be provided:

At the top and bottom of the opening:

- Not more than 300 mm or 2 courses, whichever is the smaller

At the sides of the opening or at an unsupported edge:

- Not more than 300 mm
- Where the veneer wall continues above or is interrupted by a damp-proof course or waterproof membrane, wall ties shall be provided in each of the first two courses above the membrane.

Installation - ancillary work

3.28 BUILD IN FIXINGS

Build in necessary fixing bricks or blocks for trims.

3.29 BUILD IN ELEMENTS

Build in sills, copings, lintels, steps and other elements using mortar similar to that in adjacent walls.

3.30 BUILD IN DOORS AND WINDOWS

Build in door and window frames as the work proceeds and bed in mortar similar to that in adjacent work.

Completion

3.31 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.32 EFFLORESCENCE, WATER CLEANING

To remove deposits, brush with a stiff-bristle broom and take away brushings from the locality.

Remove remaining deposit with a damp sponge. Wash wall thoroughly with a plentiful supply of clean water. Repeat this process every 4 weeks from appearance through to the completion of the contract works.

3.33 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4311S STEEL & TUBE PROFILED METAL ROOFING

1 GENERAL

This section relates to the supply and fixing of **Steel & Tube** profiled metal roofing, complete with accessories.

1.1 RELATED WORK

Refer to 7411 RAINWATER SPOUTING SYSTEMS for rainwater disposal.

1.2 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

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
AS/NZS 1170.2	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/pre painted sheet metal products for interior/exterior building applications - Performance requirements
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents related to this section are:

Steel & Tube's literature, including:

Product Guide
Product Technical Statements
Design Solutions
NZ Steel: Specifiers and Builders Guide
NZ Steel: Installers Guide

Copies of the above literature are available from Steel & Tube

Web: www.steelandtube.co.nz
Email: info@steelandtube.co.nz
Telephone: Freephone 0800 333 247

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty in accordance with published supplier's guidance on materials, environments and building types:

15 years minimum	For Perforation
15 years minimum	For coatings

- Provide warranties on Steel & Tube standard **Warranty Plus** format.
- Commence the warranty from the date of installation.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

Warrant this work under normal environmental and use conditions against weatherproofing failure.

5 years: For workmanship

Form: Roofing installers standard form

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of installation.

Include a copy of the Steel & Tube maintenance requirements with the warranty.

Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Steel & Tube products, or associated components and products.

1.8 QUALIFICATIONS

Roof Installers shall be experienced, competent roofers familiar with Steel & Tube products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.

Carry out work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone HIGH (refer to [NZS3604](#), table 5.4)

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters and [NZMRM CoP](#). Refer to Steel & Tube Product Technical Statements for the selected profile. 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 material and associated flashings and accessories to form a weather tight and durable system.

1.12 DRINKING WATER

Roofing for collecting potable water to [NZBCG12/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

2.1 PRE-FINISHED ALUMINIUM

5005 or 5052 alloy H34 or H36 temper to suit application.

Fixings

2.2 FASTENERS GENERALLY

Minimum Category 4 and durability not less than the roofing material being fixed. Screw fasteners to be head stamped identifying the manufacturer and class.

2.3 FIXING SCREWS

To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by the roofing manufacturer and with a minimum Category 4 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm.

2.4 RIVETS

Sealed aluminium, minimum diameter 4mm, for use with zinc coated, zinc/aluminium coated or aluminium roofing.

Components

2.5 FLASHINGS GENERALLY

To E2/AS1, 4.0, **Flashings**.

Grade 0.55mm BMT for galvanized, aluminium/zinc-coated and pre-painted steel, and 0.90mm for aluminium (or 0.7mm for small aluminium flashings) to the same standards as the profiled sheets, notched where across profile or provided with a soft edge. Where flashings are required but are not detailed, design to Steel & Tube's approved recommendations and designs.

2.6 FLASHINGS TO VERGE, RIDGE AND HIP

To E2/AS1, 4.0, **Flashings**.

Supplied by the roofing manufacturer to match or to suit the roofing.

2.7 BOOT FLASHINGS

EPDM proprietary pipe flashing laid on 45° 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

2.8 WIRE NETTING AND SAFETY MESH

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.9 UNDERLAY AND REFLECTIVE FOIL

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.10 SEALANT

Neutral curing silicone or MS polymer sealant as required by Steel & Tube and used as directed.

2.11 CLOSURE STRIPS

Compressible, profiled, closed cell foam strips to fit the sheet profile.

2.12 LAP SEALING TAPE

Closed cell self adhesive Trimseal lap tape.

3 EXECUTION

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 adversely affect the roofing.

3.2 FRAMING TIMBER MOISTURE

For transverse flashings the framing moisture content to be a maximum of 18%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE

Stack roofing and accessories on clean, level areas of the site and protect from mechanical damage, wind damage and contamination. Loosely cover dry sheeting, with any wet sheeting fillet or cross stack to allow air to circulate. Remove strippable protective film, if applied, prior to prolonged exposure to sunlight.

3.4 HANDLING

Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage. Use soft, flat soled shoes when fixing and for all other work on the roof.

3.5 SEPARATION

Place isolators between dissimilar metals and separate roofing from treated timber and cement based materials. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanized or Zinalume® materials.

Application

3.6 SET-OUT

Carefully set out with consideration of the position of side laps to take account of the line of sight. Ensure all sheets are square and over-sailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.7 END LAPS

End laps are not permitted, except where specifically detailed.

3.8 FIXING GENERALLY

Install and fix in accordance with the [NZMRM CoP](#) requirements, and to Steel & Tube's recommendations. Paint colour matched fixings and accessories before installation.

3.9 MARKING AND CUTTING

Cut only by shearing tools. Do not use black lead pencils for marking aluminium/zinc coated products.

3.10 FIX SHEETS

Fix sheets in place using the fastening system required by Steel & Tube for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.11 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 purpose made tools.

3.12 FLASHINGS

Flash roof to parapets, walls and penetrations to detail. Where no detail is provided flash to [NZMRM CoP](#) recommendations and Steel & Tube's requirements. Cut accurately and fix using sealant and rivets to detail and to Steel & Tube's requirements to form a weatherproof cover. For highly visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.13 USE OF SEALANTS

Select and use sealants only as recommended by Steel & Tube. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.14 FLASHING PENETRATIONS

Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing to manufacturer's requirements, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

3.15 INSTALL RIDGING

Install ridging by fastening to the purlins through the leading edge of the roofing. Do not fasten transverse flashings to timber with moisture content >18%.

Completion

3.16 REPLACE

Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.

3.17 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.

3.18 REMOVE

Remove trade rubbish 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.steelandtube.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Roofing

4.1 STEEL & TUBE - PLUMBDEK, LOW RIB TRAPEZOIDAL ROOFING

BMT/material: 0.40BMT
Framing material: TIMBER
Fixing: Refer to Steel & Tube Plumbdek literature for details
Fixing pattern: Refer to Steel & Tube Plumbdek literature for details

4.2 CLOSURE STRIP

Brand: Ecofoam or pre-notched perforated metal closers

4.3 DEKTITE PIPE FLASHING

Brand/Type: Dektite

4422A ARDEX BUTYNOL & BUTYSEAL MEMBRANE ROOFING

1 GENERAL

This section relates to **ARDEX** Butynol® and Butyseal as single-layer external waterproof coverings, with associated components and accessories, bonded to:

- structural plywood

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:

PIR Polyisocyanurate (Polyiso)

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
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2269.0	Plywood - Structural - 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

Manufacturer and supplier documents relating to work in this section are:

ARDEX Waterproofing Manual
ARDEX Butynol® and Butyseal Product Datasheets
BRANZ Appraisal 436 - Butynol® and Butyseal Roofing Membrane Systems
CodeMark™ AQ-050516-CMNZ Butynol® Roofing Membranes

Copies of the above literature are available from **ARDEX New Zealand Ltd**

Web: www.ardex.co.nz
Email: ardexspec@ardexnz.com
Telephone: 0800 2 ARDEX (27339)
09-636 0005 Auckland
04-568 5949 Wellington
03-373 6900 Christchurch

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified ARDEX materials, or associated products, components or accessories.

1.5 QUALIFICATIONS

Installation of the membrane to be carried out by an ARDEX approved installer with experience in installation of Butynol roofing. Application to be strictly in accordance with current ARDEX Technical Literature and BRANZ Appraisal 436 - Butynol® and Butyseal Roofing Membrane Systems.

NOTE: An LBP is required to carry out RBW. An LBP must carry out or supervise this work. They must work within the scope of their licence class.

1.6 SYSTEM ARDEX PROJECT

Contact ARDEX with any relevant key dates and for a list of approved applicators. The contractor is to contact ARDEX prior to starting the project.

Web: www.ardex.co.nz
Email: ardexspec@ardexnz.com
Telephone: 0800 2 ARDEX (27339)
09-636 0005 Auckland
04-568 5949 Wellington
03-373 6900 Christchurch

Warranties

1.7 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years For Butynol
20 years For Butyseal

- Provide this warranty on the ARDEX 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.

1.8 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years For Butynol installation by ARDEX approved applicator
5 years For Butyseal installation by ARDEX approved applicator

- Provide this warranty on the ARDEX 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.

Performance

1.9 TEST

Where required a suitable time lapse or water test to be carried out.

1.10 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets. All penetrations to comply with NZBC E2/AS1 and ARDEX recommendations.

Compliance information

1.11 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Applicator approval certificate from the manufacturer / importer / distributor
- Manufacturer / suppliers warranty
- Installer / applicator warranty
- Producer Statement - Construction from the applicator / installer
- Producer Statement - Construction Review from an acceptable suitably qualified person
- Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS

Materials

2.1 BUTYNOL® MEMBRANE

Single ply membrane compounded from butyl rubber.

Rolls 1.4m x 17.86m = 25m² coverage and thickness 1.0mm, 1.2mm, 1.5mm (2.25mm for special applications, coverage 12m²).

Components

- 2.2 SEAM TAPE
ARDEX uncured butyl cold gum seam tape for general lap bonding, 50mm x 30.5m
- 2.3 SEAM PRIMER
ARDEX WPM 299 is a solvent-based water resistant primer for general lap bonding, specially formulated for use prior to Seam Tape application.
- 2.4 SEALANT
ARDEX CA 20 P Silane Modified Polymer (SMP) construction adhesive and neutral curing sealant. Available in 310mL cartridge.
- 2.5 FLASHING TAPE
ARDEX uncured underflashing tape, 100mm x 5m. Not to be left exposed to UV. Applied using WA 98 adhesive. A cover strip of Butynol or detail tape must be applied over flashing tape to finish.
- 2.6 DETAIL TAPE
ARDEX self-adhesive butyl detail/finishing tape, 0.8mm thick. Available in 150mm x 30.4 m roll.
ARDEX fully-cured silicone backed detail/finishing tape. Available in 150mm x 10 m roll.
- 2.7 OVERLAY/COVER TAPE
ARDEX cured silicone backed self-adhesive tape to join Butyseal end laps. Available in 150mm x 30.4 m roll.
- 2.8 ADHESIVES AND SOLVENTS
ARDEX WA 98 Butynol contact adhesive for substrate bonding and for laps not subject to periodic ponding (pitch $\geq 5^\circ$), supplied in 20L pails.
ARDEX WA 98S Butynol solvent for cleanup of WA 98 adhesive, supplied in 20L pails.
- 2.9 EDGE TRIM
Metal or timber to ARDEX details to suit the specific location.
- 2.10 RELEASE TAPE
ARDEX release tape is a 25mm wide pressure sensitive tape between two silicone release backings. For all joints in plywood and Strandsarking, and junctions of plywood and Strandsarking with other materials.

Accessories

- 2.11 ROOFING ACCESSORIES
ARDEX substrate ventilators, roof outlets, overflows, scuppers and rainwater heads.
- 2.12 RAIN HEADS
Rotationally moulded one piece plastic rain head. 530mm x 380mm x 330mm to suit 100mm, 150mm or 200mm outlets.
- 2.13 SCUPPER OUTLETS
Moulded scupper outlets, 105mm x 65mm or 210mm x 80mm.

3 EXECUTION

Conditions

- 3.1 GENERALLY
All work and materials to the ARDEX Waterproofing Manual, the current ARDEX technical literature, [BRANZ Appraisal 436](#) and [NZBC E2/AS1](#) External moisture, 8.5 **Membrane roofs and decks**.
- 3.2 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Take delivery of ARDEX Butynol® and Butyseal branded rolls, refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

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

Check work previously carried out and confirm it is of the required standard for this part of the work.

3.5 WEATHER

Apply coverings in a dry atmospheric condition and only when the air temperature is 6°C and above.

Application - preparation

3.6 PRELIMINARY WORK

Ensure that preliminary work, including formation of falls, flashing rebates, grooves, ducts, provision of battens and fillets and fixing of vents and outlets to levels, is complete and properly constructed to enable the system to work as intended. This work and the substrate to be smooth, clean and dry.

3.7 ACCEPTANCE OF SUBSTRATE

Ensure that the substrate, including fillets, outlets and projections, meets design specification and ARDEX conditions.

Ensure whichever is the greater falls are provided:

- as shown in the drawings
- to the membrane manufacturer requirements
- minimum to [NZBC E2/AS1, 8.5.1](#), - 1:30 for roofs, 1:40 for decks and 1:100 for gutters.

Falls must be built into the substrate and slope to an outlet.

3.8 PLYWOOD SUBSTRATE

Ensure plywood is:

- a minimum of 17mm thick and complying with [AS/NZS 2269.0](#)
- minimum CD structural grade with the sanded C side upwards
- hazard Class H3.2 with waterborne CCA treatment to AS/NZS 1604.1, and kiln dried after treatment
- laid with staggered joints (brick bond) with all edges of the sheets fully supported or with tongue and groove jointing
- laid with the face grain at right angles to the supports
- provide with 20mm H3.2 CCA treated triangular timber fillets at the base of all upstands and chamfer all external edges a minimum of 5mm
- fixed with 10 gauge x 50mm stainless steel countersunk head screws
- fixed at 150mm centres on edges and 200mm in the body of the sheets.
- **Note: LOSP treated plywood not to be used.**

Plywood must be dry and the timber substructure to have a maximum moisture content of 20% when the membrane is adhered. Consult with plywood manufacturer for correct testing technique.

Application - laying Butynol and Butyseal

3.9 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.10 CONDITIONS

Do not lay membrane in wet or misty conditions or below 6°C. Check that the substrate is dry at time of laying. Concrete substrate maximum moisture content 75% RH (relative humidity); timber substructure maximum moisture content 20%.

3.11 GENERAL

Tape backing substrate sheet joints using 25mm ARDEX Release tape. Run out sheets and allow to relax for at least 20 minutes before laying. Do not stretch sheets or tapes in laying. Substrate does not generally require priming. In cases of extreme absorbency a priming coat of 50/50 solution of ARDEX WA 98 adhesive/solvent may be required, consult with ARDEX to confirm.

3.12 APPLY ADHESIVE

Apply ARDEX WA98 adhesive to the substrate and the Butyl rubber sheeting by brush, spray, or roller at a spreading rate of not less than 2.5 square metres per litre. Leave to tack dry before bonding the two surfaces together.

3.13 LAY SHEETS

Lay sheets across the roof slope and lap long edges to the full width of selvage, 50mm minimum. Smooth down and roll to remove entrapped air. Adhesive bond and seal to ARDEX requirements and roll or rub down as the work proceeds.

3.14 BONDING LAPS

Bond all laps to ARDEX requirements using ARDEX Seam Tape and Seam Primer.

3.15 MINOR MOVEMENT JOINTS

Lay sheets across joint but leave unbonded on both sides.

Unbonded width: 25mm minimum

All joints and junctions with other materials to be taped using ARDEX release tape. One release backing is removed to allow the tape to be applied over all sheet substrate joints. The other release backing is left in place to provide an unbonded area under the membrane which allows for substrate movement.

3.16 INSPECT

Inspect and test joints on completion.

3.17 PENETRATIONS

Form and finish upstands, downturns, penetrations, sumps and vents to conform with ARDEX details and NZBC E2/AS1.

3.18 PENETRATIONS AND JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of the roofing.

Confirm that the openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Protection

3.19 ACCEPTANCE

Sign off on completed areas. The main contractor to protect and maintain roofing until completion of the contract works.

Completion & Commissioning

3.20 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.ardex.co.nz.

Substitutions are not permitted to the following.

4521 ALUMINIUM WINDOWS AND DOORS

1 GENERAL

This section relates to the manufacture, supply, and installation of:

- aluminium windows
- aluminium doors and frames
- hardware and furniture
- flashings

1.1 RELATED WORK

Refer to glazing sections for glass types

1.2 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ
PQAS	Powder Coating Quality Assurance System

Documents

1.3 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 H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
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 sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
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 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
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 Amendment 7
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)

Warranties

1.4 WARRANTY - MANUFACTURER / SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years: For fabrication

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

1.5 WARRANTY - INSTALLER / APPLICATOR

Provide an installer/applicator warranty:

2 years: For installation

- Provide this warranty in the installer/applicator standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

1.7 COMPLIANCE

Windows and doors to be manufactured and installed to [NZBC E2/AS1](#).

1.8 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

1.9 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.

1.10 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

Performance - Wind (design by contractor)

1.11 WIND - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of [NZS 3604](#), table 5.4.
Refer to SELECTIONS for wind zone.

Finishes

1.12 CERTIFY COATINGS - POWDER COATING

Certify on request, compliance with this specification and support with control and sampling records.
Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.
The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS

Materials

2.1 WINDOWS

Refer to plans for more info.

2.2 DOORS

Refer to plans for more info.

2.3 ALUMINIUM EXTRUSIONS

Alloy designation to comply with [AS/NZS 1866](#). Branded and extruded for anodising or powder coating.

2.4 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

2.5 STAINLESS STEEL SHEET AND STRIP

Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

2.6 GLASS

Refer to the glazing section for glass types and installation.

2.7 REVEALS - TIMBER PAINTED

Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

2.8 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 cavity systems

2.9 STANDARD CAVITY CLOSER

A perforated 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.

2.10 SUPPORT BAR

WGANZ extruded aluminium support bar with built in drainage and ventilation to [NZBC E2/AS1](#), to provide continuous support to the window unit. Size to suit cladding type.

Components

2.11 GLAZING GASKETS

Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.12 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.

2.13 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to [NZBC F4/AS1](#), Table 2, Acceptable opening sizes for barriers.

Sealants

2.14 STRUCTURAL SEALANT

Silicone chemically curing sealant specifically formulated and tested or approved equivalent with not less than a $\pm 40\%$ movement factor complying with US Federal Specification TT S 001543A.

2.15 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 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus ($\pm 25\%$ movement) to US Federal Specification TT S 00230C.

2.16 FOAM TAPE

Foam tape to [NZBC E2/AS1](#), 9.1.10.7 **Closed cell foam tape**.

Finishes

2.17 POWDER COATED ALUMINIUM - EXTRA-DURABLE POLYESTER

Polyester powder organic coating in accordance with [WGANZ PQAS](#), AS 3715, and AAMA 2603

3 EXECUTION

Conditions - generally

- 3.1 DO NOT DELIVER
Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.
- 3.2 UNLOAD WINDOW JOINERY
Unload, handle and store elements in accordance with the window manufacturer's requirements.
- 3.3 AVOID DISTORTION
Avoid distortion of elements during transit, storage and handling.
- 3.4 PREVENT DAMAGE
Prevent prefinished surfaces rubbing together, and contact with mud, plaster and cement. Keep paper and cardboard wrappings dry.
- 3.5 PROPRIETARY ELEMENTS
Fix in accordance with the window manufacturer's requirements.
- 3.6 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.
- 3.7 ADDITIONAL PROTECTION
Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Conditions - fixings and fastenings

- 3.8 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. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with [AS/NZS 4680](#).
- 3.9 INSTALLATION FIXING
To [NZBC E2/AS1](#), 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings. Install packers between reveals and framing at fixing points, except at the head.

Assembly

- 3.10 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.
- 3.11 TIMBER / PVC REVEALS
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.
- 3.12 HARDWARE GENERALLY
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.
- 3.13 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

3.14 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.

3.15 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 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).

3.16 INSTALLATION

Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.17 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).

3.18 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 minimum plus any jamb scribe width at each end.

3.19 COMPLETE AIR SEAL

To [NZBC E2/AS1:9.1.6](#) Air seals. Form an air-tight seal by means of a proprietary expanding foam or sealants used with 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.

3.20 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.21 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window 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.

3.22 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.

3.23 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.

3.24 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.

Completion - cleaning

3.25 REMOVE TRADE DEBRIS

Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.26 TRADE CLEAN

Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.27 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.

3.28 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.

3.29 IN SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted only to minor surface scratching. Otherwise replace all damaged material.

3.30 REMOVE

At the appropriate stage of the project, remove safety indicators and protective coverings and wipe down all joinery thoroughly.

3.31 REPLACE

Replace damaged, cracked or marked elements.

4 SELECTIONS

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

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 F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1	Energy Efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
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 meet the energy requirements of NZS 4218 and NZBC H1/AS1 for housing small buildings.

Refer to SELECTIONS and schedules for location and type of glazing.

2 PRODUCTS

Materials

- 2.1 CLEAR FLOAT GLASS
Clear ordinary annealed transparent float glass for general window glazing. Thickness to [NZS 4223.1](#) and [NZS 4223](#). Supp 1.
- 2.2 TEXTURED, PATTERNED OR OBSCURE GLASS
Translucent, annealed, rolled glass with a decorative pattern on one surface.
- 2.3 LAMINATED GLASS
Grade A Safety Glass to [AS/NZS 2208](#) with PVB or CIP resin interlayer.
- 2.4 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.
- 2.5 TINTED FLOAT GLASS
Body tinted float glass.
- 2.6 INSULATING GLASS UNITS (IGU'S)
To [AS/NZS 4666](#), [NZS 4223.2](#) and the IGU Manufacturers Association (IGUMA) requirements.
Marking to [NZS 4223.2](#) as modified by [NZBC B2/AS1](#), 3.5.
Refer to SELECTIONS for specified surfaces of the IGU.
Surface numbering order for glass panes in an IGU are #1, #2, #3, and #4 as follows:
- Surface #1 - outer face of exterior pane
- Surface #2 - cavity face of the exterior pane
- Surface #3 - cavity face of the interior pane
- Surface #4 - outer face of the interior pane

Materials, screens

- 2.7 GLASS SCREENS SHOWER & BATH
Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, aluminium and uPVC glazing

- 2.8 GLAZING TAPE AND GASKETS
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.
- 2.9 SETTING BLOCKS
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

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](#).

Application aluminium

3.15 INSTALL GLASS TO ALUMINIUM FRAMES

Install glass to [NZS4223.1](#).

- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

Application miscellaneous

3.16 INSTALL GLASS SHOWER & BATH SCREENS

Install shower and bath screens and doors to manufacturer's requirements.

Finishing

3.17 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

3.18 TRADE CLEAN

Clean off or remove safety indicators at completion of the building.

3.19 REPLACE

Replace damaged, cracked or marked glass.

3.20 LEAVE

Leave work to the standard required by following procedures.

3.21 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4710P PINK® BATTS® & PINK® BATTS® SILENCER® INSULATION

1 GENERAL

This section relates to Tasman Insulation **Pink® Batts®** insulation materials installed into residential buildings.

It includes:

Thermal:

- **Pink® Batts® Ceiling Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®)**
- **Pink® Batts® Wall Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®)**

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS2	Protection from fire
NZBC H1/AS1	Energy efficiency
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS/NZS 3000	Electrical installations
NZS 4218	Thermal insulation - Housing and small buildings
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy Efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 60598.2.2:2001	Luminaires- Particular Requirements - Recessed luminaires
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents related to this section are:

Tasman Insulation New Zealand: Product Data Sheets and Installation Instructions

[BRANZ Appraisal 238](#) - Pink® Batts® Insulation

[BRANZ Appraisal 632](#) - Pink® Batts® SnugFloor® Underfloor Insulation

[BRANZ Appraisal 767](#) - Pink® Batts® Skillion Roof Insulation

Manufacturer/supplier contact details

Company: **Tasman Insulation New Zealand**

Web: www.pinkbatts.co.nz

Telephone: 0800 746 522

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

Lifetime Warranty	For Pink® Batts® insulation products
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- Commence the warranty from the date of practical completion of the contract works.
- Provide this Warranty on the **Pink® Batts® Lifetime Warranty Certificate** form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS, PINK® BATTS®

Installers to be **PinkFit® - Preferred Pink® Batts® installers**. A list of approved installers can be obtained from the web, by telephone or from the local building supplies merchant.

Web: www.pinkbatts.co.nz

Telephone: Freephone 0800 746 534

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Tasman Insulation **Pink® Batts®** insulation or associated products, components or accessories.

Performance - combustibility

1.6 FIRE PREVENTION

Pink® Batts® insulation materials are considered a non-combustible material to NZS/AS 1530.1 and need not be separated from heat sources such as fire places, heating appliances, flues and chimneys to [NZBC C/AS1](#) to [C/AS2](#), except if used in conjunction with, or attached to other heat sensitive materials.

2 PRODUCTS

Materials - thermal

2.1 PINK® BATTS® CEILING INSULATION

Pink® Batts® Ceiling Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular slabs. Refer to SELECTIONS for R values and thickness options.

NOTE: When insulation abutting or covering recessed downlights is intended to be in contact with IC, CA 80, CA 135 luminaries the insulation must withstand a 30s Needle Flame test to [AS/NZS 60695.11.5](#). **Pink® Batts®** insulation meets this requirement.

2.2 PINK® BATTS® WALL INSULATION

Pink® Batts® Wall Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular slabs. Refer to SELECTIONS for R values and thickness options.

Components

2.3 FASTENERS

Insul anchors complete with retaining washer.

2.4 WIRE NETTING

Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting used to support the insulation.

2.5 PLASTIC STRAPPING TAPES

Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall, ceiling and underfloor locations.

For drained cavities where stud spaces are greater than 450mm and only flexible underlay is used, strapping required to [NZBC E2/AS1 9.1.8.5](#) **Wall framing behind cavities**.

2.6 ADHESIVE TAPE

Pressure sensitive adhesive tape.

3 EXECUTION

3.1 STORAGE

Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, compression, puncturing and damage to edges of materials. Do not use damaged or wet insulation materials.

3.2 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.3 INSPECTION

Before starting installation of blankets and slabs, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, wall underlays and vapour barriers are in place.

Application - general

3.4 INSTALL INSULATION - GENERAL

Lay, install, fit and fix to [NZBC H1/AS1](#): Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to [NZS 4218](#) and [NZS 4246](#). Install in large buildings to [NZS 4243.1](#) and [NZS 4220](#). Allow insulation to re-loft/relax prior to installation. Do not cover vents. Confirm with fireplace manufacturer for clearances; **Pink® Batts®** insulation 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.

3.5 RECESSED LIGHT FITTINGS - CLEARANCE

Non-residential applications;

The clearance between insulation and recessed downlights

- 100mm gap to [AS/NZS 3000](#), figure 4.9.
- Provide larger clearances where required by the light manufacturer.

Residential applications;

- Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#); CA 80, CA 135, IC and IC - F
- Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides (wrapping around the sides)
- Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- Provide larger clearance where required by the light manufacturer.
- In a retrofit situation where recessed downlights are unclassified or unknown, ensure 100mm clearance from the insulation to [AS/NZS 3000](#), figure 4.9.

Application, thermal insulation

3.6 INSTALL PINK® BATTS® CEILING INSULATION

Ensure that the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Ceiling Insulation** beneath electrical wiring and plumbing. Install to the outer edge of the top plate. Maintain a 25mm gap clearance between the **Pink® Batts®** insulation and roof underlay. Refer to [NZS 4246](#) for installation guidelines and Pink® Batts® installation instructions for detailed information.

3.7 INSTALL PINK® BATTS® WALL INSULATION

Ensure the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Fill gaps around windows and doors with off-cuts. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Wall Insulation** behind electrical wiring and plumbing. Ensure there are no gaps, folds or undesirable compression at edges.

Refer to [NZS 4246](#) for installation guidelines and Pink® Batts® installation instructions for detailed information.

Application - components

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 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.

Completion

3.10 CLEAN UP

Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.

3.11 LEAVE

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.pinkbatts.co.nz.

Substitutions are not permitted to the following, unless stated otherwise.

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
- bracing systems
- wet area 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 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600:2005	Cold-formed steel structures
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)
NASH	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and Supplier documents relating to this part of the work.

- GIB® Site Guide (September 2018)
- GIB® Noise Control Systems (September 2017)
- GIB® Fire Rated Systems (October 2018)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB Toughline® Aqua (July 2018)
- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Bracing Software
- GIB Ezybrace® Systems (June 2011), with amendments (December 2014)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software (2011)
- GIBFix® Framing System (2016)
- GIB Rondo® Metal Ceiling Batten Systems
- GIB-Cove®
- GIB RocTape®
- GIB Goldline™ Platinum Tape-on Trims (January 2006)
- GIB UltraFlex® high impact corner mould (September 2004)
- GIB® Tough Systems (Nov 2014)
- GIB Ezybrace® Systems 2016
- GIB Aqualine® Wet Area Systems
- GIB Ezybrace® Systems 2016

BRANZ Appraisal 928 (2016)
BRANZ Appraisal 427 (2007)
BRANZ Appraisal 928 (2016)

GreenTag Certification

- [WWLCG001-001-A-2015](#) - GreenTag™ GreenRate / Level B for:
- GIB® Standard (10mm & 13mm)
 - GIB Fyrelite® (10mm, 13mm, 16mm & 19mm)
 - GIB Bracelene® (10mm & 13mm)
 - GIB Noiseline® (10mm & 13mm)
 - GIB Toughline® (13mm)
 - GIB Wideline® (10mm & 13mm)

Copies of the above literature are available at:

Company: Winstone Wallboards
Web: www.gib.co.nz
Telephone: 0800 100 442

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 INSTALLER WORK SKILLS AND QUALIFICATIONS

GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

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 (2016) and/or GIB Ezybrace® Bracing Software (2016)
- GIB Ezybrace® Systems (2011)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software 2011 (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 Fyrelite® 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.

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 STORAGE

Store GIB® plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB® Site Guide (September 2018).

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 SUBSTRATE

Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (September 2018).

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to [AS/NZS 2589](#) for timber framing at lining: 18% or less for plasterboard linings. Refer to [NZBC E2/AS1](#) and GIB® Site Guide (Sept 2018).

3.6 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 (Sept 2018).

Application

3.7 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.8 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide (September 2018). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.9 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.

3.10 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.11 FORM BRACING SYSTEMS

Form bracing systems to:

- GIB Ezybrace® Systems (2016)

3.12 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide (September 2018) requirements.

3.13 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.14 FINISHING GENERALLY

To GIB® Site Guide (September 2018) and [AS/NZS 2589](#).

Completion

3.15 REPLACE

Replace damaged sheets or elements.

3.16 CLEAN DOWN

Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.

3.17 REMOVE

Remove debris, unused materials and elements from the site.

3.18 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

6221A ARDEX TILING SOLUTIONS

1 GENERAL

This section relates to the preparation of floor and wall surfaces for tiling systems with ARDEX Tiling Solutions:

- Levelling screeds
- Primers
- Waterproofing systems
- Adhesives
- Sealants
- Grouts

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:

DTA DTA 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 D1/AS1	Access routes
AS CA27	Code of recommended practice for internal plaster on solid backgrounds
AS 1315	Portland Cement
AS 3740	Waterproofing of domestic wet areas
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles

AS/NZS 4671 Steel reinforcing materials

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'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

ARDEX Tiling Solutions

BRANZ Appraisal 472 - ARDEX Undertile Internal Liquid Waterproofing Membranes

DTA New Zealand - Architectural Trims catalogue. Refer to www.dtanx.co.nz

Copies of the above literature are available from ARDEX

Web: www.ardex.co.nz

Email: specification@ardexnz.com

Telephone: 0800 227339

Warranties - waterproofing

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years For materials

- Provide this warranty on the ARDEX 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.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
15 years For execution

- Provide this warranty on the installer/applicator 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.

Warranties - tiling

1.6 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
10 years For materials

- Provide this warranty on the ARDEX 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.

1.7 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
5 years For execution

- Provide this warranty on the installer/applicator 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

1.8 NO SUBSTITUTIONS

Substitutions are not permitted to any specified ARDEX materials, or associated products, components or accessories.

1.9 QUALIFICATIONS

Waterproofing work to be carried out by an ARDEX approved waterproofing applicator.
Tiling to be carried out by competent workers experienced with the materials and in the techniques specified.

1.10 DEFLECTION CRITERIA FOR SUSPENDED FLOORS

Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.11 SYSTEMS ARDEX PROJECT

Contact ARDEX with any relevant key dates and for a list of approved applicators. The contractor is to contact ARDEX prior to starting the contract.

Web: www.ardex.co.nz
Email: ardexspec@ardexnz.com
Telephone: 0800 2 ARDEX (27339)

Performance

1.12 QUALITY ASSURANCE

Follow and complete ARDEX QA documents and submit to ARDEX on completion with request for warranty.

Performance - Slip resistance

1.13 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 FLOORING UNDERLAY

Fibre cement, 6mm to 10mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish specifically intended as an underlayment for tiles.

2.2 ARDEX LQ 92

ARDEX LQ 92 is a cement-based underlay for levelling uneven concrete floors prior to tiling. When mixed with water, LQ 92 provides a smooth, pourable, free-flowing and self-smoothing material that can be applied to a thickness of 25mm down to a feather edge.

2.3 ARDEX A48 SCREED

ARDEX A 48 is a premixed, rapid-set, cement screed preparation that has been designed for all types of floor coverings and is especially effective when installing moisture sensitive coverings and ARDEX undertile waterproofing systems.

2.4 ARDEX MULTIPRIME - POROUS SUBSTRATES

ARDEX Multiprime is an internal or external primer suitable for porous substrates. Suitable for concrete, wood and fibre-cement sheet substrates. Alternatively. Contact ARDEX for recommendations.

2.5 ARDEX P9 - NON-POROUS SUBSTRATES

ARDEX P9 is a single-part, water-based primer for non-porous substrates. Contact ARDEX for recommendations.

Materials - Waterproofing

2.6 INTERNAL WATERPROOFING SYSTEM

ARDEX WPM 001 is a BRANZ Appraised, one-part liquid waterproofing membrane specifically designed for use under tiles.

Materials - Tile adhesives

2.7 ARDEX X 18

A superior, white polymer-fortified, cement-based wall and floor tile adhesive that has been specially formulated with mastic type properties. ARDEX X 18 is suitable for use with a wide range of substrates and tile types including permanent immersion and swimming pools.

Materials - Sealants - grouts

2.8 ARDEX SEALANTS

ARDEX SE acetic cure silicone is ideal for movement joints within a tiling system.
ARDEX ST neutral cure silicone is ideal for bond breakers or movement joints within a tiling system.
Sealants and back-up materials as described in clause 2.7 of AS 3958.1 and clause 2.6 of AS 3740.
Colours match some grout colours

2.9 ARDEX GROUTS

ARDEX FG 8 cement-based grout for joints 1mm to 8mm wide. Ideal for wet areas when mixed with ARDEX Grout Booster additive.
ARDEX FS DD cement-based, fine sanded grout for joints 1mm - 4mm.
ARDEX EG 15 epoxy grout with excellent stain and chemical resistance for joints 1.5mm to 15mm wide.

2.10 ARDEX GROUT BOOSTER

A water-based, synthetic polymer grout additive formulated for use with cement-based grouts for improved adhesion strength, flexibility and abrasion resistance.

Components

2.11 STRIPS AND WEATHERBARS

Unless otherwise specified DTA tile trim, edge strips, floor finish divider strips and weather bars shall be aluminium.

3 EXECUTION

General

3.1 HANDLING AND STORAGE

Take delivery of packets of tiles undamaged and dry. Handle tiles with care to avoid chipping, soiling and damage. Store on hard level standings in non-traffic, non-work areas that are enclosed, clean and dry.

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 PREPARATION OF BACKGROUNDS

Prepare backgrounds in accordance with AS 3958.1, section 4 and to the manufacturer's instructions for the selected substrate. See also the ARDEX Flooring manual by visiting www.ardex.co.nz/

Conditions

3.6 SERVICES AND ACCESSORIES

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START

Do not start laying tiles until concrete floors are cured, moisture content of floors is such that shrinkage is complete, thermal movement has been accommodated and the levels and surface finish will allow for tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT

Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less. Alternatively, see ARDEX moisture barriers.

Application

3.10 APPLICATION GENERALLY

Prepare backgrounds as described in AS 3958.1, Section 4. Suitably prepare backgrounds and substrates to the manufacturer's instructions to receive the bedded finish. Remove all dirt, dust, grease, oil, loose particles and any other form of contamination or deleterious material. Ensure that substrates are sound and dry.

Installation to be in accordance with AS 3958.1, Section 5, including setting out, fitting, movement joints, sealants, tile finish and joints, and grouting.

3.11 BACKGROUND MATERIALS

Ensure that the installation of background materials and substrate materials meets relevant standards and the manufacturer's instructions. Inspect background and substrate materials for any conditions unsuitable for tiling over. Do not commence work until the affected area is rectified. Confirm any specific preparation required for the adhesive being used.

3.12 FLOORING UNDERLAY

Underlay material: CFC sheet 6mm to 10mm

Locations: In internal locations apply underlay over the following flooring backgrounds subject to movement - strip timber flooring (T&G); particleboard sheet flooring.

Installation: Supply and install CFC to the manufacturer's recommendations.

Waterproofing

3.13 WET AREA WATERPROOFING

Provide waterproofing to wet areas as described in AS 3740.

Material: Refer to drawings

Locations: Extent of wet areas as described in AS 3740 and as shown on the drawings.

Installation: Supply and install waterproofing membrane to the manufacturer's recommendations by an approved ARDEX installer.

Screed / Cement Render

3.14 APPLY ARDEX SCREED

Prepare and apply screed system as per ARDEX requirements and instructions, including substrate preparation, mixing, applying, number of coats, finishing and curing. Protect from damp, condensation and water for at least 24 hours once application is completed.

Tiling

3.15 ADHESIVE APPLICATION METHODS

Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive.

Notched trowel method

- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method

- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations

- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

3.16 SETTING OUT

Setting out, cutting and fitting of tiles to be as described in AS 3958.1, clauses 5.4.2 and 5.4.3. Set out tiling as shown on the drawings. Confirm bond and pattern before installing. Provide even and correct falls to floor tiles where required, including falls to floor wastes. Ensure that a level finish is provided at wall lines. Where falls are not required ensure that the tiles are laid level.

3.17 TILE FINISH AND JOINTS

Provide tile finish and joints, including tolerances, as described in AS 3958.1, clause 5.4.6. Joint widths to be suited to tile and to the manufacturer's instructions.

3.18 MOVEMENT JOINTS

Provide movement joints as described in AS 3958.1, clause 5.4.5 and AS 3740, clause 3.13.7.

- Depth: Movement joints to go right through the tile and bed to the background.
- Width: Minimum 6mm.
- Corner locations: In wall tiling at internal vertical corners; in floor tiling at walls, columns, nibs, hobs and similar.
- Interruptions: Around sanitary fixtures, around fixtures interrupting the tile surface; at junctions with joinery fixtures, including window and door frames and built in cupboards; at changes in substrate or background.
- Large areas: In floor tiling provide joints at not less than 4.5 metres spacing in both directions and 3.5 metres externally. In wall tiling provide vertical joints at not less than 3.5 metres spacing along the length of a wall. In wall tiling, provide horizontal joints at each story rise in the height of a wall. Over all existing expansion joints.

3.19 GROUTING

Grout tiling to AS 3958.1, clause 5.7.

3.20 SILICONE

Apply ARDEX SE acetic cure or ARDEX ST neutral cure silicone to movement joints between tiles, and at junctions to tiled walls and tiled floors. The silicone should only be fixed to two surfaces to allow movement. On flat joints use a polyethylene tape or release agent and on floor to wall joints greater than 10mm deep use a backing rod.

Completion

3.21 REPLACE

Replace damaged tiles or elements.

3.22 CLEANING

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

3.23 LEAVE

Leave work to the standard required by following procedures.

3.24 REMOVE

Remove debris, unused materials and elements from the site.

3.25 PROTECT TILES

Protect tiles from damage. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting. Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

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 ISO 9001	Quality management systems - requirements
SNZ TS 3404	Durability requirements for steel structures and components
WorkSafe NZ	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe NZ	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 NZ: 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 NZ: 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

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 NZ: 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.

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.

Preparation - painted surfaces generally

3.23 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.

3.24 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.

3.25 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.

Application - before applying final coatings

3.26 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.

3.27 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.

3.28 CONCEALED JOINERY SURFACES

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.29 CONCEALED METAL SURFACES

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.30 DOORS

Prime or seal and paint all six faces of doors before hanging.

3.31 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.

3.32 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

3.33 PAINTING GENERALLY

Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.34 MIXING

Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.35 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

3.36 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

3.37 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.

3.38 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.

3.39 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.

3.40 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the paint system specified.

3.41 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

3.42 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.

3.43 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.

3.44 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.

3.45 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.

3.46 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

4 SELECTIONS

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.

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

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 C/AS1-AS2	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
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 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/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 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.
Gas (Safety and Measurement) Regulations 2010	
Plumbers, Gasfitters and Drainlayers Act 2006	
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps	

Warranties

1.3 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

1.4 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](#).

1.5 INFORMATION FOR OPERATION AND MAINTENANCE

Provide the following general operation and maintenance information as electronic PDF format documents:

ESCEA DF960 FIREBOX INSTALLATION GUIDE, SPECIFICATIONS & OWNERS MANUAL.

Provide this information prior to practical completion.

1.6 HOT WATER TEMPERATURES

To [NZBC G12/AS1](#), 6.14

Storage water heaters to store water at not less than 60°C.

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:

- 45°C - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 55°C - 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

1.7 TESTING - TO AS/NZS 3500

Test to [AS/NZS 3500.1](#), Section 18, **Testing and commissioning**, for cold water.

- Test reticulation system to a pressure of 1500 kpa for period not less than 30 minutes, to [AS/NZS 3500.1](#), 18.3.1 **Hydrostatic test**. Test storage tanks to [AS/NZS 3500.1](#), 18.3.2 **Storage tanks**.

and

[AS/NZS 3500.4](#), Section 9, **Testing and commissioning**, for hot water.

- Test reticulation system (excluding tanks, water heaters, and some fixtures, valves etc) to a pressure of 1500 kpa for period not less than 30 minutes, to [AS/NZS 3500.4](#), 9.3 **Testing**. Test complete system (including valves, pumps, water heaters etc) under normal working conditions for a minimum of 48 hours, then check visually, to [AS/NZS 3500.4](#), 9.3 **Testing**.

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.

1.8 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.

1.9 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.

1.10 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

Materials

2.1 COPPER PIPE

To [NZS 3501](#) complete with copper-alloy compression fittings or crox type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), Table 1 and [NZBC G12/AS1](#), Table 1.

2.2 PVC-U PIPE

Complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#) Durability, Table 1 and [NZBC G12/AS1](#), Table 1. Protect from sunlight.

2.3 POLYBUTYLENE PIPE

Polybutylene tubing to [AS/NZS 2642.1](#), [AS/NZS 2642.2](#) and [AS/NZS 2642.3](#) complete with fittings and accessories brand-matched with durability to [NZBC B2/AS1](#) Durability, table 1 and [NZBC G12/AS1](#), table1. Protect from sunlight.

2.4 POLYETHYLENE PIPE

To [AS/NZS 4130](#) Series 1 complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/AS1](#), table1. Except for solid black PE, protect from sunlight.

2.5 POLYPROPYLENE RANDOM WATER PIPE

PP-R Polypropylene pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/VM1](#). Protect from sunlight.

2.6 CROSS LINKED POLYETHYLENE PIPE

Cross Linked Polyethylene Pipe to [AS/NZS 2492](#) and fittings to [AS/NZS 2537.2](#) with a minimum pressure capability of 1200 kPa complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/VM1](#). Except for solid black PE-X, protect from sunlight.

2.7 WATER METER

To the requirements of the network utility operator.

2.8 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](#).

2.9 BACKFLOW PREVENTION DEVICES

Provide backflow prevention devices to [AS/NZS 2845.1](#) where it is possible for water or contaminants to backflow into the potable water supply. Refer to [NZBC G12/AS1](#) 3.4 Backflow protection, and [NZBC G12/AS1](#), table 2, Selection of Backflow Protection.

2.10 TEMPERING VALVE

Tempering valve to [NZS 4617](#) to [NZBC G12/AS1](#).

Materials - Hot water heating appliances

2.11 GAS HOT WATER HEATER, STORAGE TYPE
Insulated cylinder to [NZS 4305](#) with an integral gas burner and flue.

2.12 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/VM1](#) or [NZBC G12/AS1](#).

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 [NZBC G12/VM1](#) 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 - Jointing

3.10 JOINTING COPPER PIPE
Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to [NZBC G12/AS1](#).

3.11 JOINTING PVC-U PIPE
Solvent welded joints using spigots and sockets, flanged joints and seal ring compression joints to [NZBC G12/AS1](#).

3.12 JOINTING POLYBUTYLENE PIPE
Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

3.13 JOINTING POLYETHYLENE PIPE
Seal ring compression joints and electrofusion to [NZBC G12/AS1](#).

- 3.14 JOINTING POLYPROPYLENE PIPE
Fusion weld joints to manufacturer's requirements.

Application - Pipework installation

- 3.15 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](#).

- 3.16 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 [NZBC G12/VM1](#) 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.

- 3.17 HOT WATER PIPEWORK
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 7 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 G12/VM1 or G12/AS1.

- 3.18 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.

- 3.19 IN-LINE FILTER
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

- 3.20 INSTALL GAS HOT WATER HEATER, STORAGE 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.

- 3.21 PENETRATIONS
Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Installation - Valves

- 3.22 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.

- 3.23 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.

- 3.24 INSTALLING BACKFLOW PREVENTION DEVICE
Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS 2845.3 or [NZ Backflow Testing Standard](#).

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.

4 SELECTIONS

7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES

1 GENERAL

This section relates to the supply and installation of sanitary fixtures, tapware and sanitary accessories.

1.1 RELATED WORK

Refer to 7120 or 7123 HOT AND COLD WATER SYSTEM for hot water cylinders.
Refer to 7420 or 7421 SANITARY SYSTEMS for the supply and fitting of waste disposal pipework
Refer to the electrical section/s for electrical connection of accessories.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
NZBC F2/AS1	Hazardous building materials
NZBC G1/AS1	Personal hygiene
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water
NZBC G13/AS3	Plumbing and drainage
AS/NZS 1730	Washbasins
AS/NZS 2023	Baths for ablutionary purposes
AS/NZS 3500.1	Plumbing and drainage - water services
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3662	Performance of showers for bathing
NZS 4223.3	Glazing in buildings - Human impact safety requirements
Plumbers, Gasfitters and Drainlayers Act 2006	

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.

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 SUPPLIER

A specialist in the supply of tapware, and employing experienced architectural representatives available to assist during the course of the installation.

2 PRODUCTS

2.1 SANITARY FIXTURES

Refer to client for product selection.

2.2 TAPWARE

Refer to client for product selection.

2.3 SANITARY APPLIANCES

Refer to client for product selection.

2.4 ELECTRICAL SANITARY ACCESSORIES

Refer to client for product selection.

3 EXECUTION

Conditions - sanitary fixtures

3.1 DELIVERY

Only deliver to the site fixtures or fittings that can be immediately unloaded into suitable storage or be placed for direct installation.

3.2 STORAGE AND HANDLING

Take delivery of and store components complete with protective casings and coverings in areas that are enclosed, clean and dry and where no work is being done. Remove protection only to the extent that will allow installation.

3.3 QUALITY STANDARDS INCLUDING NZBC G13/AS1

Installation work to comply with [NZBC G1/AS1](#), [NZBC G12/VM1](#), [NZBC G12/AS1](#), [NZBC G13/AS1](#) and the fixture manufacturer's requirements.

3.4 SUBSTRATE

Ensure substrate and fixings will allow work of the specified standard.

3.5 CO-ORDINATION

Do not proceed if the points of supply and drainage services do not match the points of the fixtures without force or distortion.

3.6 INSTALLATION REQUIREMENTS INCLUDING NZBC G13/AS1

Install to [NZBC G1/AS1](#), [NZBC G12/VM1](#), [NZBC G12/AS1](#), [NZBC G13/AS1](#), [NZBC E3/AS1](#) and to the fixture manufacturer's installation requirements for each component. Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries and sealants in sequence.

Seal between all sanitary fixtures and wall linings, fixtures and the tops they are in, the tops and wall linings, to [NZBC E3/AS1](#), 3.2.2. Fixtures include baths, basins, tubs or sinks. Tops include, vanities, bath surrounds, sink benches, etc, and there upstands.

3.7 PROVIDE SUPPORT

Confirm fixing points needed for each unit and provide solid blocking at each fixing bracket location.

3.8 EARTHING OR EQUIPOTENTIAL BONDING METALLIC FIXTURES

If it is an electrical requirement, before installation or enclosing, ensure at-risk metallic sanitary fixtures are earthed or equipotential bonded (or at least conductor cable attached) to [NZBC G12/AS1](#), 9.0.

Conditions - tapware

3.9 RETAIN

Retain tapware in the manufacturer's original packaging and ensure that units are complete with fixings and installation instructions. Label each unit separately with its fitting name and space number.

3.10 STORE

Store tapware packages in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

Installation - sanitary fixtures

3.11 INSTALLING TOILET PAN

Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries/bedding and sealants in sequence. Fit the toilet pan in position, plumb, level, flush and rigid without stressing the attachment points of the component. Fixings to be corrosive resistant. Fit seat.

3.12 INSTALLING CISTERNS

Fit firmly in place and connect the specified cisterns from the supply services through the flush pipes to the relative fixtures in the positions as detailed all plumb and level.

Installation - Basins

3.13 INSTALLING WASHBASINS

Install to [NZBC G1/AS1](#), [AS/NZS 1730](#). Set basins firmly to walls or vanities as detailed and to comply with [NZBC E3/AS1](#). Connect to supply and drains through trap to the drainage system.

Installation - Showers

3.14 INSTALLING SHOWER FITTINGS

Shower waste, mixer and rose to be install to [NZBC G1/AS1](#) and to [AS/NZS 3662](#).

Installation - Baths

3.15 INSTALLING BATHS

Install to [NZBC G1/AS1](#). Set firmly in cradle with required points fully supported, level and flush. Connect to supply and drainage services.

Installation - Sinks

3.16 INSTALLING SINK BENCHES

Install in accordance with manufacturer's/supplier's requirements. Connect to supply and drainage services.

3.17 INSTALLING CLEANERS SINKS AND TUB UNITS

Install in accordance with manufacturer's requirements. Connect to supply and drainage services.

Installation - Miscellaneous

3.18 INSTALLING STAINLESS STEEL FIXTURES

Carry out preparatory work and fit elements in position plumb, level, flush and rigid without stressing the attachment points in sequence. Connect to supply and drainage services.

Application - tapware

3.19 GENERAL

To [AS/NZS 3500.1](#) and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with [NZBC G12/AS1](#).

Completion

3.20 REPLACE

Replace damaged or marked elements.

3.21 PROTECTIVE COVERINGS

Leave fixtures, fittings and accessories clean and unblemished with stickers and protective coverings removed, with supply and drainage connections and all parts fully operating and working. Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.

3.22 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

7221 GAS APPLIANCES

1 GENERAL

This section relates to the supply and installation of gas-powered appliances using low pressure gas.

1.1 RELATED WORK

Refer to hot and cold water system section for gas water heaters

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

[NZBC C/AS1-AS2](#) Protection from fire
[NZBC G4/AS1](#) Ventilation
[NZBC G10/AS1](#) Piped services
[NZBC G11/AS1](#) Gas as an energy source
[NZBC G12/AS1](#) Water supplies
[AS/NZS 5601.1](#) Gas Installations - general installations
[Electricity \(Safety\) Regulations 2010](#) (Reprint as at 4 April 2016)
[Gas \(Safety and Measurement\) Regulations 2010](#)
[Plumbers, Gasfitters and Drainlayers Act 2006](#)

Warranties

Requirements

1.3 COMPLY

Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010 and the network utility operator's/gas suppliers requirements. Give notices for inspections and carry out tests as required.

1.4 QUALIFICATIONS

Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying gasfitter under the [Plumbers, Gasfitters and Drainlayers Act 2006](#).

Performance

1.5 FINAL INSPECTION AND TEST

Submit the work for inspection and test and prove to the satisfaction of the network utility operator that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound.

1.6 GAS CERTIFICATE OF COMPLIANCE

Provide a Gasfitting Certificate of Compliance as required by Clause 46 and 47 of the Gas (Safety and Measurement) Regulations 2010 and when required provide a copy to the energy supplier.

1.7 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.

1.8 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

Materials

- 2.1 GAS APPLIANCES
ESCEA DF960 FIREBOX & RINNAI GAS HOT WATER HEATER
- 2.2 GAS TYPE
RETICULATED SUPPLY FROM BOUNDARY CONNECTION.

3 EXECUTION

Conditions

- 3.1 GENERALLY
Carry out the whole of this work to the requirements of [NZBC G10/AS1](#), [NZBC G11/AS1](#) and [AS/NZS 5601.1](#).

Application

- 3.2 INSTALL GAS APPLIANCES
Fit and connect gas appliances to [AS/NZS 5601.1](#), complete with isolation valves as required to the appliance manufacturer's requirements.
- 3.3 INSTALL FLUES
Install flues 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)
- 3.4 SEISMIC RESTRAINTS - GAS APPLIANCES
Where gas appliances require seismic restraints, restrain to manufacturer's requirements, [AS/NZS 5601.1](#) and [NZBC C/AS1-AS2](#), 7.2 Gas-burning Appliances.
- 3.5 CONNECT UP GAS HOT WATER HEATERS
Connect gas hot water heaters supplied and fitted under Hot and Cold Water system section or by gas fitter, to [NZBC G10/AS1](#), [G11/AS1](#), [G12/AS1](#) and to [AS/NZS 5601.1](#) and the water heater manufacturer's requirements.

Completion

- 3.6 REPLACE
Replace damaged, cracked or marked elements.
- 3.7 LEAVE
Leave appliances clean and in full working order and leave work to the standard required by following procedures.
- 3.8 REMOVE
Remove debris, unused materials and elements from the site.

4 SELECTIONS

7411 RAINWATER SPOUTING SYSTEMS

1 GENERAL

This section relates to rainwater disposal systems including spouting and downpipes in:

- metal

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
Spouting	Roof gutter bracketed off the roof edge or fascia.
Gutter	Internal gutter or gutter formed as integral part of the roof fabric.

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
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions:

10 Years	For failure of coating adhesion
10 Years	For weatherproofing by material penetration

Form:	Manufacturer's standard warranty form
From:	Commence the warranty from the date of completion of installation

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

1.4 WARRANTY - INSTALLER/APPLICATOR

Warrant this work under normal environmental and use conditions against:

3 years:	For weatherproofing by substandard workmanship:
From:	Commence the warranty from the date of completion of installation
Form:	Installers standard warranty form

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

Requirements

1.5 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

Performance

1.6 TEST

Test the completed rainwater disposal system with water to ensure spoutings are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in spoutings.

2 PRODUCTS

Materials - uPVC

2.1 UPVC DOWNPIPES

To suit the spouting system, pipes solvent cement jointed and complete with stand-off brackets, galvanized screws and accessories, brand matched and complete to the manufacturer's specifications.

Materials - metal

2.2 SPOUTING

Complete with matching brackets to suit spouting and screws.

2.3 SPOUTING BRACKETS

All exposed brackets to be colour matched before installation. Brackets to be hot-dipped galvanised, zincalume, aluminium, stainless steel or brass as specified and to suit application. Electroplated components are not acceptable.

Components

2.4 DROPPERS

Metal or uPVC droppers, compatible with spouting material and sized to fit inside the downpipe.

2.5 FASTENERS GENERALLY

Minimum Class 4 durability and not less than the roofing material being fixed.

2.6 RIVETS

Sealed aluminium, minimum diameter 4mm.

2.7 SEALANT

MS Polymer sealant.

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 fascias, bargeboards 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 18 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. Do not allow copper downpipes to discharge onto lower galvanized or zinc aluminium coated steel roofs.

Application - uPVC

3.5 INSTALL UPVC DOWNPIPES

Assemble downpipes, solvent welded complete, fit to outlets, galvanized screw fix with pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet to the downpipe manufacturer's required practice.

Application - metal

3.6 INSTALLATION GENERALLY

Install to [NZMRM CoP](#) recommendations where not otherwise specified.

3.7 INSTALL VALLEY GUTTERS

Attach valley gutters to valley boards by clips allowing for thermal movement to [NZMRM CoP](#), clause 5.6, **Valley Gutters**. Separate valley gutter from valley boards with a layer of bituminous roof underlay.

3.8 INSTALL SECRET GUTTERS

Install secret gutters to fall allowing for thermal movement to [NZMRM CoP](#), clause 5.5.7 **Secret Gutters**. Rivet and seal joints with MS Polymer sealant.

3.9 INSTALL METAL SPOUTING

Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets, true to line at 750mm centres maximum for external gutters less than 175mm wide and at 600mm centres maximum for gutters 175mm to 300mm wide. In areas where snow fall is possible the centres should be reduced to 600mm maximum. Lap spouting joints a minimum of 40mm, silicone seal between surfaces and pop rivet to the manufacturer's recommendations. 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 [NZMRM CoP](#) recommendations.

3.10 INSTALL PRE-PAINTED METAL SPOUTING

Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets true-to-line at 750mm centres maximum for external gutters less than 175mm wide and at 600mm centres maximum for gutters 175mm to 300mm wide. In areas where snow fall is possible the centres should be reduced to 600mm maximum. Lap spouting joints a minimum of 40mm and silicone seal and pop rivet to the manufacturer's recommendations. Cut out neatly for and fit the pre-formed downpipe dropper and silicone seal around the lap joint. All installation to [NZMRM CoP](#) recommendations.

3.11 INSTALL OUTLETS AND OVERFLOWS

Install outlets and overflows where required to [NZMRM CoP](#), clauses 5.8.2, **Outlets and Overflows**.

3.12 INSTALL SUMP PROTECTION

Install leaf guards of the same area as the sump. Set the leaf guard above the calculated level of flow; not directly in the outlet.

Completion

3.13 REPLACE

Replace damaged or marked elements.

3.14 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.

3.15 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.

Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1254	PVC-U pipes for storm water 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 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.
White polybutylene or PVC, 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 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 EQUIPOTENTIAL BONDING METALLIC WASTE PIPES

If it is an electrical requirement, before enclosing, ensure metallic waste pipes connected to metallic drains and attached metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) similar to [NZBC G12/AS1](#), 9.0.

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 [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 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.6 TEST

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to [NZBC G13/AS1](#) or [AS/NZS 3500.2](#), 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.7 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4 SELECTIONS

7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal Hygiene
NZBC G13/AS1	Sanitary Plumbing
NZBC G13/AS2	Foul Water
NZBC G13/AS3	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
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:

SN4 - SN6

SN8 - SN10

SN16

Use:

Domestic & light load areas

Commercial & Industrial medium load areas

Public roads & high load areas

2.4 GULLY TRAPS - NZBC G13/AS2

To [NZBC G13/AS2](#): 3.3 Gully traps, complete with grating.

2.5 SURFACE WATER SUMP GRATINGS

Cast iron frame with lift-up grating.

2.6 TRENCH BACKFILLING MATERIAL - NZBC G13/AS2 & NZBC E1/AS1

Bedding: Clean granular non-cohesive material with a maximum particle size of 20 mm.

Bedding & surround: Clean granular non-cohesive material with a maximum particle size of 20 mm.

Compacted selected fill: Any Fine grain soil or granular material which is free from topsoil and rubbish and has a maximum particle size of 20 mm.

Ordinary fill: Excavated material.

Concrete: 75 mm thick concrete pad.

2.7 DRAINAGE MATERIAL

Free draining crushed stone, 7 mm to 20 mm in size.

2.8 DRAINAGE MATERIAL - SIMPLE STANDALONE CONCRETE MASONRY RETAINING WALLS

Free draining imported hardfill to the [NZTA F2](#) specification.

Filter material comprised of clean, durable stone having a crushing resistance of not less than 100 kN when tested in accordance with [NZS 3111](#), or a mixture of such material with clean hard sand.

The filter material when tested in accordance with [NZS 4402](#), shall comply with the following gradings:

TEST SIEVE APERTURE	PERCENTAGE PASSING
26.5mm	100
13.2mm	85-100
9.5mm	80-95
4.75mm	65-85
2.36mm	50-70
1.18mm	35-55
600µm	18-40
300µm	3-25
150µm	8 maximum
75µm	0

2.9 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.
- [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 DRAINAGE GENERALLY - NZBC G13/AS2 & NZBC E1/AS1

Carry out foul water drainage work to [NZBC G13/AS1](#) and [NZBC G1/AS1](#) and complete all tests to [NZBC G13/AS1](#), 7.1 Test Methods.

Carry out stormwater drainage work to [NZBC E1/AS1](#), and complete all tests to [NZBC E1/VM1](#), 8.0 Drain Leakage Tests.

Lay uPVC pipe systems to relevant sections of [AS/NZS 2032](#), [AS/NZS 2566.1](#) and [AS/NZS 2566.2](#).

Lay polyethylene pipes and fittings to relevant sections of [AS/NZS 2033](#) and [AS/NZS 2566.1](#).

3.4 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.

3.5 CONSTRUCT GULLY TRAPS - NZBC G13/AS2

Set in a minimum 75mm thick concrete with top surround 25mm above paving and 100mm above other surfaces, to [NZBC G13/AS2](#), 3.3 Gully traps.

3.6 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.

3.7 INSTALL SURFACE WATER SUMP

To [NZBC E1/AS1](#), complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.8 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.

3.9 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.

3.10 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.

3.11 TESTING

Confirm timing before carrying out any tests. Supply potable water and apparatus needed.

Test to [NZBC G13/AS1](#) or [AS/NZS 3500.2](#), 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

Carry out stormwater drainage work to [NZBC E1/AS1](#), and complete all tests to [NZBC E1/VM1](#), 8.0 Drain Leakage Tests.

3.12 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL

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 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.

3.13 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

4 SELECTIONS

7701 ELECTRICAL BASIC

1 GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting
- electrically-powered fittings

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:

CFL	compact fluorescent lamp
ELV	extra low voltage
GLS	general lighting service
IP	international (ingress) protection classification
LCD	liquid crystal display
LED	light emitting diode
MCB	miniature circuit breaker
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
RCBO	residual current-operated circuit breaker with over current protection
RCCB	residual current-operated circuit breakers
RCD	residual current device
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

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 F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
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
AS 3786	Smoke alarms
NZS 4514	Interconnected smoke alarms for houses
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 60598.2.2:2001	Luminaires - Particular requirements - Recessed luminaires
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 4 April 2016)	
TCF Premises Wiring Code of Practice 2011	

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

Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2 and TCF Premises Wiring Code of Practice 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

Carry out work under the supervision of an electrical licensed supervisor.

1.6 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 as required by regulation 70.

1.7 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electrical (Safety) Regulations 2010, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

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: 1.5mm ² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm ² on 16 amp MCBs
Power circuits:	2.5mm ² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm ² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm ² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm ² 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. Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.

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 SMOKE ALARMS

Type 1 domestic smoke alarm to [NZBC F7/AS1](#). 1.2 **Descriptions of alarm systems.** Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class II surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class III 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 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.

2.15 RESIDENTIAL RECESSED LIGHT FITTINGS

Residential recessed luminaires to [AS/NZS 60598.2.2](#), types IC-F, IC, CA-80 or CA-135 only.

2.16 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to [NZBC G4/AS1](#), and compliant with [AS/NZS 60335.1](#).

2.17 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.

2.18 OUTDOOR SWITCHES & SOCKETS

Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches to IP56 minimum, and sockets to IP53 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

3 EXECUTION

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's and Electricity Retailer's 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's 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/NZS3000 to protect each final sub circuit.

3.5 EARTHING CONDUCTIVE STRUCTURE & MATERIALS

Earth all at risk structural metalwork and conductive building materials to [AS/NZS 3000](#), 5.4.6, and the Electricity (Safety) Regulations 2010.

If they form part of the building, this includes:

- Structural steel frames or members
- Light steel framing
- Exposed conductive materials, like metal sink/tub or vanity benches etc, with attached electrical units or equipment

3.6 EQUIPOTENTIAL BONDING

Equipotential Bond extraneous conductive parts together and to the electrical installation earthing system to [AS/NZS 3000](#), 5.6, and the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.

If they form part of the building, this includes:

- [Conductive water piping](#) (including tap etc) and exposed related connected conductive surfaces (like metal sink benches or metal cladding etc). [Not required where isolated by non-conductors \(plastic pipe etc\) from the mass of earth.](#)
- Other conductive piping (not earthed by other means) and exposed related connected conductive surfaces.
- Concrete reinforcing - for floor or wall forming part of a room with a shower or bath, or the shell and surround of a swimming/spa pool
- Built-in Swimming pool and spa pool - exposed conductive parts of electrical equipment, as well as exposed conductive, fixtures, fittings and pool structures within 1.25m of pool edge

3.7 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.

3.8 EARTH LEAKAGE PROTECTION

Install RCD protection to [AS/NZS 3000](#).

3.9 RCD - DOMESTIC 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](#).

3.10 RCD - SPECIFIC INSTALLATIONS

Install 30mA RCDs at the distribution board.

Install fixed wired RCD protected outlets (SRCD) in the following 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.

3.11 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.

3.12 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.

3.13 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.

3.14 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 noggs. Fix switch panel wall boxes to solid blocking.

3.15 SWITCH AND SOCKET UNITS

Fit all single and double switch units, all sockets to the following heights (to the centre of the unit) unless shown otherwise on the drawings.

Switch Units: 1000mm above finished floor
 Socket Units: 150mm above work benches
 400mm above finished floor

Mount light switches and switch socket outlets vertically and socket units horizontally. Label all switch units that control electrical equipment or special lighting circuits by colour filled engraving on the switch. Use proprietary engraved switch mechanisms where applicable.

3.16 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.17 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer's requirements.

3.18 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer's 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](#).

3.19 RECESSED LIGHT FITTINGS - CLEARANCE TO INSULATION

Non-residential applications;

The clearance between insulation and recessed downlights;

- Leave 100mm gap to [AS/NZS 3000](#), figure 4.9
- Provide larger gaps where required by the downlight manufacturer

Residential applications;

- Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#); CA 80, CA 135, IC and IC - F.
- Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides (wrapping around the sides)
- Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- Provide larger gaps where required by the light manufacturer
- In a retrofit situation where the insulation is non-approved or unknown, ensure 100mm clearance from the insulation to [AS/NZS 3000](#), figure 4.9.

3.20 SMOKE ALARMS

Install Type 1 domestic smoke alarm system to [NZBC F7/AS1 3.0 Domestic smoke alarms](#), [NZS 4514](#) and to the alarm manufacturer's requirements. Fit neatly and without damage to the surrounding finish.

3.21 SURGE PROTECTION

Install surge protection devices to manufacturer's requirements and in accordance with [AS/NZS 3000](#) and [AS/NZS 1768](#). When fitting IEC 61643 Class II protection at the switchboard, protect the device by a dedicated MCB.

3.22 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.23 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](#).

3.24 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with [AS/NZS 3000](#) and in accordance with the manufacturer's 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 to IP56, and sockets to IP53 as a minimum. Install to manufacturer's 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.

3.25 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.

Completion

3.26 COMPLETION

Leave installation operating correctly, with equipment clean and operational.

4 SELECTIONS

Section 6

Technical Information

- ~~• Septic Tank & Effluent Design incl. fencing~~
- ~~• ECan Approval Documents~~
- Gas Fire **Escea DF960**
- ~~• Heating Unit~~
- ~~• Solar Panels~~
- ~~• Central Heating Systems~~
- Manufacturer's Literature
- A4 Details/Acceptable Solution Extract
- ~~• Well/Water Test~~

Bespoke Architecture

SUPPORTING MANUFACTURER DOCUMENTATION

For information only. Specification and contract documentation takes precedence.

This version includes documents related to:

Performance | Installation | Maintenance | Warranty | Environmental

GRAEME RESIDENCE

Project Specification

29 PEGASUS MAIN STREET, PEGASUS, CHRISTCHURCH, New Zealand

Project Ref: J19341

Printed: 16 June 2021



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

masterspec

Specification built using Masterspec software

Project ID: 226191 - 217806

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4161T Thermakraft Underlays, Foils, DPC, DPM, & Tapes



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SUPPORTING DOCUMENTS

Thermakraft 215 - Data Sheet

Ref 14026. Uploaded 2 Oct 2020

Purpose: Performance

Thermakraft 215 - Installation Guide

Ref 14027. Uploaded 2 Oct 2020

Purpose: Installation

Thermakraft™



Product Data Sheet

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 ChrisK

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as "Building Paper" Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

Thermakraft 215 comes in two roll sizes:

1250mm wide	20m long	25m ² coverage*
1250mm wide	40m long	50m ² coverage*

* **Note:** m2 is the roll size for actual coverage, allow for laps and joints.

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Thermakraft 215

Self-supporting bituminous wall and roof underlay

Scope of Use (Roof Application)

- Suitable with masonry tile, metal tile and profiled metal roof cladding.
- Direct fix or cavity fix.
- Can be used on roofs up to and including NZS 3604 'Extra High' wind zones.
- Refer to installation guide regarding underlay support requirements.
- Will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended.

Scope of Use (Wall Application)

- Suitable for use with both timber and steel framing, either direct fix or in conjunction with an 18mm minimum drained cavity.
- Can be used with absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Can be used with masonry veneer in accordance with NZS 3604.
- Suitable for buildings situated in NZS3604 Building Wind Zones up to and including 'Very High'.
- Thermakraft 215 can be used as an air barrier to reduce wind entry and is highly water resistant.
- Will provide temporary weather protection during construction (maximum 28 days).

General

Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.

Limitations

- In roofing applications must NOT be exposed to the weather or UV for more than 7 days.
- In wall applications must NOT be exposed to the weather or UV for more than 28 days.
- Must NOT be used under translucent sheeting.
- Is not fire retardant.
- Not suitable for School Property, please refer to Ministry of Education; Weather-Tightness & Durability requirements for School Property.

Compliance

Thermakraft 215 meets the requirements of NZBC Acceptable Solutions E2/AS1, Table 23 and NZS 2295:2006 for both wall & roof underlay.

Durability

Meets the Performance Requirements of NZBC Clause B2, Durability B2.3.1 (a) 50 years and B2.3.1 (b) 15 years, E2 External Moisture providing:

- It is installed in accordance to Thermakraft Installation Guide.
- Run length is no greater than 10 meters.
- Is NOT left exposed to the weather or UV for more than 7 days on roof.
- Is NOT left exposed to the weather or UV for more than 28 days on walls.
- Is installed by or under guidance of Licensed Building Practitioners.
- Is installed in accordance with the MRM Code of Practice.
- Is compatible with the cladding system used.*

* **Note:** roof cladding system compatibility testing must be done first before installation.

Property Performance

NZBC E2/AS1 Wall Underlay Requirements					
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	Absorbency	Vapour Resistance	pH of Extract	Shrinkage	Water Resistance
Property Performance Requirement	≥ 150gsm	≤ 7 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	100mm for 24 hrs
Property Performance	Pass	Pass	Pass	Pass	Pass

NZS2295:2006 Classification			
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	Flammability Index	Wind Zone	NZS2295:2006 Index
Property Performance Requirement		R2	R2
Property Performance	Non-Fire Retardant	Up to Extra High	Self - Support

Thermakraft 215

Self-supporting bituminous wall and roof underlay

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation method to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Ceiling penetrations and entry of warm air into roof cavities.
- Low pitched roof.
- Bulk insulation.
- Building structures ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer to MRM Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ MRM Roofing Code of Practice).

Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at **thermakraft.co.nz** or call **0800 806 595**.

Thermakraft Limited / 0800 806 595

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The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found on the website. E&OE.

Thermakraft™

Installation Guide

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as “Building Paper” Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

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Installation Guide

Application Method (Roofing)

Thermakraft 215 is a bituminous building underlay used on roofs in residential buildings.

- Thermakraft 215 can be used in direct fix or cavity fix for roof construction.
- Run NO longer than 10m.

Long-run metal roofing/vertical or horizontal installation method

- Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings on timber framed structure. Fixing at 300mm centres. Fixing types and requirements for steel framed structure can be found in the MRM Code of Practice.
- Refer to table below to determine underlay support requirements.

Roof Pitch	Span	Underlay Support Required	
		Horizontally Installed	Vertically Installed
≥ 10°	> 1200mm	Yes	Yes
	≤ 1200mm	No	No
< 10° (Min 3°)	> 1200mm	Yes	Yes
	≤ 1200mm	No	Yes

- Thermakraft 215 upper sheet lapped over lower sheets (shiplap) to ensure water is shed to the outer face.
Note: Thermakraft 215 can move downwards. To prevent this, it must be "Captured" by the fastenings at each purlin. Horizontal fix must not be used on purlin distance greater than 1100mm to allow for 150mm laps.
- Must be laid firmly (tight/taut) without creases. All laps either vertical or horizontal must be a minimum of 150mm lap.
- When underlay support is required, Thermakraft recommend using AUSMESH Safety Mesh, AUSNET hexagonal netting or Thermastrap 201.
- Thermakraft 215 can be installed above the battens or purlins for profiled metal roof claddings and otherwise in accordance with NZBC E2/AS1.
- If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice), use Thermakraft Aluband window sealing tape or Thermakraft White General Purpose Tape.

- Thermakraft 215 will provide temporary weather protection during construction, same day coverage recommended. DO NOT over expose the product to the weather or UV for more than 7 days in any roof applications.
- Thermakraft 215 may be unwound to the full length from the gutter to the ridge. However, when ridge ventilation is required Thermakraft 215 may be terminated or slit at the ridge purlin to allow a free passage of air.
- Thermakraft 215 must NOT overhang the gutter line by more than 20 mm, or if eaves flashings are used, terminate on the upper side of the flashing. More details can be found in the MRM Code of Practice.
- Flue penetrations must have a minimum distance of 50mm from Thermakraft 215 (refer to NZ Metal Roof and Wall Cladding Code of Practice 10.11.5).
- Thermakraft 215 must be free of tears and punctures, fit tightly and be lap taped around all penetrations (except flue penetrations), to provide drainage for any condensation, or surface water from leaks.

Note: Do not use Aluband on penetrations where Polybutene water pipes have been installed. Refer Pipe Manufacturers for instructions on sealing penetrations.

Concrete/Metal tile roofing

- Thermakraft 215 must be laid over rafters prior to fixing the tile battens. The maximum span between rafters for Thermakraft 215 is 1200mm. Masonry tile roofs must have antiponding boards in accordance with NZBC E2/AS1 Paragraph 8.2.5.
- Installed Thermakraft may be laid over the top of the antiponding boards and draped into the gutter by no more than 20mm. Antiponding boards must be treated in accordance with NZS 3604.
- Do NOT Run Thermakraft 215 longer than 10m in length.

Application Method (Wall)

- Fix Thermakraft 215 underlay with printed side facing the exterior.
- Fix to all exterior walls from below bearers to the top plate. Pull the Thermakraft 215 underlay tight and fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically. Additional fasteners should be used around each opening to be cut out. Fixing types and requirements for steel framed structure can be found in the MRM Code of Practice.

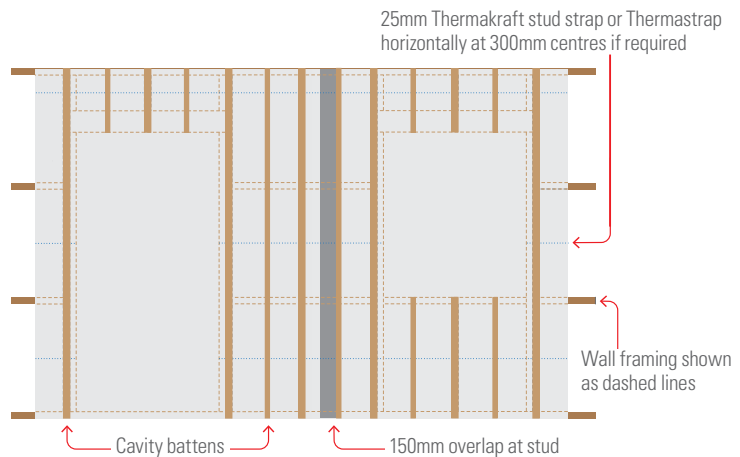
Installation Guide

- When fixing Thermakraft 215 underlay to Steel framing the same procedures applies, use adhesive spray or tape or flat head screws to fasten to the framing or thermal break, the exterior cladding fastenings will act as the permanent fixings.
- Cover all windows and door openings with Thermakraft 215 underlay.
- It is recommended that the Thermakraft 215 underlay is not cut and prepared for window installation until the arrival of the windows. minimum of 150mm lap is required at joins, all vertical laps must be made over studs. Horizontal laps to be laid ship lap style allowing water to be shed to the outer face of the membrane.
- When windows and doors are ready for installation, the Thermakraft 215 underlay covering the openings should cut at 45° and folded into the opening and securely fastened. Thermakraft window flashing tapes are recommended as the window flashing system.

Note: In accordance with NZBC Acceptable Solution E2/AS1, wall underlay must be prevented from bulging into the drained cavity. Where stud spacing is greater than 450mm Thermakraft stud strap run horizontal at 300 centres is an acceptable means of prevention.

- Once installed, Thermakraft 215 must not be left exposed to the weather or UV for a maximum of 28 days. Thermakraft 215 underlays will provide temporary weather protection during construction allowing work to continue. Internal linings and insulation must not be installed until the exterior cladding is completed.
- Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZS 3604.
- Make good any forced tears with Thermakraft window flashing tapes. Any large areas which require repair may be covered with a second layer of underlay, a lap of 150mm is required.

- For wall cavity systems where stud spacings are greater than 450mm centres, another means of restraint is required on the flexible underlay to prevent insulation bulge (refer to E2/AS1).
- Thermakraft 215 underlay must be installed by a licensed building practitioner.



Application Tips

- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in a well ventilated area. Recommended minimum 7 days.

Handling and Storage

Thermakraft 215 underlay must be handled with care to prevent damage such as tearing and roll deformation. Due to the width of the product, care should be taken when installing in windy conditions.

The product must be stored under cover well away from direct moisture, rainfall contact and sunlight (UV). Care should be taken not stack other materials on top of the product.

4171IB IBS Rigidrap Rigid Air Barrier System



Independent Building Supplies

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SUPPORTING DOCUMENTS

IBS RigidRAP Care & Maintenance

Ref 11090. Uploaded 27 Aug 2020

Purpose: Maintenance

IBS RigidRAP Codemark Certificate

Ref 11088. Uploaded 27 Aug 2020

Purpose: Performance

IBS RigidRAP Design & Installation Guide V1.1

Ref 11077. Uploaded 27 Aug 2020

Purpose: Installation

IBS RigidRAP PASS V1.1

Ref 11086. Uploaded 27 Aug 2020

Purpose: Performance

IBS RigidRAP Warranty V2

Ref 11084. Uploaded 27 Aug 2020

Purpose: Warranty

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



CARE & MAINTENANCE GUIDE

IBS RigidRAP®

IBS RigidRAP® comprises an 8mm thick, moisture-resistant, Oriented Strand board panel with a heavyweight synthetic wall underlay adhered to the outer face, suitable for use as a wall bracing element, structural rigid air barrier or interior wall lining panel.

Where IBS RigidRAP® is used as a wall bracing element or rigid air barrier, it requires no maintenance; however, the external cladding system must be well maintained. Check the external cladding system on a regular basis and carry out any required maintenance as per the supplier's instructions.

If water damage occurs to an area where IBS RigidRAP® is installed, ensure the area is allowed to dry before replacing any cladding. Maximum exposure to weather must not exceed three months.

Where IBS RigidRAP® is used as an internal lining, the paint coating, non-water based stain system, or covering wall lining system must be maintained. Check the coating or covering for wear or damage and repair if necessary.



CODEMARK™

Product description

IBS RigidRAP is an 8mm OSB panel product faced with a laminated synthetic building wrap.

Product purpose or use

IBS RigidRAP is suitable for use as a bracing element and/or rigid air barrier in conjunction with a ventilated cavity. It is suitable for use on new and existing timber framed buildings founded on either a concrete floor slab or timber subfloor. When all joints are sealed with a flashing tape, no flexible wall underlay is required.

Certificate holder

IBS Building Products
Independent Building Supplies Ltd
1/7 Fraser Road,
Mt Wellington, Auckland 1072 NZ
Ph: 0800 367 759
www.ibs.co.nz

CodeMark Product Certification Body

Bureau Veritas Australia Pty Ltd
3/435 Williamstown Road,
Port Melbourne VIC, 3207
Ph: 1800 855 190
www.bureauveritas.com.au

Sam Guindi
Product Certification Manager

For and on behalf of
Bureau Veritas Australia Pty Ltd

PRODUCT CERTIFICATE

This is to certify that

IBS RigidRAP

Complies with the New Zealand Building Code (NZBC):

If designed, used, installed and maintained in accordance with the scope of this certificate, the above mentioned product will meet or contribute to meeting the following provisions of the NZBC:

Structure B1.3.1; B1.3.2; B1.3.3(a, b, f, h, m, q); B1.3.4

Durability B2.3.1(a)

External Moisture E 2.3.2; E2.3.7

Hazardous Building Materials F2.3.1

Subject to the following conditions and limitations:

1. IBS RigidRAP must be specified, installed and stored in accordance with the IBS RigidRAP Design & Installation Guide (December 2019 V1.1).
2. This certification covers the use of IBS RigidRAP as a rigid air barrier:
 - in new buildings that comply with NZS3604:2011 (as modified by B1/AS1 Amd 18) or have been specifically designed in accordance with NZS3603:1993 and AS/NZS 1170:2002 (as modified by B1/VM1 Amd 18) or
 - in existing buildings where the specifier and installer have assured themselves that the existing structure is adequate for the intended use; and
 - where the cladding system incorporates a ventilated cavity and wall cladding that complies with E2/AS1 or is covered by a relevant CodeMark certificate
3. This certification also covers the use of IBS RigidRAP as a bracing element in buildings designed in accordance with NZS3604:2011 (as modified by B1/AS1 Amd 18)
4. IBS RigidRAP must not be exposed to the weather or ultraviolet light for more than 90 days during construction.
5. Only flashing tapes listed in the IBS RigidRAP Design & Installation Guide may be used.



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**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

3 December 2019
Date of issue

CM70035
Certificate Number

- This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004. The Ministry does not in any way warrant, guarantee, or represent that the building method or product the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product. The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.
- The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008. This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website <http://www.building.govt.nz>.



IBS RigidRAP[®]
lighter - stronger - healthier

IBS RigidRAP[®]

RIGID AIR BARRIER &
STRUCTURAL BRACING PANEL

DESIGN & INSTALLATION GUIDE

DECEMBER 2019 V1.1



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 ChrisK



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1.0 Purpose of Document

1.1 GENERAL

This document is intended for designers and installers to ensure that IBS RigidRAP® (rigid air panel) is specified and installed correctly.

1.2 SUPPORTING INFORMATION

This document must be read in conjunction with the:

- IBS Product Specification for IBS RigidRAP®
- IBS Maintenance and Warranty for IBS RigidRAP®

All other information is available at www.ibs.co.nz.

2.0 Product Information

2.1 USE OF IBS RigidRAP®

IBS supply IBS RigidRAP® for use:

- As an internal or external wall bracing element when used in conjunction with a specific fixing system.
- In exterior wall construction as an alternative to light or heavyweight wall wrap or where a rigid air barrier is required.
- As an internal wall substrate where high impact use is envisaged.

2.2 OSB3 EXPLAINED

OSB3 (oriented strand board 3) is a moisture resistant, structural wood panel. Engineered in Germany from environmentally sustainable sourced softwood, it consists of three layers of wood strands bonded together with heat-cured adhesives. Each layer is orientated at right angles to the adjacent layer creating a strong, dimensionally stable panel that resists delamination and warping. The absence of natural imperfections such as knots provides certainty of performance.

2.3 IBS RigidRAP® EXPLAINED

IBS RigidRAP® has been manufactured specifically for NZ, for use as a bracing element and/or rigid air barrier. It comes laminated with a BRANZ appraised watertight wall underlay.

As an OSB3 panel, manufactured in accordance with EN13986:2004, it is suitable for use in humid conditions where the panel in-service moisture content does not exceed 20%.

Compliance with the NZ Building Code (NZBC) is established through Product Certification (CodeMark).

IBS RigidRAP® meets all the requirements of Table 23 (clause E2 - external moisture) from the compliance document for the NZ Building Code.

IBS RigidRAP® is 8mm thick and supplied in the following panel sizes:

- 2440 mm x 1196 mm x 8 mm
- 2745 mm x 1196 mm x 8 mm
- 3050 mm x 1196 mm x 8 mm

2.4 WALL UNDERLAY

Wall underlay is a synthetic wall underlay. The product consists of a micro-porous water resistant polypropylene film laminated between two layers of spunbonded polypropylene.

2.5 IBS RigidRAP® CODEMARK EXPLAINED

IBS is the certificate holder of CodeMark for IBS RigidRAP®. CodeMark is third party certified, allowed for under the Building Act 2004. This means that under law, a Building Consent Authority must accept the specification of IBS RigidRAP® (the panel and the installation details) as complying with the NZ Building Code, providing that all conditions of the certificate have been met.

Achieving CodeMark also focuses on the quality of IBS RigidRAP® panels and the quality and competence of the support provided by IBS. This means that designers and installers can use IBS RigidRAP® with confidence that, providing all instructions are followed, IBS RigidRAP® will result in building work complying with the NZ Building Code.



2.6 IBS RigidRAP® ADVANTAGES

IBS RigidRAP® is a practical alternative to traditional flexible building wraps. The installation of IBS RigidRAP® allows the builder to enclose the exterior of the building quickly providing the following advantages:

- Reduces building time
- Provides rapid moisture protection of the building
- Allows for interior construction to continue
- Provides a greater level of site security
- Reduces structural timber movement

2.7 RESTRICTED BUILDING WORK

In some applications Restricted Building Work (RBW) provisions will apply. It is the responsibility of the designer and installer to ensure that they have met their obligations under these provisions.

2.8 INSTALL SERVICE PENETRATION

Refer to IBS RigidRAP® approved selection of flexible flashing tapes - see 3.4.

Flashing of pipe and service penetrations shall be carried out in accordance with the following:

- Pipe penetrations through IBS RigidRAP® must have a minimum of 5° slope to the outside.
- Flexible flashing tape must be installed like a bandage with a minimum of 25 mm cover around the pipe and 100 mm minimum surface adhesion to IBS RigidRAP® panel surrounding the penetration.

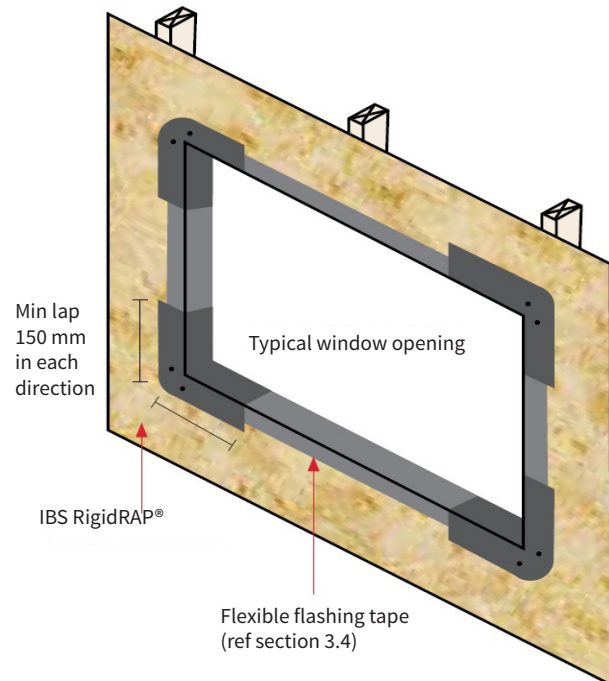
2.9 INSTALL WINDOW OPENING

Refer to IBS RigidRAP® approved selection of flexible flashing tapes - see 3.4.

Flashing window openings shall be carried out in accordance with WNZ Guide to E2/ASI (6), substituting building wraps for IBS RigidRAP®.

- Cut the flashing tape for the sill at least 200 mm wider than the opening.
- Fit the tape with the inner edge of the tape flush with the inside line of the framing and extend 100 mm up and down each jamb edge.
- Ensure the tape is well adhered to the surfaces and fitted tightly to each corner.
- Fully tape all window opening edges.

NOTE: All window tapes should be used in accordance with the manufacturer's installation guide.



2.10 DESIGNER/INSTALLER SKILL LEVEL

Where IBS RigidRAP® is specified and/or installed the designer/installer should have the appropriate skills, knowledge of the product and access to all IBS RigidRAP® technical information (reference www.ibs.co.nz).

2.11 HEALTH AND SAFETY

When installing IBS RigidRAP® take all steps to ensure your safety and the safety of others.

- Ensure that when cutting or drilling IBS RigidRAP® that there is adequate ventilation or mechanical dust extraction.
- Ensure IBS RigidRAP® is well supported when cutting or drilling the panel.
- Appropriate close fit clothing should be worn at all times
- Wear eye, ear and footwear protection when working with IBS RigidRAP®.

Site considerations

- Selection of the right equipment for working from a height
- Safe working with ladders and stepladders
- Maintain a clear unobstructed work area

For further information refer to:

- The Absolutely Essential Health and Safety Toolkit
- Worksafe New Zealand Quick Guide

2.12 HANDLING AND STORAGE

Correct storage and handling in transport is essential for the protection of IBS RigidRAP®. The following simple principles should be taken into account:

- Strapping and shrink wrap should be removed immediately upon arrival at the installer's storage area or on site.
- IBS RigidRAP® should be laid flat on timber bearers. The spacing's between the timber should be no more than 800 mm.
- If several pallets are stacked on top of each other ensure the storage bearers are in true alignment.
- When stored outside ensure there is sufficient clearance between the ground and IBS RigidRAP® to prevent moisture transfer and allow air circulation. Cover with a waterproof tarpaulin.
- IBS RigidRAP® must not be exposed to the weather for more than 90 days.
- When manually handling IBS RigidRAP® ensure the panels are lifted in the central third.
- IBS RigidRAP® should be allowed to climatise to the site conditions for 48 hours prior to installation.

2.13 SAWING, DRILLING, SHAPING

IBS RigidRAP® panels may be sawn and shaped in the same way as solid wood, although carbide tipped cutters are recommended.

If panels are to be installed in a visible location, ensure clean-cut edges with sharp tools, using a backing block to minimize break out. The feed rate should be slower than for solid wood.

2.14 IBS RigidRAP® SHEET MEASUREMENTS

Length (mm)	Width (mm)	Thickness (mm)	Weight (kg)
2440	1196	8	16.9
2745	1196	8	18.6
3050	1196	8	20

2.15 IBS RigidRAP® COMPARISON

Product	Bracing Units (BU/m) Based on 2400 x 1200 Sheet Size	
	Wind	Earthquake
Plywood 7 mm	123	139
Cement Board 6 mm	125	102
OSB3 8 mm	131	107

3.0 Bracing Element

3.1 SCOPE OF USE

IBS RigidRAP® may be used as a bracing element within the following scope:

In wind zones:

- Up to and including extra high.
- Up to 2.5 kPa ULS where the building is specifically engineered.

Building scope

- New buildings: with timber wall framing complying with NZ Building Code .
 - In conjunction with the GIB HandiBrac® method or a Strap Bracing system.
 - In conjunction with LVL System - staples, Mitek CPC 80 and SPAX screws.
 - In conjunction with LVL System - staples, Simpson Strong-Tie DTT2Z and type 17 screws.
 - In conjunction with concrete and timber subfloor applications that comply with the NZ Building Code.
 - With all cladding types that comply with NZBC.
 - In conjunction with a drained and ventilated nominal 20mm cavity system.
 - With aluminium joinery complying with the NZBC
 - IBS RigidRAP® has not been tested as a structural bracing element in conjunction steel framing.
- IBS RigidRAP® may be used as a bracing element in existing buildings, however in these cases IBS makes no claim as to the bracing value that will be achieved. If IBS RigidRAP® is to be installed as a bracing element in existing timber framed buildings the following scope applies:
- Existing timber framed buildings where the designer and/or installer have assured themselves that the existing building is suitable for the intended building work.
 - Existing concrete and timber sub-floor structures where the designer and/or installer have assured themselves that the existing building is suitable for the intended building work.

3.2 LIMITATIONS

- Allow a minimum of 4 mm between panel joints to accommodate dimension movement.
- Maximum spacings of wall studs must not exceed 600 mm centres.
- Curved walls, minimum radius 2.5 m are allowable, the IBS RigidRAP® panels must be fixed horizontally onto framing studs with spacing and stud centres dependent on the radius.
- A proprietary 'Z' flashing must be installed at mid floor level where IBS RigidRAP® is installed on multi levels. Serviceability of the joints may be affected if - at the time

the timber framing is installed - its moisture content is greater than 18%.

- For wall heights greater than 3050 mm horizontal wall joints are permitted, provided the panel joint is over solid blocking of the same gauge as the studs.
- All joints, other than mid floor level, (vertical and horizontal) must be sealed with an IBS approved self-adhesive "flashing tape" as specified in section 3.4. IBS recommend 150 mm flashing tape or a proprietary Z flashing for horizontal joints.
- A hole 100 x 100 mm maximum within an envelope of 100 mm from top and vertical edges and 200 mm from the bottom of the IBS RigidRAP® panel will not affect the bracing capacity. Multiple holes of this size are permitted provided the centre lines of the holes are not closer than 600 mm.
- Steel fixings and fastenings must be in accordance with table 4.1, NZS 3604: 2011.
- IBS RigidRAP® must be allowed to acclimatise for at least 48 hours prior to installation.
- Do not install IBS RigidRAP® if the building paper has delaminated from the OSB sheet.

When specifying IBS RigidRAP® as a bracing element, the designer must take into account site specific conditions and the building with respect to, but not limited to, the following:

- Environmental (exposure) zone
- Wind zone
- Wall bracing table for wind and EQ demand
- Structural design loads
- Structural framing requirements
- Preparation of substrate
- External envelope
- Other materials likely to affect the performance of IBS RigidRAP®

3.3 IBS RigidRAP® WALL BRACING SYSTEM

3.3.1 BRACING CAPACITY

The following table provides the bracing value for the different systems:

Table 1 System	Concrete Slab		Timber Floor	
	Wind	EQ	Wind	EQ
SYSTEM 1:				
OSB - 300 mm x 2400 mm wall with GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts	49 BU/m	58BU/m	49 BU/m	58 BU/m
SYSTEM 2:				
OSB - 400 mm x 2400 mm wall with GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts.	70 BU/m	79 BU/m	70 BU/m	79 BU/m
SYSTEM 3:				
OSB - 600 mm x 2400 mm wall with GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts	76 BU/m	81 BU/m	76 BU/m	81 BU/m
SYSTEM 4:				
OSB - 1200 mm x 2400 mm wall with GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts	131 BU/m	107 BU/m	131 BU/m	107 BU/m
SYSTEM 5:				
OSB - 2400 mm x 2400 mm wall with GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts	108 BU/m	89 BU/m	108 BU/m	89 BU/m
SYSTEM 6:				
OSB - 1200 mm x 2400 mm wall without GIB HandiBrac® Fixing 30 mm x 2.5 mm Galv clouts	93 BU/m	78 BU/m	93 BU/m	78BU/m
SYSTEM 7:				
OSB - 400 mm x 2400 mm wall with GIB HandiBrac® GIB standard 10 mm board on the inside Fixing 30 mm x 2.5 mm Galv clouts	94 BU/m	104 BU/m	94 BU/m	104 BU/m
SYSTEM 8:				
OSB - 600 mm x 2400 mm wall with GIB HandiBrac® GIB standard 10 mm board on the inside Fixing 30 mm x 2.5 mm Galv clouts	130 BU/m	130 BU/m	120 BU/m	120 BU/m
SYSTEM 9:				
OSB - 1200 mm x 2400 mm wall with GIB HandiBrac® GIB standard 10 mm board on the inside Fixing 30 mm x 2.5 mm Galv clouts	150 BU/m	150 BU/m	130 BU/m	130 BU/m

NOTE:

- For all bracing systems no product substitution is allowed. Installation must be in accordance with these instructions. If these requirements are not met, IBS provides no assurance that the bracing capacity (claimed in this design and installation guide) will be achieved.
- The allowable racking resistances for the IBS RigidRAP® systems are applicable to frames lined with IBS RigidRAP® on one side only.
- Panels must always be installed vertically if used as bracing sheet. Sheets can be installed horizontally if not used as a bracing element.
- All IBS RigidRAP systems have been tested with no nogs or dwangs
- Stud sizes and centres will vary depending on height load and loads ref: NZS3604:2011.

The systems may be used on walls of lengths different to those in TABLE 1 but is limited to:

- Wall lengths no greater than twice the tested system length.
- For walls greater than the tested system length multiply the length of the wall on a pro-rata basis, up to double the length of the system.
- A wall height less than 1.5 meters should be referred to a specific engineer design.
- A wall height less than 2.4 meters should be rated as if they are 2.4 meters high.
- Panels higher than IBS RigidRAP® 2440 mm must be fixed top plate to bottom plate. When walls are higher than 2440 mm, IBS RigidRAP® 2745 or 3050 mm sheets can be used.
- A part sheet can be used but must be nogged and nailed as per specification.

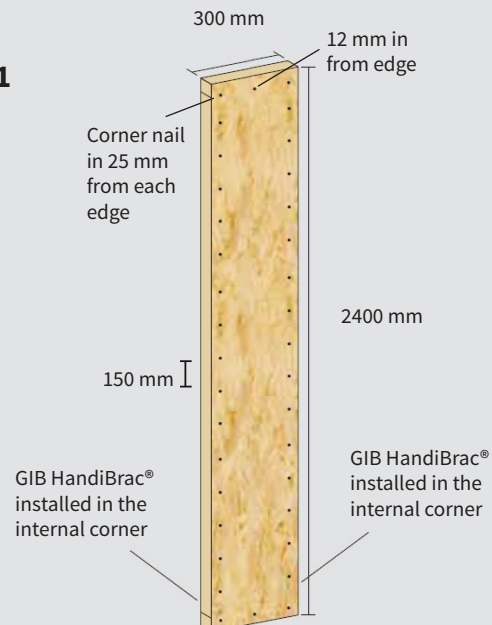
3.3.2 SYSTEM #1

SYSTEM 1 IBS RigidRAP® 300 x 2400 MM WALL USING GIB HANDIBRAC® - FIG 1

Wall construction:

- 90 x 45 MSG8 studs.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- Tested on a concrete floor with M12 hold-down bolts.

FIG 1



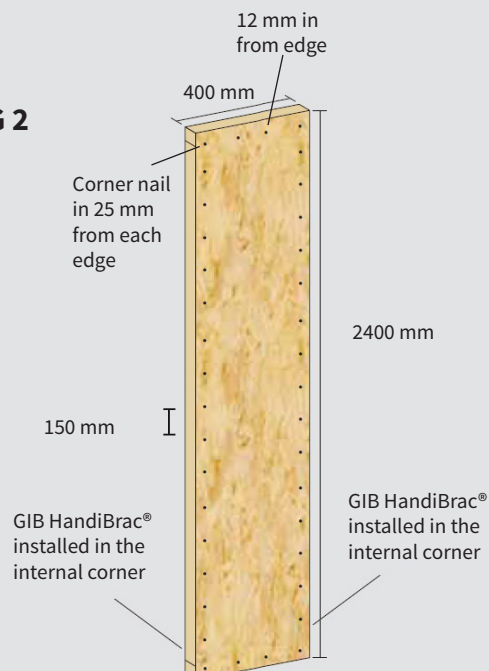
3.3.3 SYSTEM #2

SYSTEM 2 IBS RigidRAP® 400 x 2400 MM WALL USING GIB HANDIBRAC® - FIG 2

Wall construction:

- 90 x 45 MSG8 studs.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- Tested on a concrete floor with M12 hold down bolts.

FIG 2



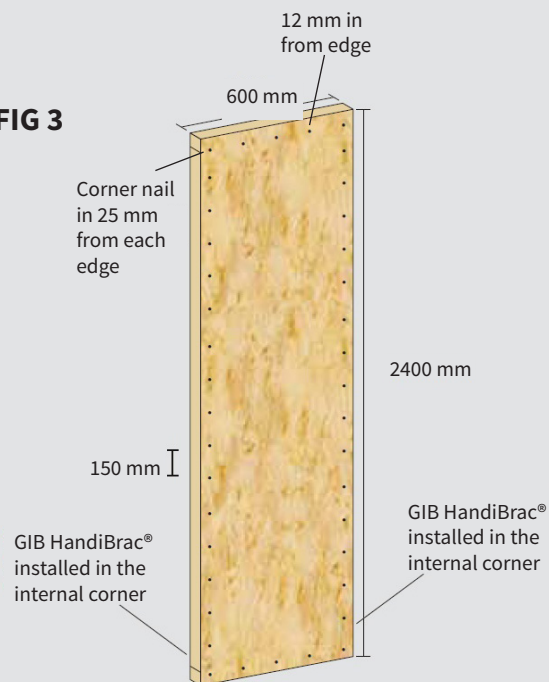
3.3.4 SYSTEM #3

SYSTEM 3 IBS RigidRAP® 600 x 2400 MM WALL USING GIB HANDIBRAC® - FIG 3

Wall construction:

- 90 x 45 MSG8 studs.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- Tested on a concrete floor with M12 hold down bolts.

FIG 3



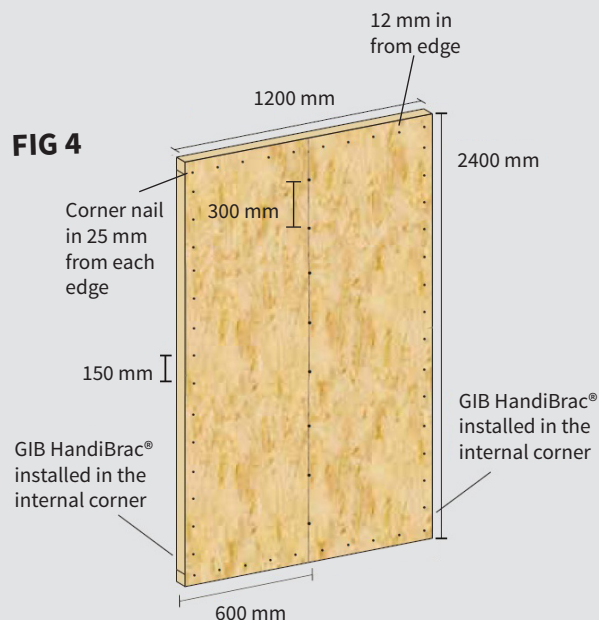
3.3.5 SYSTEM #4

SYSTEM 4 IBS RigidRAP® 1200 x 2400 MM WALL USING GIB HANDIBRAC® - FIG 4

Wall construction:

- 90 x 45 MSG8 studs (600 centres) plates.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets attached to each end studs and to the bottom plate with concrete hold-downs as per manufacturer's specifications.
- Tested on a concrete floor with M12 hold down bolts.

FIG 4

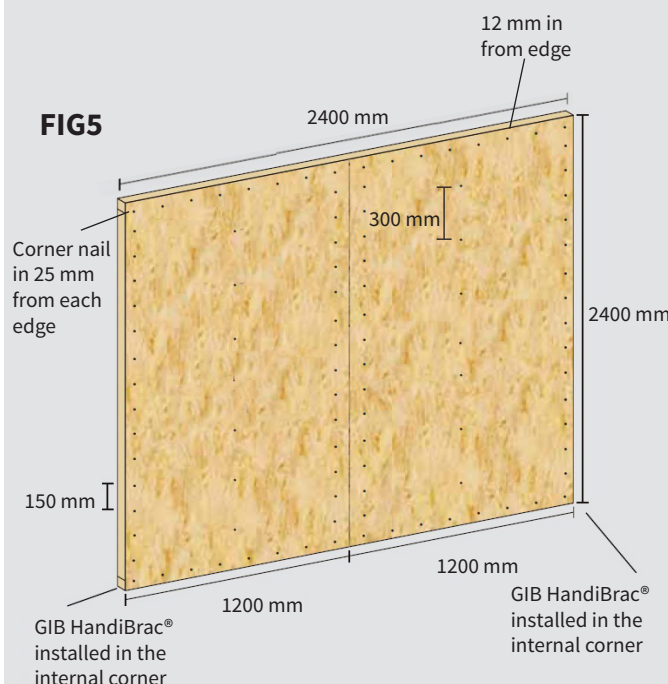


3.3.6 SYSTEM #5

SYSTEM 5 IBS RigidRAP® 2400 x 2400 MM WALL USING GIB HANDIBRAC® - FIG 5

Wall construction:

- 90 x 45 MSG8 studs (600 mm centres) plates.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- Tested on a concrete floor with M12 hold-down bolts.

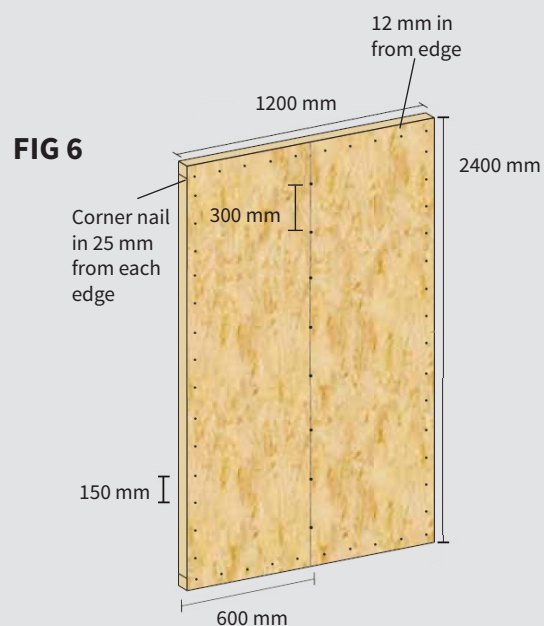


3.3.7 SYSTEM #6

SYSTEM 6 IBS RigidRAP® 1200 x 2400 MM WALL - FIG 6

Wall construction:

- 90 x 45 MSG8 studs (600 mm centres) plates.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- No hold down brackets



3.3.8 SYSTEM #7

SYSTEM 7 IBS RigidRAP® 400 x 2400 MM WALL USING GIB HANDIBRAC® AND GIB BOARD - FIG 7

Wall construction:

- 90 x 45 MSG8 studs.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- GIB standard 10 mm board on the inside.
- Tested on a concrete floor with M12 hold down bolts.

FIG 7



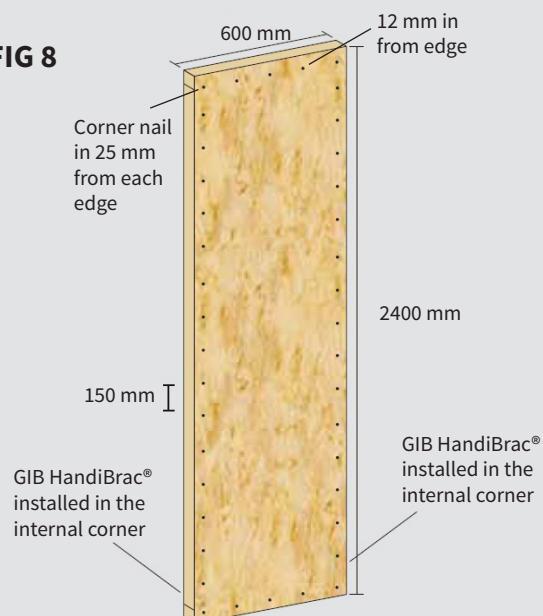
3.3.9 SYSTEM #8

SYSTEM 8 IBS RigidRAP® 600 x 2400 MM WALL USING GIB HANDIBRAC® AND GIB BOARD - FIG 8

Wall construction:

- 90 x 45 MSG8 studs.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- GIB standard 10 mm board on the inside.
- Tested on a concrete floor with M12 hold down bolts.

FIG 8



3.3.10 SYSTEM #9

SYSTEM 9 IBS RigidRAP® 1200 x 2400 MM WALL USING GIB HANDIBRAC® AND GIB BOARD - FIG 9

Wall construction:

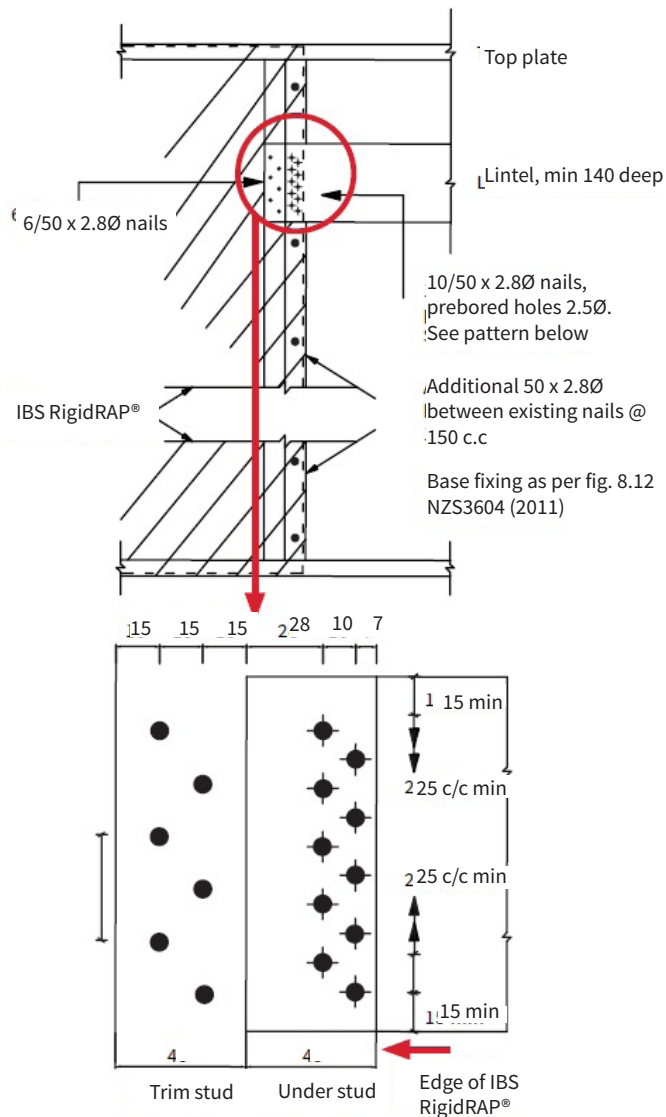
- 90 x 45 MSG8 studs (600 mm centres) plates.
- 8 mm IBS RigidRAP® panel one side.
- 30 x 2.5 mm galv clouts at 150 mm centres around the perimeter.
- GIB HandiBrac® hold down brackets fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer's specifications.
- GIB standard 10 mm board on the inside.
- Tested on a concrete floor with M12 hold down bolts.

FIG 9



3.3.11 LINTEL TIE DOWN DETAILS

Where the uplift does not exceed 7.5kN, the following strap fixing detail may be used as an alternate to 7.5kN strap fixing detailed in NZS3604, fig 8.12.



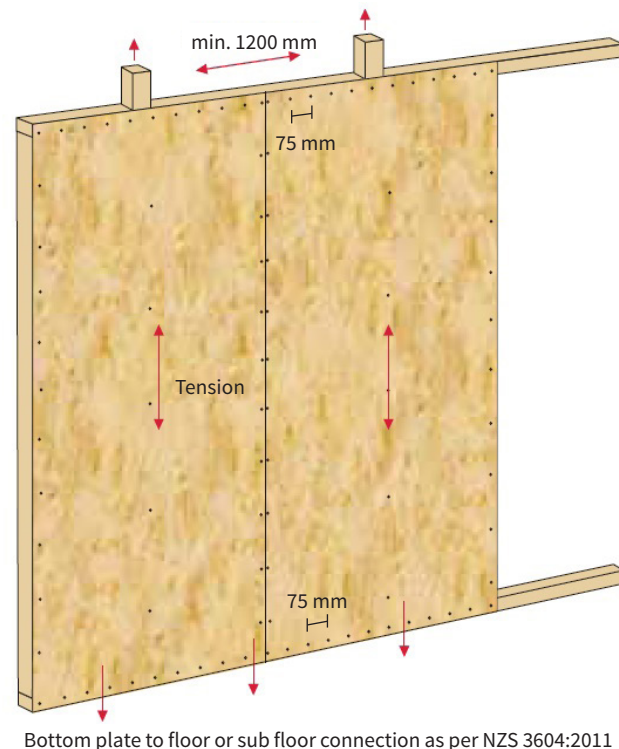
3.3.12 TOP PLATE TO RAFTER OR TRUSS CONNECTIONS

RAP sheathed wall frames transfer these uplift loads to the bottom plates; the IBS RigidRAP® acting in tension as a continuous cycle rod. Refer to NZS3604:2011 Table 8.18 for uplift connections between top plate and roof framing. Rafter/truss spacing is determined by the loaded dimensions.

Top plate / stud mechanical fixings

Uplift top plate/stud mechanical connections in accordance with NZS3604: 2011 up to 7.5kN can be omitted where IBS RigidRAP® and fixings are installed (top and bottom plates) at a maximum spacing of 75 mm.

Allowable uplift resistance (kN/rafter)	Fastener spacing (mm) top and bottom plates
7.5	75
8.5	40



3.3.13 FIXINGS

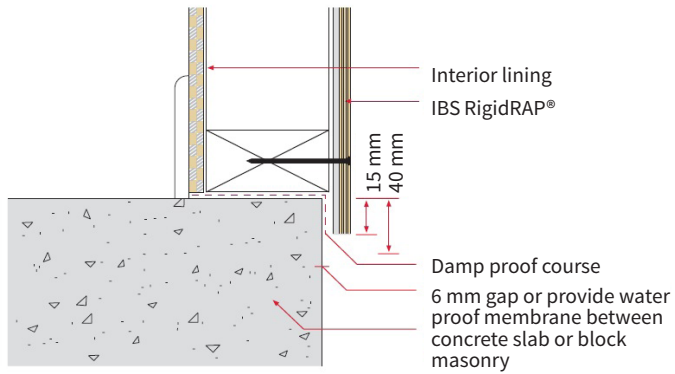
3.3.13.1 GENERAL

Fixing	Exposure Zone
Type 304 S/ Steel, Gauge 8 x 25 Surefix Screws	All exposure zones
45 x 2.5 S/Steel Annular Grooved Nails	All exposure zones
30 x 2.5 Galv Clouts, round head or D-Head	Exposure zone B & C only

3.3.13.2 BOTTOM PLATE FIXING

Bottom plate fixing	Exposure zone
GIB HandiBrac® Use supplied hold-down bolts	Steel fixing as per table 4:1 NZS3604:2011

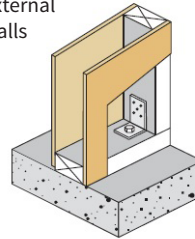
3.3.13.3 BOTTOM PLATE FIXING DETAILS BASE DETAIL



Bottom plate detail to concrete or timber floor (with 25 mm x 1 mm strap)

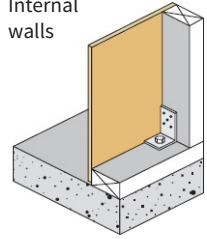
GIB HANDIBRAC® INSTALLATION - CONCRETE FLOOR

External walls



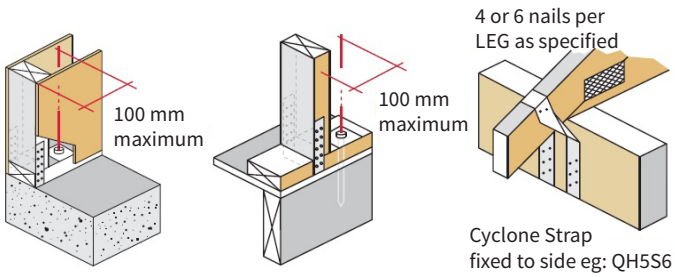
Position IBS RigidRAP® as close as practicable to the internal edge of the bottom plate.

Internal walls

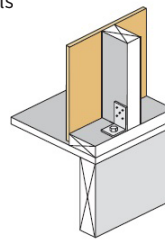


Position IBS RigidRAP® at the stud/plate junction

GIB HANDIBRAC® INSTALLATION - TIMBER FLOOR

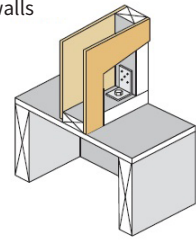


External walls



Position IBS RigidRAP® in the centre of the perimeter joist or bearer.

Internal walls



Position IBS RigidRAP® in the centre of the floor joist or full depth solid block.

3.3.14 MECHANICAL CONNECTIONS (UPLIFT & HOLD DOWN)

Connections	Exposure zone
Cyclone ties (304-2B Stainless Steel) Nails SS 30 mm x 3.15 mm in diameter	All exposure zones
1 x 25 - Sheet Brace Strap (304-2B Stainless Steel) Nails SS 6/30 x 3.15 diameter nails per strap end for 6kN capacity, 2 straps for 12kN	All exposure zones
GIB HandiBrac® https://www.gib.co.nz/products/fasteners-and-brackets/gib-handibrac/	All exposure zones
Cyclone Ties (G300 Z275 Galvanised Steel) Nails 30 mm x 3.15 mm in diameter	Exposure zones B & C only
1 x 25-Sheet Brace strap (G300 Z275 Galvanised Steel) Nails 6/ 30 x 3.15 diameter nails per strap end for 6kN capacity, 2 straps for 12kN	Exposure zones B & C only
Mitek angle bracket CPC80 - 1.55, G300, Z275, 16 x 30 mm x 3.15 mm dia. 8/Type 17, 14g x 35 hex head	Exposure zones B & C only
Simpson Strong-Tie DTT2Z - 1.74 mm, G-185, 8 x 6 mm dia x 40 screws, M12 galv. threaded rod, ChemSet	Exposure zones B & C only

3.4 JOINT SEALING AND WINDOW TAPE FOR IBS RigidRAP®

The following tapes may be used to seal panels:

Approved Joint and Window Tape (minimum face cover 50 mm)	
Hydro Tape (masons 75 mm)	www.mpb.co.nz/product/hydrowindow-tape
SUPER-STICK (Marshall Innovations)	www.mwnz.com/super_stick
TESCON EXTORIA IBS-OS (Pro Clima)	www.proclima.co.nz/tescon-extoraweathertightness
Watertight	www.technoinsulation.com/window-flashing-tapes
FlameFlash	www.technoinsulation.com/window-flashing-tapes
3M™ All Weather Flashing Tape 8067	www.3mnz.co.nz

The tape is to be installed in accordance with the specific supplier instructions.

All joints and penetrations must be sealed including:

- Vertical and horizontal joints
- External and internal joints
- Penetrations
- Window and door joinery

Where sealing a joint, ensure the IBS RigidRAP® joins are centred under the tape joint. Use a 25 mm hard PVC roller to ensure full adhesion.

4.0 Internal Lining

4.1 GENERAL

IBS RigidRAP® can be used as a substrate wall panel for internal walls and partitions where additional stiffness is required or where walls are exposed to high impact. The following fixings are recommended:

	Maximum Fastener Spacing		Maximum Fastener Spacing from Board's Edge	
	Centres at edges (on board's perimeter)	Centres at the intermediate supports	Centres at the intermediate supports	Centres at the intermediate supports
Nails/screws	150 mm	300 mm	12 mm	25 mm

5.0 Rigid Air Barrier

5.1 GENERAL

Applied to the outer face of the exterior framing, IBS RigidRAP® will minimise the pressure difference across the wall construction, thereby forming part of a weathertight external envelope.

When installed in accordance with Section 3, IBS RigidRAP® performs the function of a rigid air barrier with bracing capacity.

5.2 IBS RigidRAP® AS A NON-STRUCTURAL RIGID AIR BARRIER

Where RigidRAP® is to be used as a rigid air barrier without a bracing function then the scope of use is increased to include lightweight steel framing provided that a thermal break is installed.

IBS RigidRAP® panels should be nailed off at a minimum of 300 mm centres around the perimeter and through the body of the sheet. Rigidity of the panels will be maximised if the panels are nailed off around the perimeter at 150 mm. All other installation details to be in accordance with section 3 (IBS RigidRAP® as a bracing element).

Where all joints (vertical and horizontal) are to be sealed with an IBS approved self-adhesive “flashing tape” (see 3.4), building wrap is not required.

The IBS RigidRAP® must be allowed to acclimatise for at least 48 hours prior to installation.

When specifying IBS RigidRAP® as a rigid air barrier, the designer must take into account site specific conditions and the building with respect to, but not limited to, the following:

- Environmental (exposure) zone
- Wind zone
- Wall bracing table for wind and EQ demand
- Structural design loads
- Structural framing requirements
- Preparation of substrate
- External envelope
- Other materials likely to affect the performance of IBS RigidRAP®

6.0 Available Details

IBS supply a number of details to assist in the specification of IBS RigidRAP®. These details are available in dwg, pdf and jpg formats. Details available are as follows:

- 1210 frame layout
- 1211 frame layout brick
- 1212 frame layout sheet plaster
- 1213 frame layout EIFS plaster
- 1214 frame layout weatherboard
- 1220 joints vertical joint
- 1227 joints horizontal
- 1230 corners external corner
- 1231 corners internal corner
- 1250 floor concrete floor edge direct fix
- 1251 floor concrete floor edge cavity

- 1255 floor connections
- 1260 openings lower corner treatment
- 1261 openings upper corner treatment
- 1262 openings window head
- 1263 openings window sill
- 1264 openings window jamb
- 1265 window head
- 1266 window sill
- 1267 window jamb
- 1269 openings pipe
- 1270 wall soffit
- 1281 balustrade

Refer to www.ibs.co.nz.

7.0 Finishing

Where used as a bracing element or rigid air barrier, IBS RigidRAP® must not be left exposed for more than 90 days.

A 20 mm ventilated cavity and the cladding/joinery system must be installed that complies with the NZ Building Code. Installation of the cavity, cladding, joinery etc must be in

accordance with the relevant supplier and in accordance with the Building Consent, where applicable.

8.0 Quality Assurance

IBS recommends that installers record the installation of IBSRigidRAP®. This may include:

- Packing slips to show evidence of delivery
- Written notes, and
- Meaningful photos

9.0 Additional Resources

For compliance information of IBS RigidRAP® refer to:

- IBS Product Specification
- IBS Design & Installation Guide
- IBS CAD drawings

Information to help with the maintenance and warranty of IBS RigidRAP® refer to:

- IBS Maintenance and Warranty if IBS RigidRAP®
- www.ibs.co.nz

10.0 Technical Properties

10.1 OSB TECHNICAL PROPERTIES

OSB/3 EN300 - Characteristic values acc. to EN 13986

	Strand direction Major axis	Board thickness 8 mm
d		
Strength values [N/mm²]		
Stresses on board		
Bending	$f_{m,k}$	18.0
Compression	$f_{c,90,k}$	10.0
Shear	$f_{v,k}$	1.0
Plate loading		
Bending	$f_{m,k}$	9.9
Tensile force	$f_{t,k}$	9.9
Compression	$f_{c,k}$	15.9
Shear	$f_{v,k}$	6.8
Stiffness values [N/mm²]		
Stresses on board		
Bending modulus of elasticity	E_m^a	4930
Shear modulus	G_r^a	50
Plate loading		
Tensile force modulus of elasticity	E_t^a	3800
Compression modulus of elasticity	E_c^a	3800
Shear modulus	G_v^a	1080
^a The characteristic stiffness values E_{05} and G_{05} are calculated as follows: $E_{05} = 0.85 \times E$, and $G_{05} = 0.85 \times E$		
R Value		0.083

General and building physics values

Bulk density acc. to EN323	m	600 kg/m³
Max. deviations in board thickness		± 0.8 mm (ContiFinish®) ± 0.3 mm (sanded)
Tolerance in length and width		± 3 mm
Perpendicularity acc. to EN 324-2		2 mm/m
Thermal conductivity acc. to EN 13986	λ	0.13 W/mK
Water vapour permeability value	μ	200 (moist) / 300 (dry)
Waste code		03 01 05
Air tightness at 50 Pa		0,14 [m³/hm²]
Thickness swelling acc. to EN 317		≤ 15 %
Coefficient of expansion for 1% change in wood moisture content		0.03 %
Emissions class		E1 - 100 % Formaldehyde-free binders (< 0.03 ppm)
Environmental Product Declaration as per ISO 14025 and EN 15084		EPD-KRO-20150067- IBD2-EN
Service classes acc. to EN 1995-1-1		1 + 2
Reaction to fire acc. to EN 13501-1		D-s2, d0
Declaration of Performance No. acc. to CPR		SKDE_OSB-3_ CPR_2019_044

10.2 RigidRAP® TECHNICAL PROPERTIES

RigidRAP® Technical Data Sheet

Watertight Roof and Wall Wrap

Characteristic	Test method	Unit	Value	Tolerance	
				Min.	Max.
Length	EN 1848-2	m	50	-0	+0,5
Width	EN 1848-2	m	1,50	-0,005	+0,005
Straightness	EN 1848-2	-	pass	-	-
Mass per unit area	EN 1849-2	g/m ²	120	-10	+10
Thickness	EN 1849-2	mm	0,55	-0,1	+0,1
Reaction to fire (free-hanging)	EN 11925-2	class	F	-	-
Resistance to water penetration	EN 1928 method A	class	W1	-	-
Water vapour transmission properties	EN ISO 12572 set C	m	0,020	-0,005	+0,020
Resistance to penetration of air	EN 12114	m ³ /(m ² x h x 50 Pa)	Max 0,050	-	-
Tensile properties: Maximum tensile force	EN 12311-1	N/50 mm	MD 245	-45	+45
			CD 140	-25	+25
Tensile properties: elongation	EN 12311-1	%	MD 50	-25	+25
			CD 80	-30	+30
Resistance to tearing (nail shank)	EN 12310-1	N	MD 120	-35	+35
			CD 135	-35	+35
Dimensional stability	EN 1107-2	%	2	-	-
Stability at low temperature	EN 1109	°C	-40	-	-
Artificial ageing by long term exposure to the combination of UV radiation and elevated temperature and heat (80°C)	Elongation EN 13859-1 zał. C	%	MD 40	-20	+20
			CD 55	-20	+20
	Tensile strength EN 13859-1 zał. C	N/50 mm	MD 220	-40	+40
			CD 110	-20	+20
	Resistance to water penetration EN 13859-1 zał. C	class	W1	-	-
Water vapour transmission (23°C/85%RH)	Lyssy	g/m ² x 24h	1400	-200	+200
Water vapour transmission (38°C/90%RH)	Lyssy	g/m ² x 24h	3200	-400	+400

11.0 Limitations

The information contained in this document is current as at December 2019 and is based on data available to IBS Sustainable Building Products at the current time.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of IBS RigidRAP® products installed in accordance with this document.

IBS 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 367 759 or visit www.ibs.co.nz to obtain current information.

IBS 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, IBS assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.



HOME OF SUSTAINABLE BUILDING PRODUCTS

Sustainability covers all facets of business from sourcing, to manufacture, handling of waste and with a focus for long term sustainable products for the industry.

IBS selects products from suppliers that are committed, in the long term, to sourcing and manufacturing their products sustainably. We also look for suppliers and manufactures that have a commitment to fair employment practices.

In New Zealand, IBS looks to minimize waste, recycle and maximise the use of recyclable packaging.

We offer a range of panel products for use in many different end uses.

Structural Plywood

Uncertified Plywood

Decorative Ply

OSB

PRIMAaqua

Wet Wall Linings

PRIMAalpha Groove

PRIMAflex

RigidRAP

CUT Panels

Hardboard

Marine Ply

Softboard

Panel Brace Line

Formply



IBS RIGIDRAP®

PURPOSE

IBS RigidRAP® is supplied by IBS for use as a wall bracing element, a structural rigid air barrier or an interior wall lining panel, where high impact is envisaged.

Where used as an exterior wall bracing element or rigid air barrier, IBS RigidRAP® functions as a temporary cladding.

EXPLANATION

IBS RigidRAP® comprises an 8 mm, moisture-resistant (class 3), Oriented Strand Board (OSB) panel with a heavyweight, synthetic wall underlay adhered to the outer face.

Manufactured by Swiss Krono, the OSB is a structural wood panel made of three layers of softwood strands, orientated at right angles and bonded together with heat-cured adhesives.

The BRANZ appraised wall underlay, adhered to the OSB in New Zealand by IBS, is a water-resistant polypropylene film, laminated between two layers of spunbonded polypropylene.

IBS RigidRAP® is supplied in the following sizes:

- 2440 x 1196 x 8 mm
- 3050 x 1196 x 8 mm.
- 2745 x 1196 x 8 mm



For further assistance please contact:

- ☎ 0800 367 759
- ✉ info@ibs.co.nz
- 🌐 www.ibs.co.nz



SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Location In wind zones up to and including extra high as defined in NZS 3604:2011 or to a wind design pressure (ULS) of 2.5 kPa. In all exposure zones, as defined in NZS 3604:2011.	➤ Material selection in accordance with NZS 3604:2011, section 4.
Building With timber framing. In conjunction with a primary structure that complies with the NZ Building Code or where the designer has established that the existing structure is suitable for the intended building work. As a rigid air barrier.	➤ The stud spacing must be a maximum of 600 mm. ➤ At mid floor junctions, a proprietary 'Z' flashing must be installed. ➤ The cladding system must incorporate a ventilated cavity and wall cladding that complies with E2/AS1 or has a relevant CodeMark certificate. ➤ Nailhead must not penetrate the board; it must be finished flush.
As a wall bracing element.	➤ Where designed in accordance with NZS 3604:2011 (as modified by B1/AS1 amd. 18). ➤ Nailhead must not penetrate the board; it must be finished flush.

USEFUL INFORMATION

For information on the design, installation and maintenance of IBS RigidRAP® and for our warranty refer to www.ibs.co.nz.

OTHER CERTIFICATIONS AND APPROVALS HELD BY THE MANUFACTURER

Swiss Krono, as manufacturer of the OSB3 has the following certifications.

- Swiss Safety Center AG. [26/04/2018]. Certificate No. 06-11-053. ISO 9001:2015. *Quality management systems — Requirements.*
- Swiss Safety Center AG. [26/04/2018]. Certificate No. 98-111-503. ISO 14001:2015. *Environmental management systems — Requirements with guidance for use.*

CONDITIONS OF USE

- IBS RigidRAP® must not be exposed to the weather for more than 90 days.
- Only flashing tapes listed in the IBS RigidRAP® Design and Installation guide may be used.

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with all IBS requirements, the IBS RigidRAP® will comply with or contribute to compliance with the following performance claims:

NZ Building Code clauses		BASIS OF COMPLIANCE	
		Compliance statement ¹	Demonstrated by
B1 Structure		PRODUCT CERTIFICATION	
B1.3.1, B1.3.2		CodeMark Certificate	
B1.3.3 (a), (b), (f), (h), (m), (q)		CM70035 18/07/2019	
B1.3.4			
B2 Durability			
B2.3.1 (a)			
E2 External Moisture			
E2.3.2, E2.3.7			
F2 Hazardous Building Materials			
F2.3.1			



CodeMark Certificate issued by Bureau Veritas.
Bureau Veritas is an accredited product certification body under section 263 of the Building Act 2004.

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

BASIS FOR CERTIFICATION

Technical

- IBS Building Products. [November 2019]. *Design and Installation Guide, version 1.1.*
- EN 13986: 2015. *Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking.* In accordance with EN 300:2006. *Oriented Strand Board (OSB). Definitions, classifications and specifications.* Use classes and durability issues.

Quality

- Bureau Veritas. *Audit of IBS manufacturing facilities.*
- Bureau Veritas. *Review and audit of IBS Quality plan and associated manufacturing.*

Buildability

- Bureau Veritas. *NZ site audits.*



VERSION:

.....

Note: Uncontrolled in printed format.

DATE:

.....

Signed on behalf of IBS Building Products:

NAME:

.....

Jason Bardell

POSITION:

.....

Managing Director

By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.



IBS Building Products, 1/7 Fraser Road, Panmure, Auckland ➤ info@ibs.co.nz ➤ 0800 367 759 ➤ www.ibs.co.nz

This Product Assurance Supplier Statement (pass™) has been prepared by TBB in accordance with MBIE PTS guidelines and the recommendations of s9.2, Determination No. 2019-011 (issued 12 April 2019). TBB is ISO9001:2016 certified. Copyright © 2017, The Building Business Limited (TBB). All rights reserved.



IBS RigidRap®

WARRANTY GENERAL TERMS

May 2020 – Version 2

This warranty applies to IBS RigidRAP® ('RigidRAP®') supplied by IBS Sustainable Building Products (IBS) when used in accordance with all IBS requirements.

This warranty is to be read in conjunction with all relevant and applicable technical documentation published or referenced by IBS.

Date warranty valid:

50 years from proven date of purchase or dispatch from IBS whichever is the earlier.

All enquiries relating to this warranty must (in the first instance) be directed to the place of purchase, the supplier or the installer.

> IBS warrants that

At the time of delivery to the merchant or site (where applicable) the RigidRAP® will:

- be free from freight-related defects
- be free from defects that may have arisen through defective factory workmanship or materials
- conform to the performance characteristics listed on the current RigidRAP® pass™ ('warranted condition').

> In the event a breach of the warranty is proven, the following applies:

- IBS will, at its discretion, supply replacement RigidRAP® without charge or refund the value of the product.
- Other losses or damage caused by a breach of the warranty or failure of the product for any other reason are not covered.
- IBS obligations under this warranty are limited to the replacement of defective RigidRAP® or the value of the RigidRAP®. The value of the materials will be reduced pro-rata, based on the remaining life of the product (as set by the relevant durability requirements of the NZ Building Code).
- IBS reserves the right to supply other comparable materials should the warranted materials no longer be supplied by IBS.

> This warranty is subject to the following:

- Receipt of date of purchase of the product.
- Evidence satisfactory to IBS of failure of the RigidRAP®.
- Receipt of a written claim from the claimant either within 30 days of when the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.
- The claim must include full details of the alleged defect.
- Evidence satisfactory to IBS that all maintenance requirements have been carried out.
- The warranty does not cover failure or problems caused by defective use; failure relating to improper design of the project structure; structural failure; settlement; movement of materials to which the product is attached or dependent on; acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions; inadequate maintenance; growth of mould, mildew, fungi, bacteria or any organism on any product; or acts or omissions of a third party over whom IBS has no control.
- The warranty does not cover failure or loss arising from the failure to follow all relevant IBS advice and requirements.
- Normal wear and tear is excluded from this warranty.

All relevant information is available from IBS (refer to www.ibs.co.nz).

> Note:

All RigidRAP® technical information is uncontrolled in printed format, so in all instances refer only to the documentation on the website.

4221HH Hermpac Horizontal Weatherboard Cladding System



Hermpac

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technical@hermpac.co.nz
www.hermpac.co.nz

SUPPORTING DOCUMENTS

BRANZ Appraisal 658 (2020) - Hermpac Rusticated, Splaycut & Multi-Splay System

Ref 11054. Uploaded 27 Aug 2020

Purpose: Performance

CODEMARK Certificate - Hermpac Rusticated, Splaycut & Multi-Splay System (30037 Rev1)

Ref 11056. Uploaded 27 Aug 2020

Purpose: Performance

Construction Drawings - Hermpac Rusticated, Splaycut & Multi-Splay Cladding System - Direct Fix

Ref 11279. Uploaded 30 Aug 2020

Purpose: Installation

Hermpac Horizontal Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System 102426

Ref 10155. Uploaded 26 Jun 2020

Purpose: Performance, Installation, Maintenance, Environmental

Installation Specification - Hermpac Rusticated, Splaycut & Multi-Splay Cladding System - Cavity Fix

Ref 11271. Uploaded 30 Aug 2020

Purpose: Installation, Maintenance

Product Installation Checklist - Hermpac Rusticated, Splaycut & Multi-Splay Cladding System

Ref 11075. Uploaded 27 Aug 2020

Purpose: Installation, Warranty

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chris



BRANZ Appraised

Appraisal No. 658 [2020]

HERMPAC RUSTICATED, SPLAYCUT AND MULTI-SPLAY WEATHERBOARD CAVITY SYSTEM

Appraisal No. 658 [2020]

This Appraisal replaces BRANZ
Appraisal No. 658 [2014].



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



Hermpac

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BRANZ

BRANZ

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Product

- 1.1 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is a cavity-based timber weatherboard external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 The system consists of horizontally fixed Hermpac Rusticated, Splaycut and Multi-Splay timber weatherboards, cavity battens, flashings and accessories and is finished with a premium penetrating oil, stain or an exterior paint system to Hermpac specifications.
- 1.3 The system incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with a minimum 18 mm drained cavity.

Scope

- 2.1 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished Cedar and DuraLarch weatherboards and paint finished DuraLarch and AshinDura weatherboards has been appraised as an external wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable System 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 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished weatherboards has also been appraised for weathertightness and structural wind loading when used as an external wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.

- 2.3 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished cedar weatherboards has been appraised as an external wall cladding system for buildings within the following scope:
- the scope limitations of NZBC Acceptable System 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 Medium when studs are at maximum 600 mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400 mm centres.
- 2.4 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must only be installed horizontally on vertical, flat surfaces.
- 2.5 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[The Appraisal of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

Building Regulations

New Zealand Building Code [NZBC]

- 3.1 In the opinion of BRANZ, the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, 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 for the relevant physical conditions of B1.3.3 being self-weight, wind, impact and creep [i.e. B1.3.3 [a], [h], [j] and [q]]. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements. See Paragraphs 9.1 - 9.5.
- Clause B2 DURABILITY:** Performance B2.3.1 [b], 15 years and B2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements. See Paragraphs 10.1 and 10.2.
- Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement. See Paragraphs 14.1 - 14.5.
- Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 System components and accessories supplied by Hermpac are as follows:

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboards

- Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are manufactured from Canadian Coastal Western Red Cedar. Selected rusticated weatherboards are also manufactured from DuraLarch [Siberian Larch heartwood] and AshinDura [Western Hemlock].
- The lap and rebate profiles of Hermpac Rusticated and Splaycut weatherboards are in accordance with NZS 3617 and BRANZ Bulletin 411. The weatherboards are minimum 18.5 mm thick, and are available in a range of widths and face profiles. They are supplied in random lengths. Lengths outside of the general specification may be available by special contract.
- Hermpac Multi-Splay weatherboards are minimum 18.5 mm thick and are available in a range of widths and face profiles. They are supplied in random lengths. Lengths outside of the general specification may be available by special contract.



BRANZ Appraisal
Appraisal No. 658 [2020]
27 May 2020

HERMPAC RUSTICATED,
SPLAYCUT AND MULTI-SPLAY
WEATHERBOARD CAVITY SYSTEM

- Cedar and DuraLarch weatherboards are supplied unfinished for site finishing with oil, stain or paint prior to installation, or prefinished using the flood coat application method by Machinecoat NZ Limited. AshinDura weatherboards are treated to Hazard Class H3.1 and must be paint finished only. They are supplied primed, or prefinished using the flood coat application method by Machinecoat NZ Limited. Refer to the Appraisals listing on the BRANZ website for details of the Hermpac rusticated, splaycut and multi-splay weatherboard profiles covered by this Appraisal. *[Note: This Appraisal is only valid when weatherboards with profiles as listed are supplied by Hermpac.]*

Accessories

- **Hermpac external corner mouldings** - 40 x 40 mm and 42 x 42 mm profiled external corner moulds supplied in lengths 1.8 m and longer.
- **Hermpac internal corner mouldings** - 18.5 x 18.5 mm, supplied in 1.8 m and longer.
- **Hermpac cover boards** - 18 mm thick boards in widths of 69 and 90 mm. The cover boards are supplied in lengths 1.8 m and longer.
- **Hermpac eaves moulding** - 40 x 27 mm, 26 x 15 mm and 30 x 18 mm bevelled profile, supplied in 1.8 m and longer.
- **Hermpac Rusticated plugs** - 40 x 9.25 mm and 25 x 9.25 mm profiled to suit selected weatherboard profiles. The plugs are supplied in 10 m bundles.
- **Hermpac scribes** - 10 mm wide x 40 and 60 mm, 17 mm wide x 40 and 60 mm scribes with bevelled or radiused edges supplied in 1.83 to 6.1 m lengths.

[Note: All timber accessories are manufactured from Canadian Coastal Western Red Cedar or Siberian Larch heartwood.]

- **Hermpac oil or stain finished weatherboard fixings** - silicon bronze, Grade 304 or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails. The nail shank must be minimum 3.15 mm diameter and the length must allow minimum 30 mm penetration of the wall frame.
- **Hermpac paint finished weatherboard fixings** - Grade 304 or Grade 316 stainless steel annular grooved jolt head nails. The nail shank must be minimum 3.15 mm diameter and the length must allow minimum 30 mm penetration [for DuraLarch and AshinDura] or minimum 35 mm penetration [for Cedar] of the wall frame.
- **Hermpac clinch nails** - 27 x 2.0 mm, 40 x 2.0 mm or 50 x 2.0 mm Grade 316 stainless steel annular grooved nails with an off-set flat head.
- **Hermpac cover board fixings** - 50 x 2.8 mm silicon bronze, Grade 304 or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails.
- **Hermpac scribe fixings** - 60 x 2.8 mm stainless steel annular grooved jolt head nails.

4.2 Accessories used with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System which are supplied by the building contractor are:

- **Flexible wall underlay** - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible wall underlay support** - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *[Note: mesh and wire galvanising must comply with AS/NZS 4534.]*
- **Rigid wall underlay** - Plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
- **Flexible sill and jamb flashing 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.

- **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.
- **Cavibat cavity battens** - manufactured from extruded polypropylene. The battens are cut after extruding to a finished size of approximately 45 mm wide by 18 mm thick. The battens are coloured green and are supplied in 1,200 mm long lengths. Cavibat cavity battens are covered by BRANZ Appraisal No. 524 [2012].
- **Timber cavity battens** - nominal 50 mm wide by 25 mm thick [minimum finished size of 45 mm wide by 18 mm thick] Radiata pine timber treated to Hazard Class H3.1.
- **Cavibat fixings** - 40 x 2.5 mm flat head hot-dip galvanised nails or stainless steel finishing brads used to temporarily fix the battens in place until the cladding is installed.
- **Timber cavity batten fixings** - 40 x 2.5 mm flat head hot-dipped galvanised nails or 50 x 2.87 mm hot-dipped galvanised gun nails to temporarily fix the battens in place prior to installation of the cladding.
- **Cavity closure strip** - uPVC, aluminium or stainless steel, punched with 3-5 mm diameter holes or slots complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3.
- **Flashings** - including external corner flashing, internal corner flashing, horizontal inter-storey joint flashing, balustrade and parapet saddle flashing, and balustrade and parapet cap flashings. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 and Table 21 for durability and material compatibility requirements.
- **Aluminium joinery head flashings** - as supplied by the joinery manufacturer or contractor.
- **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.

Finishing System Specification – Oil or Stain Finish

- 4.3 Prior to the installation of oil or stain finished weatherboards, the back, face, ends and edges of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards not supplied prefinished must be sealed with an exterior grade oil or oil-based penetrating stain. At least two coats of an exterior grade quality oil or oil-based penetrating stain must be used over the front face of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards to protect the weatherboards and give the desired finish colour to the exterior walls. The oil or stain must be recommended for use as a wall cladding oil or stain by the manufacturer and must be applied in accordance with the manufacturer's instructions. Proprietary oil or stain systems have not been assessed, and are therefore outside the scope of this Appraisal. *[Note: Hermpac recommends the use of oil and oil based stains manufactured by Wood-X and Resene.]*

Finishing System Specification – Paint Finish

- 4.4 Prior to the installation of paint finish weatherboards that are supplied unprimed, the back, face, ends and edges of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be primed in accordance with the Technical Literature for the relevant timber type. All exposed edges, including top edges at sills and all bottom edges of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards and accessories not supplied prefinished, must be finished with at least two coats of an exterior grade acrylic latex paint complying with any of Parts 7, 8, 9 or 10 of AS 3730 to protect the weatherboards and give the desired finish colour to the exterior walls. The paint must be recommended for use as a wall cladding paint for the selected timber by the manufacturer and must be applied in accordance with the manufacturer's instructions. Proprietary paint systems have not been assessed, and are therefore outside the scope of this Appraisal. *[Note: For Hermpac Rusticated, Splaycut and Multi-Splay weatherboards, Hermpac recommends using paint with a colour that has a Light Reflectance Value (LRV) of $\geq 40\%$ for Cedar or AshinDura, or $\geq 45\%$ for DuraLarch.]*

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Hermpac or the building contractor, whether on site or off site, is under the control of the building contractor. Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be stacked flat and true, clear of the ground by a minimum of 150 mm and supported on dry and clean timber bearers at maximum 900 mm centres. They must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the weatherboard surfaces.
- 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 the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

- 7.1 Timber wall framing behind the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Where interior linings compliant with NZS 3604 Section 12 are installed directly to the interior face of the wall framing, dwangs are not required. Refer to NZS 3604 Section 8.5.4 for further information.
- 7.3 Additional framing may be required at soffits, internal and external corners, and window and door openings for the support and fixing of cavity battens and the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System.
- 7.4 Timber wall framing behind where weatherboards are joined over a cavity batten must be nominal 50 mm thickness [i.e. 45 mm minimum finished thickness].
- 7.5 Timber wall framing must have a maximum moisture content of 24% at the time of the cladding application. *[Note: If Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]*

General

- 8.1 When the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres 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 must provide a minimum ventilation opening area of 1,000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable System E2/AS1, Paragraph 9.1.8.3 [b]. *[Note: Cavibat cavity battens do not provide vermin proofing to the bottom of the drained cavity.]*

- 8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable System E2/AS1, Table 18.
- 8.4 At balcony, deck or roof/wall junctions, the bottom edge of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must be kept above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable System E2/AS1, Paragraph 9.1.3.
- 8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to and including Very High, and rigid underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.
- 8.6 Where the system 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].

Structure

Mass

- 9.1 The mass of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is less than 30 kg/m². The system is therefore considered a lightweight cladding in terms of NZS 3604.

Impact Resistance

- 9.2 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has good resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

- 9.3 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished Cedar or DuraLarch weatherboards 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 System E2/AS1, Paragraph 1.1, or up to 2.5 kPa design differential ULS wind pressure where buildings are specifically designed.
- 9.4 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished DuraLarch and AshinDura weatherboards 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 System E2/AS1, Paragraph 1.1.
- 9.5 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished cedar weatherboards is suitable for use in NZS 3604 Wind Zones up to, and including Medium when studs are at maximum 600 mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400 mm centres.

Durability

Serviceable Life

- 10.1 Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System installations are expected to have a serviceable life of at least 20 years provided the system is maintained in accordance with this Appraisal and the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are continuously protected by a oil, stain or paint finish. *[Note: For oil or stain finished weatherboards this opinion only covers serviceability with regards to structural and weathertightness performance. It does not cover appearance, which may deteriorate significantly, especially when proper and regular maintenance is not carried out.]*
- 10.2 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 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 to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.
- 11.2 Regular cleaning [at least annually] of the oil, stain or paint coating is required to remove grime, dirt and organic growth, and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent.
- 11.3 Recoating of the oil or stain finish will be necessary throughout the life of the cladding system. Recoating must be carried out every 2-3 years or in accordance with the oil or stain manufacturer's instructions. Recoating will be required more frequently on exposed northern and western facing walls. When recoating, care must be taken to ensure bottom edges and Hermpac Rusticated, Splaycut and Multi-Splay edges are well covered and penetrated with the oil or stain.
- 11.4 Recoating of the paint finish will be necessary throughout the life of the cladding system. Repainting must be carried out every 7-10 years or in accordance with the paint manufacturer's instructions. When repainting, care must be taken to ensure bottom edges and Hermpac Rusticated, Splaycut and Multi-Splay edges are well covered with the paint.
- 11.5 Annual inspections must be made to ensure that all aspects of the cladding system, including flashings and 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, oil, stain or paint coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.
- 11.6 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *[Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System.]*

Control of External Fire Spread

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 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has not been assessed for a peak heat release or total heat released rating and therefore cannot be used within 1 m of the relevant boundary or Risk Group SI Buildings.
- 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 Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System 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 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, 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 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.
- 14.4 The details given in the Technical Literature for weather sealing are based on the 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 Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirements 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 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal will not create a risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirements

- 16.1 All design and building work must be carried out in accordance with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity 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 License class.

Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

- 17.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid wall underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems must be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

Cavity Batten Installation

- 17.2 Cavity battens must be installed over the wall 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. [Refer to Paragraph 9.5 for the maximum stud spacings for paint finished cedar weatherboards.] Cavibat cavity battens must be fixed in place with 40 x 2.5 mm hot-dip galvanised flat head nails or galvanised or stainless steel finishing brads at 400 mm centres. Refer to BRANZ Appraisal No. 524 [2012] for further information. Timber cavity battens must be fixed in place with 40 x 2.8 mm hot-dip galvanised flat-head nails at maximum 800 mm centres.
- 17.3 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Installation

- 17.4 Hempac Rusticated, Splaycut and Multi-Splay weatherboards may be cut on site by power or hand saw. Holes and cut-outs may be formed by using a hole saw.
- 17.5 Hempac Rusticated, Splaycut and Multi-Splay weatherboards must be dry prior to installation.
- 17.6 Before oil or stain finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards are installed, the back, face and edges must be sealed with an exterior grade oil or oil-based penetrating stain. During installation, cut ends must be sealed with an exterior grade oil or oil-based penetrating stain.
- 17.7 Before paint finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards are installed, the back, face and edges must be sealed with an exterior grade primer. During the installation of paint finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards, cut ends must be sealed with two coats of an exterior grade alkyd timber primer.
- 17.8 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner, external corner moulding etc. The necessary flashings must be installed before commencing weatherboard fixing and the cavity closure must be installed continuously around the bottom of the cavity.
- 17.9 The first course of weatherboards must be installed using full length boards where possible, and commence from an external corner. The first weatherboard must be installed level to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50 mm.
- 17.10 Immediately prior to installing the weatherboards over the internal and external corner flashings, a continuous bead of sealant must be applied to the face of the flashing along the fixing line.
- 17.11 Hempac Rusticated, Splaycut and Multi-Splay weatherboards must be overlapped a minimum of 25 mm with an expansion gap of 2 mm at the overlap. It is recommended that the top of the weatherboard lap is restrained using the Hempac clinch nail at every cavity batten.

- 17.12 Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be pre-drilled with a hole slightly smaller than that of the nail. Fix each weatherboard with one nail per board at every cavity batten. Fixing of oil or stain finished weatherboards must be carried out using Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails. Fixing of paint finished weatherboards must be carried out using silicon bronze or Grade 304 or 316 stainless steel annular grooved jolt head nails. The nail length must allow minimum 30 mm penetration [for DuraLarch and AshinDura] or 35 mm penetration [for Cedar] of the wall frame. The fixing must be located 30-35 mm above the bottom of the weatherboard and a minimum of 32 mm from the end of the board. Crown Head, Rose Head or Flat Head nails must finish flush onto the surface of the weatherboard, not into or below the surface. The nail must be installed with a slight upslope to reduce capillary draw. Jolt head nails must be punched a maximum of 2 mm beneath the surface of the board.
- 17.13 Fix weatherboards in full lengths where possible. Where joints are unavoidable, scarf the weatherboard at 30° over a cavity batten and fix with one fixing through the overlapping board.

Aluminium Joinery Installation

- 17.14 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5-10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.
- 17.15 After installing the window and door joinery, Hermpac Rusticated plugs or scribes must be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/ weatherboard junction.

Finishing

- 17.16 The coating manufacturer's instructions must be followed at all times for application of the oil or stain finish.
- 17.17 To prevent swelling of the weatherboard around punched fixings, the fixing must be filled immediately, or alternatively the weatherboard and the head of the fixing must be primed with a premium alkyd timber primer.
- 17.18 The paint coating manufacturer's instructions must be followed at all times for the application of the paint finish. Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be painted as soon as practicable following fixing and must be clean and dry before commencing. If the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are exposed to the weather for more than 2 months they must be reprimed with one coat of primer prior to the application of the finishing coats. Allow the recommended drying time between coats and follow the temperature limitations for application.

Inspection

- 17.19 The Technical Literature must be referred to during the inspection of Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System installations.

Health and Safety

- 18.1 Cutting of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be carried out in well ventilated areas and dust masks, eye and hearing protection must be worn.
- 18.2 Safe use and handling procedures for the components that make up the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System are provided in the relevant manufacturer's Technical Literature.



BRANZ Appraisal
Appraisal No. 658 [2020]
27 May 2020

HERMPAC RUSTICATED,
SPLAYCUT AND MULTI-SPLAY
WEATHERBOARD CAVITY SYSTEM

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 the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is based on testing and evaluation of all details within the scope and as stated within this Appraisal. The Hermpac Rusticated and Splaycut Weatherboard Cavity System was tested to NZBC E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, horizontal joints, internal and external corners and balustrade to wall junction. The Hermpac Multi-Splay Weatherboard Cavity System was tested to determine the weathertightness performance limits of the system. The testing assessed the performance of the foundation detail, horizontal lap joints, internal and external corners. In addition to the weathertightness tests, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for cavity-based weatherboard claddings.
- Fastener pull through testing. BRANZ determined design wind suction pressures, and by comparing these pressures with AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber framed walls.

Other Investigations

- 20.1 Structural and durability opinions have been provided by BRANZ technical experts.
- 20.2 The performance of timber weatherboard wall cladding products in New Zealand has been considered, including the structural and durability performance, and non-hazardous nature.
- 20.3 Site inspections have been carried out by BRANZ to assess the practicability of installation.
- 20.4 The Technical Literature for the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of materials, components and accessories supplied by Hermpac is the responsibility of Hermpac.
- 21.3 Quality of installation on site of components and accessories supplied by Hermpac and the building contractor 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 framing systems and joinery, wall underlay, flashing tapes, air seals, cavity battens and the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System in accordance with the instructions of Hermpac.
- 21.5 Building owners are responsible for the maintenance of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System in accordance with the instructions of Hermpac.



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HERMPAC RUSTICATED,
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WEATHERBOARD CAVITY SYSTEM

Sources of Information

- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 4534: 2006 Zinc and zinc/aluminium-alloy coatings on steel wire.
- BRANZ Bulletin Number 411, April 2001, Recommended Timber Cladding Profiles.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 3617: 1979 Specification for profiles of weatherboards, fascia boards and flooring.
- 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.



BRANZ Appraised
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27 May 2020

HERMPAC RUSTICATED,
SPLAYCUT AND MULTI-SPLAY
WEATHERBOARD CAVITY SYSTEM



In the opinion of BRANZ, the **Hermipac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Herman Pacific 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. **Herman Pacific 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 **Herman Pacific 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 **Herman Pacific Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

27 May 2020



PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



KEY INFORMATION

CERTIFICATE: GM-CM30037 Rev1

1 SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT

The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

2 SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT

- The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has been assessed as an external horizontally fixed wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Third Edition including amendment 9 (27/06/2019), 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, Third Edition including amendment 9 (27/06/2019), Table 2; and,
 - situated in NZS 3604:2011 Wind Zones up to, and including Extra High.
- The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has also been assessed for weathertightness and structural wind loading when used as an external horizontally fixed wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Third Edition including amendment 9 (27/06/2019), Paragraph 1.1; with regards to building height and floor plan area; and,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.
- The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must only be installed horizontally on vertical, flat, surfaces.
- The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is assessed for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. (The assessment of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System relies on the joinery meeting the requirements of NZS 4211:2008 including Amendment 1 for the relevant Wind Zone or wind pressure.)

4 CERTIFICATE HOLDER DETAILS

Herman Pacific Limited.
 Herman Pacific
 110 Foundry Road, Silverdale 0932, New Zealand.
 technical@hermpac.co.nz
 Tel: 09 426 5475, Fax: 09 426 7638,
www.hermpac.co.nz

ISSUED	LAST UPDATE	EXPIRY
31/3/2014	23/8/2020	31/3/2023
5 SIGNATURE		
Herve Michoux, Global Mark Managing Director		

6 PRODUCT CERTIFICATION BODY

Global-Mark Pty Ltd
 57 Willis Street
 Wellington, 6011
 customer.service@global-mark.co.nz
 +64 9 889 0622
www.global-mark.co.nz
 The complaints process for this certificate
 can be found here:
<https://www.global-mark.com.au/?s=complaint>



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CERTIFICATE V1.2



PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



3 BUILDING CODE PROVISIONS

The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System if designed, used, installed and maintained in accordance with the scope of this Certificate, the statements and conditions of the supporting BRANZ Appraisal No. 658 (2020), the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System Installation Specification, May 2020 will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2, B1.3.4 (b), (c), (d) and (e) for the relevant physical conditions of B1.3.3 (a), (h), (j) and (q). The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets the requirements.

Clause B2 DURABILITY: Performance B2.3.1(b) 15 years and B2.3.2(a). The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement and will not present a health hazard to people.

7 CONDITIONS AND LIMITATIONS OF USE

1. Subject to regular inspection for soil movement, earthquake or other structural impact or user damage.
 2. Maintaining the validity of BRANZ Appraisal No. 658 (2020) Hermpac Rusticated, Splaycut and Multi-splay Weatherboard Cavity System.
 3. Proprietary stain systems and proprietary paint systems have not been evaluated, and are therefore outside the scope of this certification.
- Design Conditions:
4. Product specification and incorporation of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System into the building design shall be carried out by a designer / architect / engineer or a building professional who:
 - a. Is qualified to design the buildings covered under the 'Scope' of use of this product.
 - b. Has ready access to the technical specifications including construction drawings and standards referenced in both the BRANZ appraisal No. 658 (2020) Hermpac Rusticated, Splaycut and Multi-splay Weatherboard Cavity System and this certificate.
- Product Installation Conditions:
5. Installation shall be carried out by a Licensed Building Practitioner (LBP), or tradespersons with experience in Rusticated, Splaycut and Multi-Splay Weatherboard external wall cladding installation who are supervised by a LBP.
 6. Installation shall be undertaken in accordance with all relevant technical information related to the selected installation method, including information contained within the BRANZ appraisal No. 658 (2020), the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System Installation Specification, May 2020, including
 - a. the construction drawings applicable (see section 9)
 - b. The finish requirements applicable to species and the stain or paint system used.
 7. As part of the application for the Code Compliance Certificate (CCC), a signed Quality Assurance Checklist Hermpac Rusticated, Multi-Splay & Splaycut Weatherboard Cavity System (dated May 2020) must be supplied by the LBP who installed or supervised installation.

8 HEALTH AND SAFETY INFORMATION



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PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



Standard industry safety practices and manufacturer safety requirement as detailed in the technical literature including the applicable SDS must be observed at all time.

9 SUPPORTING INFORMATION ABOUT DESCRIPTION

1. The system consists of horizontally fixed Rusticated, Splaycut and Multi-Splay Weatherboards installed over battens to form the cavity, flashings and accessories.
2. The Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are manufactured from Western Red Cedar. Selected Weatherboards are also manufactured from DuraLarch and AshinDura. Cedar and DuraLarch weatherboards are supplied either raw, with one coat of machine applied premium penetrating exterior grade oil stain to Hermpac specifications or, with a machine applied primer coat and one machine applied undercoat of exterior grade paint to Hermpac specifications. AshinDura weatherboards are treated to H3.1 and are only available with a machine applied primer coat and one machine applied coat of exterior grade paint to Hermpac specifications.
3. The system incorporates a primary and secondary means of weather resistance (first and second line of defense) against water penetration by separating the cladding from the external wall frame with a minimal 18 mm drained cavity.
4. Hermpac Standard Profiles (HP51, HP52, HP65, HP65MS, HP66, HP66MS, HP67, HP68, HP53, HP54 and HP57) and Hermpac Custom Profiles defined in accordance with NZS3617 and BRANZ Bulletin 411 are covered by this certificate
5. The system construction details defined in:
 - Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System – Construction Drawings -Version 1.2 dated 20 May 2020; and
 - Rusticated Random Width & Depth Weatherboard Cavity System – Construction Drawings -Version 1.2 dated 20 May 2020.

10 SUPPORTING INFORMATION ABOUT INTENDED USE

Nil

11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

Nil

12 BASIS FOR CERTIFICATION

The certification decision is based independent technical review(s) of engineering opinion(s) and other documented evidence(s), factory audit(s) and site review(s)

13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

Ref	Author	Title	Date and/or revision
1	BRANZ	Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System - BRANZ Appraisal No. 658 (2020)	27/05/2020
2 *	BRANZ	BRANZ Appraisals Means of Compliance - Basis of Appraisal - Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System - BRANZ Appraisal No. 658 (2020)	TV10664-004
3	Herman Pacific	Hermpac Weatherboard Cladding Cavity Systems – SDS Index	20-May-2020

* This document was provided commercial in confidence and is not publicly available.

14 CONDITIONS RELATING TO NOTIFICATION

- (a) the certificate holder notifies the product certification body in writing of any intended change to any of the following particulars:
- (i) the name, address, or contact details of the certificate holder;
 - (ii) any address of a location where a certified product is produced or manufactured;



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PRODUCT CERTIFICATE

Hermipac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



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

End of document



This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification accreditation body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004.

This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website <http://www.building.govt.nz>. The purpose of construction site audits is to confirm the practicability of installing the product; and to confirm the appropriateness and accuracy of installation instructions. In issuing this certificate, Global-Mark has relied on the independent expert and/or laboratory advice or reports. In placing the **CodeMark mark** on the product/system, the certificate holder makes a declaration of compliance with the certification standard(s) and confirms that the product is identical to the product certified herein.

1 of 2 HP DRAWING INDEX - HC-RUST-000

Product	Suffix	Dwg No.	Description	Issued
HC	RUST	000	Drawing Index	16/10/2017
HC	RUST	001	Drawing Index	16/10/2017
HC	RUST	002	Isometric Views	16/10/2017
HC	RUST	100	Rusticated Weatherboard System Profiles	16/10/2017
HC	RUST	101	Trim and Moulding Profiles	16/10/2017
HC	RUST	200	Window Head Detail, Aluminium Joinery	16/10/2017
HC	RUST	201	Window Sill Detail, Aluminium Joinery	16/10/2017
HC	RUST	202	Window Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	202A	Window Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	202B	Window Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	210	Door Head Detail Aluminium Joinery	16/10/2017
HC	RUST	211	Door Sill Detail, Aluminium Joinery	16/10/2017
HC	RUST	212	Door Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	212A	Door Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	212B	Door Jamb Detail, Aluminium Joinery	16/10/2017
HC	RUST	300	Internal Corner HP41	16/10/2017
HC	RUST	302	Enclosed Deck Balustrade to Wall Junction	16/10/2017
HC	RUST	307	Internal Corner HP370	16/10/2017
HC	RUST	310	Internal Corner HP360	16/10/2017
HC	RUST	400	External Corner Boxed	16/10/2017
HC	RUST	401	External Corner HP40	16/10/2017
HC	RUST	402	External Corner HP42	16/10/2017
HC	RUST	403	External Corner HP202 & HP201	16/10/2017
HC	RUST	404	External Corner HP310	16/10/2017
HC	RUST	405	External Corner HP321	16/10/2017

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 23/09/2021 brendam



Hempac

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Cavity Fix Rusticated Weatherboard System
Drawing Index

HC-RUST-000
DRAWING



@ A4
SCALE

16/10/2017
ISSUED DATE

2 of 2 HP DRAWING INDEX - HC-RUST-001

Product	Suffix	Dwg No.	Description	Issued
HC	RUST	410	General Detail Cavity Fix, Stain Finish	16/10/2017
HC	RUST	411	General Detail Cavity Fix, Paint Finish	16/10/2017
HC	RUST	412	Drained Inter-Storey Joint	16/10/2017
HC	RUST	413	Scarf Join Stain Finish	16/10/2017
HC	RUST	500	Base of Wall, Concrete	16/10/2017
HC	RUST	501	Base of Wall, Timber	16/10/2017
HC	RUST	502	Cavity at Enclosed Deck	16/10/2017
HC	RUST	600	Roof/Wall Junction	16/10/2017
HC	RUST	601	Soffit Detail, Overhang	16/10/2017
HC	RUST	602	Eaves Detail, No Overhang	16/10/2017
HC	RUST	700	Parapet Detail	16/10/2017
HC	RUST	800	Meter Box Detail	16/10/2017
HC	RUST	801	Pipe Penetration Detail	16/10/2017
HC	RUST	802	Pipe Penetration Plan Detail	16/10/2017



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Cavity Fix Rusticated Weatherboard System
Drawing Index

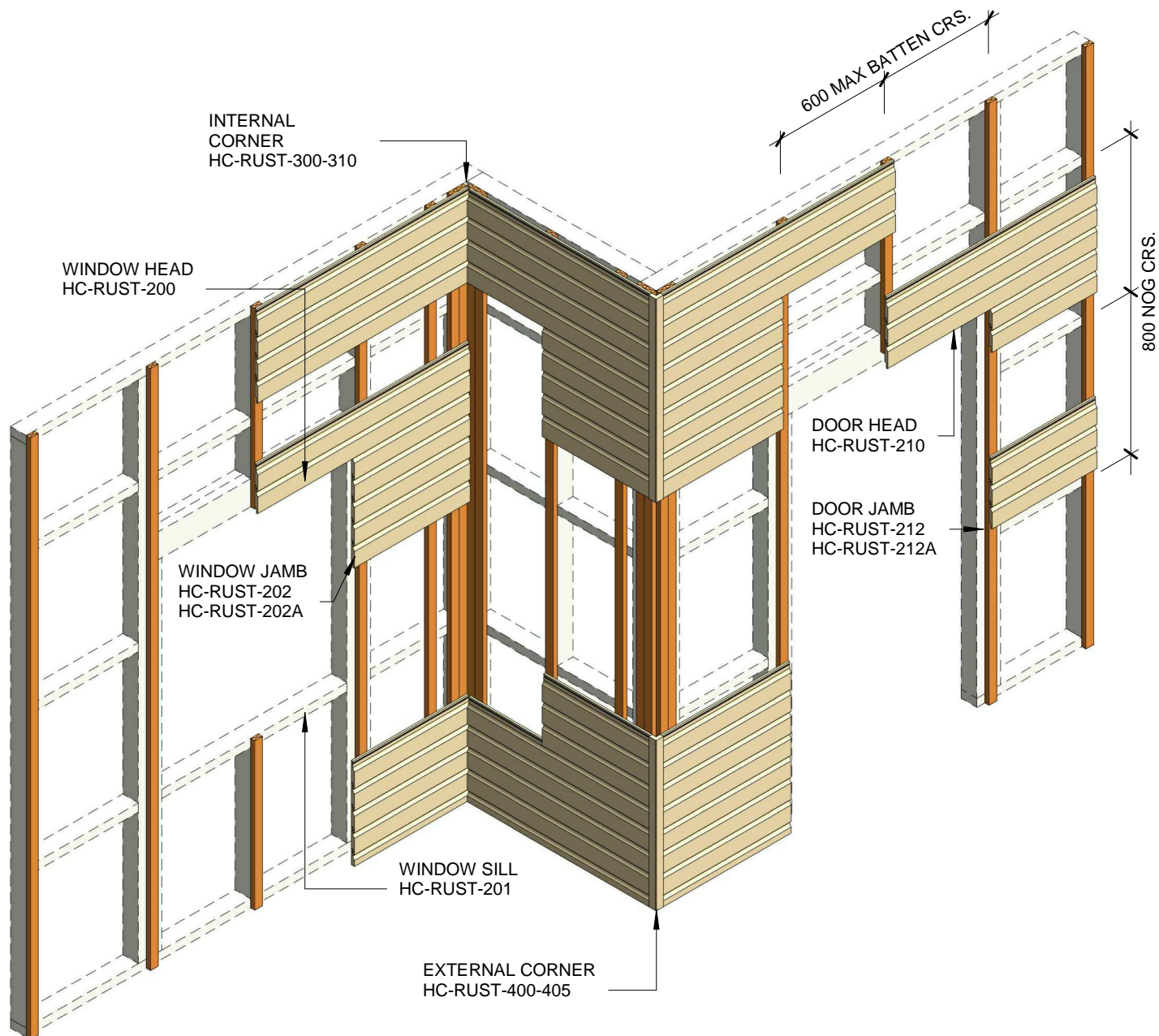
HC-RUST-001
DRAWING



@ A4
SCALE

16/10/2017
ISSUED DATE

Note:
Building Wrap and Flashings not shown for clarity.



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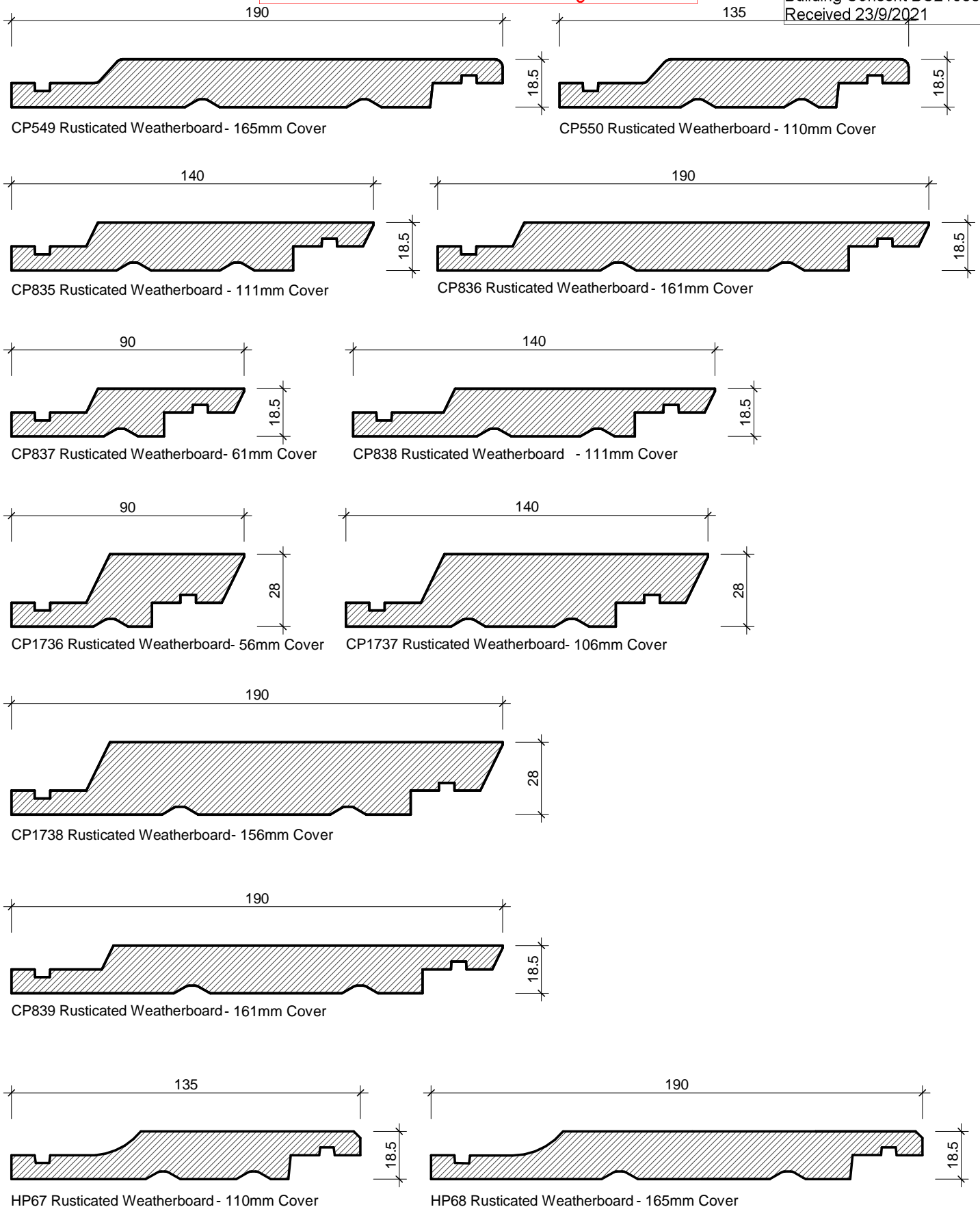
Cavity Fix Rusticated Weatherboard System
Isometric Views



HC-RUST-002
DRAWING

1 : 25 @ A4
SCALE

16/10/2017
ISSUED DATE



NOTE:
Custom HP Profiles Available Upon Request



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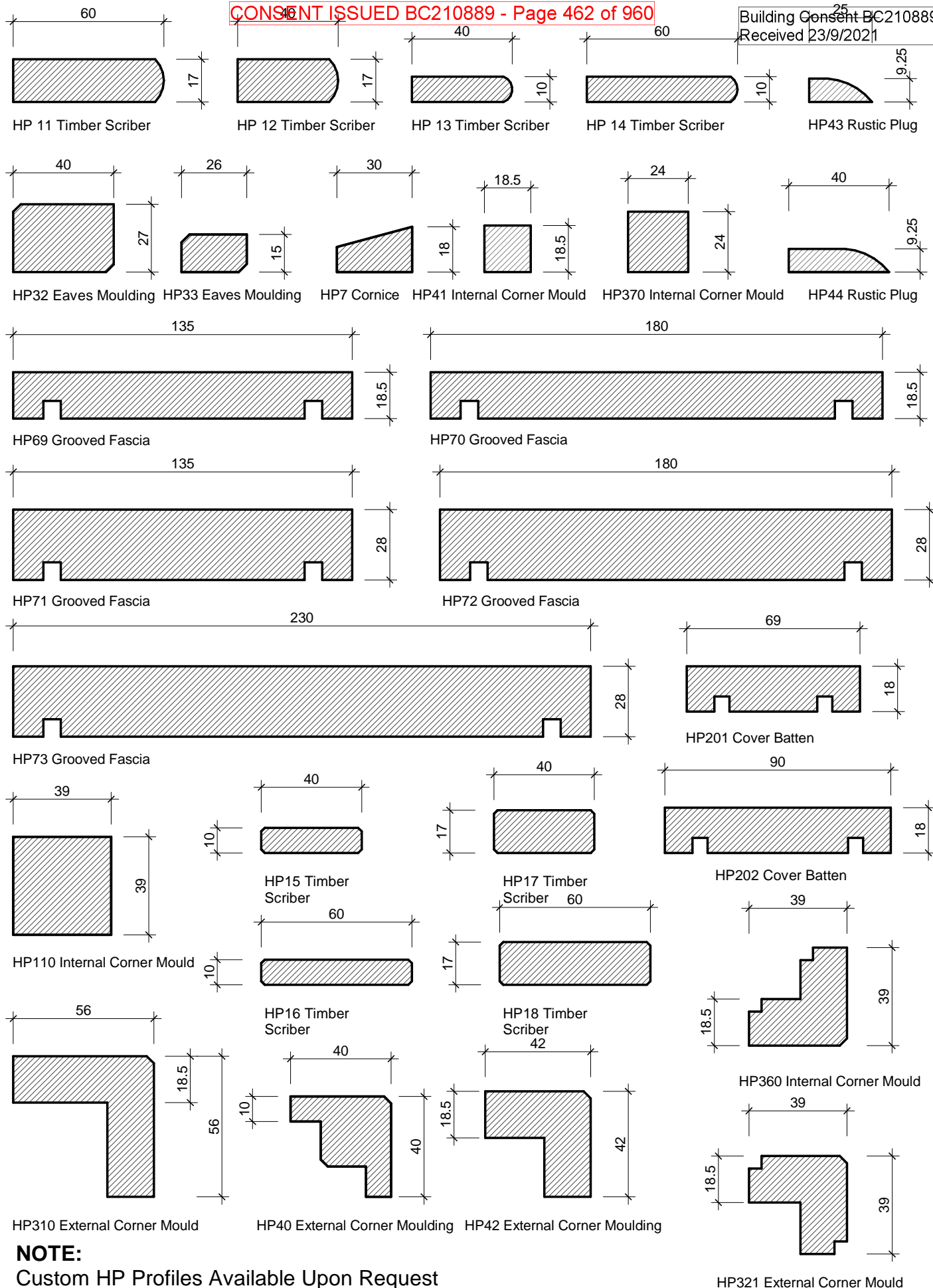
Cavity Fix Rusticated Weatherboard System
Rusticated Weatherboard System Profiles



HC-RUST-100
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



NOTE:

Custom HP Profiles Available Upon Request



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Cavity Fix Rusticated Weatherboard System
Trim and Moulding Profiles



HC-RUST-101
DRAWING

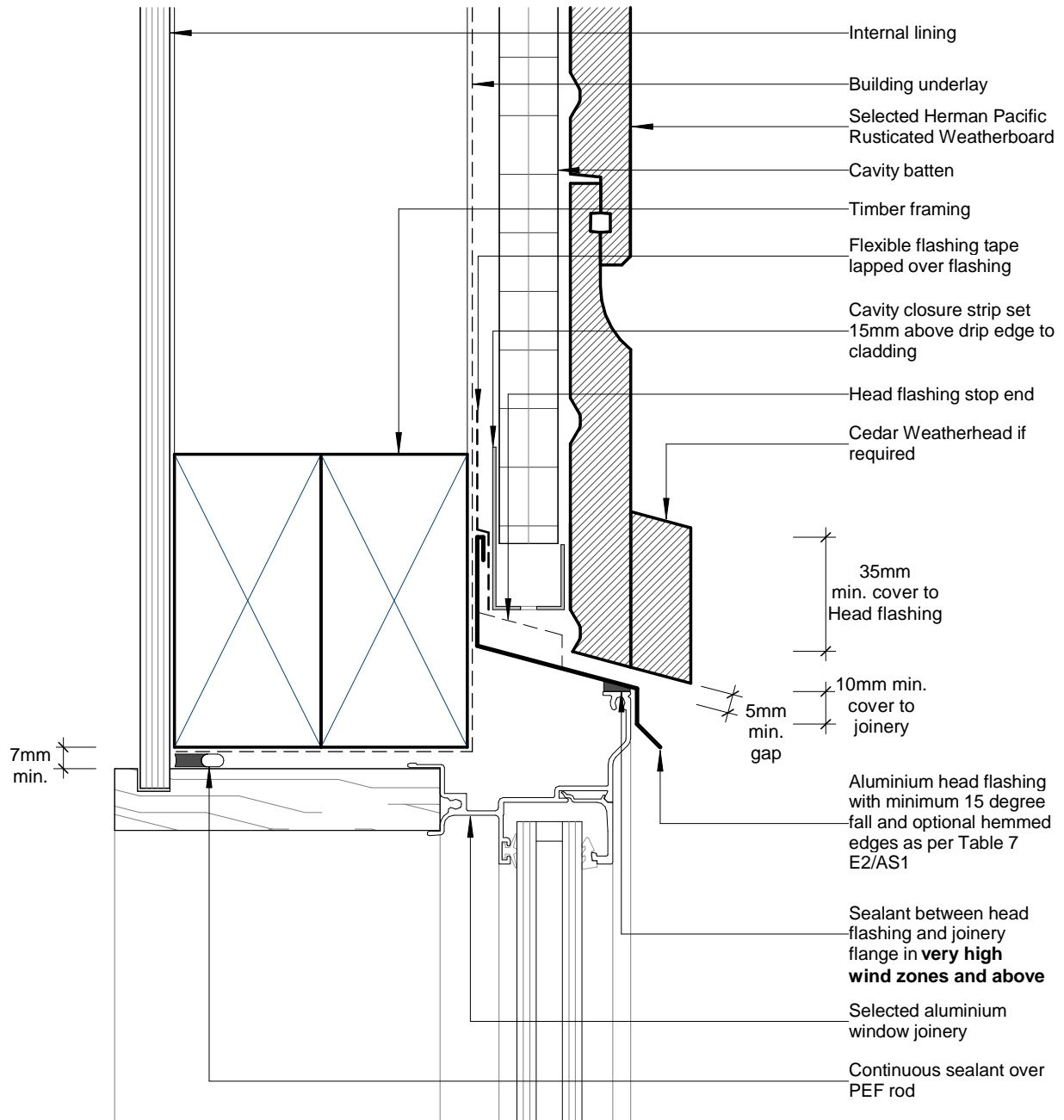
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.

Head flashing turned up to form stop end



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Cavity Fix Rusticated Weatherboard System

Window Head Detail, Aluminium Joinery



HC-RUST-200

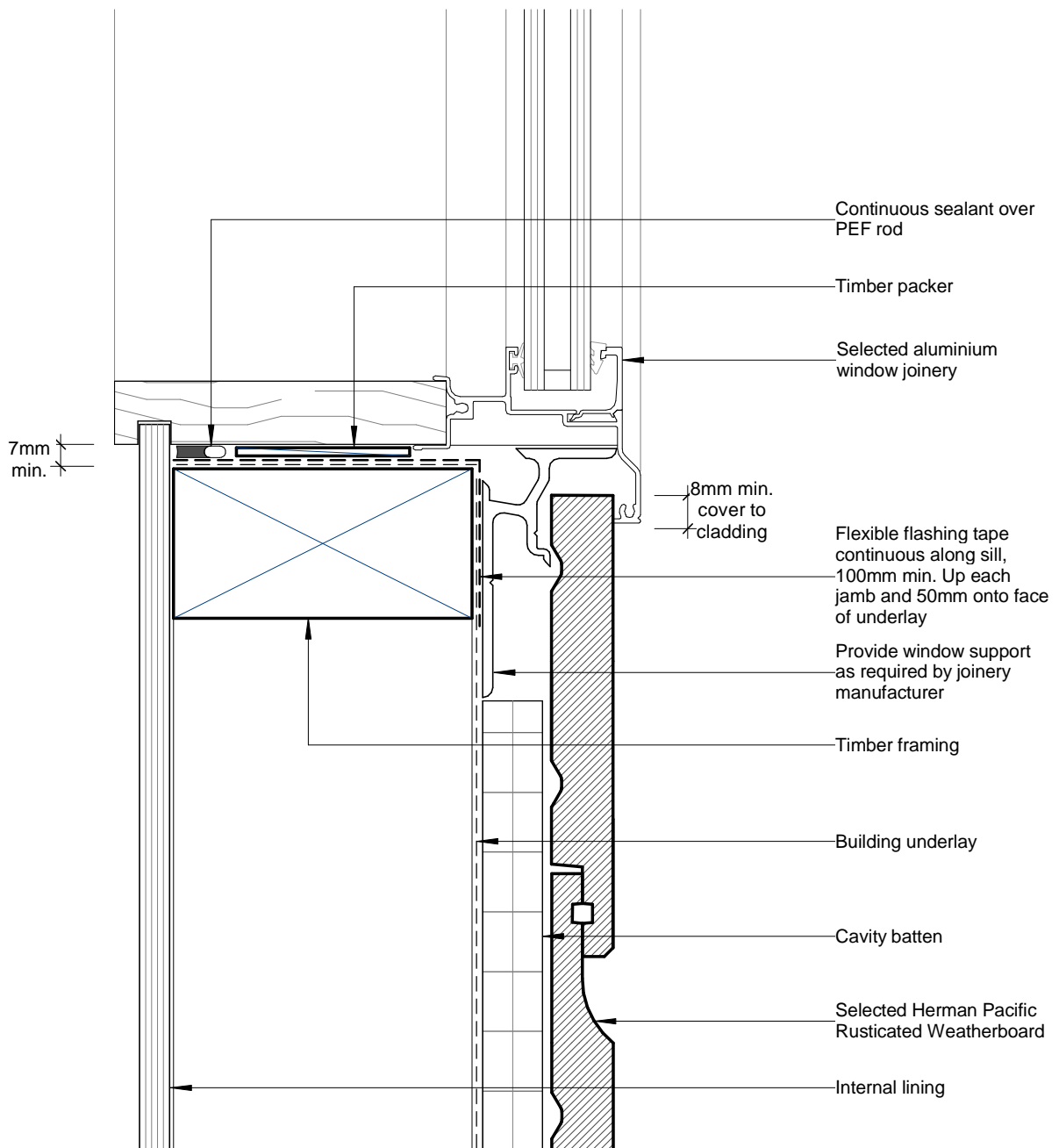
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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Cavity Fix Rusticated Weatherboard System

Window Sill Detail, Aluminium Joinery



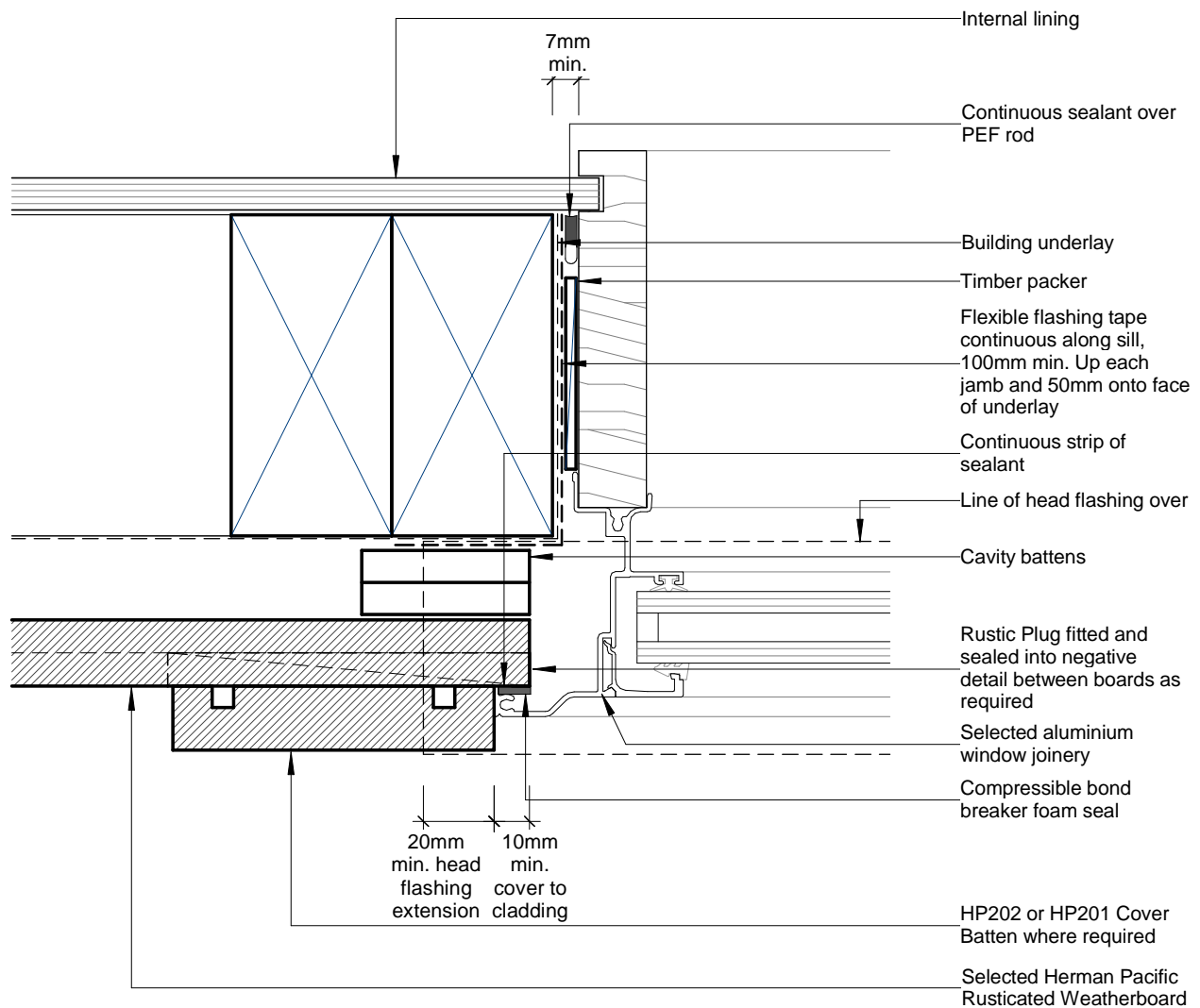
HC-RUST-201
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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Cavity Fix Rusticated Weatherboard System
Window Jamb Detail, Aluminium Joinery



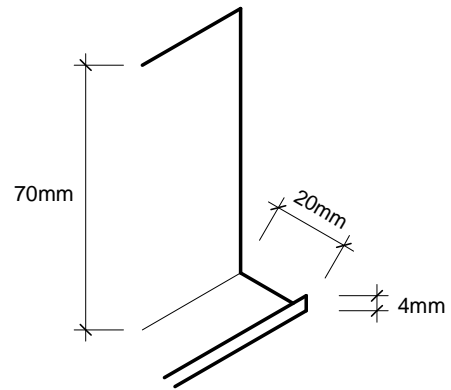
HC-RUST-202
DRAWING

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SCALE

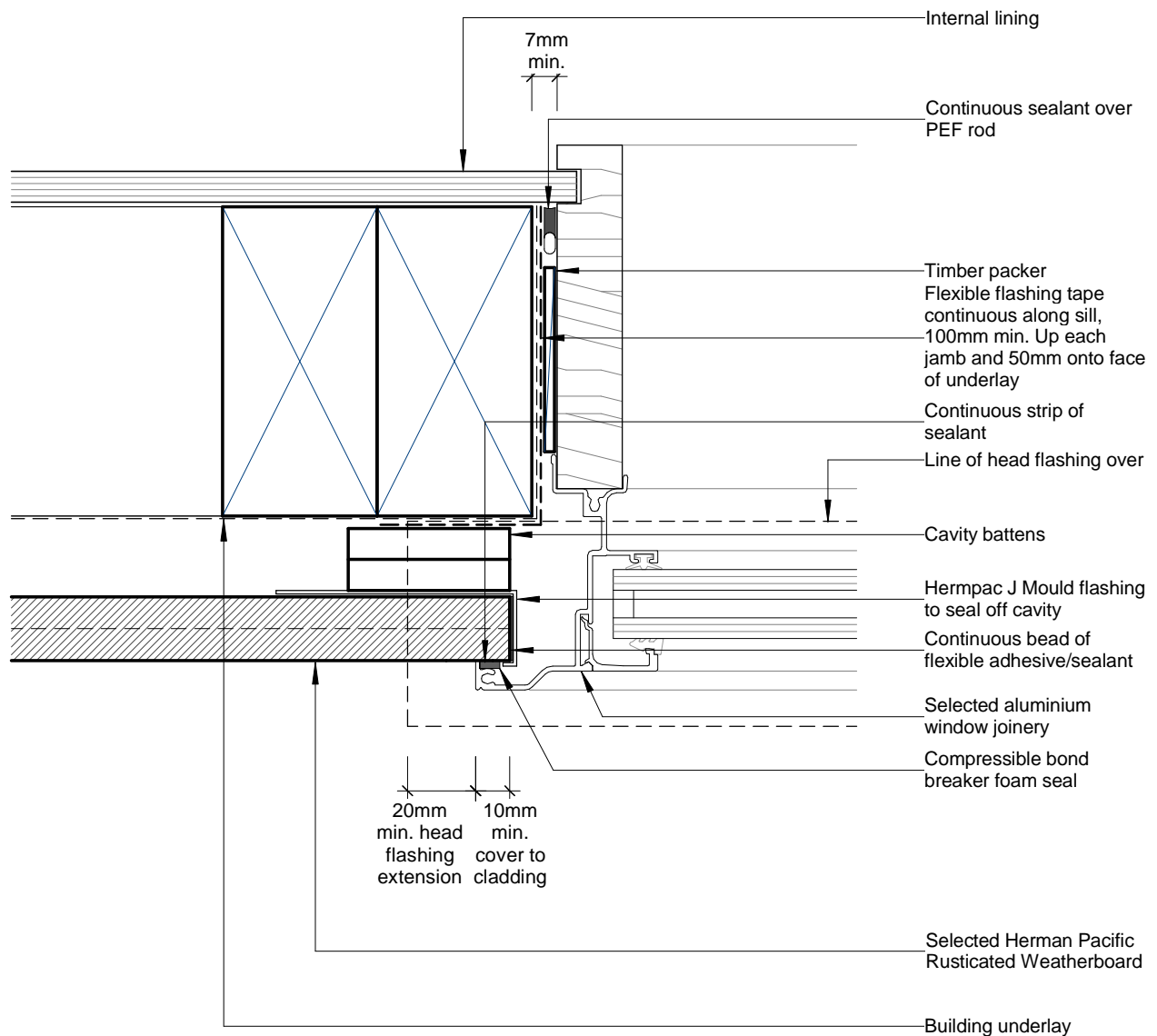
16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Herpac J Mould flashing



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Cavity Fix Rusticated Weatherboard System

Window Jamb Detail, Aluminium Joinery



HC-RUST-202A

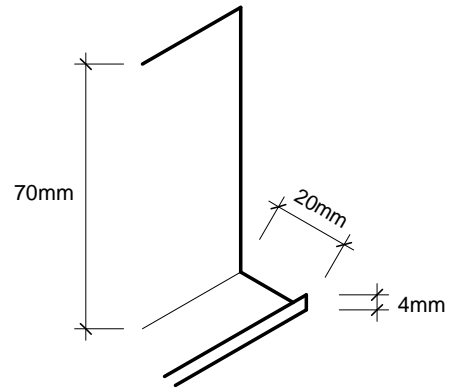
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SCALE

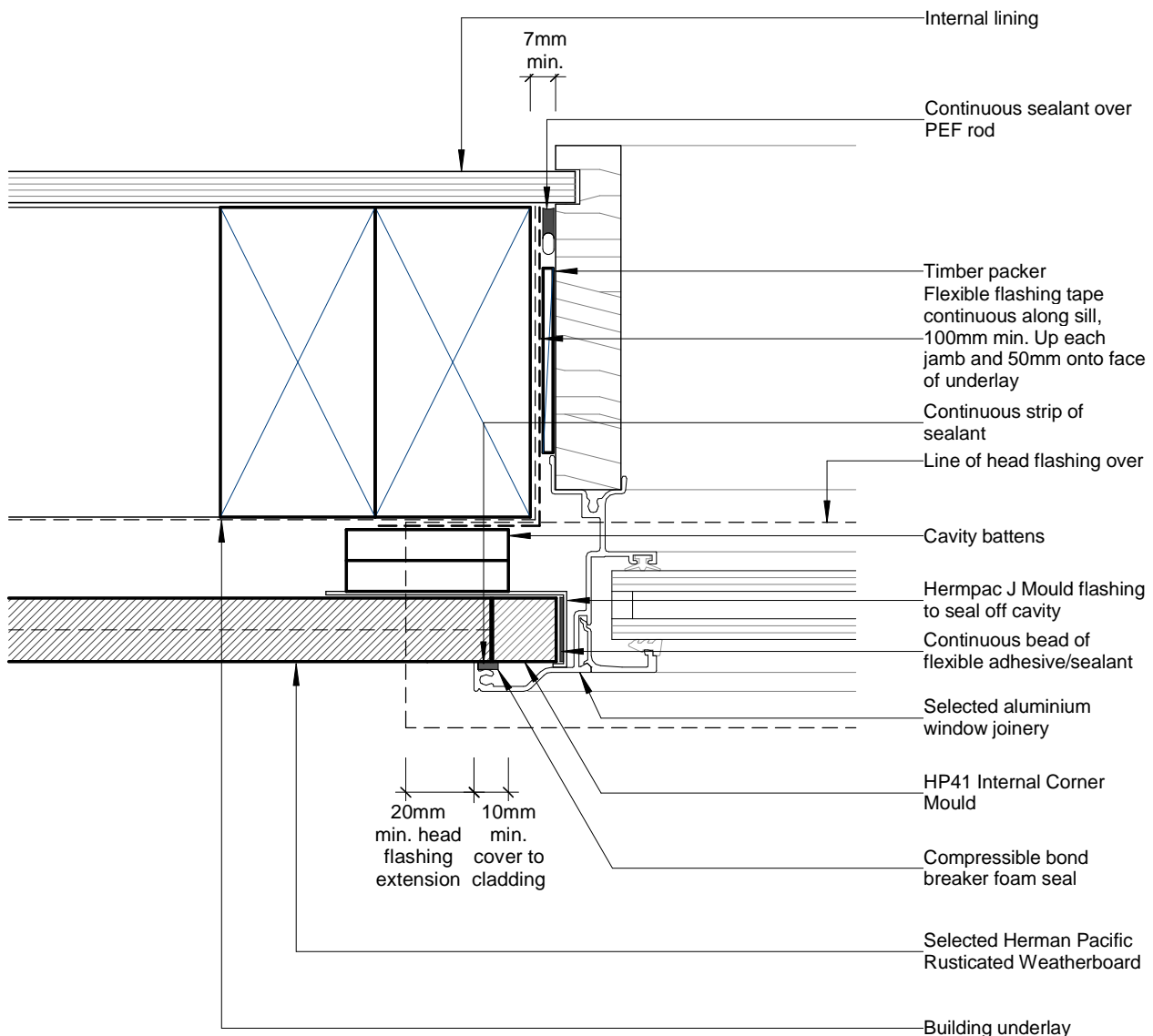
16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermepac J Mould flashing



Hermepac

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Cavity Fix Rusticated Weatherboard System
Window Jamb Detail, Aluminium Joinery



HC-RUST-202B
DRAWING

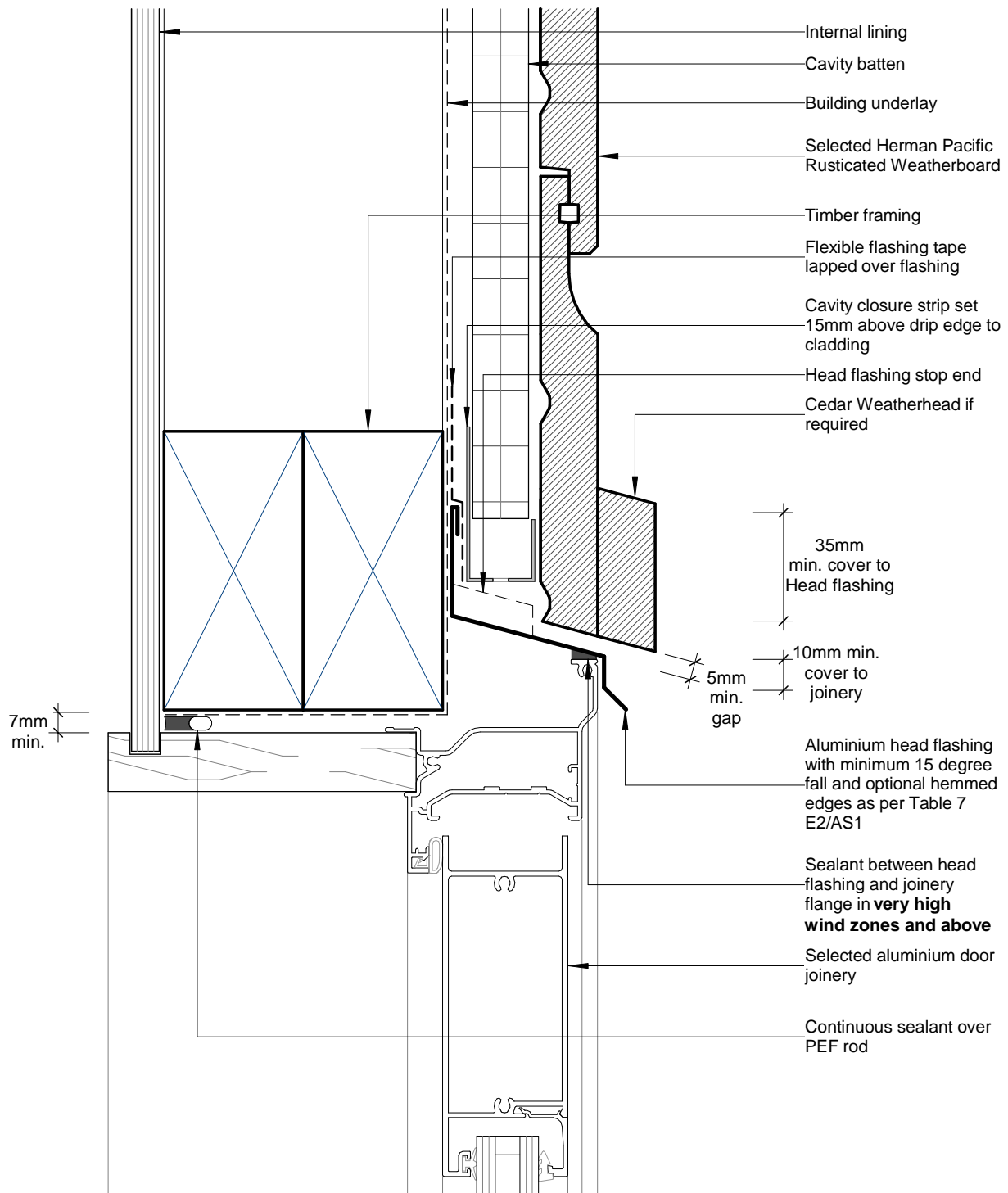
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SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.

Head flashing turned up to form stop end



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Cavity Fix Rusticated Weatherboard System

Door Head Detail Aluminium Joinery

HC-RUST-210

DRAWING

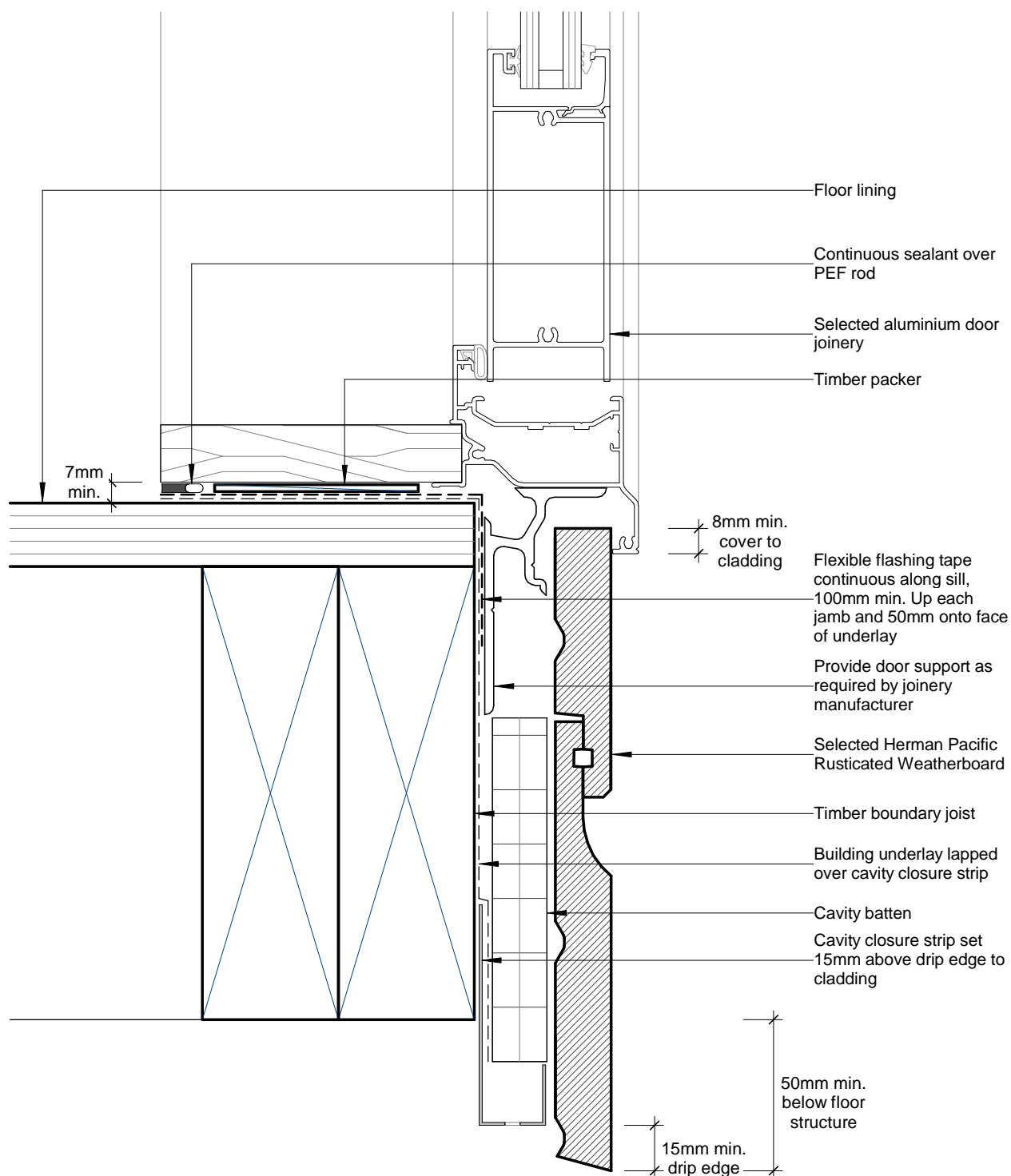
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



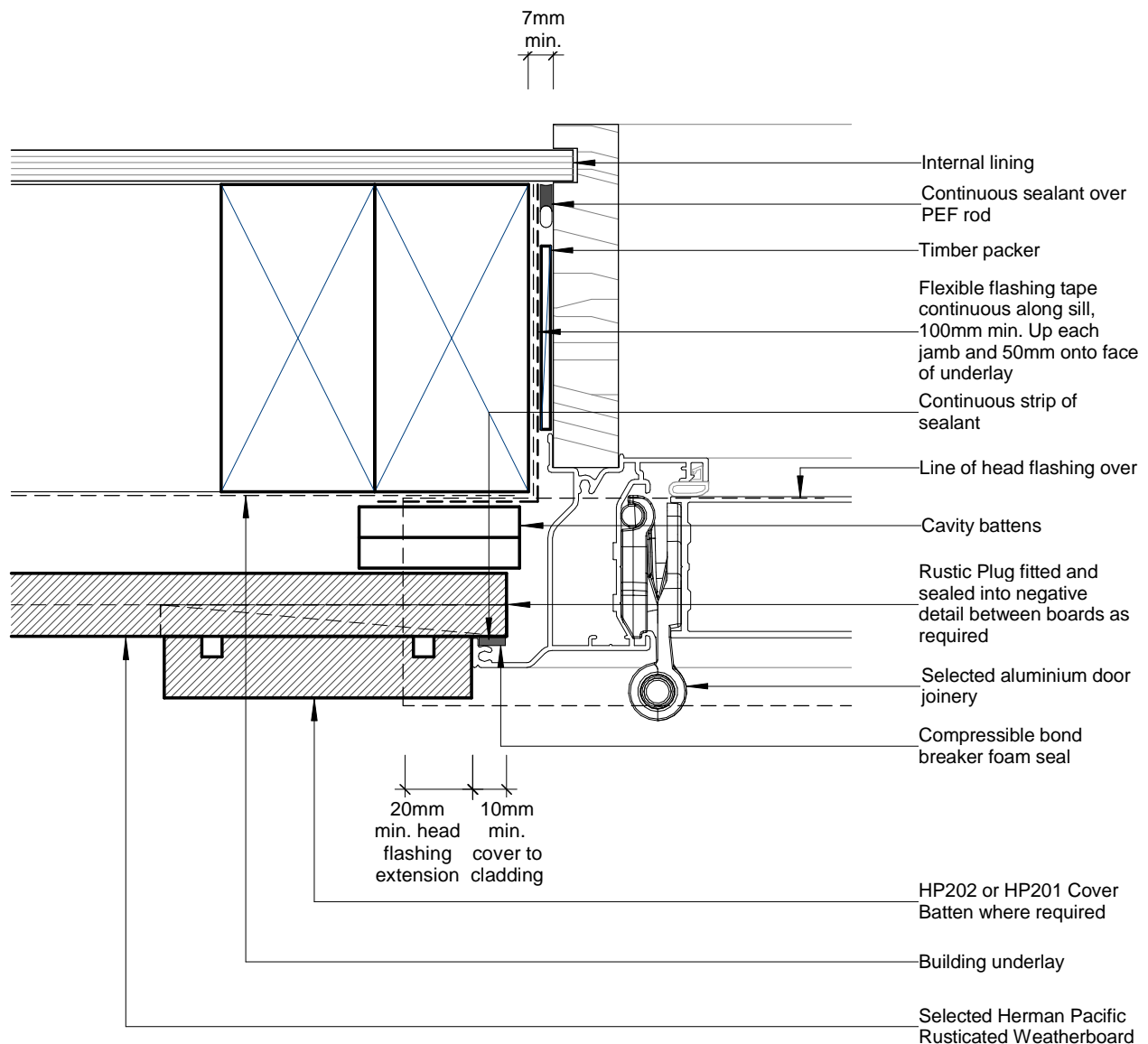
Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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Cavity Fix Rusticated Weatherboard System
Door Jamb Detail, Aluminium Joinery



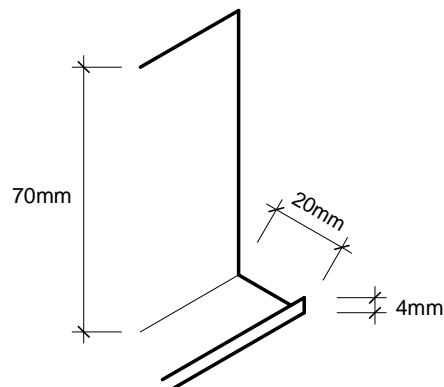
HC-RUST-212
DRAWING

1 : 2 @ A4
SCALE

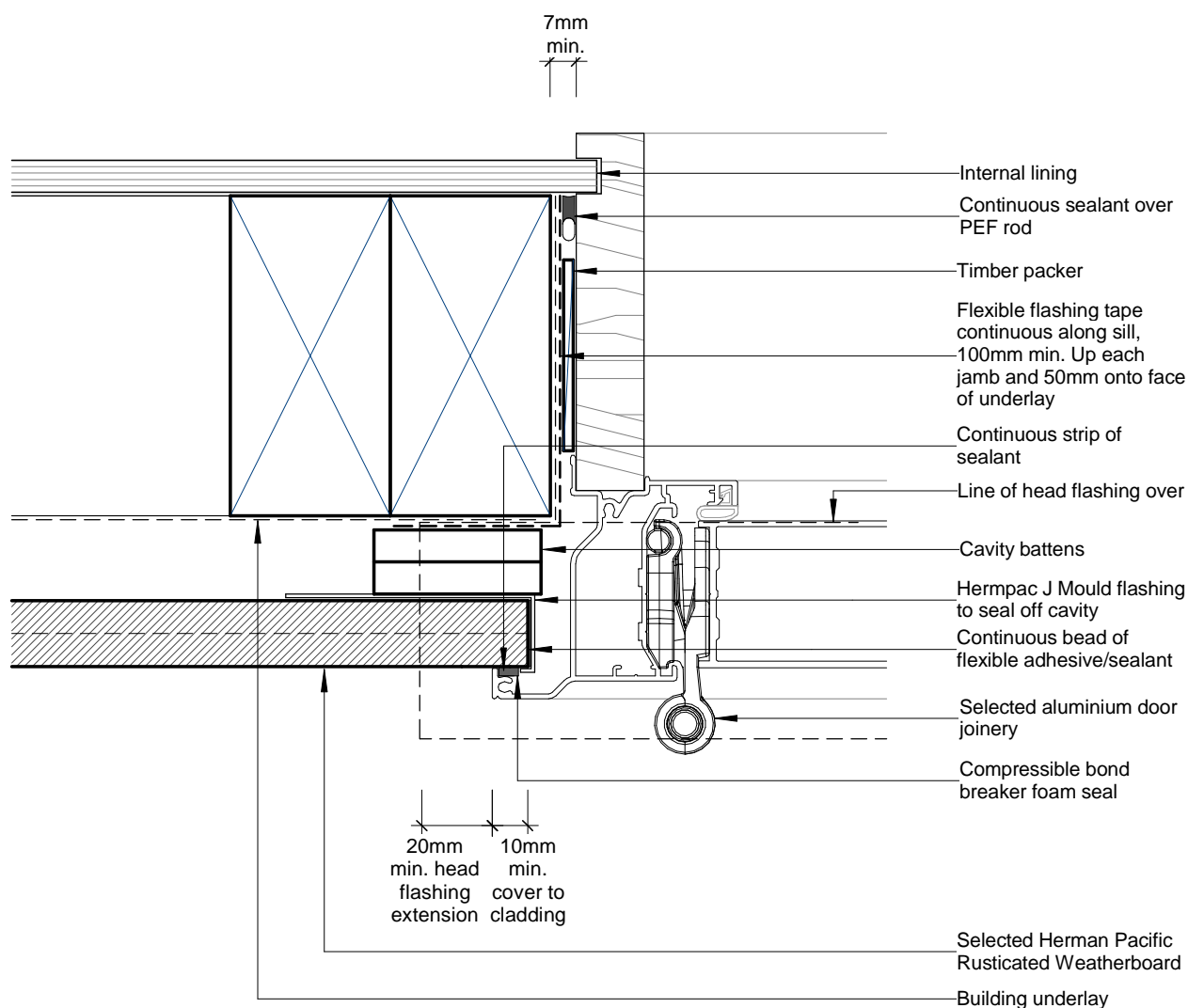
16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermpac J Mould flashing



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Cavity Fix Rusticated Weatherboard System

Door Jamb Detail, Aluminium Joinery

HC-RUST-212A

DRAWING

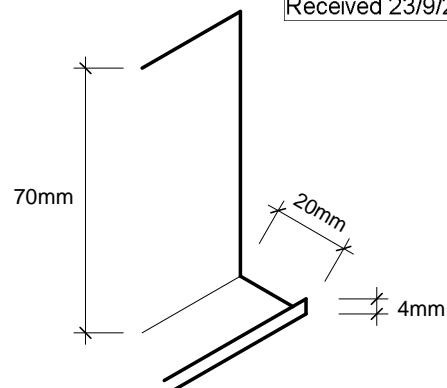
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SCALE

16/10/2017
ISSUED DATE

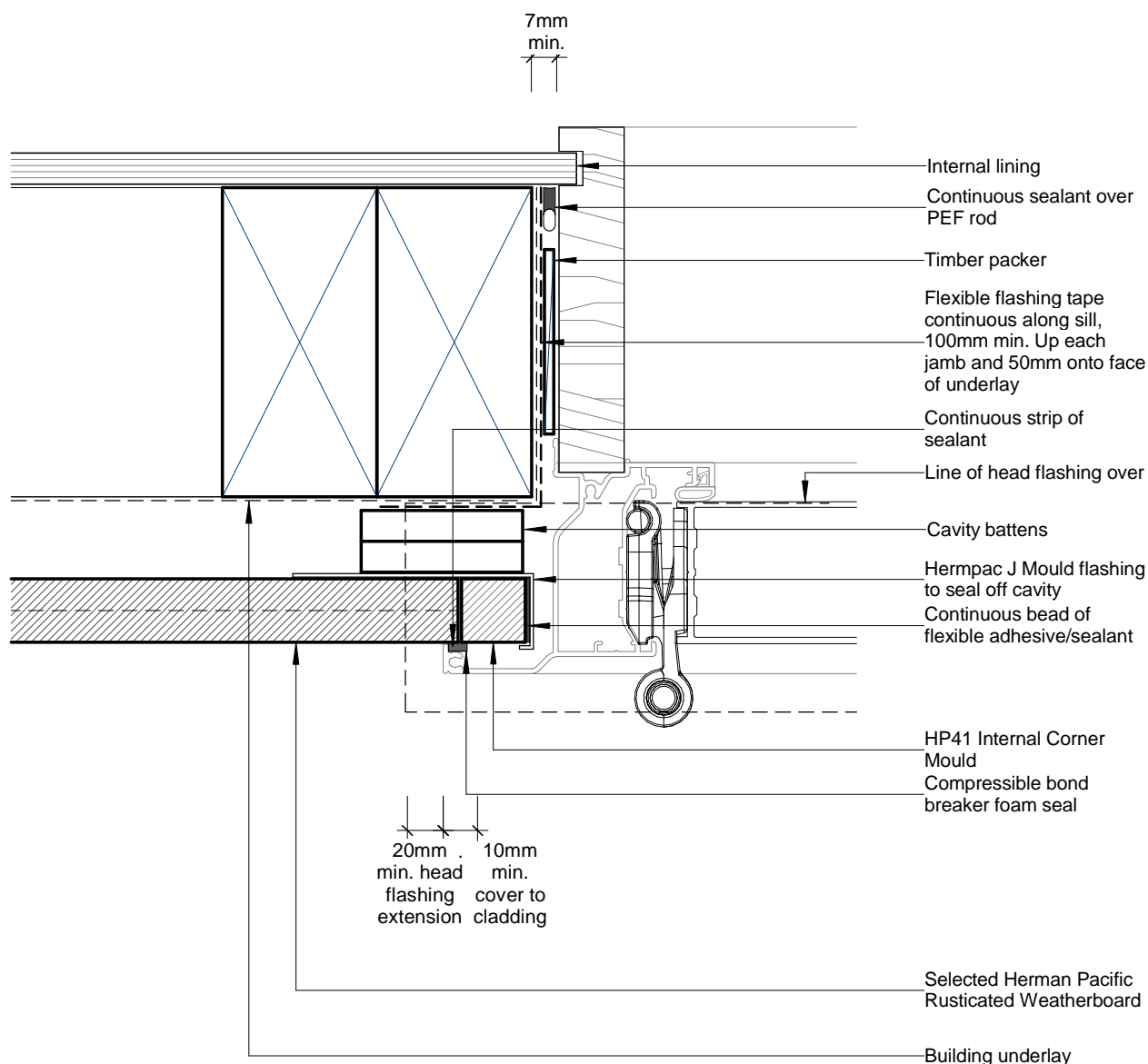


Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermipac J Mould flashing



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Cavity Fix Rusticated Weatherboard System

Door Jamb Detail, Aluminium Joinery

HC-RUST-212B

DRAWING

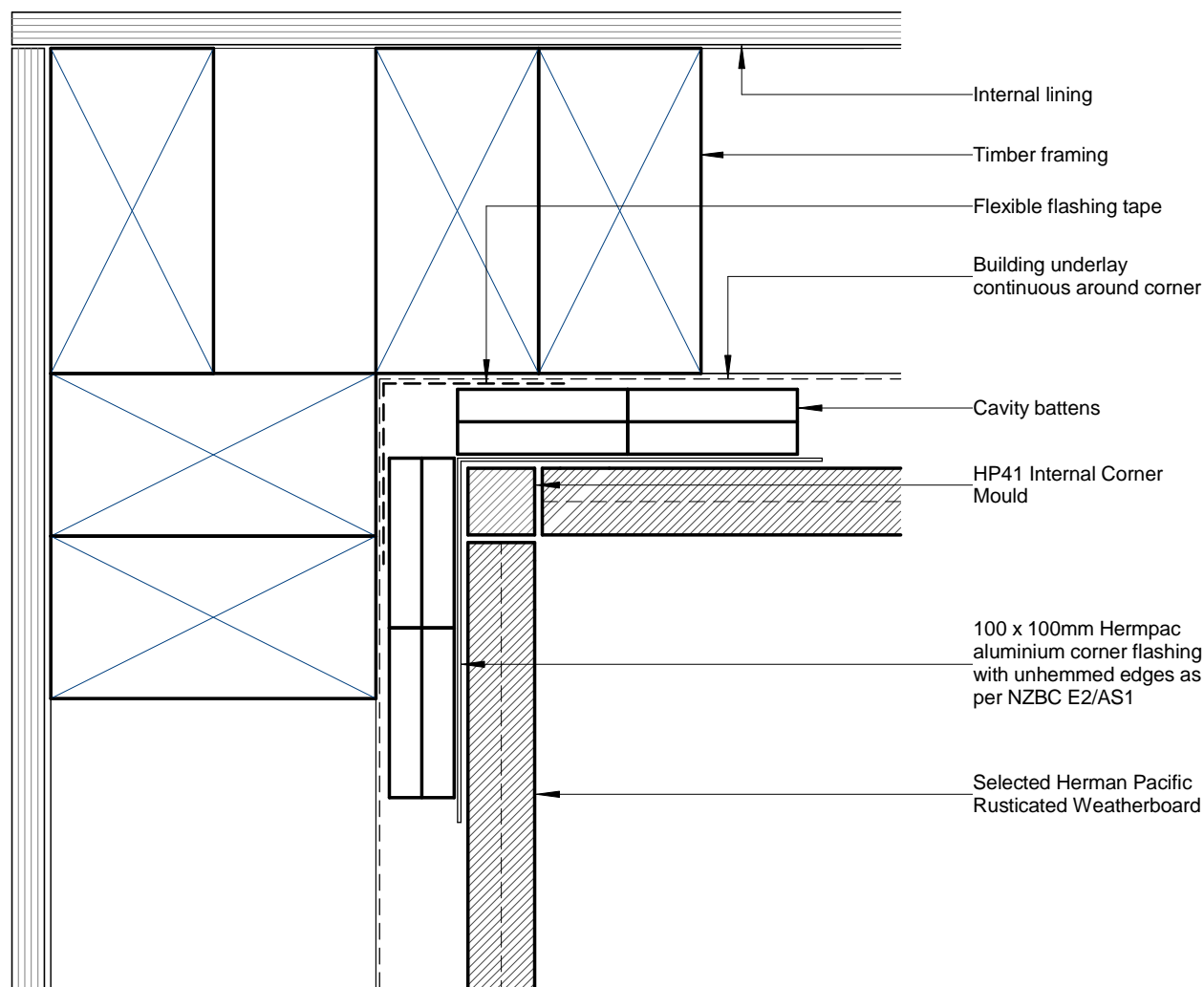
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
Internal Corner HP41

HC-RUST-300
DRAWING

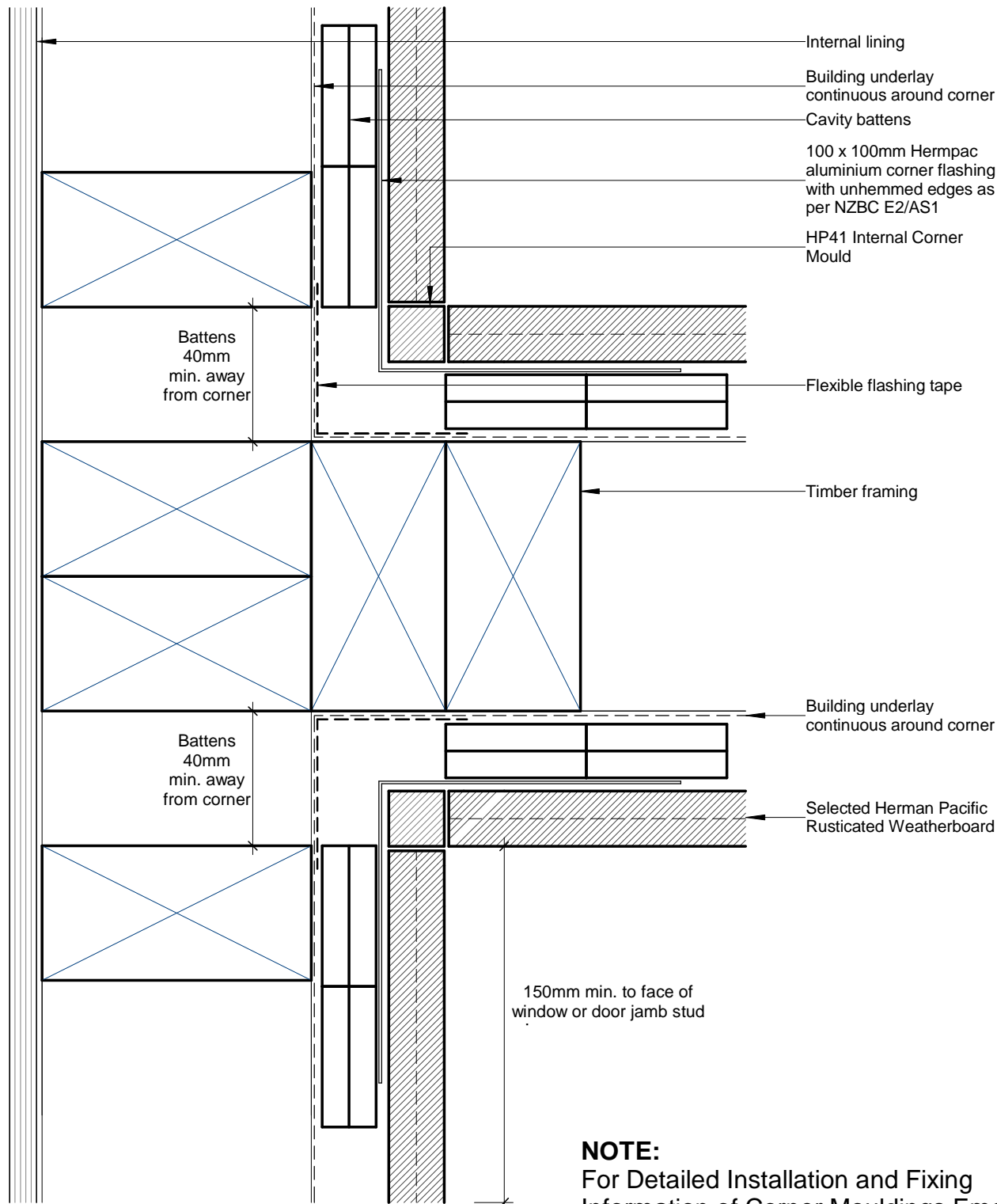


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:
For Detailed Installation and Fixing
Information of Corner Mouldings Email
technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
**Enclosed Deck Balustrade to Wall
Junction**



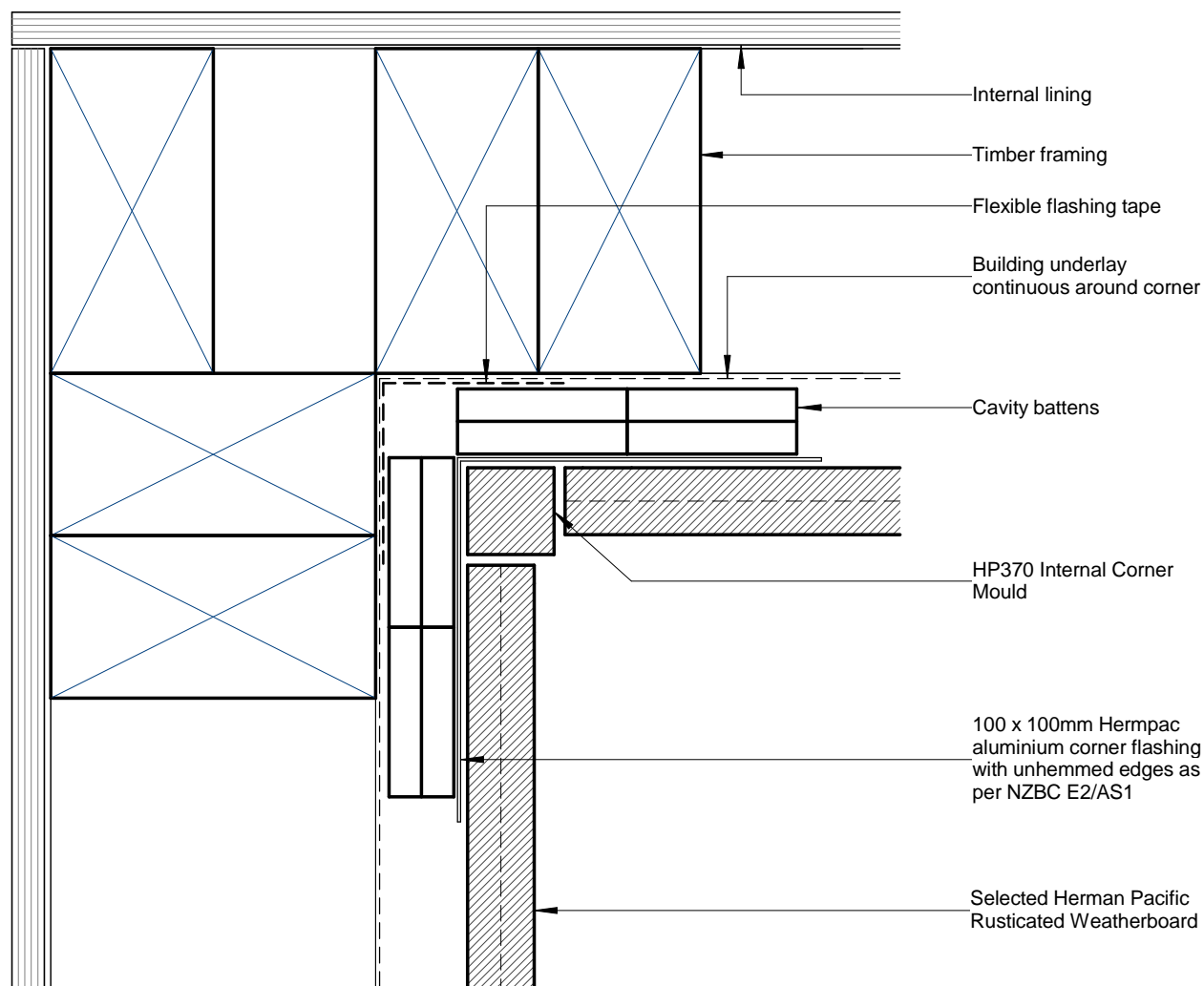
HC-RUST-302
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
Internal Corner HP370

HC-RUST-307
DRAWING

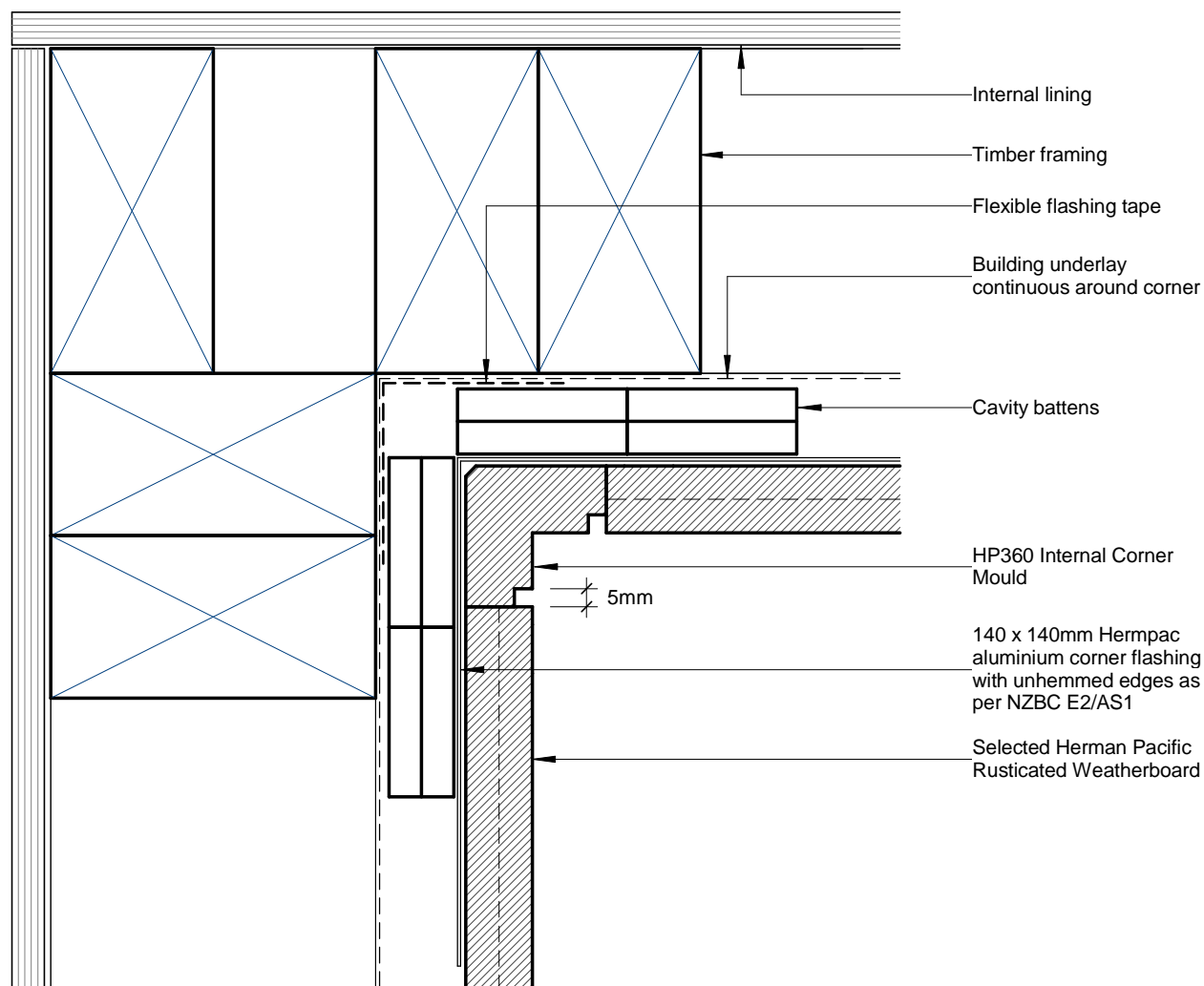


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
Internal Corner HP360

HC-RUST-310
DRAWING

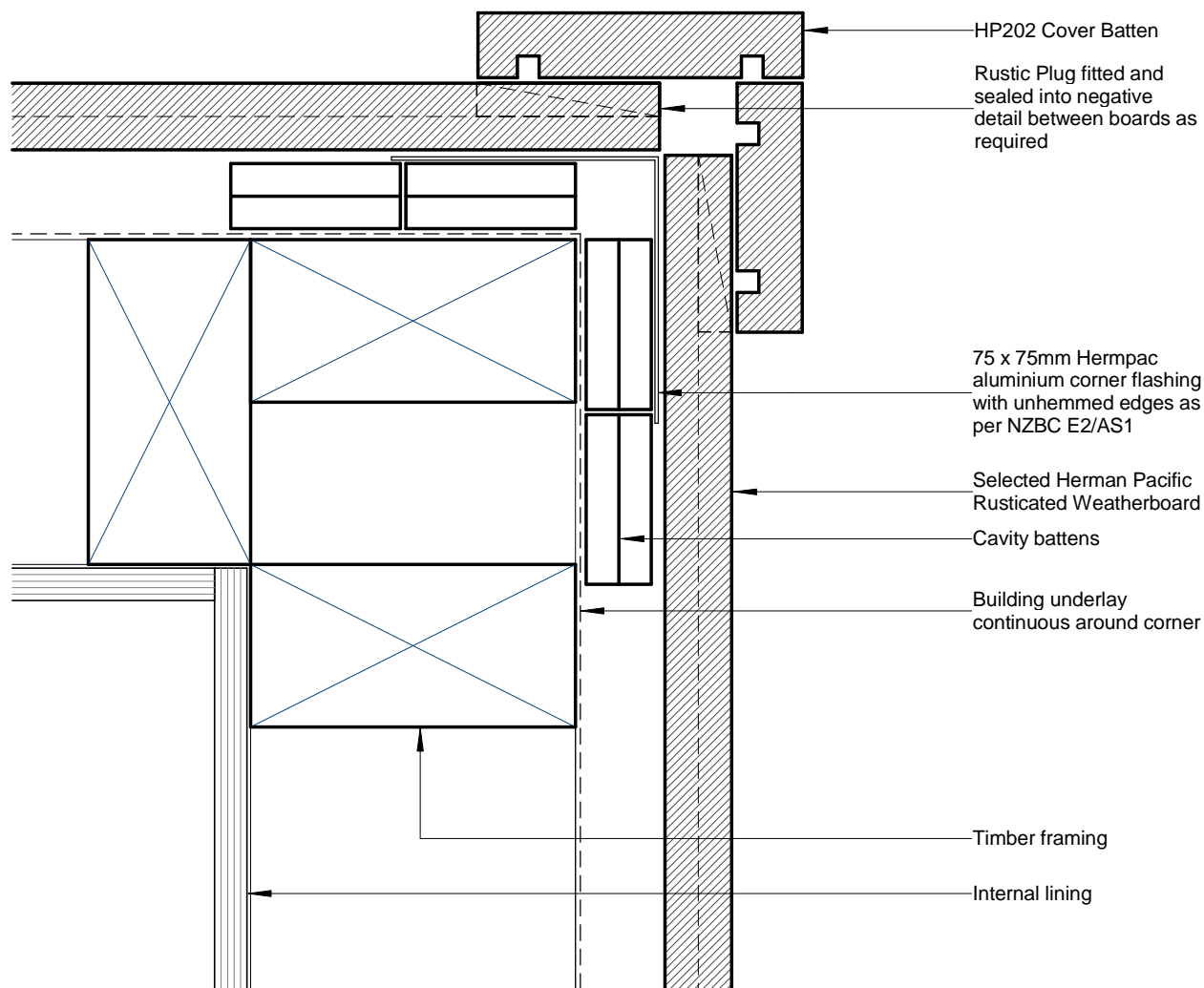
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
External Corner Boxed

HC-RUST-400
DRAWING

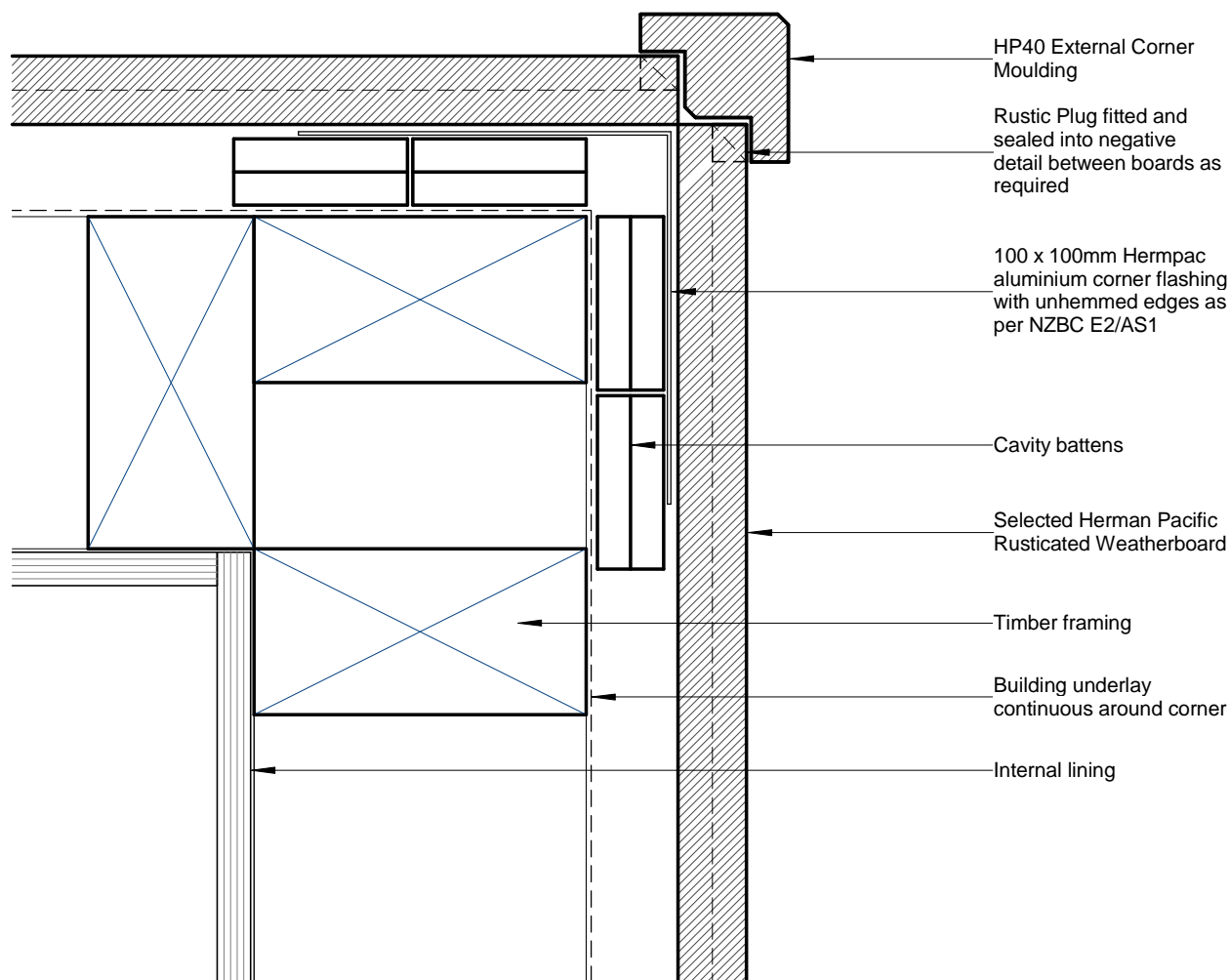
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SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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Cavity Fix Rusticated Weatherboard System
External Corner HP40

HC-RUST-401
DRAWING

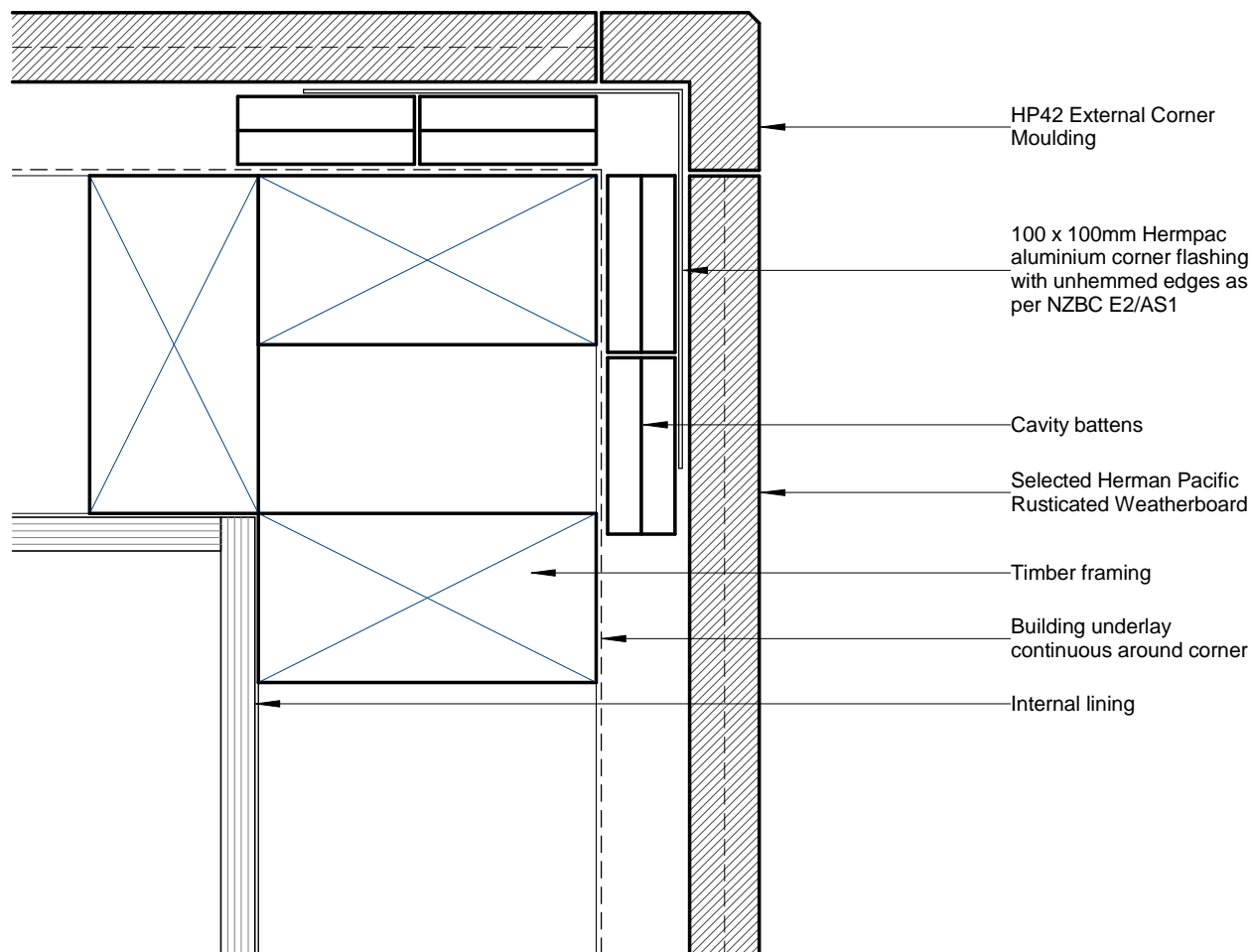
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



Hermipac

www.hermpac.co.nz

SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
External Corner HP42

HC-RUST-402
DRAWING

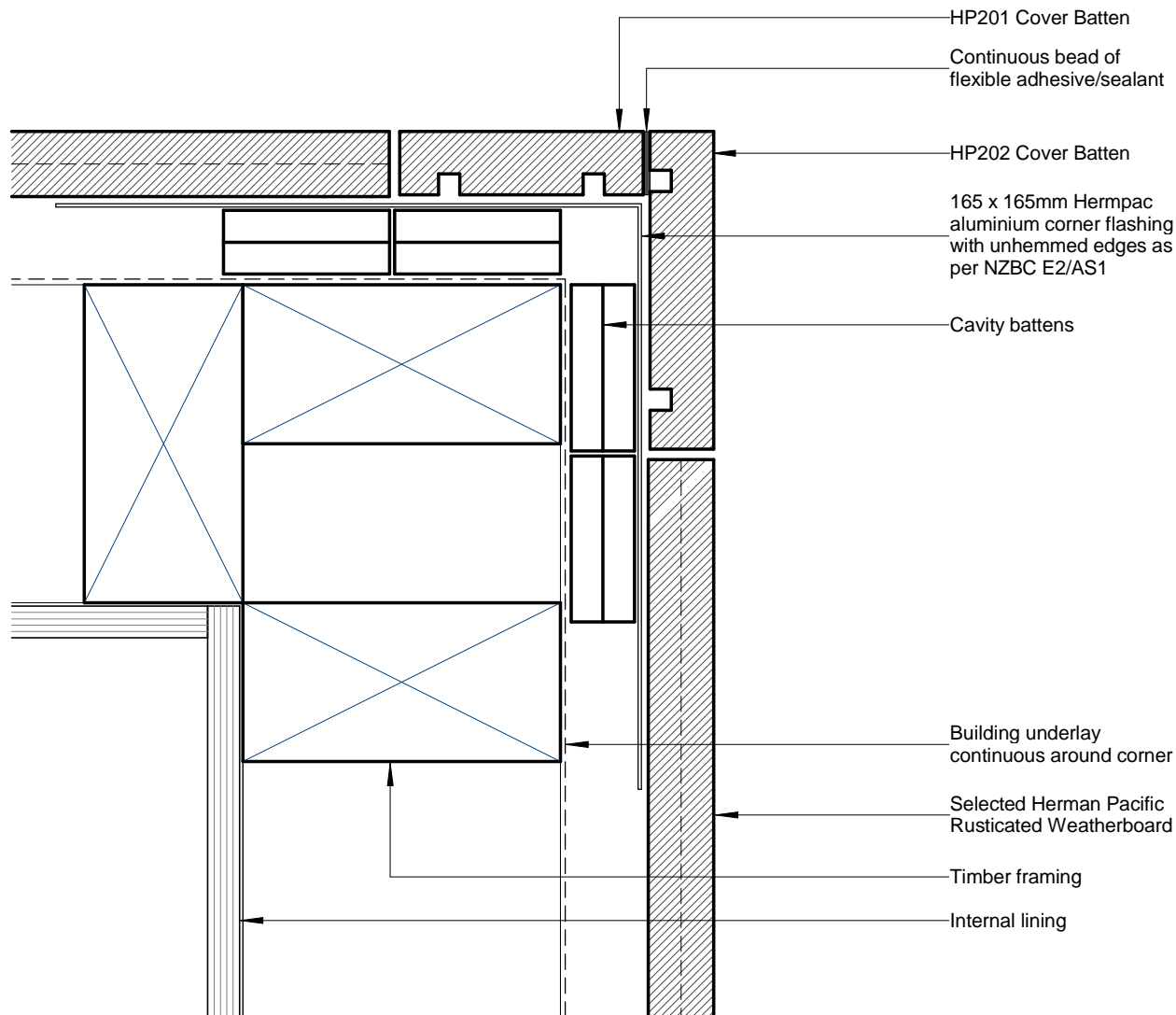


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
External Corner HP202 & HP201



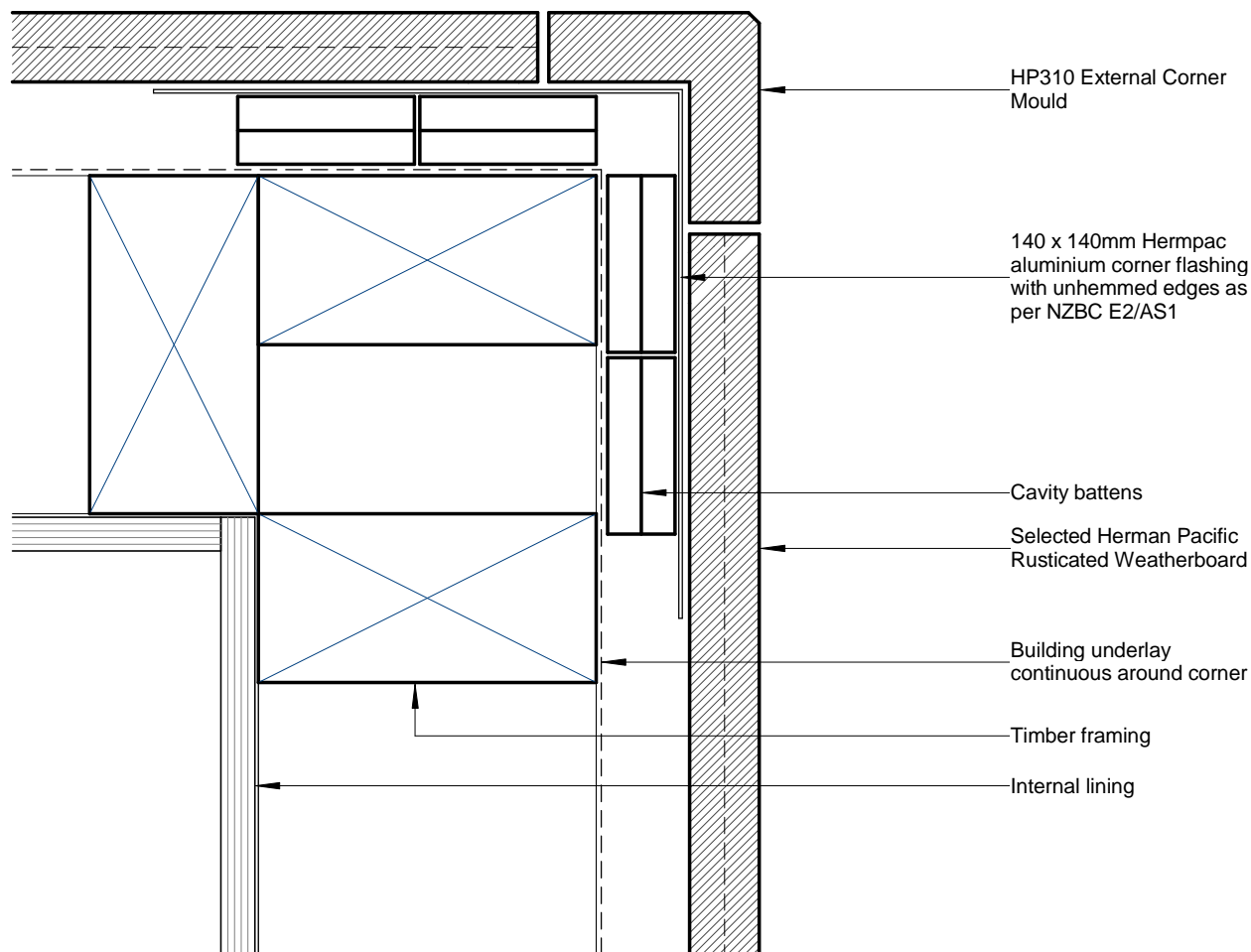
HC-RUST-403
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
External Corner HP310

HC-RUST-404
DRAWING

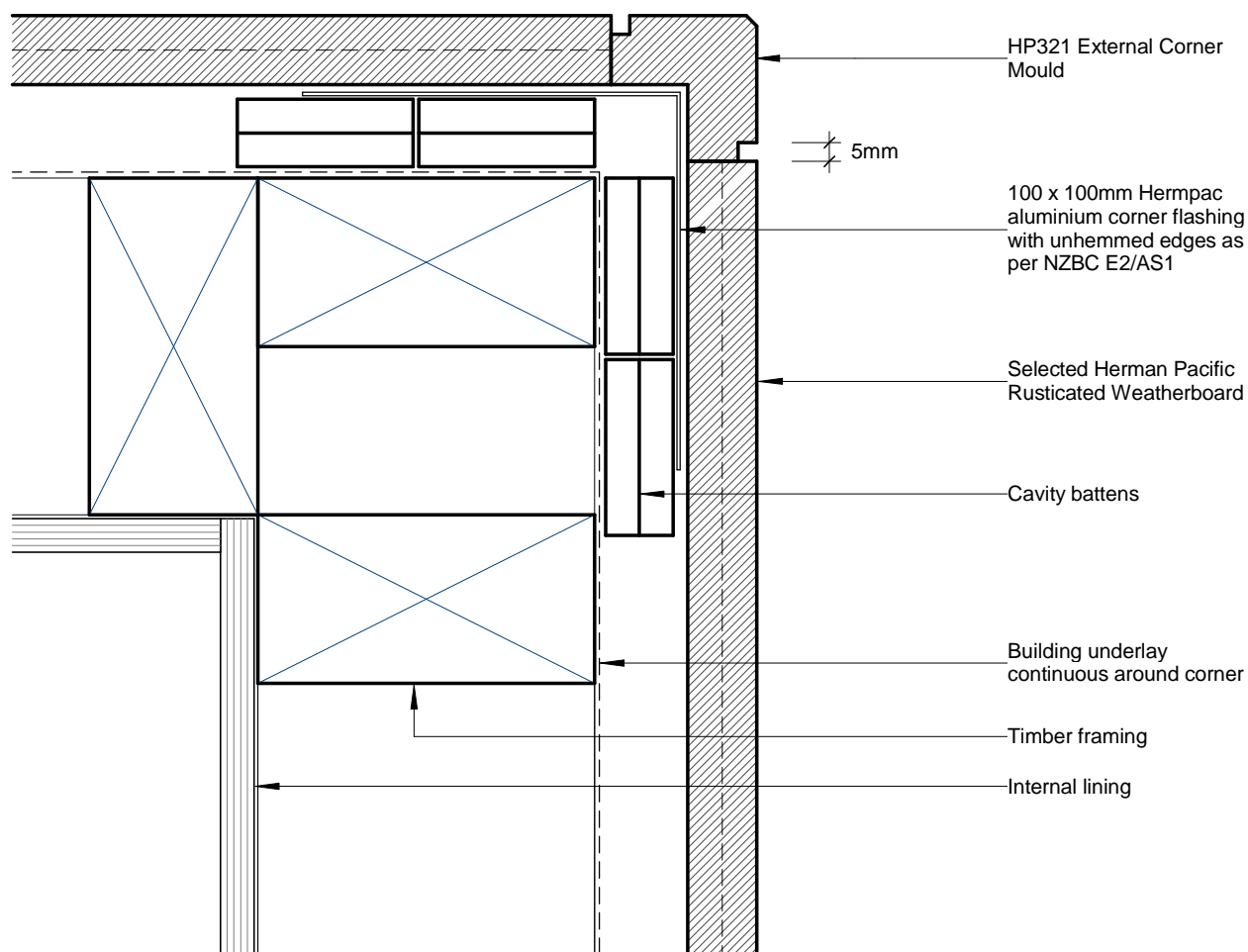
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

For Detailed Installation and Fixing Information of Corner Mouldings Email technical@hermpac.co.nz



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
External Corner HP321

HC-RUST-405
DRAWING

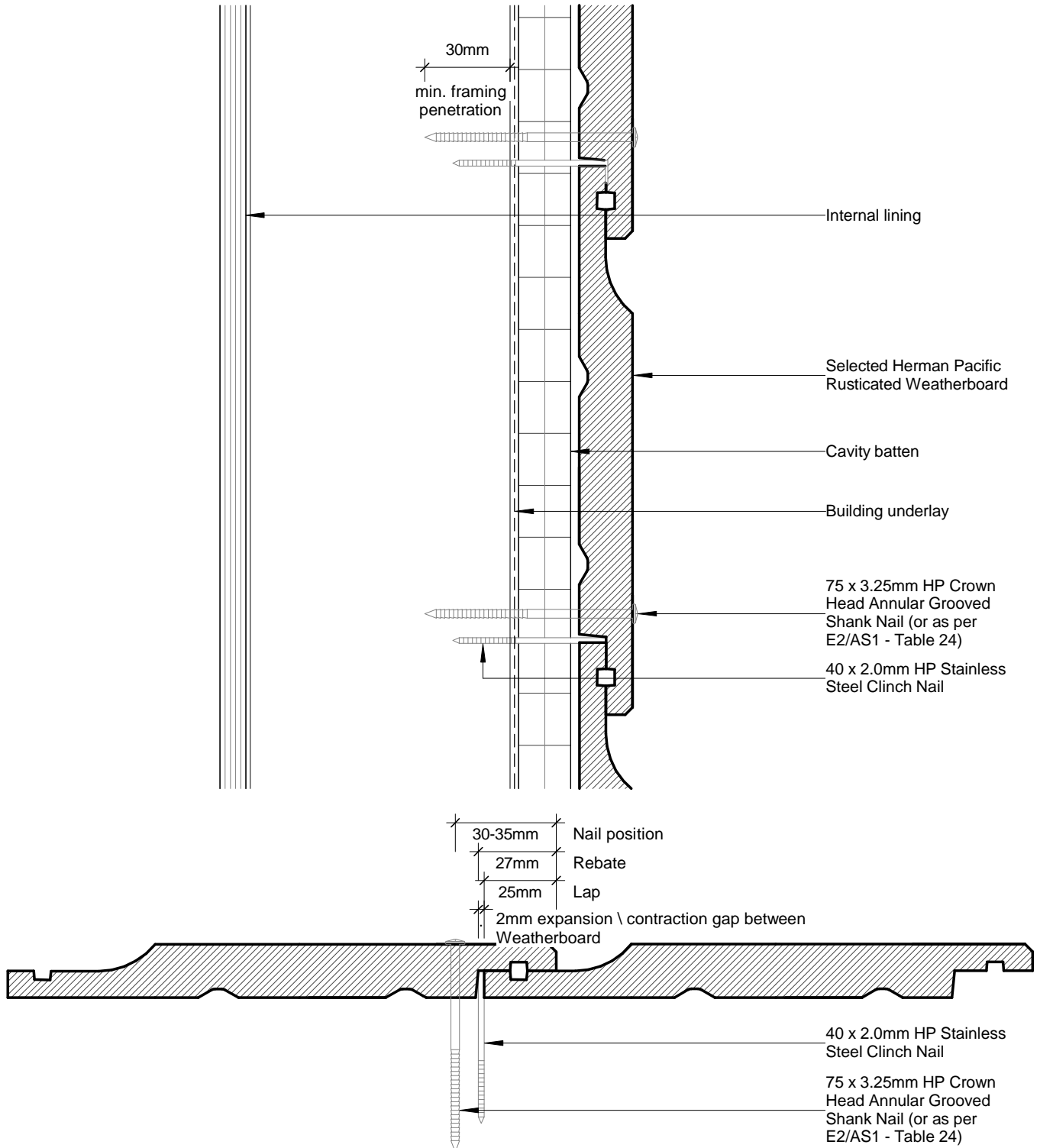


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermipac

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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System

General Detail Cavity Fix, Stain Finish

HC-RUST-410

DRAWING

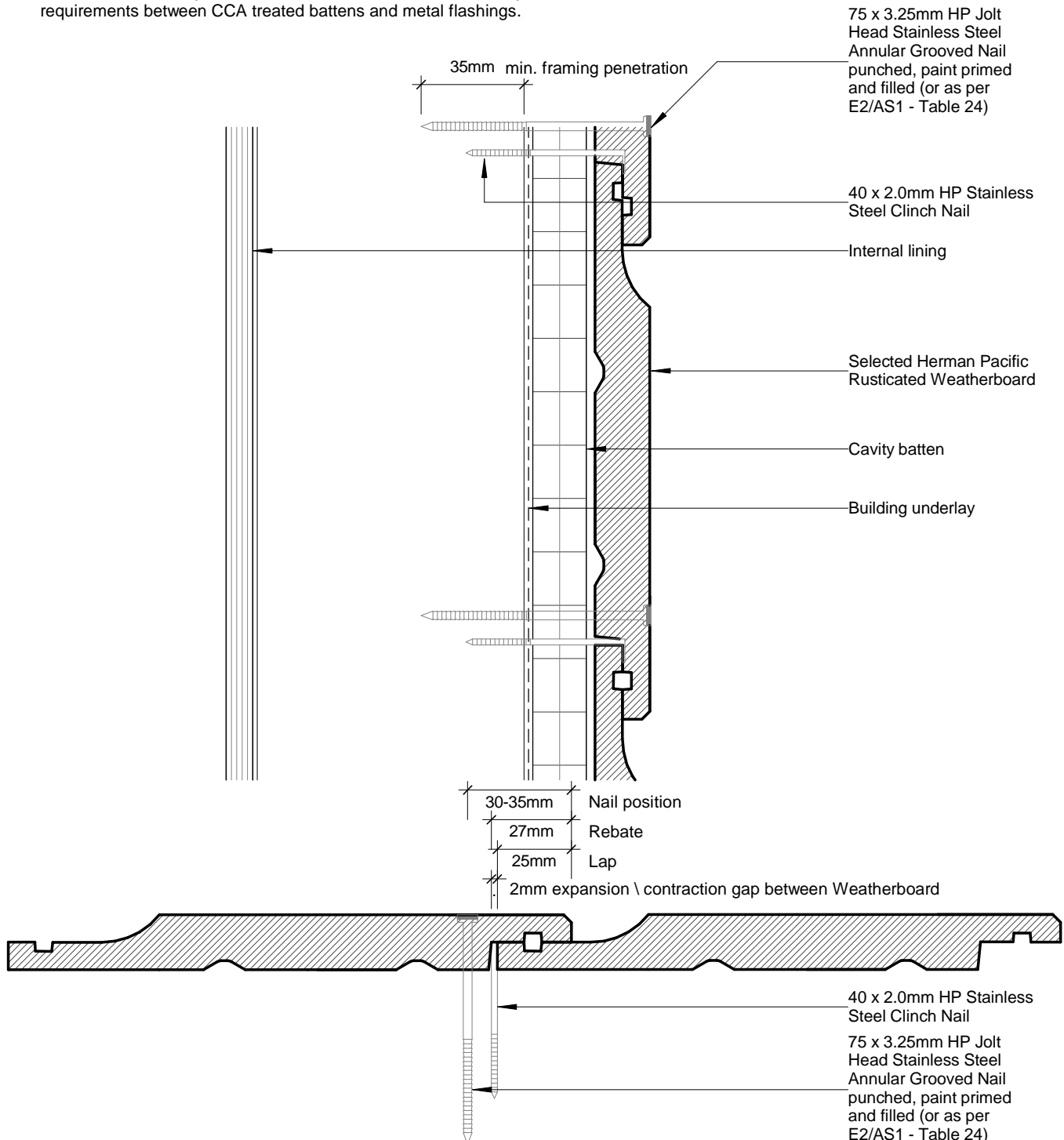
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Note:

Hermipac Cedar weatherboards fixed with jolt head nails are limited to use in NZS 3604 Wind Zones up to and including Medium when studs are at maximum 600 mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400 mm centres.

Hermipac DuraLarch and Ashin-Dura weatherboards fixed with jolt head nails are limited to use in NZS 3604 Wind Zones up to and including Extra High when studs are at maximum 600 mm centres.



Hermipac

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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System

General Detail Cavity Fix, Paint Finish

HC-RUST-411

DRAWING

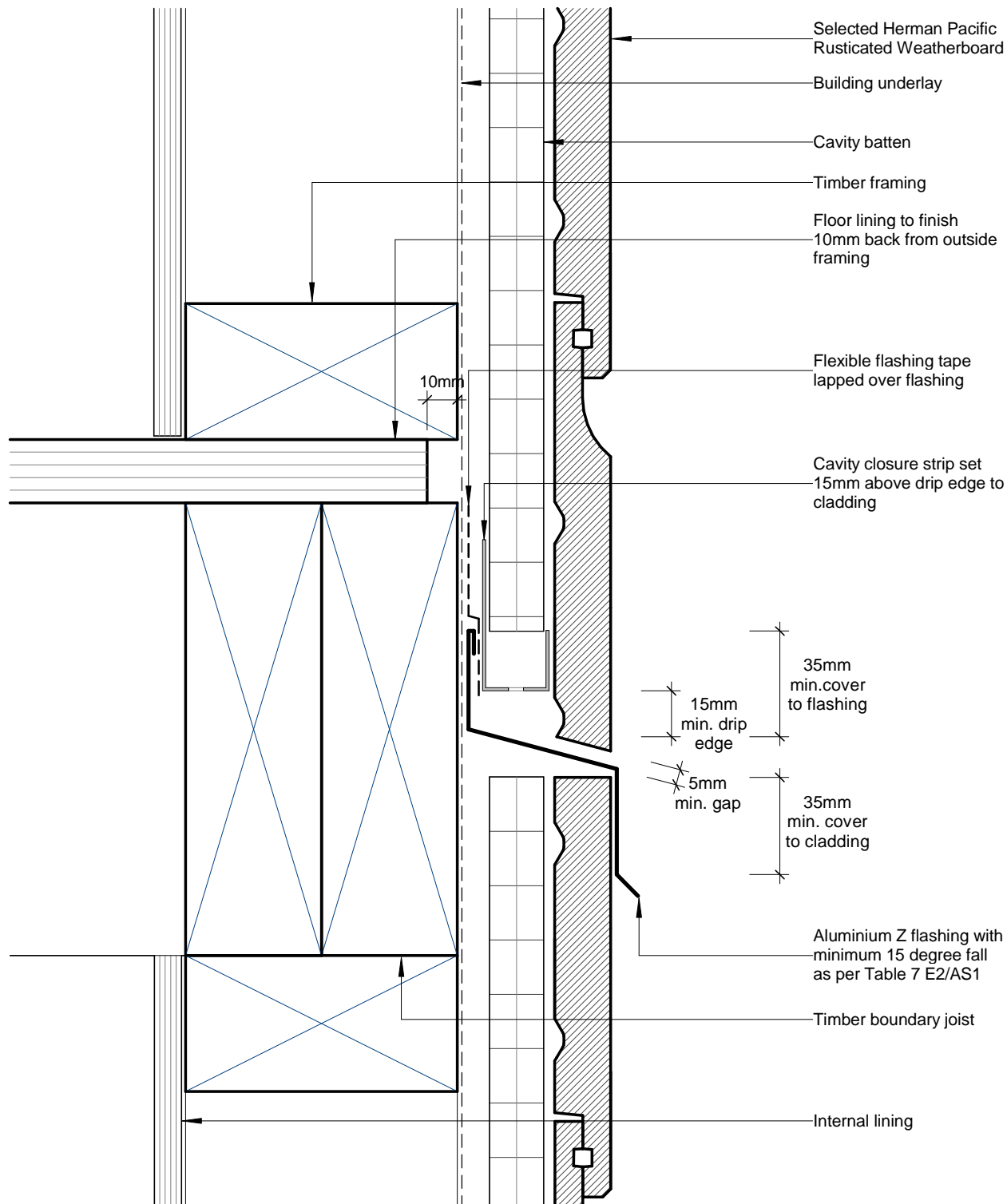
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermipac

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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Drained Inter-Storey Joint

HC-RUST-412
DRAWING

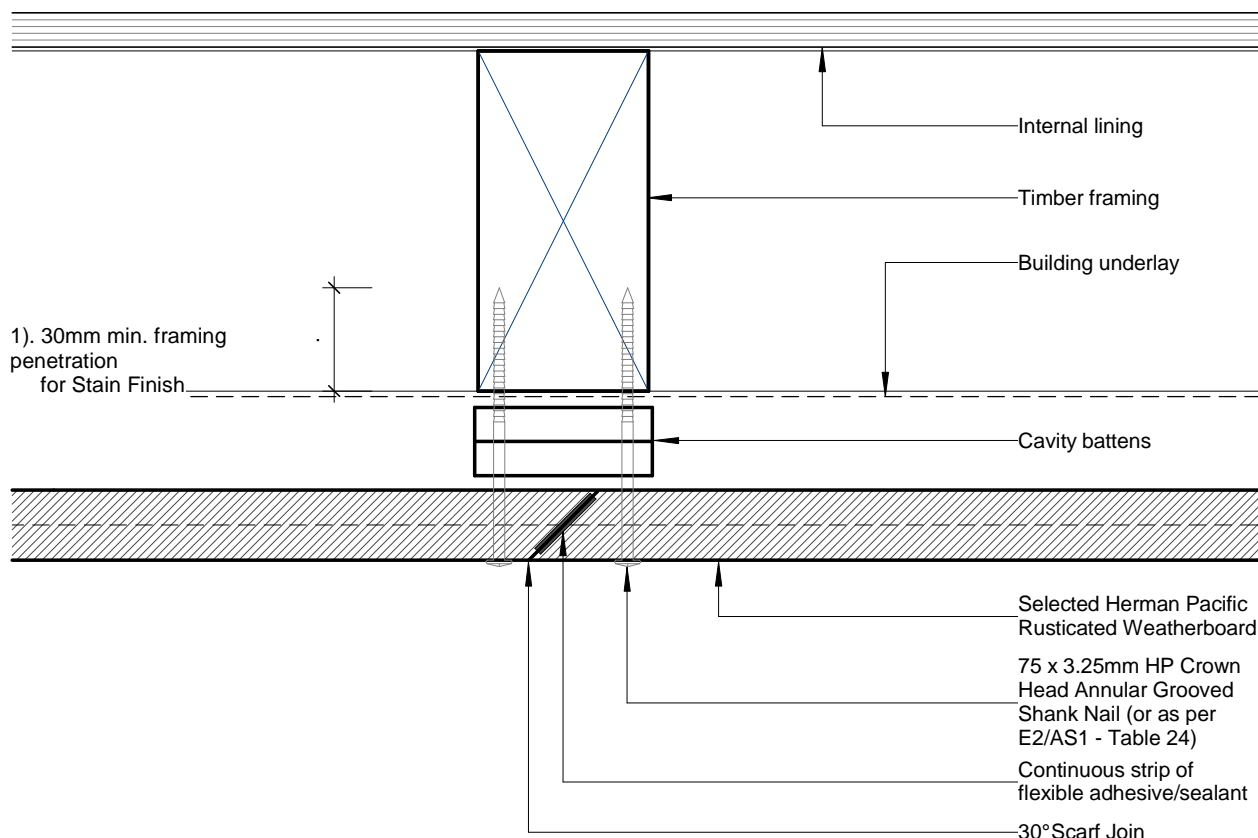


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



NOTE:

Cut ends of scarf join must be double coated with oil or stain. 35mm framing penetration using HP Jolt Head Stainless Steel Annular Grooved nail for paint finish



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Scarf Join Stain Finish

HC-RUST-413
DRAWING

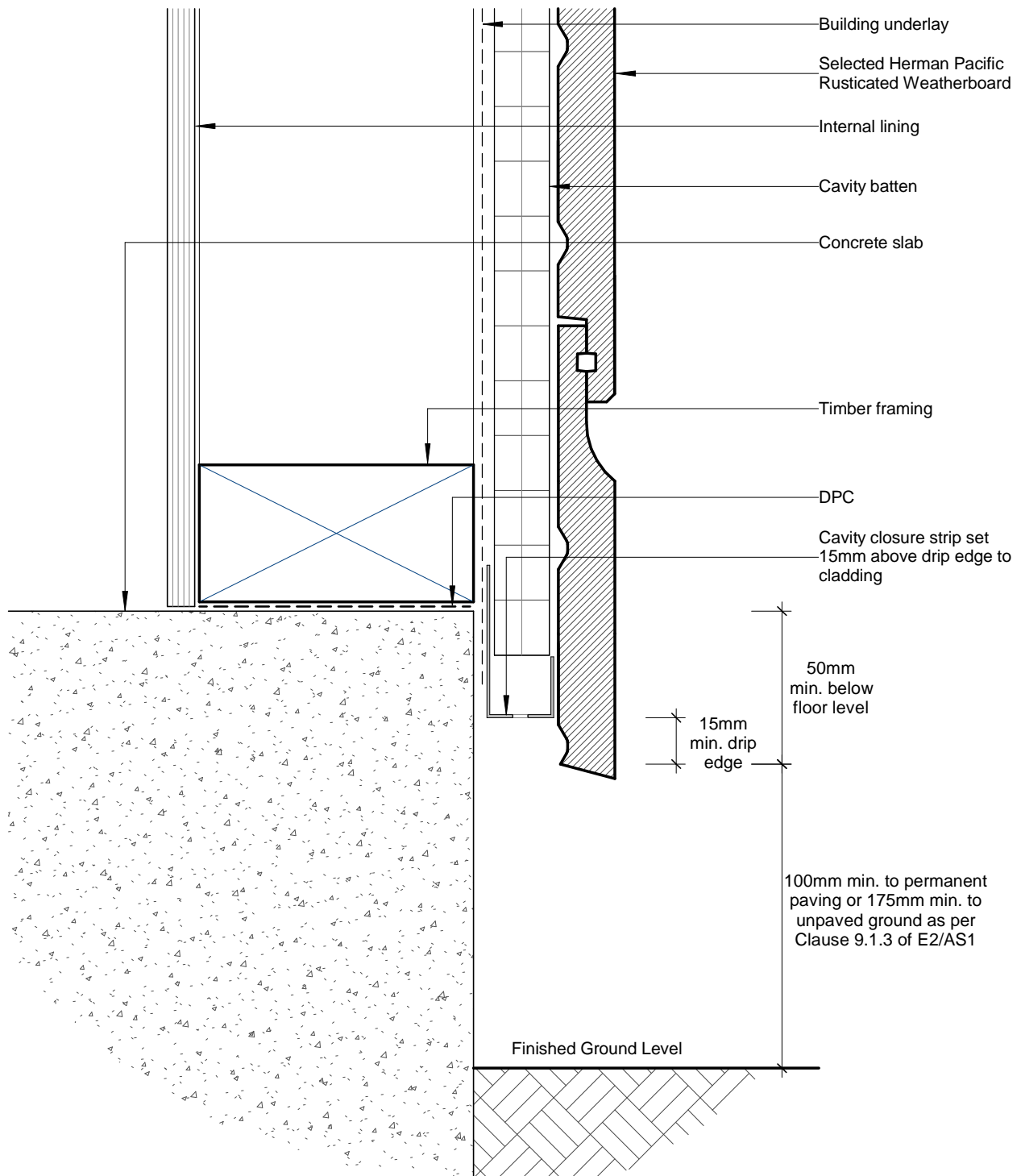
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Base of Wall, Concrete

HC-RUST-500
DRAWING

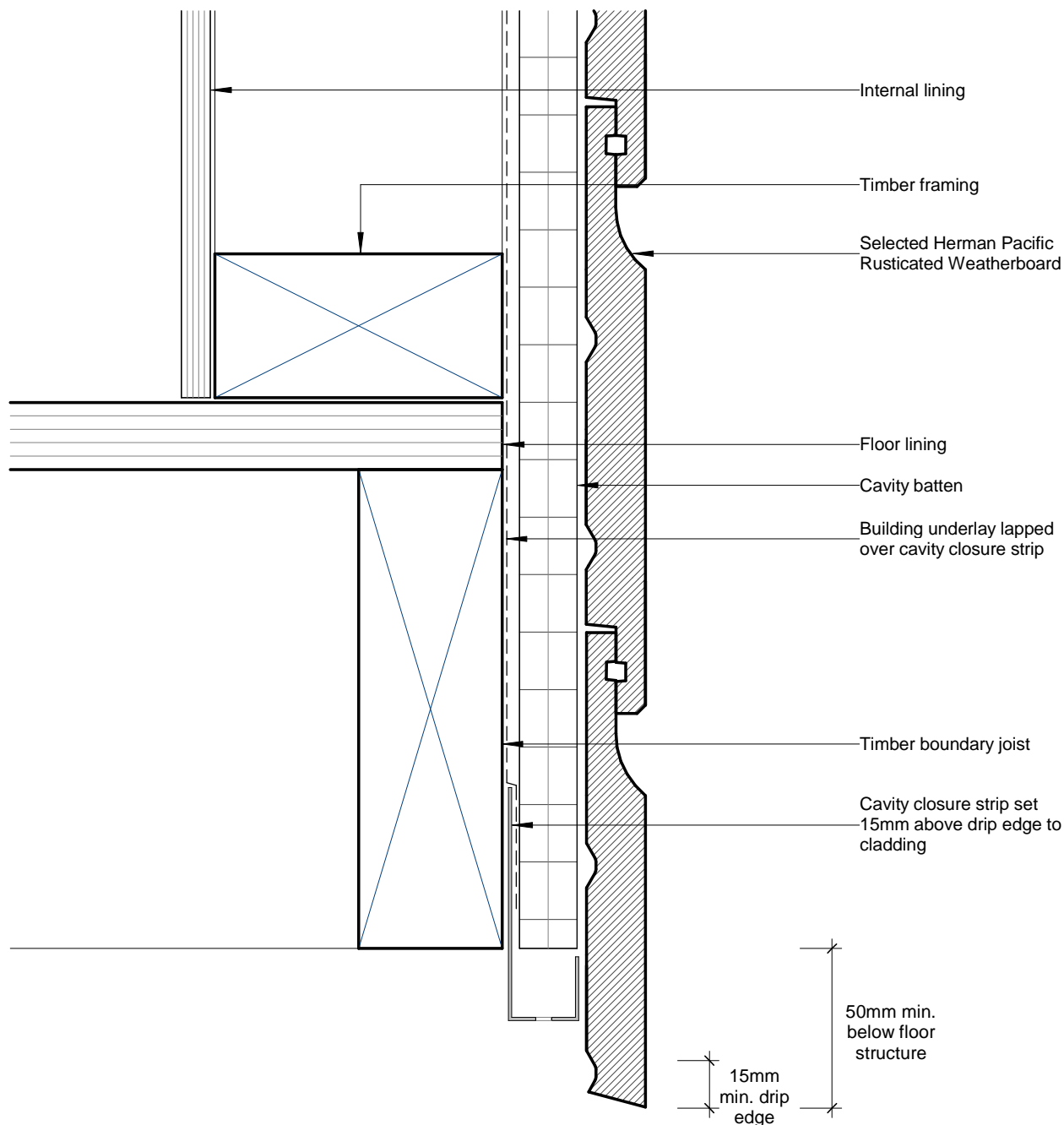


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermipac

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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Base of Wall, Timber

HC-RUST-501
DRAWING

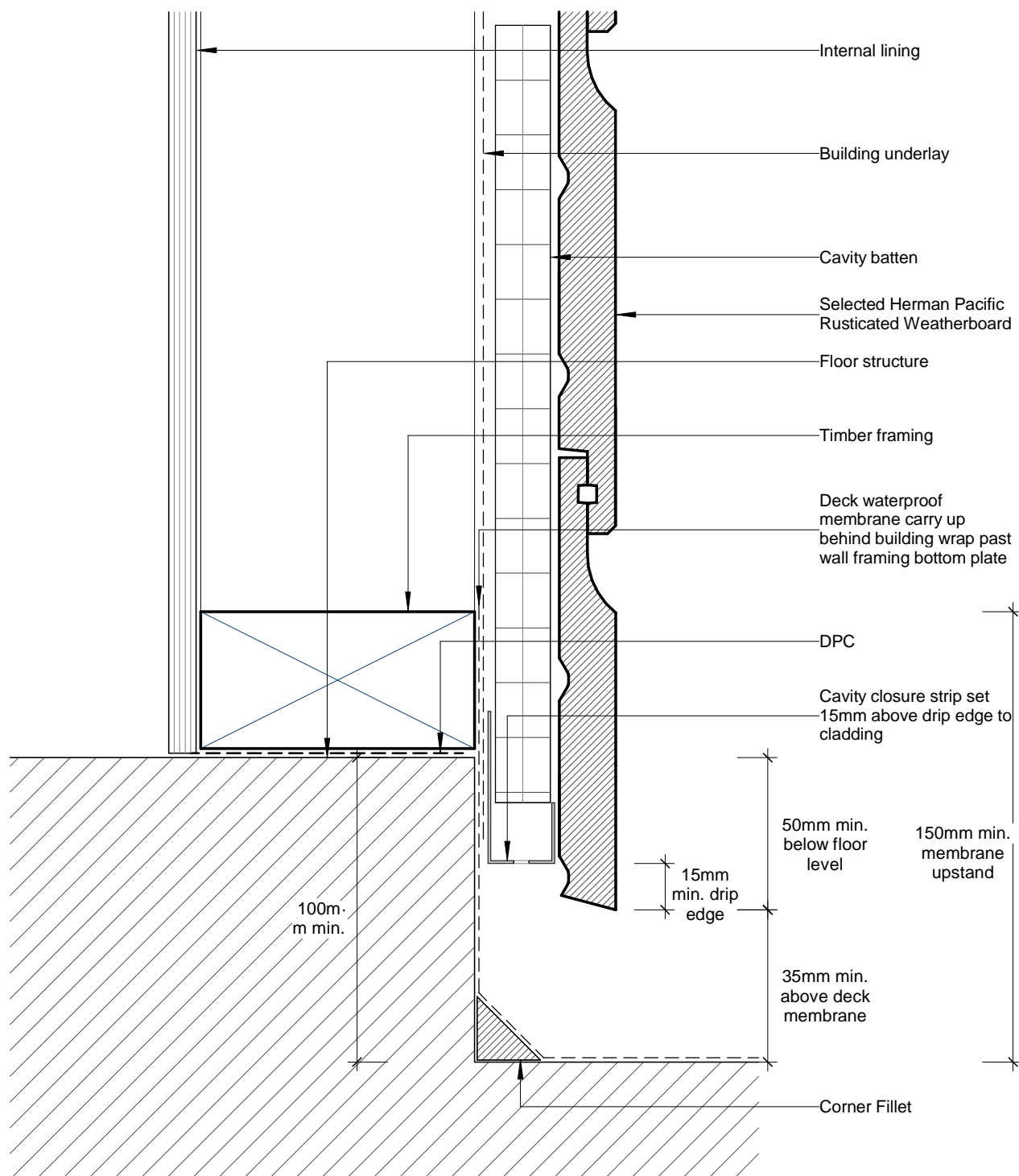


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Cavity at Enclosed Deck

HC-RUST-502
DRAWING

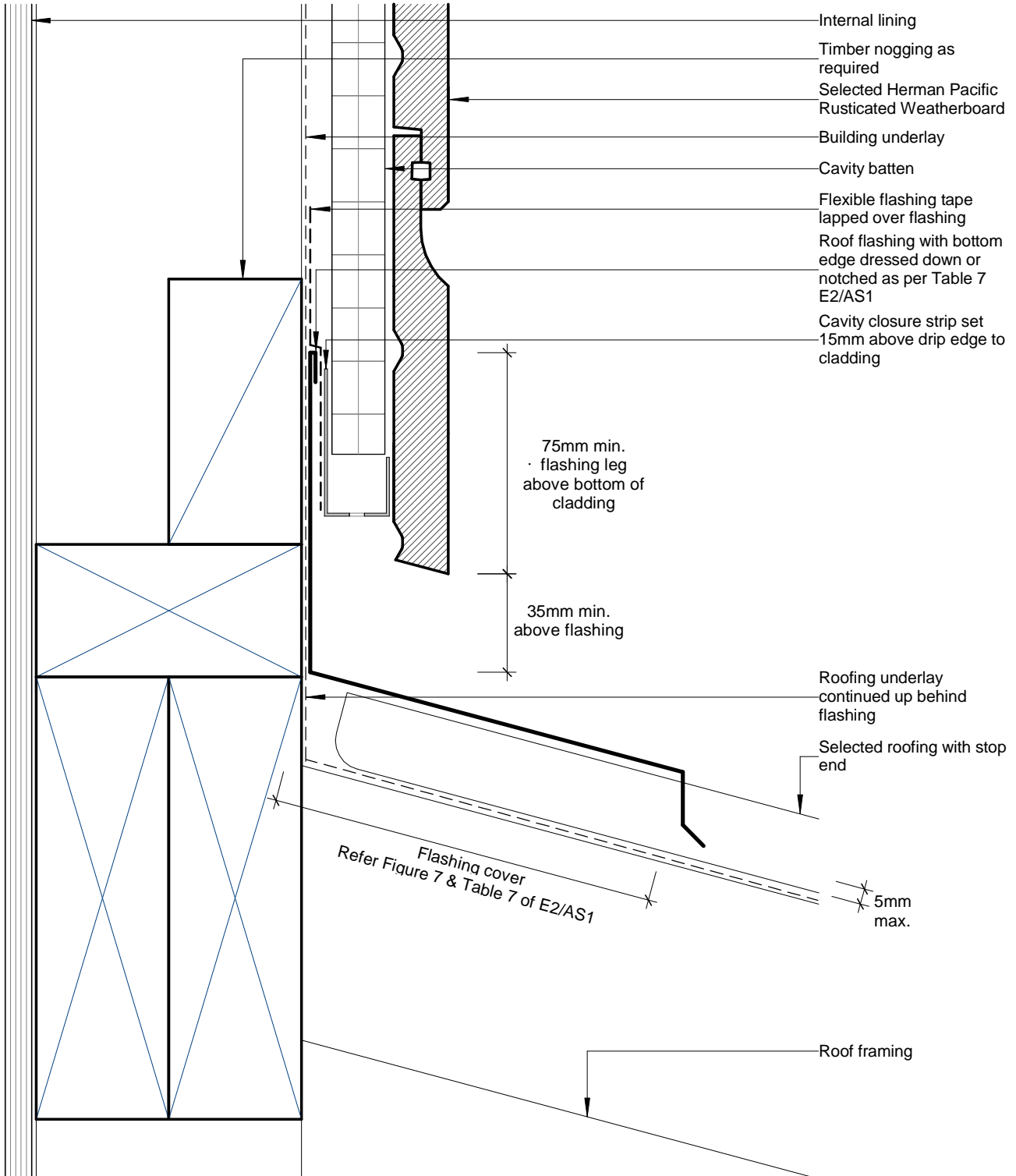
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Roof/Wall Junction

HC-RUST-600
DRAWING

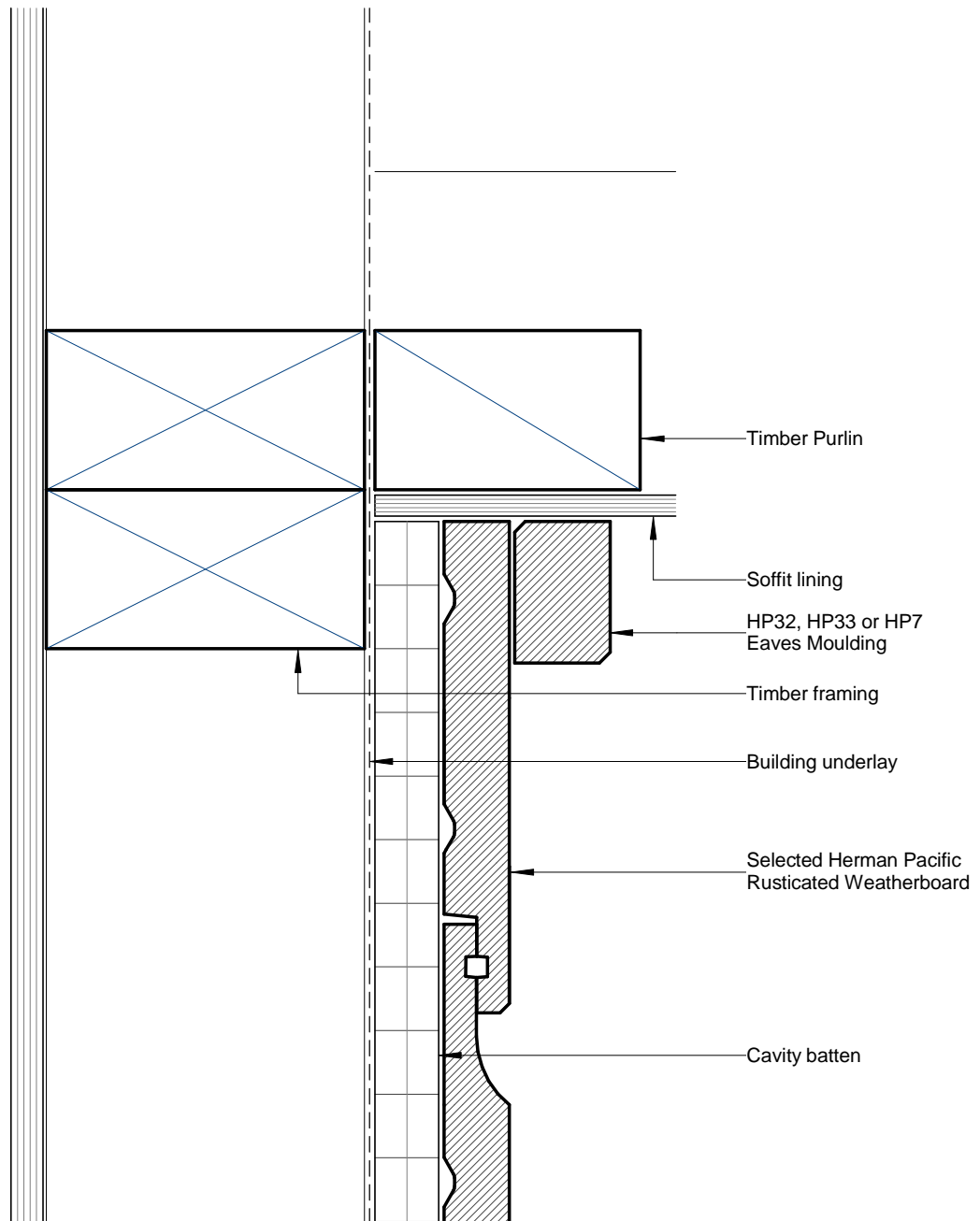


1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Hermipac

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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Soffit Detail, Overhang



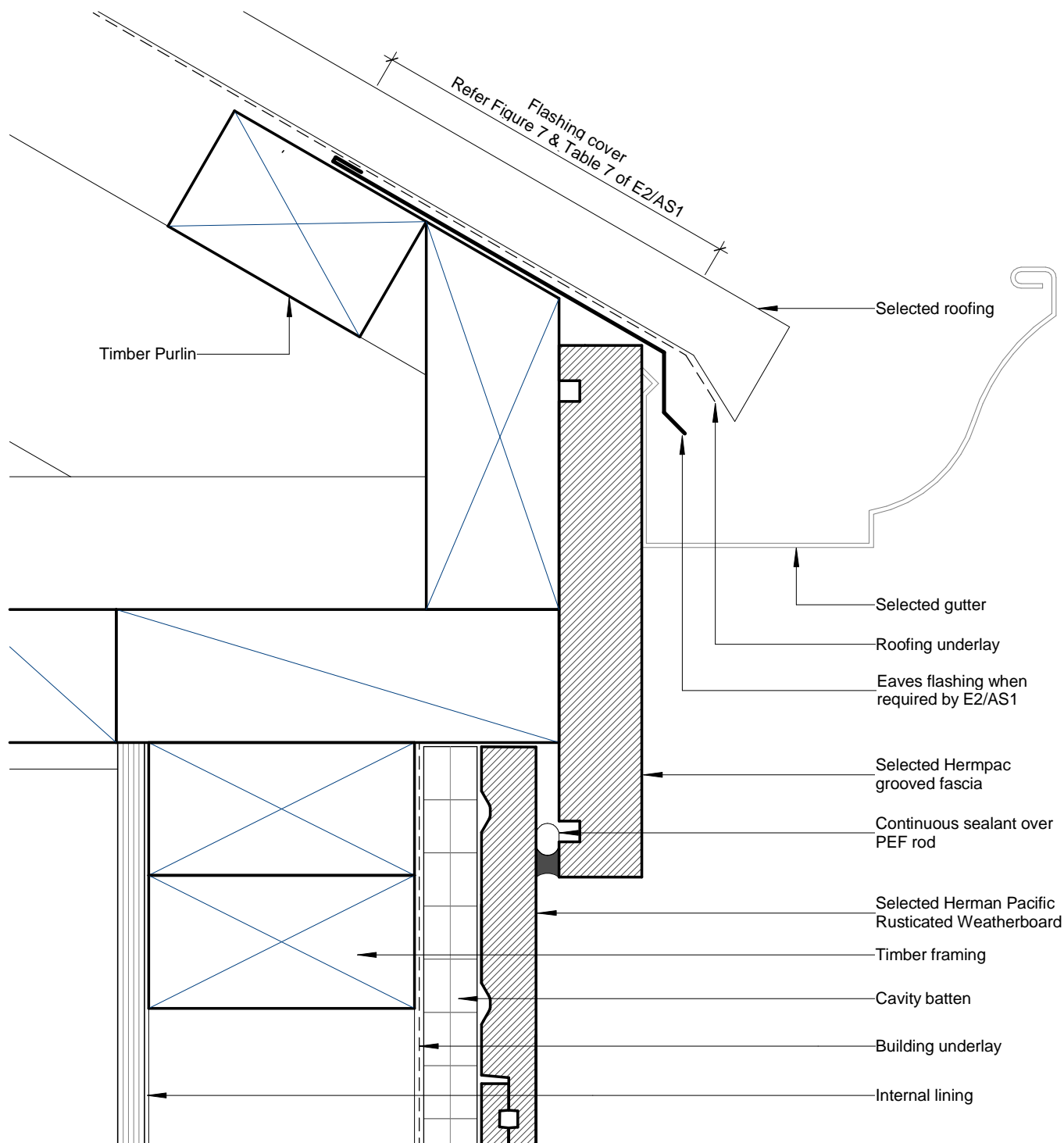
HC-RUST-601
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



Herculac

www.herculac.co.nz

SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Eaves Detail, No Overhang



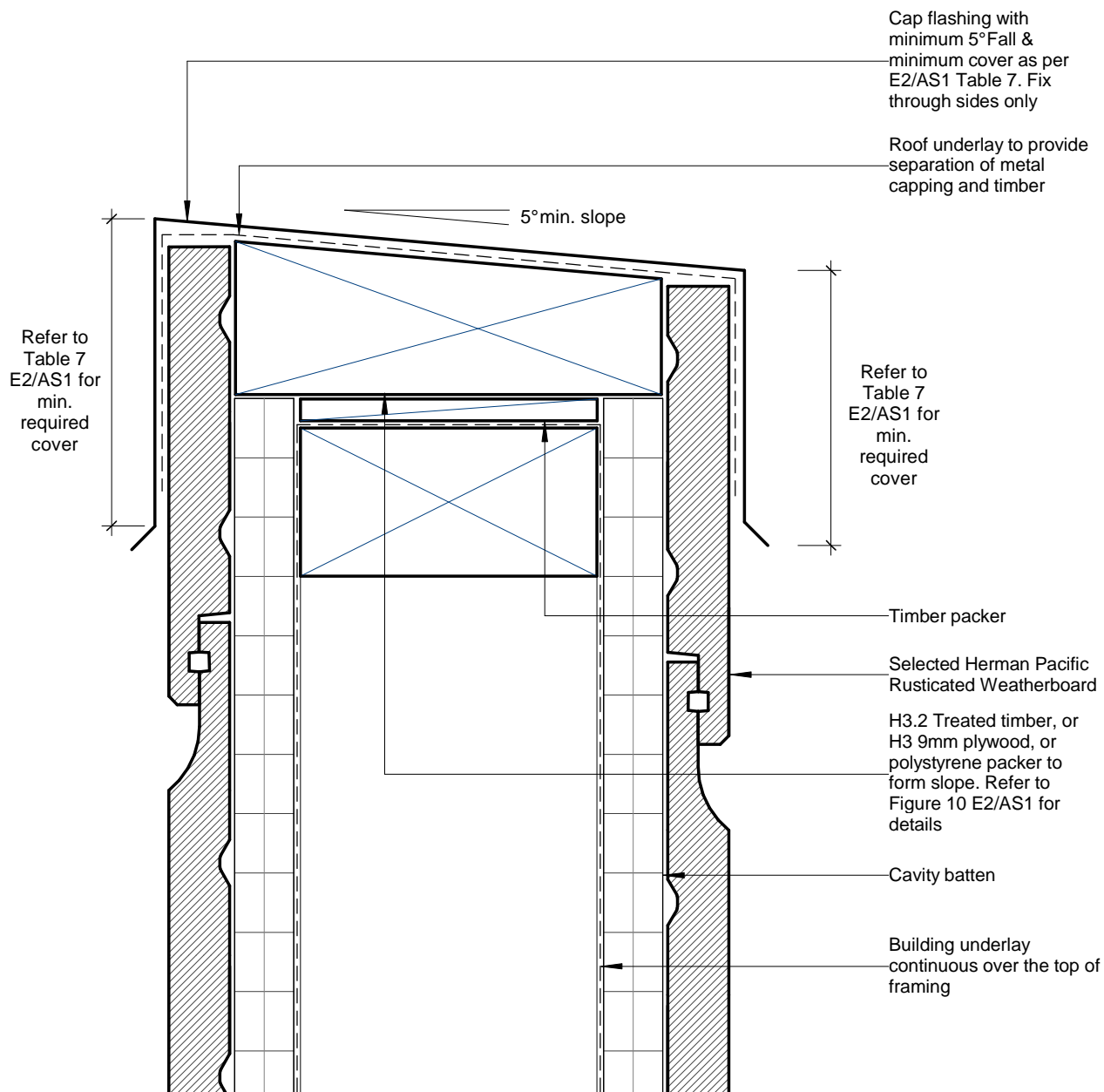
HC-RUST-602
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Parapet Detail

HC-RUST-700
DRAWING

1 : 2 @ A4
SCALE

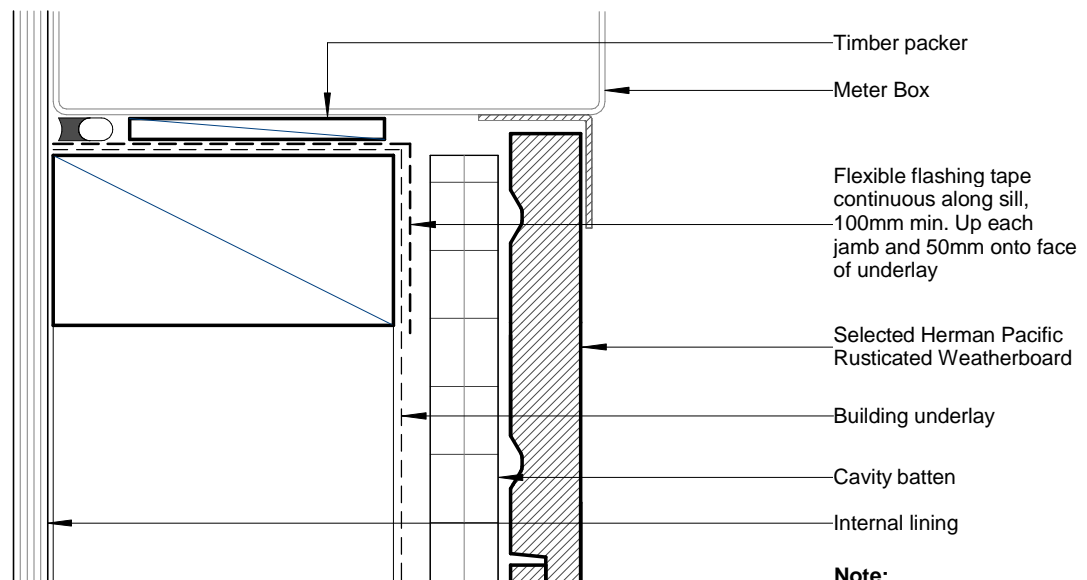
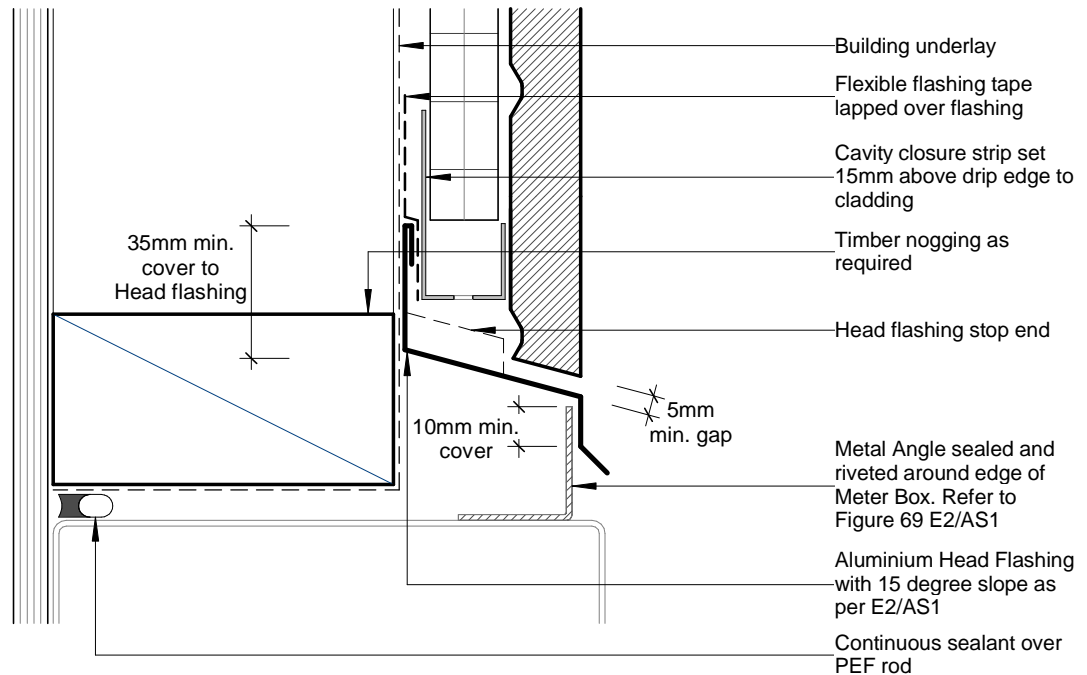
16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.

Head flashing turned up to form stop end



Note:
Jamb detail is similar to sill



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Meter Box Detail

HC-RUST-800
DRAWING

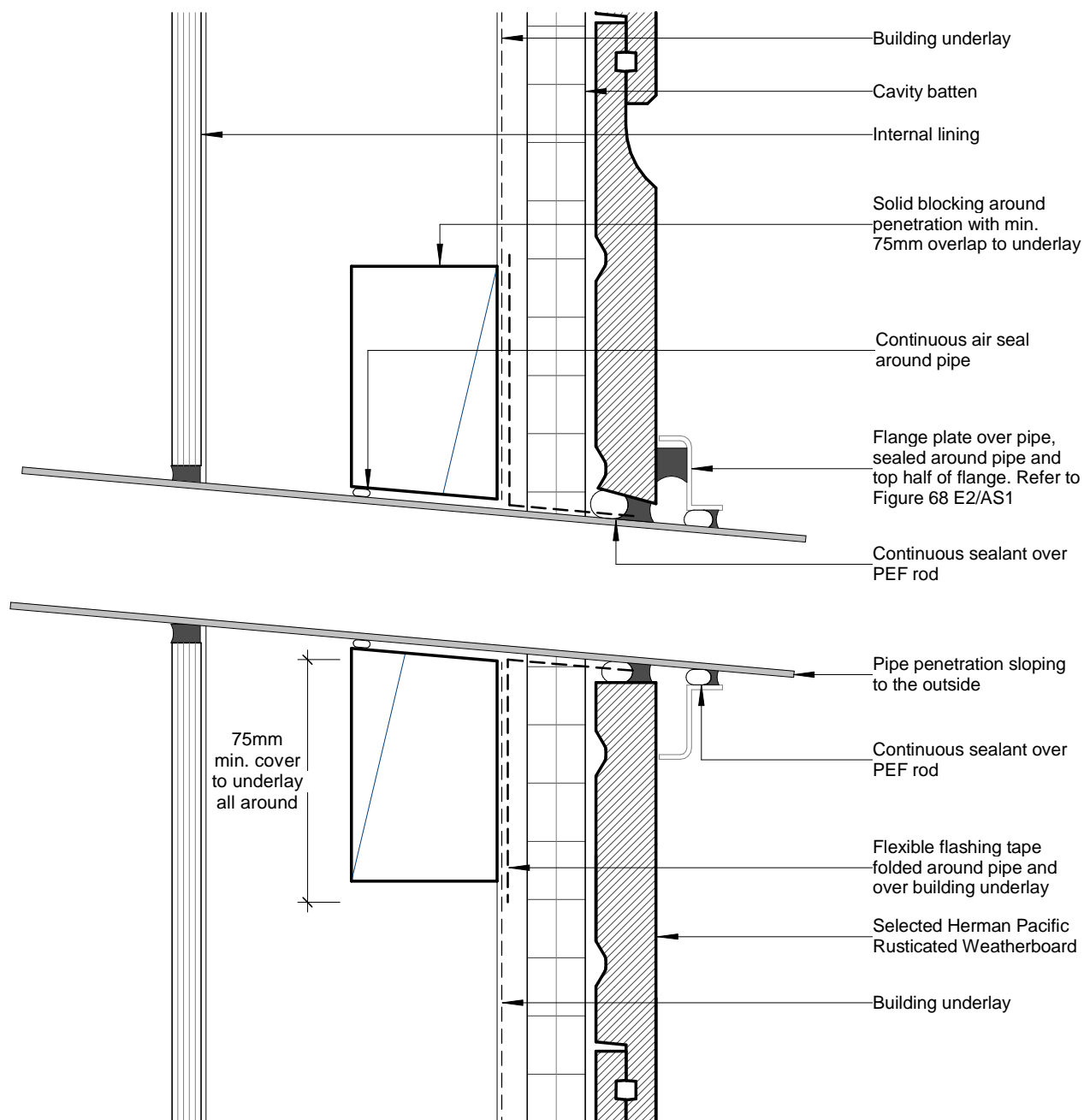
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- For non-hemmed corner flashings, ensure a minimum 75mm cover to weatherboards beyond the point where BRANZ bulletin 411 compliant weatherboard lap or rebate combinations terminate at the corner junction. In Extra High Wind Zone and above, the 75mm cover requirement remains and hemmed edges must also be used.
- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Pipe Penetration Detail

HC-RUST-801
DRAWING

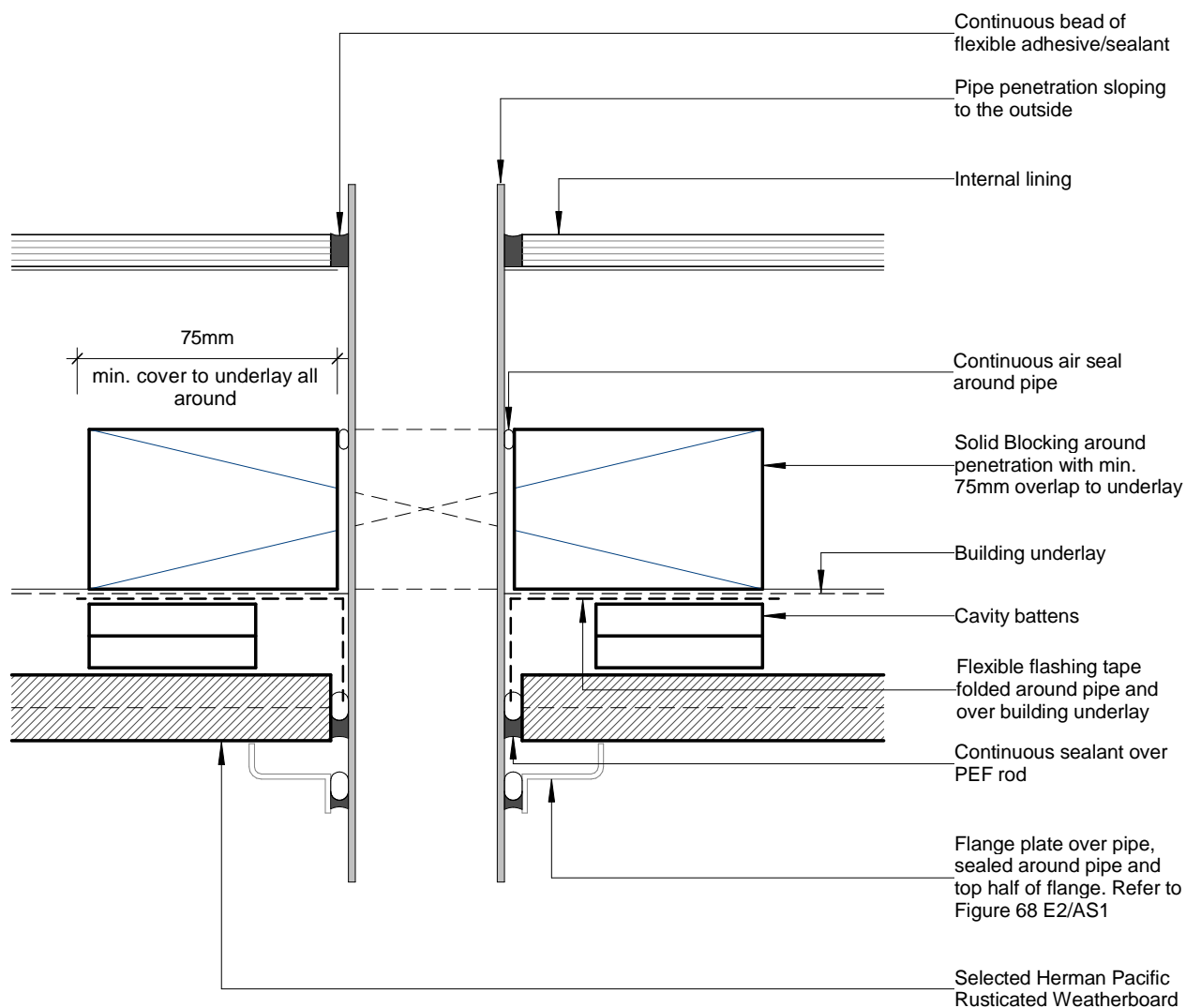
1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All HermanPacific timber products to be pre-coated & cut ends and edges and all fresh cut surfaces double coated and sealed before fixing.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
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- Refer to NZBC Acceptable Solution E2/AS1 Table 21 for the separation requirements between CCA treated battens and metal flashings.



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SUBJECT TO CHANGE WITHOUT NOTICE

Cavity Fix Rusticated Weatherboard System
Pipe Penetration Plan Detail



HC-RUST-802
DRAWING

1 : 2 @ A4
SCALE

16/10/2017
ISSUED DATE

Herpac Horizontal Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Product Technical Statement: 102426



Horizontal Rusticated, Splaycut and Multi-Splay Cedar Weatherboards

[View miproducts listing](#)



Level of assurance needed to demonstrate NZ Building Code Compliance

Supporting documentation should include technical information by manufacturer and either an independent assessment or reference to an industry-based scheme



Herpac confirms that this minimum level of assurance has been met or exceeded by the following:

CodeMark

[30037](#)

BRANZ Appraisal

[658\(2020\)](#)

Technical Statement

Product Description

Our Rusticated Horizontal Weatherboards are a popular design solution due to their versatility and ability to showcase the natural beauty of timber.

Various innovative profiles have been developed at Herpac, each with differing negative detailing, and all looking perfectly matched for their required surrounds be they modern, traditional, urban or rural.

Fitting snug and firm against a wall frame, our Splaycut profiles are a great choice - they have a lighter shadow line and projection from the plane. Splaycut cladding can be an affordable yet highly versatile solution.

Herpac rusticated, splaycut and multi-splay weatherboards are available in both standard and custom profiles, of various widths and thicknesses. These profiles can be supplied with either a bandsawn face (BSF) or dressed face (DF).

The Herpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

Manufactured in New Zealand from Canadian Coastal Western Red Cedar (*Thuja plicata*) and available in various widths and thicknesses incorporating the standard 27mm rebate and 25mm lap detail. Selected profiles available in "DuraLarch™" Siberian Larch (*Larix sibirica*) and AshinDura™ (paint finish).

There is a range of corner mouldings, "smart corners", fascia, flashings, and fixings that accompany the Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System.

Scope of use

The Herpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has been appraised as an external horizontally fixed wall cladding system within the following scope:

- the scope limitations of NZBC Acceptable System 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.

Refer [BRANZ Appraisal 658 \(2020\)](#) and [Codemark Certificate GM-CM30037](#).

New Zealand Building Code (NZBC)

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code:

- **Clause B1 Structure:** Performance B1.3.1, B1.3.2, B1.3.3(a), B1.3.3(h), B1.3.3(j), B1.3.3(q), B1.3.4
- **Clause B2 Durability:** Performance B2.3.1(b), B2.3.2
- **Clause E2 External moisture:** Performance E2.3.2
- **Clause F2 Hazardous building materials:** Performance F2.3.1

Evidence

The product meets the requirements set out in the following documents, or relevant parts of cited standards within the documents:

The Herpac Rusticated and Splaycut Weatherboard Cavity System was tested in accordance with, and meets the requirements of E2/VM1.

Supporting Evidence

The product has and can make available the following additional evidence to support the above



masterspec partner

Company Contact Details



Herpac

Company: Herpac

Physical Address: 110 Foundry Road
SILVERDALE

Postal Address: PO Box 35209
Browns Bay
AUCKLAND

Telephone: 64 09 4219840

Fax: 64 09 4267638

Email: technical@herpac.co.nz

Website: www.herpac.co.nz

Hermpac Horizontal Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Product Technical Statement: 102426



statements:



CodeMark
[30037](#)



BRANZ Appraisal
[658\(2020\)](#)

Use in Service History

Rusticated and splaycut weatherboards have been used as a cladding in New Zealand for over a century.

Product Criteria

Design requirements

The Hermpac Rusticated and Splaycut Weatherboard Cavity System is designed to be used as an external cladding, fixed horizontally on flat surfaces.

The profiles are manufactured in accordance with NZ3617 and BRANZ Bulletin 411.

There is an extensive range of standard and custom profile designs with a focus on innovation and product development. Refer to www.herpac.co.nz for latest profiles.

Installation requirements

The system must be installed in accordance with the Hermpac Rusticated and Splaycut Weatherboard Cavity System Installation Specification, BRANZ Appraisal 658 (2020), Codemark Certificate GM-CM30037, and the Hermpac Rusticated and Splaycut construction drawing details (ref: HC-RUST).

Please refer to www.herpac.co.nz for this technical information or email technical@herpac.co.nz

Maintenance requirements

Maintenance of the Hermpac Rusticated and Splaycut Weatherboard Cavity System is the building owner's responsibility.

Annual inspections must be made to ensure that all aspects of the cladding system, including flashings, remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.

Maintenance requirements will depend on the coating type that is applied. Please refer to the coating manufacturer's specification. Specific maintenance schedules for re-coating oil stains are issued on a project specific basis.

Regular cleaning (at least annually) of the surface finish with water and a mild detergent is recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the cladding.

Company Product Information

Environmental

Herpac Canadian Coastal Western Red Cedar is available via a number of independent third party sustainability certification schemes including FSC, PEFC, SDI, and CSA. Hermpac can offer full chain of custody certification for FSC certified cedar.

Canadian Coastal Western Red Cedar is sourced primarily from managed forests in British Columbia, Canada. Hermpac Western Red Cedar meets the requirements for clause F2 Hazardous building materials F2.3.1 and does not present a health hazard to people.

Relationships



New Zealand Made



Date last validated: **17 June 2020**



Date last updated: **17 June 2020**

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Hermipac

Rusticated, Splaycut & Multi-Splay Weatherboard **Cavity System**

Installation Specifications

Contents

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WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 ChrisK



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Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

1.0 General Information

1.1 Introduction

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

The cladding system consists of horizontally fixed Hermpac Rusticated, Splaycut & Multi-Splay weatherboards installed over cavity battens, flashings and accessories and is finished with a premium penetrating oil/stain or paint finish to Hermpac specifications.

The system incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with an 18/20/40-45 mm drained cavity.

1.2 BRANZ Appraisal

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System has been appraised by BRANZ. Refer to Appraisal No. 658 (2020).

1.3 CODEMARK Certification

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System has the Codemark Certificate of Conformity. Refer Certificate No. GM-CM30037.

1.4 Hermpac Rusticated, Splaycut & Multi-Splay Weatherboards

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards are manufactured from Canadian Coastal Western Red Cedar. Selected weatherboard profiles are manufactured from DuraLarch (oil/stain or paint finish) or AshinDura (paint finish only).

The Rusticated and Splaycut weatherboard lap and rebate profiles are in accordance with NZS 3617 and BRANZ Bulletin 411. The weatherboards are minimum 18.5mm thick and are available in a range of widths and face profiles, supplied as a random length supply. Selected lengths are outside the general specification and are available by special contract.

Note: Multi-Splay weatherboards fall outside the scope of NZS 3617 and BRANZ Bulletin 411.

1.5 Cavity Battens

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System uses either treated timber cavity battens or Cavibat polypropylene cavity battens to separate the weatherboards from the wall frame and form the cavity. Cavity battens are installed vertically over the studs to provide support for the weatherboards at fixing points.

Refer to www.cavibat.co.nz and BRANZ Appraisal No. 524 (2012) for the full Cavibat Cavity Battens specifications.

1.6 Accessories

Accessories supplied by Hermpac for use with the Hermpac Rusticated, Splaycut & Multi-Splay Cavity System include:

- Hermpac external corner mouldings – HP40 (40 x 40mm) and HP42 (42 x 42mm) and the Hermpac 'Smart Corner' series, profiled external corner moulds.
- Hermpac internal corner moulds – HP41 (18.5 x 18.5mm) and the Hermpac 'Smart Corner' series.
- Hermpac cover battens – HP201 (69 x 18mm) and HP202 (90 x 18mm).
- Hermpac eaves moulding – HP32 (40 x 27mm), HP33 (26 x 15mm) and HP7 (30 x 18mm) bevelled profile.
- Hermpac cover batten fixings – 50 x 2.8 mm silicon bronze, Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails

for oil/stain finish or Grade 316 stainless steel annular grooved Jolt Head nails for paint finish.

- Hermpac Rustic plugs – HP44 (40 x 9.25 mm) and HP43 (25 x 9.25mm) profiled to suit selected weatherboard profiles. The plugs are supplied in 10 m bundles.
- Hermpac scribes – HP11 - HP18, with bevelled or radiused edges (cut to suit as required).
- Hermpac scribe fixings – length to suit scribe size (minimum 50 x 2.8mm) stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails for oil/stain finish or Jolt Head nails for paint finish.
- Oil/Stain finished weatherboard fixings – Silicon Bronze or Grade 316 Stainless Steel annular grooved Hermpac Crown/Rose or Flat Head nails. NB: Nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten.
- Paint finished weatherboard fixings – Grade 316 Stainless Steel annular grooved Hermpac Jolt Head nails. NB: Nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten (for AshinDura or DuraLarch) and 35mm (for Western Red Cedar). NB: If Crown/Rose or Flat Head nails are used with paint finished weatherboard, refer to fixing clause above.
- Hermpac clinch nails – Grade 316 stainless steel annular grooved nails with an off-set flat head.
- Hermpac flat and corner soakers (for selected Splaycut & Multi-Splay profiles) – 90° soakers available in copper, stainless steel, powder coated Zincalume or etch primed aluminium.
- Hermpac soaker fixings – 19 x 1.6mm silicon bronze or stainless steel Rose Head or Flat Head nails.
- Hermpac aluminium flashings – widths to suit specified corners – 2.4m or 3.0m lengths.
- Hermpac J Mould Flashing – for window jambs – 20mm or 29.5mm, 2.4m or 3.0m lengths.
- Hermpac aluminium Cavity Closure – 20/40/45mm, 2.4m or 3.0m lengths.

1.7 Handling and Storage

Hermpac Rusticated Splaycut & Multi-Splay weatherboards must be stacked flat and true, clear of the ground by a minimum of 150mm and supported on dry and clean timber bearers at maximum 900 mm centres.

The weatherboards must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the weatherboard surfaces.

2.0 Design Information

2.1 Design Responsibility

The Specifier for the project must ensure that the details in this literature are suitable for the intended application and that additional detailing is provided for specific design or any areas that fall outside the scope and specifications of this literature.

2.2 Scope

This specification covers the use of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System as an external horizontally fixed wall cladding system for buildings within the following scope:

Stain finished weatherboards with crown/rose/flat head nails. Paint finished DuraLarch and AshinDura weatherboards fixed with annular grooved jolt/crown/rose/flat head nails. Paint finished Western Red Cedar

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

weatherboards fixed with annular grooved crown/rose/flat head nails:

- the scope limitations of NZBC Acceptable System 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'.

Any oil/stain or paint finished weatherboards if fixed with annular grooved flat/crown/rose head nails only for weathertightness and structural wind loading 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.

CedarOne or other paint finished Western Red Cedar weatherboards if fixed with annular grooved jolt head nails:

- the scope limitations of NZBC Acceptable System 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 Medium when studs are at maximum 600mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400mm centres.

For applications which are outside the scope of this literature and details which are not in this literature the specifier must ensure that the design meets the relevant performance requirements of the NZBC.

Hermipac recommends that professional design advice is sought in these circumstances.

2.3 Building Regulations

The Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System if designed, used and installed in accordance with the statements and conditions of this literature and the supporting BRANZ Appraisal, will meet the following provisions of the New Zealand Building Code:

- Clause B1 Structure
- Clause B2 Durability
- Clause E2 External Moisture
- Clause F2 Hazardous Building Materials

2.4 Ground Clearances

The finished floor level must have a minimum clearance to paved or unprotected ground as required by NZS 3604:2011.

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

The bottom edge of the Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must finish a minimum of 100mm above paved surfaces or 175mm above unprotected ground.

At deck or low pitch roof/wall junctions, the bottom edge of the Hermipac weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm.

2.5 Structure & Framing

Timber wall framing behind the Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Use of timber framing must be in accordance with framing manufacturer's specifications.

In all cases studs must be at maximum 600mm centres. Where interior linings compliant with NZS 3604 Section 12 are installed directly to the interior face of the wall framing, nogs/dwangs are not required. See NZS 3604 section 8.5.4 for further information.

Note: For CedarOne or painted cedar weatherboards fixed with annular grooved Grade 316 stainless steel Jolt Head nails, studs must be at a maximum 600mm centres for NZS 3604 Wind Zones up to, and including Medium, and 400mm centres maximum for NZS 3604 Wind Zones High and Very High.

2.6 Framing 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 3604:2011.

2.7 Cavity Closure Strip

The Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must incorporate a cavity closure strip to close off the bottom of the cavity and provide resistance against the penetration of vermin. The cavity closure strip must be in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3.

The cavity closure strip must be manufactured from uPVC, aluminium or stainless steel, and be punched with 3-5mm holes or slots which provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall.

2.8 Wall Underlay

The Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must be installed over wall underlay complying with NZBC Acceptable Solution E2/AS1, Table 23, or wall underlays covered by a valid BRANZ Appraisal.

All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for wind zones up to and including Very High, and rigid underlays for buildings in the Extra High wind zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure.

Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.

2.9 Inter-storey Junctions

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 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4(b).

2.10 Hermipac Rusticated, Splaycut & Multi-Splay Weatherboards

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards shall be fixed with an approximate 2mm vertical expansion gap at the overlap between boards. Hermpac Rusticated and Splaycut profiles are all manufactured in accordance with BRANZ Bulletin 411 (Refer to E2/AS1 page 121, paragraph 9.4.1.1) and have a 27mm rebate for a 25mm lap.

Note: Multi-Splay weatherboards fall outside the scope of NZS 3617 and BRANZ Bulletin 411.

The weatherboards shall be pre-coated with the selected coating (prior to site delivery and installation) by Hermpac associate Machinecoat (NZ) Ltd, by the flood coat inundation method or in-line spray coat system (subject to coating type selected).

Pre-finished Rusticated, Splaycut & Multi-Splay weatherboards shall be over-coated and maintained in accordance with the coating manufacturer's specification. All cut ends and/or uncoated surfaces shall be double coated during installation to protect against the penetration of moisture, post installation.

The weatherboards shall be fixed through the cavity battens to the studs, or into the structurally fixed cavity battens, at maximum 600mm centres using Hermpac weatherboard fixings.

External corners shall be weatherproofed by the use of corrosion resistant corner flashings and corner facings, e.g. Hermpac proprietary profiles HP40, HP42, the Hermpac 'Smart Corner' series, or cover battens HP201 and HP202 with Hermpac rustic plugs or scribes.

Internal corners shall be weatherproofed by the use of corrosion resistant internal corner flashings along with internal mouldings, e.g. Hermpac profile HP41 or the Hermpac 'Smart Corner' series.

3.0 Installation Information

3.1 System Installation

The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System. Flexible building underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75mm minimum at horizontal joints and 150mm 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.

The selected cavity closure strip must be installed so a minimum 15mm drip edge to the bottom of the weatherboards is maintained at all times.

Cavity battens must be installed over the wall underlay to the wall framing at a maximum of 600mm centres where the studs are at 600mm centres, or at 400mm centres when studs are at 400mm centres. Cavibat cavity battens must be fixed in place with 40 x 2.8mm hot-dip galvanised flat head nails or galvanised or stainless steel finishing brads at 400mm centres. Refer to www.cavibat.co.nz and BRANZ Appraisal Number 524 (2012) for further information. Timber cavity battens must be fixed in place with 40 x 2.8mm hot-dip galvanised flat-head nails at maximum 800mm centres or as per BRANZ Bulletin BU582 Structurally Fixed Cavity Battens.

Where stud spacings are greater than 450mm and a flexible wall underlay is being used, wall underlay support

(eg. Polypropylene/Polythene tape, galvanised mesh / wire or additional battens) is required to be installed vertically at a maximum of 300mm centres. The wall underlay support is required to restrain the flexible wall underlay and insulation to prevent bulging into the drained cavity as required by E2/AS1, paragraph 9.1.8.5.

3.1.1 Aluminium Joinery Installation

Aluminium joinery and associated head flashings must be installed in accordance with the window manufacturer's instructions. A 7.5-10mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6 after the joinery has been secured in place.

3.1.2 Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Installation

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must not be wet prior to installation. Prior to installation, the back, face and edges of the Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be sealed with an exterior grade oil-based penetrating oil/stain or paint. During installation, cut ends and edges and all fresh cuts or exposed timber must be double sealed with an exterior grade oil-based penetrating oil/stain or paint.

Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner/corner moulding etc. The necessary flashings must be installed before commencing weatherboard fixing and the cavity closure must be installed continuously around the bottom of the cavity.

Immediately prior to installing the weatherboards over the internal and external corner flashings, a continuous bead of sealant must be applied to the face of the flashing along the fixing line.

The first course of weatherboards must be full length, and commence from an external corner. The first weatherboard must be installed level to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50mm.

Hermpac Rusticated and Splaycut weatherboards must be overlapped a minimum of 25mm with an expansion gap of 2mm at the overlap. Multi-Splay weatherboards must be overlapped a minimum of 30mm with an expansion gap of 2mm at the overlap.

Use the Hermpac clinch nail to restrain the top of the weatherboard lap at every cavity batten.

NB: Clinch nails are a proprietary component of this cladding system. For best performance we recommend their use on all installations. The use of clinch nails is mandatory for installations in 'Extra High' wind zones and above.

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be pre-drilled on a slight up-slope, with a hole slightly smaller than that of the nail, to reduce the risk of moisture entry. Fix each weatherboard with one nail per board at every cavity batten.

The fixing must be located 30-35mm above the bottom of the weatherboard (for Rusticated and Splaycut - ref: HC-RUST-410 and HC-SPLAY-410) and 35-40mm above the bottom of the weatherboard (for Multi-Splay - ref: HC-SPLAY410A), be located no closer than 32mm (where practical) from the end of the board, and must finish flush onto the surface of the weatherboard, not into or below the surface.

Fix weatherboards in full lengths where possible. Where joints are required, scarf the weatherboard at 30° over a cavity batten and fix as per drawn detail 'HC-RUST-413' or 'HC-SPLAY-413'.

For oil/stain finished weatherboards

Weatherboard fixings must be either Silicon Bronze or Grade 316 Stainless Steel annular grooved Hermpac

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

Crown/Rose or Flat Head nails. The nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten. Finish flush onto the surface of the weatherboard, not into or below the surface.

For paint finished weatherboards

Weatherboard fixings must be Grade 316 Stainless Steel annular grooved Hermpac Jolt Head nails. The nail shank diameter and length as per Hermpac construction drawings. NB: Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten (for AshinDura or DuraLarch) and 35mm (for Western Red Cedar). Punch nails 2mm below the weatherboard surface, prime nail holes and fill prior to sanding and finishing. NB: If Crown/Rose or Flat Head nails are used with paint finished weatherboards, refer to fixing clause above.

3.1.3 Boxed Corners, Cover Battens and Mouldings

External and internal corners must be finished in accordance with the installation detailing.

Most Hermpac 'Smart Corners' mouldings can be fixed by applying a continuous bead of sealant to the inside surfaces of the moulding or the faces of the flashing to which the moulding is to be bonded. Excess coating should be wiped off areas of the moulding intended to contact the adhesive.

Wherever possible, the moulding should be bonded to the flashing prior to installation. If this is not possible, the moulding shall be temporarily held in place while the sealant cures.

A continuous bead of sealant should also be applied at the join between the moulding and the end-grain cross section of any butted weatherboard and direct to flashing along the line of weatherboard nail fixing (if the weatherboard fixing will pierce the flashing).

Sealant options for Wood-X, Traditional Oil/Stains or Resene Waterborne Oil/Stains include Bostik Seal N Flex FC or Sikaflex AT Façade (NB: for other coatings please check with the manufacturer to determine the most suitable sealant).

Further or sole mechanical support of the Moulding-Flashing interface can be achieved in some cases with a pre-drilled and suitably placed Hermpac nail. The requirement for a continuous bead of sealant as detailed above still applies.

3.1.4 Finishing

At least two coats of an exterior grade quality oil-based penetrating oil/stain must be used over the front face of the Hermpac Rusticated, Splaycut & Multi-Splay weatherboards to protect the weatherboards and give the desired finish colour to the exterior walls. The oil/stain must be recommended for use as a wall cladding oil/stain by the manufacturer and must be brush or Machinecoat NZ Ltd applied. Hermpac recommends the use of oil based stains manufactured by Wood-X and Resene.

Follow the oil/stain manufacturer's instructions at all times for application of the oil/stain finish.

For paint finish the paint must be recommended for use as a wall cladding paint by the manufacturer and must be brush or Machinecoat NZ Ltd applied.

To ensure a top quality paint finish:

1. Any sharp edges should be removed to provide a radius to aid in uniform paint film coverage.
2. Use a premium alkyd oil or acrylic based primer to

envelope prime all cut ends and bare timber surfaces twice.

3. Punch nail holes and prime promptly after punching.
4. Fill holes with a suitable filler and allow to dry.
5. When filler is fully dry and cured, sand area smooth.
6. Apply one coat of an alkyd oil or acrylic based primer to sanded area and allow to fully dry before sanding lightly.
7. Ensure surface is clean and free from any chalking, dirt, dust, mould or other contaminants prior to painting top coats.
8. Apply two coats of premium high quality 100% exterior grade acrylic to surface allowing adequate time for drying between coats.

Timber is a natural product and for best results use a colour with a LRV of 40-45% or above. Please consult with us for a specific recommendation minimum for your chosen timber.

Follow the paint manufacturer's instructions at all times for application of the paint finish.

Refer to Section 4.0 for maintenance requirements.

4.0 Maintenance

Building owners are responsible for the maintenance of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System.

Annual inspections must be made to ensure that all aspects of the cladding system, including flashings remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.

Regular cleaning (at least annually) of the surface finish with water and a mild detergent is recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the cladding.

Recoating of the oil/stain finish will be necessary throughout the life of the cladding system. Re-staining must be carried out every 2-3 years in accordance with the oil/stain manufacturer's instructions. Re-staining will be required more frequently on exposed northern and western facing walls. When re-staining, care must be taken to ensure bottom edges and shiplap edges are well covered and penetrated with the stain.

Recoating of the paint finish will be necessary throughout the life of the cladding system. Re-coating must be carried out every 7-10 years in accordance with the paint manufacturer's instructions. When re-coating, care must be taken to ensure bottom edges are well covered and penetrated with the paint.

5.0 Health & Safety

Cutting of Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be carried out in well ventilated areas and dust masks, eye and hearing protection must be worn.

All relevant sections of AS/NZS2311:2017 "Guide to the painting of Buildings" should be adhered to. Technical Data Sheets and Safety Data Sheets for the specified coating should be obtained from the coating supplier and consulted prior to commencing work. MBIE guidelines and regulations must be followed at all times.



Quality Assurance Checklist

Hermipac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Project Name

Project Address

Initial Check done by

Date

Revision Check done by

Date

To be read in conjunction with NZS3604:2011 and Hermipac Documentation: Construction drawings, Rusticated, Splaycut and Multi-Splay Installation Specification, BRANZ Appraisal 658 (2020) and CodeMark Certificate GM-CM30037 Aluminium Joinery to NZBC:4211 and material compatibility as per NZBC E2/AS1 Tables 20 and 21.

	PLEASE TICK <input checked="" type="checkbox"/>	OK	REQUIRED	RECHECK	DATE
Framing checks					
Ensure framing is straight and true. Framing tolerances must comply with the requirements of NZS3604:2011.					
Studs as per design specification and NZBC (or at max. 600mm centres).					
Nogs/Dwangs as per design specification and NZBC (refer NZS 3604:2011 Section 8.5.4).					
Wind loading & wall underlay - as per NZBC E2/AS1					
Wind Loading up to, and including 'Very High' - flexible or rigid underlay - installed in accordance with manufacturer's instructions and in accordance with E2/AS1.					
Wind Loading 'Extra High' - a rigid wall underlay overlaid with a flexible wall underlay, or using proprietary RAB system in accordance with E2/AS1.					
SED or Specific Design wind pressures up to and including a design differential of 2.5kPa ULS - proprietary RAB system installed in accordance with manufacturer's instructions.					
Cavity battens					
Non structurally fixed - Either Cavibat Polypropylene fluted battens or Merchant Grade batten (min. H3.1 treated) Radiata Pine at 600mm centres (max).					
Non structural fixing - Tack in place with 40x2.5mm hot dip galvanised flat head nails, 50x2.8mm or 60x2.8mm hot dip galvanised gun nails or Stainless Steel clouts (to temporary fix) - fix to all studs at 600mm (max).					
Install vertically at all internal and external details. Fit to support corner flashing.					
Structurally fixed cavity battens - refer Hermipac construction drawings or as per BRANZ Bulletin BU582.					
Flashings					
Rusticated - Hermipac Aluminium flashings to all internal and external corners. Ensure you have the correct size flashing. Refer construction drawings HC-RUST-300, 302,307,310-402, 404,405.					
Splaycut & Multi-Splay - Hermipac Aluminium flashings to all internal and external corners. Ensure you have the correct size flashing. HC-SPLAY-300-303 and 400-401.					
Apply a continuous bead of sealant to the face of the flashing along the fixing line if the nail is going to penetrate the flashing. eg. (Bostik Seal 'N' Flex FC, Sikaflex AT Facade).					
Cavity closure					
The selected cavity closure strip must be installed so a minimum 15mm drip edge to the bottom of the weatherboards is maintained at all times.					



Premium timbers that don't cost the earth

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Quality Assurance Checklist

Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

PLEASE TICK ☒

	OK	REQUIRED	RECHECK	DATE
FIXING WEATHERBOARDS				
Fix Hermpac clinch nail to the hidden lap of the weatherboard at every cavity batten - refs: HC-RUST-410 OR HC-SPLAY-410 OR HC-SPLAY-410A. Recommended for all installations, mandatory for installations in "Extra High" wind zones and above.				
Nails to be pilot drilled on a slight up-slope with a hole slightly smaller than that of the nail.				
Single face fix the weatherboards and line nails vertically up boards.				
Ensure set out of weatherboards allows for 2mm expansion gap between lapped boards.				
Rusticated and Splaycut - Place face nail fixing 30-35mm above the bottom of the weatherboard lap, at 600mm max centres horizontally and located no closer than 32mm (where practical) from the end of the board and finish flush onto the surface of the board - ref: HC-RUST OR HC-SPLAY-410.				
Multi-Splay - Place face nail fixing 35-40mm above the bottom of the weatherboard lap, at 600mm maximum centres horizontally and located no closer than 32mm (where practical) from the end of the board and finish flush onto the surface of the weatherboard - ref: HC-SPLAY-410A.				
Ensure all fixings achieve minimum penetration requirements - refer Hermpac Installation Specification or Construction Drawings for details.				
Note specific requirements for CedarOne and paint finished weatherboards. Refer to Installation Specification and Construction Drawings prior to commencing installation.				
Sealing weatherboards				
Coating all six sides of the weatherboards prior to installation (if not coated via Machinecoat NZ Ltd)				
Double seal all cut edges, ends or fresh cut timber with selected coating.				
Apply second and subsequent coatings on site as per coating manufacturer's specification.				
Note specific requirements for CedarOne and paint finished weatherboards. Refer to Installation Specification and Construction Drawings prior to commencing installation.				
Corner mouldings, scribes, cappings				
Rusticated - internal corners as per construction drawings HC-RUST-300, 302,307,310 and external corners as per construction drawings HC-RUST-400-405.				
Splaycut & Multi-Splay - internal corners as per construction drawings HC-SPLAY-300-303 and external corners as per construction drawings HC-SPLAY-400-401.				
Apply a continuous bead of sealant to the inside surfaces of the moulding or the faces of the flashing to which the moulding is to be bonded.				
Further or sole mechanical support can be achieved with a pre-drilled and suitably placed Hermpac nail. The requirement for a continuous bead of sealant as detailed above still applies.				
Sealant options for Wood-X Cedar Oil, Traditional Oil Stains or Waterborne Oil Stains include Bostik Seal N Flex FC or Sikaflex AT Façade (NB: for other stains please check with the manufacturer to determine the most suitable sealant).				
Check all eaves moulding, scribes and cappings.				
Clearances				
The weatherboards must overhang the floor structure by a minimum of 50mm as required by NZBC Acceptable Solution E2/AS1, Table 18.				
Ensure minimum ground clearances are observed: Bottom of weatherboards to finish 35mm clear of finished deck surface, 100mm above paved surfaces or 175mm above unprotected ground (other surfaces ref: E2/AS1 9.1.3.3).				
At deck or low pitch roof/wall junctions, the bottom edge of the weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm.				
Scarf Joins				
Scarf the weatherboard at 30° over a cavity batten and fix as per HC-RUST-413 or HC-SPLAY-413.				
Inter-storey junctions				
Inter-storey drained joints must be constructed as per HC-RUST-412 or HC-SPLAY-412.				
Aluminium joinery				
All joinery and associated detailing and flashings must be installed in accordance with manufacturer's instructions, in accordance with NZBC E2/AS1, paragraph 9.1.6 and as per construction drawings HC-RUST-200-210 or HC-SPLAY-200-212.				
Health & Safety				
Cutting of Hermpac weatherboards must be carried out in well ventilated areas. Dust masks, eye and hearing protection must be worn.				
All relevant sections of AS/NZS2311:2017 "Guide to the painting of Buildings" should be adhered to. All Technical Data Sheets and Safety Data Sheets for the specified coating have been obtained from the coating supplier and consulted prior to commencing work.				
Maintenance				
Maintenance schedule provided to homeowner on completion of project.				

This is a guide only, designed to assist contractors during installation.
Contractors must always follow the instructions provided within the Hermpac Installation Specification and construction details.



Hermpac

For further information please contact us
technical@hermpac.co.nz

Auckland
09 421 9840

Wellington
04 586 9674

Christchurch
03 341 2163

4261 Brick Veneer Cladding

Brick veneer best practice guide

Ref 23569. Uploaded 16 Apr 2021

Purpose: Installation

BRICK VENEER BEST PRACTICE GUIDE



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



BRICK & BLOCK LAYERS
- FEDERATION OF NEW ZEALAND -



BRICK VENEER BEST PRACTICE GUIDE - PREFACE

Preface

This document is the result of a collaboration between the collective of Brick and Blocklayers associations within New Zealand and the manufacturing and distribution sector under the guise of the 'Brick and Blocklayers Federation of New Zealand (BBFNZ).

Since 1991, New Zealand has had a 'performance based' Building Code in place. What this means is that there is no set, one way that buildings within New Zealand MUST be built but instead focus is placed on how a building should perform once built.

The Ministry of Business, Innovation and Employment (MBIE) provides to the industry a set of 'Acceptable solutions' as a means of complying with the Building Code. These documents however are not compulsory and at times the Best Practice Guide for Brick Veneer makes recommendations that are not part of, or contradict the Acceptable solutions. In these areas, we have endeavoured to point you towards information or independent study reports that show that these 'alternative solution proposals' should also meet the performance requirements of the NZ Building Code.

As an Industry, we believe that we also need to consider Workmanship Quality with our guidance. Workmanship Quality describes the brick work that is not related to building performance but the aesthetic finish that customers expect from Brick work.

An acceptable Workmanship Quality standard has been met if a brick veneer has been laid to meet the performance requirements of the Building Code and achieves no visible defects when viewed by a 6.1m with diffused light viewing distance as per manufacturer's specifications. This may be achieved without meeting all of the tolerances contained within this Best Practice Guide.

It is recommended, when planning the design of a Brick Veneer that you engage a bricklayer early on for their knowledge of design and product.

BBFNZ asks that you consider engaging the products and services of our members who have contributed and made this document possible.

THE BRICK CAVITY

The brick cavity has meant that most brick homeowners' managed to avoid owning a leaky home



Designing and building brick cavities

A 'cavity' or 'cavity gap' is an area of space between the timber framing and the brick veneer that enables sufficient airflow and drainage to dry any moisture that may penetrate the brick veneer.

Without a cavity, any moisture would be trapped between the brick and timber and may cause the timber to rot which has been the case with other cladding products, particularly prior to 2004 resulting in 'leaky home syndrome'.

CAVITY WIDTH

Unless a building consent states otherwise, a cavity should be between **40–75mm** to comply with

E2/AS1 which is the acceptable solution for claddings.

Designers and bricklayers should familiarise themselves with Section 9.2.6 Cavities and review Figure

73Dof E2/AS1. You can read this documentation here: E2/AS1 (part4).

It is important to remember that measurements for cavities are taken from the point where the brick tie is secured to the framing (which may not necessarily be the line of the supporting structure).

The cavity width should be clearly marked on all working drawings.

The Brick and Blocklayers Federation recommends that cavity gaps are designed to a 50mm cavity.

This provides a 10mm tolerance for variations in the framing or slab and accommodates should plywood bracing be a requirement. E2/AS1 allows for a maximum overhang of 20mm.

SLAB RECESSES

As a further weather tight design precaution brick veneers should be designed and constructed with a slab recess. This means that the veneer should be extended below the final floor level to ensure that any moisture that penetrates the cavity drains past the flooring level and out through the weep holes. This is intended to prevent moisture from potentially pooling and running to the inside of the dwelling.

Designers and Bricklayers should familiarise themselves with Section 9.2.5 and Figure 73DofE2/AS1 for options of slab recess. You can read this document here: [E2/AS1 \(part4\)](#) E2/AS1 requires a step down of 50mm or more.

The Brick and Blocklayers Federation recommends a step down of 90-100mm and the placement of a sloping fillet at the base of the cavity to direct water to the outside.

DAMP PROOFING OF SLAB RECESSES

The slab edge and the bottom of the cavity should be sealed to prevent any moisture sitting in the bottom of the cavity from entering the dwelling.

E2/AS1 requires that damp proofing material be either:

Rebates lower than the ground; or

Two coats of a bituminous liquid; or

1mm of butyl rubber or bituminous sheet; or

0.25mm polythene or polyethylene damp proof membrane.

If the rebate is above ground level then either 1mm of butyl rubber or bituminous sheet or 0.25mm polythene or polyethylene damp proof membrane are the only options available.

WIDTH OF SLAB RECESSES

The width of the recess at the base of the veneer, where the brick sits upon, is governed by three factors:

The desired cavity width;

The width of the brick;

The amount, if any, that the brick will overhang the foundation.

If the brick product has not yet been selected, or if it is subject to change then it is important to ensure that this ledge is designed with flexibility.

The Brick and Blocklayers Federation recommends designing a 120mm wide ledge and planning to overhang the brick 10mm to provide a drip edge.

ENSURING THE CAVITY IS CLEAR

A clean cavity, free of mortar bridging the gap, is essential for preventing moisture transference. NZS4210:2001 Section 2.7.1.7 advises that mortar should not encroach into the cavity more than 5mm.

The Brick and Blocklayers Federation recommends specifying and installing 'wash-outs'.

A 'wash-out' involves laying every corner brick and every subsequent brick at 800mm centres on a bed of sand (thus coinciding with weep hole requirements). Once the veneer is approximately 800mm high, these bricks are removed to facilitate the regular washing out of mortar at the base of the cavity.

MORTAR

Mortar is used to hold bricks together and fill and seal any gaps around them. Basically mortar used in brick veneer is a mixture of sand, cement, ad mixture and water. It is however critical that the components of mortar are properly proportioned and mixed correctly.

MIXING MORTAR

For brick veneer to function correctly it is important that the bricks are stronger than the mortar. This will ensure that in the event of seismic activity the tensile bond strength or adhesion of the mortar will fracture rather than the bricks themselves.

NZS4210:2001 provides for a strength requirement for structural masonry but not for brick veneer and states that mortars for veneers shall follow the strength requirement of the masonry suppliers.

In 2011 BRANZ released SR258 – Critical properties of Mortar for good seismic performance of brick veneer.

You can read this report here:

http://www.branz.co.nz/cms_show_download.php?id=8270db8e7e10636a60e5faedc2cd280ee6041b62

This research indicates that mortar strength should be at least 6MPa and advises that this can be achieved with mortar mixes of 4:1 sand to cement.

A hydration process occurs between the water and cement which causes the cement to harden and bind with the sand and therefore cause the mortar to 'set'. If the mortar shows signs of powdering that may mean that hydration has not occurred properly and the resulting veneer will need to be pulled down.

One of the most common causes of mortar powdering is rapid loss of moisture when the bricks are first laid. If the temperature exceeds 27 degrees Celsius then it is important to ensure that the bricks are kept damp for the first 24 hours.

In summer any mortar which is more than 1.5 hours old should be discarded and for temperatures below 5 degrees Celsius mortar should be discarded after 2 hours.

NZS4210:2001 Section 2.2.2.2(e) advises that bricklayers should avoid re-tempering mortar with water.

Mixing good mortar is a skill obtained through experience. Mixing times, humidity levels and even the type of sand used can all have an effect on the final product. Bricklayers should consider using bagged mortar for quality control issues and to obtain compliant mortar strength.

Chemical admixture shall comply with NZS 3113:1979 or AS 1478.1:2000 Admixtures shall be dosed in accordance with the manufacturer's instructions.

The Brick and Blocklayers Federation ask that if you do use bagged mortar that you support our manufacturing members:

Dricon (Firth)

<http://www.firth.co.nz/product-information/dricon/dricon-product-range/trade-mortar.aspx>

MORTAR JOINTS

‘Mortar joint’ is the term for the space of mortar between bricks. According to NZS4210:2001 the average thickness of a mortar bed, cross or perpendicular joint should be 10mm +/- 3mm. A joint thickness of up to 20mm may be accepted on the bottom course to accommodate any slab level issues.

While the thickness of mortar needs to ensure that an adequate seal and bond is achieved, the mortar joint itself also provides an aesthetic value to the brick veneer. Different looks and weather tight properties can be achieved by creating different patterns in the mortar joint.

Varying mortar joint styles are created by bricklayers by running jointers, rakes or beadings across the mortar before it sets to achieve the desired look.

The most common mortar joint types are – grooved, weathered, ‘V’, raked, extruded or flush.

GROOVED JOINT – Also known as Concaved or rolled. This type of joint is formed by using a curved steel jointing tool. Its recessed profile and tight seal mean that it is very effective at resisting moisture penetration. This type of joint can be good for hiding small irregularities.

Should be tooled to a maximum depth of 6mm after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints. It is recommended that all slurry coated bricks should use a grooved joint.

WEATHERED JOINT – The mortar forms a joint that is recessed from the bottom to the top. This type of joint can give brickwork a neat, ordered appearance. While not as weathertight as Grooved and ‘V’ joints, it can be used on external walls and should be tooled to after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints.

‘V’ JOINT – This type of joint is formed with a V-shape jointer (or trowel). This type of joint can be good for hiding small irregularities. This joint has good weathertight properties. Should be tooled to a maximum depth of 6mm after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints.

RAKED JOINT – For this type of joint the mortar is raked out and once pointed and tooled shall not exceed a maximum depth of 6mm. It is important to compact the mortar to improve its weather tight performance, this design creates a form of ledge where water can pool.

EXTRUDED JOINT – This type of joint is formed without tooling. It is caused naturally as excessive mortar squeezes out between the bricks. Exposure to weather may degrade an Extruded joints appearance.



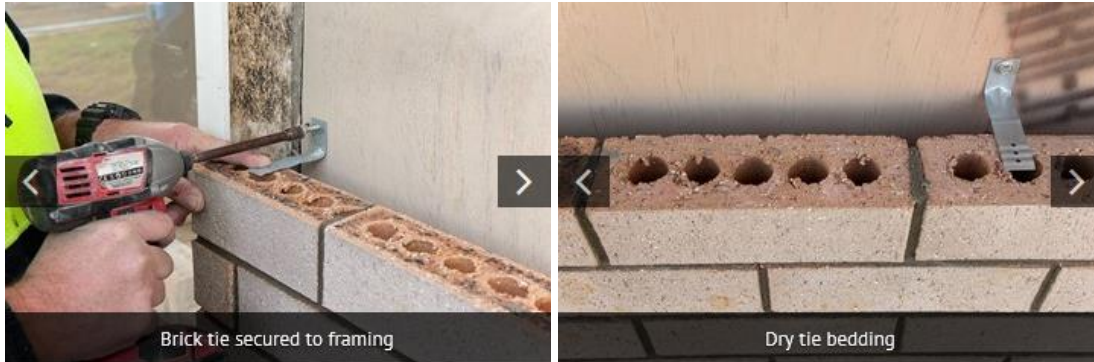
FLUSH JOINT – The Brick and Blocklayers Federation does not recommend the use of flush joints unless they are compacted. If the mortar is flush jointed and not compacted it can lead to the following issues:

- When veneer is to be honed, the mortar can 'flick' out with honing process.
- When brick is to be plastered it can lead to hairline cracking in the plaster where the outline of the brick can be seen.

The type of brick selected plays a part in which type of mortar joint will work best. Straight edged bricks with a 'Vitrated' or 'slurry' coat must use grooved (rolled) joints whereas colour through bricks with rumpled edges are better with raked joints. It is important to adhere to the recommendations of your brick manufacturer when deciding on which type of mortar joint to use.

BRICK TIES

Brick ties provide strength and flexibility to brick veneer.



Brick Tie

As the name suggests, a brick tie is a connector that ties the brick veneer to the structural framing of a building. This feature both prevents the bricks from simply falling away from the framing and they also increase the strength of the brick veneer by transferring some of the force away from the brick and on to the structural element.

BRICK TIE DURABILITY

As brick ties are considered a structural element they are required under the New Zealand Building Code to have a 50 year durability.

If a building is within 500m of the high water mark or within 100m of a tidal estuary (also known as the 'sea spray zone') then stainless steel brick ties will be required. If you are unsure of this then we recommend talking with your local council before commencing design or construction work.

BRICK TIE LENGTH

The length of the brick tie is dependent on two factors– the width of the brick cavity and the width of the brick being laid.

Brick ties generally come in four sizes– 85mm, 105mm, 115mm and 135mm.

To determine the minimum tie length required you need to ensure that the tie can sit flush with the framing and reaches at least half way across the width of the brick.

For example: If your cavity was 50mm and your brick was 70mm wide then you would need to ensure that a 85mm brick tie was used (50mm+35mm).

BRICK TIE INSTALLATION

Brick ties must be screw tied using a 35mm X12g screw and must be installed with a 5 degrees slope down from the frame. The slope ensures that any water is moved away from the framing.

BRICK TIE BEDDING

Brick ties are required to be bedded into the brick with mortar. You need to ensure that there is a minimum mortar cover of 15mm of the end of the tie.

There are two trade practices for the bedding of brick ties. Wet-bedding is the process where the brick tie is held with a layer of mortar both above and below the tie. With dry-bedding the brick tie is placed directly on top of the brick and mortar is only placed on the top of the tie.

Tie bedding is an area of the trade where regulation has not kept up with building science.

The current acceptable solutions for tie bedding are:

On timber framing E2/AS1 requires wet-bedding

On concrete block work E2/AS3 allows for either bedding methods.

In general, bricklayers prefer to dry-bed brick ties. This is because it is a more efficient, productive and a proven method of installation. In 2006 BRANZ released a report that confirms that dry bedding is an acceptable procedure in brick veneer construction. You can read a copy of this report here: [BRANZ DryBeddingMasonry Ties StudyReportno156:2006](#)

The Brick and Blocklayers Federation recommends that designers ensure they specify dry-tie bedding until NZS4210:2001 is updated. This may mean that you will need to identify your building consent application as an alternative solution proposal—were commend including the above reference to the BRANZ study report.

BRICK TIE PLACEMENT

Brick veneer is not assumed to have any structural strength and relies on support from the ties securing it to the structural timber framing. The ties themselves are designed to support a certain tributary area of masonry and it is important that the area per tie is not exceeded. The bottom brick tie, when the rebate is sealed with a liquid applied damp –proof course, must be within 300mm or two courses (whichever is smaller) of the base of the veneer. Brick ties are to be fixed to studs only with a maximum of 600mm centres horizontally and a maximum of 400mm vertically. Ties should also be positioned within 300mm horizontally of openings (BBFNZ recommends 200mm vertical spacing to meet the 220kg/m² mass requirement in any seismic zone)

Designers and bricklayers should familiarise themselves with Section 9.2.7 Wall Ties and Tables 18A and 18B of E2/AS1. You can read this documentation here: [E2/AS1 \(part4\)](#)

The Brick and Blocklayers Federation ask that when selecting brick ties that you support our manufacturing members:

INNOVATIVE BUILDING PRODUCTS LTD— www.brickties.co.nz

BRICK BONDING

The way that bricks are arranged affects a veneers stability and strength and is referred to as a 'bond' or 'bonding'.

Brick Bonds

The way that bricks are arranged affects a veneers stability and strength and is referred to as a 'bond' or 'bonding'.

RUNNING OR STRETCHER BOND

Section 9.2.2 of E2/AS1 requires that bricks are laid with a "running" bond (also referred to as "stretcher" bond). You can read this document here: [E2/AS1 \(part4\)](#)

This means that the bricks of each course overlap the previous course by between 25% and 75% of the length of the bricks as per NZS4210: 2001 Section 1.3 Definitions

NZS3604:2011 Section 11.7.2.2 advises that no length of veneer wall or return can be less than 230mm.

While 70mm brick maybe laid to 1/3 bond (also known as metric bond) it is recommended that bricks always be laid to 1/2 bond (50%). This may mean cutting all 70mm corner bricks to 190mm in length.

Internal corners and junctions need to be stitch bonded.

STACKBONDING

Stackbonding provides the ability to create a brick cladding that presents both vertical and horizontal lines and patterns that add new dimensions to the aesthetic appeal of the veneer.

Stackbonding is not recognised under the acceptable solution for brick veneers (E2/AS1) and therefore requires specific engineering design.

To assist with the design of stack bonded systems, the New Zealand Concrete Masonry Association (NZCMA) has released design guidance that provides the following specification and limitations for stackbond use:

Studs are to be positioned at a maximum 400mm centres.

Screw fixed brick ties are to be installed at maximum 400mm centres horizontally and 400mm centres vertically (every 4th course commencing at two courses above the base or equivalent in the case of a double height brick)

In-joint reinforcement is to be installed every 4th course (or maximum of 400mm) alternating with the rows of brick ties.

The maximum permitted height is 4.0m unless Specific Engineering Design has been undertaken to cover the additional required height specified.

You can read this information here: [NZCMA information on Stackbonding design](#)

LAYING BRICKS

A good bricklayer carefully plans their work prior to laying. This involves:

- Carefully reading **ALL** building consent documents and familiarising themselves with any standard cited in the documents before starting,
- Checking that the substrate has been properly prepared and sealed where required,
- Calculating how many bricks are going to be required (and ensuring that factors such as mortar thickness are taken into account),
- Checking the bricks supplied are correct as per the building consent and contract,
- Checking that there are no obvious issues/defects with the brick pallets provided,
- Checking that all pallets display the same batch number
- Identifying what cuts may be required.

Bricks should be laid to a straight line which generally involves running a string line at both ends of the wall. Bricks should be buttered to form perpend ("perps").

NZS4210:2001 sets out the following tolerances for brick veneers walls:

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

Tolerances cannot breach minimum cavity width requirements.

BRICK BLENDING

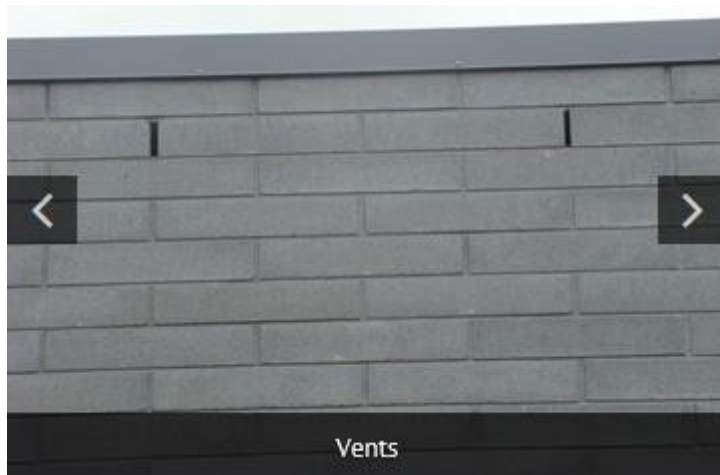
Bricks are natural products that are subject to colour variance between batches. 'Blending' is the process used to vary brick pallets as they are laid as a means of avoiding any unwanted patterns caused by a variance.

The Brick and Blocklayers Federation recommends that bricklayers select bricks and blend vertically from at least three pallets in order to achieve an adequate colour mix.

A bricklayer should also regularly check the veneer while laying from a viewing distance of 6.1m for obvious pockets of colour forming that may be unacceptable.

WEEP HOLES AND VENTS

Air flow and drainage are essential design features that ensure dry homes.



Weep holes and Vents

Weep holes and vents are components of brick design intended to assist with drainage and airflow within the brick cavity.

WEEP HOLES

It is important to remember that while brick veneers are an excellent rain shield, they are not waterproof. A considerable amount of water would be required before moisture is likely to flow down the back of the veneer.

In the event that this saturation does occur, a series of gaps or 'weep holes' are required to be placed along the bottom course.

A weep hole of 75mm x 10mm is required to be placed every 800mm along the base or alternatively 1000mm²/linear meter of wall.

Any weep hole wider than 13mm requires vermin proofing.

Weep hole requirements also need to be met across the heads of doors, windows and openings.

VENTS (VENTILATION)

Ventilation is the process of replacing air in any space with the intention of improving air quality. For the brick cavity this means replacing moist air within the cavity with drier air from the outside.

E2/AS1 provides two acceptable methods for venting brick veneer:

- Vertical vents installed as per the earlier weep holes; or
- Leaving a 5mm gap around the top of the veneer.

You can view these E2/AS1 requirements in Section 9.2.6(d) and Figure 73E here: [E2/AS1 \(part4\)](#).

The Brick and Blocklayers Federation recommends that if you are installing vertical vents that you install these in the second brick from the top.

This ensures that the bond of the bricks on the top row is not weakened.

Vent holes are generally not required under window sills as air can move freely around the frame.

The Brick and Blocklayers Federation recommends that where windows exceed 2.4m in length that 1 or 2 vent holes are evenly spaced under the sill.

PLASTERED OR PAINTED BRICK VENEER

Where a brick veneer is plastered or painted, the brick veneer exterior cladding is effectively a waterproof system. This means the need to have air circulation to dry the cavity and the weep holes to drain the veneer become less important.

The acceptable approach to weep holes in this scenario is 50mm x 10mm weep holes at 1m centres or 500mm²/linear meter of wall.

Vent holes are still required at the top of the plastered or painted veneer however designers should check with their local council as requirements vary.

The Brick and Blocklayers Federation ask that when selecting vents that you support our members:

Victor Vents: <http://www.victorvents.co.nz/>

BRICK VENEER FLASHINGS

It is the bricklayer's responsibility to ensure that all flashings have been correctly installed prior to the bricks being laid.

Brick veneer flashings

A flashing is an impervious material designed to prevent water from entering the brick cavity from joints such as those found in windows and doors.

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

Designers and bricklayers should familiarise themselves with Figure 73 Cof E2/AS1 which can be viewed here: [E2/AS1 \(part4\)](#)

It is the bricklayer's responsibility to ensure that all flashings have been correctly installed prior to the bricks being laid.

HEADFLASHINGS

If a metal head flashing is used and fixed to the framing, you should ensure it is kept 5mm short at each end and the ends of the flashing should be turned up. This will allow for any movement in the framing without interfering with the bricks.

A 5-10mm gap between the underside of the lintel bar and the flashing allows for both drainage and ventilation eliminating the need for weep holes in the bricks across the head of the opening.

JAMB FLASHINGS

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

SILL FLASHINGS

Any moisture being driven up the sill brick needs to be stopped from reaching the timber framing and redirected into the bottom of the cavity. NZS 3604S11.7.7 requires that flashings be extended

200mm past the sides of any openings where practical to do so.

DESIGNING AND CONSTRUCTING BRICK SILLS AND LINTEL BARS



Designing and Constructing Brick Sills and Lintel Bars

BRICK SILLS

Brick sills must overhang the brick work below by 30 - 50mm with a minimum slop of 15 degrees. Bricks must be evenly spread and of equal thickness across the width of the sill.

Another option is to have a header course spread evenly over the sill width. This applies to the heads of the windows as well.

LINTEL BARS

A lintel bar is a load-bearing building component that spans across openings such as windows and doors to provide structural support.

Designers and Bricklayers should familiarise themselves with Paragraph 9.2.9 and Table 18D and Table 18E of E2/AS1. You can read this here: [E2/AS1 \(part 4\)](#).

Lintel seating – lintels shall have a minimum seating into adjacent veneer of

- (i) 100mm for spans up to, and including 2m
- (ii) 200mm for spans over 2m

There are two methods of installing a lintel bar with brick veneer:

Acceptable solution for lintel bar – E2/AS1 provides a method where the angle spans the brick from one side to the other. The lintel should be kept either solely in the brick or the timber framing but not both. The angle sizes within Table 18E of E2/AS1 should be applied.

Alternative solution for lintel bar – The second method involves sitting the lintel back 20mm from the face of the veneer, and have correct seating. With this method, the angle is attached directly to the structure and kept 5mm short of the opening at each end to accommodate any movement in the frame. The below table applies to this method.

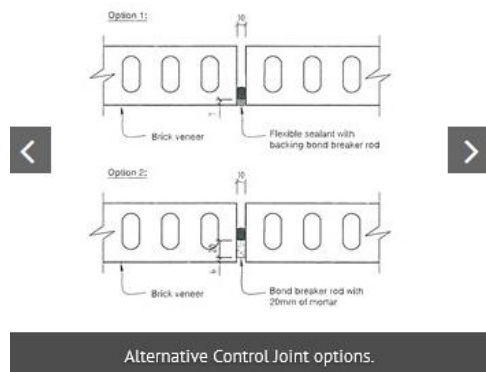


Max.Span(mm)	Size of Angle
3000mm	80X80X6
3500mm	100 x 100 x 6 or 125 x 75 x 6
4500mm	125 x 75 x 8
4800mm	125 x 75 x 10

The durability requirements for lintel bars can be seen in Table 18D of [E2/AS1 \(part 4\)](#).

CONTROL JOINTS

Control joints allow concrete brick veneer to respond to minor movement of the building.



Control Joints

Buildings and building components generally move slightly after construction. Often this relates to normal expansion due to acceptable moisture absorption. Control joints are vertical gaps, usually filled with in elastic materials, which allow brick veneer to respond to these movements usually by opening in response to expansion.

Generally clay brick veneer does not require control joints. Slight expansion can occur soon after manufacture but this does not appear to present any issues in normal construction.

Concrete brick veneer however typically requires control joints. Designers and bricklayers should check manufacturers' specifications and familiarise themselves with Section 9.2.8.2 of E2/AS1 which you can read here: [E2/AS1 \(part4\)](#).

DESIGNING OF CONTROL JOINTS

Control joints should also be designed and constructed as shown in Figure 73A of E2/AS1.

This requires that control joints consist of:

- A backer rod of compressible foam; and
- Sealant that complies with either Type F, Class 20 LM or 25 LM of ISO11600 or Low modulus Type II Class A of Federal Specification TI-S-00230C

PLACEMENT OF CONTROL JOINTS

To allow for the potential shrinkage in the length of concrete brick veneer E2/AS1 requires that vertical control joints are placed at not more than 6m centres.

Vertical control joints are also required to be located:

- Within 600mm of Tjoints;
- Within 600mm of L shaped corners or by restricting the space to the next control joint to 3.2m maximum
- At changes in wall height that exceed 600mm;
- At changes in wall thickness.

It is not uncommon to read reports from Geo-Tech Engineering control joints in clay brick veneers due to expansive clay soils but this is not necessary. Where such soil types occur an appropriate foundation should be designed to manage this and there is no evidence that control joints would be necessary.

Control joints should be considered however in clay and concrete brick veneer in the following circumstances:

- If a wall is 10m or longer and has no window or door openings– a control joint should be installed at an intermediate point.
- Where a small panel of brick work adjoins a large panel of brickwork, as movement within the framing may cause a crack, a control joint may be considered. An alternative however would be to strengthen the framing using additional brick ties and using reinforcing in mortar joints in these areas.

Where a control joint is used it is important to ensure that the framing details provide a stud within 200mm of each side of the joint for the fitting of brick ties.

If possible, position a control joint behind down pipes to hide them.

It is important to remember that if a crack develops in an otherwise well-constructed brick veneer it is an aesthetic issue only and should cause no problems as to weather tightness or the overall integrity of the veneer. A control joint is in effect a controlled crack.

BRICK VENEER HEIGHTS

Brick Veneer Heights

E2/AS1 sets the limitations for Brick Veneer heights in Section 9.2.3 and Figure 73B . You can read this document here: [E2/AS1 \(part 4\)](#)

It advises that brick veneers with timber framing shall have:

- A maximum height of veneer above finished ground level of 7m;
- A maximum height of 4m from the foundation;
- A maximum height of 5.5m to the apex of a gabled area.

If the veneer is supported by a masonry structure, NZS4229:2001 permits a veneer height of 6.0 for the wall and up to 10m in a gable area.

The Clay Brick and Paver Manufacturers Association have developed a combined 2 storey system for clay brick veneer- Design Note TB 1. Designers and Bricklayers should familiarise themselves with this document which you can read here: [2StoreyClayBrickVeneerConstruction- MadeEasy](#)

You may also want to consider the following concrete brick 2Storeysolutions:

[Firth 2StoreyBrickVeneersolutionforDevonstoneand70mmBrickVeneers](#)

[Firth 2StoreyBrickVeneersolutionforFirth 10seriesHollowMasonry, Manorstoneand 90mmBrick Veneers](#)

BRICK STAINING

Staining generally has only an aesthetic effect on brick veneer.

Stain removal



While it is perfectly normal for clay bricks to have a slight variance in colour, this is different than brick stains. All care should be taken during construction to prevent staining occurring, however this is not always possible.

Stain removal depends on the cause of the stain.

The Brick and Blocklayers Federation recommends that you consult your bricklayer or brick supplier before attempting stain identification and removal.

VANADIUM STAINS

Light-coloured clays often contain vanadium salt that are generally colourless but under certain conditions may appear as yellow, green or reddish-brown discolouration of the brick. Vanadium stains are neither permanent nor harmful and do not indicate a defect in the brick.

Vanadium stains are often generated by the use of too strong a concentration of hydrochloric acid during the initial cleaning process, or from excessive water penetration.

While vanadium stains will wash off overtime, an application of 4% Sodium Hypochlorite (Janola) or a mixture of Sodium Bicarbonate and water (60g per litre of water) will assist in their removal.

Hydrochloric acid may turn vanadium salts black and make it difficult to remove. It is therefore important that vanadium salts are removed before attempting to clear mortar residue from clay brick veneer with hydrochloric acid.

MANGANESE STAINS

This stain occurs characteristically along the edges of grey or brown clay bricks. It appears as a dark-blue brown discolouration.

If you suspect manganese staining, contact your brick company for them to inspect and advise on a resolution.

COPPER AND BRONZE STAINS

Sometimes clay brick veneer may be in close proximity to metals such as copper or bronze. Water washing over these metal surfaces can result in a bluish-green stain appearing on the surface of the bricks.

These stains may be removed using a solution of 1 part acetic acid (80% or stronger): 1 part hydrogen peroxide (30%-35% strength): 6 parts water.

IRON OXIDE (RUST)

Rust can be the result of using hydrochloric acid on clay bricks. This may be able to be removed by applying a solution of 1 part phosphoric acid to 4 parts of water. Allow up to 24 hours for it to work.

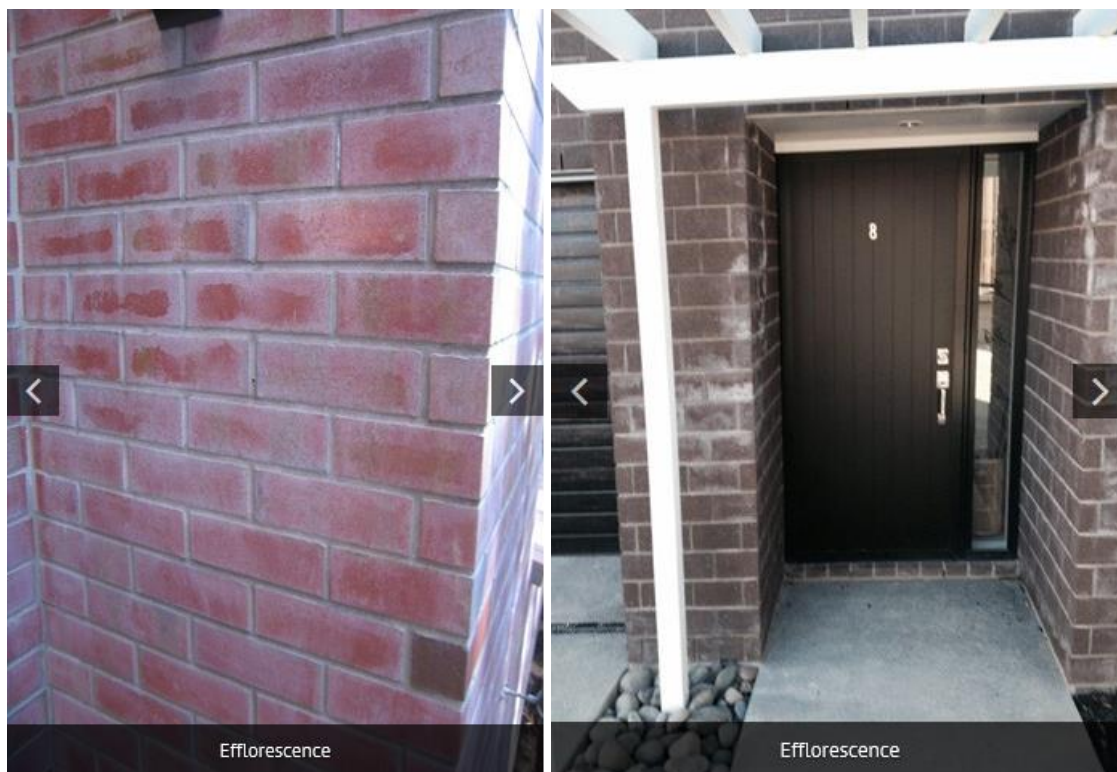
SMOKE STAINS

Common around domestic fireplaces but can also be an issue with fire damaged buildings.

Minor smoke stains can be removed with sugar soap—which is a highly alkaline mixture. Mix approximately 500g in to 2 litres of water and apply liberally by brush. After the smoke stains disappear, scrub with a mixture of detergent and household scouring powder containing Sodium Hypochlorite (Janola).

EFFLORESCENCE

Efflorescence



Efflorescence is a calcium deposit that can form on clay or concrete veneer. It appears as a white powdery and sometimes 'fluffy' deposit on the brick.

Efflorescence occurs where excessive amounts of water enters a veneer that has soluble salts present. When the water dries out, the salts are then deposited on the surface of the veneer. Soluble salts can enter the veneer from various sources:

- Mortar components, particularly cement.
- Soil or fill in contact with the wall.
- Sea spray in coastal areas.
- Masonry units (not a common source).

The Brick and Blocklayers Federation recommends that bricklayers protect new brick work with adequate coverings when rain interrupts construction.

Persistent efflorescence may act as a warning sign that water is entering the wall through faulty copings, flashings or pipes.

CLEANING EFFLORESCENCE

Most efflorescence will naturally disappear over time, however its removal can be accelerated by brushing with a stiff dry brush. The use of a dust pan or vacuum cleaner to collect the salts after

brushing is recommended as this will prevent salts from re-entering the brickwork or any porous paving materials below.

After brushing and cleaning up, an absorbent cloth (wrung out until damp only) can be used to pick up any residue. Frequent rinsing of the cloth in fresh water is advisable. Rinsing brick work with water will only cause the salt to be re-absorbed in to the bricks and reappear when dry.

BRICK TOLERANCES AND AESTHETIC APPEARANCE

Brick Tolerances and Aesthetic Appearance

It is possible for a brick veneer to be building code compliant but not have the visual look that reflects the skills of an experienced bricklayer. This is referred to as 'workmanship quality'.

It is important to discuss with your bricklayer the aesthetic look you are hoping to achieve with your brick veneer and if possible, include them in your selection process.

The Brick and Blocklayers Federation recommends that parties to a brick veneer construction enter into a clear, written contract that sets out the expectations of parties including agreed workmanship quality standards, quality checking responsibilities and an agreement on how disputes will be managed– even if it is not a compulsory requirement under legislation.

VIEWING DISTANCE

Due to the nature of bricks no two bricks are the same and no brick is perfect when examined close-up. ASTM C90 has been adopted as the industry standard for viewing brickwork – it states that 'for exposed wall construction chips and imperfections shall not be evident when viewed from a distance of not less than 6.1m in diffused light'.

DRYING CRACKS

During the manufacturing process hairline cracks can appear in a small number of clay bricks. This occurs during the drying process when excess moisture is removed from the clay prior to it entering the kiln. Bricks with these cracks conform to AS/NZS4455 and do not compromise the structural integrity or weather tightness of the brick.

From an aesthetic standpoint, the relevant American Standard Test Method (ASTM) has been adopted. ASTM C216-04 specifies that bricks must contain less than 5% visible cracking when viewed from a distance of 6.1 meters.

CHIPPING

Bricks may be transported several times before arriving onsite and occasionally chipping can occur. Chips are more noticeable on bricks that have a surface colour different from the body of the brick. A workmanship quality standard is achieved if imperfections, including chips, are not visible when viewed from a distance of not less than 6.1m under diffused light as per ASTM C90.

New Zealand does not have a standard to assist a Bricklayer to evaluate the level of chipping acceptable in a brick prior to laying however ASTM C216-15 has been adopted by BBFNZ.

- ASTM C216-15 for a general purpose face brick (FBS textured) basically has the following requirements:
- Chips from the edge should not be deeper than 8mm
- Corner chips should not be deeper than 13mm.
- When all the length of the chips are added up that the total is not exceed 10% of the perimeter of the brick face (as an example, the accumulative lengths of the chips for a 230mm X 75mm brick shall not exceed 61mm).

It is good practice for Bricklayers to set aside bricks that do not meet this standard and to assess whether to discard it or use it for cuts.

DIMENSIONAL CATEGORY

AS/NZS4455 Masonry units and segmental pavers' calls for bricks to be classified into dimensional categories based on their deviation from their work size, or the size specified in manufacture.

To test if bricks meet the standard, 20 bricks should be placed in a row and the total length should be measured. This can be done with height, width and length. Tolerances for these are:

Category	Height	Length	Width
DW1	±90mm	±50mm	±50mm
DW2	±60mm	±40mm	±40mm

RUBBING


During transportation brick may rub together on the pallet. This can sometimes cause light rubbing on the face of the bricks. Excessively rubbed bricks should be discarded or used for cuts.

COLOUR VARIATION

Clay and concrete bricks are both subject to some variation in colour between batches. This is part of the inherent beauty of brick.

Unusual discolouration patterns can be limited by blending the bricks. Should there be any concern regarding significant colour variation laying should cease and the manufacturer contacted.

4311S Steel & Tube Profiled Metal Roofing

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SUPPORTING DOCUMENTS

COLORSTEEL Installers Guide

Ref 11174. Uploaded 28 Aug 2020

Purpose: Installation

COLORSTEEL Maintenance Recommendations Bulletin

Ref 11159. Uploaded 28 Aug 2020

Purpose: Maintenance

COLORSTEEL Warranty Guide

Ref 11165. Uploaded 28 Aug 2020

Purpose: Warranty

Plumbdek Product Technical Statement

Ref 11183. Uploaded 28 Aug 2020

Purpose: Performance, Installation

Steel & Tube Plumbdek 110063

Ref 15371. Uploaded 27 Oct 2020

Purpose: Installation, Maintenance, Environmental, Warranty

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Installers Guide

July 2019





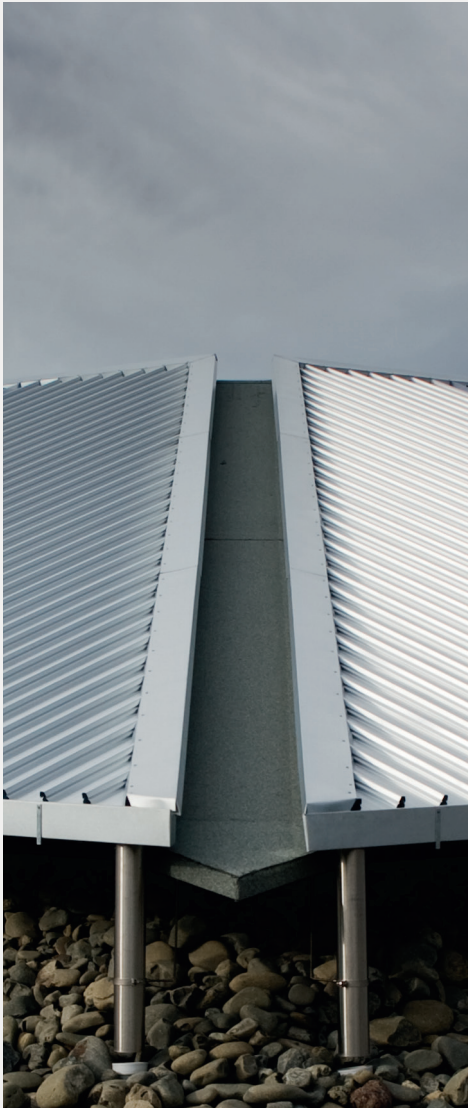


INTRODUCTION

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

MATERIALS

A variety of steel coating systems are offered:



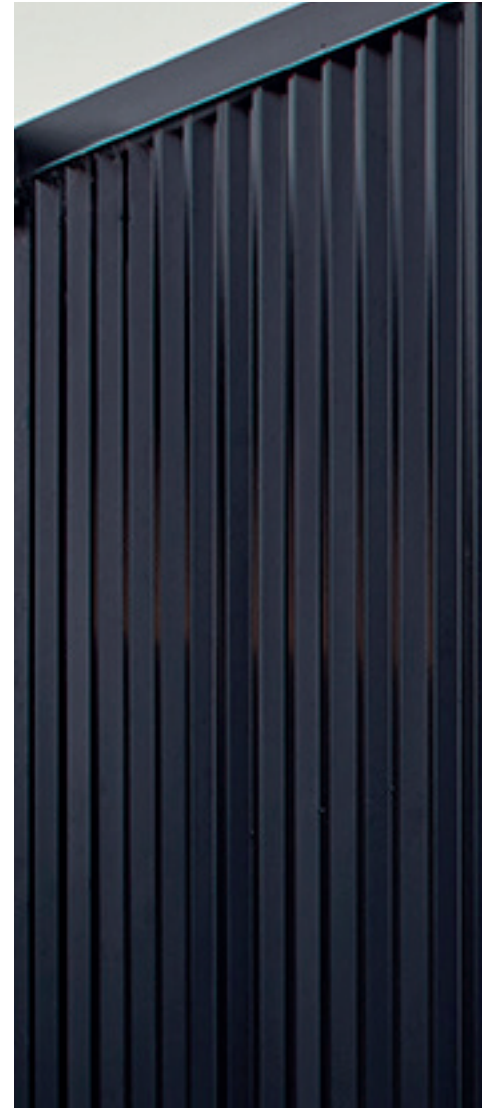
ZINCALUME®

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



GALVSTEEL®

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



COLORSTEEL®

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

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



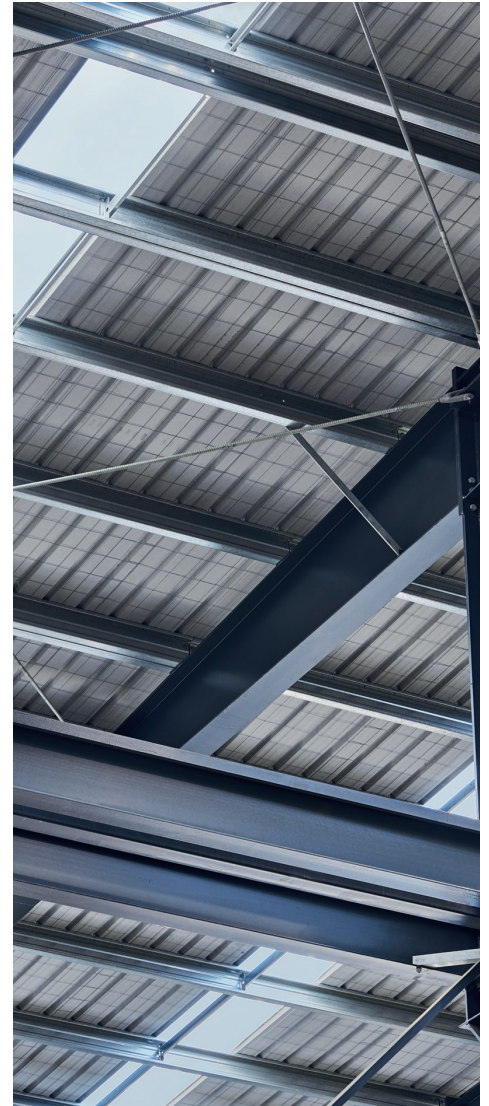
COLORSTEEL® ENDURA®

Has a Zinalume® substrate with an AZ150 coating class, (i.e. 150 g/m² of aluminium/ zinc alloy). It is suitable for most moderate to severe marine applications.



COLORSTEEL® MAXX®

Has a Zinalume® substrate with an AZ200 coating class, (i.e. 200 g/ m² of aluminium/ zinc alloy), to give enhanced performance in very severe marine environments.



COLORSTEEL® DRIDEX® and DRIDEX+®

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

PRODUCT SELECTION

Appearance

Colour

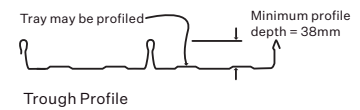
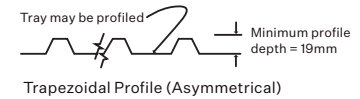
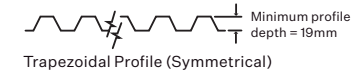
COLORSTEEL® comes in an extensive palette of colours. Refer to your supplier or the New Zealand Steel brochure Choosing COLORSTEEL® for details. New microwrinkle technology has led to the development of COLORSTEEL® Matte colours, in a limited colour range. COLORSTEEL® Matte requires special care during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

Glare

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

Profile

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



Performance

Strength

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

Environment

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

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

Compatibility

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

Copper

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

Lead

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

Stainless Steel

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


Galvanised Steel

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

Minimum Pitch

Different profiles have different minimum pitch limitations.

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

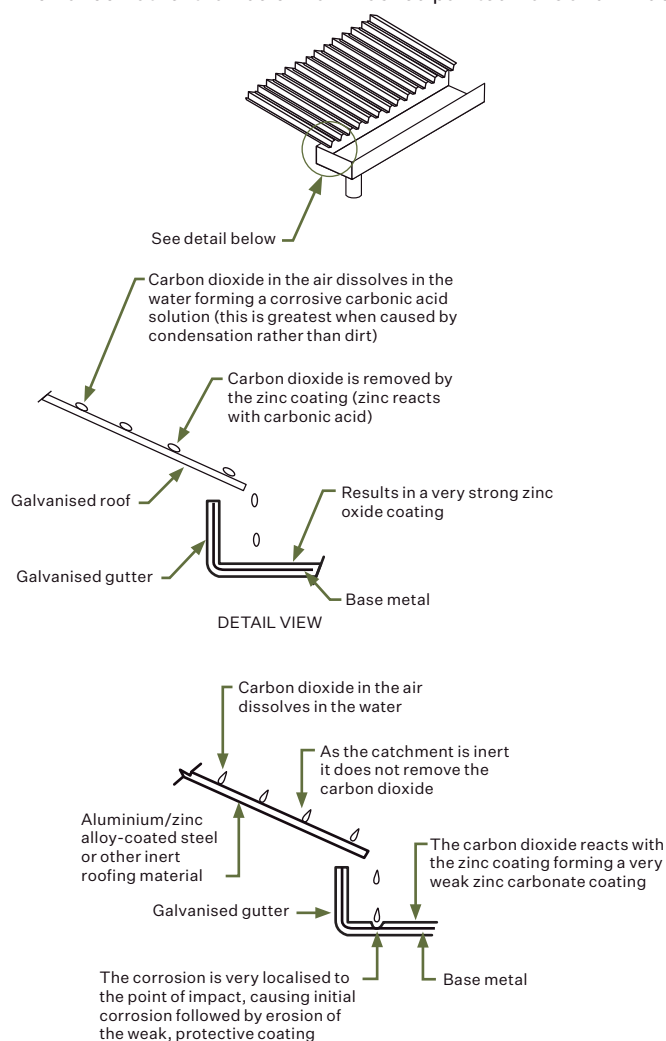
Zinc / Zinalume® / Aluminium	<p>MORE ACTIVE MATERIALS</p>  <p>MORE NOBLE METALS</p>	<p>This chart lists commonly used metals in a 'Galvanic series'. If any two of these metals are in damp contact or a run-off situation, the metal higher on the table will sacrifice itself to protect the metal lower on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

Inert Catchment

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

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

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



Flashings

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

TAKING DELIVERY

Checking

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

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

Unloading

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

Storage

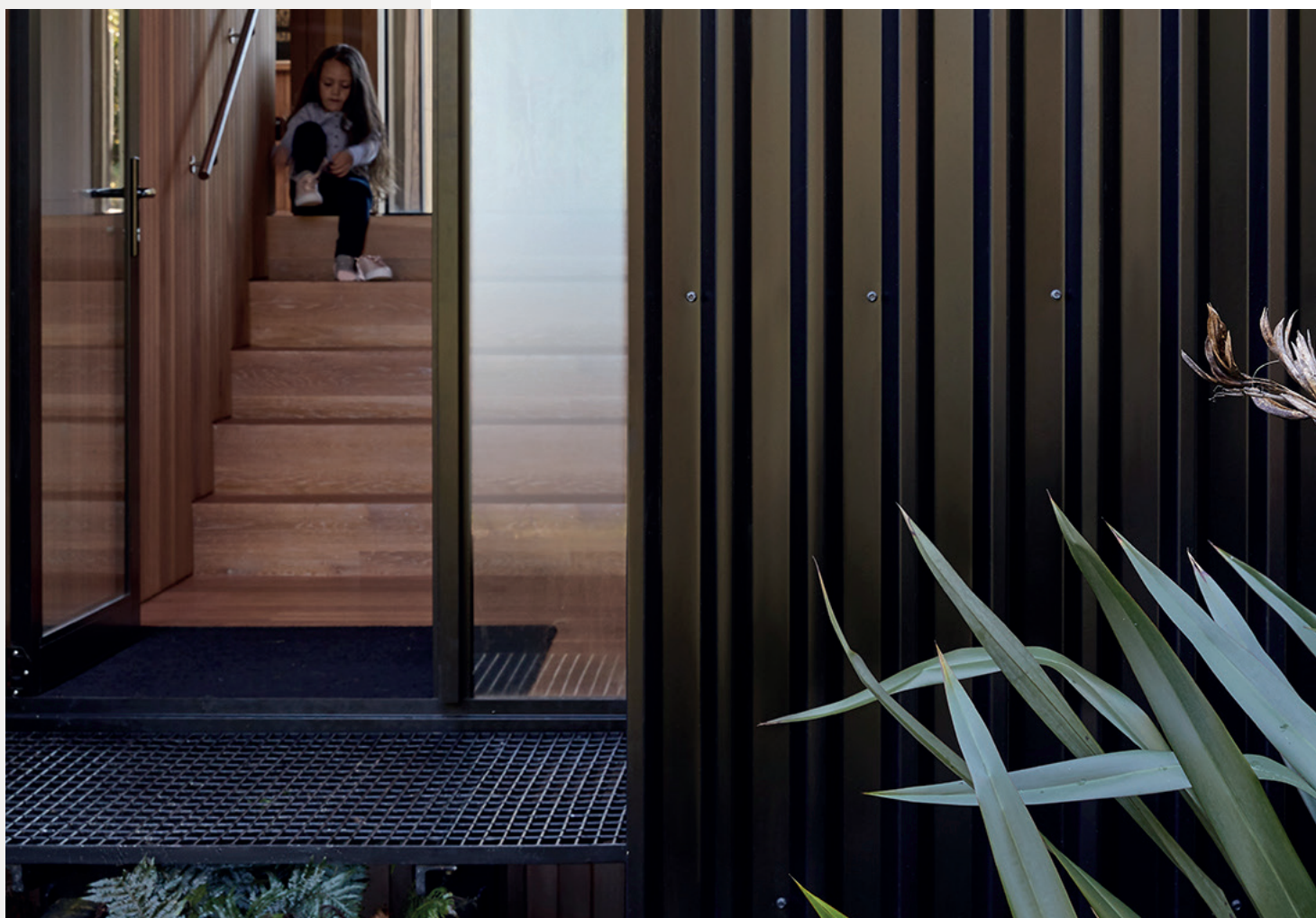
Close stacked sheets may deteriorate rapidly if water enters the pack. Sheets that are delivered wet or become wet in storage must be used immediately or dried. Drying can be done by filleting sheets or cross stacking them on a slope to allow water to drain and air to circulate between the sheets.

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

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

Wet Storage Damage

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



INSTALLATION



Safety

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

Handling

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

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

Footware

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

Strippable protective film

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

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

Storage

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

Usage

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

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

Marking

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

Cutting

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

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

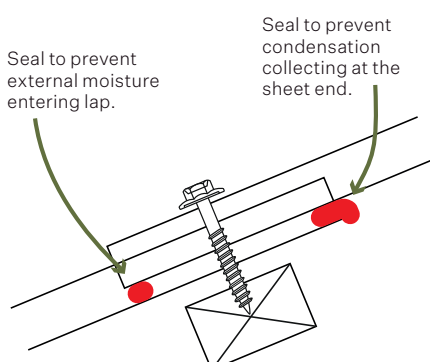
Sealing and joining

Sealing

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

End Laps

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



Fastening

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

Screw fasteners

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

Rivets

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

Spacing

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

Rivets on flashings should be placed at 50mm centres.

Setting

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

Driving

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

Allowance for expansion

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

Flashings

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

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

Sheet ends

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



PREVENTING PROBLEMS

Water ponding

Roofs

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

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

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

Gutters

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

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

Foot traffic

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

Colour match paint

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

Minor scratches

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

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

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

Lichen

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

Sunscreen

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

FIELD PAINTING

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

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

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

MAINTENANCE

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

WARRANTIES

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





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www.colorsteel.co.nz
www.nzsteel.co.nz

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

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

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MAINTENANCE

MAINTENANCE RECOMMENDATIONS

Made to stand the test of time

To maximise the life of your steel roofing and cladding, regular washing and maintenance is recommended. It is also required to maintain your warranty.

The following maintenance practices will help to ensure the long term performance, durability and aesthetic appeal of your COLORSTEEL® pre-painted steel or ZINCALUME® steel.

Helping your steel roofing and cladding last longer

All roofing and cladding products are subject to the cumulative effects of weather, dust and other deposits.

Regular washing of steel roofing and cladding products increases the durability by reducing attack from airborne salts and pollutants.

Normal rain washing will remove most accumulated atmospheric contaminants from the top side of roofs.

Wall cladding requires manual washing every 3 to 12 months (depending on the local environment and paint system), to prevent build up of dirt, debris or other material that is not otherwise removed by rain washing.

Areas that do not receive adequate rain washing (known as unwashed areas) require more extensive manual washing. These areas include soffits, wall cladding under eaves, undersides of gutters, fascias, sheltered areas of garage doors, unwashed roof areas, and other **high risk areas** like around flues, under television aerials and solar panels or in sites prone to mould, lichen, bird droppings or debris.

External objects such as walkways and platforms, air conditioning units, solar hot water and solar photovoltaic systems all have the potential to create areas on the roof that are sheltered from the rain (unwashed areas) and, as such, additional maintenance of the roof area is required as highlighted in the table.

For the underside of roofs, such high risk areas exist for any roof that is not fully enclosed by four walls such as open sheds, awnings etc.

Washing your steel roofing and cladding

Roofing and cladding products should be manually washed by either water and a sponge or a soft nylon-bristled brush or by water blasting at pressures of no more than 20MPa.

Note: The reverse surface of the COLORSTEEL® DRIDEX® range should be manually washed with water from a low pressure hose and a sponge.

When correctly installed and maintained, our products will meet or exceed New Zealand Building Code B2: Durability

The New Zealand Building Code B2 requirement of 15 years durability for non-structural roofs and exterior walls will be met, or exceeded if New Zealand Steel Limited's roofing and cladding products are maintained according to the recommendations specified in this bulletin.

About the code

The New Zealand Building Code durability requirement does not include aesthetic appearance. It requires a durability of 15 years minimum (with maintenance) for non-structural roofing, including valleys, and wall cladding products. This means no moisture penetration due to product failure.

New Zealand Steel Limited's roofing and cladding products are designed to exceed the requirements of New Zealand Building Code B2: Durability. Continued maintenance and over-painting will greatly extend the ultimate life of all roofing and cladding products.



For more information

The maintenance information contained in this document is only intended as a guide and is not a warranty or professional advice and should not be construed as such. For more detailed information, please refer to our **Environmental Categories, Warranty & Product Maintenance Recommendations guide**.

Please also refer to the manufacturers' recommendations for each proprietary building product. Where a 50 year durability is required, or where a product is to be used in aggressive internal or heavy industrial environments, please contact New Zealand Steel Limited for advice.

MAINTENANCE RECOMMENDATIONS¹

		ENVIRONMENT		
		VERY SEVERE	SEVERE	MODERATE
ENDURA®	ROOF	Not recommended	Rain washing ²	Rain washing ²
	WALL CLADDING	Not recommended	Not recommended	Rain washing plus manual washing every year
	UNWASHED AND HIGH RISK AREAS	Not recommended	Not recommended	Manual washing every 6 months
MAXX®	ROOF	Rain washing ²	Rain washing ²	Rain washing ²
	WALL CLADDING	Rain washing plus manual washing every 3 months	Rain washing plus manual washing every 6 months	Rain washing plus manual washing every year
	UNWASHED AND HIGH RISK AREAS	Manual washing every month	Manual washing every 3 months	Manual washing every 6 months
DRIDEX®	ROOF	Not recommended	Not recommended	Rain washing ²
	UNWASHED AND HIGH RISK AREAS	Not recommended	Not recommended	Manual washing every 6 months
DRIDEX+®	ROOF	Not recommended	Rain washing ²	Rain washing ²
	UNWASHED AND HIGH RISK AREAS	Not recommended	Manual washing every 3 months	Manual washing every 6 months
ZINCALUME®	ROOF	Not recommended	Not recommended	Rain washing ²
	WALL CLADDING	Not recommended	Not recommended	Rain washing plus manual washing every 6 months
	UNWASHED AND HIGH RISK AREAS	Not recommended	Not recommended	Manual washing every 3 months

¹ The recommendations provided in this table apply to the standard provisions of the New Zealand Building Code, Section B2: Durability.

² If lichen or fungal growth occurs, further maintenance will be required. For identification and recommendations for removal of lichen or fungus, refer to Maintenance: Removal of Lichen.

³ In industrial environments the type of pollution generated may alter the recommendations contained in this bulletin. Please contact New Zealand Steel Limited for advice.

For more information about COLORSTEEL® products
call **0800 697 833** or visit **colorsteel.co.nz**

NOTE: Buyers and users of New Zealand Steel Limited products and services must make their own assessment of the products for their own conditions. All queries regarding product specification, purpose or application should be directed to New Zealand Steel Limited, phone 0800 697 833. New Zealand Steel Limited reserves the right to modify products, techniques, equipment and statements to reflect improvements in the manufacture and application of its products. The information contained in this brochure is supplied without prejudice to New Zealand Steel Limited standard terms and conditions of sale. In the event of conflict between this information and the standard terms and conditions, the standard terms and conditions prevail. COLORSTEEL®, COLORSTEEL MAXX®, COLORSTEEL ENDURA®, COLORSTEEL DRIDEX® are registered trademarks of New Zealand Steel Limited. ZINCALUME® is a registered trademark of BlueScope Steel Limited.

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Special environments

In New Zealand there are areas where local conditions create an increased likelihood of corrosion. Special consideration should be given to material selection in these areas. If you think your project may experience one of the below environments, please contact New Zealand Steel for advice about the best COLORSTEEL® product to use.

GEOTHERMAL AREAS

Hydrogen sulphide associated with geothermal activity creates a corrosive environment. Variations in natural activity or draw-off from steam bores plus the effects of weather conditions make the high risk areas hard to define.

WEST COAST, SOUTH ISLAND

In this area, smoke from coal burning fires may cause high concentrations of sulphur dioxide in the air. The combination of this and the high rainfall for the region creates an aggressive situation which must be considered when choosing the appropriate COLORSTEEL® solution. The effects of a severe coastal environment aggravate the situation.

This area combines the most severe features of both industrial and coastal environments.

INTERNAL ENVIRONMENTS

Some commercial or agricultural applications may create internal environments in which the build-up of pollutants or fumes is a potential source of corrosion. Similarly a corrosive environment can develop within sheds for intensive animal farming.

INDUSTRIAL ENVIRONMENTS

Environments close to corrosive industrial emissions and subject to heavy fallout from them require extra consideration.

Considerations

IMPORTANT

- As product use is dictated by local conditions, seek advice from your roofing supplier or fixer for the best New Zealand Steel product to suit your specific environment.
- Gutters should be installed according to manufacturer's instructions.
- Unwashed and high risk areas require manual washing every 3 months.

NON-RESIDENTIAL WARRANTY

For applications like schools, warehouses and other commercial buildings please contact New Zealand Steel. The maximum warranty offered on commercial buildings is 15 years.

FURTHER ASSISTANCE

Further advice on the selection of the appropriate product to suit your particular location is available from New Zealand Steel or your local COLORSTEEL® supplier.

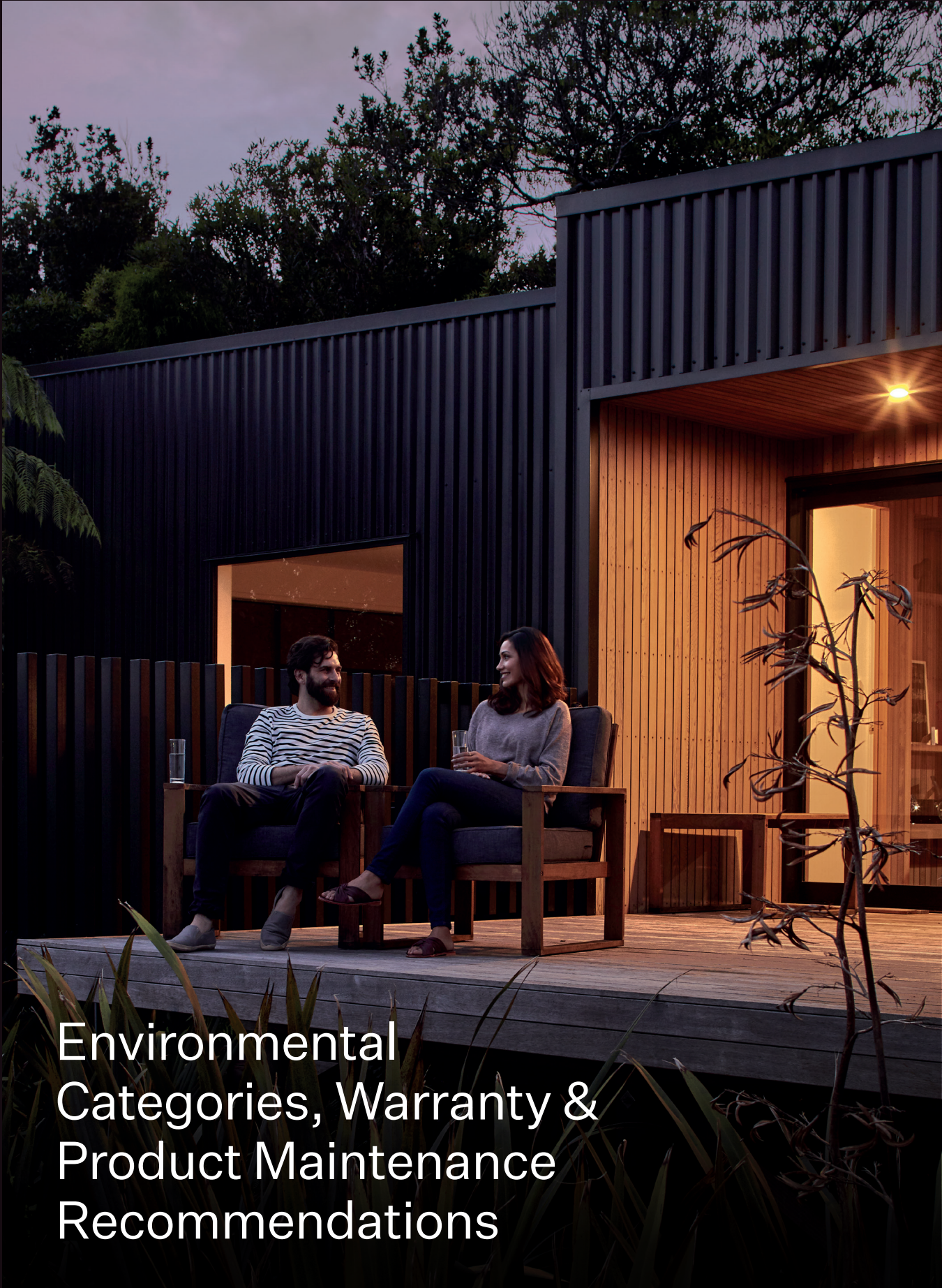


For more information about warranties and maintenance, please call **0800 697 833** or visit **colorsteel.co.nz**

NOTE: Buyers and users of New Zealand Steel Limited products and services must make their own assessment of the products for their own conditions. All queries regarding product specification, purpose or application should be directed to New Zealand Steel Limited, phone 0800 697 833. New Zealand Steel Limited reserves the right to modify products, techniques, equipment and statements to reflect improvements in the manufacture and application of its products. The information contained in this brochure is supplied without prejudice to New Zealand Steel Limited's standard terms and conditions of sale. In the event of conflict between this information and the standard terms and conditions, the standard terms and conditions prevail. This Environmental Categories, Warranty & Product Maintenance Recommendations guide supercedes all previous editions. COLORSTEEL®, COLORSTEEL® DRIDEX®, COLORSTEEL® MAXX® and COLORSTEEL® ENDURA® are registered trademarks of New Zealand Steel Limited. ZINCALUME® is a registered trademark of BlueScope Steel Limited.

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Environmental Categories, Warranty & Product Maintenance Recommendations

New Zealand has a wide range of environmental conditions.

From the harsh west coast beaches, to the relative shelter of the Waikato farming region, New Zealand Steel offers a range of coated steel products that are suitable for most locations.

This chart is intended as a guide only. Design, position and other factors can influence which product is recommended. Please contact New Zealand Steel for further advice on the best COLORSTEEL® product to use.

- Eligible for a residential warranty.
- Not eligible for a residential warranty.
- ¹ Against perforation as a result of corrosion.
- ² Covering the paint surface against flaking, peeling and excessive fade.

Starts 25m from the high water mark on the east coast and 50m from the high water mark on the west coast, characterised by:

- Heavy salt deposits.
 - The almost constant smell of salt spray in the air.
- Close to breaking surf such as is found on exposed coasts (typically starts 25-50 metres).

This environment may be extended inland by prevailing winds and local conditions

SEVERE

Characterised by:

- Light salt deposits.
 - A frequent smell of salt in the air.
 - Typically starts 100 – 500 metres from breaking surf such as is found on exposed coasts.
- In the immediate vicinity of large expanses of calm salt water such as harbour foreshores.

This environment may be extended inland by prevailing winds and local conditions

MODERATE

Characterised by:

- Little or no salt deposits.
 - The occasional smell of salt in the air.
 - Typically starts 500 – 1000 metres from breaking surf such as is found on exposed coasts, or in the immediate vicinity of calm salt water such as estuaries.

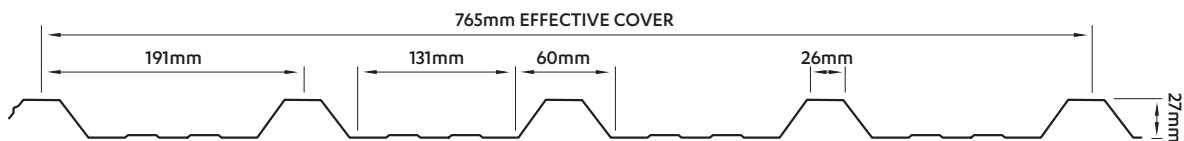
			WALL CLADDING	ROOFING	GUTTER DOWNPIPES	FASCIA	WALL CLADDING	ROOFING	GUTTER DOWNPIPES	FASCIA	WALL CLADDING	ROOFING	GUTTER DOWNPIPES	FASCIA
ENDURA®	RESIDENTIAL WARRANTIES	PERFORATION ¹						15 YEARS	10 YEARS	15 YEARS	15 YEARS	30 YEARS	10 YEARS	15 YEARS
		PAINT ²						15 YEARS	5 YEARS	5 YEARS	15 YEARS	18 YEARS	10 YEARS	10 YEARS
	MAINTENANCE						Not recommended in this environment	Rain washing	Manual washing every 3 months	Manual washing every 3 months	Rain washing plus manual washing every year	Rain washing	Manual washing every 6 months	Manual washing every 6 months
MAXX®	RESIDENTIAL WARRANTIES	PERFORATION ¹	15 YEARS	15 YEARS	10 YEARS	15 YEARS	15 YEARS	20 YEARS	10 YEARS	15 YEARS	15 YEARS	30 YEARS	10 YEARS	15 YEARS
		PAINT ²	15 YEARS	15 YEARS	10 YEARS	10 YEARS	15 YEARS	15 YEARS	10 YEARS	10 YEARS	15 YEARS	18 YEARS	10 YEARS	10 YEARS
	MAINTENANCE						Rain washing plus manual washing every 3 months	Rain washing	Manual washing every month	Manual washing every month	Rain washing plus manual washing every year	Rain washing	Manual washing every 6 months	Manual washing every 6 months
DRIDEX®	RESIDENTIAL WARRANTIES	PERFORATION ¹									15 YEARS	30 YEARS		
		PAINT ²									15 YEARS	18 YEARS		
	MAINTENANCE						Not recommended in this environment	Not recommended in this environment	Not recommended in this environment	Not recommended in this environment	Rain washing plus manual washing every 6 months	Rain washing	Not recommended in this environment	Not recommended in this environment
DRIDEX+®	RESIDENTIAL WARRANTIES	PERFORATION ¹					15 YEARS	20 YEARS			15 YEARS	30 YEARS		
		PAINT ²					15 YEARS	15 YEARS			15 YEARS	18 YEARS		
	MAINTENANCE						Not recommended in this environment	Rain washing plus manual washing every 6 months	Rain washing	Not recommended in this environment	Rain washing plus manual washing every 6 months	Rain washing	Not recommended in this environment	Not recommended in this environment
ZINCALUME®	RESIDENTIAL WARRANTIES	PERFORATION ¹									15 YEARS	15 YEARS	10 YEARS	10 YEARS
	MAINTENANCE						Not recommended in this environment	Not recommended in this environment	Not recommended in this environment	Not recommended in this environment	Rain washing plus manual washing every 6 months	Rain washing	Manual washing every 3 months	Manual washing every 3 months

PRODUCT TECHNICAL STATEMENT

PLUMBDEK®

✦ Profiled Metal Roofing and Cladding

NOMINAL DIMENSIONS



INTRODUCTION

Plumbdek® is a low rib, five-ribbed trapezoidal product offering great looks, economy and exceptional performance.

APPLICATIONS

- Residential Roofing and Cladding
- Industrial/Commercial Roofing and Cladding
- Curving

FEATURES

Plumbdek is a very material-effective product with good performance under load.

OPTIONS

Plumbdek can be crimp curved to radii of 400mm and greater. Clear sheeting is available in profiled G.R.P. (fibreglass) to match.

MATERIALS

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

FASTENERS

Typically: Steelfix 12g x 55mm, Timberfix 12g x 65mm, Class 4 minimum, of material compatible with that being fastened and durability no less than the sheet material. Category 5 or non-ferrous fasteners are recommended for severe or very severe marine environments.

DURABILITY

All material selections must be compatible with prevailing environmental conditions and adjacent materials, see New Zealand Steel's *Environmental Categories, Warranty & Product Maintenance Recommendations*. Areas not exposed to rain washing will require programmed maintenance.

WARRANTY PLUS

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

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

PERFORMANCE DATA

MASS (KG/M²)

.40mm B.M.T.	4.07	.55mm B.M.T.	5.52
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MAXIMUM SPAN

Maximum spans for normal and heavy traffic in millimetres based on point load limits, distributed loads in kPa at maximum spans, using 4 fasteners per sheet per support. Loads for alternative fastener frequencies available on request.

	Material Thickness	Internal Span			End Span		
		Span	Strength Load	Serviceability Load	Span	Strength Load	Serviceability Load
Controlled Traffic*	.40mm	1600	4.37	1.82	1300	5.58	2.37
	.55mm	2400	4.41	1.75	1900	4.77	1.91
Heavy Traffic**	.40mm	1100	7.16	3.08	800	8.15	3.94
	.55mm	1800	6.08	3.31	1400	6.75	3.28

* Supports 1.1kN load to PAN at mid-span.

** Supports 1.1kN load to RIB at mid-span.

To minimise the possibility of roof traffic damage, Steel & Tube recommends Heavy Traffic maximum spans be used.

FASTENERS PER SHEET PER PURLIN

Material Thickness	Purlin Spacing	Wind Zone			
		Low/Medium	High	Very High	EH
.40mm	900	2	2	3	4
	1200	2	3	4	4
.55mm	900	2	2	2	2
	1200	2	2	2	2

Fastener requirements for wind zones according to NZS 3604:2011 (calculated on periphery area pressures), using standard fasteners without load spreading washers. (Typically fasten through every rib to top and bottom purlins.)

For SED conditions and applications designed to AS/NZS 1170 contact Steel & Tube: 0800 333 247.

MINIMUM PITCH

In accordance with Acceptable Solution E2, the minimum pitch for **Plumbdek** for roofing dwellings is 3°. Roof runs in excess of 40 metres should be checked for water runoff capacity.

FOOT TRAFFIC

Foot traffic up the roof must take place in the pan of the profile, or over purlin lines. Traffic across the roof must take place along purlin lines.

SPECIFICATIONS

Recommended specifications are available in the branded sections of Masterspec, or on our website: www.steelandtube.co.nz.

DESIGN DETAILS

Design details covering many applications are available on our website in CAD and PDF under each product section. Visit www.steelandtube.co.nz.

IMPORTANT PUBLICATIONS

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

- Steel & Tube: Roofing Solutions Product Guide
- BRANZ: Good Profiled Metal Roofing Practice
- MRM: New Zealand Metal Roofing and Wall Cladding Code of Practice
- E2/AS1

INSTALLERS

A list of installers for your area is available from your local Steel & Tube branch or visit www.steelandtube.co.nz.



BIM-spec™ is a one stop portal for all Steel & Tube's specification and technical content. It provides access to a large library of 2D and 3D CAD content and building information models (BIM) across a wide range of Steel & Tube product categories. The BIM-spec portal can be accessed through our website www.steelandtube.co.nz

Trademark Note:

Masterspec is a registered trademark of Construction Information Limited.

Plumbdek is a registered trademark of Steel & Tube Holdings Limited.

Steel & Tube Plumbdek

Product Technical Statement: 110063

miproducts
THE NATIONAL PRODUCT DATABASE

Plumbdek is a low rib profiled metal roofing and cladding with 5 trapezoidal ribs of 27mm height.

[View miproducts listing](#)



Level of assurance needed to demonstrate NZ Building Code Compliance

Supporting documentation should include technical information by manufacturer and either an independent assessment or reference to an industry-based scheme



Steel & Tube confirms that this minimum level of assurance has been met or exceeded by the following:

CodeMark
[CM70050](#)

Technical Statement

Product Description

Plumbdek is a low rib profiled metal roofing and cladding with 5 trapezoidal ribs of 27mm height.

Plumbdek is available in clear sheeting (GRP) in matching profile.

Scope of use

Plumbdek is used for residential roofing and cladding, industrial/commercial roofing and cladding and curving. Plumbdek can be crimp curved to a radii of 400mm and greater.

Available in metallic coated and pre-painted steel in .40mm and .55mm BMT (base metal thickness), aluminium plain and pre-painted in .70mm and .90mm.

Plumbdek is suitable for a wide range of end uses including roof and wall cladding, ceilings and linings. For applications requiring compliance with NZBC Clause E2, the minimum pitch is 3°.

Plumbdek is available in clear sheeting (GRP) in matching profile.

New Zealand Building Code (NZBC)

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code:

- **Clause B1 Structure:** Performance B1.3.3(a), B1.3.3(b), B1.3.3(g), B1.3.3(h)
- **Clause B2 Durability:** Performance B2.3.1(b), B2.3.1(c)
- **Clause C3 Fire affecting areas beyond the fire source:** Performance C3.9
- **Clause E2 External moisture:** Performance E2.3.1, E2.3.2
- **Clause G12 Water supplies:** Performance G12.3.2

Notes

C Fire: Colorsteel® Maxx® is rated as a Group 1-S material and has an average specific extinction area of 107.0m²/kg, a peak heat release rate of 15.3 kW/m² and total heat released of 0.44 MJ/m² when tested in accordance with ISO 5660:2002 Part 1 and Part 2.

Colorsteel® Endura® is rated as a Group 1-S material and has an average specific extinction area of 132.2m²/kg, a peak heat release rate of 16.0 kW/m² and total heat released of 0.54 MJ/m² when tested in accordance with ISO 5660:2002 Part 1 and Part 2.

G12 Drinking Water: Colorsteel® Maxx® and Colorsteel® Endura® samples tested in accordance with AS/NZS 4020:2005 passed the requirements for products in contact with drinking water.

Evidence

The product meets the requirements set out in the following documents, or relevant parts of cited standards within the documents:

[COLORSTEEL Fire Testing Bulletin](#)

[COLORSTEEL Endura PTS](#)

[COLORSTEEL Maxx PTS](#)

[COLORSTEEL Dridex PTS](#)

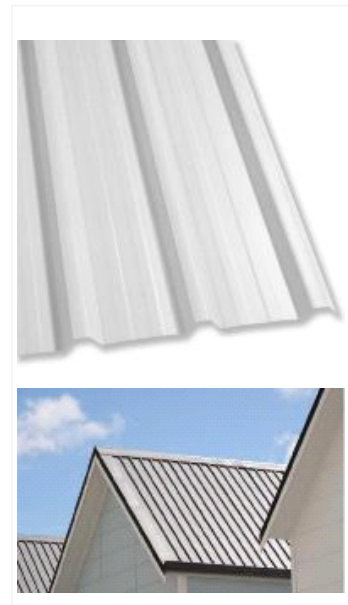
[COLORSTEEL Dridex+ PTS](#)

Supporting Evidence

The product has and can make available the following additional evidence to support the above statements:



CodeMark
[CM70050](#)



masterspec partner

Company Contact Details



Company:	Steel & Tube
Physical Address:	68 Stonedon Drive East Tamaki AUCKLAND
Postal Address:	PO Box 204117 Highbrook AUCKLAND
Telephone:	64 09 2806685
Email:	info@steelandtube.co.nz
Website:	www.steelandtube.co.nz

Steel & Tube Plumbdek

Product Technical Statement: 110063



Product Criteria

Design requirements

To comply with the performance clause of NZBC clause E2 roof cladding to be installed in accordance with (1) acceptable solution E2/AS1 (2) NZMRM Code of Practice and (4) S&T specifications. (3) S&T Details and available on 'www.steelandtube.co.nz', (4) S&T specifications.

Roof cladding to be installed in accordance with acceptable solution E2:AS1 clause 8.4.6 Structure and table 11&12 for the wind zone at the specific site location. For additional information refer to NZMRM Code of Practice section 3.16 Maximum span and fastener requirements.

Installation requirements

[Link to NZ Steel Installers Guide](#)

Maintenance requirements

[Link to NZ Steel Maintenance Guide](#)

Warrantees

[Link to NZ Steel Environmental Categories](#)

Company Product Information

Environmental

[Link to NZ Steel Environmental Product Declaration Guide](#)

Quality Assurance



ISO 9001 (Quality Management)

Relationships



New Zealand Made



Environmental Choice New Zealand



Date last validated: **27 October 2020**



Date last updated: **27 October 2020**

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4710P Pink Batts & Pink Batts Silencer Insulation



Tasman Insulation New Zealand

+64 09 5792139
customer@pinkbatts.co.nz
www.pinkbatts.co.nz

SUPPORTING DOCUMENTS

Pink® Batts® Classic and Ultra® Ceiling Insulation 102181

Ref 10234. Uploaded 26 Jun 2020

Purpose: Performance, Installation, Environmental

Pink® Batts® Insulation Wall 101155

Ref 10235. Uploaded 26 Jun 2020

Purpose: Performance, Installation, Maintenance, Environmental

PinkBatts Lifetime Warranty

Ref 13233. Uploaded 24 Sep 2020

Purpose: Warranty

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Pink® Batts® Classic and Ultra® Ceiling Insulation

Product Technical Statement: 102181



Glasswool thermal insulation for ceilings and roofs

[View miproducts listing](#)



Level of assurance needed to demonstrate NZ Building Code Compliance

Supporting documentation should include self-assessment and technical information by manufacturer



Pink® Batts® confirms that this minimum level of assurance has been met or exceeded by the following:

BRANZ Appraisal

[238](#)

Technical Statement

Product Description

Pink® Batts® insulation is a lightweight, flexible glass wool insulation product designed to:

- Thermally insulate ceilings in new homes, can be fitted into existing homes with no insulation or laid over existing insulation.
- Fit easily in standard ceiling constructions, or be easily cut to fit in non standard constructions
- Meet the requirements of the New Zealand Building Code (NZBC) for different designs and environments,

Features:

- Non-combustible
- Very high heat-resistant levels (R-values up to R5.0), to help keep homes above the recommended 18°C.

Scope of use

Pink® Batts® insulation is suitable for use as thermal insulation in ceilings where:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2006: Energy Efficiency-Installing Insulation in Residential Buildings

Pink® Batts® should NOT be crushed or folded.

New Zealand Building Code (NZBC)

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code:

- Clause B2 Durability:** Performance B2.3.1(a), B2.3.1(b)
- Clause E3 Internal moisture:** Performance E3.3.1
- Clause F2 Hazardous building materials:** Performance F2.3.1
- Clause H1 Energy efficiency :** Performance H1.3.1, H1.3.2E

Notes

E3.3.1 and H1.3.1(a) Pink® Batts® insulation will contribute to meeting these requirements

Evidence

The product meets the requirements set out in the following documents, or relevant parts of cited standards within the documents:

NZS/AS 1530.1:1994: Group Number 1S

NZS/AS 1530.3:1993:

- Ignitability (Range 0-20) = 0
- Spread of Flame Index (Range 0-10) = 0
- Heat Evolved Index (Range 0-10) = 0
- Smoke Developed Index (Range 0-10) = 0-1

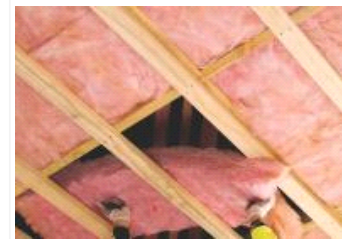
Supporting Evidence

The product has and can make available the following additional evidence to support the above statements:



BRANZ Appraisal

[238](#)



masterspec partner

Company Contact Details



Brand: Pink® Batts®

Company: Tasman Insulation New Zealand

Physical Address: 9-15 Holloway Place
Penrose
AUCKLAND

Postal Address: PO Box 12069
Penrose
AUCKLAND

Telephone: 64 09 5792139

Fax: 64 09 5713482

Email: customer@pinkbatts.co.nz

Website: <http://www.pinkbatts.co.nz>

Product Criteria

Installation requirements

Pink® Batts® Classic and Ultra® Ceiling Insulation

Product Technical Statement: 102181



[Installation Instructions](#)

Company Product Information

Environmental

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% recycled glass, making sustainable use of waste glass
- Energy used during the manufacture of Pink® Batts® products is offset by the energy saved by a home fully insulated with Pink® Batts® products within 3-15 months
- Manufactured in New Zealand and Australia, reducing shipping distances
- Recyclable packaging

Potential Green Star NZ Credits

Green Star NZ is a comprehensive environmental rating system for buildings. Pink® Batts® insulation may contribute to points under Green Star. Further information is available at www.nzgbc.org.nz

Quality Assurance



ISO 9001 (Quality Management)

Relationships



Environmental Choice New Zealand



New Zealand Made



Date last validated: **02 March 2017**



Date last updated: **02 March 2017**

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Pink® Batts® Insulation Wall

Product Technical Statement: 101155

miproducts
THE NATIONAL PRODUCT DATABASE

Light weight insulation - flexible glass wool for walls.

[View miproducts listing](#)



Level of assurance needed to demonstrate NZ Building Code Compliance

Supporting documentation should include self-assessment and technical information by manufacturer



Pink® Batts® Insulation confirms that this minimum level of assurance has been met or exceeded by the following:

BRANZ Appraisal

[238](#)

Technical Statement

Product Description

Pink® Batts® is a competitively priced lightweight, flexible glass wool insulation product designed to:

- Thermally insulate timber and steel framed walls
- Fit easily in standard wall constructions, or be easily cut to fit in non standard constructions

Pink® Batts® is non combustible - will not easily burn in the event of a fire - and is made from over 80% recycled glass.

Several improvements have been achieved:

- Ultra-low formaldehyde binder; helping to gain international certifications for Indoor Air Quality: GreenGuard Indoor Air Quality Certified
- Additives to reduce dust; making it easier to handle.
- No slump; products became more rigid due to the change in the binder.

Pink® Batts® insulation product range has been extended to fit with specific requirements of the New Zealand Building Code

- Steel framed walls - Segments are cut to 610mm to friction fit inside framing at 600mm centres
- Narrow walls - Segments are cut to 380mm to fit between studs at 400mm centres. Minimize wastage during installation
- 140mm walls - Extra thickness provides high thermal performance. Max R-value is R4.0

Pink® Batts® BRANZ appraised wall products carry a Lifetime Warranty, valid for the life of the building it is installed in - Tasman Insulation has been manufacturing Pink® Batts® products for New Zealand conditions for over 50 years.

Acoustic Properties

Pink® Batts® will assist with noise control; however penetrations in walls will transmit sound readily. Superior noise control can be achieved by using Pink® Batts® insulation products in conjunction with good acoustic design.

View our [Product Guide](#) for available R-values and sizes

Scope of use

Pink® Batts® insulation is suitable for use as thermal insulation in walls and ceilings where:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2006: Energy Efficiency-Installing Insulation in Residential Buildings

Pink® Batts® wall insulation should NOT be crushed or folded.

New Zealand Building Code (NZBC)

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code:

- **Clause B2 Durability:** Performance B2.3.1(a)
- **Clause E3 Internal moisture:** Performance E3.3.1
- **Clause F2 Hazardous building materials:** Performance F2.3.1
- **Clause H1 Energy efficiency :** Performance H1.3.1, H1.3.2E

Evidence

The product meets the requirements set out in the following documents, or relevant parts of cited standards within the documents:

Properties	Result	Test/Method/Standard	Test Result
Combustibility	Non-Combustible ✓	NZ/AS 1530.1:1994	Group Number



masterspec partner

Company Contact Details



Brand:	Pink® Batts® Insulation
Company:	Tasman Insulation New Zealand
Physical Address:	9-15 Holloway Place Penrose AUCKLAND
Postal Address:	PO Box 12069 Penrose AUCKLAND
Telephone:	64 09 5792139
Fax:	64 09 5713482
Email:	customer@pinkbatts.co.nz
Website:	http://www.pinkbatts.co.nz

Pink® Batts® Insulation Wall

Product Technical Statement: 101155



			1S
Flammability	Non-Flammable	√	NZ/AS 1530.3:1993 Ignitability (Range 0-20) = 0 Spread of Flame Index (Range 0-10) = 0 Heat Evolved Index (Range 0-10) = 0 Smoke Developed Index (Range 0-10) = 0-1
R-value	Various *	√	AS/NZS 4589.1:2002
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1: 2002 – Glass wool exempt
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1: 2002 – Glass wool exempt
Vermin Resistance	No Food Source	√	AS/NZS 4859.1: 2002 – Glass wool exempt

Supporting Evidence

The product has and can make available the following additional evidence to support the above statements:



BRANZ Appraisal
[238](#)

Product Criteria

Design requirements

Pink® Batts® Insulation is intended to be friction-fitted between wall, ceiling or roof framing

Installation requirements

Correct installation with no compression, gaps or folds is critical to ensure wall insulation performance is not compromised.

Please refer to the [Pink® Batts® wall installation instruction](#) sheet

We can recommend PinkFit® professional installers throughout New Zealand who guarantee that their completed installation will meet the requirements of NZS 4246:2006

Visit www.pinkbatts.co.nz or call 0800 PINK BATTS (746 522) to locate an installer in your region.

Maintenance requirements

Pink® Batts® insulation must be protected from damage and weather. Store under cover in clean dry conditions. The installed product must remain dry at all times. If the product has become wet or damp, the source of the dampness (e.g leak in plumbing) must be repaired immediately and insulation replaced with the new product of an equivalent R-value.

Company Product Information

Environmental

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% recycled glass, making sustainable use of waste
- Manufactured in Auckland, minimising shipping distances compared to imported products

Potential Green Star NZ Credits

Green Star NZ is a comprehensive environmental rating system for buildings. Pink® Batts® insulation may contribute to points under Green Star. Further information is available at www.nzgbc.org.nz

Environmental Choice

Higher R-value Pink® Batts® Wall insulation products have Environmental Choice New Zealand Accreditation (refer to product specification)

Independently assessed for:

- Waste Minimisation
- Energy Management
- Manufacturing Process
- Product Characteristics

Indoor Air Quality

Pink® Batts® insulation is certified by North American GREENGUARD Indoor Air Quality Certified®. Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and Formaldehyde), to help create healthier indoor environments

Quality Assurance

Pink® Batts® Insulation Wall

Product Technical Statement: 101155



ISO 9001 (Quality Management)

Relationships



New Zealand Made



Environmental Choice New Zealand



Date last validated: **02 March 2017**



Date last updated: **02 March 2017**

Disclaimer: The Product Technical Statement (PTS) template is copyright to Construction Information Limited. However the content of this PTS is the responsibility of the product manufacturer/supplier. Refer to the miproducts Terms and Conditions



Lifetime product warranty

Pink® Batts® insulation

We believe our Pink® Batts® insulation products will provide you with quality performance for the life of your home.

Tasman Insulation has been manufacturing Pink® Batts® products for New Zealanders for more than 50 years, and every day we work hard to ensure the quality of these products.

LIFETIME WARRANTY

We warrant that Pink® Batts® insulation products:

- are provided free from defects due to defective workmanship or materials, and
- will meet the specifications in Pink® Batts® insulation BRANZ Appraisals* for the lifetime of the building in which the Pink® Batts® product is installed.

Our warranty is subject to the terms and conditions set out overleaf, and applies only if the Pink® Batts® product is installed, used, and maintained in accordance with NZS4246 and our technical instructions in a residential home or building which is constructed to meet the New Zealand Building Code.

Nothing in this warranty document excludes or modifies any legal rights you may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified by law.

PINK® BATTS® INSULATION PRODUCTS

This warranty applies to the BRANZ appraised ceiling, wall and blanket products in Tasman's Pink® Batts® insulation range specified here: pinkbatts.co.nz. We may update or change this list from time to time.

USING, INSTALLING AND MAINTAINING PINK® BATTS® INSULATION

These resources set out the specifications and standards for use, installation, and maintenance of Pink® Batts® insulation.

Pink® Batts® installation instructions:

Our technical instructions for installing Pink® Batts® products can be found here: pinkbatts.co.nz

New Zealand Standard 4246:2016

Sets out the appropriate methods of installing insulation products in common residential construction types in New Zealand.

*BRANZ Appraisal No. 238 [2018] and No. 767 [2018]

Contains the technical specifications for Pink® Batts® insulation and the installation and conditions required in your home to ensure your Pink® Batts® product performs in accordance with the specifications for thermal insulation materials AS/NZS 4859.1:2018. These appraisals can be found at pinkbatts.co.nz

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Homeowner's record

IMPORTANT: This information, including proof of purchase, is required for any warranty claim. We recommend you attach your proof of purchase to this homeowner's record and keep it in a safe place. If your Pink® Batts® product was installed by a builder, contractor, or installer, you must ensure that he or she has provided you with proof of purchase and details of the Pink® Batts® product installed.

Name:

Address of building:

Pink® Batts® product:

Date product installed in building:

Installer:

Terms and conditions of warranty

This warranty is given by Tasman Insulation New Zealand Limited ("Tasman") to the original end purchaser ("you" or "claimant") of specified Pink® Batts® insulation products (each a "product"), and is strictly subject to the following terms and conditions.

Procedure for making a warranty claim

1. Tasman will not be liable for any breach of warranty unless, within 30 days after a defect becomes reasonably apparent (or should reasonably have become apparent), you provide Tasman with:
 - a. written notice of your warranty claim;
 - b. a reasonable written description of how the product does not comply with this warranty; and
 - c. the information set out in the "Homeowner's Record" on page 1, or other evidence reasonably satisfactory to Tasman of the date(s) of purchase and installation of the affected product.
2. If the defect in the product was reasonably apparent, or should reasonably have become apparent, prior to installation of the product, then any warranty claim must be made prior to installation, and Tasman will have no liability to a claimant under this warranty or otherwise in statute, contract, tort, or otherwise at law or in equity in respect of the product.
3. You must:
 - a. bear all expenses incurred in making a claim under this warranty, including but not limited to costs of returning any defective product to us, and collecting any replacement product from Tasman or its agent; and
 - b. allow Tasman and its agents access, at no cost and at any reasonable time, to the building to inspect the affected product.

Installation requirements

4. The product must be installed, and used and maintained during the lifetime of the building strictly in accordance with:
 - a. the statements and conditions of BRANZ Appraisal No. 238 [2018] and No. 767 [2018];
 - b. Tasman's technical instructions for use, installation and maintenance of the product; and
 - c. NZ Standard 4246:2016: Energy Efficiency – Installing Insulation in Residential Buildings;

each as amended or replaced from time to time.

Meaning of 'building' and 'lifetime'

5. In these terms and conditions:
 - a. "building" means any 'household unit' (as that term is defined in the Building Act 2004) in which a claimant has installed or is using the product; and
 - b. "lifetime" means the duration of the useful or serviceable life of that building.

Transfer of warranty

6. This warranty may be transferred to each subsequent owner of the building in which the product is installed or used, subject to each owner being notified in writing of, and at all times being subject to, these terms and conditions. You agree you will no longer have any rights under this warranty following such transfer.

Benefits under this warranty

7. Your sole and exclusive remedy for any breach of this warranty is that Tasman will (at its sole option):
 - a. replace or repair the affected product;

- b. supply equivalent products or goods;
 - c. pay the cost of replacing the affected product; or
 - d. refund the cost of the affected product.
8. Other than as provided in these terms and conditions, Tasman will have no liability to a claimant (whether in statute, contract, tort, or otherwise at law or in equity) in respect of any defects in the product or for any loss, damage, costs or expenses caused by the product or defects in the product. **Nothing in this paragraph 8 or otherwise in these terms and conditions excludes or modifies any legal rights you may have under the Consumer Guarantees Act, the Building Act, or any other legislation which cannot be excluded or modified at law.**

Limitations

9. Tasman will in no circumstances be liable for breach of warranty or otherwise in respect of defects in the product as a result of use, installation or maintenance of the product (whether by the claimant or any other person) other than in accordance with the requirements set out in paragraph 4 of this warranty.
10. Without limiting paragraph 9, Tasman Insulation will in no circumstances be liable for:
 - a. any damage or loss caused by a claimant or anyone other than Tasman, or by any other factor affecting the product or a building beyond Tasman's reasonable control, including but not limited to moisture, water, fire, lightning, salt air, chemicals, industrial fallout, fumes, liquids, solids, animals or precipitation;
 - b. the removal of product installed or the installation of replacement or equivalent products, or the cost of removal or installation of replacement or equivalent products;
 - c. any direct, consequential, or indirect loss of any kind; or
 - d. any loss of profits, use, sales, turnover, reputation (or damage to it), production, anticipated savings, goodwill, business opportunity, customers, software or data, or loss of use of any software, data, premises or facilities, or loss under, or in relation to, any other contract; in each case whether of a direct, indirect or consequential nature.
11. All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.
12. In accepting this warranty you irrevocably waive any other claims, actions, rights or remedies you may have against Tasman in respect of any defects in the product.
13. Subject to paragraph 8, this warranty only applies to an original end purchaser of the product, and does not apply to:
 - a. any person who purchases the product for use or installation in any works, erection, structure or construction other than a 'household unit' (as defined in the Building Act 2004); or
 - b. any person who has purchased the product in trade or for resupply to any other purchaser (except any builder, contractor or installer who purchases the product for use or installation in a building);
 - c. any installation or use of the product resulting in the product being consumed in the course of a process of production or manufacture.

For warranty claims please contact 0800 746 522

5113G GIB Plasterboard Linings



Winstone Wallboards Ltd

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info@gib.co.nz

www.gib.co.nz

SUPPORTING DOCUMENTS

BRANZ Appraisal 427 (2021) GIB® Wet Area Systems

Ref 20082. Uploaded 10 Feb 2021

Purpose: Performance

BRANZ Appraisal 928 (2016) GIB Ezybrace® Systems 2016

Ref 10727. Uploaded 17 Aug 2020

Purpose: Performance

Declare Certification 10mm GIB Aqualine®

Ref 15236. Uploaded 22 Oct 2020

Purpose: Environmental

Declare Certification 13mm GIB Aqualine®

Ref 15237. Uploaded 22 Oct 2020

Purpose: Environmental

Declare Certification GIB Braceline® GIB Noiseline®

Ref 15238. Uploaded 22 Oct 2020

Purpose: Environmental

Declare Certification GIB® Standard

Ref 15241. Uploaded 22 Oct 2020

Purpose: Environmental

GIB EzyBrace® Systems

Ref 11539. Uploaded 1 Sep 2020

Purpose: Installation, Maintenance

GIB Standard Plasterboard 101955

Ref 10140. Uploaded 26 Jun 2020

Purpose: Installation

GIB Wet Area Systems

Ref 22822. Uploaded 1 Apr 2021

Purpose: Installation, Maintenance

GIB® Product and System Warranty

Ref 11092. Uploaded 27 Aug 2020

Purpose: Warranty

GIB® Rondo® Metal Batten Systems

Ref 11551. Uploaded 1 Sep 2020

Purpose: Installation, Maintenance

GIB® Site Guide

Ref 11079. Uploaded 27 Aug 2020

Purpose: Installation, Maintenance

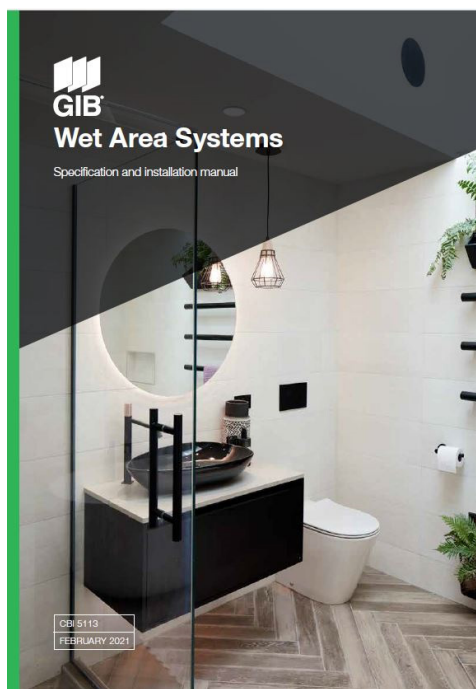


BRANZ Appraised
Appraisal No. 427 [2021]

GIB® WET AREA SYSTEMS

Appraisal No. 427 [2021]

This Appraisal replaces BRANZ
Appraisal No. 427 [2007]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



Winstone Wallboards Ltd

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BRANZ

BRANZ

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Product

- 1.1 GIB® Wet Area Systems are for the interior lining of timber and steel-framed walls and ceilings in wet areas such as bathrooms, laundries, kitchens and toilets where a water-resistant lining material is desirable.

Scope

- 2.1 GIB® Wet Area Systems have been appraised for use as a wet area wall and ceiling lining in buildings within the following scope:
- on timber-framed walls and ceilings within the scope limitations on NZS 3604; or,
 - on steel-framed walls and ceilings within the scope limitations of NASH Standard Part 2, or,
 - on timber and light gauge steel-framed walls and ceilings subject to specific design.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, GIB® Wet Area Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB® Wet Area Systems meet the requirements for loads arising from self-weight and impact [i.e. B1.3.3 (a) and (j)]. See Paragraphs 8.1-8.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.1 (c) 5 years. GIB® Wet Area Systems meet these requirements. See Paragraphs 9.1-9.5.

Clause E3 INTERNAL MOISTURE: Performance E3.3.4 and E3.3.5. GIB® Wet Area Systems meet these requirements. See Paragraphs 12.1-12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB® Wet Area Systems meet this requirement.

Technical Specification

4.1 The GIB® plasterboards and accessories used in GIB® Wet Area Systems, and supplied by Winstone Wallboards Ltd are as follows:

GIB® Plasterboards

- **GIB Aqualine®** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in 10 and 13 mm sheet thicknesses. Sheets are available in various edge profiles and lengths from 2,400 mm to 4,800 mm. Refer to Table 1. The nominal sheet weights are 8 kg/m² and 11 kg/m² for 10 mm and 13 mm thick sheets respectively. GIB Aqualine® face paper is green in colour.
- **GIB Toughline® Aqua** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in a sheet thickness of 13 mm. Sheets are available in various edge profiles and lengths from 2,400 mm to 3,000 mm. Refer to Table 1. The nominal sheet weight is 11.4 kg/m². GIB Toughline® Aqua face paper is mauve in colour.
- **GIB Weatherline®** is an exterior-grade, glass-fibre fleece-wrapped modified-gypsum core sheet material. The product is available in 10 mm and 13 mm thicknesses and a board width of 1,200 mm. Standard sheet lengths are 2,450, 2,700 and 3,000 mm. Custom sheet lengths are also available. The nominal sheet weights are 9 kg/m² and 11.5 kg/m² for 10 mm and 13 mm thick sheets respectively.

Table 1: GIB® Wet Area Plasterboard Available Sheet Sizes

Plasterboard Type	Sheet Thickness [mm]	Sheet Edge Profile	Sheet Width [mm]	Sheet Length [mm]					
				2,400	2,450	2,700	3,000	3,600	4,800
GIB Aqualine®	10	TE/TE	1,200	✓		✓	✓	✓	
		TE/SE	1,200	✓					✓
		TE/SE	1,350	✓				✓	
	13	TE/TE	1,200	✓		✓	✓	✓	
GIB Toughline® Aqua	13	TE/TE	1,200	✓		✓	✓		
GIB Weatherline®	10	SE/SE	1,200		✓	✓	✓		
	13	SE/SE	1,200			✓	✓		

TE = Tapered Edge SE = Square Edge

Fastenings

- GIB® Grabber® High Thread Drywall screws for fixing to timber: 6 g x 25 mm and 32 mm.
- GIB® Grabber® Self Tapping Drywall screws for fixing to light gauge steel: 6 g x 25 mm and 32 mm.

Adhesive and Sealants

- GIBFix® One [Acrylic].
- GIBFix® All-Bond [Solvent].

GIB® Accessories

- Corner Support Angle - GIBFix® Angle or GIB® Rondo® NZ18. Minimum 32 x 32 x 0.55 mm galvanised metal angle.

GIB® Jointing Compounds

- As specified in the GIB® Wet Area Systems and GIB® Site Guide Technical Literature.

- 4.2 System components and accessories for the GIB® Wet Area Systems, which are supplied by the building contractor are:

Waterproofing

- A waterproofing system complying with AS/NZS 4858.

Finishes

- Finishes such as tiling, flexible sheet vinyl, paints and wallpapers have not been assessed and are outside the scope of this Appraisal.

Handling and Storage

- 5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.
- 5.2 All accessories must be kept dry.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB® Wet Area Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 GIB® Wet Area Systems provide a water-resistant lining as a base for finishing systems in wet areas such as bathrooms, toilets, laundries and kitchens. The typical finishes are ceramic tiles and flexible sheet vinyl to walls, and paint and wallpaper to walls and ceilings. *[Note: GIB Weatherline® is a suitable substrate for ceramic tiles and sheet vinyl. For paint or wallpaper finishes use GIB Aqualine® or GIB Toughline® Aqua.]*
- 7.2 GIB® Wet Area Systems must not be used in the following situations:
- For bracing applications in shower areas or adjacent baths [See Paragraphs 7.4 and 8.2].
 - In areas of high humidity (above 90% RH) or continually wet areas such as group showers, steam rooms, or swimming pools.
 - Installed over a vapour barrier.
 - Applied directly to masonry, concrete or solid plaster.
 - Applied over other sheet lining materials.
 - Used externally of the building envelope.
 - Exposed to temperatures of 52°C or greater for prolonged periods. (Refer to appliance and fitting manufacturers for installation details.)
- 7.3 GIB Aqualine® may be substituted for some other GIB® plasterboard products in specific GIB® Bracing Systems, GIB® Fire Rated Systems and GIB® Noise Control Systems. Refer to the relevant systems technical literature for details.

Wet Areas

- 7.4 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. There are two general categories of wet areas as follows:
- Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
 - Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.
- 7.5 Both the above wet area categories must be finished with surfaces and joints that are impervious and easily cleaned. In addition, shower areas must be waterproofed. This can be achieved using proprietary rigid shower lining systems, flexible vinyl shower wall finishes, or tiling. Tiled shower areas must include a wet area waterproofing membrane system under the tiles.

Intertenancy Walls – Wet Areas

- 7.6 Intertenancy construction that incorporates fire resistance and noise control must be protected from water splash. In shower areas, GIB® Wet Area plasterboards must not be substituted for other GIB® plasterboards but must be an extra lining layer. Refer to the Technical Literature.

Tiling

- 7.7 GIB® Wet Area Systems are suitable as a substrate for tiling up to the following weights:
- 10 mm GIB Aqualine® and GIB Weatherline® – up to 26 kg/m².
 - 13 mm GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® – up to 40 kg/m².
- [Note: Most ceramic and porcelain wall tiles weigh less than 20 kg/m². For further information on tiling consult the BRANZ Good Practice Guide – Tiling.]*

Framing

- 7.8 Supporting framing must comprise one of the following, subject to the minimum sizes, dwang centres and all other frame requirements of GIB® Wet Area Systems Technical Literature:
- Timber framing must be designed and constructed in accordance with NZS 3604, or to a specific design using NZS 3603 and AS/NZS 1170. Refer to Paragraph 15.2 regarding recommended moisture content of timber framing.
 - Steel framing must be designed and constructed in accordance with NASH Standard Part 2, or to a specific design in accordance with AS/NZS 1170.

Structure

Bracing

- 8.1 GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in GIB EzyBrace® Systems. Refer to BRANZ Appraisals Nos. 928 [2016] and 1048 [2019].
- 8.2 GIB Wet Area Systems must not be used for bracing in shower areas or behind baths.

Impact Resistance

- 8.3 GIB® plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications. GIB Toughline® Aqua is recommended by Winstone Wallboards Ltd where higher impact resistance is desired.

Durability

Serviceable Life

- 9.1 GIB® Wet Area Systems have a serviceable life of at least 15 years as a fully protected shower or water splash lining. As a general wall and ceiling lining, GIB® Wet Area Systems will have a serviceable life in excess of 50 years. The ability of GIB® plasterboards to remain durable is dependent on being protected and remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

- 9.2 The building must be maintained weathertight and all lining systems protected from internal and external moisture.
- 9.3 Finishes to water splash and shower areas, including tiles, grout, waterproof membranes, sealants and flexible sheet vinyl must be checked to ensure the integrity of the system is maintained. They must be repaired or replaced if necessary. When repairing or replacing finishes, the GIB® plasterboard substrate must be checked for defects and repaired or replaced, as required.
- 9.4 For flexible sheet vinyl, particular attention must be paid to joints, especially at corners. Checks should be made to ensure the vinyl has not been punctured. Where damage has occurred, repairs must be made immediately.
- 9.5 Impact damage to GIB® plasterboard, resulting in small holes and cracks, may be patched, stopped and finished. For larger areas of damage, expert advice on repair must be sought from Winstone Wallboards Ltd.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the GIB® Wet Area Systems from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

- 11.1 The gypsum plasterboard used in GIB® Wet Area Systems without an applied paint or wallpaper finish has been tested in accordance with ISO 5660 and achieved a Material Group Number of 1-S.
- 11.2 The gypsum plasterboard used in GIB® Wet Area Systems with an untested applied finish of a waterborne or solvent borne paint coating $\leq 0.4\text{mm}$ thick achieves a Material Group Number of G2-S in accordance with Table A1 of NZBC Verification Method C/VM2.
- 11.3 A lower Material Group Number may be achieved when used with a tested finishing system. The Material Group Number for the complete lining system must be obtained from the supplier of the finish product or system.

Fire Resistance Ratings (FRRs)

- 11.4 GIB® Wet Area plasterboards, when used as part of GIB® Fire Rated Systems, can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2. Refer to BRANZ Appraisal No. 289 [2018] and relevant technical literature.

Internal Moisture

- 12.1 When installed in accordance with this Appraisal, GIB® Wet Area Systems will provide wall surfaces adjacent to sanitary fixtures and sanitary appliances that are impervious and easily cleaned.
- 12.2 The construction methods in the Technical Literature meet with the internal moisture requirements of the NZBC Acceptable Solution E3/AS1.
- 12.3 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

Airborne and Impact Sound

- 13.1 GIB® Wet Area plasterboards, when used as part of GIB® Noise Control systems, can be used to provide acoustic ratings as required by NZBC Acceptable Solution G6/AS1. Refer to BRANZ Appraisal No. 394 [2017] and relevant technical literature.

Installation Information

Installation Skill Level Requirement

- 14.1 Installation of GIB® Wet Area Systems must be completed by, or under the supervision of, a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

- 15.1 GIB® Wet Area Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

- 15.2 To achieve an acceptable decorative finish, the walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommend a moisture content of 8–12% where buildings are to be air conditioned or centrally heated.

Cutting

- 15.3 GIB® Wet Area plasterboards are easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Fixing Sheets

Non-Tiled Areas

- 16.1 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 300 mm centres around the perimeter of the sheet, and with GIBFix® adhesive on all intermediate studs and dwangs. Adhesive must not be used under fasteners. A 5–10 mm gap must be left between the floor and the bottom of the sheet.

Tiled Areas

- 16.2 Control joints must be provided at maximum 4 m centres.
- 16.3 Internal corners in shower areas must be reinforced with a minimum 32 x 32 x 0.55 mm galvanised metal angle (i.e. GIBFix® Angle or GIB® Rondo® NZ18) prior to lining the walls.
- 16.4 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 150 mm centres to the perimeter of wall and to all intermediate studs. Adhesive must not be used in place of screws.

Ceilings

- 16.5 Supports of timber or steel battens or ceiling joists must be 450 mm centres for 10 mm GIB Aqualine®, or 600 mm centres for 13 mm GIB Aqualine® or GIB Toughline® Aqua.
- 16.6 GIB Aqualine® and GIB Toughline® Aqua sheets must be fixed with GIB® Grabber® screws at 600 mm centres around the perimeter of the ceiling and at 200 mm centre along supports. Alternatively, sheets are screw fixed at 600 mm centres along the supports and GIBFix® adhesive placed at 200 mm centres between the screws.

Penetrations and Sealants

- 17.1 All cut-outs for pipe penetrations must be made neatly using a hole saw. Cut-outs should be made approximately 12 mm diameter greater than the pipe.
- 17.2 A bead of sealant must be placed to the full thickness of the plasterboard sheet around all pipe penetrations, at bath rims and preformed shower bases and where an impervious junction is required at the floor/wall line.
- 17.3 In tiled areas, a bead of sealant 6 mm wide must also be placed to the full thickness of the tiles where the above situation occurs. The sealant manufacturer's technical literature must be followed for installation.

Jointing and Finishing

- 18.1 Jointing must be carried out in accordance with GIB® Site Guide Technical Literature.
- 18.2 Tiled shower areas must incorporate a waterproofing membrane over GIB® Wet Area Systems. Waterproofing membranes are outside the scope of this Appraisal and must otherwise be specified and approved.

Health and Safety

- 19.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, edge hardness, water resistance, hard and soft body impact tests and humidified deflection.
- 20.2 Cone calorimeter tests to ISO 5660 have been carried out by BRANZ.

Other Investigations

- 21.1 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 21.2 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 21.3 The GIB® Wet Area Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.
- 22.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001: 2015, Registration No. 581.
- 22.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.
- 22.4 The quality of the application and finish on site is the responsibility of the installation, stopping and finishing contractors.
- 22.5 Designers are responsible for the design of buildings.
- 22.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.



BRANZ Appraised
Appraisal No. 427 [2021]

BRANZ Appraisal

Appraisal No. 427 [2021]

15 February 2021

GIB® WET AREA SYSTEMS

Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- AS/NZS 2588: 2018 Gypsum plasterboard.
- BRANZ Good Practice Guide: Tiling [3rd edition], April 2015.
- ISO 5660-1:2002 Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate [cone calorimeter method].
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraisal
Appraisal No. 427 [2021]
15 February 2021

GIB® WET AREA SYSTEMS



In the opinion of BRANZ, **GIB® Wet Area Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Winstone Wallboards Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Winstone Wallboards Ltd:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Winstone Wallboards Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Winstone Wallboards Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

15 February 2021



BRANZ Appraised

Appraisal No. 928 [2016]

**GIB EZYBRACE®
SYSTEMS 2016**

Appraisal No. 928 [2016]

Amended 06 August 2021



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 GIB EzyBrace® Systems 2016 are a range of wall and ceiling bracing systems based on the use of GIB® Standard, GIB Braceline® and other GIB® plasterboards. GIB EzyBrace® Systems 2016 are used to resist earthquake and wind loads on timber frame buildings designed and constructed in accordance with NZS 3604 and the GIBFix® Framing System. The GIB EzyBrace® Bracing Software provides an electronic means of calculating bracing demand and resistance.

Scope

- 2.1 GIB EzyBrace® Systems 2016 and the GIB EzyBrace® Bracing Software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, the GIB EzyBrace® Systems 2016, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB EzyBrace® Systems 2016 meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 [a], [f], [h] and [j]]. See Paragraphs 8.1-8.10.

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years. GIB EzyBrace® Systems 2016 meet this requirement. See Paragraphs 9.1-9.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB EzyBrace® Systems 2016 meet this requirement.

- 3.2 The bracing demand calculation and bracing distribution rules contained in the GIB EzyBrace® Bracing Software are in accordance with Section 5 of NZS 3604. Bracing resistance is provided by bracing element ratings determined in accordance with NZS 3604, Paragraph 8.3.1.2.
- 3.3 NZS 3604 is an **Acceptable Solution** for compliance with New Zealand Building Code Clause B1 Structure.

Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB EzyBrace® Systems 2016, and supplied or specified by Winstone Wallboards Ltd are as follows:

GIB® plasterboards

- **GIB® Standard** - GIB® Standard plasterboard is a paper-bound fibreglass reinforced gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1,200 mm and 1,350 mm [GIB® Wideline]. The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2,400 mm to 6,000 mm. The nominal sheet weight is 6.5 kg/m² for 10 mm thick sheets and 8.5 kg/m² for 13 mm thick sheets. GIB® Standard plasterboard face paper is a light buff colour.
- **GIB Braceline®** - GIB Braceline® is a high-density fibreglass reinforced paper-bound gypsum-plaster core sheet lining material. GIB Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1,200 mm and 1,350 mm, and is available in lengths of 2,400 mm, 2,700 mm, 3,000 mm, 3,600 mm and 4,800 mm. The nominal sheet weight is 9 kg/m² for 10 mm thick sheets and 12.5 kg/m² for 13 mm thick sheets. GIB Braceline® face paper is a light blue in colour.
- **Alternative GIB® plasterboards** - in certain situations, as specified in the Technical Literature, substitution is permitted with GIB Aqualine®, GIB Fyrelene®, GIB Toughline® and GIB Ultraline®.

Components and Accessories

- **GIB® Accessories and GIB® Jointing Compounds** - as specified in the GIB® Site Guide Technical Literature.
- **Fasteners**
 - GIB Grabber® High Thread Screws for fixing directly to timber - 32 mm x 6 g.
 - GIB Nail - 30 x 2.8 mm.
 - GIB Grabber® screws for fixing to light gauge steel battens - 32 mm x 6 g.
- **Adhesive and Sealants**
 - GIBFix® One - an off-white acrylic adhesive supplied in 375 ml cartridges and 600 ml sausages.
 - GIBFix® All-Bond - a green solvent-based adhesive supplied in 375 ml cartridges and 600 ml sausages.
- **GIBFix® Framing Components**
 - GIBFix® Angle - 45 x 45 x 0.55 mm galvanised steel angle with a knurled surface. Supplied in lengths of 2.4 and 2.7 m.
 - GIB Grabber® Dual Thread Screws for fixing to timber through GIBFix® Angle - 32 mm x 7 g needle-point screw with coarse thread lower section and fine thread upper section.
- **Fasteners, Anchors and Connections**
 - GIB® HandiBrac® - a one-piece, 2 mm thick, galvanised-steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with 5 Type 17 screws 14 g x 35 mm.
 - BOWMAC® screw bolt - M10 x 140 mm screw anchor, with a blue painted hex-head.
 - Coach screws - 12 mm x 150 mm and 50 x 50 x 3 mm washer hot-dip galvanised for fixing to timber floors.
 - Cast-in bolts - M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors.
 - Shot-fired fasteners - minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1-N, GS2-N and GS2-NOM internal line bracing elements to concrete slabs.
 - Galvanised or stainless steel strap - 25 x 0.9 mm top and bottom plate connections.
 - Strap fixings - 30 x 2.5 mm hot-dip galvanised or stainless-steel flat-head nails.

[Note: For corrosion protection requirements refer to NZS 3604 Section 4.]

- **Ceiling Diaphragms** – ceiling diaphragms are constructed using timber ceiling battens, or GIB® Rondo® or similar metal ceiling batten systems.
- **Plywood**
 - **Plywood** – minimum of 7 mm thick complying with AS/NZS 2269 D-D Structural Grade.
 - **Plywood fixings** – 50 x 2.5 mm hot-dip galvanised or stainless-steel annular-grooved, flathead nails.

Handling and Storage

- 5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.
- 5.2 All accessories must be kept dry.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB EzyBrace® Systems 2016. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 NZS 3604 provides methods to distribute the bracing elements in walls to resist forces. The use of ceiling diaphragms is defined in the Technical Literature.
- 7.2 GIB EzyBrace® Systems 2016 are for use in dry, internal situations only.
- 7.3 GIB EzyBrace® Systems 2016 must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

GIB EzyBrace® Bracing Software

- 7.4 The GIB EzyBrace® Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5–5.10 for 2 kPa floor loads or less, or Tables 14.1–14.3 for 3 kPa floor loads.
- 7.5 The bracing demand calculations contained in the GIB EzyBrace® Bracing Software are based on first principles engineering and calculate wind and earthquake demand based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The GIB EzyBrace® Bracing Software has been assessed as part of this Appraisal.
- 7.6 The bracing ratings for GIB EzyBrace® Systems 2016 are embedded in the GIB EzyBrace® Bracing Software.

GIBFix® Framing System

- 7.7 The GIBFix® Framing System utilises GIBFix® Angles fixed at internal corners and at wall/ceiling junctions to reduce the potential for fastener ‘popping’ and joint cracking due to timber framing movement. The GIBFix® Framing System also offers an alternative arrangement of studs at corners and at intersecting walls to improve insulation and to reduce thermal bridging compared to traditional wall framing layouts. Refer to the Technical Literature for full details.
- 7.8 Where walls intersect, noggings are required at maximum 900 mm centres to enable fixing of the end stud of the intersecting wall to the main wall framing.
- 7.9 The GIBFix® Framing System permits the use of a single panel hold-down [e.g. GIB® HandiBrac®] at wall corners and T-intersections for both the across and along bracing directions.

Framing

- 7.10 GIB EzyBrace® Systems 2016 can be installed using conventional timber framing layouts or by using the layouts provided in the GIBFix® Framing System. The bracing ratings embedded in the GIB EzyBrace® Bracing Software are equally applicable to both framing options.
- 7.11 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.
- 7.12 Winstone Wallboards Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 x 45 mm for external walls and 75 x 45 mm for internal walls.
- 7.13 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 x 0.9 mm hot-dip galvanised mild steel strap, 3 nails each side of joint for 3 kN and 6 nails each side of joint for 6 kN.

Bracing System GS2-NOM

- 7.14 Most GIB EzyBrace® Systems require additional fasteners at the corners to achieve the published bracing ratings. The GS2-NOM system only requires fixings at 300 mm centres around the sheet perimeter.
- 7.15 Where internal doors penetrate a GS2-NOM bracing element and recessed door jambs are used, the sheets may be adhesive fixed around the door opening with GIBFix® All-Bond, instead of screw fixing. This is designed to reduce fastener 'popping' around internal doors when using grooved door frames. Screw fixing should be used where door frames are to be finished with architraves and the architrave will cover the screws. The adhesive fix option around door openings must not be used with any other GIB EzyBrace® Systems 2016.

Alternative GIB® plasterboards

- 7.16 On occasions, properties additional to bracing may be required of the plasterboard lining. Refer to Table 1.

BOWMAC Screw Bolts

- 7.17 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

Table 1: Permitted Alternatives in GIB EzyBrace® Systems

PERMITTED GIB® plasterboard ALTERNATIVES IN GIB EZYBRACE® SYSTEMS 2016									
GIB Ezybrace® Systems 2016 have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® plasterboard product. The following table provides acceptable alternative options.									
Specified	Permitted alternative GIB® plasterboard products								
GIB® plasterboard	GIB® Standard	GIB Ultraliner®	GIB Braceline/ Noiseline®	GIB Aqualiner®	GIB Toughliner®	GIB Fyreliner®			
						10mm	13mm	16mm	19mm
GIB® Standard	N/A	✓	✓	✓	✓	✓ NOTE 1	✓NOTE 1 and 3		
GIB Braceline®	X	X	N/A	✓ NOTE 2	✓	X	✓NOTES 1, 2 and 3		

- **NOTE 1:** The fastener type and length and must be as required for the relevant FRR, system but the fixing pattern must be as required for bracing elements.
- **NOTE 2:** The bracing element must be 900 mm or longer. Fasteners must be at maximum 100 mm centres to the perimeter of the bracing element. The bracing corner fastening pattern applies to all four corners of the element.
- **NOTE 3:** Specify traditional wall framing layout where a Fire Resistance Rating (FRR) is required. See Paragraph 11.4.

Structure

Bracing

- 8.1 The bracing unit [BU] ratings are embedded in the GIB EzyBrace® Bracing Software and vary with the wall length.
- 8.2 The Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using anchor screws and cast-in bolts (concrete), coach screws (timber), GIB® HandiBrac® or nailed stud-to-plate straps.
- 8.3 The bracing units are derived from BRANZ P21 test method based on a wall height of 2.4 m. For greater wall heights the bracing rating is calculated by multiplying the appropriate bracing rating shown in Table 1 by a factor $f=2.4$ and divided by the wall height in metres. Walls lower than 2.4 m shall be rated as if they were 2.4 m high.
- 8.4 NZS 3604 limits wall bracing elements to a maximum of 120 BU/m for timber-framed floors and 150 BU/m for concrete floors.

Ceiling Diaphragms

- 8.5 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be square or rectangular and the length must not exceed twice the width.
- 8.6 For ceiling diaphragms not steeper than 15° and not exceeding 7.5 m in length, any GIB® plasterboard may be used provided the perimeter fixing are at 150 mm centres.
- 8.7 For ceiling diaphragms not steeper than 45° and not exceeding 7.5 m in length, and for diaphragms not steeper than 25° and not exceeding 12 m in length, any GIB® plasterboard may be used provided the perimeter fixings are at 100 mm centres.

Openings in Bracing Elements

- 8.8 Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

Shower Areas

- 8.9 GIB EzyBrace® Systems 2016 must not be located in shower cubicles or behind baths and the like. GIB EzyBrace® Systems 2016 may be used in water-splash areas provided they are protected as required by NZBC Clause E3 Internal Moisture. Refer GIB Aqualine® Wet Area Systems.

Impact Resistance

- 8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon history of use in domestic and light commercial applications.

Durability

- 9.1 GIB EzyBrace® Systems 2016, including linings and their fixings have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

- 9.2 The building must be maintained weatherproof and GIB® plasterboards must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.
- 9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.
- 9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the GIB EzyBrace® Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

- 11.1 For Internal Surface Finish properties and Fire Resistance Ratings, refer to BRANZ Appraisal No. 289 [2018] GIB® Fire Rated Systems.

Internal Moisture

- 12.1 GIB® plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

Installation Information

Installation Skill Level Requirement

- 13.1 Installation of GIB EzyBrace® Systems 2016 must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

- 14.1 GIB EzyBrace® Systems 2016 must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

- 14.2 To achieve an acceptable decorative finish, the GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommends a moisture content of 12% or less where buildings are to be air conditioned, centrally heated or have heat pumps installed.
- 14.3 Where the GIBFix® Framing System is used, GIBFix® Angles are tacked to the framing with flat-head clouts prior to installation of the GIB® plasterboard.

Cutting

- 14.4 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Hold-downs

- 14.5 GIB EzyBrace® Systems 2016 which require hold-downs must either have a GIB® Handibrac® fitted to each end of the bracing element or alternatively a metal stud-to-plate strap and hold-down anchor may be used. Refer to the Technical Literature for full installation details. Where a metal stud-to-plate strap is used, the hold-down anchor must be placed no more than 80 mm from the end of the bracing element.
- 14.6 Where the GIBFix® Framing System is used, a single hold-down located at a wall intersection may be used to provide the hold-down in both the across and along bracing directions.

Plasterboard Sheet Fixing

- 14.7 Corner fixings must be 50 mm away from the sheet corner. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.
- 14.8 Wall bracing plasterboards (except for those used with the GS2-NOM system) are fixed at 150 mm centres around the perimeter framing of the bracing element [*Note variation for GIB Aqualine® and GIB Fyrelime® - see Table 1*]. At the corners of the wall bracing elements, a special fastening pattern is required with fasteners spaced at 50 mm, 100 mm, 150 mm, 225 mm and 300 mm from the corner and there-after at 150 mm centres. Fixing to other framing is either mechanical or by using GIBFix® adhesives.
- 14.9 When installing GS2-NOM bracing elements, the GIB® plasterboard is fixed to framing around the bracing element perimeter and at sheet joints with fasteners at maximum 300 mm centres. Where recessed door jambs are used on internal door frames, the GIB® plasterboard may be fixed to the framing around the door opening with GIBFix® All-Bond. See Paragraph 7.15.
- 14.10 Where GIB Aqualine® or GIB Fyrelime® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres and the corner pattern described in Paragraph 14.8 used.
- 14.11 Full sheets must be used wherever possible.

Fire Resistance Rated Bracing Elements

- 14.12 Where a bracing element is also used as a fire-rated element, the method of fixing (including the length of the fixing specified) for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres and fixings at corners of the bracing element must be fixed as described in Paragraph 14.8. In two-layer systems the inner layer must be used for bracing.

Plywood Fixing

- 14.13 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

Ceiling Diaphragms

- 14.14 All GIB EzyBrace® System 2016 ceiling diaphragms require fixings around the perimeter at 100 or 150 mm centres, depending on the ceiling pitch and length. See Paragraphs 8.4 to 8.6 and refer to the Technical Literature.
- 14.15 The perimeter of the ceiling diaphragm is fixed to GIBFix® Angles, GIB® Rondo® perimeter channels, or alternatively, to an additional ex 150 x 40 mm timber plate fixed to the top plate.

Jointing and Finishing

- 14.16 All bracing element joints must be reinforced with GIB® tape and finished in accordance with the GIB® Site Guide.

Health and Safety

- 15.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 16.1 Bracing tests were carried out by Winstone Wallboards Ltd in accordance with BRANZ Technical Paper P21 to determine the performance of GIB EzyBrace® Systems 2016 when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. The Winstone Wallboard's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 17.1 The GIB EzyBrace® Bracing Software has been assessed by BRANZ and found to be satisfactory.
- 17.2 The GIB EzyBrace® Systems 2016 and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.
- 17.3 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 17.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 17.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, hard and soft body impact tests.

Quality

- 18.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.
- 18.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.
- 18.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.
- 18.4 The quality of the application and finish on-site is the responsibility of the installation and stopping contractors.
- 18.5 Designers are responsible for the design of buildings.
- 18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 2269.0:2012 Plywood - Structural - Specifications.
- AS/NZS 2588:1998 Gypsum plasterboard.
- BRANZ Technical Paper P21:2010 A wall bracing test and evaluation procedure.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 06 August 2021.

This Appraisal has been amended to reflect building code updates relating to fire.



BRANZ Appraisal
Appraisal No. 928 [2016]
05 September 2016

GIB EZYBRACE® SYSTEMS 2016



In the opinion of BRANZ, **GIB Ezybrace® Systems 2016** 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 **Winstone Wallboards Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Winstone Wallboards Ltd**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
 - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Winstone Wallboards Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Winstone Wallboards Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

05 September 2016



10 mm GIB Aqualine® Plasterboard Winstone Wallboards

Final Assembly: Auckland, New Zealand

Life Expectancy: 50 Year(s)

End of Life Options: Recyclable (100%)

Ingredients:

Gypsum Wall Panel: Gypsum; Cellulose Fibre - Paper; Fibreglass; Boric acid; FlyAsh; Methylhydrogenpolysiloxane; Starch

Living Building Challenge Criteria: Compliant

I-13 Red List:

- | | |
|---|-----------------------------|
| <input checked="" type="checkbox"/> LBC Red List Free | % Disclosed: 100% at 100ppm |
| <input type="checkbox"/> LBC Red List Approved | VOC Content: Not Applicable |
| <input type="checkbox"/> Declared | |

I-10 Interior Performance: CDPH Standard Method v1.1-2010

I-14 Responsible Sourcing: Not Applicable

WWL-0001

EXP. 01 NOV 2021

Original Issue Date: 2015

MANUFACTURER RESPONSIBLE FOR LABEL ACCURACY

INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/declare



13 mm GIB Aqualine® Plasterboard Winstone Wallboards

Final Assembly: Auckland, New Zealand

Life Expectancy: 50 Year(s)

End of Life Options: Recyclable (100%)

Ingredients:

Gypsum Wall Panel: Gypsum; Cellulose Fibre - Paper; Fibreglass; Boric acid; Methylhydrogenpolysiloxane; Starch; Vermiculite

Living Building Challenge Criteria: Compliant

I-13 Red List:

- | | |
|---|-----------------------------|
| <input checked="" type="checkbox"/> LBC Red List Free | % Disclosed: 100% at 100ppm |
| <input type="checkbox"/> LBC Red List Approved | VOC Content: Not Applicable |
| <input type="checkbox"/> Declared | |

I-10 Interior Performance: CDPH Standard Method v1.1-2010

I-14 Responsible Sourcing: Not Applicable

WWL-0002

EXP. 01 NOV 2021

Original Issue Date: 2015

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Declare. SM

GIB Braceline[®] GIB Noiseline[®] Plasterboard Winstone Wallboards

Final Assembly: Auckland, New Zealand

Life Expectancy: 50 Year(s)

End of Life Options: Recyclable (100%)

Ingredients:

Gypsum Wall Panel: Gypsum; Cellulose Fibre - Paper;
Fibreglass; Starch

Living Building Challenge Criteria: Compliant

I-13 Red List:

☒ LBC Red List Free

% Disclosed: 100% at 100ppm

☐ LBC Red List Approved

VOC Content: Not Applicable

☐ Declared

I-10 Interior Performance: CDPH Standard Method v1.1-2010

I-14 Responsible Sourcing: Not Applicable

WWL-0003

EXP. 01 NOV 2021

Original Issue Date: 2015

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GIB® Standard Plasterboard Winstone Wallboards

Final Assembly: Auckland, New Zealand

Life Expectancy: 50 Year(s) 

End of Life Options: Recyclable (100%)

Ingredients:

Gypsum Wall Panel: Gypsum; Cellulose Fibre - Paper;
Fibreglass; Boric acid; Starch

Living Building Challenge Criteria: Compliant

I-13 Red List:

- | | |
|---|-----------------------------|
| <input checked="" type="checkbox"/> LBC Red List Free | % Disclosed: 100% at 100ppm |
| <input type="checkbox"/> LBC Red List Approved | VOC Content: Not Applicable |
| <input type="checkbox"/> Declared | |

I-10 Interior Performance: CDPH Standard Method v1.1-2010

I-14 Responsible Sourcing: Not Applicable

WWL-0005

EXP. 01 NOV 2021

Original Issue Date: 2015

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GIB Standard Plasterboard

Product Technical Statement: 101955



GIB® Standard plasterboard is an economical lining material available in 10mm and 13mm thicknesses.

[View miproducts listing](#)

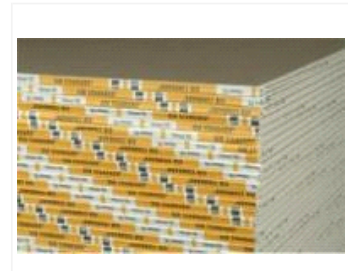


Appraisal Company

GIB confirms that this minimum level of assurance has been met or exceeded by the following:

GIB

[Technical Data](#)



Technical Statement

Product Description

GIB® Standard plasterboard is an economical lining material available in 10mm and 13mm thicknesses.

13mm GIB® Standard plasterboard is recommended for use on ceilings as it is stronger and more rigid than 10mm GIB® Standard plasterboard.

Sheets have a width of 1200mm and are available in 2400, 2700, 3000, 3300, 3600, 4200, 4800 and 6000mm lengths - see the [selector chart](#) for more information.

GIB Standard plasterboard is available with both edges tapered to allow for flush finishing, or with 1 tapered, 1 square edge to provide a flat surface for finishing trims when fixing horizontally

New Zealand Building Code (NZBC)

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code:

Notes

Evidence

The product meets the requirements set out in the following documents, or relevant parts of cited standards within the documents:

Supporting Evidence

The product has and can make available the following additional evidence to support the above statements:



CodeMark



BRANZ Appraisal

Use in Service History

Product Criteria

Installation requirements

GIB® Standard must be installed in accordance with the manufacturer's Technical Literature.

Warrantees

Company Product Information

Relationships

GIB

[Technical Data](#)



Environmental Choice New Zealand

masterspec partner

Company Contact Details



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Date last validated: 12 July 2017



Date last updated: 12 July 2017

Disclaimer: The Product Technical Statement (PTS) template is copyright to Construction Information Limited. However the content of this PTS is the responsibility of the product manufacturer/supplier. Refer to the miproducts Terms and Conditions



Wet Area Systems

Specification and installation manual

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chris

CBI 5113

FEBRUARY 2021

NATIONAL SUPPORT

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GIB® HELPLINE

0800 100 442

RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS. BATHROOMS, LAUNDRIES, TOILETS AND KITCHENS.

Protection from internal moisture is an important consideration when designing interior lining systems for homes, multi-unit apartments, educational, healthcare and commercial applications.

The New Zealand Building Code sets out minimum standards for wet area spaces in residential dwellings. However, often higher levels of performance and protection from internal moisture is demanded.

The GIB® Wet Areas System specification and installation manual provides internal lining options and details for specifiers, builders and building owners.

USE ONLY THE CURRENT SPECIFICATION

This manual supersedes the publication GIB Aqualine® Wet Area Systems March 2007. Winstone Wallboards Ltd accepts no liability for reliance upon publications that have been superseded.

If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442 or go to gib.co.nz

BEWARE OF SUBSTITUTION

The performance of GIB® Wet Area Systems requires accurate design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested, assessed or appraised, to ensure the required level of performance. It is important to use GIB® components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.



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This publication

This publication is a best practice guide to the design and construction of wall and ceiling linings in wet areas with intermittent water exposure within residential and non-residential buildings, as covered by NZ Building Code Clause E3 Internal Moisture.

The information is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZ Building Code and the end user.

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

To form a complete wet area system it is important to specify compatible materials and systems, designed to cope with conditions that are common in wet areas, and to ensure correct installation using best practice.

WET AREAS

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Within wet areas the following requirements apply;

1. NZBC Clause E3.3.4 states that wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.
2. NZBC Clause E3.3.6 states that surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

NZ Building Code Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management. Ongoing maintenance of wet areas is also important to maximise service life.

GIB AQUALINE®, GIB TOUGHLINE® AQUA AND GIB WEATHERLINE®

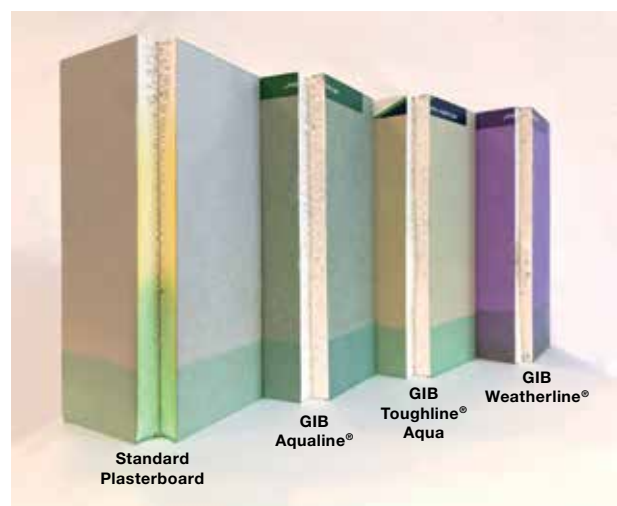
Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or a high moisture environment.

The NZ Building Code does not call for water resistant linings in wet areas but it is desirable to specify lining materials which will maintain their integrity longer when exposed more frequently to moisture, and to one-off events such as leaks or flooding.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® feature a water-resistant polymer impregnated core, designed for wet area applications. These core formulations not only resist penetration of moisture through the lining into the framing behind, but also resist water “wicking” up the core, a common cause of long-term damage where a water-resistant lining has not been used.

WATER ABSORPTION TEST

The illustrations below show how GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® compare with standard plasterboard after soaking for two-hours in green dye.



WHERE TO USE GIB® WET AREA LININGS

In order to prolong the life expectancy of the space it is highly desirable to include wet area linings in situations where there is an increased risk of water or moisture damage. Applications include walls and ceilings in bath and shower rooms, and walls in laundries, toilets and kitchens.

BENEFITS

- Water resistant and durable linings help protect against water damage
- Proven substrate for paint, wallpaper, waterproofing membranes, tiles, sheet vinyl and rigid sheet shower linings
- Suitable for both residential and non-residential applications
- Dimensionally stable and an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains glass fibres and other additives to increase strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB Noise Control® Systems (see Compliance with the NZ Building Code, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details

HANDLING AND STORAGE

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

LIMITATIONS

- GIB® wet area linings must not be used for bracing purposes in shower cubicles or above baths. For more information refer to page 9 of this manual
- Do not use GIB® wet area linings where exposed for extended periods to humidity levels above 90% RH, such as in group shower or steam rooms, or where exposed to moisture and chlorine rich environments such as in indoor swimming pools
- GIB® wet area linings used in a bathroom or other high humidity environment must not be directly applied to solid plaster (gypsum or cement), wood-based sheet linings or similar materials, masonry or concrete, without strapping or steel furring channels
- GIB® wet area linings must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® or GIB Toughline® Aqua must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details

Table 1: GIB® Wet Area linings sheet dimensions and weights

Product	Sheet face colour	Thickness (mm)	Sheet width (mm)	Edge Type	Sheet length (mm)						Max. Weight (kg/m²)
					2400	2450	2700	3000	3600	4800	
GIB Aqualine®	Green	10	1200	TE/TE							8.0
			1200	TE/SE							
			1350	TE/SE							
		13	1200	TE/TE							11.0
GIB Toughline® Aqua	Mauve	13	1200	TE/TE							11.4
GIB Weatherline®	Purple	10	1200	SE/SE							9.0
		13	1200	SE/SE							11.5

BOARD SUBSTITUTION OPTIONS

Acceptable GIB Aqualine® alternatives	
10mm GIB Aqualine® can be replaced with:	10mm GIB Weatherline® 13mm GIB Toughline® Aqua
13mm GIB Aqualine® can be replaced with:	13mm GIB Weatherline® 13mm GIB Toughline® Aqua

GIB® Wet Area System construction details in this manual refer to the use of GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® sheets may also be used in place of GIB Aqualine®.

FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® are suitable substrates for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures are presented in this literature, except that the lining gap at the floor is no more than 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles behind internal lining corners is recommended for sheet vinyl applications in showers or shower over bath situations
- The lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph even through a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl

RIGID SHEET SHOWER LININGS

- The wall surface must be free of dust before installation of the lining
- Avoid lining joints as much as possible and where necessary flush with plaster to achieve a level surface
- Do not pre-seal or paint areas which are to be covered by the rigid shower linings
- The suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Care must be taken to ensure that rooms are adequately ventilated
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- Consult the supplier of the shower lining for full installation details
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service

WATERPROOF MEMBRANE SYSTEMS AND TILING

- A waterproof membrane system must be applied to lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane system over the lining and once penetrations for shower mixers, taps and associated fittings are sealed
- The installation of galvanised steel reinforcing angles behind internal lining corners is required for tiled wall applications in showers or shower over bath situations
- In-situ waterproofing membrane materials manufactured to AS/NZS 4858:2004 “Wet Area Membranes” are recommended and must be applied to manufacturer’s recommendations. Typically, these types of membrane systems are not suitable for paint and wallpaper finishes
- Waterproof membrane systems must be fully cured and dry prior to application of tiling adhesives
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this manual are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane system

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

PENETRATIONS AND SEALANTS

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

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Ensure shower mixer and tap penetrations are sealed with a proprietary flange system to prevent the passage of moisture into the wall cavity
- Sealants should be of a mould inhibiting type and be paintable. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Apply a bead of sealant to the full depth of the lining in the following locations:
 - Around all tap/pipe bodies
 - The gap between the bath rim and the bottom edge of the wet area lining
 - Between the upstand of preformed shower bases and the bottom edge of the lining
 - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable always use tested and approved proprietary penetration seals

RENOVATIONS

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

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

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

MAINTENANCE

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

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

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

Compliance with the NZ Building Code

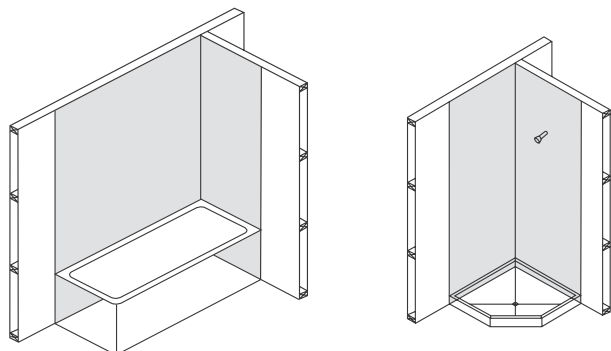
STRUCTURE – CLAUSE B1

The design and material specification for steel and timber framing used in GIB® Wet Area systems must be in accordance with the performance requirements of NZ Building Code Clause B1 (Structure).

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

Otherwise, GIB® Bracing Systems can be used in water-splash areas, provided these are maintained impervious for the life of the building.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. They can also be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB® Grabber 32mm x 6g screws at 100mm centres, using the GIB Braceline® corner fixing pattern. Refer to the GIB® Bracing System literature.



No bracing in the shaded areas.

DURABILITY – CLAUSE B2

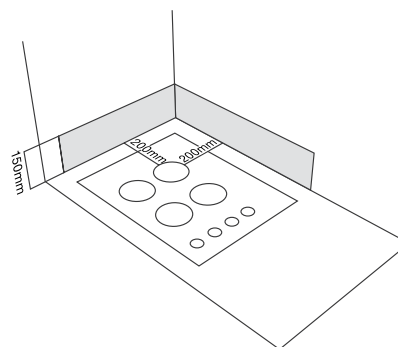
When installed and maintained in accordance with this literature, GIB® Wet Area systems tiled or vinyl covered have a serviceable life of at least 15 years. They comply with the requirements of NZ Building Code Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers,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

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

FIRE AFFECTING AREAS BEYOND THE SOURCE – CLAUSE C3

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

The protection of combustible surfaces surrounding gas cooking appliances is covered by the latest version of AS/NZS 5601.1.



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

- 5mm tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the specific requirements of AS/NZS 5601.1

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

INTERNAL MOISTURE – CLAUSE E3

The New Zealand Building Code Clauses that relate to wall surfaces are;

E3.3.4 - Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

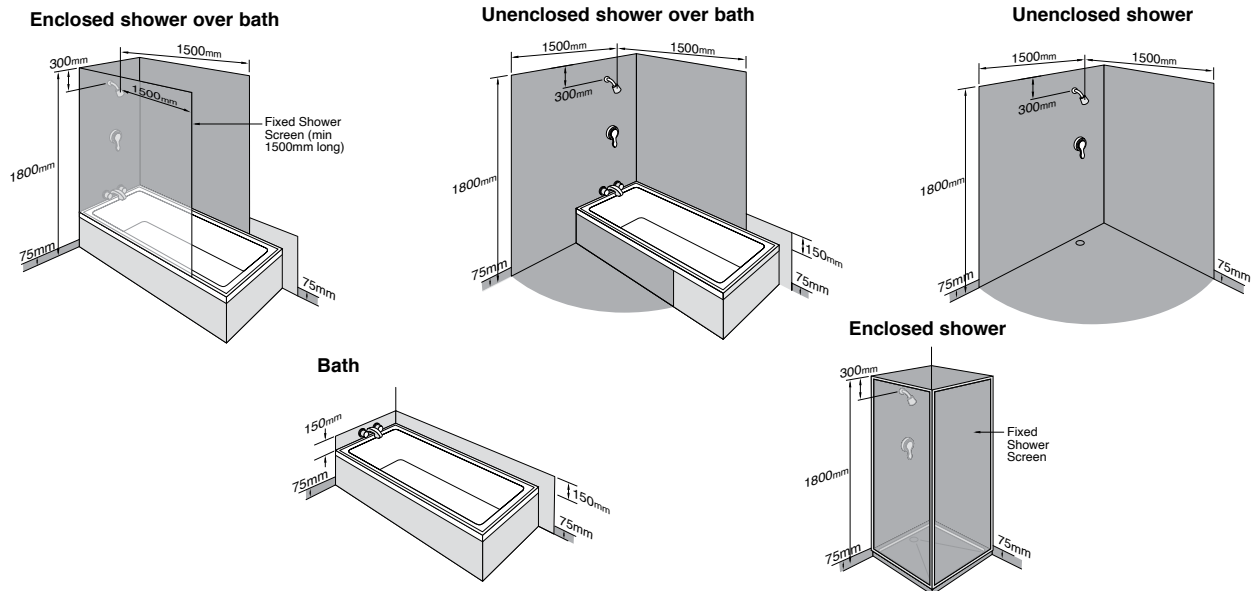
E3.3.5 - Surfaces of the building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned.

E3.3.6 - Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

New Zealand Building Code Acceptable Solution E3/AS2 substantially refers to the Waterproof Membrane Association Incorporated (WMAI) Code of Practice for Internal Wet Area Membrane Systems (IWAM), August 2020.

The IWAM Code of Practice refers to wet area membranes and over-surfaces that are easy to clean and suggests an extent as outlined below for a typical bathroom application. For further details refer to the IWAM Code of Practice which also lists suitable rigid sheet materials and tiling membranes.

Shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.



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 Fyrelite®, the STC and IIC rating of that system will be maintained. When GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information refer to the GIB Noise Control® Systems literature or contact the GIB® Helpline 0800 100 442.

TIMBER WALL FRAMING

Framing dimensions must comply with the requirements of NZS 3604:2011.

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

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread screws.

FASTENER CENTRES

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs

- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

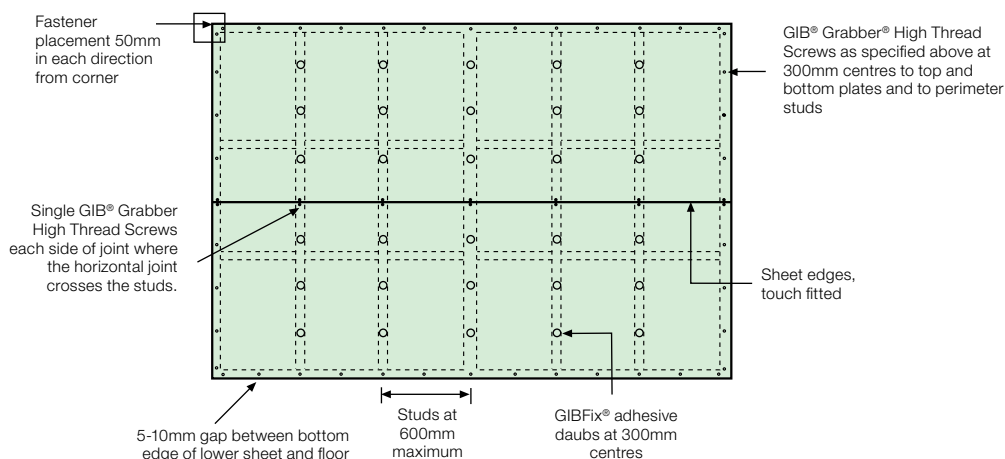
LINING

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

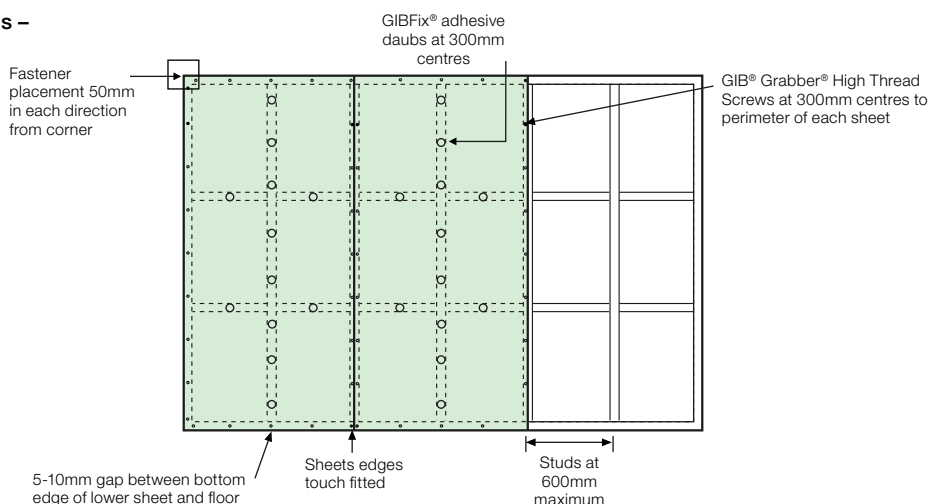
JOINTING

- Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide.

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



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.

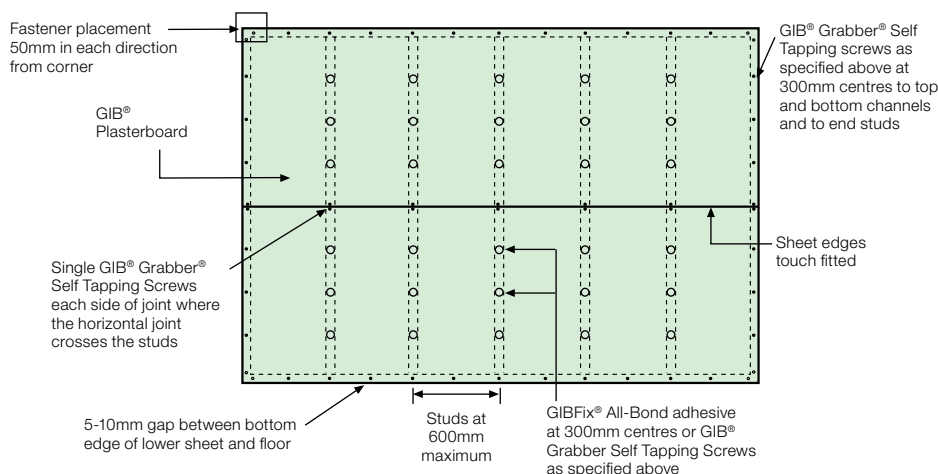
LINING

- 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.

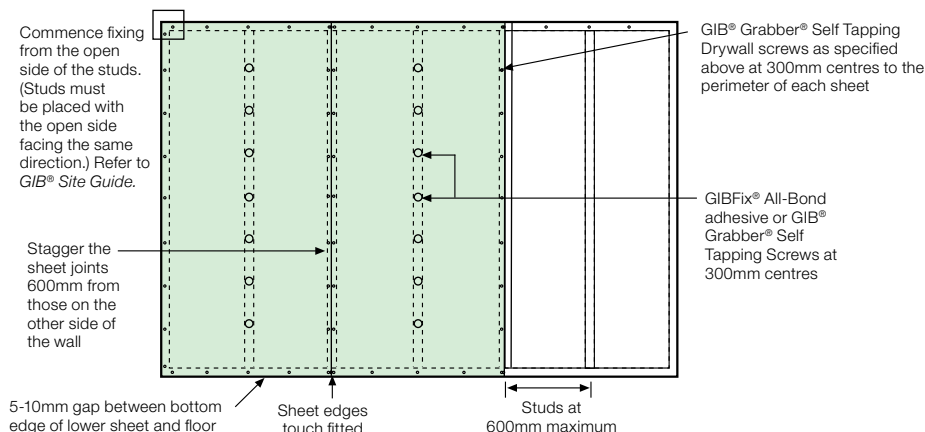
JOINTING

- Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide

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. Angles need to be temporarily held in place until secured by the lining fixings.

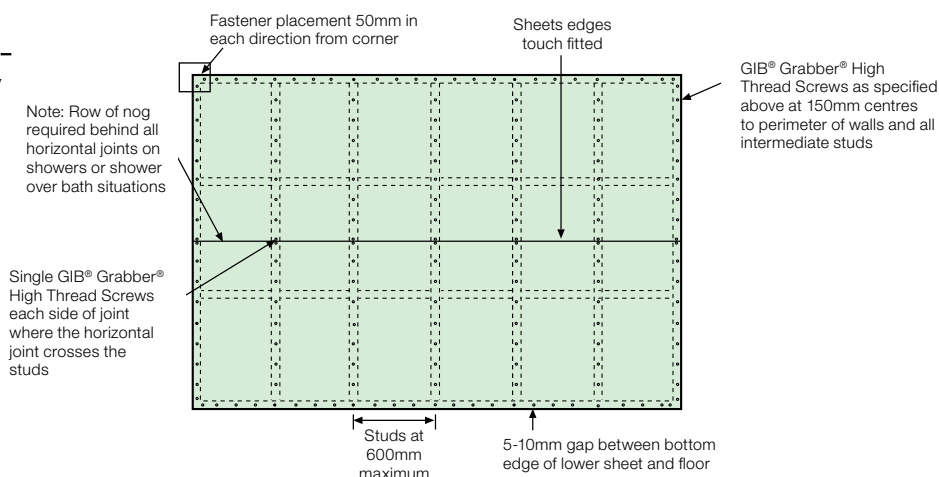
FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread Screws

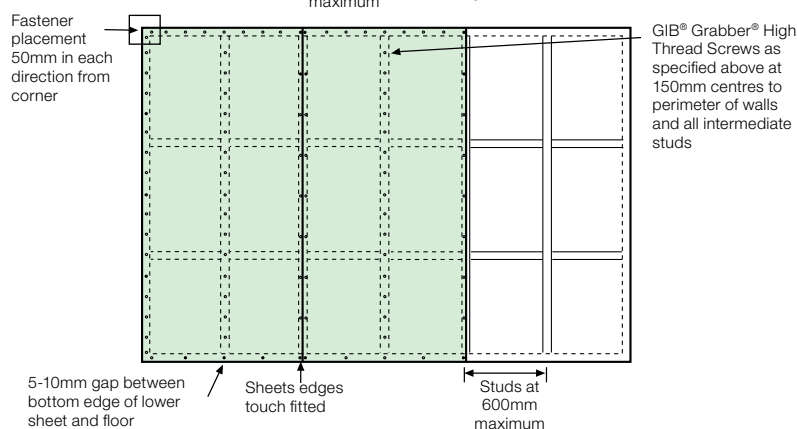
FASTENER CENTRES

- 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

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



- 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

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.

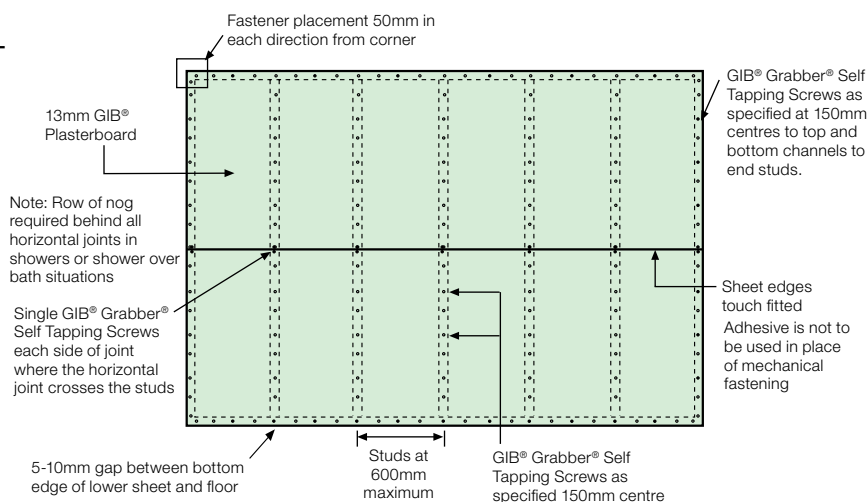
LINING AND TILE WEIGHTS

- 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

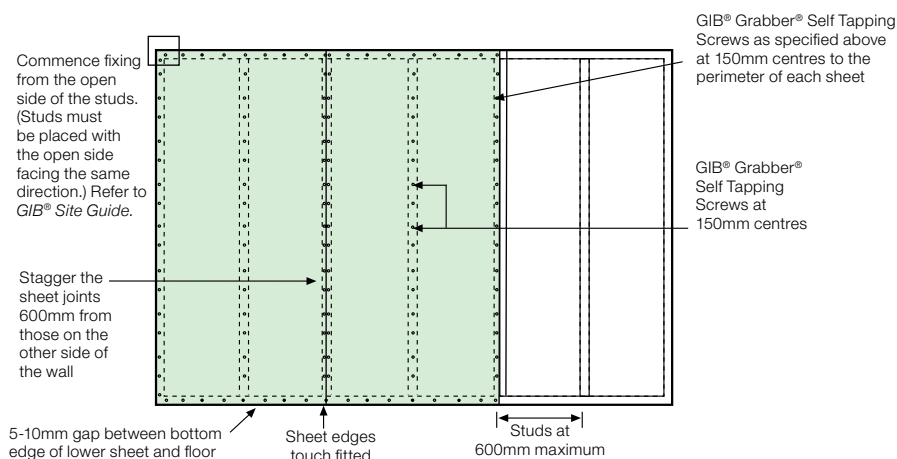
JOINTING

- 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

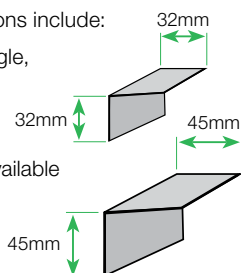


METAL ANGLES FOR TILED INTERNAL CORNERS

- 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.

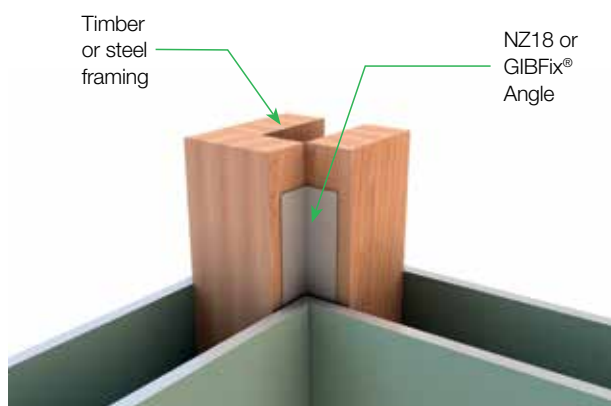
- Suitable GIB® metal angle options include:

- GIB® Rondo® NZ18 metal angle, available length: 3.0m



- GIBFix® Angle metal angle, available lengths: 2.4m and 2.7m

- Angles need to be temporarily held in place until secured by the lining fixings
- 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/m² has been factored into tile adhesion testing on top of the above stated tile weights to account for adhesive and grout weight used during the installation of the tile.

CEILING FRAMING

Framing dimensions and spacing must comply with the requirements of NZS 3604:2011, NASH for steel or relevant NZ Standard.

For noise control or fire rating applications consult the relevant GIB® technical publication.

FASTENERS

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

ADHESIVES

- Steel battens - GIBFix® All-Bond
- Timber battens - GIBFix® All-Bond or GIBFix® One

FASTENERS CENTRES

- Single screws to the edges and centre of the sheets across each batten
- Single screw at 600mm maximum to the perimeter of the ceiling
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw pops

LINING

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

BATTEN SPACINGS

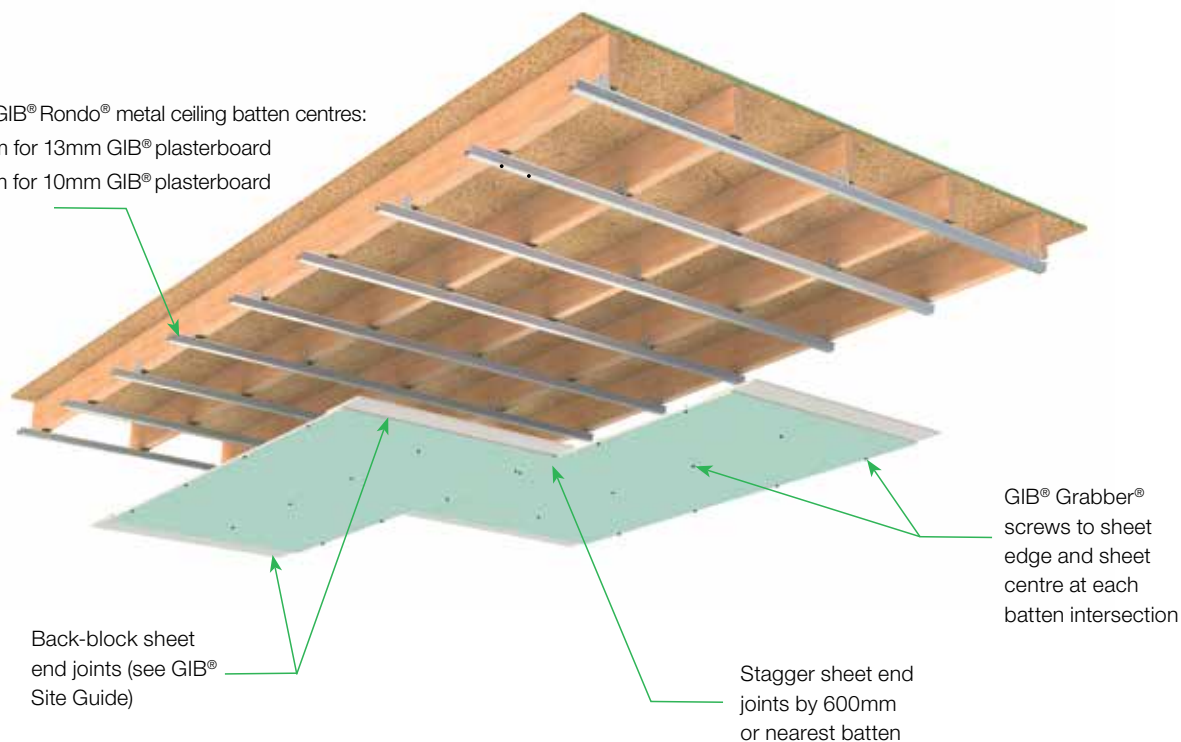
- 13mm GIB® plasterboard – 600mm centres maximum
- 10mm GIB® plasterboard – 450mm centres maximum

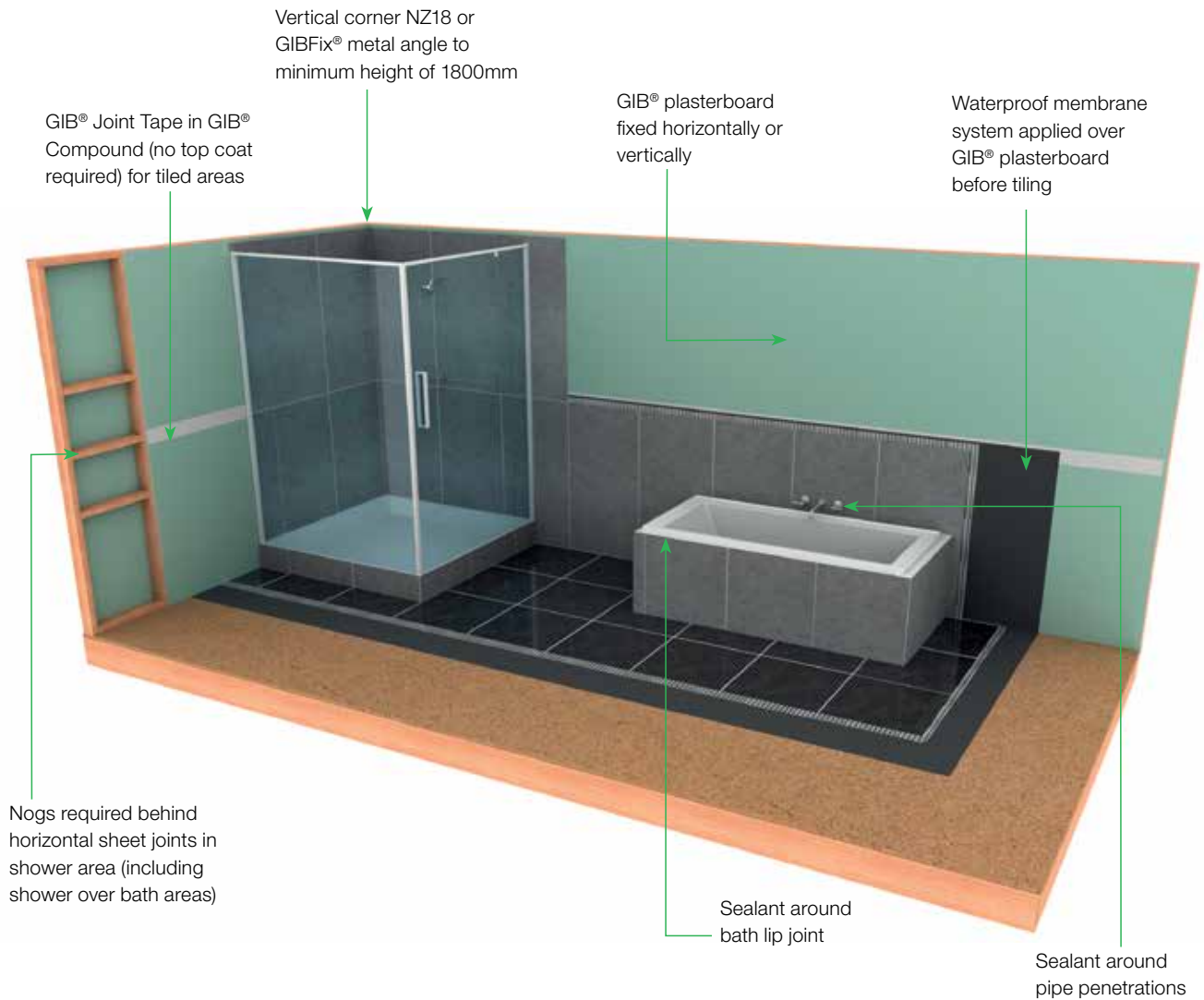
JOINTING

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the GIB® Site Guide
- Do not fix tiles to GIB® plasterboard ceilings

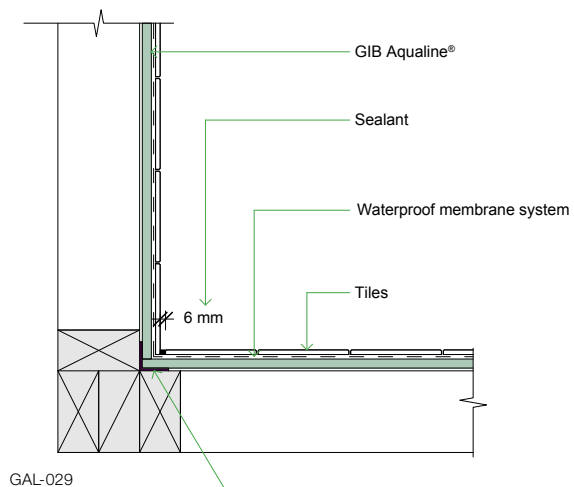
Maximum GIB® Rondo® metal ceiling batten centres:

- 600mm for 13mm GIB® plasterboard
- 450mm for 10mm GIB® plasterboard



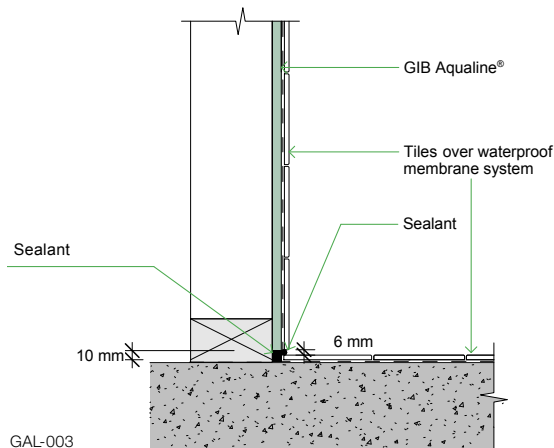


A: TILED INTERNAL CORNER

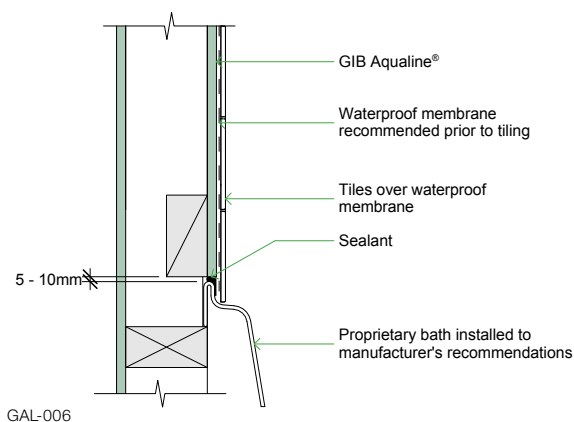


32 x 32 x 0.55mm vertical fixed galvanised steel angle NZ18 or GIBFix® Angle

B: CERAMIC FLOOR LINING JUNCTION



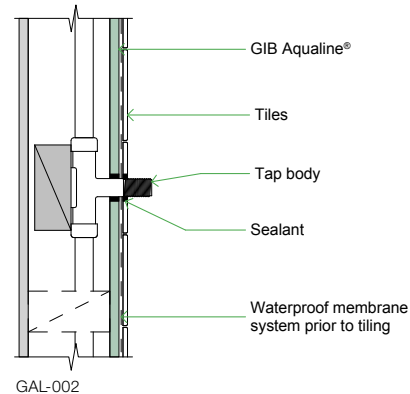
C: BATH LINING JUNCTION



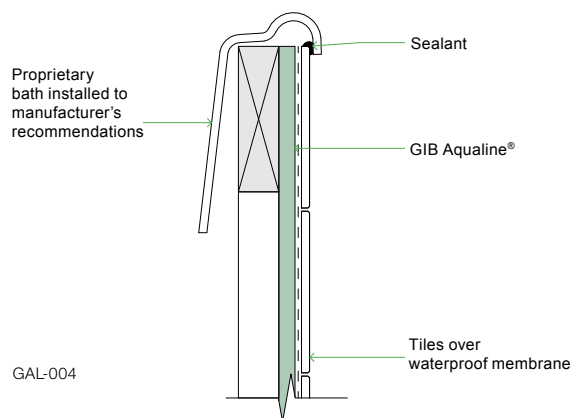
G: SHOWER MIXER PENETRATION IN WET WALL LININGS

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.

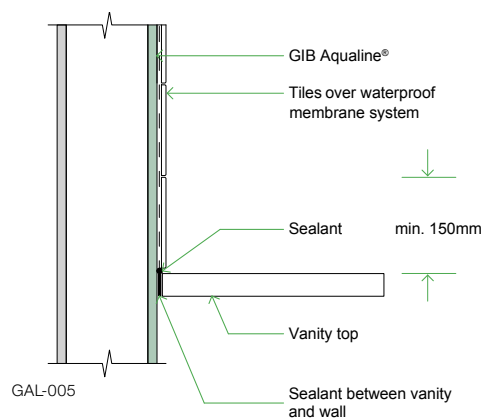
D: SEALING WET AREA PENETRATION



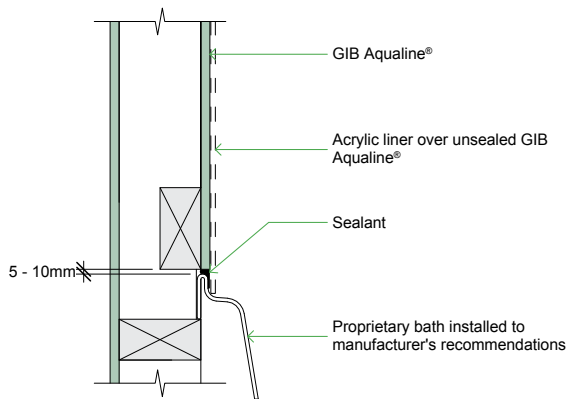
E: BATH CRADLE LINING DETAIL



F: VANITY TOP LINING JUNCTION

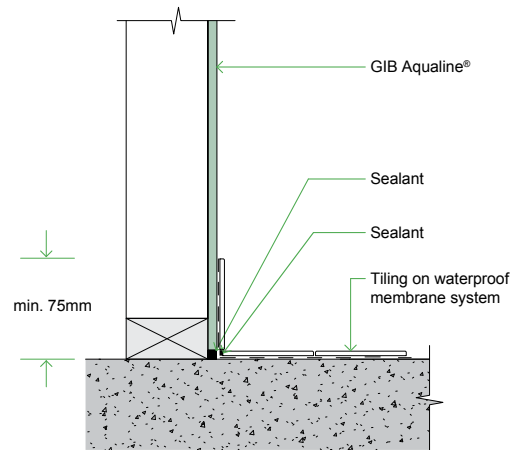


A: BATH LINING JUNCTION



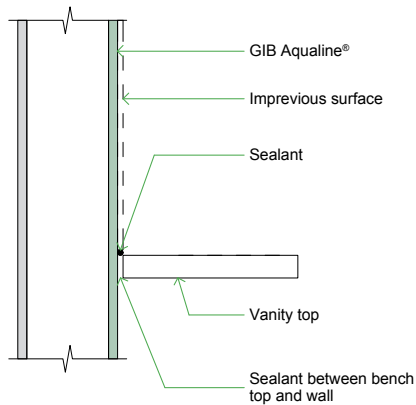
GAL-011

D: CERAMIC FLOOR SKIRTING LINING JUNCTION



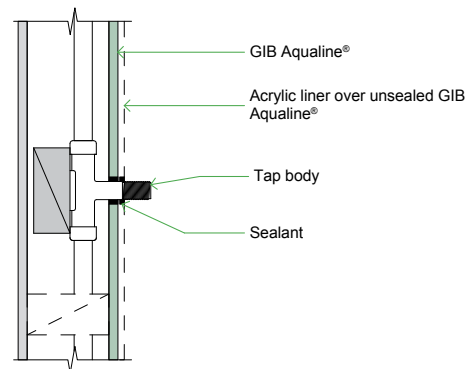
GAL-001

B: VANITY TOP LINING JUNCTION



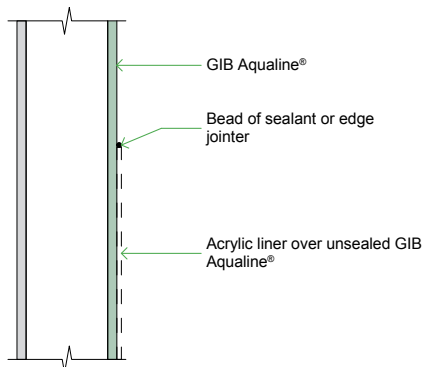
GAL-023A

E: SEALING SEMI WET AREA PENETRATION



GAL-019

C: UNSEALED PLASTERBOARD LINING



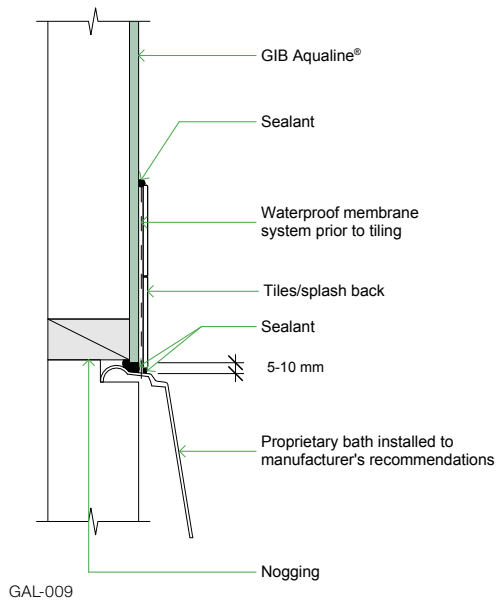
GAL-028

F: SHOWER MIXER PENETRATION IN WET WALL LININGS

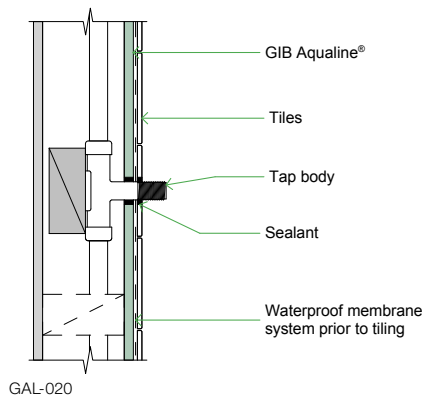
Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



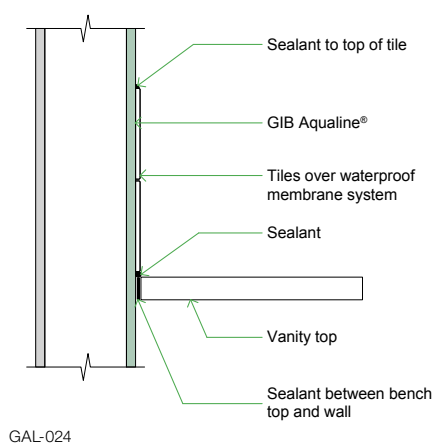
A: BATH LINING JUNCTION



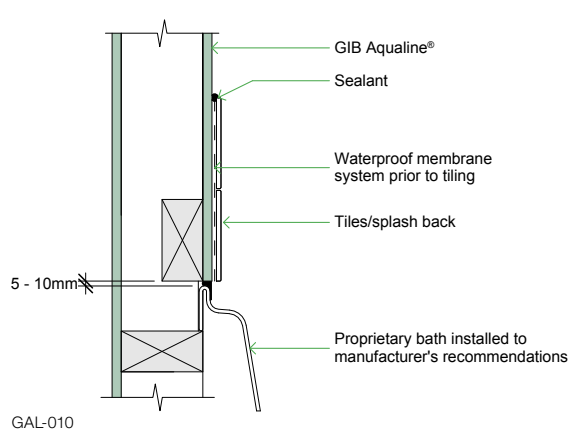
B: SEALING SEMI WET AREA PENETRATION



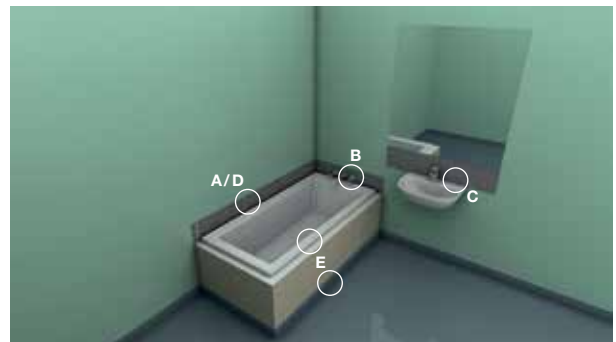
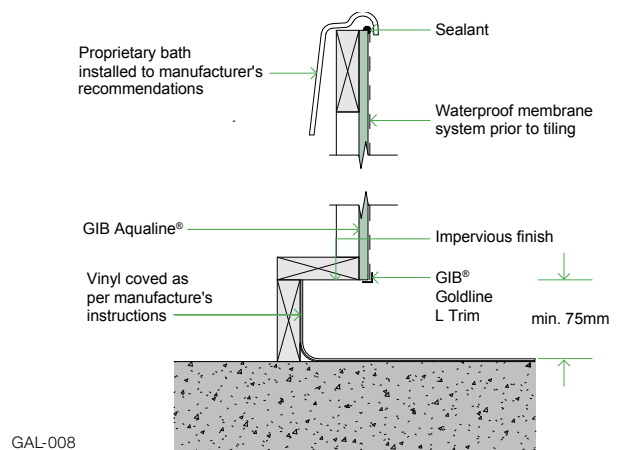
C: VANITY TOP LINING JUNCTION



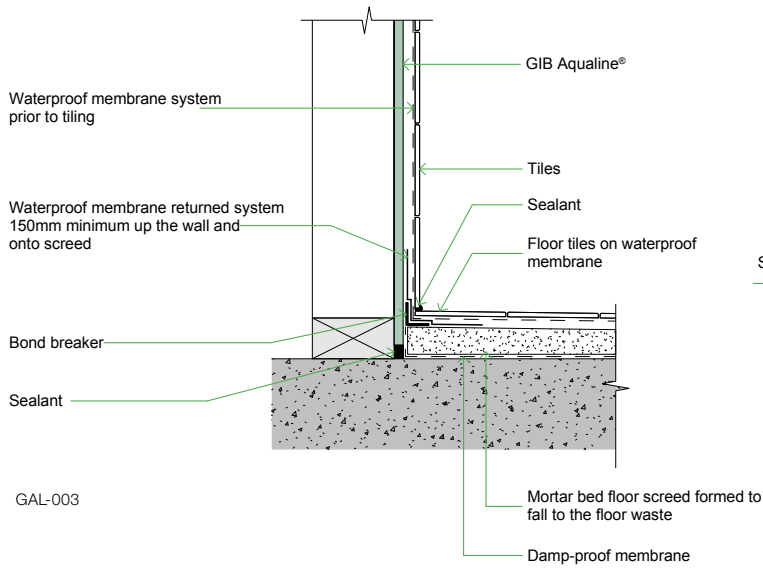
D: BATH LINING JUNCTION



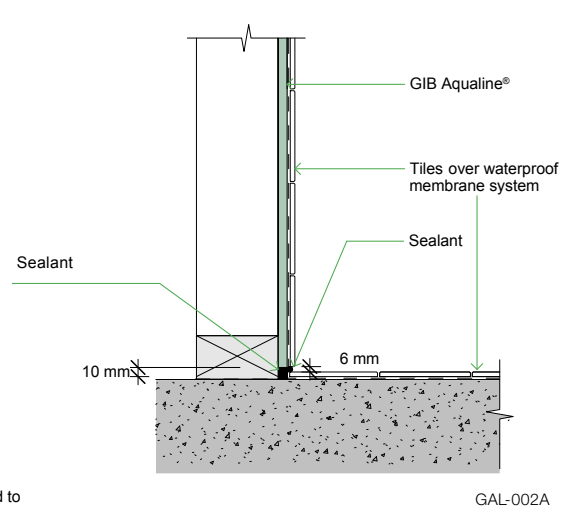
E: CRADLE VINYL LINING JUNCTION



A: MORTAR UNDER CERAMIC FLOOR LINING JUNCTION



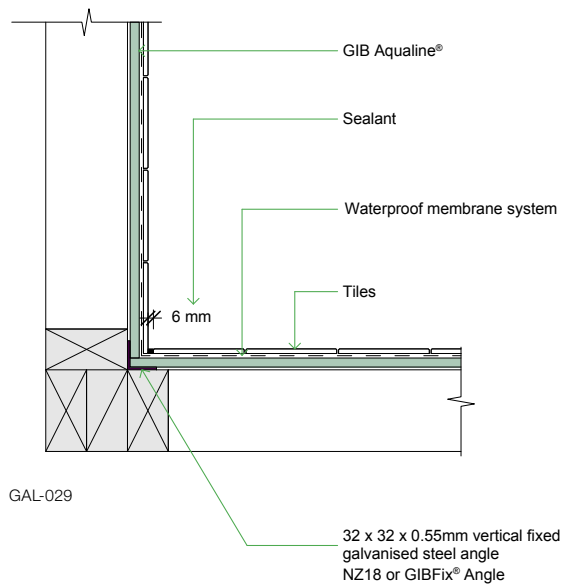
C: CERAMIC FLOOR LINING JUNCTION



PREFORMED SHOWER BASE JUNCTIONS

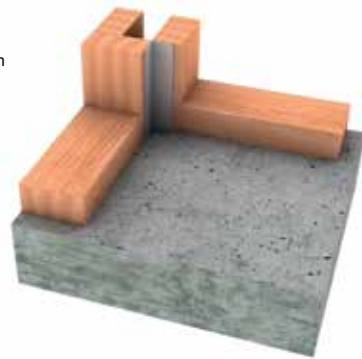
Refer to the shower base manufacturer for proprietary shower tray installation detailing including wet wall lining junction detailing.

B: TILED INTERNAL CORNER



D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.

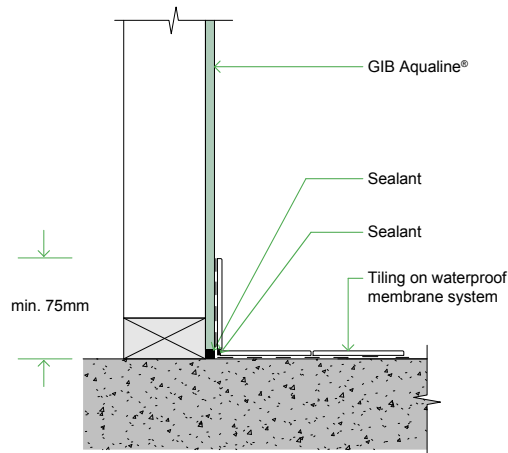


E: SHOWER MIXER PENETRATION IN WET WALL LININGS

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.

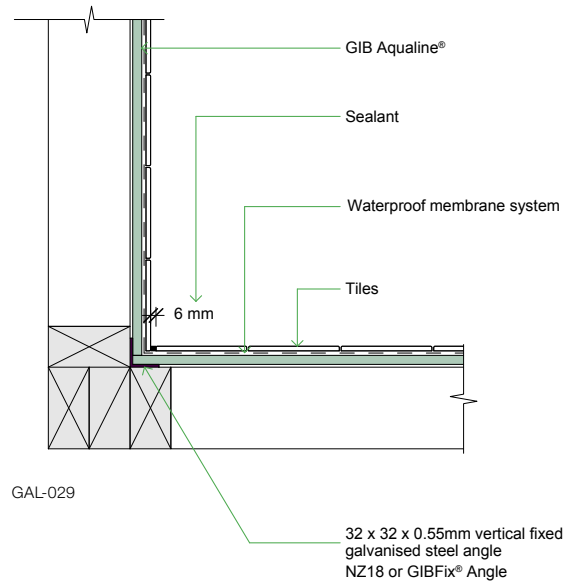


A: CERAMIC FLOOR SKIRTING LINING JUNCTION



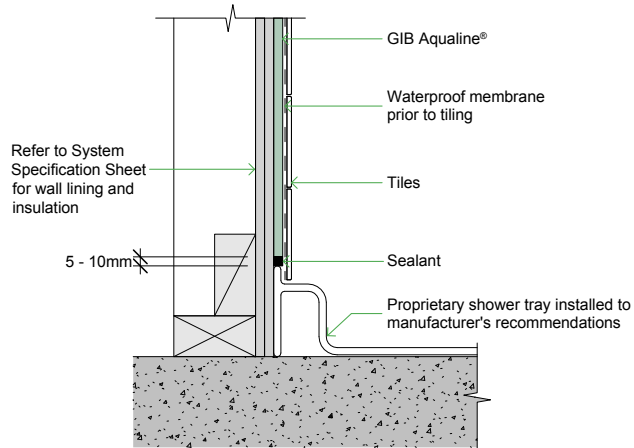
GAL-001

C: TILED INTERNAL CORNER



GAL-029

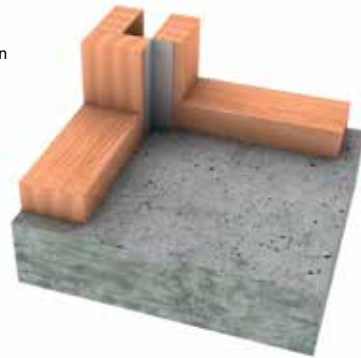
B: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



GAL-016

D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.

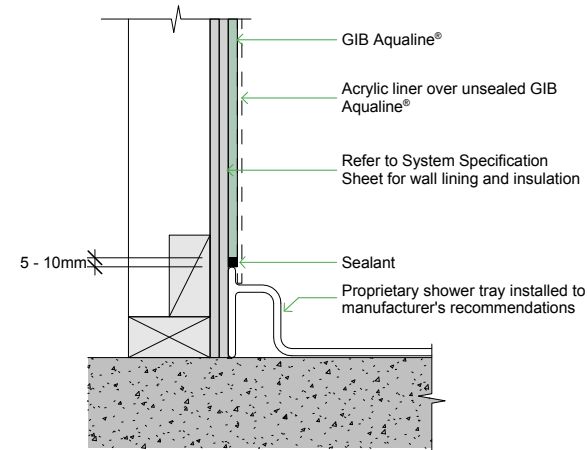


E: SHOWER MIXER PENETRATION IN WET WALL LININGS

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.

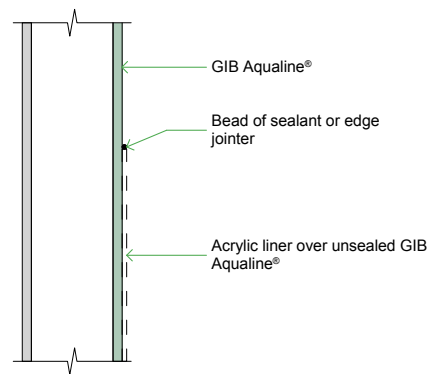


A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



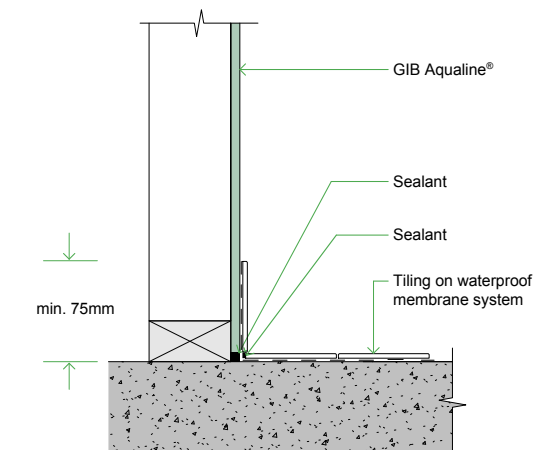
GAL-015

C: UNSEALED PLASTERBOARD LINING



GAL-028

B: CERAMIC FLOOR SKIRTING LINING JUNCTION



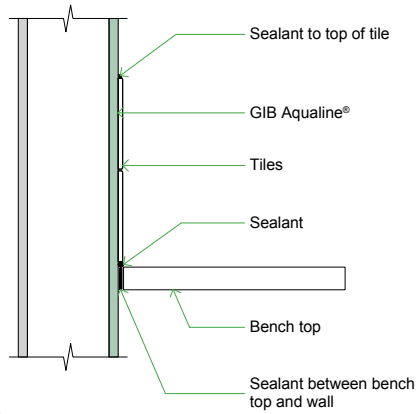
GAL-001

D: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

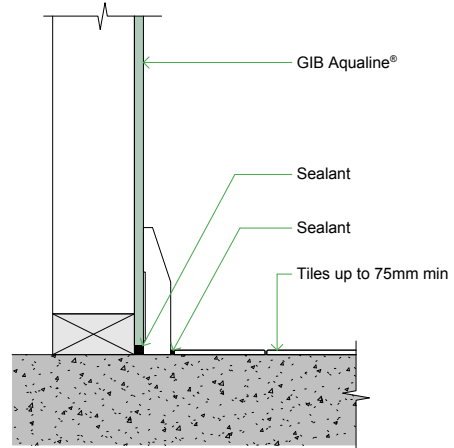


A: BENCH TOP LINING JUNCTION



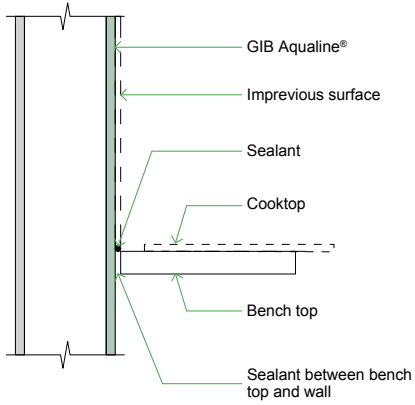
GAL-024

CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001A

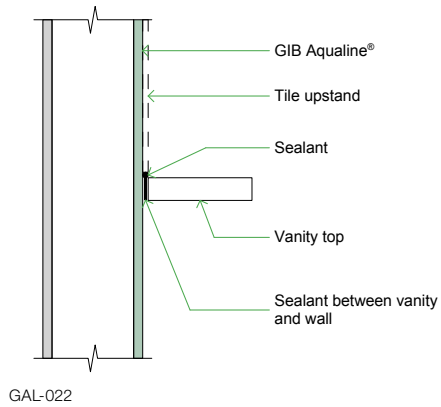
B: COOKTOP LINING JUNCTION



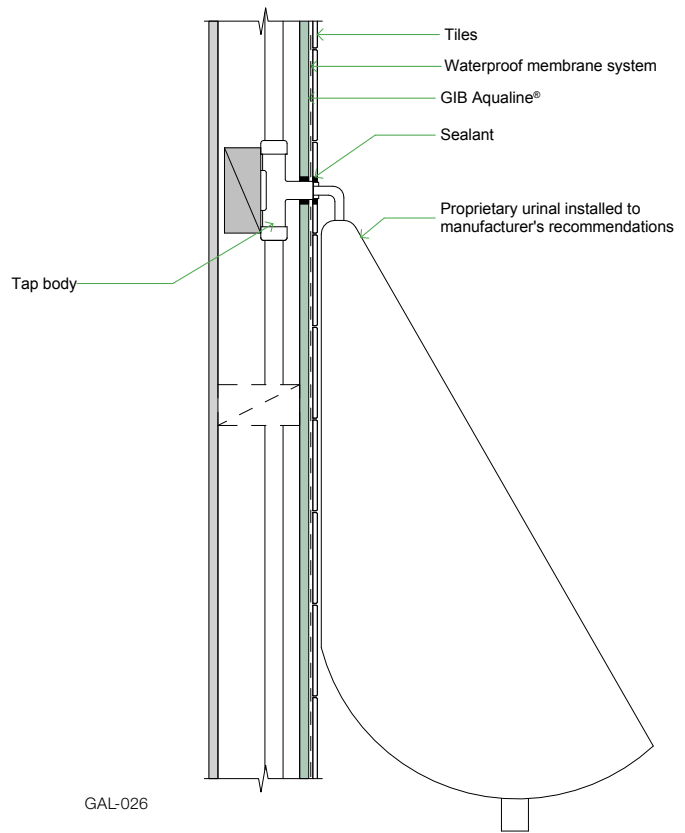
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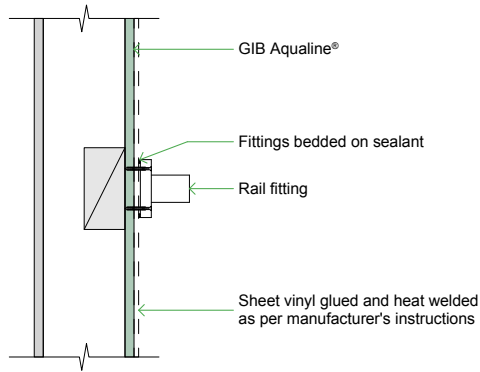
A: VANITY TOP LINING JUNCTION



B: SEALING WET AREA PENETRATION LINING JUNCTION

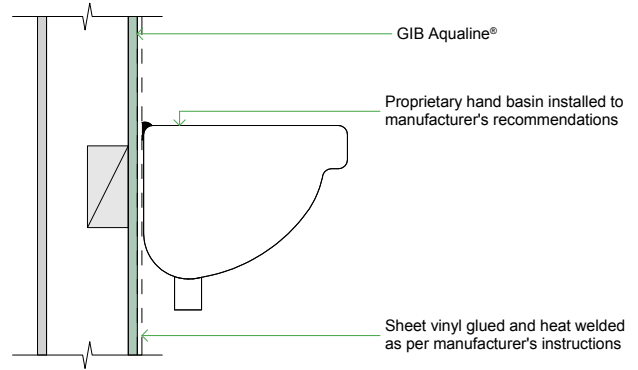


A: SURFACE MOUNTED WITH NOG



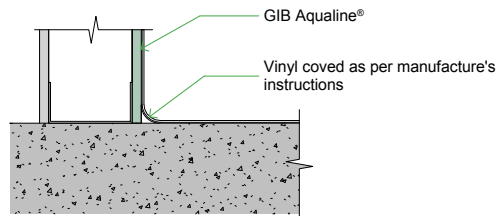
GAL-027

C: BASIN LINING JUNCTION



GAL-025

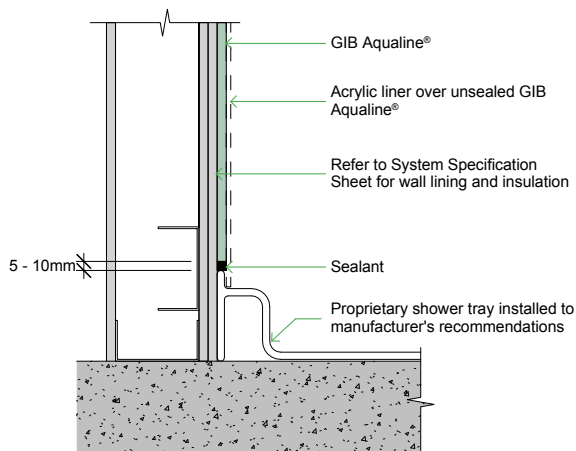
B: VINYL FLOOR LINING JUNCTION



GAL-006A

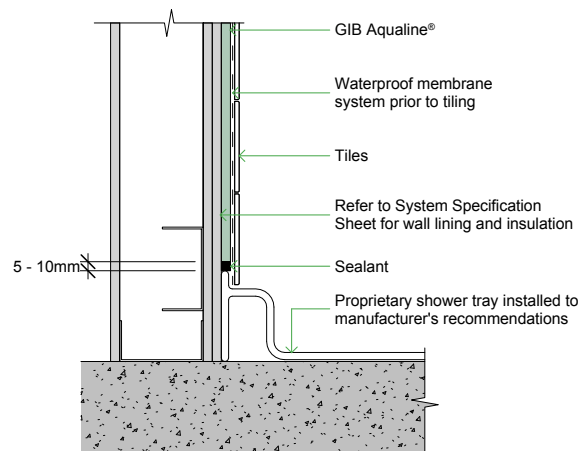


A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



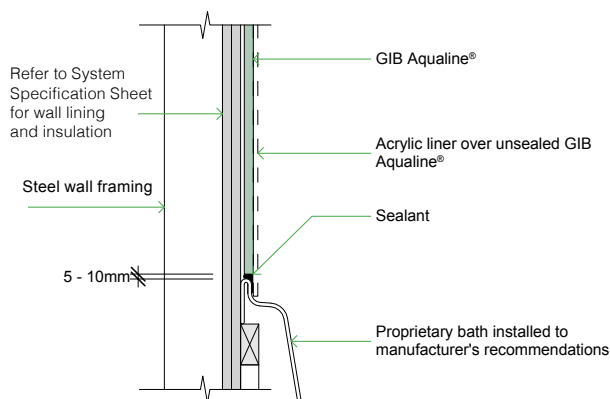
GAL-017

C: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



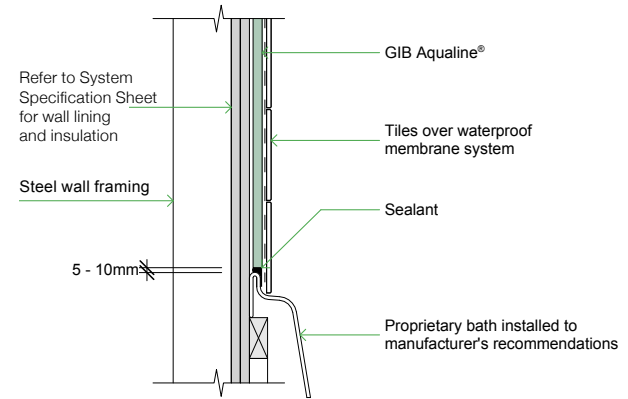
GAL-018

B: BATH DOUBLE LINING JUNCTION



GAL-013

D: BATH DOUBLE LINING JUNCTION



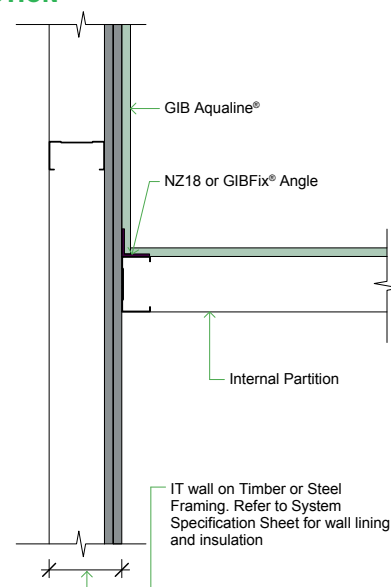
GAL-014

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.

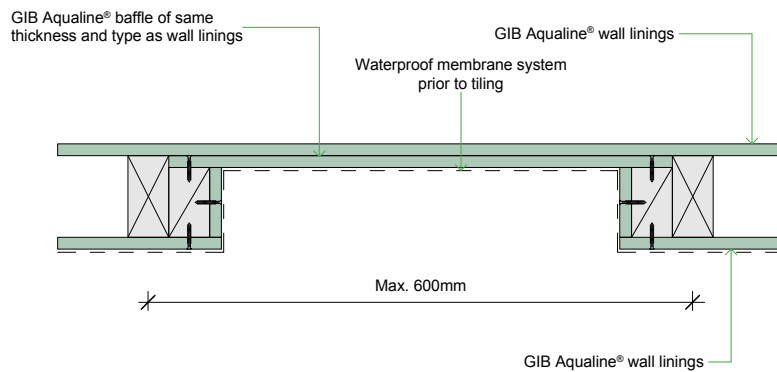
Do not tile on the resilient side of a GIB Rail® or Acoustic Resilient Mount (ST-001) and channel noise control system.

E: INTERTENANCY WALL AND WET AREA WALL JUNCTION

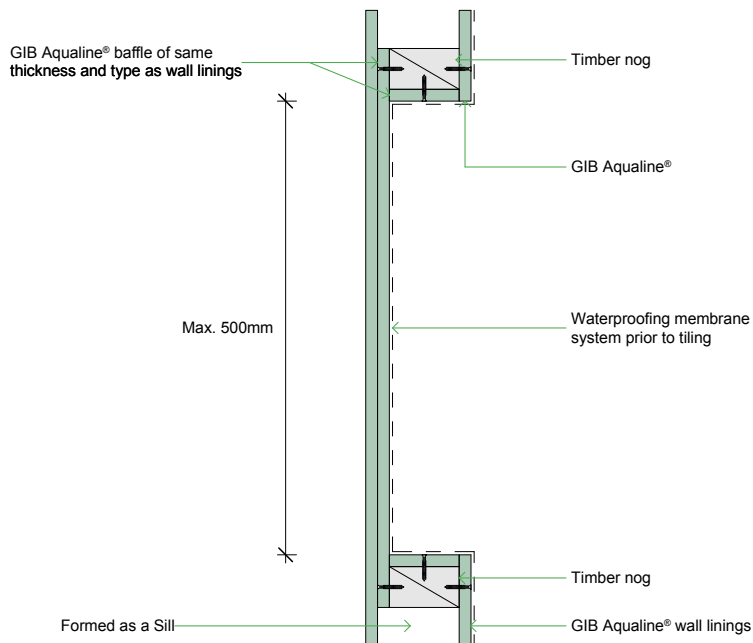


GAL-031C

TIMBER FRAME TILE RECESS

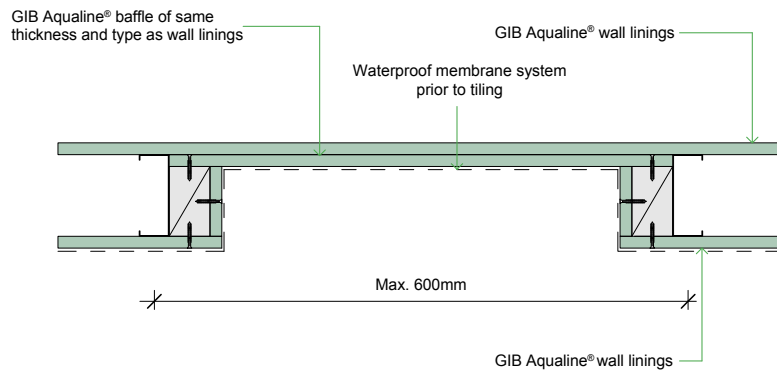


Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.

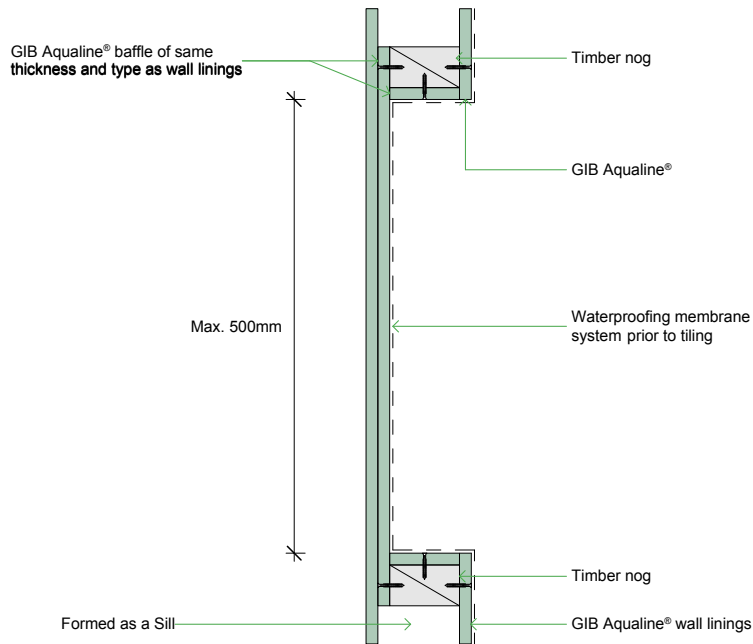


GAL-029B

STEEL FRAME TILE RECESS



Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.



GAL-030

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



Product and System Warranty



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.

YOU'RE PROTECTED WITH GIB® PLASTERBOARD SYSTEMS



BRANZ Appraised
Appraisal No. 427 [2007], 940 [2016],
928 [2016], 394 [2017], 289 [2018],
1048 [2019]

For over 90 years, building professionals have relied on GIB® plasterboard systems. Locally made for local conditions, they meet or exceed the New Zealand Building Code, are BRANZ appraised and are backed by full technical information and support to give complete confidence in using GIB® Plasterboard Systems*.

*When installed and maintained strictly in accordance with the relevant Winstone Wallboards literature current at the time of installation and under normal conditions of dry internal use, unless otherwise permitted in GIB® literature.

Winstone Wallboards is committed through its heavy investment in quality management and technical support to ensure that GIB® products and systems perform as claimed. Comprehensive statements of 'fitness for purpose', functional performance and code compliance (including durability) are contained in GIB® literature and in the relevant BRANZ Appraisal.

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 is unable to support system performance where substitute products are used as these have not been tested by us as part of our systems and we cannot be responsible for the ongoing quality and performance of these products.

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. Individual GIB® products are always covered by the GIB® product warranty even if these are not used as part of a full GIB® system. Winstone Wallboards warrants that GIB® products will be free from defects caused by factory workmanship or materials and, subject to compliance with the conditions attached, 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. This Product and System Warranty is transferable to subsequent owners of the building.

NZ BUILDING CODE CLAUSE B2 - DURABILITY

The New Zealand Building Code sets the required durability standard for specific elements of building work. Clause B2 Durability aims to ensure that building elements and buildings are durable enough so all other objectives of the Building Code are satisfied throughout the life of the building, without the need for reconstruction or major renovation.

GIB® SYSTEMS DURABILITY

The following systems have, unless stated otherwise in the technical literature, a serviceability life in excess of that stated and satisfy the requirements of NZBC Clause B2 Durability.

15 YEARS

- GIB Aqualine® Wet Area Systems
- GIB Weatherline® Rigid Air Barrier Systems**

** 50 years where the cladding durability requirement is 50 years.

50 YEARS

- GIB® Fire Rated Systems
- GIB EzyBrace® Systems
- GIB X-Block® Systems
- GIB Noise Control® Systems



CONDITIONS OF WARRANTY:

This warranty is subject to the following conditions.

Nothing in these conditions excludes or modifies any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law:

- (a) Receipt of your written claim as soon as practicable but in any event within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation. We may also request written proof of purchase as a condition to considering your claim;
- (b) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code, and in compliance with other regulations and standards that apply to the project;
- (c) This warranty only applies to the initial application of the product and/or system where used and maintained in accordance with the relevant Winstone Wallboards product and/or system literature (including GIB® Site Guide instructions, GIB® Systems details and GIB® Plasterboard Lining Systems Care and Maintenance document), other manufacturers' instructions (where applicable if the GIB® products and/or systems are attached to, or dependent on, other manufacturers' products) and good trade practices current at the time of installation, under normal conditions of dry internal use (unless otherwise permitted in GIB® literature), and does not apply to reuse of any product after initial installation;
- (d) If a claim under this warranty is covered, we will work with you to find a solution, which might involve product replacement and assistance with replacement work. Any recoating of GIB® products may result in slight colour differences between the original and replacement GIB® products. Depending on the situation, notwithstanding the foregoing, Winstone Wallboards will, at its option, (1) supply replacement product, (2) rectify the affected product or (3) pay for the cost of the replacement of the affected product.

Winstone Wallboards will not be liable for any losses or damages arising as a result of the breach of warranty or the defective product or systems, other than as set out in this paragraph (d);

- (e) This warranty does not apply to, and Winstone Wallboards will not be liable for, any claims, damages or defects arising from or in any way attributable to events outside of Winstone Wallboards' control including, but not limited to, poor workmanship or poor design/detailing, settlement or structural movement, failure in and/or movement of materials to which the product is attached or dependent on, performance of paint/coatings applied to the product, normal wear and tear, organisms or growths on or within the product, or any acts of God;
- (f) GIB® Systems have been tested and approved to work together as a full building system as set out in GIB® literature and are supported as outlined in the GIB® Product and System Warranty. For any guidance, recommendation, review, information, or assistance ("Guidance") we provide that may fall outside of GIB® Systems and Product literature, we endeavour to provide helpful Guidance based on the information provided to us at the time on an all care, no liability basis. It remains the full responsibility of the receiver of the Guidance to ensure the adequacy and appropriateness of any course of action taken on the project and application it is being used in;
- (g) To the extent permitted by law, all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded.

Before using this publication check whether it is the current publication by calling the GIB® Helpline weekdays on 0800 100 442 or visit gib.co.nz

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Note: To obtain copies of Winstone Wallboards Ltd literature or BRANZ Appraisals, please contact the GIB® Technical Helpline 0800 100 442 or download from gib.co.nz.

Related BRANZ Appraisals can also be downloaded from www.branz.co.nz/appraisals.

GIB® RONDO® METAL BATTEN SYSTEMS

SYSTEM AND INSTALLATION MANUAL

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



GIB® Rondo® Metal Batten Systems

Specification and installation guide

- Suitable for Residential and some commercial applications
- GIB® Rondo® metal battens are the recommended system for use in ceilings in conjunction with 13mm GIB® plasterboard
- Easy to install; achieve a flat and true ceiling
- A stable substrate that reduces the risk of costly call backs

GIB® Rondo® Metal batten systems

Winstone Wallboards accepts no liability if the system is not installed in strict accordance with the instructions contained in this publication.

Use only the current specification

This publication may be superseded by a new publication. Winstone Wallboards accepts no responsibility for reliance on superseded publications. Call 0800 100 442 or visit www.gib.co.nz to confirm the currency of the publication.

Beware of substitution

The performance of GIB® Rondo® Metal batten systems is very sensitive to design detailing and specification. It is important that only GIB® Rondo® branded products are used in the systems contained in this publication. No responsibility will be accepted for alternative manufacturers product.

Customised design solutions

The systems detailed in this publication should cover most commonly encountered situation. For projects where specific performance is required please contact our technical support team on 0800 100 442.

GIB® RONDO® METAL BATTEN SYSTEM



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GIB® RONDO® METAL BATTEN SYSTEM



INTRODUCTION

AUGUST 2012

WHY METAL?

A large proportion of ceiling defects such as peaking or cracked joints and popped fasteners can be attributed to movement in the substrate. Timber ceiling substrates are more prone to temperature or moisture induced movement and shrinkage. These issues tend to impact on the surface of the plasterboard and can result in call-backs. Metal ceiling batten systems provide a stable substrate for plasterboard ceiling linings. Regular users of metal batten systems consistently have fewer call-backs for movement related ceiling defects such as peaking or cracked joints and popped fasteners. Once builders change to GIB® Rondo® metal battens they appreciate the simple installation methodology and enjoy reduced callbacks. Very few, if any, revert back to using timber.

Benefits of steel battens include;

- **Consistent performance**
 - Less influence from moisture or environmental factors than timber. Unlike timber battens which can vary in grade, species with temperature and humidity, the performance of GIB® Rondo® metal battens is consistent throughout New Zealand
- **Lighter weight**
 - Lower transport costs and easier to handle on site
- **Require less storage space**
 - Storage space is often at a premium on building sites and a house-lot of GIB® Rondo® componentry will occupy substantially less space on site than timber battens
- **Easy to achieve a flat, stable substrate**
 - This results in a trouble free ceiling and reduces the risk of costly call-backs

Benefits of GIB® Rondo® metal batten systems

- **Versatility**
 - The extensive componentry range provides solutions to a multitude of situations
- **Technical back up**
 - Our well established and highly rated technical team are available to quickly and efficiently handle any enquiries, call us on 0800 100 442
- **Flexibility**
 - GIB® Rondo® metal batten systems can be used on residential and some commercial ceilings. Components are also available for use in wall strapping situations and have been tested and approved for use in GIB® noise control systems

There are two systems to select from;

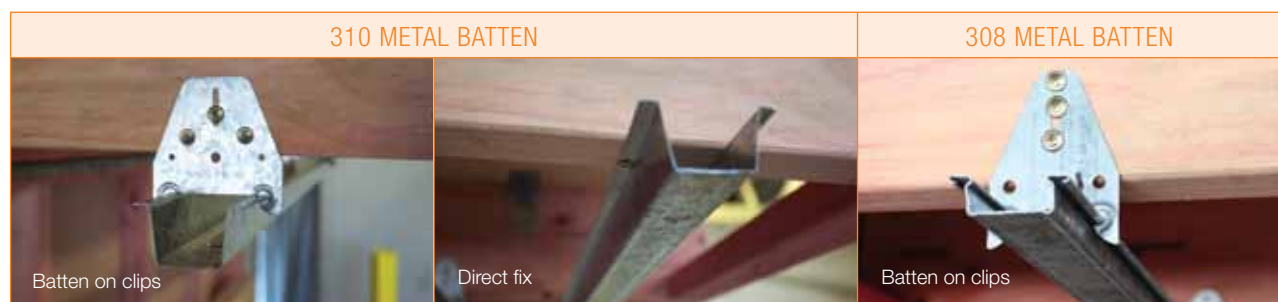
GIB® Rondo® 310 metal batten system – (35mm battens)

The GIB® Rondo® 310 metal batten system comprises a 35mm deep batten. The recommended method of fixing is to use clips as illustrated below.

This provides a flat substrate for the plasterboard ceiling as it is able to compensate for any deviations in the framing. If the substrate is consistently flat the battens can be attached directly to the underside of the framing.

GIB® Rondo® 308 metal batten system – (16mm battens)

The GIB® Rondo® 308 ceiling batten is a light weight system based on a 16mm deep batten fixed to a clip attached to the ceiling framing as shown.



IMPORTANT NOTE:

Manufactured from 0.55BMT steel with a Z275 coating exceeding the NZBC durability requirements for interior use

GIB® RONDO® METAL BATTEN SYSTEM



GIB® RONDO® 310 METAL BATTEN SYSTEM

AUGUST 2012

GIB® RONDO® 310 CEILING BATTEN SYSTEM

The GIB® Rondo® 310 system forms a strong, stable and flat substrate for ceilings in residential and commercial applications. The 35mm dimension allows it to be directly substituted into ceilings where 35mm timber battens would traditionally have been used. Consult an electrical contractor for any earthing requirements that may need to be incorporated. There are two methods of fixing GIB® Rondo® 310 metal battens.

Recommended method

Clipped using either;

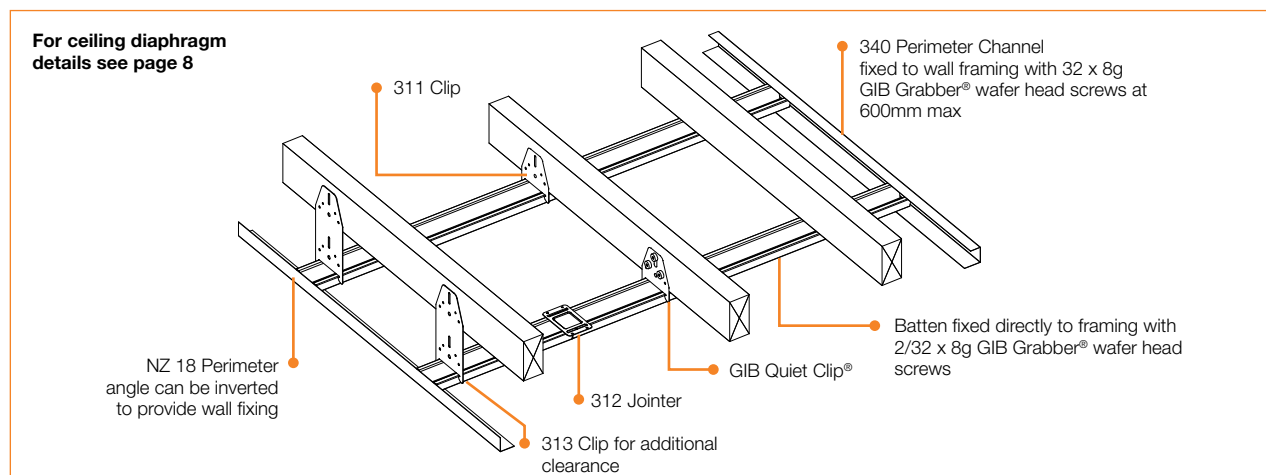
- 311 clip for a drop of 0-30mm
- 313 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten a drop of up to 130 mm can be achieved in order to accommodate services or variations in framing heights
- GIB Quiet Clip® for use in GIB® Noise control systems

Alternative method

- Directly by fastening with pairs of min GIB Grabber® 32mm x 8g wafer head screws through the flange (consult span tables pg 5)
- Alternatively pairs of min 45mm x 2.8mm FH nails can be used
- For fixing to steel framing a drill tip screw is recommended

311 CLIP	GIB QUIET CLIP®	313 CLIP
<p>Bottom edge of framing</p> <p>Top edge of ceiling batten</p> <p>Back face of ceiling lining</p>	<p>Rubber washer</p> <p>0 - 30mm</p> <p>35mm</p>	<p>Bottom edge of framing</p> <p>0 - 130mm</p> <p>35mm</p>

GIB® RONDO® 310 BATTEN	312 JOINTER CLIP	340 PERIMETER CHANNEL	NZ18 PERIMETER ANGLE
<p>35</p>	<p>312</p>	<p>35</p> <p>32</p> <p>340</p>	<p>32</p> <p>NZ18</p>



GIB® RONDO® METAL BATTEN SYSTEM

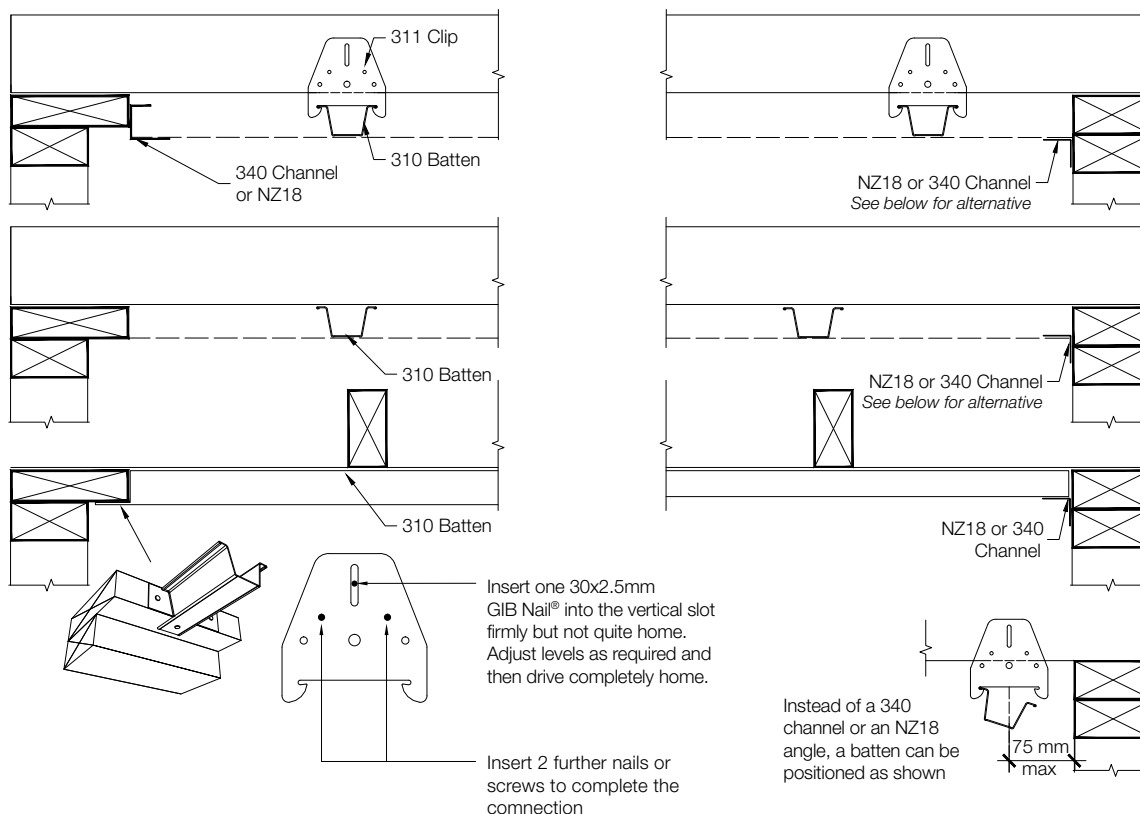


GIB® RONDO® 310 METAL BATTEN SYSTEM

AUGUST 2012

GIB® RONDO® METAL BATTEN SYSTEM INSTALLATION INSTRUCTIONS

Consult an electrical contractor for any earthing requirement that may need to be incorporated

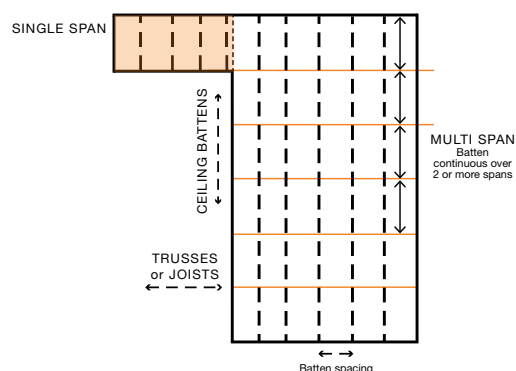


- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm plasterboard) using the string line to establish the correct position
- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Rondo® 310 Batten Span Table for Residential Internal Applications

GIB® Plasterboard thickness Single layer	Maximum batten spacing (mm)	Multi Span (mm)	Single Span and Garages (mm)
10mm	450	1200	900
13mm	600		

For situations not covered by this chart please contact the GIB® Helpline on 0800 100 442



GIB® RONDO® METAL BATTEN SYSTEM



GIB® RONDO® 308 METAL BATTEN SYSTEM

AUGUST 2012

GIB® RONDO® 308 METAL BATTEN SYSTEM

The GIB® Rondo® 308 system is a light weight yet very strong ceiling batten. In addition to its function as a ceiling batten it can also be used as a wall furring channel and is an integral part of GIB® Noise control systems. See page 9 for details. Consult an electrical contractor for any earthing requirements that may need to be incorporated.

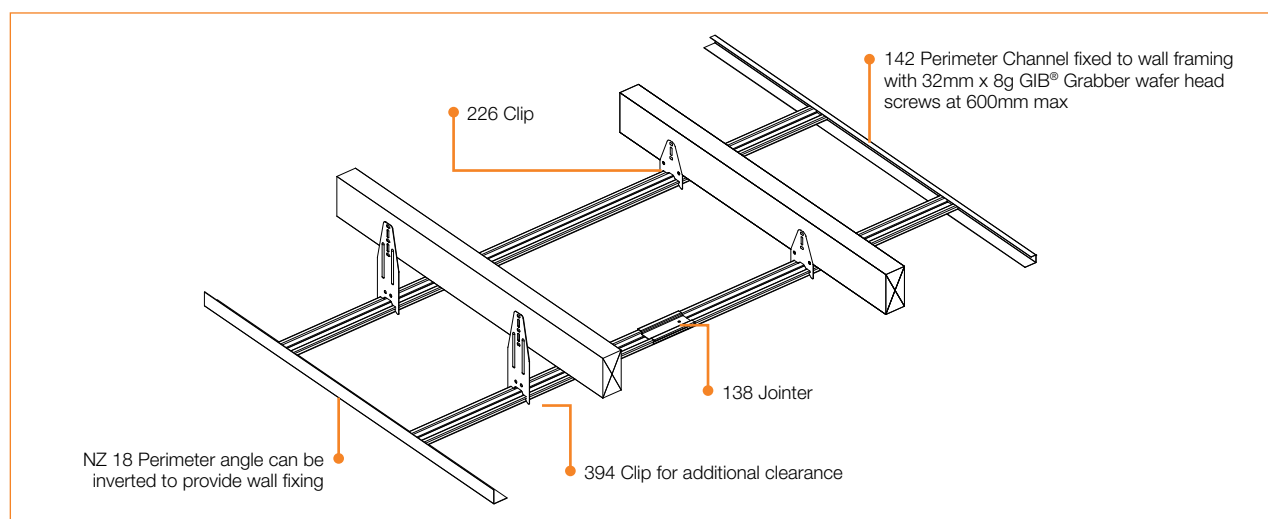
The GIB® Rondo® 308 system is installed using either;

- 226 clip for a drop of 0-30mm
- 394 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten. Up to 130 mm clearance between the bottom of the framing and the back of the batten of can be achieved in order to accommodate services or variations in framing heights

Note: If the 308 system is to be used in a ceiling diaphragm, the batten needs to be secured directly to the framing. See page 8 for details.

226 CLIP	394 CLIP
<p>Bottom edge of framing</p> <p>Top edge of ceiling batten</p> <p>Back face of ceiling lining</p> <p>0 - 30mm</p> <p>16mm</p>	<p>Bottom edge of framing</p> <p>0 - 130mm</p> <p>16mm</p>

GIB® RONDO® 308 BATTEN	138 JOINTER	142 PERIMETER CHANNEL	NZ 18 PERIMETER ANGLE
<p>16</p>	<p>138</p>	<p>142</p> <p>25</p>	<p>NZ18</p> <p>32</p> <p>25</p>



GIB® RONDO® METAL BATTEN SYSTEM

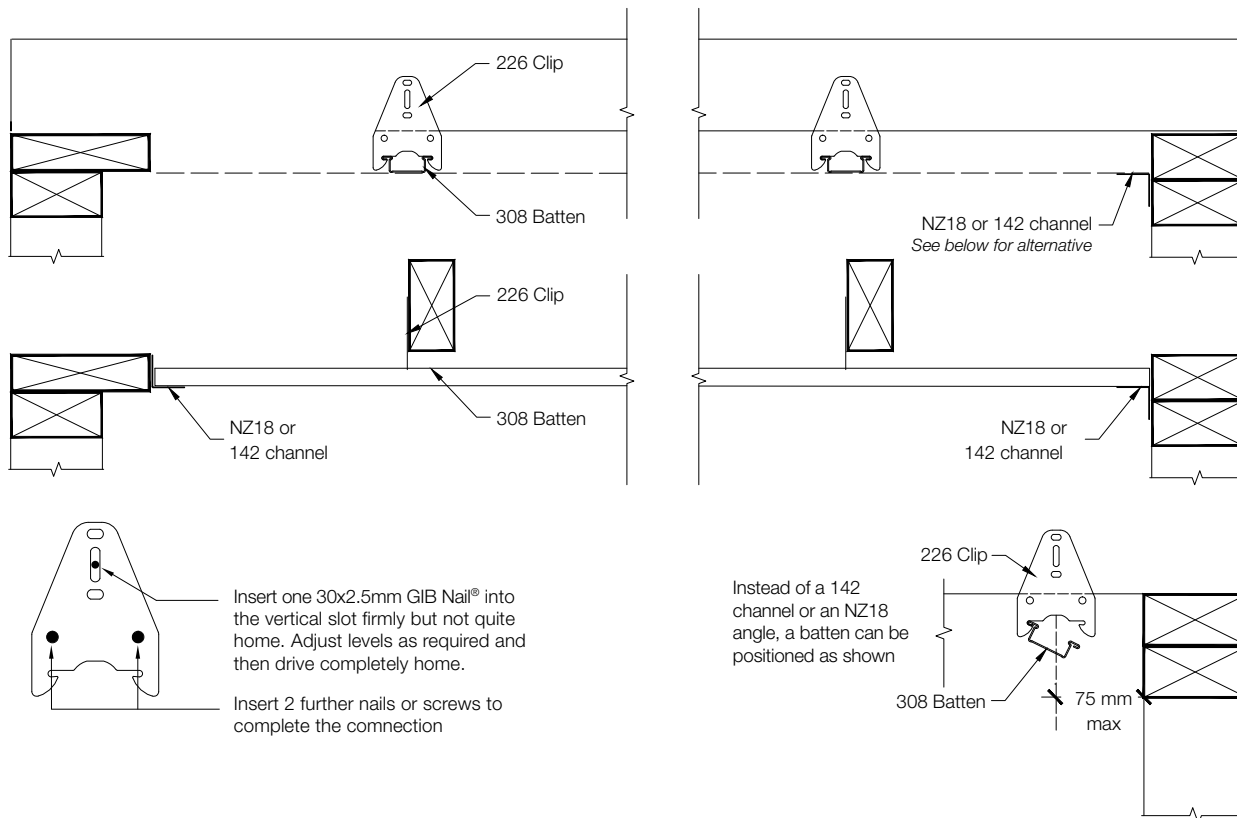


GIB® RONDO® 308 METAL BATTEN SYSTEM

AUGUST 2012

GIB® RONDO® METAL BATTEN SYSTEM INSTALLATION INSTRUCTIONS

Consult an electrical contractor for any earthing requirement that may need to be incorporated.

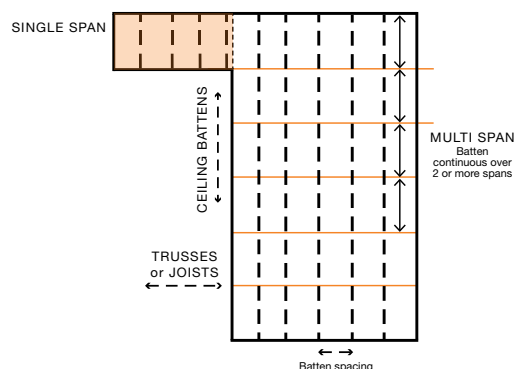


- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm plasterboard) using the string line to establish the correct position
- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Rondo® 308 Batten Span Table for Residential Internal Applications

GIB® Plasterboard thickness Single layer	Maximum batten spacing (mm)	Multi Span (mm)	Single Span and Garages (mm)
10mm	450	1200	900
13mm	600		

For situations not covered by this chart please contact the GIB® Helpline on 0800 100 442



GIB® RONDO® METAL BATTEN SYSTEM



GIB® RONDO® COMPONENTS

AUGUST 2012

Ceiling Diaphragms using GIB® Rondo® Metal Battens

GIB® Rondo® metal batten systems may be used in ceiling diaphragms as required for GIB Ezybrace® systems provided that;

- The batten is either fixed directly to the underside of the ceiling framing OR
- The batten is fixed to a block or continuous member that has been securely attached to the ceiling framing with 4x90mm nails (minimum)

NOTE: It is not acceptable to install a ceiling diaphragm on clips without additional support as shown below:

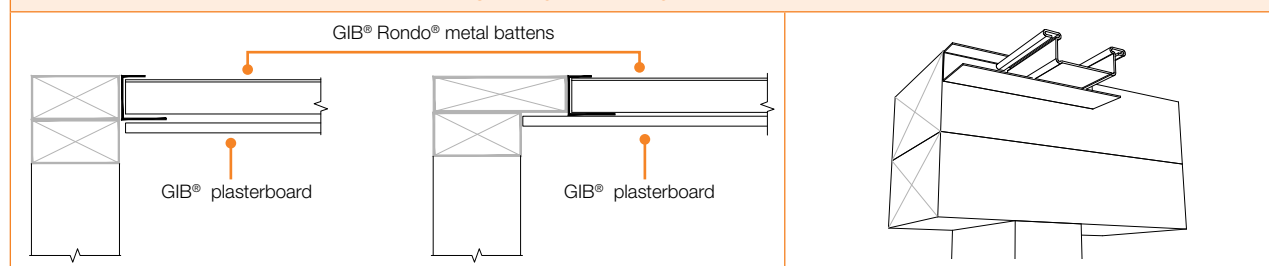


Timber block (min 300mm)
or continuous member
alongside framing

GIB® Rondo® batten to be fixed
with 32mm x 6g GIB® Grabber®
screw through both flanges.

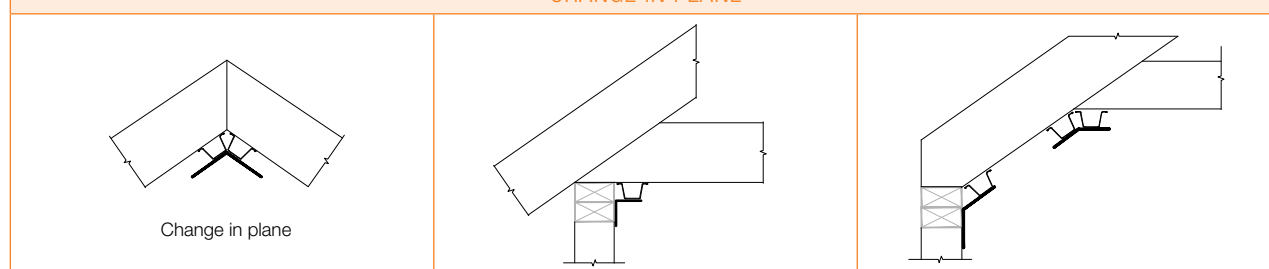


CEILING DIAPHRAGM PERIMETER



Perimeter channel, (340, 142 or 140) to be fixed with 32mm x 8g GIB® Grabber® wafer head screws at 300mm centres

CHANGE IN PLANE



Changes in plane can be achieved by attaching a folded metal angle to the junction.

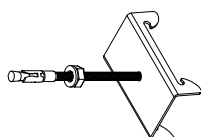
- Minimum 0.55mm BMT
- Fastened on each edge using 2.8mm x 30mm GIB® Nails or 32mm x 8g GIB® Grabber® wafer head screws at 300mm centres
- Plasterboard linings to be fastened to each edge of the folded angle at 150mm centres

GIB® Rondo® wall strapping systems

In addition to the ceiling batten function the GIB® Rondo® 308 batten system can be used as a wall strapping channel for masonry or concrete wall construction. The adjustable length masonry anchor allows insulation to be installed if required.

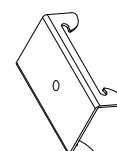
A239 CLIP

Threaded hole,
Masonry anchor included
(100mm or 180mm)



237 CLIP

Unthreaded hole,
No masonry anchor included
Suitable for timber or masonry application



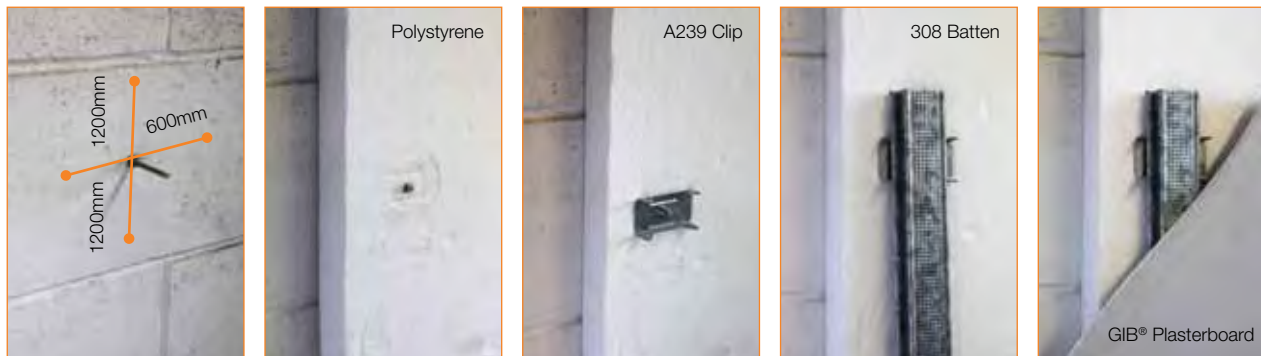
GIB® RONDO® METAL BATTEN SYSTEM



GIB® RONDO® COMPONENTS



AUGUST 2012

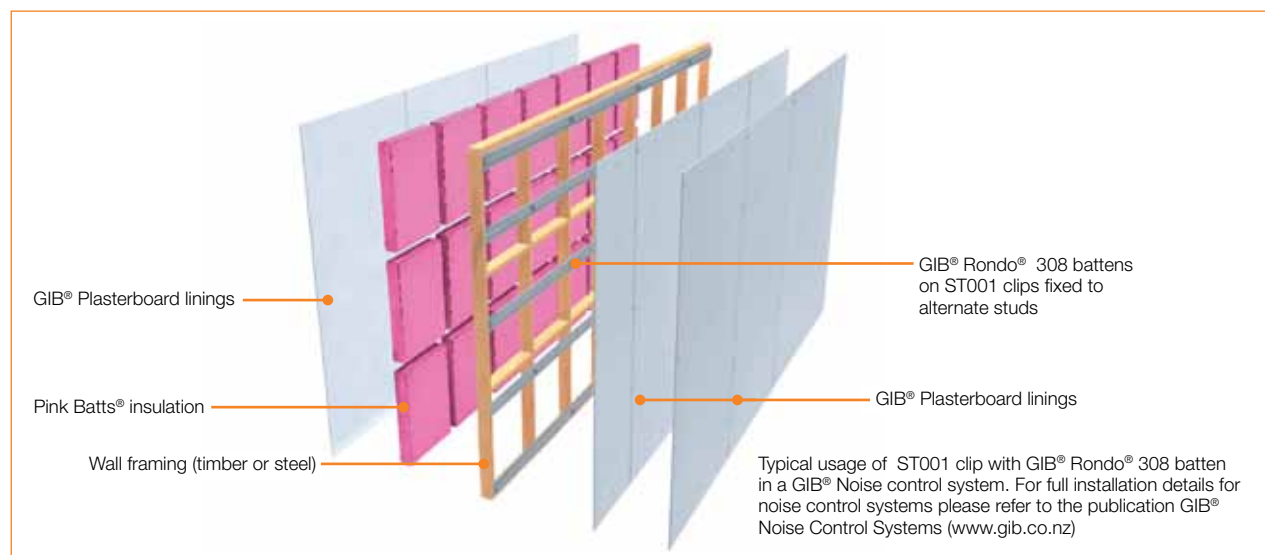
The A239 clip can be used in conjunction with the 308 batten to provide an effective wall strapping solution. If required polystyrene insulation can be fitted over the anchor bolts. A239 clips should be spaced at 1200mm centres vertically (max) and 600mm centres horizontally (max).



GIB® Rondo® and Noise Control

GIB® Rondo® metal batten systems play an important part in GIB® Noise control systems.

GIB QUIET CLIP®	ST001 ACOUSTIC MOUNT
 <p>The GIB Quiet Clip® has rubber grommets that provide isolation between the ceiling and the ceiling framing. Installation is the same as for the 311 clip.</p>	 <p>The ST001 clip has a threaded rubber washer to provide isolation from the wall framing. The thread allows the clip to be adjusted to compensate for framing deviations. The clip accepts the GIB® Rondo® 308 batten. This is a high performing noise control system and can deliver STC ratings up to 62.</p>



GIB® RONDO® METAL BATTEN SYSTEM



SUSPENDED CEILING SYSTEMS

AUGUST 2012

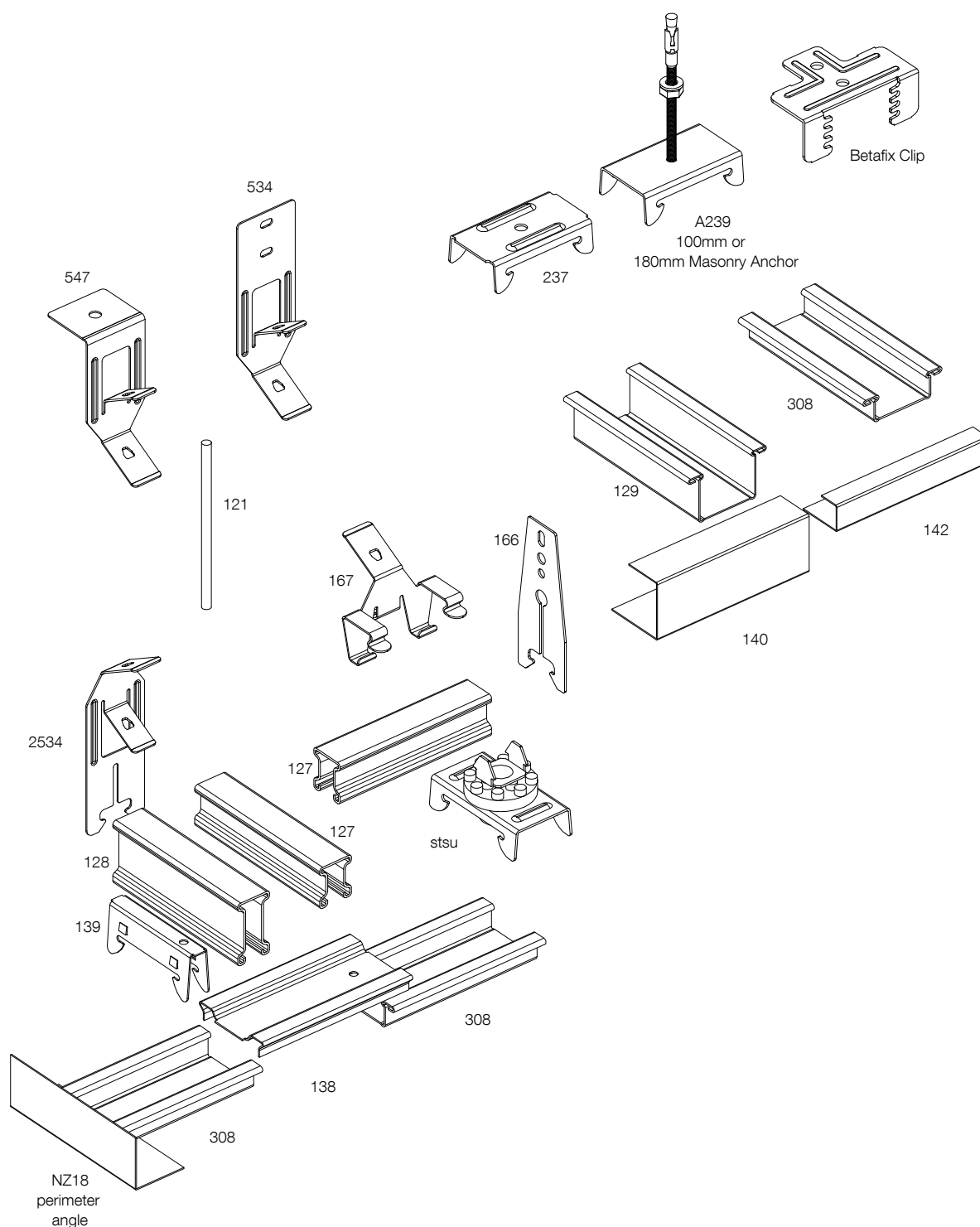
Suspended ceiling layout and spans are subject to specific design. For further information please contact the GIB® Help line on 0800 100 442

The range of GIB® Rondo® suspended ceiling componentry provides additional clearance above the ceiling level. This could be to run electrical, plumbing or ventilation equipment. The system allows for the ceiling lining material to be directly attached to the lower face of the battens. This is not to be confused with a two way grid system which accommodates proprietary ceiling tiles.

The components can be assembled in a wide range of combinations to suit a variety of applications.

Curved ceilings can also be created by curving the Top Cross Rail (TCR) and attaching the batten to the TCR.

For details on curving componentry contact the GIB® Helpline on 0800 100 442.

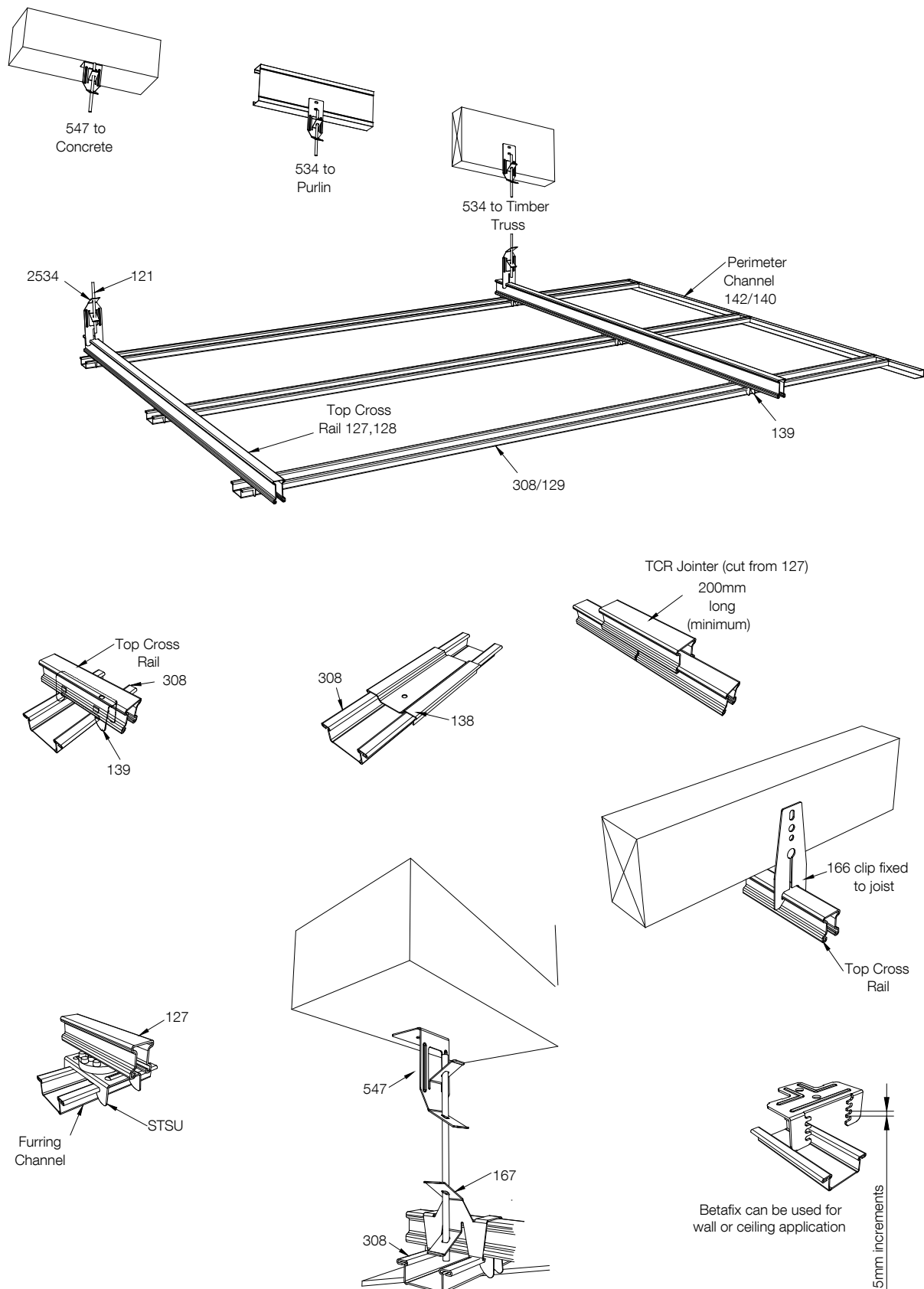


GIB® RONDO® METAL BATTEN SYSTEM



SUSPENDED CEILING SYSTEMS

AUGUST 2012



GIB® RONDO® CEILING BATTEN SYSTEM



NOTES

AUGUST 2012

GIB Products

Manufactured by Winstone Wallboards Ltd. Distributed nationwide by authorised distributors.

Trademarks

The names GIB®, GIB Ultraline®, GIB Toughline®, GIB Noiseline®, GIB Braceline®, GIB Aqualine®, GIB Wideline®, GIB Fyrelane®, GIB Soundseal®, GIB Cove®, GIB Rail®, GIB Tradeset®, GIB Handibrac®, the colour mauve for GIB Toughline® and the colour blue for GIB Braceline®, GIB Living Solutions®, GIB Living®, GIB Dry Zone®, GIB Tough Zone®, GIB Feature Zone®, GIB Fix®, GIB Quiet Zone® and EzyBrace® are all trademarks of Fletcher Building Holdings Ltd

GIB Helpline - Call Free

0800 100 442

Free Facsimile

0800 229 222

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www.gib.co.nz

Auckland

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Facsimile 09 - 633 0101

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Printed in New Zealand using mineral-oil-free inks on environmentally responsible Media Satin using PEFC pulp from a mill that is EMAS accredited and ISO 14001 certified.



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Site Guide

For Residential and
Commercial Installations.

CBI 5113

SEPT 2018.

RRP \$9.95 INCL
GST

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk





ABOUT WINSTONE WALLBOARDS

Winstone Wallboards Ltd, marketed under the GIB® brand, is New Zealand's largest manufacturer and marketer of gypsum plasterboard, drywall systems and associated products and services. Winstone Wallboards has manufactured plasterboard since 1927 and is committed to the advancement of the New Zealand building industry through ongoing technology development, industry skills training programmes, industry association sponsorship and a number of wider industry initiatives.

This guide provides you with the essential information needed when designing with, and installing, GIB® Systems.

GIB® Help Line – Call Free

0800 100 442

Free Facsimile

0800 229 222

Email

info@gib.co.nz

Website

gib.co.nz

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Barrierline®, GIB Braceline®, GIB Toughline®, GIB Toughline®Aqua, GIB Noiseline®, GIB Aqualine®, GIB® Nail, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIB Tradefilla®, GIB Fix®, GIB RocTape®, GIB Wideline®, GIB Trade Finish®, GIB® RediFilla™, GIB TradeFilla®, 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®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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GIB® Warranty Statement

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.**



BRANZ Appraised
Appraisal Nos. 427 [2007],
289 [2012], 340 [2016],
928 [2016], 394 [2017]

YOU'RE PROTECTED WITH GIB® PLASTERBOARD SYSTEMS**

Since 1927 building professionals have relied on GIB® plasterboard systems. Locally made for local conditions, they meet or exceed the New Zealand building code, are BRANZ appraised and are backed by full technical information and support to give complete confidence in using GIB® plasterboard systems*. Winstone Wallboards is committed through its heavy investment in quality management and technical support to ensure that GIB® products and systems perform as claimed. Comprehensive statements of 'fitness for purpose', functional performance and code compliance, including durability, are contained in GIB® literature and in the relevant BRANZ Appraisal.



*When installed and maintained strictly in accordance with the relevant Winstone Wallboards literature current at the time of installation and under normal conditions of dry internal use.

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.

NZ BUILDING CODE CLAUSE B2 – DURABILITY

The Building Code sets the required durability standard for specific elements of building work. Clause B2 Durability aims to ensure that building elements and buildings are durable enough so all other objectives of the Building Code are satisfied throughout the life of the building, without the need for reconstruction or major renovation.

GIB® SYSTEMS DURABILITY

The following systems have, unless stated otherwise in the technical literature, a serviceability life in excess of that stated and satisfy the requirements of NZBC Clause B2 Durability.

15 Years

- GIB Aqualine® Wet Area Systems

50 Years

- GIB® Fire Rated Systems
- GIB EzyBrace® Systems
- GIB X-Block® Systems
- GIB Noise Control® Systems
- GIB® Intertenancy Barrier Systems

**Visit gib.co.nz/warranty to view the full GIB® products and systems warranty including terms and conditions.



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1.0 INTRODUCTION

The planning, building and finishing of a home or commercial building has a large number of important considerations. This guide provides you with the essential information needed when designing with, and/or installing, GIB® systems.

GIB® systems specifically designed for fire rating, noise control, bracing and wet areas are not fully documented in this guide. Please refer to the relevant sections in the specific technical publications.

1.1 GIB® SYSTEMS LITERATURE

Winstone Wallboards offers an extensive range of tested systems to ensure compliance with the requirements of the New Zealand Building Code.

Detailed information about these systems can be found in GIB® systems literature (see p. 10–11).

1.2 GIB® PRODUCTS AND SYSTEMS

GIB® systems incorporate different GIB® products, which are manufactured or supplied by Winstone Wallboards and are distributed nationwide by authorised dealers.

Winstone Wallboards has a range of GIB® branded jointing compounds, adhesives, fasteners and other drywall products. It is recommended that these GIB® branded products are used with GIB® plasterboard systems. They

have been specifically developed or chosen by Winstone Wallboards for their compatibility with GIB® plasterboard systems.

Refer to the installation section for instructions on how to handle, store, install, fix and maintain GIB® products and systems. These instructions must be followed if GIB® systems are to achieve their claimed performance levels.

1.3 SUBSTITUTION

Winstone Wallboards accepts no liability if the systems are not installed in accordance with instructions contained in the GIB® technical literature. Substitution of specified or recommended components with alternative brands can compromise performance.

If alternative products are substituted into GIB® Systems it is the responsibility of the user to ensure that the performance of the system is not compromised.

1.4 ACHIEVING THE DESIRED FINISH QUALITY

No matter how smooth wall and ceiling linings may appear, they will never be 100% physically flat. It is possible however to achieve the 'appearance' of blemish free flatness with the

appropriate choice of a number of factors. For more detail refer to the 'GIB® Interior Finishing' literature. Download from gib.co.nz or call 0800 100 442 for a copy.

1.4.1 Levels of Finish

Having a clear understanding of the Levels of Finish is an important step in delivering an acceptable finished surface.

- Levels of Finish are a set of guidelines contained in AS/NZS 2589:2017 for specifying the required quality of finish prior to the application of decorative finishes such as paint
- No sheet lining material or substrate has a surface that is perfectly flat and totally free of minor imperfections
- It is important to be aware that Levels of Finish apply only to the finished plasterboard

surface PRIOR to the application of any paint or decorative systems

Often there is a gap between the finish that a customer expects and the finish that can realistically be delivered. There are several factors that influence the final finished appearance. These include:

- Natural or artificial light from a critical angle
- Installation techniques and workmanship
- Stopping techniques and workmanship

Three Levels of Finish are defined in AS/NZS 2589:2017.

Level 3 — Level 3 must be used in areas that do not require decoration, such as above ceiling level or inside service shafts and the like.

All joints and interior angles must have tape embedded in joint compound and one separate coat of joint compound applied over all joints and fastener heads. All joint compounds must be finished smooth. (Generally this is achieved by scraping off nibs and ridges and the like, with the edge of a trowel.)

Level 4 — Level 4 shall be the default level of finish for gypsum linings unless specified otherwise.

Flat or low sheen paints must be used for this level.

All joints and interior angles must have tape embedded in jointing compound and a minimum of two separate coats of jointing compound applied over all joints, angles, fastener heads and accessories. All jointing compound must be finished evenly and be free of tool marks and ridges in preparation for decoration.

Note:

- Under critical lighting conditions surface imperfections may still be apparent in a Level 4 finish.

Level 5 — Level 5 is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on flat or low sheen paints. Level 5 is characterised by a parity of texture and porosity. The surface texture must be random in fashion and monolithic, concealing joints and fixing points.

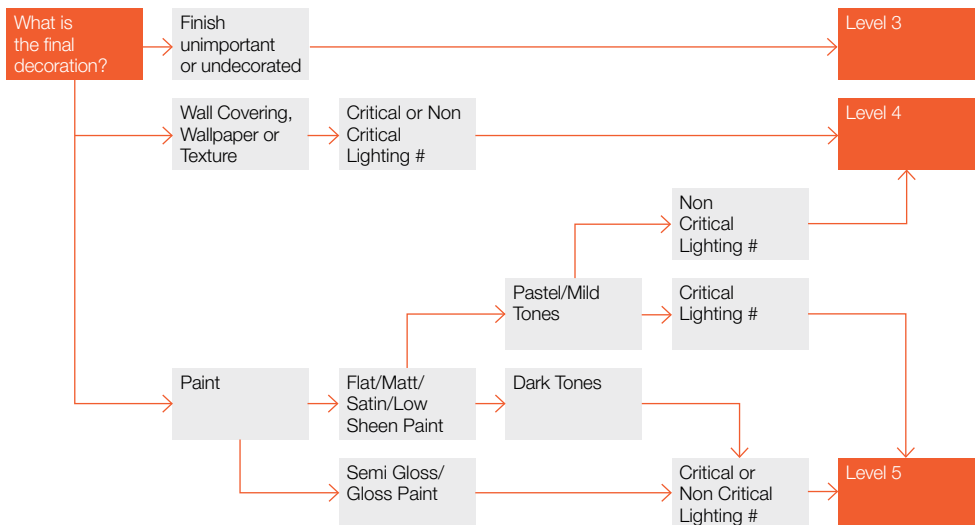
All joints and interior angles must have tape embedded in joint compound plus a minimum of two separate coats of joint compound applied over all joints, angles, fastener heads and accessories. All joint compound must be finished smooth and be free of tool marks and ridges.

A paint or plaster material shall then be sprayed, rolled or trowelled over the defined area in accordance with the manufacturers recommendations.

Note:

- Level 5 is difficult to achieve and always requires co-operation of the framer, plasterboard installer, plasterer and painter in establishing suitable work practices that deliver the agreed paint finish for the given project
- Some minor imperfections may still be visible in a Level 5 finish, however these will be minimised under the additional measures applied under Level 5
- The surface of the defined area may require sanding to be suitable for decoration

1.4.2 Levels of Finish Selection Chart



* May not be suitable for subsequent decoration to high levels of quality in the future. Refer to Level 4 or 5 for upgrading requirements.

Critical lighting – when the light source is nearly parallel to the surface.

Non critical lighting – when the light striking the surface is diffused and / or at right angles



1.4.3 Levels of Finish Guidelines

For light timber framed construction as extracted from AS/NZS 2589:2017.

Note: It is important to recognise that the Level of Finish approach was developed to optimise

installed plasterboard surfaces IN PREPARATION for decoration and NOT as a basis for establishing acceptance or rejection criteria for the final decorated surface.

		Levels of Finish Guidelines		
		Level 3	Level 4	Level 5
Framing Requirements				
Maximum deviation from a 1800mm straight edge along or across adjacent framing members	90% of measured points must be less than 4mm 10% may be no more than 5mm		90% – less than 3mm 10% no more than 4mm	
Timber moisture content at the time of lining	18% or less. NZS 3602 recommends lower moisture content (8% - 18%) if heat pumps, air conditioning or central heating are to be installed			
Installation Requirements				
Wall Joints	Sheets must be set out to minimise joints, usually requiring wall sheets to be horizontally fixed			
Joints round openings	Vertical joints must not coincide with the vertical edge of doors or windows. If a joint needs to be made in this area it must be made above the opening, no closer than 200mm to the edge of the opening			
Control Joints	Control Joints must be positioned at maximum 12.0m centres in either direction. See p. 48			
Sheet and butt joints in ceilings	These must be made centrally between ceiling battens and back blocked. Butt joints should be staggered by at least 600mm			
Sheet end butt joints in walls	Can be made on framing or back blocked between studs		All joints must be back blocked	
Tapered edge joints in ceilings	Back blocking not required but is still highly recommended	Must be back blocked in areas with 3 or more sheet edge joints on timber battens (6 if metal battens have been used) Not required in ceiling suspension systems. See p. 47	All joints must be back blocked	
Finishing Requirements				
Joints	All joints must have GIB® jointing tape embedded in joint compound PLUS 1 additional coat of joint compound applied over all joints, angles, accessories and fastener heads	All joints must have GIB® jointing tape embedded in joint compound PLUS 2 additional coats of joint compound applied over all joints, angles, accessories and fastener heads.		
Additional requirements			A skim coat must be applied to remove differential surface porosity	
*Tapered edge joint total width (incl. formed tapers in backblocked sheets).	170mm min.	250mm min.		
*Butt joint widths (flat joints)	340mm min.	500mm min.		
*Joint build-up	Maximum of 2mm build up across entire width as an even curve, without a distinct peak or ridge. Joint should not be hollow.			
*Joint surface (incl. internal and external corners)	No gouges, scratches, voids, pock marks or tool marks. Joint edges should be smooth and feathered without any scuffed paper. Edges should be an even straight line.			
*External angles	Must be plumb and straight. Minimum joint width 250mm. 3mm max build up at the metal angle over an even, gentle taper. Joint should not be hollow.			
*Internal angles	Must be plumb and straight. Minimum joint width 100mm. 2mm max build up at the corner, over an even, gentle taper. Joint should not be hollow.			

This chart is intended as a guide only to critical elements relating to Levels of Finish.

Full details of the requirements can be found in AS/NZS 2589:2017

*These minimum requirements have been extracted from AS/NZS 2589:2017

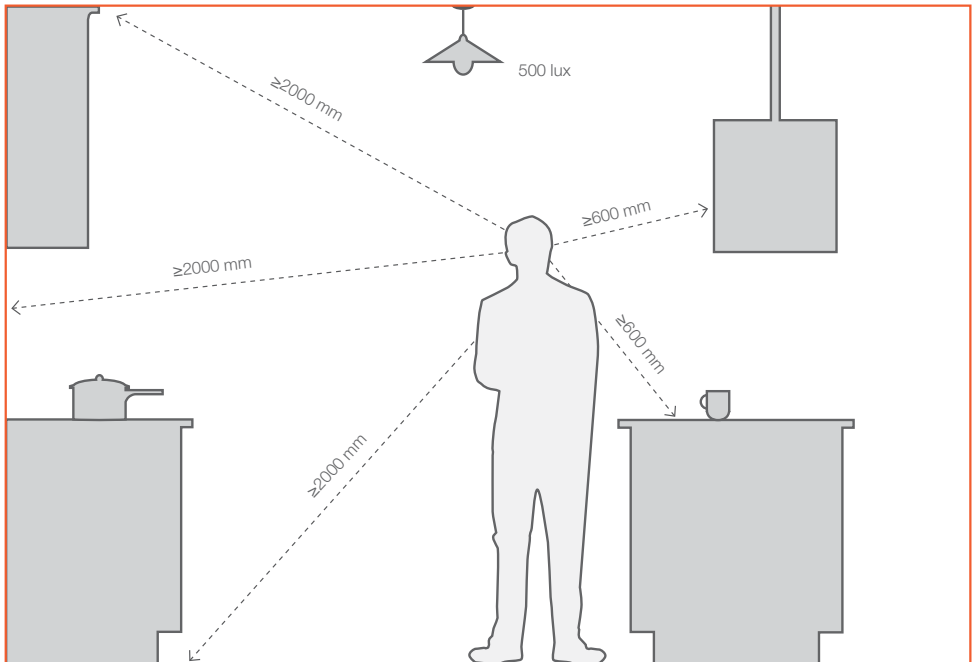
1.4.4 Assessment Of The Surface Condition At Handover

A satisfactory finish for plasterboard linings is dependent on a number of critical factors including the straightness of the underlying substrate to which they are attached. Careful management of localised build-up of joint compound on the surface of plasterboard linings during the finishing process of jointing, internal and external angles and fastener points is also required.

This clause shall be used to assess the finish of joints, angles and fastener points in plasterboard wall or ceiling linings, or both.

Visual satisfaction of the final job can be impacted by the quality of finished decoration. A sign-off form should be used at handover to assist in agreement between the parties on the quality of finish to avoid concerns being levelled at the finish of the plasterboard lining when it may relate to inadequate decoration.

Note: High intensity lighting is commonly used to provide light for work areas or application purposes but is not deemed suitable for performing a subjective visual inspection of interior surfaces. Inspection should be undertaken under normal lighting conditions (in the absence of critical lighting) and from normal viewing positions. See diagram below.



Normal viewing positions vary depending on the type of surface being inspected.

Taken from MBIE Guide to tolerances, materials and workmanship in new residential construction 2015.

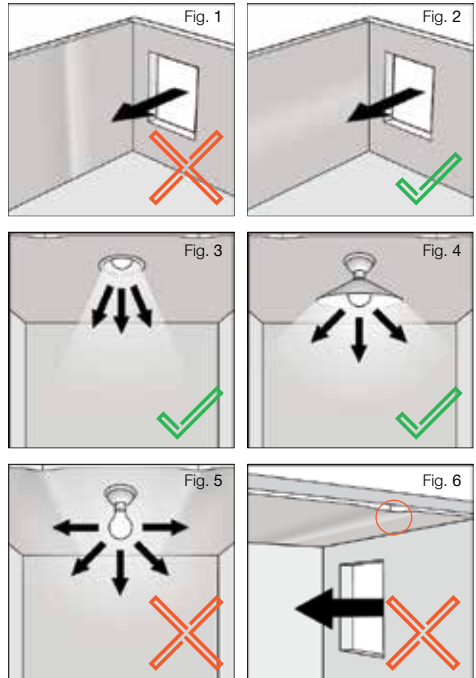
1.4.5 Critical Lighting

When light from sources such as windows, skylights and artificial wall or ceiling washer lights strike a surface at a shallow angle surface, irregularities tend to be exaggerated. This is termed

"critical lighting". When the angle of light is more or less at right angles to a surface, imperfections are less obvious – this is termed "non-critical lighting".

Minimising Critical Lighting

- Horizontal Fixing – fix GIB® plasterboard sheets horizontally instead of vertically on walls. GIB® plasterboard fixed horizontally allows glancing light from adjacent windows to shine along the joint reducing the "shadowing" effect that can be more noticeable with vertical fixed. Refer to Figures 1 and 2
- Sheet layout is often determined by the system being installed. Ensure that the sheet layout complies with the installation requirements of the particular system.
- Recessed downlights and light shades – incorporating recessed downlights or light shades help to channel light downwards. Refer to Figures 3, 4 and 5
- Spot Lights – avoid spot lighting or wall mounted up-lighting or be careful about where these lights are directed and the angle at which they hit a surface particularly near jointing
- Window Positioning and Shades – avoid positioning narrow windows hard up against the end of a wall or ceiling, particularly on long walls or ceilings at the end of a room or hallway. Making a window wider and placing it away from the room corner should reduce the critical lighting effect. Avoid taking windows right up to the ceiling level. Provide sunshades over the window or recess the window to stop the sunlight reaching the wall. Refer to Figure 6



1.4.6 Other Factors that Influence the Finished Surface

- Heavily textured or patterned finishes tend to hide imperfections
- Smooth, monolithic painted surfaces tend to highlight imperfections
- Matt finishes will aid in disguising imperfections. Conversely, high gloss paint will accentuate imperfections
- Variations in surface, such as negative details, will remove the focus from imperfections
- The method of paint application has an effect. Paint applied by roller will aid in disguising imperfections. Paint applied by spray can accentuate imperfections
- Lighter colours are less likely to show imperfections and are more effective at diffusing light and reducing shadowing, particularly in smaller rooms

1.5 HEALTH AND SAFETY

Under normal conditions of use, GIB® plasterboard presents no known health hazard.

Construction sites can contain multiple hazards. It is important that appropriate health and safety requirements are strictly followed in such environments.

For further information on safety, handling and installing GIB® products and systems refer to the installation section.

1.6 COMPLIANCE

Under normal conditions of dry internal use GIB® plasterboard systems have a service life complying with the durability requirements of NZBC B2 Durability.

The systems and product testing referred to in this guide have been carried out and/or appraised by BRANZ and various other independent testing organisations.

1.7 LIMITATIONS

GIB® plasterboard (paper faced):

- Must not be installed externally or exposed to weather elements for long periods of time without being covered or protected *(refer to exceptions below)
- Must not be handled or installed while in a very damp or wet state
- Must not be placed or installed directly into surface water
- Must not be exposed to chlorine rich environments or areas where relative humidity is greater than 90% RH for long periods of time like; group showers, steam rooms or indoor heated swimming pools
- Must not be exposed to temperatures greater than 52°C for long periods of time as this may cause calcination of the core. Carefully consider the heat output from fittings like: halogen lights, cooking elements, fire places and flues etc. Consult the fitting manufacturer for specifications
- Must not support ceiling loads that exceed 3kg/m² including; light fittings, ceiling fixtures and insulation etc
- Can develop mould growth if left wet or damp for extended periods of time and exposed to airborne or surface contaminants. The plasterboard must be replaced if it has not been able to dry within approx. 48 hour period after becoming wet, or the water source has been contaminated

Electric Radiant Ceiling Heating (ERCH)

- ERCH systems may give rise to abnormal localised or overall temperature conditions in ceiling spaces which could affect the timber framing and GIB® plasterboard linings
- Excessive thermal or hygrometric movement induced by these systems may result in some, or combinations, of the following defects; deterioration of the gypsum in the GIB® plasterboard core (possibly affecting structural and fire resistant rating performance), fastener 'popping', joint peaking or joint cracking
- Prior to construction, we suggest you contact your designer to fully consider these factors in order to optimise surface finish quality
- Winstone Wallboards will not accept liability for surface finish quality problems where ERCH systems are installed in conjunction with any GIB® lining system

*Exceptions - the following range of plasterboard can be installed externally and exposed for the maximum times shown. The plasterboard must be installed in a dry state:

- 25mm GIB Barrierline® 12 weeks maximum
- 16mm GIB Fyrelite® (when used in the GIB Barrierline® system) 4 weeks maximum

1.8 COMPLAINTS PROCEDURE

Should a problem be encountered with any GIB® product during installation or delivery, immediately contact the GIB® Helpline on 0800 100 442. Do not continue to use the product that is not performing to specification or expectation. Keep

samples of the product in question and where possible, document batch numbers and/or manufacturing dates.



2.0 GIB® PRODUCT RANGE

Because of the volume of information it is not feasible to include all the GIB® systems publications in the GIB® Site Guide.

If you are installing any of the following GIB® Systems it is important that you obtain a copy of the relevant publication.

These can be accessed by:

- Downloading from gib.co.nz
- Download the GIB® App available from the App or Google Play Stores
- Contacting the GIB® Helpline on 0800 100 442
- Or from most GIB® stockists

2.1 GIB® SYSTEM BROCHURES



GIB EzyBrace® Systems

The GIB EzyBrace® Systems literature provides a guide to wall bracing of buildings constructed in accordance with NZS 3604:2011.



GIB Noise Control® Systems

GIB Noise Control® Systems provide the detail necessary to specify and install elements that will deliver noise control solutions for intertenancy and sub intertenancy requirements.



GIB Aqualine® Wet Area Systems

GIB Aqualine® with its water resistant core containing special polymers helps protect against damage to linings caused by moisture ingress.

The GIB Aqualine® Wet Area Systems literature provides full specification and installation details.



GIB® Fire Systems

GIB® Fire Rated Systems literature has been compiled to make it easy to specify passive fire protection systems that will form part of a complete fire design.



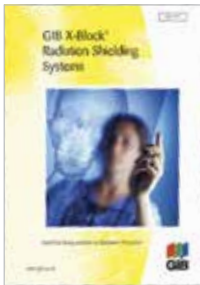
GIB® Tough Systems

GIB® Tough Systems provides information on reducing the effects of impact damage to walls.



GIB® Reverberation Control Systems

GIB® Reverberation Control Systems specifically address spaces with hard reflective surfaces, by absorbing sound.



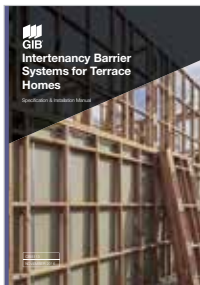
GIB X-Block® Radiation Shielding Systems

GIB X-Block® is a specialist plasterboard and jointing system to provide protection from X-ray radiation in medical facilities, dental clinics and veterinary practices.



GIB® Rondo® Systems

GIB® Rondo® Metal Batten Systems are a simple way to ensure that you get a straight and true ceiling every time.



GIB® Intertenancy Barrier Systems

Intended for multi-unit residential homes designed within the scope of NZS3604:2011, the GIB® Intertenancy Barrier System for Terrace Homes provides peace of mind, delivering fire, noise and security performance.



2.2 GIB® PLASTERBOARD RANGE

TE/TE – Both edges tapered. TE/SE – 1 tapered, 1 square edge.

Shaded box indicates availability

GIB® Standard

GIB® Standard is an economical lining material available in 10mm and 13mm thicknesses.

GIB Wideline® – 1350mm wide GIB® Standard is ideal for horizontal fixing for wall heights above 2.4m



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	10	1200									7.0
TE/TE	13	1200									9.0
TE/SE	10	1200									7.0
GIB Wideline® TE/SE	10	1350									7.0
GIB Wideline® TE/SE	13	1350									9.0
GIB® Patch Board	10	1200 x 590									7.0

GIB Braceline® / GIB Noiseline®

GIB Braceline® / GIB Noiseline® is a dual purpose board that provides high level bracing performance when used in GIB® Bracing Systems and helps reduce noise transmission through walls and ceilings. Refer to GIB Noise Control® Systems literature for noise control installation requirements.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	10	1200									9.3
TE/TE	13	1200									12.5
TE/SE	10	1200									9.3
TE/SE	10	1350									9.3

GIB Aqualine®

GIB Aqualine® has a water resistant core to help prevent moisture penetration. Refer to the installation section or GIB Aqualine® Wet Area Systems literature for installation requirements.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	10	1200									8.0
TE/TE	13	1200									11.0
TE/SE	10	1200									8.0
TE/SE	10	1350									8.0

GIB Ultraline®

GIB Ultraline® features a modified core for enhanced density and rigidity. Its Pearlcoat coated paper provides an enhanced surface appearance for high visibility areas.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	10	1200									7.5
TE/TE	13	1200									9.1

GIB Fyreline®

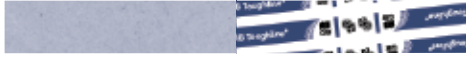
GIB Fyreline® has a high density modified core which resists exposure to fire longer than standard plasterboard. Refer to GIB® Fire Rated Systems literature for installation requirements.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	10	1200									7.0
TE/TE	13	1200									11.0
TE/TE	16	1200									15.3
TE/TE	19	1200									16.9

GIB Toughline®

GIB Toughline® is a high density, fibreglass mesh embedded plasterboard for added resistance to impact damage. Refer to GIB® Tough Systems literature for installation requirements.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	13	1200									11.7

GIB Toughline® Aqua

GIB Toughline® Aqua is a multi-performance plasterboard with multiple attributes including noise attenuation, impact, water, fire and bracing resistance. See the appropriate system literature for installation requirements.



	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	13	1200									11.4

GIB Barrierline®

GIB Barrierline® plasterboard is a key component in the GIB® Intertenancy Barrier system. Refer to GIB® Intertenancy Barrier or GIB® Noise Control Systems literature for installation requirements.

	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
SE/SE	25	600									20.2

GIB X-Block®

GIB X-Block® plasterboard provides protection from X-ray radiation. Refer to GIB X-Block® Systems literature for installation requirements.

	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	13	1200									18.3

GIB Quietline®

GIB Quietline® plasterboard is perforated producing unique patterns to absorb and reflect sound. Refer to GIB® Reverberation Control Systems literature for installation requirements.

	Thickness (mm)	Sheet Width (mm)	2400	2700	3000	3300	3600	4200	4800	6000	Max. kg/m²
TE/TE	13	1200									8.3

GIB® Plasterboard Sheet Coverage

Sheet width	1200	1200	1200	1200	1200	1200	1200	1200	1350	1350	1350
Sheet length	2400	2700	3000	3300	3600	4200	4800	6000	3600	4800	6000
Sheet area m²	2.88	3.24	3.60	3.96	4.32	5.04	5.76	7.20	4.86	6.48	8.10



2.3 BOARD SUBSTITUTION OPTIONS

With the wide range of plasterboard types there are occasionally some overlaps in functionality.

For situations not covered below contact the GIB® Helpline on 0800 100 442.

10mm Substitution Options

10mm GIB® Standard can be replaced with:	○	<ul style="list-style-type: none"> 10mm GIB Braceline® / GIB Noiseline® 10mm GIB Fyrelime® 10mm GIB Ultraline® 10mm GIB Aqualine®
10mm GIB Fyrelime® can be replaced with:	○	<ul style="list-style-type: none"> 10mm GIB Braceline® / GIB Noiseline® 10mm GIB Ultraline® 10mm GIB Aqualine® 13mm GIB® Standard
10mm GIB Braceline® / GIB Noiseline® can be replaced with:	○	<ul style="list-style-type: none"> 10mm GIB Aqualine® (see Note 1 below) 13mm or thicker GIB Fyrelime® (see Notes 1 & 2 below)

13mm Substitution Options

13mm GIB® Standard can be replaced with:	○	<ul style="list-style-type: none"> 13mm GIB Braceline® / GIB Noiseline® 13mm GIB Fyrelime® 13mm GIB Ultraline® 13mm GIB Aqualine® 13mm GIB Toughline® 13mm GIB Toughline® Aqua
13mm GIB Fyrelime® can be replaced with:	○	<ul style="list-style-type: none"> 13mm GIB Braceline® / GIB Noiseline® 13mm GIB Aqualine® 13mm GIB Toughline® 13mm GIB Toughline® Aqua (See Note 2 below)
13mm GIB Braceline® / GIB Noiseline® can be replaced with:	○	<ul style="list-style-type: none"> 13mm GIB Aqualine® (see Notes 1 & 3 below) 13mm or thicker GIB Fyrelime® (see Notes 1, 2 & 3 below) 13mm GIB Toughline® (see Note 3 below) 13mm GIB Toughline® Aqua (see Note 3 below)

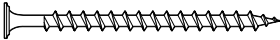
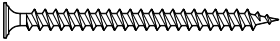
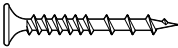
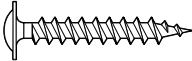

Note 1: The bracing element must be 900mm or greater in length. Fasteners to be at 100mm centres to the perimeter of the bracing element. Corner bracing fastener pattern applies. Hold downs required.

Note 2: Fastener type and length must be as specified for the relevant fire rated system.

Note 3: The bracing performance will be met but the noise control rating will be reduced.

2.4 GIB® FASTENERS



GIB® Grabber® Screws		Size	Quantities	
Plasterboard to Timber – High Thread				
Loose	25mm x 6g	200	1000	
	32mm x 6g	200	1000	
	41mm x 6g	200	1000	
	51mm x 7g	100		
	57mm x 7g	100		
Collated	25mm x 6g	1000		
	32mm x 6g	1000		
	41mm x 6g	1000		
	51mm x 7g	800		
Plasterboard to Steel – Fine Thread, Self Tapping				
Loose	25mm x 6g	200	1000	
	32mm x 6g	200	1000	
	41mm x 6g	200	1000	
	51mm x 7g	100		
	63mm x 8g	100		
	76mm x 8g	100		
Collated	25mm x 6g	1000		
	32mm x 6g	1000		
	41mm x 6g	1000		
Plasterboard to Timber/Steel GIB® Grabber® Dual Thread				
Collated	32mm x 7g	1000		
Metal to Timber – Wafer Head, Self Tapping				
Loose	32mm x 8g	200	1000	
Metal to Metal – Pancake Head, Drill Tip				
Loose	13mm x 8g	500		

GIB® Fastenings coverage	
Screws	Approx. 800 per 100m² plasterboard

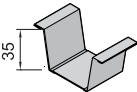
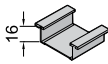
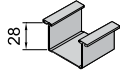
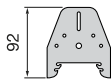
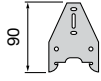
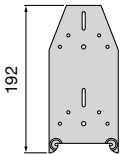
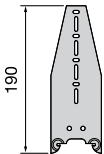
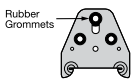
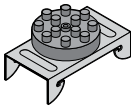
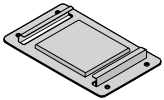
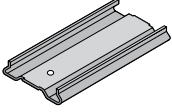
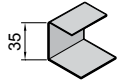

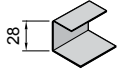
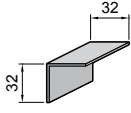
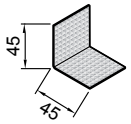


2.5 GIB® RONDO® METAL BATTEN CEILING SYSTEM

GIB® Rondo® Metal Batten Systems* provide a flat, stable ceiling substrate.

The long clips 313 and 394 will provide approx. 100mm additional drop below ceiling framing.

Vertically aligned components are compatible.

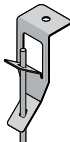
GIB® RONDO® 310	308 SYSTEM	129 SYSTEM
310 Batten 3.6m 4.8m 6.0m 	308 Batten 3.6m 4.8m 6.0m 	129 Batten 3.6m 4.8m 6.0m 
311D Clip 	226 Clip 	
313 Long Clip 	394 Long Clip 	
A311 GIB Quiet Clip® 	STWC Acoustic Clip (ST001) Resilient mount Direct fix to wall or ceiling Accepts 129 or 308 batten 	
312 Jointer 	138 Jointer 	
340 Perimeter Channel 3.0m 	142 Perimeter Channel 3.0m 	140 Perimeter Channel 3.0m 
<div style="display: flex; justify-content: space-between;"> <div> NZ18 Perimeter Angle 3.0m Can also be used for internal corners in tiled shower situations  </div> <div> GIBFix® Angle 2.4m 2.7m  </div> </div>		

*Note: GIB® Rondo® components are referred to elsewhere throughout this publication by product numbers rather than including the full GIB® Rondo® name e.g. GIB® Rondo® 310 Batten referred to as 310 batten.

SUSPENDED CEILING ACCESSORIES

547 Clip

Fix vertically.
5mm galv. rod (121) is fitted by squeezing the two lugs of the 547 clip. Easily adjustable for height



BETAFIX Clip

For direct fixing to concrete walls or ceilings. Approx 25mm adjustment for height in 5mm increments
Accepts 129 or 308 Batten



534 Clip

5mm galv. rod (121) is fitted by squeezing the two lugs of the 534 clip. Easily adjustable for height



166 Clip

Direct horizontal fixing to timber or steel framing
Accepts 127 or 128 TCR



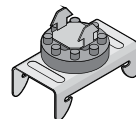
121 Rod

3.6m
5mm galv. rod



STSU Clip

Ceiling resilient mount
Fits into 127 or 128 TCR.
Accepts either 129 or 308 battens



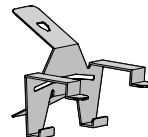
2534 Clip

Friction fitted to 121 rod
Connects to TCR



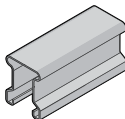
167 Clip

Side mount clip - low profile alternative for 2534 clip
Connects 127 TCR to 5mm rod
Provides height adjustment



127 TCR

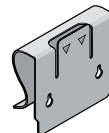
3.6m
4.8m
128 TCR
14923 4.8m
Top Cross Rail (TCR) Also called a strongback. Clips to 2534 clip



MISCELLANEOUS COMPONENTRY

BMCL Clip

Provides plasterboard fixing to structural steel framing in conjunction with 140 Perimeter channel



139 Clip

Clicks into TCR at spacings to suit the ceiling lining, ie. 450mm for 10mm plasterboard and 600mm for 13mm plasterboard
Connects to 308 or 129 batten



A239 Clip - clip with 100mm Rod

A239 Clip - clip with 180mm Rod

237 Clip - 100 or 180mm bolt length (incl 30mm anchor)

For direct fixing to concrete walls or ceilings.

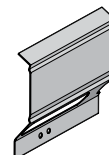
Accepts 129 or 308 Batten 239 excl bolt, 237 excl bolt and threaded hole



GIB RAIL®

3.0m

Fix directly to studs as per GIB® Noise control systems literature



*Note: GIB® Rondo® components are referred to elsewhere throughout this publication by product numbers rather than including the full GIB® Rondo® name e.g. GIB® Rondo® 310 Batten referred to as 310 batten.



2.6 GIB® ADHESIVES AND SEALANTS

GIBFix® All-Bond

Solvent based adhesive suitable for most surfaces except polystyrene (Minimum application temperature is 5°C).



375ml Cartridge
600ml Sausage

GIBFix One®

Acrylic based adhesive with an ultra low VOC content. Compatible with timber/steel framing (Minimum application temperature is 10°C).



375ml Cartridge
600ml Sausage
4 litre Pail

GIB Soundseal®

Water based, highly flexible acoustic sealant for use in GIB Noise Control® Systems. Paintable



375ml Cartridge
600ml Sausage

GIB® Gapfiller

Multipurpose acrylic gapfiller with an ultra low VOC content. Paintable



300ml Cartridge

GIB® Adhesive Coverage

375ml cartridge	17m ² plasterboard
600ml sausage	28m ² plasterboard
4 litre pail	170m ² plasterboard

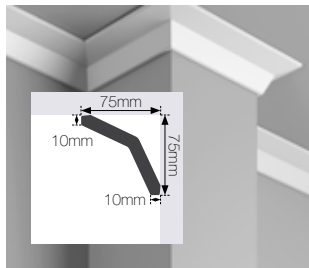
GIB Soundseal® Coverage

Bead Size	375ml Cartridge	600ml Sausage
10mm x 10mm	3.75 lineal metres	6.0 lineal metres
10mm x 5mm	7.5 lineal metres	12.0 lineal metres

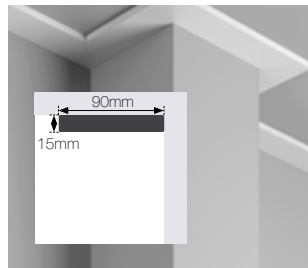
2.7 GIB-COVE®

All profiles available in 3.6m lengths.

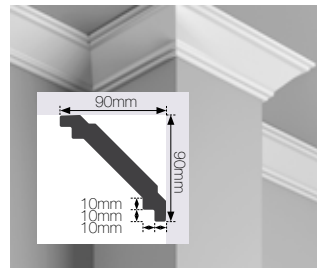
Mezzo



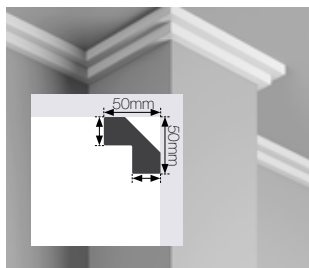
Tenor



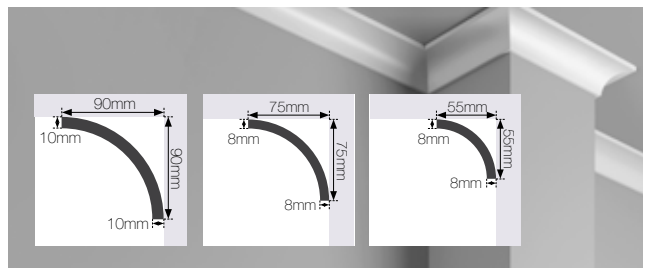
Basso



Alto



Classic 90mm, 75mm and 55mm



2.8 GIB® COMPOUNDS

There are numerous options for compounds. These fall into two general categories, setting compounds and air drying compounds.

Air Drying Compounds

- Ready to use materials (except GIB® U-Mix)
- Easy to sand producing a smooth finish
- Harden as they dry. Drying can be slow if applied thick and in poor drying conditions

Setting Compounds

- Harden and set by chemical reaction with water
- Supplied in powder form and mixed with clean water to the correct consistency
- The working time is controlled during manufacture so that compound sets and goes hard after a specified time
- Must not be mixed with other compounds
- Must not be applied over air drying materials

Setting Compounds

GIB Tradeset®



- Ideal for bedding tape
- Machine tool compatible
- Variety of working times available

		Base Coat	✓
		Second Coat	✓
		Finishing Coat	✗
		Suitable for GIB-Cove®	✗
Product Size	5kg, 20kg Bag	Compound Type	Setting
Working/Set Times (mins)	20, 45, 90 & 150*	Scraping	Easy

GIB MaxSet®



- Mechanically strong
- Strong tape adhesion
- Sets hard for faster jointing
- Maximum coverage with low shrinkage

		Base Coat	✓
		Second Coat	✓
		Finishing Coat	✗
		Suitable for GIB-Cove®	✗
Product Size	20kg Bag	Compound Type	Setting
Working/Set Times (mins)	90	Scraping	Only while 'green'

GIB Lite Blue®



- Easy to sand
- Machine and hand tool application
- Low shrinkage

		Base Coat	✗
		Second Coat	✓
		Finishing Coat	✗
		Suitable for GIB-Cove®	✗
Product Size	17.5kg Bag	Compound Type	Setting
Working/Set Times (mins)	90	Sanding	Easy

*GIB Tradeset® 150 is only available in 20kg bags



Air Drying Compounds

GIB Trade Finish® Heavy Weight



<ul style="list-style-type: none">— Heavy weight, suitable for machine sanding— Cool weather application— Super slick to trowel or apply with box— Full body trowelling— Ideal for filling or covering uneven surfaces	Base Coat	✗	
	Second Coat	✗	
	Finishing Coat	✓	
	Suitable for GIB-Cove®	✗	
Product Size	15L Pail	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Hard

GIB Trade Finish® Multi



<ul style="list-style-type: none">— Medium weight multi purpose— Super slick to trowel or apply with box— Yellow tint enables easy identification		Base Coat	✓
		Second Coat	✓
		Finishing Coat	✓
		Suitable for GIB-Cove®	✗
Product Size	10L, 15L Pail & 14L Carton	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Moderate

GIB Trade Finish® Lite



<ul style="list-style-type: none">— Easy sanding light weight compound— Super slick to trowel or apply with box— Yellow tint enables easy top coat identification	Base Coat	✓	
	Second Coat	✓	
	Finishing Coat	✓	
	Suitable for GIB-Cove®	✗	
Product Size	15L Pail & 14L Carton	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Easy

GIB Trade Finish® Extra Lite



<ul style="list-style-type: none">— Very easy sanding light weight compound— Super slick to trowel or apply with box— Yellow tint enables easy top coat identification— Warm weather application	Base Coat	✓	
	Second Coat	✓	
	Finishing Coat	✓	
	Suitable for GIB-Cove®	✗	
Product Size	15L Pail & 14L Carton	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Very Easy

GIB® U-Mix



<ul style="list-style-type: none">— Economical finishing compound— Mix and adjust viscosity as required on site— Good open time— Machine tool compatible	Base Coat	✗	
	Second Coat	✗	
	Finishing Coat	✓	
	Suitable for GIB-Cove®	✗	
Product Size	20kg Bag	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Easy

GIB Plus 4®



<ul style="list-style-type: none">— Suitable for all three jointing coats— Ideal for skim coating— Excellent adhesion to a variety of substrates		Base Coat	✓
		Second Coat	✓
		Finishing Coat	✓
		Suitable for GIB-Cove®	✗
Product Size	4L, 10L & 15L Pails	Compound Type	Air Drying Ready Mix
Working/Set Times (mins)	-	Sanding	Easy

Note: For guidance on approximate drying times for air drying compounds refer to p. 82.

Repair Compounds

GIB® RediFilla™



- Repair scratches, dents, nail heads and cracks
- Sandable, paintable, low shrinkage, good adhesion
- Ready to use

Product Size

2L & 4L Pails

Working/Set Times (mins)

-

Base Coat

✓

Second Coat

✓

Finishing Coat

✓

Suitable for GIB-Cove®

✗

Compound Type

Air Drying Ready Mix

Sanding

Easy

GIB® TradeFilla™



- Quickly repair and fill holes
- Paintable and doesn't need a finishing coat
- Can apply second coat after 30 minutes if required

Product Size

5kg Bag

Working/Set Times (mins)

10

Base Coat

✓

Second Coat

✓

Finishing Coat

✓

Suitable for GIB-Cove®

✗

Compound Type

Setting

Sanding & Scraping

Moderate

Cove Bond

GIB-Cove® Bond



- Excellent "wet tack"
- Required for back blocking
- Two setting times available

Product Size

5kg* & 20kg Bags

Working/Set Times (mins)

45 & 90

Base Coat

✗

Second Coat

✗

Finishing Coat

✗

Suitable for GIB-Cove®

✓

Compound Type

Setting

Scraping

Hard

Victor® Cornice Bond



- Specifically designed for adhering fibrous plaster products

Product Size

20kg Bag

Working/Set Times (mins)

30

Base Coat

✗

Second Coat

✗

Finishing Coat

✗

Suitable for GIB-Cove® / Fibrous Mouldings

✓

Compound Type

Setting

Scraping

Hard

Specialty Compounds

Victor® Multi Plus



- For solid plaster screeding/rendering over a masonry surface
- Long work time and gradual controlled set
- Use as a finish coat or as general purpose undercoat

Product Size

20kg Bag

Working/Set Times (mins)

90

Base Coat

✓

Second Coat

✓

Finishing Coat

✓

Suitable for GIB-Cove®

✗

Compound Type

Setting

Sanding

Polished / Not Sanded

GIB X-Block® Jointing Compound



- Eliminates the need for backing joints with lead strip
- High strength joint when used in conjunction with paper joint tape
- Can be finished with any of the GIB® finishing compounds

Product Size

25kg Bag

Working/Set Times (mins)

90

Base Coat

✓

Second Coat

✗

Finishing Coat

✗

Suitable for GIB-Cove®

✗

Compound Type

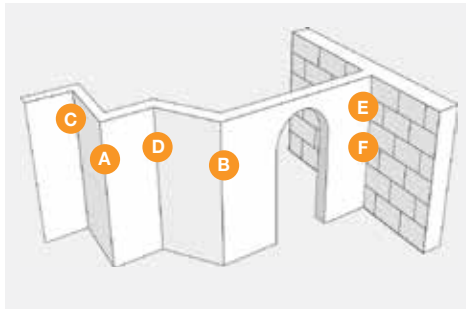
Setting

Sanding

Polished / Not Sanded



2.9 GIB® PAPER FACED TRIMS

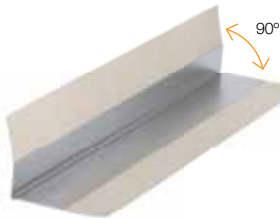


GIB® Goldline® Platinum Trims are made with a patented, high quality paper laminated to galvanised steel forms. The metal provides maximum strength and protection for the corner, while the paper face matches the plasterboard paper surface to help create a more uniform surface finish.

Ext 90° GIB® Goldline® Corner Trim

G1-W

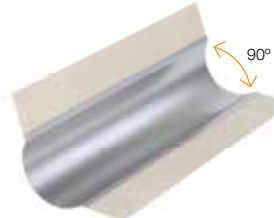
2.4m
2.7m
3.0m



A

GIB® Goldline® Bullnose Ext 90° Corner Trim G1-B

2.4m
3.0m



A

Ext 135° GIB® Goldline® Corner Trim

G1-O

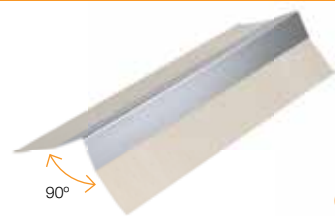
2.4m



B

Int 90° GIB® Goldline® Corner Trim G2 Standard

2.4m
2.7m
3.0m

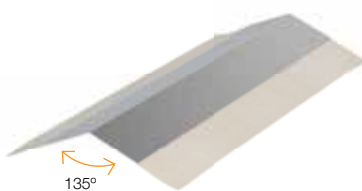


C

Int 135° GIB® Goldline® Corner Trim

G2-O

2.4m



D

GIB® Goldline® Reveal

GR

for 10mm GIB® plasterboard 3.0m
for 13mm GIB® plasterboard 3.0m

10mm /
13mm



E

GIB® Goldline® L-Trim

G4

for 10mm GIB® plasterboard 3.0m
for 13mm GIB® plasterboard 3.0m

10mm /
13mm



F

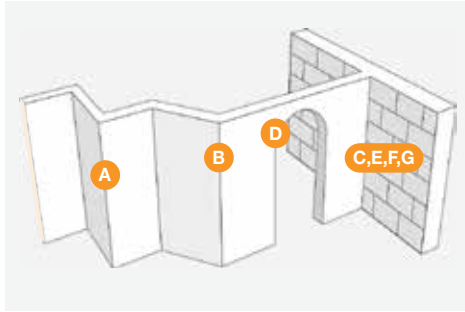
GIB® Goldline® L-Trim / GR Reveal as Control Joint

GIB® Goldline®
L-Trim



GIB® Goldline®
Reveal

2.10 GIB® METAL TRIMS



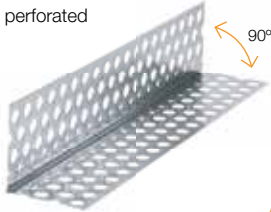
GIB® Metal Trims provide a clean defined edge on either straight or curved details. The perforated legs provide a strong key for compounds and the sharply defined nib provides a knock resistant corner.

Ext 90° GIB® Slim Angle

P01

External 90 degree perforated corner trim

2.4m
2.7m
3.0m



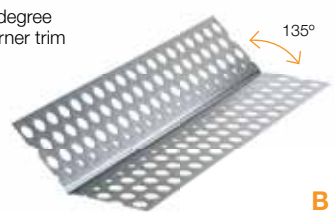
A

Ext 135° GIB® Slim Angle

P01A

External 135 degree perforated corner trim

2.4m
2.7m
3.0m



B

Rondo® Stopping Angles

P25/26/27

L-Trim for stopped end trim

P25-10mm-3.0m
P26-13mm-3.0m
P27-16mm-3.0m

10mm / 13mm / 16mm



C

GIB® Slim Arch Bead

P10

Perforated curvable corner edge trim

2.4m
3.0m



D

Rondo® Stopping Beads

P12/13

End cap bead – stopped

P12-10mm-2.4m
3.0m
P13-13mm-2.4m
3.0m

10mm / 13mm



E

Rondo® Shadowline Stopping Bead

P50

Reveal or Z-trim

P50-10mm-3.0m

10mm



F

Rondo® Casing Bead

P05/7

End cap bead – unstopped

P05-10mm-2.4m
P07-13mm-3.0m

10mm / 13mm



G

Rondo® Control Joint

P35

P35 Control Joint – White

3.0m

18mm



2.11 GIB® ADDITIONAL COMPONENTS

GIB® Paper Joint Tape

A critical element to reinforce joints. Spark perforated to aid drying and adhesion. Buffed underside to aid bonding with compound

75m roll, 52mm wide

150m roll, 52mm wide



GIB RocTape®

Similar to GIB® Paper Joint Tape and can be installed using hand tools or mechanical tools. Suitable for flat joints only

75m roll, 50mm wide



GIB® UltraFlex® No Coat

High Impact Flexible Composite Trim suitable for all off angles interior or exterior

325"-30m roll, 82mm wide

450"-30m roll, 112mm wide



GIB® Levelline™ Trim

A foldable composite trim with a paper face to match the paper face of GIB® plasterboard for a more uniform finish on corners

30m roll, 70mm wide



GIB® Plastic W-Profile Control Joint

3.0m



GIB HandiBrac®

Required in specific bracing elements

Sold in pairs complete with Tek screws and screw-bolt. Must be installed as per GIB EzyBrace® Systems literature



3.0 PRE – INSTALLATION

Before installation of GIB® products or systems there are some points that need to be considered. In order that products and systems perform as stated, it is important for designers and installers to be familiar with these points.

Achieving a satisfactory finished wall or ceiling surface is the result of teamwork involving several trades and disciplines.



Designers

- Convert the client's brief into working drawings
- Comply with Building Code requirements and ensure that all relevant standards are applied
- Determine final decoration
- Determine lighting design to achieve functional requirements and optimised quality of finish
- Determine the level of finish required
- Determine the location of control joints
- Provide sufficient detail on the drawings for trades people to interpret accurately



Builders

- Provide project management and supervision to ensure that the site is ready for each incoming trade
- Co-ordinate the sub-trades
- Site management to provide suitable dry storage for plasterboard products



Carpenters

- Ensure framing is erected plumb, straight, level and flat
- Ensure that ceiling battens are all running in the same direction within rooms
- Provide an acceptable substrate for the plasterboard installer

It is the responsibility of each contractor to carry out their part of the process in a manner that allows following trades to do their part effectively.

There is no place in the industry for the phrase “The stopper will fix it”.

All trades involved in the process have to take full responsibility for the quality of their workmanship.



Plasterboard Installers

- Check the substrate prior to installing plasterboard
- Ensure that remedial work is carried out before any plasterboard is installed
- Check with builder that the pre-lining inspection has taken place and the timber moisture content does not exceed 18%
- Install plasterboard to manufacturer's instructions
- Provide an acceptable substrate for the plasterboard stopper



Stoppers

- Check the substrate prior to commencing finishing work
- Ensure that remedial work is carried out before finishing
- Carry out stopping work in accordance with manufacturer's instructions and the requirements of AS/NZS 2589:2017
- Provide an acceptable substrate for the painter



Painters

- Check the substrate prior to painting.
- Ensure that remedial work is carried out before any painting commences
- Apply paint according to the manufacturer's instructions and to best trade practice



3.1 DELIVERED TO SITE SERVICES

At Winstone Wallboards we are always striving to ensure that every site delivery is as smooth, safe and efficient as possible. Make sure your site is ready for your delivery – first time.

Note: GIB® Delivered to Site (DTS) services not available to all areas.

What is a 'Plasterboard Ready' site?

A plasterboard ready site is one that has clear and unobstructed access. Hazards (e.g. building waste, scaffolding) need to be removed before the plasterboard is delivered to site.

The floor area where the plasterboard is to be stored must be clean, clear, dry and free of obstacles. This means the roof is installed and the building is weatherproof, i.e. closed in.

What if the site is not plasterboard ready?

Will result in delivery delays and redelivery charges (i.e. If risk is too high, delivery of plasterboard will not go ahead).

Increases the potential risk of injury and product damage.

Extra delivery charges

DTS prices include the costs for a Standard Delivery. Your delivery may incur extra charges for a Specialist Delivery if one or more of the following apply:

- Plasterboard is to be carried more than 20 metres
- Multi-storey pass up
- Plasterboard split into more than two areas.
- Foundations higher than 400mm
- Use of long (23m) or extra long reach hiab (32m)
- Bulk plasterboard delivery to commercial sites.
- Plasterboard to be carried from door/window where hiab has dropped to another location
- Narrow driveway, height + weight restriction
- Unstable ground (mud, loose dirt) prevents truck/hiab from getting within 20 metres of nearest point of cover
- Driver has to be on site for more than 2 hours
- Poor weather conditions prevent the safe delivery of the plasterboard (eg. heavy rain)

Do you need a site check?

A site check requires 2 full working days' notice prior to delivery date. Order must be received by Winstone Wallboards before site check can be organised. The site check will be booked in within 48 hours of delivery.

If in doubt, book a free site check so we can let you know if your site is Plasterboard Ready, and advise on the most efficient delivery service for you.

You must book a site check for:

- Commercial sites
- Orders over 10 tonne (i.e. approximately two standard house lots or 1250m²)
- Hill (steep) sites

How you can help

Make sure the site is plasterboard ready.

Ensure the site contact is contactable by phone at least 1 hour before delivery (e.g. for a 7am delivery, site contact will need to be able to take a call from 6am).

Provide all required information when placing your order so we can despatch the correct delivery vehicle, including:

- Site address
- Site contact and number
- Site access description (e.g. from truck to building, type of building – single or multi-level)
- Delivery requirements
- Specific safety equipment for the site (if applicable)

If in doubt, request a free site inspection to avoid potential delivery delays and extra re-delivery charges.

For more information on getting your site plasterboard ready, contact your local GIB® representative or call the GIB® Helpline on 0800 100 442.

Is your site 'Plasterboard Ready'? Check the examples below.





3.2 PRE – INSTALLATION CHECKLIST

Using a checklist can help with inter-trade co-operation.

Site Address 	Builder	
	Fixer	
	Stopper	
	Painter	

Fixer	Before any fixing commences...	Y/N	Checked by	Date
	Has the framing surface been checked for flatness? i.e. no protruding nogs, lintels etc.?			
	Is the moisture content acceptable i.e. 18% or less			
	Are grooved jambs set up correctly to allow 1–1.5mm clearance for sheet edge?			
	Are all ceiling battens running in same direction within room spaces?			
	Are there any factors that could affect the fixing of the board? Please note here:			
	Substrate accepted by fixer			
	Name	Signed		Date

Stopper	Before any stopping commences...	Y/N	Checked by	Date
	Have the number and length of joints been kept to a minimum?			
	Has the lineal meterage of joints been kept to a minimum?			
	Has the board been fixed horizontally wherever practical?			
	Correct fasteners used?			
	Fastenings (nails or screws) have not been overdriven?			
	No joints above or below the edges of windows or doors?			
	No fastenings to sheet centres on walls? (Not applicable to Fire Rated systems or tiled surfaces)			
	Butt joints in ceiling back blocked where required?			
	Correct size and spacing of glue daubs? (If viewed during installation)			
Only GIB® tape used on stopping joints				
Are there any factors that could affect the stopping of the board? Please note here:				
Substrate accepted by stopper				
Name	Signed		Date	

Painter	Before any painting commences...	Y/N	Checked by	Date
	Surface free of visible trowel marks or defects			
	Are there any factors that could affect the painting of the board? Please note here:			
	Substrate accepted by fixer			
Name	Signed		Date	

3.3 SITE CONDITIONS

It is important to consider the impact of damp and cold site conditions during the construction process on the finish quality once the building has been occupied and reaches equilibrium.

Maintain a minimum temperature (interior) of 10°C during the plasterboard fixing process and a controlled temperature of above 10°C for 24 hours before, during and after the joint stopping

process. With concrete slab construction, provide sufficient ventilation to minimise the build-up of internal humidity (which increase the risk of sagging of plasterboard as well as delaying the project due to prolonged drying/curing of joint compounds).

Failure to observe these requirements may result in framing and plasterboard surface defects.

3.4 STACKING, STORAGE AND HANDLING

GIB® plasterboard is a finishing product and needs to be handled as such. For safety reasons, plasterboard sheets should be stacked horizontally wherever possible, taking the following considerations into account:

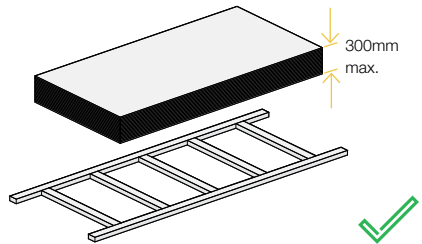
- To avoid sheet distortion or damage, sheets must be neatly stacked on a clean surface not susceptible to moisture
- Sheets stacked flat on a concrete floor must be separated from the floor surface by a moisture barrier (e.g. polythene sheet) or placed on bearers (min. 75 x 50)
- Consider floor loadings as GIB® plasterboard weighs in the range of 700–800kg/m³
- Stacks should be limited to 300mm high on suspended floors to minimise the risk of structural damage through point loading

Due to the complexity of a construction site and the restricted site conditions, it is not always possible to horizontally stack plasterboard on a flat surface. Plasterboard can be stored vertically as a last option, taking the following considerations into account:

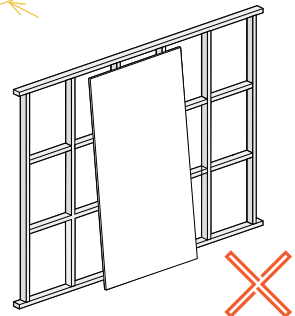
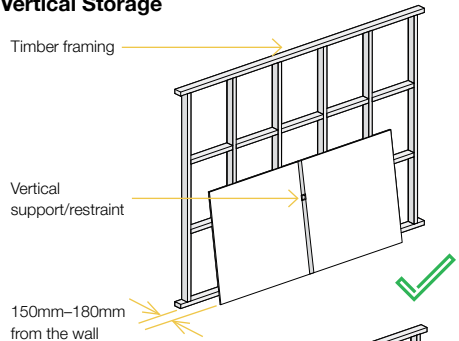
- For safety reasons and to prevent sheets from falling, vertical supports/restraints must always be used when plasterboard is vertically stacked
- The maximum number of 10mm and 13mm sheets that can be vertically stacked is 20 against timber framing. This reduces to 13 sheets maximum for 16mm and 19mm GIB Fyreline®
- To reduce the risk of toppling, the first sheet must be placed 150–180mm from the bottom plate
- Winstone Wallboards does not recommend stacking sheets vertically on the short edge

When handling plasterboard sheets, lift sheets from the stack rather than dragging them. This also reduces the risk of face paper damage. Carry sheets on edge. This is easier than carrying them on the flat and sheets are less likely to crack or break.

Horizontal Storage



Vertical Storage





3.5 PROTECTION FROM WEATHER

Do not install GIB® plasterboard in any situation where external claddings are not in place or which is not totally protected from the elements. If plasterboard is installed under such conditions it greatly increases the risk of surface defects such as cracked or peaked joints and fastener pops.

GIB® products must be kept dry preferably by being stored inside a building and under cover. Where it is necessary to store GIB® plasterboard outside, it must be stacked off the ground and be fully protected from the weather.

3.6 ORDERING AND DELIVERY

At the time of ordering, consider specifying which sheet sizes are designated for walls and those for ceilings so that they can be placed in separate stacks.

With the extensive GIB® product range it is impossible for building merchants to stock all types

and sizes of product. Winstone Wallboards has a strong customer service promise to back up our merchant customers. Planning ahead will mean you can get the exact products you require.

Deliver GIB® plasterboard to site immediately prior to installation to reduce the risk of damage.

3.7 TIMBER MOISTURE CONTENT

The moisture content of timber at the time of fixing plasterboard must be 18% or less.

Fixing plasterboard to timber with moisture content exceeding 18% will increase the risk of surface defects such as peaked or cracked joints and popped fasteners.

Winstone Wallboards strongly recommends builders invest in the use of moisture meters to check timber framing is suitable for plasterboard linings prior to installation.

Winstone Wallboards recommends a lower moisture content (8% to 18%) if air conditioning, heat pumps or central heating are to be installed.

The objective should be to install linings to timber framing with a moisture content as close as possible to the final equilibrium level of the complete and occupied building.

Winstone Wallboards recommends:

- The use of GIB® Rondo® Metal Ceiling Battens
- The use of Kiln Dried Machine Stress Graded (KDMG) timber for all wall, roof and mid-floor framing members

Note: Mixing KDMG framing with non KD timber can cause undue substrate movement and is not recommended.

3.8 WASTE MINIMISATION

Ever increasing pressure is being placed on waste disposal facilities. As the construction industry is a major contributor of waste material, consideration should be given to methods of waste minimisation.

The use of longer sheets and horizontal fixing helps reduce on-site waste.

GIB® plasterboard off cuts, if separated from other waste building materials, can be readily recycled. For larger projects the waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and utilise it in compost.

3.9 SITE HEALTH AND SAFETY

Construction sites can contain multiple hazards. It is important that appropriate health and safety requirements are strictly followed at all times.

Before commencing any installation work, familiarise yourself with the safety requirements of the site you are working on.

Identify any potential hazards, applying the steps in the table to the right.

Under normal conditions of use, GIB® plasterboard presents no known health hazards.

- 1. Eliminate the Hazard** - Eliminate the hazard altogether if at all possible
- 2. Isolate the Hazard** - Install barriers or guard rails to isolate people from the hazard
- 3. Minimise the Risk of Harm** - For example, use fall restraints or provide soft landing systems to minimise the risk of harm

Lifting Machines

Plasterboard lifting machines are recommended for ceiling sheets. These can generally be hired from a local hire centre. If a plasterboard lifter is not available, ensure that adequate labour is on hand to assist.



Lifting Techniques

Careful lifting techniques must be employed to minimise the risk of back injury.



Knives

Knives used for scoring and snapping need to be sharp to operate effectively. Extreme care needs to be taken when using any cutting implements.



Dust Masks

Dust masks complying with AS/NZS 1715 and 1716 must be worn for all sanding of stopping compounds. For more information visit business.govt.nz/worksafe.



Waste Materials

Do not dispose of waste materials or compounds into any drainage system. Most local authorities will accept gypsum waste materials in landfills. If in doubt, check with your local authority.



Vertical Restraints

For safety reasons, flat stacking of sheets is recommended wherever possible (see page 29). Plasterboard can be stored vertically as a last option and should always be restrained to prevent sheets from falling. No more than 20 sheets should be vertically stacked at any one point against a timber frame. This reduces to 13 sheets for 16mm and 19mm GIB Fyrelite®. To reduce the risk of toppling, the first sheet must be placed 150–180mm from the bottom plate.



Scaffolding

Ensure that scaffolding complies with relevant safety requirements.



Safety Tags

All electrical equipment and leads must have a current and appropriate safety tag.



3.10 REQUIRED TOOLS

Plasterboard installation requires a range of general carpentry tools

Hammer



Measuring Tape



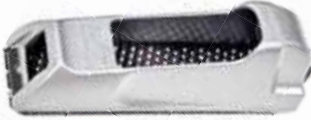
Folding Rule



Plasterboard Knife



Hand Rasp – Surform



T Square



Straight Edge



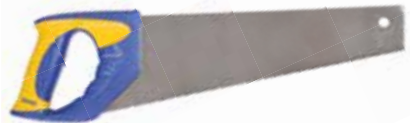
Nail Punch



Keyhole Saw



Plasterboard Saw



Flat Lifting Bar



Drywall Screwdriver



Adhesive Gun



Tip: If using a cordless drill with clutch for fixing, take some time to adjust the clutch so that the screws do not cut through the surface of the paper.

Practise on some off-cuts and timber or in an area that will be out of normal view. Remember that old timber will be much harder than newly installed timber, so be careful when working in areas with both.



4.0 GENERAL WALL AND CEILING INSTALLATION

This section covers the installation of GIB® plasterboard in walls and ceilings. Installation guidance is also provided for speciality systems; GIB EzyBrace® and GIB Aqualine® Wet Area Systems.

For further installation guidance including system specifications for GIB Toughline®, GIB Noiseline®, GIB Fyreline® and GIB Barrierline® refer to the appropriate system literature.

4.1 BEFORE STARTING INSTALLATION

Inspect the framing	
Check that the surface is flat and that there is nothing that could affect the finished surface. For example:	
Nogs not flush.	
Nails not below the framing surface.	
<p>Do not simply rely on the building inspector at the pre-line inspection but take responsibility and understand the effects of framing moisture on content and the quality of finish.</p> <p>Moisture content to be 18% or less.</p>	
Nail plates or hold down ties not checked in flush with the surface insulation bulging out between studs.	
<p>These are all factors that will affect the quality of the finished surface. The time to correct them is now. Once fixing commences it indicates an acceptance of the substrate quality.</p> <p>It is the responsibility of the framing contractor to provide a substrate that allows the plasterboard fixer to effectively install the plasterboard in accordance with the manufacturer's instructions.</p> <p>Likewise it is the responsibility of the plasterboard fixer to provide a suitable surface for the plasterboard stopper to effectively carry out the stopping process.</p> <p>There is no place in the industry for the phrase "The stopper will fix it".</p> <p>All trades involved in the process have to take full responsibility for the quality of their workmanship.</p>	

4.2 GENERAL INSTALLATION TECHNIQUE

Cutting GIB® Plasterboard

Measure the wall to determine the required sheet size. Generally cut the sheet 2mm–3mm less than the exact dimension needed.

Position the sheet with the face paper side up. Mark the sheet as required.

Firmly hold the straight edge on the line to be cut.

Cut through the face paper and into the plaster core by sliding the knife blade against the straight edge.

Break the sheet core by snapping the sheet back firmly while holding on to the sheet edge.

Turn the sheet over so that back paper is now facing up. Score the back paper to complete the cut.





4.2 GENERAL INSTALLATION TECHNIQUE

Cutting GIB® Plasterboard

For sheets requiring multiple cuts, use a handsaw to complete the short cuts before scoring and snapping the longer cut.



Mark the position of any power outlets or pipes on the face of the board.

Make hole at a corner of the marked outlet. Cut out the box as marked.



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

4.2 GENERAL INSTALLATION TECHNIQUE

Fixing GIB® Plasterboard

Apply GIBFix® adhesive at specified centres. Apply immediately prior to fixing the GIB® plasterboard. Do not allow time for the adhesive to “skin” over.

GIBFix® adhesive daubs should be approximately 35mm in diameter and about 12mm high.

Cold temperatures (10°C or less) will affect the curing time of adhesive. It is recommended that steps are taken to achieve 10°C at the time of installation.

Tip: Do not place GIBFix® adhesive behind fasteners. This will increase the risk of “fastener popping” Place at least 200mm from fasteners

Fit the GIB® plasterboard in position against the framing. Press the sheet firmly against the framing to ensure a good bond with the adhesive.

Sheets must be 5–10mm from the floor. Place packers to suit OR use a flat bar to lift the sheet off the floor.

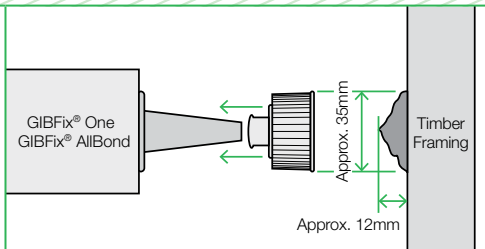
(Note that some specific fire rated systems require that the sheets are fixed hard to the floor).

Install fasteners at specified centres. Make sure that the head of the fastener is bedded just below the surface of the board.

Tip: Use an electric drywall screwgun equipped with an adjustable depth control head and Philips bit. If a screw is overdriven and the paper and/or core of the GIB® plasterboard is damaged, insert a second screw approximately 50mm from the first and then remove the first screw.

How much GIBFix® adhesive to use?

A simple method of reducing GIBFix® waste and having consistently sized daubs of adhesive is to remove the sealer cap from a sipper type drink bottle top and fit it to the nozzle of an adhesive cartridge. Press the face of the cap against the surface and apply pressure to the adhesive applicator gun. The cap will fill with adhesive and when full, pull the cap away from the surface. This will leave a daub of adhesive approximately 35mm in diameter and with a raised “peak” of about 10–12mm.



4.2 GENERAL INSTALLATION TECHNIQUE

Joint Placement

Give careful consideration to the placement of sheet joints in walls and ceilings.

Try to minimise sheet joints by using the largest sheet size available.

Where possible place joints in situations where they are less likely to be affected by critical lighting.

Horizontal Fixing

Sheet edge joints in horizontally fixed walls may be unsupported (stud centres must not exceed 600mm).

For levels of finish 3 and 4, sheet end butt joints may be made on studs. However, to reduce the risk of joint defects, it is strongly recommended that sheet end butt joints are back blocked off framing.

Vertical Fixing

Form sheet edge joints in vertically fixed walls on studs.

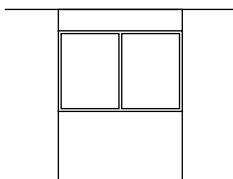
Shorter vertical joints (400mm or less) such as above a window or door can be made off the stud. Joints under windows can be made off the stud provided that nogs are installed to reduce the unsupported joint to 600mm or less. Alternatively the joint may be back blocked.

Around Door or Window Openings

Sheet edge joints formed at the edge of door and window openings are highly prone to cracking. To reduce the risk of cracking it is strongly recommended that sheets are cut around openings and joints are formed no closer than 200mm to the edge of the opening.

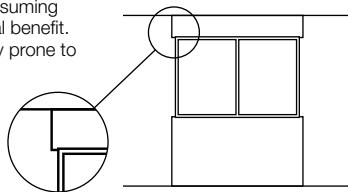
General Installation – Not recommended

Prone to cracking due to frame flexibility. Not recommended for general installations.



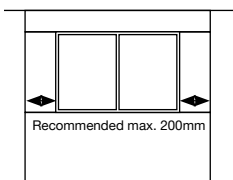
General Installation – Not recommended

Time consuming for no real benefit. Still highly prone to cracking.



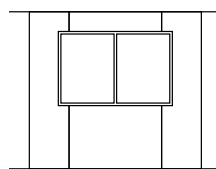
General Installation – Acceptable

This moves the joint away from problem area. Floating joint, correctly taped and stopped is less likely to crack.



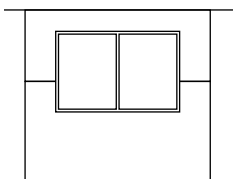
General Installation – Acceptable

Positioning the joint 200mm from the window edge will reduce the likelihood of cracking.



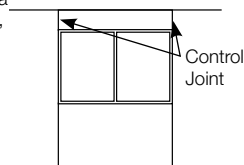
General Installation – Recommended

If the grooved jambs have been accurately installed, this is not difficult for a competent fixer. The lining on this wall will need to be fixed prior to any adjacent walls.



High Movement Applications

For applications prone to a high degree of movement, such as transportable homes, consideration should be given to installing a control joint at the edges of the door or window (see p. 49)



4.3 GIB® PLASTERBOARD INSTALLATION – WALLS

For installation guidance on GIB EzyBrace® and GIB Aqualine® Wet Area Systems refer to the GIB® Performance Systems section.

For all other GIB® Performance Systems refer to the relevant GIB® Systems literature.

4.3.1 Timber Frame – Horizontally Fixed

Wall Framing

- Framing dimensions, spacings and nog requirements must comply with NZS3604:2011
- Timber moisture content must not exceed 18% (see p. 30)
- Nogs to be evenly spaced with a maximum spacing of 1350mm. If staggering nogs off a centreline (Option A) it is recommended a maximum offset of 50mm–75mm
- Nogs are not required behind the horizontal joint except in shower situations and specific fire, noise or impact prone area, such as stairwells or doorways

Fasteners

- 10mm GIB® plasterboard, minimum 25mm x 6g GIB® Grabber® high thread screws*
- 13mm GIB® plasterboard, minimum 32mm x 6g GIB® Grabber® high thread screws*

Installation

- 300mm to top and bottom plates and perimeter studs
- Pairs of single fasteners to each stud where horizontal joint crosses
- Place fasteners no closer than 12mm from paper bound sheet edge or 18mm from any cut edge
- Fasteners at wall corners to be placed 50mm in from the corner in each direction
- Do not place GIBFix® adhesive at sheet edges or within 200mm of fasteners
- Place daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

Stopping

- Refer to the Jointing and Finishing section (p. 78)

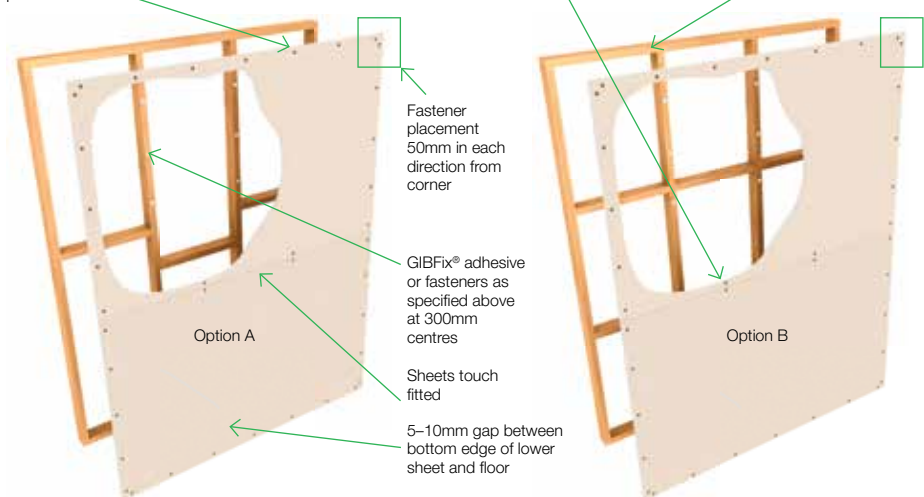
*Some GIB® Performance Systems may require different fastener lengths and types. Refer to the applicable GIB® System literature for more information.

Timber Frame – Horizontally Fixed

Fasteners as specified above at 300mm centres to top and bottom plates and perimeter studs

Fasteners to each stud where the horizontal joint crosses the stud

Studs at 600mm maximum



4.3 GIB® PLASTERBOARD INSTALLATION – WALLS

For installation guidance on GIB EzyBrace® and GIB Aqualine® Wet Area Systems refer to the GIB® Performance Systems section.

For all other GIB® Performance Systems refer to the relevant GIB® systems literature.

4.3.2 Timber Frame – Vertically Fixed

Wall Framing

- Framing dimensions, spacings and nog requirements must comply with NZS3604:2011
- Timber moisture content must not exceed 18% (see p. 30)

Fasteners

- 10mm GIB® plasterboard, minimum 25mm x 6g GIB® Grabber® high thread screws*
- 13mm GIB® plasterboard, minimum 32mm x 6g GIB® Grabber® high thread screws*

Installation

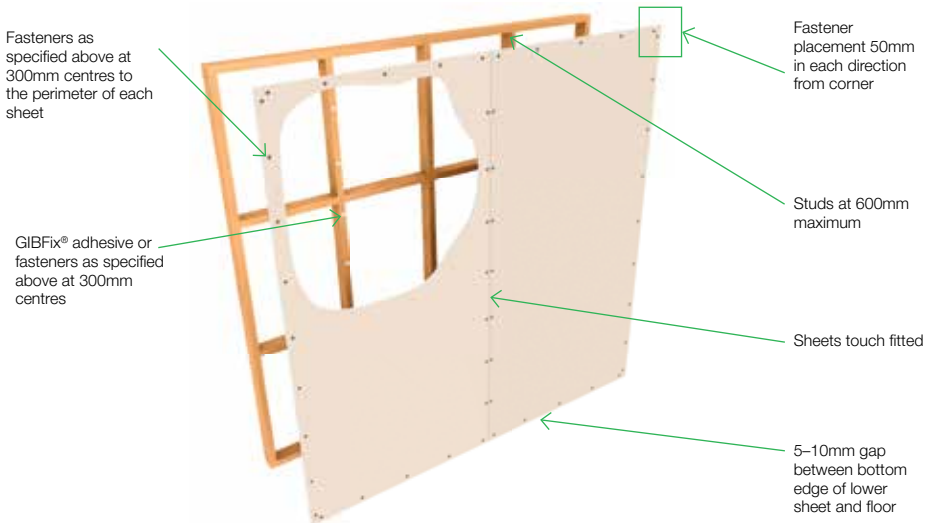
- 300mm centres around sheet perimeter
- Place fasteners no closer than 12mm from paper bound sheet edge or 18mm from any cut edge
- Fasteners at wall corners to be placed 50mm in from the corner in each direction
- Do not place GIBFix® adhesive at sheet edges or within 200mm of fasteners
- Place daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

Stopping

- Refer to the Jointing and Finishing section (p. 78)

*Some GIB® Performance Systems may require different fastener lengths and types. Refer to the applicable GIB® System literature for more information.

Timber Frame – Vertically Fixed



4.3 GIB® PLASTERBOARD INSTALLATION – WALLS

For installation guidance on GIB EzyBrace® and GIB Aqualine® Wet Area Systems refer to the GIB® Performance Systems section.

For all other GIB® Performance Systems refer to the relevant GIB® systems literature.

4.3.3 Steel Frame – Horizontally Fixed

Metal framing to which GIB® plasterboard is fixed must be in accordance with AS/NZS 4600 or NASH Standard. The lining thickness for specific design steel framing systems can be determined by the designer as a component in the system.

For other light steel framing application a minimum thickness of 13mm GIB® plasterboard shall be used.

Wall Framing

- Steel stud dimensions to be min. 64 x 34 x 0.50mm nominal with a 6mm return
- Steel channel dimensions to be min. 64 x 30 x 0.50mm nominal
- Studs must be spaced at 600mm centres maximum
- Ensure that the studs are placed with the open side facing in the same direction (see diagram p. 42)

Fasteners

- 13mm GIB® plasterboard, minimum 25mm x 6g GIB® Grabber® fine thread self tapping screws*

Installation

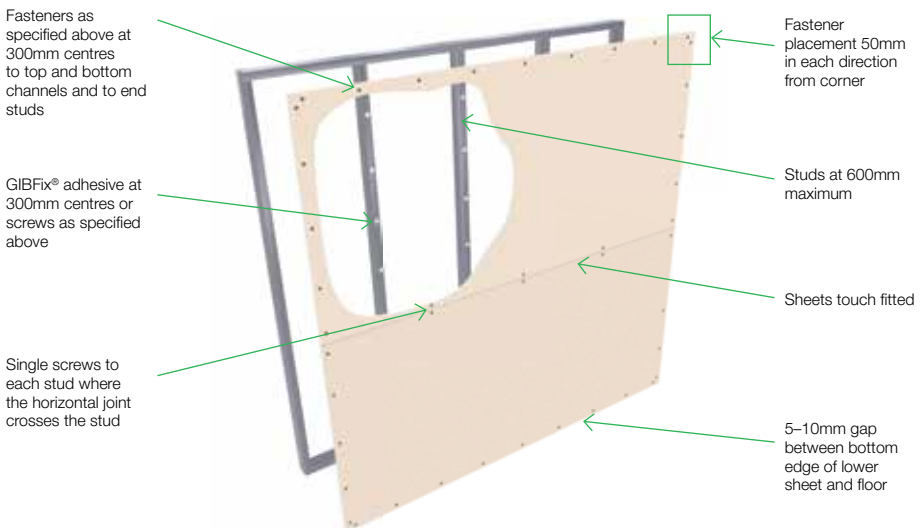
- 300mm to top and bottom channels and end studs
- Pairs of single fasteners to each stud where horizontal joint crosses
- Place fasteners no closer than 12mm from paper bound sheet edge or 18mm from any cut edge
- It is recommended that fasteners at wall corners be placed 50mm in from the corner in each direction
- Do not place GIBFix® adhesive at sheet edges or within 200mm of fasteners
- Place daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

Stopping

- Refer to the Jointing and Finishing section (p. 78)

*Some GIB® Performance Systems may require different fastener lengths and types. Refer to the applicable GIB® System literature for more information.

Steel Frame – Horizontally Fixed



4.3 GIB® PLASTERBOARD INSTALLATION – WALLS

For installation guidance on GIB EzyBrace® and GIB Aqualine® Wet Area Systems refer to the GIB® Performance Systems section.

For all other GIB® Performance Systems refer to the relevant GIB® systems literature.

4.3.4 Steel Frame – Vertically Fixed

Metal framing to which GIB® plasterboard is fixed must be in accordance with AS/NZS 4600 or NASH Standard. The lining thickness for specific design steel framing systems can be determined by the designer as a component in the system.

For other light steel framing application a minimum thickness of 13mm GIB® plasterboard must be used.

Wall Framing

- Minimum steel stud dimensions to be min. 64 x 34 x 0.50mm nominal with a 6mm return
- Steel channel dimensions to be min. 64 x 30 x 0.50mm nominal
- Studs shall be spaced at 600mm centres maximum
- Ensure that the studs are placed with the open side facing in the same direction (see diagram p. 42)

Fasteners

- 13mm GIB® plasterboard, minimum 25mm x 6g GIB® Grabber® fine thread screws*

Installation

- 300mm to centres around sheet perimeter
- Place fasteners no closer than 12mm from paper bound sheet edge or 18mm from any cut edge
- It is recommended that fasteners at wall corners be placed 50mm in from the corner in each direction
- Do not place GIBFix® adhesive at sheet edges or within 200mm of fasteners
- Place daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

Stopping

- Refer to the Jointing and Finishing section (p. 78)

*Some GIB® Performance Systems may require different fastener lengths and types. Refer to the applicable GIB® System literature for more information.

Steel Frame – Vertically Fixed

Fasteners as specified above at 300mm centres to the perimeter of each sheet

GIBFix® adhesive or screws at 300mm centres

Commence fixing from the open side of the studs (studs must be placed with the open side facing the same direction)
See p. 42

Stagger the sheet joints 600mm from those on the other side of the wall

Fastener placement 50mm in each direction from corner

Studs at 600mm maximum

Sheets touch fitted

5–10mm gap between bottom edge of lower sheet and floor



4.3.5 Fastening to Metal Studs

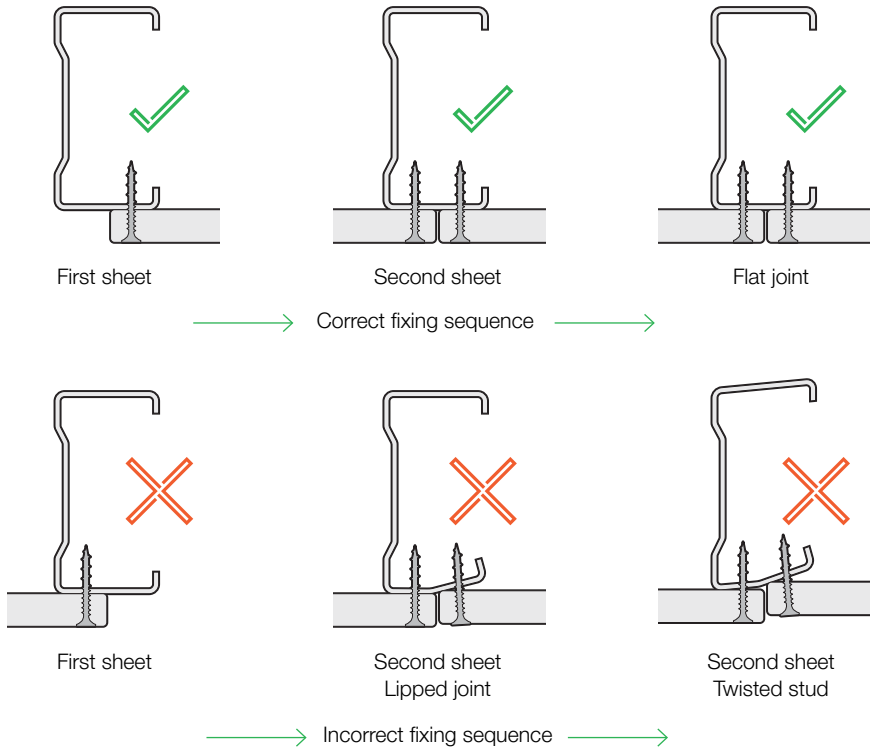
Correct Method

As the face of a steel stud can deflect initially, the correct sequence of attaching the plasterboard is important. The first sheet is attached to the open side of the stud which will cause minor deflection but will pull back tight against the sheet when the screw is fully tightened.

When the second sheet is fixed there will be minimal deflection as the open flange is now supported by the previous sheet.

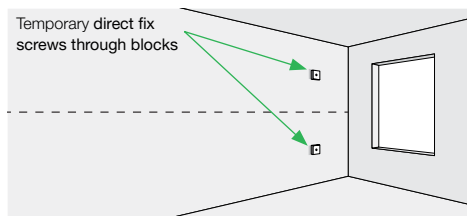
Support the stud to avoid twisting.

Fastening GIB® Plasterboard to Metal Studs



Incorrect fixing method can result in lipped joints, twisted studs and misalignment of the wall.

Temporary Fixing



Tip: Occasionally a bow may develop in the board due to storage methods. It might be necessary to temporarily hold the board until the adhesive cures.

Screw through an offcut of plasterboard and remove the block and screw once adhesive has cured.

4.3.6 Grooved Jambs and Architraves

Winstone Wallboards recommends:

The use of architraves for finishing around doors and windows for the following reasons.

- Larger plasterboard sheets can be used, resulting in fewer joints.
- Speedier installation of plasterboard.
- Reduced chance of remedial work due to better placement of joints

Architraves make best practice fixing of plasterboard much simpler. If the use of grooved jambs is unavoidable here is some information to help minimise plasterboard fixing problems.

Grooved door jambs and window liners are an integral part of the New Zealand building scene. Unfortunately their use means that additional joints often need to be made in the wall surface. Installation of grooved jambs is subject to workmanship skills. Unless the jambs are correctly set up and installed, with a 1–2mm clearance for the plasterboard, it is difficult to install the board effectively.

If the use of grooved jambs is unavoidable there are some golden rules to be followed.

The groove must be at least 1–2mm wider than the board that is being used. Trying to get a 10mm plasterboard into a 10mm groove will be difficult.

Line the back of the groove up with the face of the substrate.

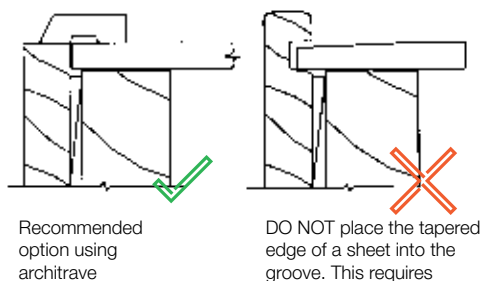
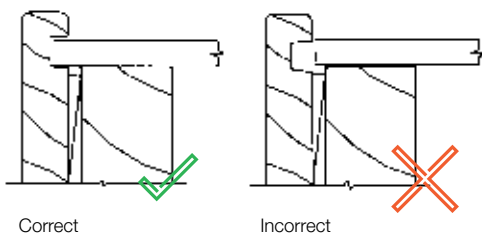


Correct installation of grooved jambs using an 11–12mm packer.

Grooved Jambs and Architraves

Summary

- Grooved jambs are designed to be quick and easy to install. Unless they are installed correctly, they can cause delays in plasterboard fixing and remedial work due to poorly positioned joints
- Unless a small amount of time and effort is invested in getting the unit set up correctly, grooved jambs and liners can cause far more problems than they are worth
- Simple best practice carpentry techniques are all that is required to install units accurately
 - Accurate measuring and ordering by the building contractor
 - Accurate fabrication by the joinery manufacturer
 - Careful installation by the installer
- The use of architraves is the recommended method of finishing around doors and windows





4.3.7 Reducing Joints When Using Grooved Jambs

- Line the wall with the opening before lining any adjacent walls
- Joinery must be accurately installed to give 1.5–2mm clearance for sheet into the groove. (see p. 43)
- Groove depth should be 8mm minimum
- Cut lower sheet 20mm less than overall wall length
- Measure from wall or floor to outer edge of joinery frame (not into groove)
- Cut lower sheet as shown in Fig. 2
- Install sheet by placing against the wall and sliding and lifting into grooves as required

- Repeat the procedure for the upper sheet. Measure D from the top edge of the fixed lower sheet to the top outer edge of the window frame. Deduct 6mm from this measurement

Fig. 1

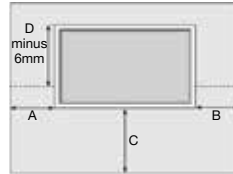
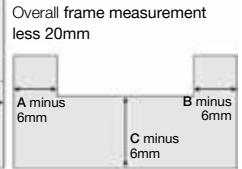


Fig. 2 – Lower Sheet



4.4 INSTALLATION TO CEILINGS

4.4.1 General Installation

Truss dimensions and spacings must comply with NZS3604:2011.

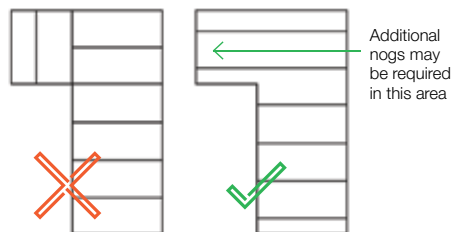
The use of GIB® Rondo® metal ceiling battens is strongly recommended. Timber battens can be prone to conditions that contribute to joint failure and popped fasteners. If the use of timber ceiling battens is unavoidable, additional care needs to be taken to ensure that the moisture content is 18% or less (see p. 30).

To limit sag in GIB® plasterboard ceilings, long term uniformly distributed loads such as that of fixtures and fittings and/or overlaid insulation shall not exceed 3kg/m² unless independently supported

Winstone Wallboards recommends:

- 13mm GIB® plasterboard on GIB® Rondo® steel battens at 600mm centres
- Ceiling battens are installed after the roof framing is complete and the roof has been loaded
- All ceiling sheets be fixed at right angles to the ceiling framing. Sheets must not be fixed in the same direction as the framing to which it is attached. All ceiling battens in a single area need to run in the same direction to enable this. Sometimes this will require additional nogs to be fitted between trusses. Failure to do this will result in a tapered edge/cut edge joint at a point that is highly susceptible to cracking

General Ceiling Installation



4.4.2 Standard Ceiling Fixing

This information applies to the general installation of GIB® plasterboard. If bracing, fire or noise control is a consideration consult the relevant GIB® Systems literature.

Ceiling Framing

- If using timber ceiling battens, timber moisture content must not exceed 18% prior to lining (see p. 30)
- Battens should all run in the same direction within a ceiling area. Additional nogs may be required to achieve this

Batten Spacing

- 10mm GIB® plasterboard – 450mm maximum
- 13mm GIB® plasterboard – 600mm maximum
- Winstone Wallboards recommends the use of 13mm GIB® plasterboard in ceiling applications for optimal performance

Fasteners

Metal Battens

- Minimum 25mm x 6g GIB® Grabber® fine thread self tapping screws*

Timber Battens

- Minimum 32mm x 6g GIB® Grabber® high thread screws*

Fastener Spacings

- Single screws at the edges and centre of the sheet across the batten
- Single screw at 600mm maximum to the perimeter of the ceiling. See p. 68 for ceiling diaphragm installation
- Place fasteners no closer than 12mm from a taper sheet edge or 18mm from a cut sheet edge

Adhesive

- Place daubs of GIBFix® adhesive at 200mm to intermediaries
- Do not place adhesive at sheet edges or within 200mm of fasteners

Lining

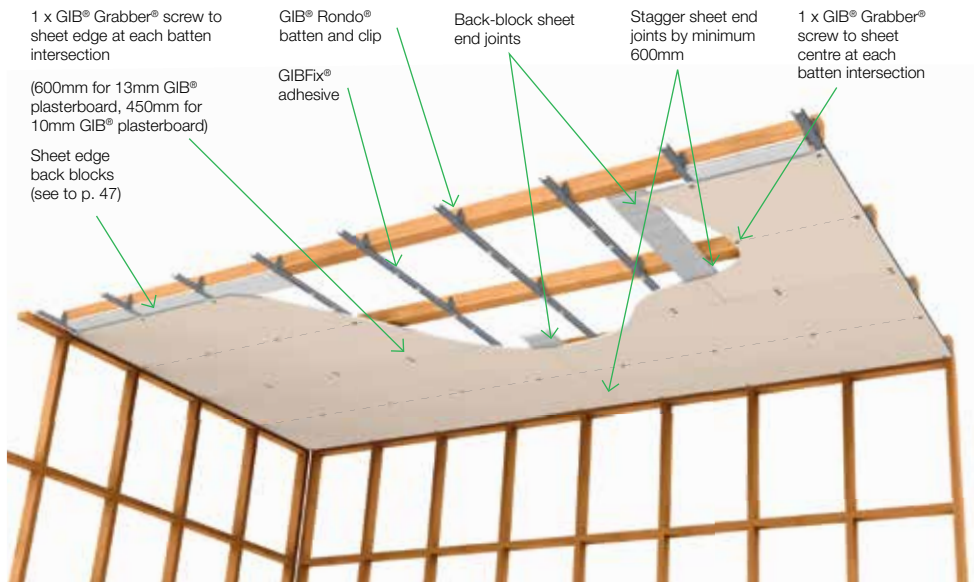
- Sheets should be touch fitted
- Sheets must be fixed at right angles to the ceiling framing unless otherwise specified in GIB® Performance System specifications

Stopping

- Refer to the Joint and Finishing section (p.78)

*Some GIB® Performance Systems may require different fastener lengths and types. Refer to the applicable GIB® System literature for more information

Ceilings



4.4.3 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).

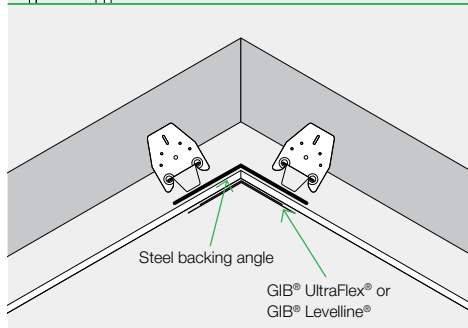
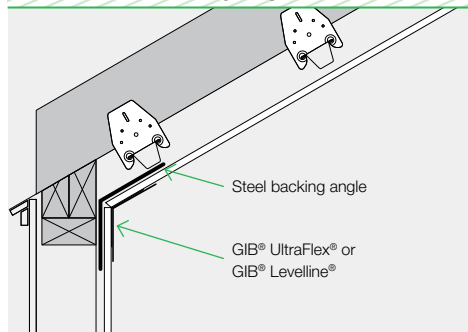
Because of the heat that can be generated in roof spaces, timber battens can be subjected to conditions that contribute to joint failure and popped fasteners.

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 or Noise Control Systems.

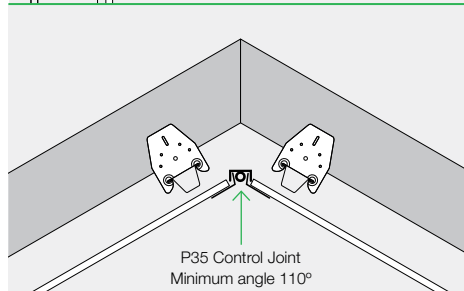
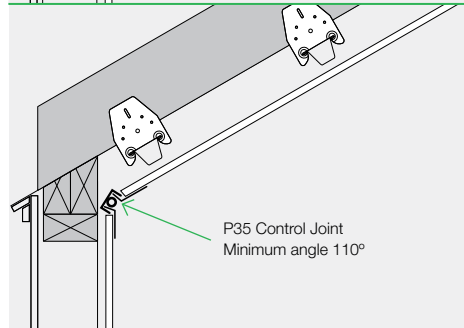
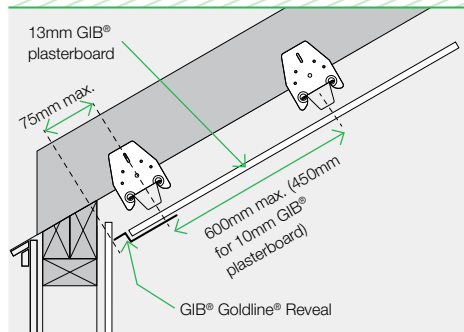
Back blocking of all ceiling joints is highly recommended as it can reduce the likelihood of cracking.

Fixed – Steel Backing Angle



Note: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

Flexible – Perimeter Relief





4.4.4 Back Blocking – Butt and Edge Joints

Back blocking is the practice of laminating an off-cut of plasterboard to the back of a joint using GIB-Cove® Bond adhesive.

Back blocking is required to ceiling sheet edge joints as follows:

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

Back blocking is required to all joints when a Level 5 Finish has been specified.

Back blocking is strongly recommended at sheet end joints in ceilings. Some fire rated systems require that joints are made on solid blocking and that requirement takes precedence and must be followed. Refer to GIB® Fire Rated Systems specifications for more information.

Back blocking is not required for a Level 4 Finish when a suspension system has been used. This includes GIB® Rondo® metal ceiling batten system fixed on clips. See p. 46. Sheets ends should be back blocked.

Due to wind pressure when garage door is open, and vibration from garage door opening, it is recommended that all sheet joints in garage ceilings are back blocked.

Back Blocking Comprises 2 Steps:

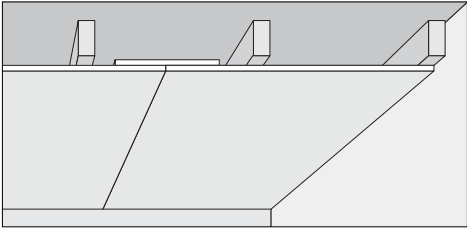
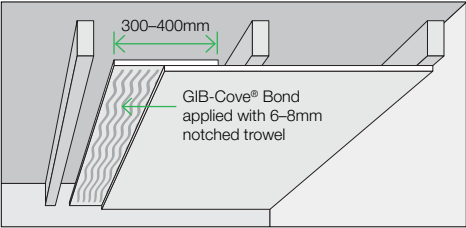
- Laminating a piece of plasterboard to the back of the joint
- Forming a tapered edge to help form a flat stopped joint

Step 2 can be omitted but the stopped joint will need to be much wider (500–600mm) in order to minimise the effect of the stopping joint thickness.

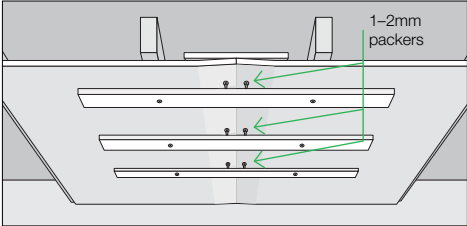
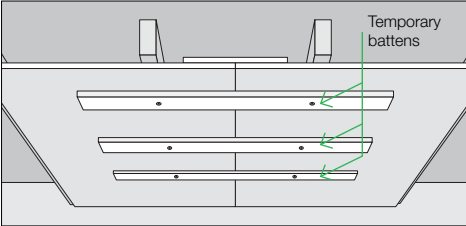
Back Blocking Technique

- Make back blocks at least 300mm wide and cut to fit loosely between framing members
- Apply GIB-Cove® Bond to the underside of the back block with a 6–8mm notched trowel
- Do not use synthetic wall board adhesive for back blocking
- If possible, attach the back block to the back of the joint from above
- If access from above is not possible, apply GIB-Cove® Bond to one half of the back block before attaching the back block to the edge of the sheet. Install a couple of screws through the tapered edge to secure the back block
- Apply GIB-Cove® Bond to the remainder of the back block just before fixing the next sheet

Back Blocking



Creating a Tapered Edge





4.4.5 Control Joints – Walls and Ceilings

These control joints and maximum recommended centres aim to provide relief from stresses associated with changes in temperature, humidity and the response of dissimilar construction materials (e.g. metal, timber, gypsum and plasterboard). For more significant structural movements consult the building designer.

Walls

- In long unbroken partitions or wall runs, control joints are required at maximum 12m centres. They are also required where structural control joints occur in the primary structure
- Door frames extending from floor to ceiling constitute effective control joints

Ceilings

- Extensive ceiling areas must have control joints spaced at maximum 12m centres
- It is recommended joints be positioned to intersect lighting fixtures, heating vents or air diffusers

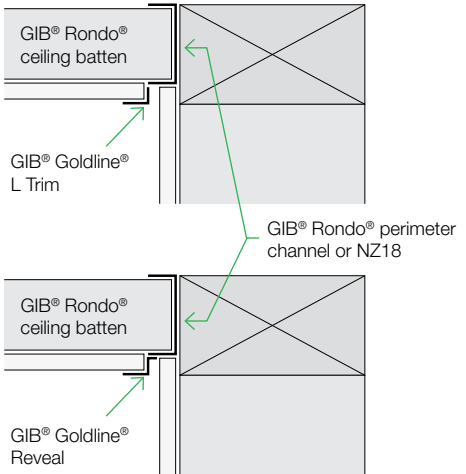
Other situations

- Where GIB® plasterboard meets dissimilar materials, it must be isolated by an edge trim or casing bead
- In stairwells and high timber framed walls, provision should be made for timber movement by leaving a 20mm gap between the sheet lining at, or near, the upper floor joists. This gap can be covered by a suitable cover batten

Joint Control

Joint Position	Maximum Centres
Walls	12 metres
Ceilings	12 metres

Perimeter relief using GIB® Goldline® Tape-On Trims



Control Joints in Ceilings – Recommendation to Reduce Risk of Cracking

There are some common places within the 12m spacing where cracks are most likely to occur in ceilings (as shown below).

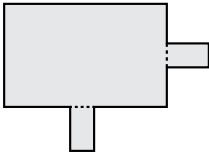
It is recommended to consider installing control joints in these locations (as shown below) to reduce the risk of cracking.

Where hallways exit from a larger ceiling area.

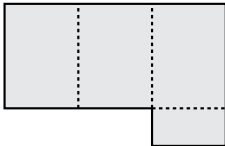
At internal corners in irregular shaped ceilings or where the main ceiling would look better divided into smaller sections.

At openings such as skylights, voids or recessed strip lighting. This may also include designated functional areas of a space.

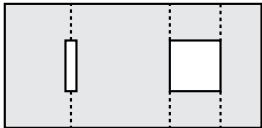
Plan view



Plan view



Plan view



4.4.5 Control Joints – Walls and Ceilings

Installation of the GIB® Rondo® P35 control joint

- Allow an 18mm minimum gap between the plasterboard sheets
- Locate the GIB® Rondo® P35 control joint centrally in the gap. Staple both flanges to the lining at 150mm centres maximum
- Finish with jointing compound using the channel ribs as screeding guides
- When the joint is dry remove the protective tape

Control joint using GIB® Goldline® Platinum trim

- Allow a 14–17mm gap between the plasterboard sheets
- Install GIB® Goldline® Platinum GR reveal to one side of joint
- Install GIB® Goldline® L Trim to the other side. Use a spacer to provide an even gap between the trim. This can be between 3–12mm
- Apply compounds as described on p. 83–84

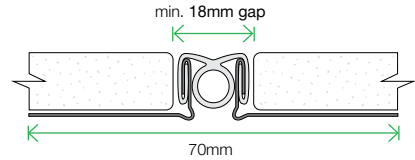
GIB® Plastic W-profile Control Joint

- Discrete finish and has tear-away tabs for easy installation
- This trim is thicker than the other control joint trims and thus may have implications for the final joint height
- Available in 3.0m lengths

Note: Contact the GIB® Helpline 0800 100 442 for detailing of control joints in GIB® Performance Systems (e.g. fire, noise, bracing).

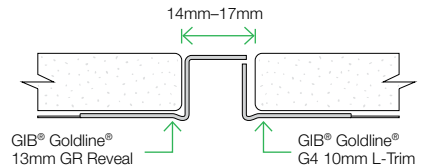
Installation of the Rondo® P35 control joint

1.



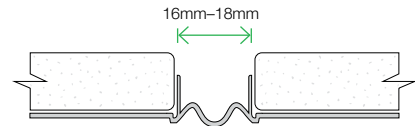
Control joint using GIB® Goldline® Platinum trim

2.



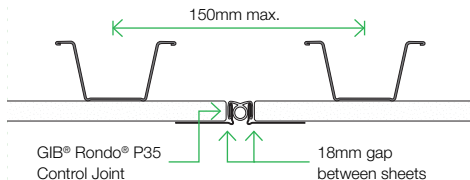
GIB® Plastic W-profile Control Joint

3.

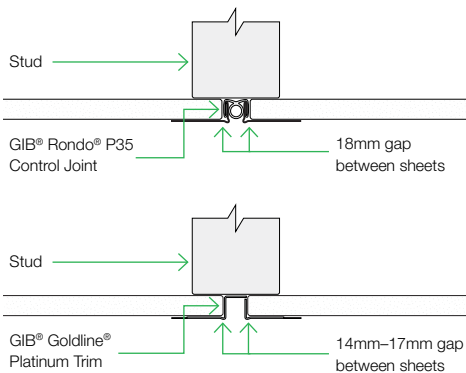




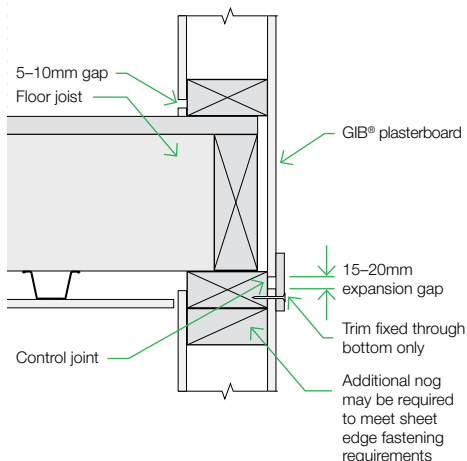
GIB® Rondo® Steel Battens



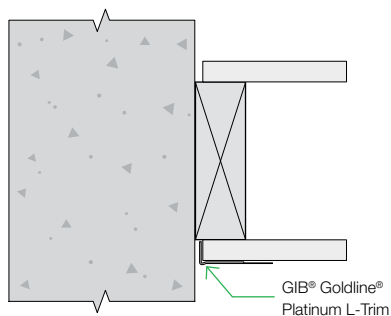
Timber Stud Walls



Two Storey Full Height Wall with Expansion Joint



Masonry Junction Timber or Steel Framing



4.4.6 GIB® Rondo® 310 Metal Batten System Installation Instructions

The GIB® Rondo® 310 system forms a strong, stable and flat substrate for ceilings in residential and commercial applications. The 35mm dimension allows it to be directly substituted into ceilings where 35mm timber battens would traditionally have been used. Consult an electrical contractor for any earthing requirements that may need to be incorporated.

There are two methods of fixing GIB® Rondo® 310 metal battens.

Recommended method

Clipped using either:

- 311D clip for a drop of 0–30mm
- 313 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten

A drop of up to 130mm can be achieved in order to accommodate services or variations in framing heights

- GIB Quiet Clip® in GIB Noise Control® Systems

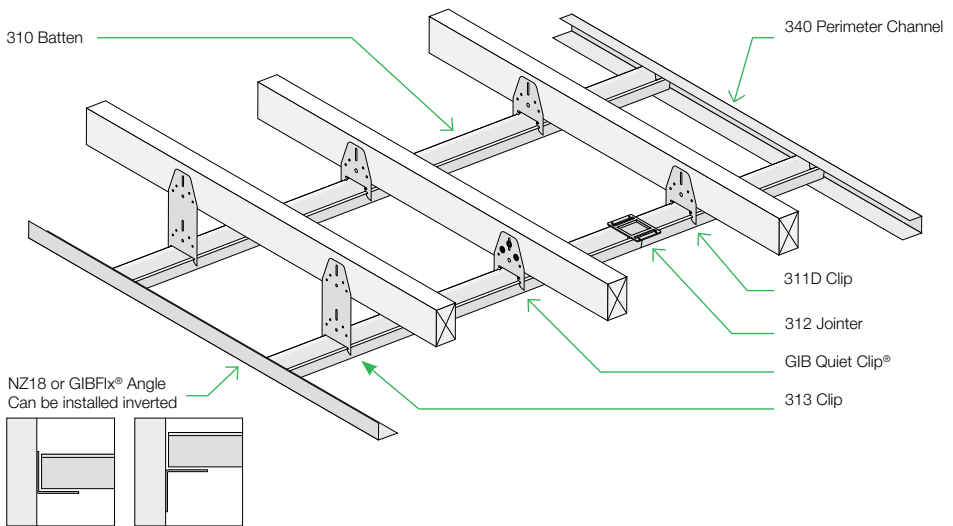
Alternative method

- Directly by fastening with pairs of min. GIB® Grabber® 32mm x 8g wafer head screws through the flange
- Alternatively pairs of min. 45mm x 2.8mm flat head nails can be used
- For fixing to steel framing a drill tip screw is recommended

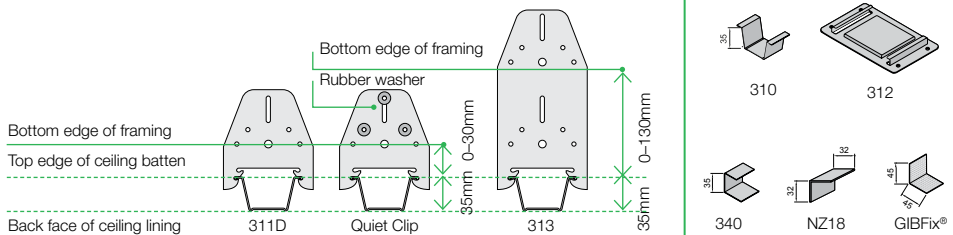
Note: If the 310 system is to be used in a ceiling diaphragm the batten needs to be screwed directly through the flanges to the framing.

See detail on page (69)

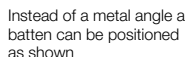
GIB® Rondo® 310 System



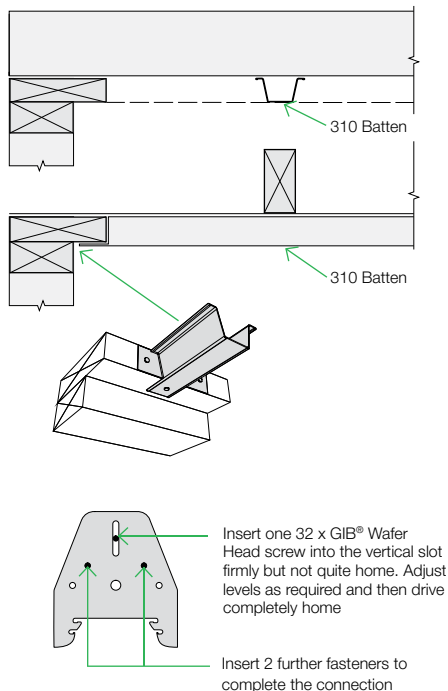
For ceiling diaphragm details refer to p. 66



Recommended Best Practice Details



Other Details



- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm GIB® plasterboard) using the string line to establish the correct position
- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Plasterboard Thickness – Single layer	10mm	13mm
Maximum Batten Spacing (mm)	450	600
Multi Span (mm)	1200	
Single Span and Garages (mm)	900	

Single Span

Ceiling Battens

Trusses Or Joists

Batten spacing

Multi Span Batten Continuous Over 2 Or More Spans

4.4.7 GIB® Rondo® 308 Metal Batten System Installation Instructions

The GIB® Rondo® 308 system is a light weight yet very strong ceiling batten. In addition to its function as a ceiling batten it can also be used as a wall furring channel and is an integral part of GIB Noise Control® Systems for walls. Consult an electrical contractor for any earthing requirements that may need to be incorporated.

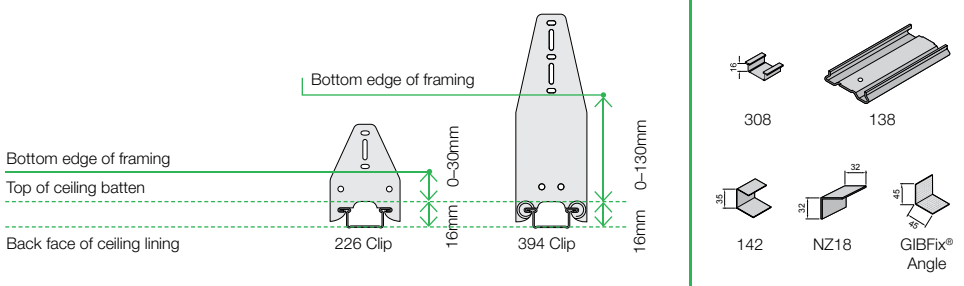
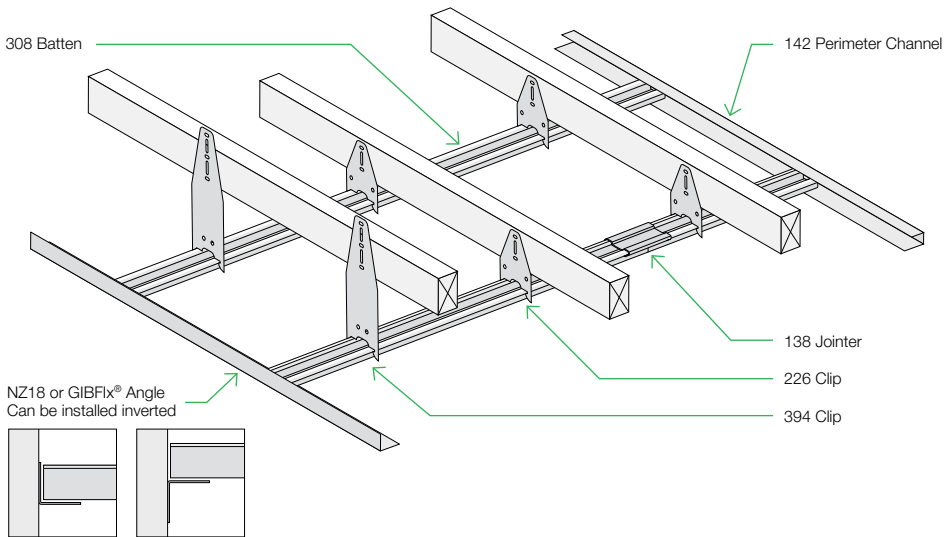
Recommended method

The GIB® Rondo® 308 system is installed using either:

- 226 clip for a drop of 0–30mm
- 394 clip where a larger drop is required between the bottom of the truss chord, joist or rafter and the back of the ceiling batten. Up to 130mm clearance between the bottom of the framing and the back of the batten of can be achieved in order to accommodate services or variations in framing heights

Note: If the 308 system is to be used in a ceiling diaphragm, the batten needs to be secured directly to the framing (see p. 69).

GIB® Rondo® 308 System



Recommended Best Practice Details

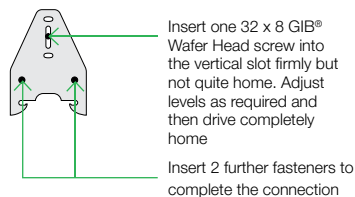


Diagram illustrating alternative attachment methods for the 308 Batten:

- Method 1: 226 Clip attached to the wall, 308 Batten attached to the clip.
- Method 2: 226 Clip attached to the wall, NZ18, GIBFix® Angle or 142 channel attached to the clip, 308 Batten attached to the angle/channel.
- Method 3: 226 Clip attached to the wall, NZ18, GIBFix® Angle or 142 channel attached to the clip, 308 Batten attached to the angle/channel.

Instead of a metal angle a batten can be positioned as shown

75mm max.

- Establish a datum line for the ceiling
- Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
- Install GIB® Rondo® clips at 600mm centres (450mm for 10mm GIB® plasterboard) using the string line to establish the correct position

- Cut the batten to the required length using snips or a hacksaw
- Insert the batten into the channel at each end and fit into the clip
- Install remainder of clips ensuring that the batten is straight and flat

GIB® Plasterboard Thickness – Single layer	10mm	13mm
Maximum Batten Spacing (mm)	450	600
Multi Span (mm)	1200	
Single Span and Garages (mm)	900	

Single Span

Ceiling Battens

Trusses Or Joists

Batten spacing

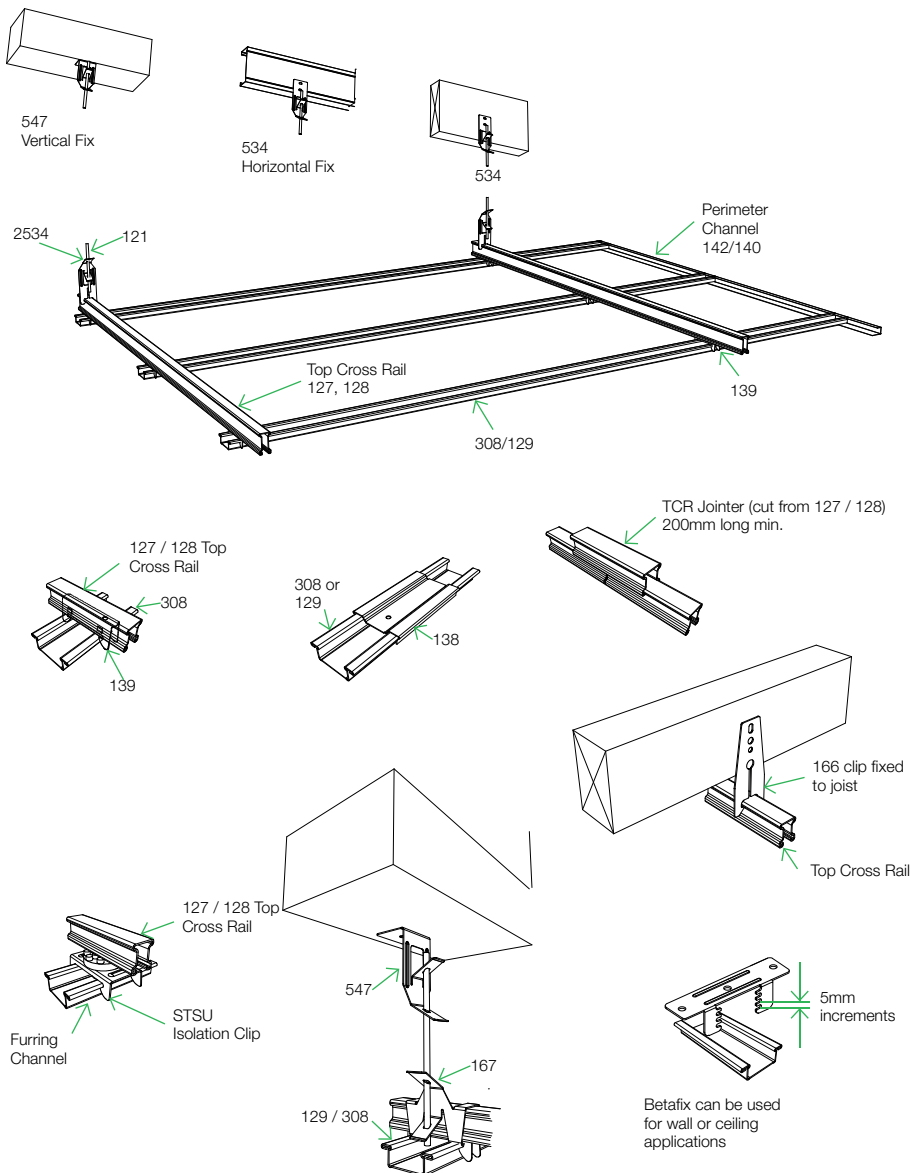
Multi Span Batten Continuous Over 2 Or More Spans

4.4.8 GIB® Rondo® Suspended Ceiling System

The range of GIB® Rondo® suspended ceiling componentry provides additional clearance above the ceiling level. This could be to run electrical, plumbing or ventilation equipment. The system allows for the ceiling lining material to be directly attached to the lower face of the battens.

This is not to be confused with a two way grid system which accommodates proprietary ceiling tiles. The components can be assembled in a wide range of combinations to suit a variety of applications. Refer to GIB® Rondo® System literature for more information.

GIB® Rondo® Suspended Ceiling Components





4.5 CURVING GIB® PLASTERBOARD

GIB® plasterboard can be curved. Curvature is dependent on the thickness and type of board and whether the board is applied wet or dry. Sheets must be fixed horizontally to walls.

The radii shown are for GIB® Standard and GIB Ultralite®. Other performance boards such as

GIB Fyrelite® and GIB Aqualite® can also be curved but with slightly increased radii due to the increased density of the board.

It is not recommended to curve high density boards such as GIB Bracelene / GIB Noiseline® or GIB Toughline® due to the risk of breakage.

Minimum Bending Radii of GIB® Plasterboard

Board Thickness/Type	Minimum Radius (Wet)	Minimum Radius (Dry)
10mm GIB® Standard	900mm	1200mm
13mm GIB® Standard	1000mm	1500mm
10mm GIB Ultralite®	1000mm	1500mm
13mm GIB Ultralite®		1500mm

Framing Centres

Wall or Ceiling Radius	Maximum Stud, Batten or Joist Spacing
900mm–1200mm	200mm
Over 1200mm–3000mm	300mm
Over 3000mm	400mm

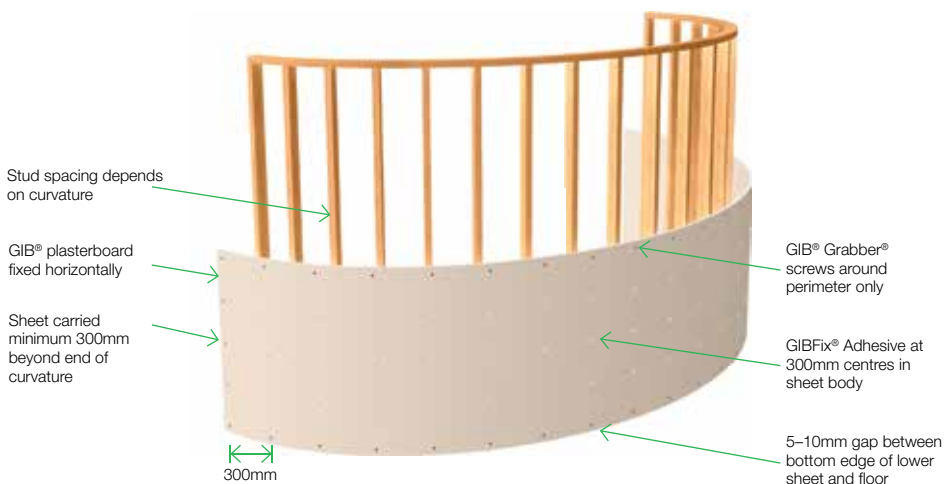
Application Method

- Ensure that framing spacings are correct
- If possible, select board length to allow for one unbroken panel to cover the entire curve with enough extra length to extend 300mm beyond each end
- Alternatively apply water with a paint roller to both sides

- If creating an outside curve, begin installation at one end and fasten the sheet as it is wrapped around the curve
- If creating an inside curve, start fastening the sheet at the centre of the curve and work outwards to the end of the sheet

Note: Lining the inside of the curve will be more difficult than lining the outside and will require additional labour.

Curving GIB® Plasterboard



4.6 FIXING TO MASONRY

Direct bonding of GIB® plasterboard to concrete or brick masonry walls must only be considered when the concrete or masonry substrate is thoroughly dry and adequately protected against moisture penetration.

The substrate must be firm, dry, and free of dust, grease, release agents and curing compounds.

In situations where dampness or rain penetration problems exist, corrective measures must be taken prior to installation of interior linings.

Movement and control joints in the main structure must be carried through the GIB® plasterboard linings. This can be achieved by installing a control joint in the plasterboard.

Direct Bonding (For Sheet Heights up to 3m)

- Determine the sheet position for either vertical or horizontal fixing and mark on wall
- GIB® plasterboard sheets can be fixed vertically or horizontally. Horizontal fixing creates fewer joints and is recommended
- Use GIB-Cove® Bond to bond the GIB® plasterboard to concrete or masonry surfaces
- Mix GIB-Cove® Bond to a smooth, thick consistency
- Apply GIB-Cove® Bond daubs approximately 50mm diameter x 12mm thick at 300–400mm centres vertically and 500–600mm centres horizontally. Ensure that adhesive is placed no closer than 25mm from the edge of the sheet
- Where irregularities up to 10mm occur on the masonry surface, use larger daubs of adhesive to bridge the gap
- Position the sheet and press into place
- Obtain true alignment and flatness by using a long straight edge over the surface of the sheet
- Alternatively, apply adhesive over the entire back surface of the sheet using a notched trowel
- Apply GIB-Cove® or GIB® Trims to wall and ceiling intersections
- Fix skirting and architrave with masonry nails or adhesive

Daubs approximately 50mm diam. x 12mm high

Daubs placed no closer than 25mm from sheet edge

Control joints in walls need to continue through GIB® plasterboard

GIB-Cove® Bond adhesive daubs at 300–400mm centres vertically and 500–600mm centres horizontally



Wall Strapping must be used:

- Wall Strapping must be used:
 - When the concrete or masonry wall is below ground level
 - When the concrete or masonry wall is an external wall, unless a proprietary external weatherproofing system can be verified as providing weather tightness for the life of the building
 - In bathrooms, laundries and other wet areas
 - When the concrete or masonry substrate or paintwork is in poor condition
 - When the wall surface contains irregularities of more than 8–10mm strapping can be packed to provide a flat surface for the plasterboard
 - For walls in excess of 3.0m in height
- Use either nominally 50 x 25mm timber strapping or metal furring channels. Deeper strapping may be required to accommodate insulation requirements
- Fix DPC behind timber strapping
- Fix strapping vertically to the wall surface at a maximum of 600mm centres, with either a continuous horizontal batten or nogs at the top and bottom of the wall
- Install services prior to installing GIB® plasterboard linings

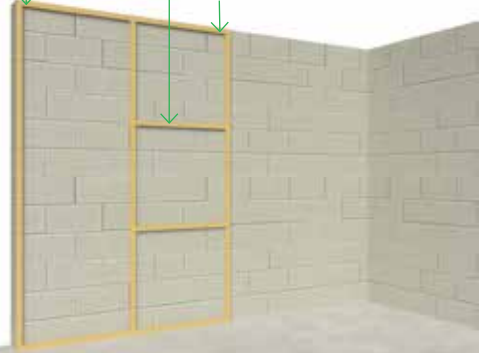
50 x 25mm KDMG timber or GIB® Rondo® Steel Battens, maximum 600mm apart.

Pack battens as required to provide a flat surface

For vertically fixed boards, use nogs between battens at 800mm centres

Nogs are not required for horizontally fixed boards

DPC behind timber strapping










4.6 FIXING TO MASONRY

If insulation 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.

<div>Anchor bolt</div> 	<div>Polystyrene</div> 
<div>A239 Clip</div> 	<div>308 Batten</div> 
<div>GIB® Plasterboard overlay</div> 	



5.0 GIB® PERFORMANCE SYSTEMS

The GIB® Performance Systems section covers installation of GIB EzyBrace® and GIB Aqualine® Wet Area Systems. For other systems including

GIB Noise Control®, GIB® Fire Rated, GIB® Tough and GIB® Intertenancy Barrier Systems refer to the appropriate GIB® systems literature.

5.1 GIB® BRACING SYSTEMS

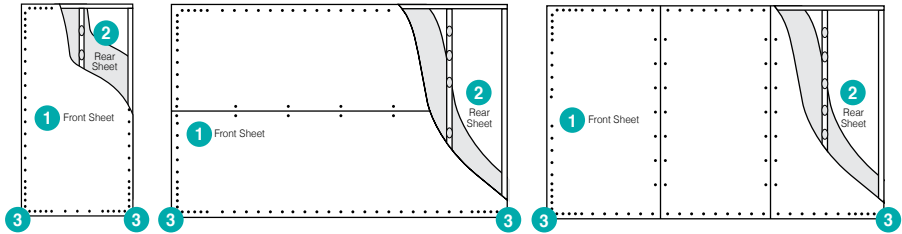
This section covers the installation of GIB EzyBrace® Systems to timber framing to NZS 3604:2011. Full design details can be found in the GIB EzyBrace® Systems literature.

Bracing of steel framed walls is by specific design. For assistance refer to the document GIB EzyBrace® for Light Steel Frame Systems available from gib.co.nz or nashnz.org.nz.

GIB® Bracing elements code system:	
GS	GIB® Standard plasterboard or other similar thickness
BL	GIB Braceline®
P	7mm structural plywood manufactured to AS/ NZS 2269:2012
1	Bracing element fixed to one side of the wall only
2	Bracing element fixed to both sides of the wall
N	Panel hold down not required
H	GIB HandiBrac® or metal strap and hold down bolt
NOM	Nominal fixing as per p. 38-39



5.1.1 Installation Summary



Sheet Installation

	Front Sheet 1		Rear Sheet 2		Panel Hold-Down Fixings 3	Fastener Spacing
	Lining	Fasteners	Lining	Fasteners		
GS2-NOM	Any 10mm or 13mm GIB® plasterboard	Minimum 32mm x 6g GIB® Grabber® high thread screws	Any 10mm or 13mm GIB® plasterboard	Minimum 32mm x 6g GIB® Grabber® high thread screws	Not Required	Corner fastening pattern as illustrated on p. 65. All four corners of GS2-NOM bracing element must be fastened at 50mm and 250mm from the edge of the sheet at 300mm centres
GS1-N	Any 10mm or 13mm GIB® plasterboard	Minimum 32mm x 6g GIB® Grabber® high thread screws	Not Required	Not Required	Not Required	GIB® Plasterboard Corner fastening pattern as illustrated on p. 65 Fasteners at 150mm to bracing element perimeter and: at 300mm centres to intermediate sheet joints for vertical fixing, or at stud/sheet junction for horizontally fixed elements, and GIBFix® adhesive daubs at 300mm are to intermediate framing Structural Plywood Fasteners at 150mm around the perimeter of every sheet and at 300mm centres to intermediate studs. Place fasteners no closer than 7mm from sheet edges. Plasterboard corner fastener pattern does not apply to plywood
GS2-N			Any 10mm or 13mm GIB® plasterboard	32mm x 6g GIB® Grabber® high thread screws		
GSP-H			Minimum 7mm structural plywood manufactured to AS/NZS 2269	50mm x 2.8mm flat head galvanised or stainless steel nails	Yes	
BL1-H	10mm or 13mm GIB® Braceline®	Minimum 32mm x 6g GIB® Grabber® high thread screws	Not required	Not required		
BLG-H			Any 10mm or 13mm GIB® plasterboard	32mm x 6g GIB® Grabber® high thread screws		
BLP-H			Minimum 7mm structural plywood manufactured to AS/ NZS 2269	50mm x 2.8mm flat head galvanised or stainless steel nails		

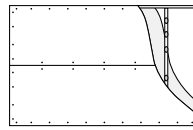
Note: Minimum bracing element length is 400mm

5.1.2 System Specifications

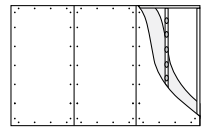
GS2-NOM

1. 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing
2. Corner fastening pattern applies (see p. 65)
3. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 300mm to perimeter
4. Panel hold downs not required
5. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
6. Joints and fastener heads must be stopped
7. GIB® tape must be used in joints
8. Sheets may be fixed horizontally or vertically

Bracing Element – Plasterboard side shown



Horizontal Fixing

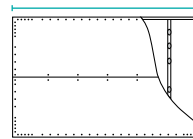


Vertical Fixing

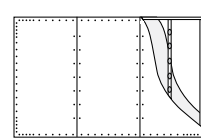
GS1-N

1. Any 10mm or 13mm GIB® plasterboard to one side of the wall only
2. Corner fastening pattern applies (see p. 65)
3. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter
4. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
5. Panel hold downs not required
6. Joints and fastener heads must be stopped
7. GIB® tape must be used in joints
8. Sheets may be fixed horizontally or vertically

Bracing Element – Plasterboard side shown



Horizontal Fixing

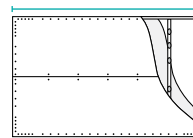


Vertical Fixing

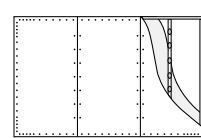
GS2-N

1. Any 10mm or 13mm GIB® plasterboard to both sides of the wall. Both sides fixed as bracing elements
2. Corner fastening pattern applies (see p. 65)
3. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter
4. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
5. Panel hold downs not required
6. Joints and fastener heads must be stopped
7. GIB® tape must be used in joints
8. Sheets may be fixed horizontally or vertically

Bracing Element – Plasterboard side shown



Horizontal Fixing

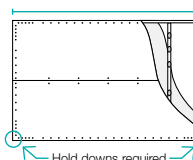


Vertical Fixing

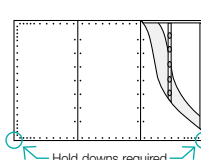
GSP-H

1. Any 10mm or 13mm GIB® plasterboard to one side of the wall
2. 7mm structural plywood to the other side
3. Corner fastening pattern applies (see p. 65)
4. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter (plasterboard side) 50 x 2.8mm FH nails at 150mm to perimeter. Corner fastening pattern not applicable to plywood side
5. Panel hold downs required
6. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
7. Joints and fastener heads must be stopped
8. GIB® tape must be used in joints
9. Sheets may be fixed horizontally or vertically

Bracing Element – Plasterboard side shown



Horizontal Fixing



Vertical Fixing

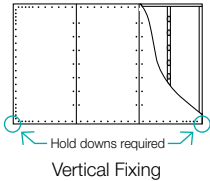
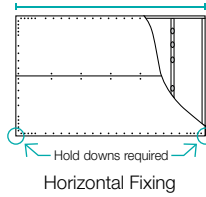


5.1.2 System Specifications

BL1-H

1. 10mm or 13mm GIB Braceline® to one side of the wall only
2. Corner fastening pattern applies (see p. 65)
3. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter
4. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
5. Panel hold downs required
6. Joints and fastener heads must be stopped
7. GIB® tape must be used in joints
8. Sheets may be fixed horizontally or vertically

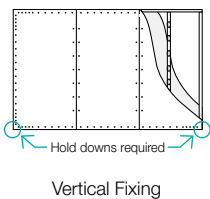
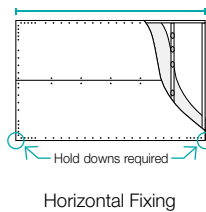
Bracing Element – Plasterboard side shown



BLG-H

1. 10mm or 13mm GIB Braceline® to one side of the wall
2. Any 10mm or 13mm GIB® plasterboard to the other side. Both sides fixed as bracing elements
3. Corner fastening pattern applies (see p. 65)
4. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter
5. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
6. Panel hold downs required
7. Joints and fastener heads must be stopped
8. GIB® tape must be used in joints
9. Sheets may be fixed horizontally or vertically

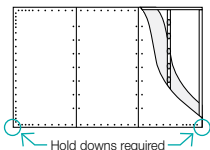
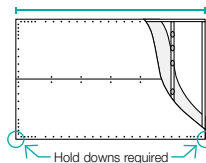
Bracing Element – Plasterboard side shown



BLP-H

1. 10mm or 13mm GIB Braceline® to one side of the wall only
2. 7mm structural plywood to the other side
3. Corner fastening pattern applies (see p. 65)
4. 32 x 6g GIB® Grabber® screws or GIB® Grabber® Dual Thread screws at 150mm to perimeter (plasterboard side). 50 x 2.8mm FH nails at 150mm to plywood perimeter. Corner fastening pattern not applicable (plywood side)
5. Panel hold downs required
6. Centre of the sheet may be fixed with adhesive or fastenings at 300mm
7. Joints and fastener heads must be stopped
8. GIB® tape must be used in joints
9. Sheets may be fixed horizontally or vertically

Bracing Element – Plasterboard side shown

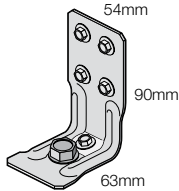
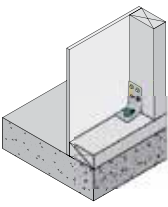
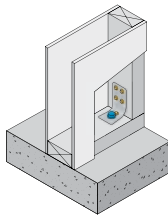
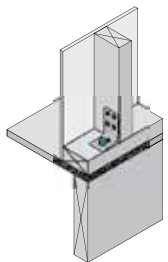
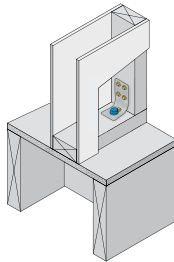


For sheet substitution options refer to p. 14.

5.1.3 Bottom Plate Fixing

Bottom Plate Fixings for GIB® Bracing Elements			
Brace Type	Concrete Slabs		Timber Floors
	External Walls	Internal Walls	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 GS2-NOM	Not applicable		
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. 63–64		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
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p. 63 & 64	In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated below

5.1.4 Panel Hold-Down Details

GIB HandiBrac® – Recommended Method			
<p>Developed in conjunction with MiTek™ NZ, the GIB HandiBrac® has been designed and tested for use as a hold-down in GIB® BL and GSP bracing elements.</p> <ul style="list-style-type: none"> – 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 into 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 Floors		Timber Floors	
External Walls	Internal Walls	External Walls	Internal Walls
 <p>Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate</p>	 <p>Position GIB HandiBrac® at the stud / plate junction</p>	 <p>Position GIB HandiBrac® in the centre of the perimeter boundary joist</p>	 <p>Position GIB HandiBrac® in the centre of floor joist or full depth solid block</p>
Hold-Down Fastener Requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT 10/140 screw bolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT 10/140 screw bolt in GIB HandiBrac® pack.	

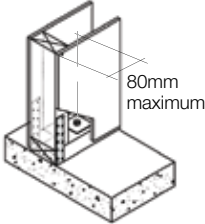
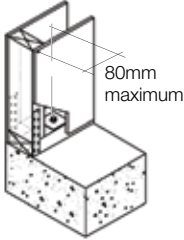
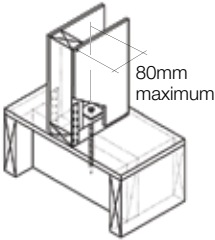
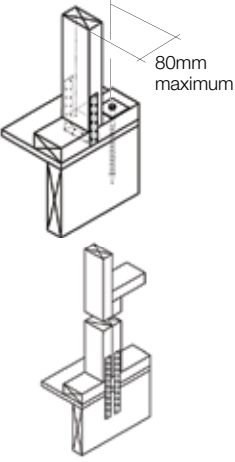
Bracing Strap Installation

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. It should be positioned in such a way that the important 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 important corner fastenings to be installed without having to penetrate the bracing strap.

Concrete Floors

Timber Floors

400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5 flat head galvanised nails to each side of the stud. Three 30 x 2.5 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 edge of the element.

Internal Walls	External Walls	Internal Walls	External Walls
			 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.

Hold-Down Fastener Requirements

Concrete Floors

A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.

Timber Floors

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.

- All four corners of a GIB® plasterboard bracing element must be fastened as per the fastening patterns shown below

- Bracing element perimeter is then fastened at 150mm centres, or for GS2-NOM 300mm centres
- Fasteners must be no closer than 12mm from the paper enclosed edge and no closer than 18mm from sheet ends or cut edges of sheets

Unless specified all fastener spacings are maximums.



Note: For panels between 400mm and 450mm place this fastener centrally



5.1.6 Permitted GIB EzyBrace® Plasterboard Substitutions

Refer to p. 14 for GIB® plasterboard substitutions in GIB EzyBrace® systems

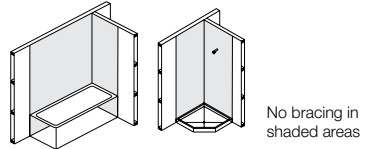
5.1.7 General Installation Details

- Timber framing to comply with NZS 3604:2011
- Minimum stud dimensions:
 - External walls – 90 x 35mm
 - Internal walls – 70 x 45mm
- Use full sheets where possible
- If part sheets are required a minimum dimension of 300mm applies for all bracing elements
- All joints and fastener heads in GIB EzyBrace® Systems must be stopped. GIB® tape must be used in joints

Bracing in Wet Areas

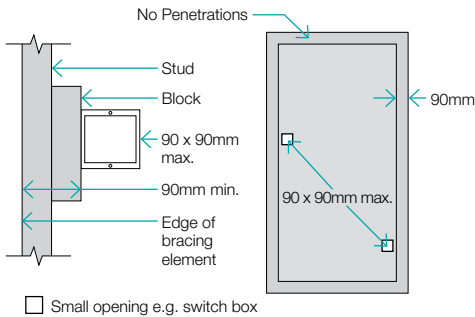
GIB EzyBrace® Systems are not to be installed inside shower cubicles or around baths.

Outside of these areas it is acceptable to use GIB EzyBrace® Systems in bathrooms and other wet areas provided that the surface of the element is maintained impervious for the life of the building.



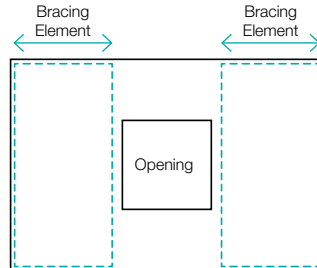
Small Openings in Bracing Elements

Small openings (e.g. power outlets) of 90 x 90mm maximum or circular holes no more than 100mm 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 in Bracing Elements

For 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 the bracing element on the other side of the wall framing.



Intersecting Walls

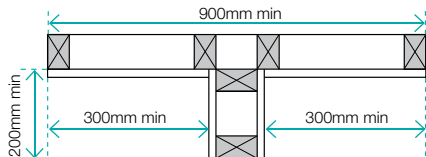
GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. The bracing element length must be no less than 900mm.

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).

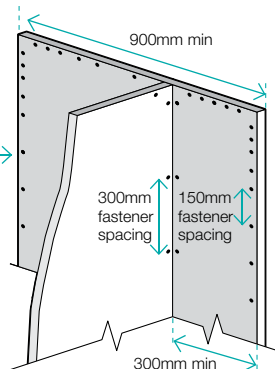
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures on p. 67.

5.1.7 General Installation Details

Intersecting Walls



Example using fastener pattern for GS and BL elements



Junction
Minimum 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres each side

Top Plate Connections

For top plate connection refer to NZS3604:2011 section 8.7.3.

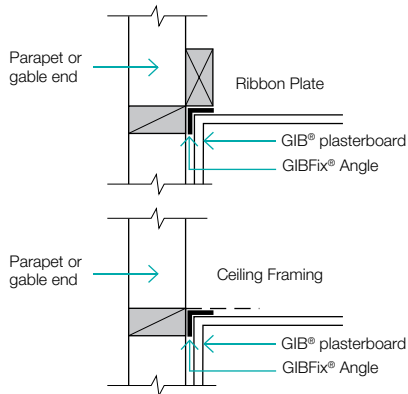
Parapets and Gable End Walls

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 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line;

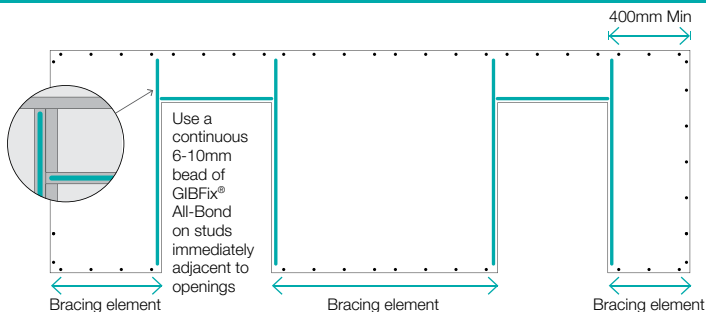
OR

GIBFix® Angle is installed as shown. The angle is fixed to a row of nogs with 30 x 2.5mm galvanised flat head nails at 300mm centres.



Screw and Adhesive Fix for Openings - GS2-NOM Only

GIBFix® All-Bond Adhesive





5.1.8 Ceiling Diaphragms

Ceiling diaphragms do not have a bracing unit rating but are used when bracing lines are spaced further than 6.0m apart.

Any 10mm or 13mm GIB® plasterboard can be used for ceiling diaphragms.

Ceiling Diaphragms

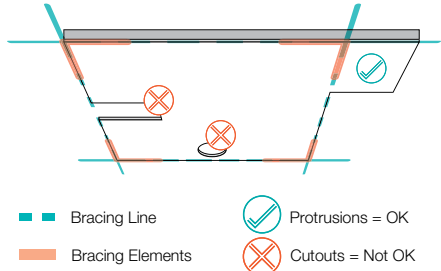
Small Openings

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

Large Openings

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

Where fireplace flue or range hood openings are required in a ceiling diaphragm the use of a galvanised metal backing plate is recommended, with a maximum hole diameter of 350mm.

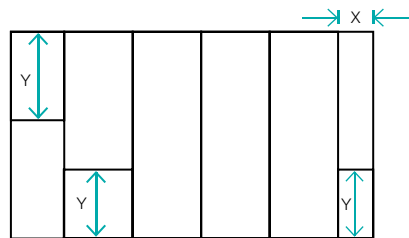


Use full width sheets where possible.

Minimum length sheet – 1.8m

Minimum width sheet – 900mm

Sheets less than 900mm in width but no less than 600mm may be used provided that the sheet edge joint is fully back blocked.



X = 900mm min or 600-900mm min provided all adjacent joints are back-blocked

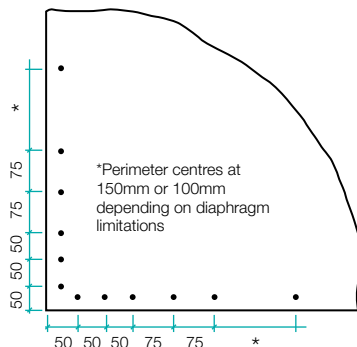
Y = 1800mm min sheet lengths at ends of ceiling diaphragms

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.



All fastener spacings are maximums

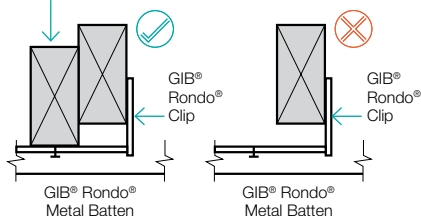
5.1.8 Ceiling Diaphragms

Ceiling Diaphragms

GIB® Rondo® 310 metal ceiling battens may be used if fixed directly through the flanges into the ceiling framing using 2/32mm x 8g wafer head screws.

If the 310 ceiling battens are required to be clip fixed, a block or continuous timber member must be securely attached to the ceiling framing at the level of the back of the metal batten. The batten is then fastened to this timber as shown.

Block or continuous timber member min 300mm fixed with min 4 x 100mm x 3,75mm nails



For steel battens a continuous channel or angle is required to the perimeter of the diaphragm.

This shall be fastened to the framing with GIB® Grabber® 32mm x 8g wafer head screws at 300mm centres.

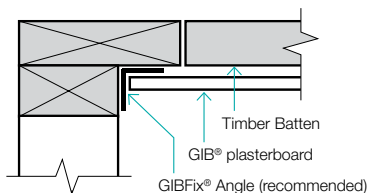
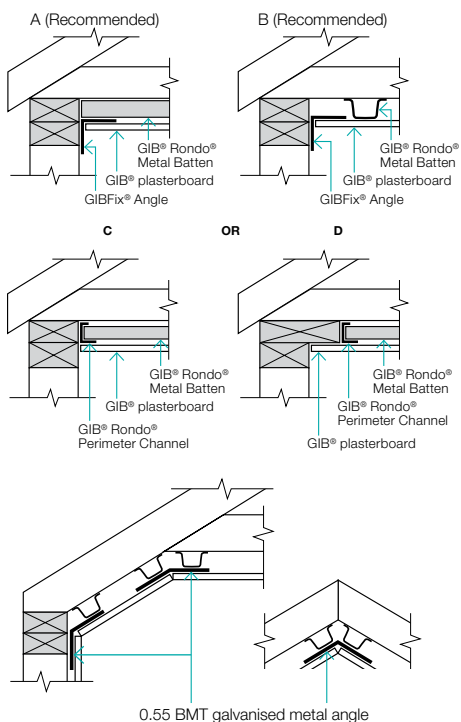
Battens shall be fixed to the channel with 32 x 8g GIB® Grabber® wafer head screws.

It is important that a positive connection is created between the top plate and the ceiling substrate.

Coved ceiling diaphragms can be achieved by attaching a folded metal angle to the junctions.

- Minimum .55mm BMT with 100mm each leg
- Fastened at 300mm centres on each edge using 32mm x 6g GIB® wafer head screws

Linings shall be fixed to both sides of the metal angle at 150mm or 100mm centres with minimum 25mm x 6g GIB® Grabber® self-tapping screws



General installation

- Sheet end butt joints must be formed off framing and back-blocked (see p. 47)
- Framing and ceiling batten requirements for ceiling diaphragms are the same as for general ceiling installation (see p. 45)
- The body of the ceiling shall be fixed as per general ceiling installation (see p. 45)
- Openings and penetrations in ceiling diaphragms are as for wall bracing (see p. 66)
- Linings shall be installed over the entire area of the diaphragm
- Joints and fastener heads must be stopped. GIB® tape must be used in joints



5.2 GIB AQUALINE® WET AREA SYSTEMS

This section covers the installation of GIB Aqualine® Wet Area Systems. Full information can be found in the GIB Aqualine® Wet Area Systems literature.

GIB Aqualine®

GIB Aqualine®, with its green face paper, has a water resistant core which will provide resistance to the effects of moisture in wet areas such as bathrooms and laundries.

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

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

Limitations

- Do not use GIB Aqualine® in situations where it is exposed for extended periods to humidities of 90% RH or greater. Such areas include group shower rooms, as well as moisture and chlorine laden environments such as indoor heated swimming pools
- GIB Aqualine® must not be installed in exterior situations
- GIB Aqualine® must not be directly applied to solid plaster (gypsum or cement) wood based sheet linings or similar materials, masonry or concrete. GIB Aqualine® may only be applied to these materials where timber strapping or steel furring channels are installed
- GIB Aqualine® must not be installed over a vapour barrier or a wall acting as a vapour barrier
- GIB Aqualine® must not be used for bracing purposes in shower cubicles or over baths

NZBC Clauses E3 Internal Moisture

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

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



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

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

1. Wall surface likely to be splashed
2. Wall surfaces directly exposed to water e.g. shower walls

Although not a requirement of NZBC it is highly recommended that the wall surfaces within 150mm of the top edge of a bath, and the vertical faces immediately under the edge of a bath, are treated in the same way as for a shower wall.

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

-  Code requirements
-  Best practice



5.2.2 Fixing Details for Non Tiled Walls

As for general installation details (see p. 38–41)

Ceilings

Battens or ceiling joists shall be spaced at 450mm centres maximum for 10mm GIB Aqualine® and 600mm centres maximum for 13mm GIB Aqualine®.

5.2.3 Fixing Details for Tiled Walls

Wall Framing

Timber Framing dimensions and spacings must comply with the requirements of NZS 3604:2011.

Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32mm x 32mm angle such as NZ18 or GIBFix® Angle. Each side of the angle shall be fastened to the framing with 30mm galvanised clouts at 300mm centres (see p. 74).

Steel stud systems are proprietary but do not generally incorporate nogs except as required below:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases
- To support towel rails, grab rails and wall basin brackets
- For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid blocking. This may either require vertical fixing of the GIB Aqualine® or the installation of some additional nogs

Lining and Tile Weights

- 10mm or 13mm GIB Aqualine® is recommended for use on timber or steel framing and for tile weights up to 20kg/m²
- 13mm GIB Aqualine® must be used for tile weights between 20 and 32kg/m² and when steel framing has been used

Ceiling Fixing

Fixing as for GIB® Standard plasterboard (see p. 45)

Jointing

All sheet joints must be GIB® tape reinforced and stopped in accordance with instructions on p. 83.

- GIB® Grabber® Drywall Screws at 100mm centres to perimeter of tiled wall and to all intermediate studs
- For 10mm GIB Aqualine® use minimum 25mm x 6g GIB® Grabber® Drywall Screws
- For 13mm GIB Aqualine® use minimum 32mm x 6g GIB® Grabber® Drywall Screws
- GIB Aqualine® may be fixed vertically or horizontally
- Provide a 5mm–10mm gap at the wall/floor junction
- Provide a 5mm–10mm gap between the bottom edge of the GIB Aqualine® and any bath rim or preformed shower base to allow for placement of sealant
- GIB Aqualine® sheets shall be touch fitted
- Where the framing or fastener centres required for tiled GIB Aqualine® are closer than those specified for GIB® Fire Rated and GIB Noise Control® Systems, the GIB Aqualine® specification shall prevail. Where relevant check fastener lengths comply with requirements of GIB® Fire Rated Systems
- Do not fix tiles to GIB® plasterboard ceilings or non-vertical planes

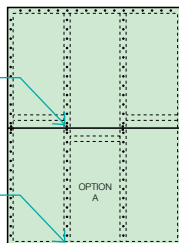
Jointing

- Jointing shall be carried out in accordance with instructions on p. 85
- No joint compound is required under impervious shower linings
- Air drying compounds shall not be used on areas that are to be tiled

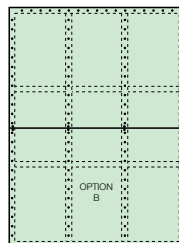
Fastening the Linings – Horizontal Fixing in Tiled Areas

Single screw to each stud where the horizontal joint crosses the studs

5–10mm gap between edge of sheet and floor



OPTION A



Screws as specified 100mm centres

Adhesive is not to be used in place of mechanical fastenings

Note: Nog required behind all joints in showers or shower over bath situation

5.2.4 Tiling, Flexible Sheet Vinyl and Rigid Sheet Shower Linings

Tiling

- Tile grouting and sealing shall be carried out in accordance with the requirements of AS3958.1 2007 (Guide to the Installation of Ceramic Tiles)
- Provide for surface control joints at 4m centres maximum
- The adhesive shall be organic based complying with AS2358 – 1990 (Adhesives for Fixing Ceramic Tiles)
- Note that the adhesive should be combed in a horizontal direction only. It is important that adhesive is applied to the wall and not “buttered” onto individual tiles

Flexible Sheet Vinyl – Showers and Other Wet Areas

- GIB Aqualine® is a suitable substrate for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures for the GIB Aqualine® substrate shall be as per p. 72, except that the lining gap at the floor is reduced to 5mm when a pencil cove detail is used
- The installation of metal reinforcing angles (minimum. 32 x 32 x 0.55mm) behind internal GIB Aqualine® corners is recommended for sheet vinyl applications in showers or shower over bath situations (see illustration p. 74)
- The GIB Aqualine® lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph through even a commercial grade 2mm vinyl
- A minimum vinyl thickness of 2mm is recommended for the wall finish in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of the flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl

Rigid Sheet Shower Linings

- The manufacturers/suppliers of thin (usually 2mm–3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Do not pre-seal areas which are to be covered by the rigid shower linings
- Some suppliers of rigid sheet acrylic shower linings recommend a minimum of one week for the adhesive to cure fully prior to use
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- Care must be taken to ensure that rooms are adequately ventilated and the adhesive is fully cured before the shower is used
- Consult the manufacturer/supplier of the shower lining for full installation details

Waterproof Membranes (tiled shower areas and shower over baths)

- In showers and shower over bath situations the GIB Aqualine® system is not complete and ready for tiling until coated with a waterproof membrane over the lining and the jointed areas
- Only in-situ waterproofing materials which are manufactured to AS/NZS 4858:2004 Wet Area Membranes Requirements are recommended.
- Waterproof membranes must be fully cured and dry prior to application of tiling adhesives
- Embed reinforcing mats in the membrane at all internal corners of the shower (including floor/wall junctions)

For further information on waterproof membranes prior to tiling, consult BRANZ GOOD PRACTICE GUIDE TILING.



5.2.5 Typical Construction Details

FIG. B: Typical Details for Tiled Shower over Bath

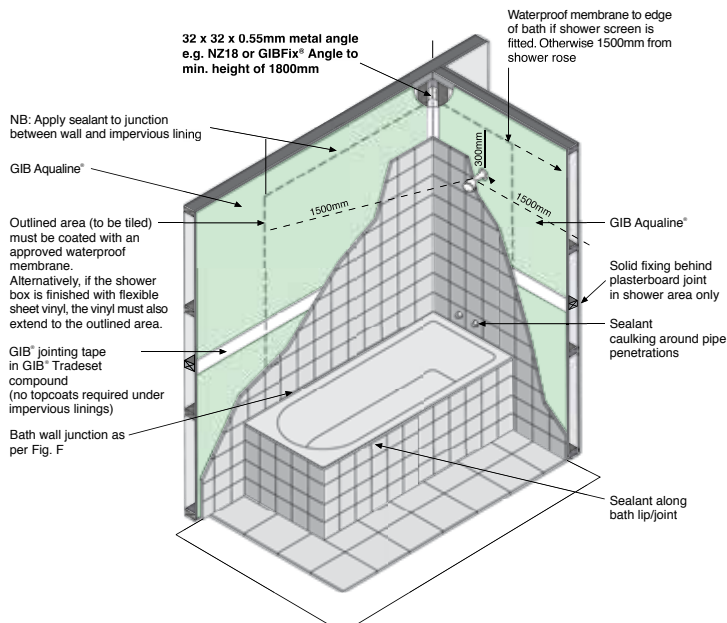
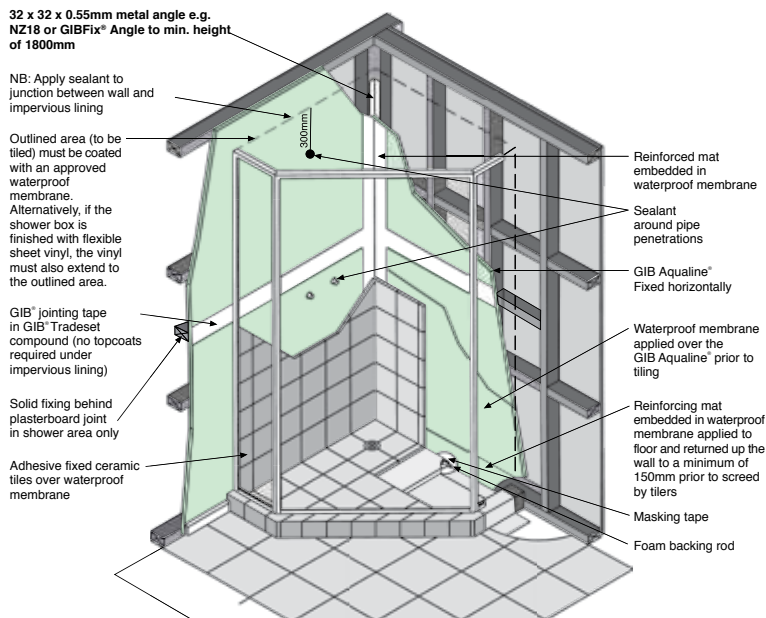


FIG. C: Typical Details for Tiled Shower Enclosure



5.2.5 Typical Construction Details



Introduction

Product Range

Pre-Installation

General Installation

GIB® Performance Systems

Finishing & Joining Systems

Repairs & Maintenance

Trouble Shooting

FIG. D: Typical shower edge detail

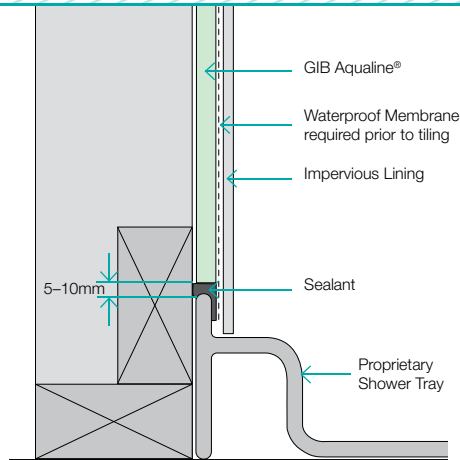


FIG. E: Typical shower edge detail in fire or noise control area

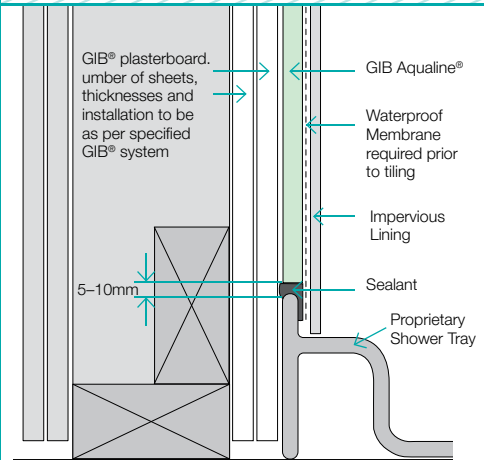


FIG. F: Typical bath edge detail

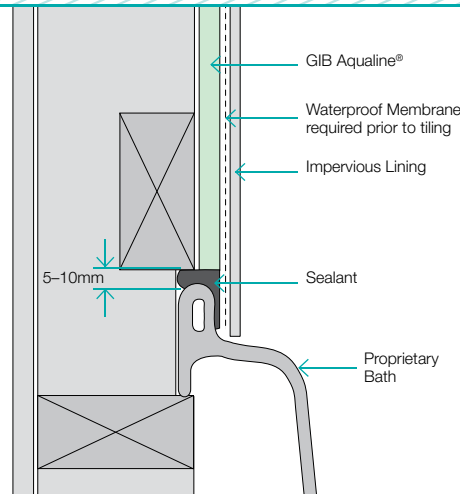
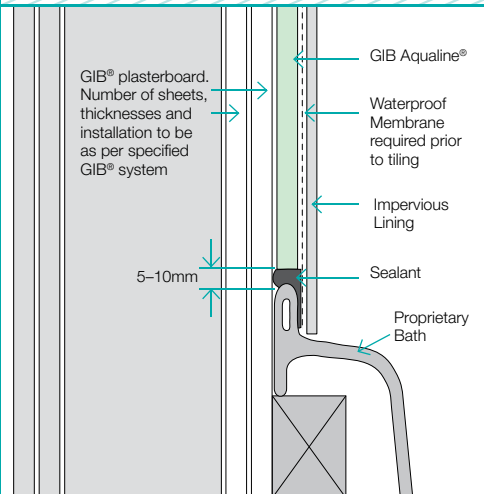


FIG. G: Typical bath edge detail in fire or noise control area



As the edge profiles of showers and baths can vary significantly between manufacturers, these details are intended only as a guide. Attention should be paid to ensure that:

- Sufficient sealant to effect a waterproof barrier has been used
- The sealant has been applied in a manner that does not permit water ingress

Note: The gap between the front face of the shower/bath upstand and the front face of the GIB Aqualine® should be 1mm–4mm. This may require additional packing behind final layer of GIB Aqualine® OR checking shower tray or bath into framing.

Silicone sealants must be of the mould inhibiting type and must be compatible with GIB Aqualine®, shower/bath surfaces and the impervious lining.



5.2.5 Typical Construction Details

It is recommended that GIB Aqualine® is fixed to ceilings in wet areas such as bathrooms and

laundries. Installation is the same as for standard ceiling. See p. 45.

FIG. H: Typical Plumbing Penetration

Penetrations in wet areas should be sealed with silicon sealant to prevent moisture access to the framing.

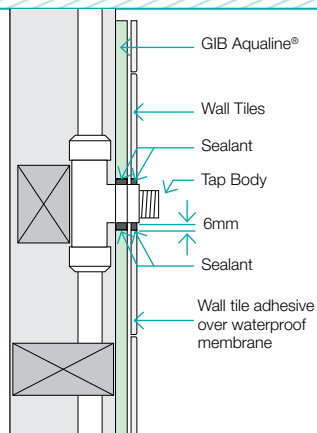


FIG. I: Sealing Under Mixer Facia

Apply a bead of sealant behind the cover plate on shower mixer to divert any water from the penetration.

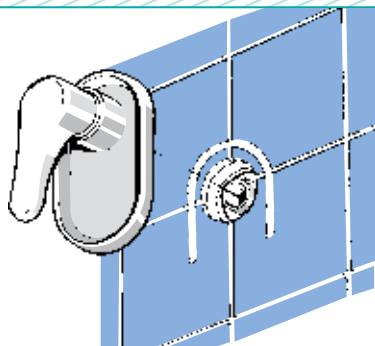


FIG. J: Tiled Shower – Internal Corner Detail

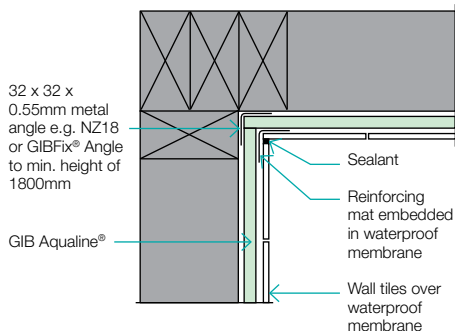
Edge profiles of baths and shower trays can vary significantly between manufacturers. Always follow the manufacturers installation instructions.

The details shown are intended as a guide only.

Allow 5mm–10mm gap between bath rim and/or shower base to allow for installation of sealant.

Sealants should contain a mould inhibitor.

Ensure that the gap is well filled with sealant.



5.3 GIB® FIRE, NOISE AND OTHER PERFORMANCE SYSTEMS

Because of the volume of information it is not feasible to include installation guidance for all the GIB® Performance Systems in the GIB® Site Guide. If you are installing GIB® Performance Systems including GIB® Fire, Noise, Tough or Intertenancy systems it is strongly recommended that you obtain a copy of the relevant specification and installation publication prior to commencing installation.

These can be easily accessed by:

- Download from gib.co.nz
- Download the GIB® App available free from the App or Google Play Stores
- Contact the GIB® Helpline on 0800 100 442
- Or from most GIB® plasterboard stockists

5.3.1 GIB® Fire Rated Systems

The NZBC requires fire safety systems to reduce the risk of injury or death, and to protect adjacent property in a fire situation.

Fire rated systems require attention to the details in the GIB® Fire Rated Systems literature.

Deviating from these specifications can invalidate the system leading to expensive remedial work to comply or increased risk in case of fire.

A fire system is NOT simply a matter of fixing GIB Fyrelite® instead of another GIB® plasterboard.

The fire resistance rating can only be assured when the board has been installed strictly in accordance with the relevant instructions in the GIB® Fire Rated Systems literature.

5.3.2 GIB Noise Control® Systems

Noise control for Intertenancy situations is comprehensively covered in GIB Noise Control® Systems literature. As these situations are generally subject to building code requirements it is important that the publication is consulted to design and construct Intertenancy noise control systems.

Sound Transmission Class (STC)

STC relates to airborne noise such as speech, TV and so on. It is the ability of a wall, ceiling, or floor/ceiling to reduce noise from rooms next door. In general a higher STC means a better performance.

STC 35 – Normal speech may be clearly heard in the next room

STC 45 – Muffled speech may be heard in the next room

STC 55 – Minimum building code requirement for intertenancy walls

Impact Insulation Class (IIC)

IIC measures the ability of a floor or ceiling system to reduce noise resulting from impacts such as footsteps, falling objects and moving furniture. A higher IIC means a better performance. Impact noises easily travel from hard surfaces into the structure and to the room below. Hard surfaces such as finished timber floors and ceramic tiles often cause noise transmission to the room below. Semi-hard surfaces such as cork tiles and flooring grade vinyl perform a little better, but still do not efficiently absorb impact energy. Installing carpet and underlay is an effective way of reducing impact noise. Installing a GIB Noise Control® System will help reduce impact and airborne noise levels.

Substitution

GIB Noise Control® Systems are not generic. It is important that only GIB® branded components are used when specifying and installing GIB Noise Control® Systems. Substitution is not in accordance with GIB® Systems recommendations and is at the risk of the owner, specifier or builder.



6.0 JOINTING AND FINISHING SYSTEMS

Jointing and finishing of GIB® plasterboard is to be as per instructions to meet requirements of AS/NZS 2589:2017.

This section covers the basics of joint construction and finishing.

For details on the full GIB® compound and accessory range refer to p. 19–24.

Note: The use of correct GIB® materials and practices is critical to delivering adequate joint strength and resistance to cracking which in turn contributes to the performance of GIB® plasterboard bracing systems.

6.1 JOINTING – MATERIALS

GIB® Jointing Tapes

GIB® Paper Tape provides reinforcing and resistance to joint cracking. It is pre-creased for use in internal corners. The rougher side of the tape must face the wall surface when bedded in to the jointing compound.

GIB RocTape® is a fibreglass mesh tape suitable for flat joints.

Jointing Compounds.

There are two general types of jointing compound:

Plaster Based (Setting Compounds)

These compounds are powders based on plaster of paris. They have a specific working time before they start to set and harden when mixed with water in the recommended ratio.

Once the set time is reached, the product begins to harden as a result of chemical reaction between the plaster with water.

Plaster based compounds are mixed on site, enabling viscosity to be adjusted as it's mixed so that it's suitable for the chosen application method.

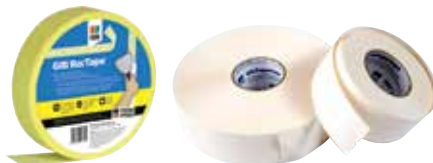
Product examples: GIB Tradeset® range (different set times), GIB Lite Blue® and GIB MaxSet®. Refer to p. 19–21 for details.

Air Drying Compounds

These compounds are pre-mixed pastes and are ready to use direct from their pails. They do not set but rather rely on evaporation of water to enable their polymer binder to cure.

These products are generally formulated to be softer and easier to sand, so are normally used for the third or top coat. Some air drying compounds are designed as multi-purpose so they can be used for all three coats. Please consult p. 19–21 before using a three-coat air drying compound system.

GIB® Jointing Tapes



Plaster Based Jointing Compounds



Air Drying Jointing Compounds



Product examples: GIB Trade Finish® range (Heavy Weight, Multi, Lite and Extra Lite), GIB Plus 4® or GIB Redifilla® range.

Refer to p. 19–21 for details of each compound's performance.



6.2 DETERMINING HOW MUCH YOU NEED

The table below gives the approximate usage rates for some joint compounds. These figures are approximate and will vary depending on wastage

and the actual thickness at which the product is applied.

APPROXIMATE COVERAGE OF JOINT COMPOUNDS

Coverage in lineal metres per package size

2 coats (taping plus second coat)

GIB Tradeset®	200m (per 20kg bag)
GIB MaxSet®	260m (per 20kg bag)
GIB X-Block®	90m (per 25kg bag)

Second coat only

GIB Lite Blue®	330m (per 17.5kg bag)
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Top coat only

GIB Plus 4®	75m (per 15L pail)
GIB Trade Finish® Heavy	70m (per 15L pail)
GIB Trade Finish® Multi	75m (per 15L pail)
GIB Trade Finish® Lite	75m (per 15L pail)
GIB Trade Finish® Extra Lite	75m (per 15L pail)
GIB® U-Mix Finishing Compound	375m (per 20kg bag)

All three coats (taping plus two coats)

GIB Plus 4®	50m (per 15L pail)
GIB Trade Finish® Multi	50m (per 15L pail)
GIB Trade Finish® Lite	50m (per 15L pail)
GIB Trade Finish® Extra Lite	50m (per 15L pail)

*Skim coat at 1mm thick yields approximately 10m² per kg.

Note: These are estimated quantities, and can vary significantly due to site conditions and fixing practices. They are intended as a rough guide and should not be used for quoting purposes.



6.3 WEATHER AND VENTILATION

Weather Conditions

Understanding the part that weather conditions play in joint construction is critical for the creation of trouble free joints.

Cool Weather

In cool weather the rate of drying drops dramatically so achieving a dry coating in a commercially acceptable time becomes an issue. Under these conditions a thick coating of air drying compound also results in longer drying times, so most stoppers use a setting compound for the first and second coats followed by a thin top coat of an air drying compound.

As the overall amount of drying is diminished under cool weather conditions, it is wise to use a harder sanding finishing compound such as GIB Trade Finish® Multi, or GIB Trade Finish® Heavy which will sand with less risk of scratching or “swirling”.

In cold weather, issues such as partial freezing of the mixing water can result in poor feathered edge adhesion. Do not use below the minimum temperature stated on the bag or pail. The biggest issue here is the speed of drying of plaster. If it has not dried before the next coat is applied, it will shrink, and the result can be delayed shrinkage and hollow joints.

To minimise the above issues, the building needs a source of heating. One option is placement of one 2kW fan heater every 50m² of floor area. This will create slight air movement and take the chill off the air, thereby creating conditions more favourable to drying at a reasonable rate. These provide a gentle uniform heating effect. Always check with the main building contractor before doing this. Check the heater has a thermal overload and always remove all possible sources of combustion (bits of paper etc.) before using.

Try to avoid going above 18–20°C in any individual room in the building. Rapid drying through excessive heat can cause popping or movement of fasteners and joints.

Note: It is not a good idea to use air drying compounds for all coats in winter in an unheated building. Shrinkage will result if each coat has not dried properly, and the ability to dry in a reasonable time is significantly diminished in this situation.

Hot Weather

This may be defined as ‘any part of the job and/or the air around the area of stopping with a temperature at, or above, 25°C’.

In these conditions we recommend the use of GIB Tradeset® 90 or shorter set products such as GIB Tradeset® 45. Air drying compounds tend to be good in hot weather and dry out reasonably quickly.

Rooms that heat up to this extent during the morning should be taped in early so that the compound has a chance to fully set.

Digital thermometers are readily available at hardware stores, to accurately measure surface and air temperatures on site for more informed decision making.

Ventilation and Air Drying

Winstone Wallboards recommends:

- At least one window be opened at either end of the building. Even in wet weather this will allow airchanges and some drying throughout the building. The exception to this would be fog and continual rain. In colder weather these air changes are even more critical as the air carries less moisture
- If the building is locked shut with no air movement the air will dry the joints until such time it has reached 100% humidity and then the drying process will stop



Examples of Relative Humidity (RH) in New Zealand Homes

Averages

Average ambient humidity (approx.)		=	70% RH	
At 70% RH the moisture air can carry		=	30% moisture	
Air temp	RH		Moisture air can carry	
10°C	70%	=	2.7g /m ³	
20°C	70%	=	5.1g /m ³	

Typical house example

Floor Area		=	190m ²	
Cubic volume		=	450m ³ (approx.)	
Plaster used on house (approx.)		=	100kg	
Water required to mix plaster (approx.)		=	66ltrs	
Water naturally retained in plaster (approx.)		=	10ltrs	
Water to be evaporated from plaster (approx.)		=	56ltrs	

Example #1 – House temp 10C and RH 70%

House volume multiplied by 450m ³ x 2.7g/m ³		=	1.21kg	
Moisture the air can carry		=	At 10°C/ 70% RH the maximum moisture the air inside this house can hold is 1.21kg	

Example #2 – House temp 20C and RH 70%

House volume multiplied by 450m ³ x 5.1g/m		=	2.30kg	
Moisture the air can carry		=	At 20°C/ 70% RH the maximum moisture the air inside this house can hold is 2.30kg	

Conclusion

At 20°C / 70%RH it will take 24 complete air changes to remove the 56ltrs of moisture in this house. However at 10°C / 70%RH it will take even longer requiring 46 complete air changes.

Setting Compounds

Plaster based compounds are generally used for the base and the second coats of a plasterboard jointing system.

When the setting compound is mixed with water it forms a paste which can be trowelled to form smooth flat joints and which subsequently sets hard.

Plaster requires a specific amount of water to fully set. In hot weather the mixed compound can dry and the water content can drop below this amount before it starts to set. The longer the compound's set time, the more likely it can dry too much before it sets. When dry, the end result can be a "soft" or "weak" bedding compound, poor tape adhesion and poor resistance to cracking.

Air Drying

To provide better plasterboard surface finish quality, sandable air drying compounds are used as the top coat on jointing systems. Some air drying compounds such as GIB Plus 4® are designed as multi-purpose and can be used for each coat in the entire joint system.

Air drying compounds contain powdered mineral fillers held together with a polymer binder (or glue) in a water emulsion. After applying air drying compound to a plasterboard surface, the water needs to evaporate to create a solid mass. This hardening, unlike setting compounds, is directly related to the speed (and temperature) at which the compound dries out. In winter with poor drying conditions, these products can take a very



long time to thoroughly dry to a point where they are sandable. If it has not dried in total before painting, the product can shrink.

A minimum temperature is also required in order to form a film to bind the compound together. In most cases the minimum air and compound temperature for satisfactory application and performance of air drying compounds is 10°C.

If the compound dries below this minimum temperature, the end result is likely to be a much softer compound, that scratches readily when sanded, has poor adhesion to underlying compounds and poor paint adhesion properties.

Approximate Drying Times for Air Drying and Setting Compounds

Relative Humidity	Temperature				
	10° C	16° C	21° C	27° C	32° C
98%	26 days	18 days	12 days	9 days	6 days
94%	10 days	7 days	5 days	3 days	2 days
90%	6 days	4 days	3 days	49 hrs	36 hrs
80%	3 days	2 days	38 hrs	27 hrs	19 hrs
60%	42 hrs	29 hrs	20 hrs	14 hrs	10 hrs
40%	29 hrs	20 hrs	14 hrs	10 hrs	7 hrs

Indicates common weather conditions in New Zealand.
Based on 1.5mm–2mm thickness of wet compound.

Drying And Shrinkage

At the time of usage all jointing compounds will contain water. As the excess water evaporates from the compound, varying degrees of shrinkage occurs depending on the type of compound.

Shrinkage is one of the more common failures seen and is usually the result of a coat of jointing compound not being adequately dried before the next is applied. It is avoidable however!

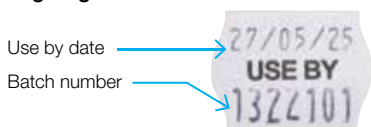
In general, air drying compounds shrink far more than plaster based compounds generally between 15-25%. As air drying compounds are typically applied quite thin, shrinkage does not tend to detract from the overall joint shape.

Setting compounds can shrink by 8-9% with around half of their shrinkage occurring between application and setting. The rest of the shrinkage occurs during the drying process and after setting. Setting compounds are typically used for the base coats and often are up to 1.4mm deep. Whilst the shrinkage percentage may be lower, the thicker amount means the actual amount of shrinkage can be noticeable.

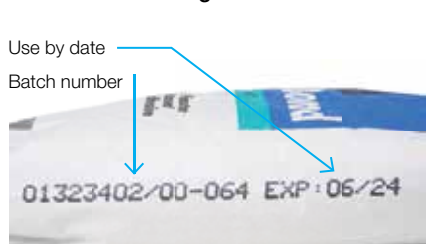
When all is considered the shrinkage that can occur if a coat is not dry before the next coat is applied is in the order of 0.2mm-0.35mm. These are tiny figures, however are detectable on a generally flat wall and quite obvious in critical or glancing light conditions.

6.4 IDENTIFYING PRODUCT USE BY DATES

5kg Bags and Pails



GIB® and Victor Bags



Note: The performance of GIB® and Victor compound products may be compromised if used after the date indicated.

6.5 STOPPING OF TAPERED OR RECESSED EDGE JOINTS – HAND TOOLS

These are the joints where the two tapered (recessed) edges of plasterboard meet.

Surface Preparation

- Ensure that all fixings, screws or nails, are seated just below the surface of the plasterboard. Any fixings that are driven too far into the plasterboard will cut the paper of the board causing problems such as 'popping' or 'dimpling'
- Remove any dust or loose material from the plasterboard

Mixing Instructions

- Mixing instructions for GIB® compounds can be found on the back of the bag or pail
- If hand mixing, it is better to initially mix a setting compound too thick than too thin and add water to adjust. Adding more powder to a thin mixture tends to create lumps that are difficult to mix in by hand
- If machine mixing with a paddle and drill, use a paddle with vertical sides
- Use a slow speed drill. If possible ensure the entire mixing part of the blade is under the compound whilst it is mixing. This reduces the amount of air stirred in to the product, which in turn reduces the incidence of 'pock marks' and 'pin holes'

Tips

- Paint mixing blades are not recommended (identified by the mixing part which looks like two flat wide curved ribbons). These work well in paint, but tend to mix a lot of air into the (thicker) jointing compounds
- A large battery drill is perfect for slow speed mixing, with less introduction of air to the mix compared to most relatively high speed mains power drills

Surface Preparation



Mixing Compounds



6.6 JOINTING TECHNIQUES – HAND TOOLS

Tools Required

Some or all of the following tools will be required depending on the work being carried out.

- Rubber Spatula, or similar, for mixing plaster
- Plastic Pail
- 75mm Chamfered Broad-knife
- 100mm Chamfered Broad-knife
- 150mm Broad-knife
- 200mm Trowel (Optional)
- 280mm Trowel
- Sanding Float
- Corner Trowel
- Dust Mask

All tools must be clean and free of any old/set plaster. Remember that as these tools are being used to create a smooth finish, any kinks or scratches in the edge of the tool will cause rough areas in the plaster. To preserve edges, do not use broad-knives for opening paint cans, etc.



First (Taping) Coat

Using a 150mm broad-knife, fill the recess formed by the edges of the sheets with GIB® jointing compound.

Centre the GIB® tape along the joint and using a 150mm broad-knife press the tape down into the GIB® compound.

GIB® Paper Joint Tape has two distinct sides. The rougher side, facing out on the roll, is bedded into the compound toward the wall surface. GIB® Paper Joint Tape can be folded for use in internal corners.

GIB RocTape® is installed similar to paper joint tape on flat joints but is not recommended for corner joints.

Draw the broad-knife (held at approximately 45 degrees to the board surface), along the joint to remove any trapped air bubbles beneath the tape.

Ensure that sufficient compound is left behind the tape to achieve a good bond.

Immediately apply a thin coat of compound over the surface of the tape. This reduces the possibility of the tape curling and wrinkling, which can lead to edge cracking.

When the compound is set, scrape back any build-up of compound along the joint.

Allow this coat to dry.



Second Coat

Apply a second coat of jointing compound with a trowel. Ensure that this coat extends at least 25mm beyond the edge of the first coat.

Feather the joints to eliminate build-up of the compound at the edges.

Allow to thoroughly dry (at least 24 hours) and scrape back any build-up of compound along the joint.

If a sandable second coat is desired: use GIB Lite Blue®, an easy sanding plaster-based compound with a 90 minute set time, developed for second coating.



Top Or Finishing Coat

Apply a finishing coat of GIB® Air Drying compound with a 280mm trowel. Joint edges should be feathered at least 25mm beyond the edges of the previous coat. Allow at least 24 hours to dry.

Using 220 grit sand paper (or finer sandpaper), lightly sand in the same direction as the joint. Take care not to scuff the face paper of the GIB® plasterboard when sanding the joint.

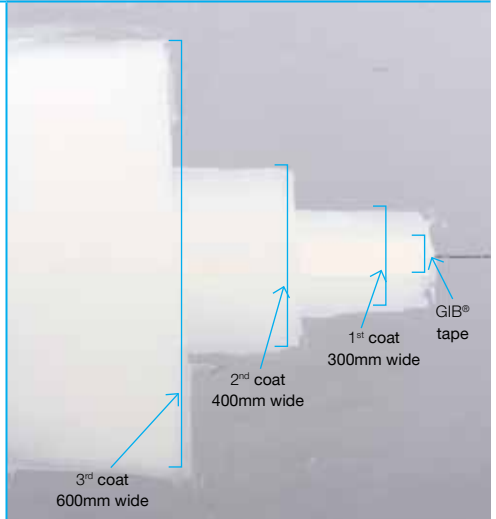
Tip: The finishing compound should not be harder to sand than the second coat. Refer to p. 98



6.7 STOPPING OF END JOINTS / BUTT JOINTS AND CUT EDGES – HAND TOOLS

End Joints / Butt Joints And Cut Edges

- Where possible ensure the plasterboard sheets are fixed so that the butt joint sits mid span and not on framing. If the board is already fixed, use the technique described on p. 47 (where possible) to ensure a joint recess is created
- When jointing two cut edges or sheet ends which are not recessed, care must be taken to ensure the surface build-up of compound is minimised (whilst still creating a strong joint)
- The same procedure should be followed for tapered edge joints, except that the width of each stage is double that required for the tapered edge method. This results in a joint that is around 600mm wide
- Use GIB Tradeset® 45 for the first coat and tape in
- Take extra care when bedding in the tape to ensure that sufficient compound remains behind the tape
- Blending the resultant “bump” from stopping on an un-recessed surface is an issue, especially where critical light comes into play. The wider the joint is, the less the angle it presents to the critical light, so it is less likely that a shadow will show on the side of the joint opposite the light source



6.8 JOINTING TECHNIQUES – MECHANICAL TOOLS

The mechanical tools referenced in this guide are for representative purposes only and do not preclude the use of alternatives. These include pneumatic taping machines and spring loaded flat boxes. All tools must be used in strict accordance with the relevant manufacturer's recommendations.

Tools Include

Banjo – a taping tool containing a roll of jointing tape and compound which simultaneously applies the jointing tape and compound to a joint.

Automatic Taping tool – a more sophisticated taping tool which has better control of the depth of material under the tape and so is a more reliable tool for ensuring good tape adhesion in hot weather. However, as they can be expensive and difficult to clean, these tools do not lend themselves to applying setting compounds, and consequently are seldom seen in NZ.

Box – a box shaped metal vessel with a slot at the top and adjustable wiping surface to control the flow to the joint, and the shape of the joint. Available in different widths for the different coats of the joint and handles to suit the operator.

Corner Finishing Tools – can apply joint compound to internal corners.

Preparation

- Ensure that all fixings, screws or nails are seated just below the surface of the plasterboard. Any fixings that are driven too far into the plasterboard will cut the paper of the board causing problems such as 'popping'
- Tidy up any damaged areas of plasterboard such as broken corners. It is usually easier to remove these completely and fill them with a plaster based (setting) compound prior to continuing
- Remove any dust or loose material from the plasterboard
- Mixing instructions can be found on the back of the compound packaging

Refer to p. 83 for mixing detail.

Mechanical Stopping With Banjo And Box

A Banjo taping tool applies bedding compound and tape in one step and is an efficient method for taping-in of medium/large areas of plasterboard walls or ceilings.

Note: This device places the tape on top of a layer of plaster, the depth of which is not easily controlled. Be aware that lack of compound under the tape can cause tape adhesion issues.

Always place the banjo on the maximum setting when applying the compound in warm / hot weather.

First Coat – Banjo

- Mix the bedding compound with a drill and then carefully adjust the water content until it can just be poured from one bucket to another

Note: if the compound is too thin, the tape will tend to slide along the recess and may peel or drop out.

- Place and lock the roll of GIB® tape onto the spindle and thread inside the banjo and along the top (handle) inside edge as illustrated. Pour the compound into the banjo cavity underneath the GIB® tape. Close and clip the side panel
- Place the coated tape centrally in the joint. Hold the tape with one hand whilst pulling the banjo along the joint with the other hand (make sure that the nose of the banjo is held against the surface of the joint)
- Adjust the banjo control knob so that a layer of approximately 2mm thick of compound is on the underside of the tape and is not excessively squeezed out from the edge of the tape when applied
- After placing the tape at the end of a joint, cut the tape neatly with a broad-knife
- Using a 150mm broad-knife held at about 45 degrees, press the tape down into the compound and at the same time removing excess compound
- When the compound is set (or dry) scrape back any ridges

Note: Do not allow setting compounds to set in the banjo.



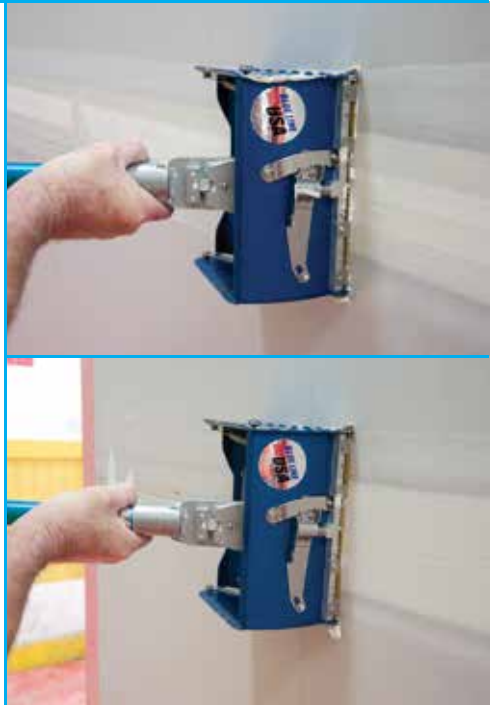
Second Coat – Flat Box

The flat boxes used for second coating of tapered joints are typically 200mm-250mm wide. They automatically dispense the correct amount of joint compound and feather the edges in one pass. The adjustable blade holder fine tunes the 'crown' for proper compound distribution and shape. The boxes are controlled by a specially designed handle.

To start, place the adjustable notch for the wiper blade on the second lowest setting and then adjust to suit the job. The advantage of using flat boxes for tapered joints is the speed with which joints can be filled. They generally will not require any further touch-up if set up and operated correctly.

- Mix the compound with a drill and adjust to a 'pourable consistency', i.e. requires a minimal effort to 'push' out of the box but not so thin that it will 'run' out of the box, or slump on the wall during use
- Using a scoop, broad-knife, or pump; fill the flat boxes with compound
- Place the box on the surface of the board as flat as possible. Place one hand just below the head of the box handle (to control application pressure to force compound out of the box) and the other hand at the other end (to control the 'brake' and keep the box running parallel to the joint)
- Allow the compound to dry thoroughly before scraping back any ridges or build up

Note: Do not allow setting compounds to set or air-drying compound to dry in the flat box.



Top Or Finishing Coat – Flat Box

A 300mm flat box is typically used with specifically formulated air-drying finishing/topping compounds for the top/finishing coat.

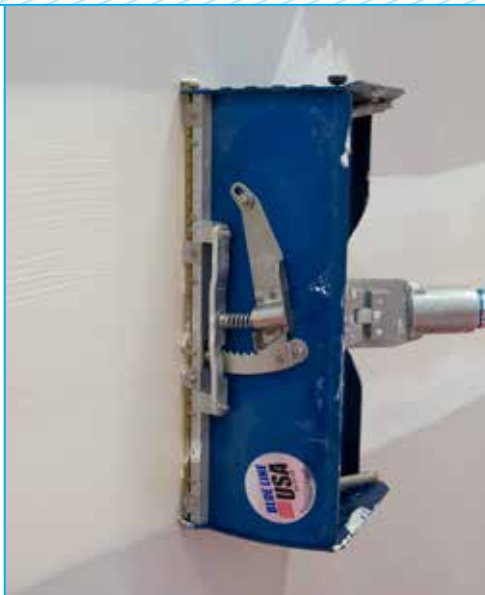
The air drying compound should be thoroughly mixed and if necessary, the consistency adjusted to give a smooth 'tear free' finish (but not so thin that it will 'run' out of the box during use).

The 'setting' of the flat box is typically two notches above the bottom setting. However, adjustment may be necessary.

The box is adjusted and operated to leave a very smooth surface free from lumps, ridges or scratches.

Note: Don't allow air-drying compound to dry in the flat box. Placing too much compound in one application may result in bubbles, pin holes, and streaks.

Please read notes below to understand some of the issues that can be created by the use of machine tools.



Possible Issues With Machine Tool Application

1. When using machine tools, the compounds placed in them have to be diluted (compared with that required for trowel application) to achieve a viscosity that flows readily through the machine.
2. The addition of water will result in:
 - Greater Shrinkage as the compound dries
 - Longer Drying Time due to a greater amount of water to dry
 - Possibility of Delayed Shrinkage as more water soaks into the substrate (then has to dry back through the joint)

Longer drying times in cooler conditions must be allowed for before the next coat is applied. Delayed shrinkage may occur if the next coat is applied before the first has dried. Make allowances for this, by warming the rooms to be stopped until the joints are dry.

3. Placing tapes with an automatic taping tool is quick and easy. However it is very easy to force too much compound from under the tape. This can result in poor tape adhesion in summer, as the compound can dry out more quickly. In extreme situations this can lead to the plaster in the compound not being able to set. Be aware and check material depth when starting (to ensure the machine set up and methods of use are appropriate).
4. Horizontally fixed board not supported with framing adjacent to the joint, can result in a variation in the depth of the taper between the two boards. Machine tools can easily place a thin layer on only one edge (this can result in tape adhesion issues).



6.9 NAIL AND SCREW STOPPING

If good fixing practice has been followed, there should be no fixings in the middle of the plasterboard sheet on the wall. However, this cannot be avoided on ceilings or in fire rated or noise control systems.

Critical light areas

This method takes longer, but ensures that no air is trapped between the screw or nail head and the first coat of compound. This reduces the possibility of dimpling.

- For the first coat, press a mixed GIB® plaster based compound into the fastener indentation with a 25mm putty knife, then wipe off the excess
- Do the second and third coats as per the normal jointing procedure

Non-critical light areas

- For the first coat, wipe the compound across the top of the screw or nail head, as per normal towelling application. Use a 100mm broad-knife for the first two coats of compound
- Do the second and third coats as per normal jointing procedure

For either method, leave the first two coats to dry for at least 24 hours before applying the finishing coat with a 150mm broad-knife. Leave to dry for at least 24 hours and then lightly sand with 220 grit sandpaper.

For over-driven screws, use a short set time setting compound to minimise the time and amount of water that can soak in and swell the board paper. Leave for a longer period to dry compared to normal screw stopping. These actions may reduce the incidence of “popping” or “dimpling” on these surfaces.

6.10 CORNERS AND FINISHING TRIMS

External Corners

These can be finished with:

Paper Faced Trims

- GIB® Goldline® profiled paper faced trims
- GIB® UltraFlex® high impact reinforced corner trims
- GIB® Levelline® reinforced corner trims

Metal Trims

- GIB® Slim Angle metal trims

GIB® Slim Angle

- Mechanically fix at 100mm centres on alternate sides of the corner (fixings should also be placed on both sides at each end of the trim)
- GIB® Slim Angle can be fixed with GIB® Grabber® screws or staples (minimum 10mm)
- Apply a first coat of GIB® setting compound, using a 150mm broad-knife or 200mm trowel
- When hard, lightly scrape back using a broad-knife or the edge of a trowel
- Apply a second coat of GIB® setting compound using a 200mm trowel. When hard, lightly scrape back
- Apply a third coat of a GIB® air drying topping compound using a 300mm trowel and leave to dry
- When thoroughly dry, lightly sand in the direction of the joint with 220 grit or finer sandpaper, taking care not to scuff surface paper of the plasterboard

Internal Metal Corner Trims

Inside corners are installed similarly to outside corners except that only one top coat of a GIB® finishing compound is required. A corner trowel may be used to apply and smooth the compound if desired.

Apply similar installation methods for the other metal trims. Casing beads can be secured using GIBFix® adhesive.

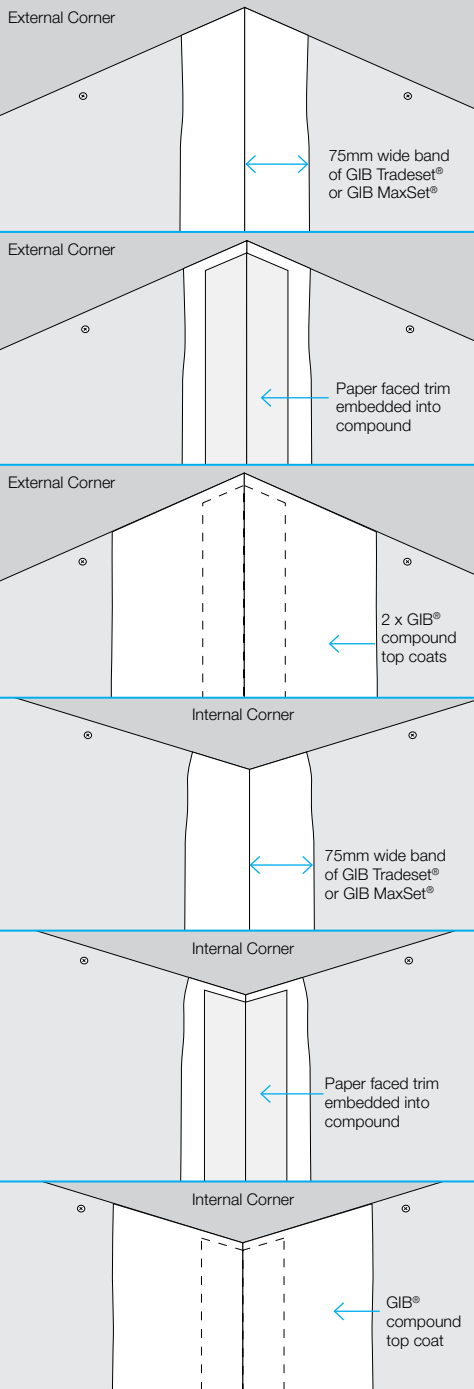
Note: Bullnose external corners are not permitted in fire rated systems.

Paper Faced Trims

- Paper faced trims such as GIB® Goldline® Platinum Tape-on trims, GIB® UltraFlex® and GIB® Levelline™ are installed by embedding directly into the joint compound
- A slightly thinned mix of a GIB® setting compound is recommended for the installation of paper faced trims because they provide maximum adhesion to the paper surface of these trims
- When installing external Bullnose Corners, check that the plasterboard edges do not extend past the corner of the framing substrate on either side. If the plasterboard edges do protrude, trim them back before commencing installation
- Make sure that products such as GIB® UltraFlex® are fully supported by the two plasterboards neatly butted up to each other. Otherwise a void is left behind the trim, which will become a weak/fail point if the corner is impacted at some point during its life
- Apply a 75mm wide band of GIB Tradeset® or GIB MaxSet® to each side of the GIB® plasterboard corner
- Cut trim to required length and position over the joint compound. Allow 10mm at the bottom for expansion and contraction of framing members. Mitre any corners which will be meeting other trims at corners
- Press the trim firmly into the compound evenly along its full length, embedding the trim and forcing out excess compound. The installation of the trim may be performed with the aid of a corner roller. It is crucial an adequate amount of compound remains under the tape for good adhesion
- Using a 100mm broad-knife, wipe off surplus compound and eliminate all air bubbles under the paper. Be careful not to remove all compound
- Using additional compound, flush the joint with a 150mm broad-knife or trowel. Remove any excess jointing compound on the nose of the trim by wiping with a damp sponge
- Allow to harden and dry, then apply a light top coat of GIB® air dry compound (in a band of about 200mm wide). This is done using a large (250–300mm wide) broad-knife or trowel
- Feather the compound by drawing the knife along the trim, with one edge of the blade riding on the nose of the trim and the other on the surface of the GIB® plasterboard
- Repeat for the other side of the trim and allow to dry
- Once the previous coat is dry, apply a second top coat of GIB® finishing compound. Feather the edges of each coat about 50mm beyond the preceding coat. When the top coat is completely dry, lightly sand, taking care not to scuff the face paper of the GIB® plasterboard

Tips:

- Multi purpose air drying compounds may be used to adhere GIB® UltraFlex® and GIB® Levelline® trims, however they may take a long time to dry
- Generally air drying compounds have a higher shrinkage. Filling of any voids behind tapes with air drying compounds is not recommended, voids should be filled with setting compounds





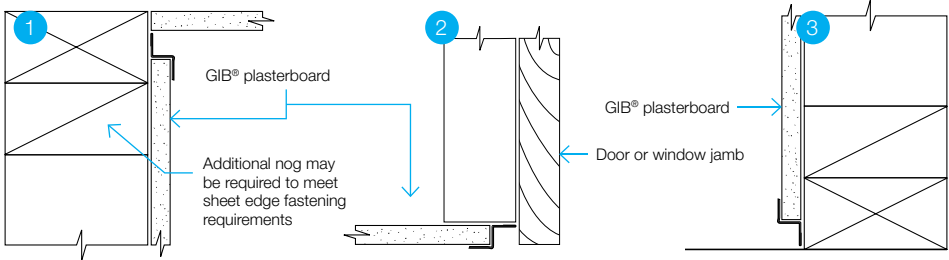
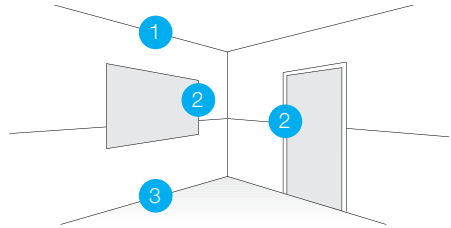
6.11 NEGATIVE DETAIL

Negative details can be formed at plane junctions and at junctions between dissimilar building materials. There are many different effects that can be achieved and some suggestions are shown below.

- GIB® Goldline® Platinum GR reveals, or the GIB® Rondo® P50 metal reveals, can be used to create straight, evenly spaced details that clearly define the junction
- Care needs to be taken to ensure that joints are straight and that adequate clearance is provided for the flange of the reveal trim

Note: Allow a 14mm–17mm gap for the top flange of the GIB® Goldline® Platinum trim or a 12mm gap for the Rondo® P50 metal reveal trim

Negative Detail



6.12 GIB-COVE®



Preparation

- Always fix GIB-Cove® prior to skim coating or any paint application
- Ensure that all joints that are not to be covered with GIB-Cove® are stopped first. For accurate placement of GIB-Cove®, mark walls with a chalk line (either 50mm, 55mm, 75mm or 90mm) from the wall/ceiling angle. Measure and cut the GIB-Cove®, using a fine toothed saw and a mitre box. Tidy the cut edges using sandpaper
- If cove work has not been done before, it is suggested that slight over-ordering is done so a short length is available to practice cutting the angles up the right way
- It is also suggested that a chalk line be used around the room to establish the correct position on the wall for the bottom of the GIB-Cove®
- Measure the GIB-Cove® to get the correct measurement for the chalk line set up. Do this by placing a straight edge from each edge of the cove, and measuring the length to where they bisect. Use this measure as the chalk line datum
- Align the cove on the chalk line to ensure all the cove is installed at the same level
- Joints in long runs of GIB-Cove® should be mitred (not square cut)
- Mix GIB-Cove® Bond to instructions on the back of the bag



Introduction

Product Range

Pre-Installation

General Installation

GIB® Performance Systems

Finishing & Joining Systems

Repairs & Maintenance

Trouble Shooting

Application

- In smaller rooms (e.g. toilets and bathrooms) fix shorter lengths of GIB-Cove® first. This allows the longer more flexible pieces to be placed last for a tight fit
- Apply the GIB-Cove® Bond in two strips (about 10mm thick) along the entire length of each edge of the GIB-Cove® where contact will be made with ceiling and wall
- Where friction joints or deflection heads are used in non Fire Resistant Rated commercial light steel framed construction, the GIB-Cove® may be adhered to the ceiling only and sealed to the wall using a flexible sealant
- Carefully place the first length along the chalk line and press firmly into position. Hold in place until the adhesive grips
- Remove excess GIB-Cove® Bond using a broad-knife and clean the joints with a moistened brush or sponge
- Where walls and ceilings are uneven, it may be necessary to hold the GIB-Cove® in position for longer until the GIB-Cove® Bond has set. This is done with partly driven nails or screws supporting the edge of the GIB-Cove®. These can be removed and the holes stopped when the adhesive has set. Note: GIB-Cove® Bond must be discarded after it shows signs of stiffening



6.13 SKIM COATING

All paint products and systems must be applied in strict accordance to the manufacturer's recommendations.

Level 5 Skim Coating

Skim coating is one method to achieve a Level 5 Finish as specified in AS/NZS 2589:2017. A Level 5 Finish is defined as being 'characterised by a parity of texture and porosity' over the entire surface of the plasterboard, jointing and fastener points.

Skim coating can be achieved by applying jointing compound to the surface with a trowel. This creates a uniform texture (and also hides bumps, steps and joint protrusions).

Alternatively, high build paint systems can be used. These are comprised of a specially formulated high build coating which is very efficiently applied with airless spray equipment. These also do an excellent job of masking surface texture variance, but may not correct irregularity in the board surface.

Trowel Application of a Skim Coat New GIB® Plasterboard

This surface is the simplest to skim coat, however care should still be taken as problems can occur through incorrect application.

Any of the GIB® ready mixed air drying range of compounds can be used for trowel applied skim coating. Consider weather conditions when making the choice to ensure optimum sand-ability is achieved. See p. 98 for further detail.

- Joints should be prepared in the normal manner up to the finish coating stage. Allow plaster to dry thoroughly
- Apply a skim coat of approximately 0.25mm–0.5mm (but no greater than 1.0mm) of the GIB® compound of choice to the entire surface of the board
- Leave the skim coated area until completely dry
- Sand by hand or a pole sander, in one direction with 220 grit or finer sandpaper

- Ensure surface is free of dust. Seal with a wallboard sealer prior to decoration. Use a pigmented oil based sealer for areas that will be exposed to moisture

Existing Plasterboard – Undecorated

These areas would typically include board that has been fixed to the wall and has not been stopped. When the board has been exposed to the elements for an extended period of time face paper may fade.

1. Remove any dirt or oil with detergent. Allow to thoroughly dry before continuing
2. Seal the entire area with a pigmented-oil based sealer
3. Lightly sand the entire area with 100–120 grit sandpaper
4. Apply a skim coat of approximately 0.25mm–0.50mm of GIB® air drying compound to the entire surface of the board
5. Leave GIB® air drying compound to completely dry. Sand with 220 grit or finer sandpaper, in one direction, using either a pole sander or sanding block. A vacuum power sander can also be used
6. Ensure surface is free of dust. Seal with an Acrylic Wallboard Sealer prior to decoration. Use a pigmented oil based sealer for areas that will be exposed to moisture

Existing Plasterboard – Painted Surface

1. Clean the entire area to be skimmed with water and a scouring pad. Use an alkaline cleaning solution in water to remove any dirt/oil. Thoroughly rinse with water
2. Sand painted areas to be skimmed with 100–120 grit sandpaper
3. Apply a skim coat of approximately 0.25mm–0.50mm of GIB® air drying compound to the entire surface of the board
4. Leave GIB® air drying compound to completely dry. Sand, with 220 grit or finer sandpaper, in one direction, using either a pole sander or sanding block.
5. Ensure surface is free of dust. Seal with an Acrylic Wallboard Sealer prior to decoration. Use a pigmented oil based sealer for areas that will be exposed to moisture

Existing Plasterboard – Previously Wallpapered

This surface would be commonly encountered in renovation work where old wallpaper has been removed and skim coat is required. This surface presents special problems because it is usually rough, uneven, has loose paper and is covered with wallpaper size.

1. Rinse area twice with warm water and leave to dry
2. Repair any damaged areas to the core of the plasterboard with GIB Tradeset® 20 or 45. Ensure plaster is completely set and dry before proceeding
3. Seal the entire area to be skim coated with a pigmented oil based sealer. (**Note:** Water based acrylic sealers must not be used on existing wallpapered plasterboard)
4. Sand the entire area with 100–120 grit sandpaper
5. Apply approximately 0.25mm–0.5mm thick coat of GIB® air drying compound
6. Leave the GIB® air drying compound to completely dry. Sand, with 220 grit or finer sandpaper, in one direction, using either a pole sander or sanding block
7. Ensure surface is free of dust. Seal with an Acrylic Wallboard Sealer prior to decoration. Use a pigmented oil based sealer for areas that will be exposed to moisture



6.14 SANDING

Winstone Wallboards has a range of compounds to cater for different drying conditions experienced in New Zealand.

The GIB Trade Finish® compounds have different sanding characteristics. For example, during winter a harder finishing compound can be used to avoid scratching and swirl marks. During summer, an easier to sand finishing compound can be selected to speed up sanding (and where a lot of hand sanding is required).

When drying conditions are not ideal, problems may arise with softer compounds scratching too easily and leaving “swirl” marks after sanding. A harder finishing compound is recommended in these conditions (e.g. a switch from GIB Trade Finish® Lite to GIB Trade Finish® Multi or from GIB Trade Finish® Multi to GIB Trade Finish® Heavy Weight in colder conditions).

When selecting a harder finishing compound, it is important to remember the coats underneath need to be just as hard (or harder) and not softer. Using softer compounds underneath a hard compound can be problematic if the top coat is completely sanded away. This can manifest as grooves or trench marks being created rapidly as the softer compound underneath is removed more easily; and may give the impression the top coat has delaminated when it has not. To avoid this, use the same compound or a softer compound for the top coat.

Ease Of Sanding

The plaster based GIB Tradeset® range and GIB MaxSet® taping compounds are both much harder than any of the GIB® air drying compounds, so there are no compatibility issues.

GIB Lite Blue® (which is used as a second coat) is a softer setting compound compared to the GIB Tradeset® range and GIB MaxSet®. GIB Lite Blue® is softer than the hardest air drying compound but suitable to use under GIB TradeFinish® Multi or softer compounds.

Refer to p. 98 for a list of GIB® compounds ordered from easiest to hardest to sand.

Machine sanding

Purpose built vacuum sanding machines can be used to significantly reduce airborne dust, as well as the time and effort taken to sand the joints (and general clean-up time).

- Follow the manufacturer's instructions. Use 220 grit paper
- When sanding, position the sanding head so that it is in contact with the joint. Press lightly on any feathered edges so that the paper is not scuffed excessively
- Be careful when using a machine sander on nail and screw hole areas. If the paper surface is scuffed excessively, it may show through the finished painted surface as a variance in texture or sheen, diminishing the overall quality of the finish

Pole sanding

- Pole sanding is a dry sanding technique
- Round pole sanders have no corners to dig into the surface and use standard sanding disks like a machine sander
- Rectangular pole sanders are good for corners
- The main drawback with pole sanding is the volume of dust created. Ensure all safety issues are addressed by wearing suitable personal protective equipment before using these tools

Sanding Blocks

These are block shaped sanding pads, handy for corners and small sanding areas.

Sandpaper

Sanding disks come in many types.

Although they may state the same grit size, the abrasive material used also plays a part in how quickly the surface can be sanded. If too abrasive and drying issues are experienced, swirl marks may be left in the surface of the joint.

If problems are experienced with one sort of sanding disk, try another. If the problems are on-going, change to a harder air drying compound, or heat the premises to be stopped (to ensure the joint has dried), and is therefore sandable.

Sanding In General

- Always sand in the direction of the joint
- Try to minimise “scuffing” of the paper surface next to the joint
- If scuffed excessively, the “furry” quality of the sanded paper will show as a different texture through the painted surface, creating a visible difference in sheen

- Be aware that damp conditions (such as foggy weather), can cause the surface of the board to absorb moisture, and be far more likely to scuff badly when sanded. Either heat the room, or use worn sand paper disks to ensure a less abrasive effect is applied to the paper

GIB Ultralite® plasterboard has a surface coating on the paper which is far more resilient to sanding compared to conventional paper surfaces. This is one of the reasons why this board is touted as a Level 4-plus product.

6:15 JOINT SYSTEMS RECOMMENDATION

The GIB® plasterboard range of air drying compounds caters for different weather conditions caused by seasonal change.

Air drying compounds (the compounds in pails) are held together by binders (glue). When these binders coalesce and cure, they bind the filler particles (mostly limestone) together which causes the product to go hard. How hard a specific compound will be to sand is dictated by temperature as it cures.

- The warmer the weather, the harder the product will become to sand
- The colder the weather, the softer the same product will become to sand

This can be seen when a compound that is great to machine or hand sand when applied on a hot summer's day is seen to be much easier to sand if applied on a cold winter's day. This can result in the winter application sanding too easily, resulting in swirl marks that ruin the finish when sanded, it may also be easily damaged if trade folk brush past a dry but not painted joint.

Conversely, a harder compound may sand well in winter, but become too hard if applied in very hot weather, or if in-line with sun shining through a window in summer resulting in direct UV penetration.

This may result in the product becoming “glazed” as it is sanded and very difficult to sand.

To resolve this issue there is a range of GIB® compounds, each of which is optimised for warm, cold, or in-between weather use. It is up to the trades person to select the product most suited to the condition to ensure ease of sanding and quality of finish.

The GIB Trade Finish® range was developed to ensure a product is available that has similar rheological (trowelling) properties through the range, but different sanding characteristics to suit different seasons.

The harder to sand products should be used in the colder weather (winter). In these conditions the binder will not cure as hard, however it will still be hard enough to resist swirl marks, scratching and trade damage.

The easiest products to sand should be used in warm weather, when the binder will cure harder. This creates a surface that is easy to sand and can be machine sanded in summer without leaving swirls and dig marks.

The table on the right shows the sanding characteristics of each GIB® compound.









Remember

- Harder sanding products in cold seasons
- Easier sanding products in warmer weather

Change from one to the other for the cold and warm seasons if ultimate ease of sanding without swirl marks and scratching is desired. Use the chart to guide you to figure what will work best for you.



Ease of Sanding Table

		Sanding/Scrape	GIB® Air Drying Compound	Setting Compound
Weather Conditions	Warmer ↑	Very easy sanding	GIB Trade Finish® Extra Lite 	
		Easy sanding	GIB Trade Finish® Lite GIB Plus 4® 	
			GIB U-Mix® 	
		Moderate sanding	GIB Trade Finish® Multi 	GIB Lite Blue® 
	Colder ↓	Harder to sand	GIB Trade Finish® Heavy Weight 	
		Easy to scrape		GIB Tradeset® 
		Scrape while "green"		GIB Maxset® 

6.16 PAINTING

All preparation and painting work should be undertaken in accordance with AS/NZS 2311 'Painting of Buildings' and with the relevant paint manufacturers recommendations.

Surface Preparation Prior to Painting

Ensure all stopped surfaces are dry, sanded smooth and that any dust, oil, grease or dirt has been removed with a soft brush, damp soft cloth or a vacuum cleaner.

Ensure all windows, electrical fittings, furniture, covers, doors (or other components which are not to be painted), are masked out, covered or protected throughout the painting process.

Guidelines

- Flat paints tend to minimise visibility of any minor surface imperfections but may not be suited to areas that need regular cleaning
- Light tone colours tend to diffuse light, which helps in disguising any minor surface imperfections
- Avoid the use of harsh lighting (e.g. 'wall washers') or situations such as windows extending to the wall or ceiling line. If these situations are unavoidable consider the use of a Level 5 pre-decorative skim coat

- As a general rule 'cut in' around edges and doors with a brush and then apply the remainder of the paint system with a 6mm –10mm nap roller sleeve
- Always maintain a 'wet edge' with the roller and lay off the final coat in one direction, preferably parallel to the dominant light source
- On faded GIB® plasterboard, use a pigmented alkyd sealer as the first coat

IMPORTANT NOTE: BACK ROLLING

Where the paint system will be applied by airless spray equipment, it is essential to 'back roll' the final coat of paint using a roller with a fine nap. This is to create a 'soft' orange peel effect which aids in disguising plasterboard jointing, or any other minor surface imperfections.

Painting Existing Walls

Follow the paint manufacturer's instructions regards preparation and methods of application.

Wallcoverings

New Surfaces – Follow the application instructions of the wallcovering manufacturer.

6.17 PLASTER RENDERING INTERIOR MASONRY OR CONCRETE

Victor® Multi Plus is a plaster based material formulated for application to interior concrete or masonry surfaces.

Mixing Instructions: Undercoat

Victor® Multi Plus with the addition of sand, can be used as a base or undercoat coat (up to a ratio of 35% of sand by volume) to rule out uneven internal concrete substrates. The sand must be a good washed grade, free of contaminants.

- As a guide, use a ratio of 2:1 (two dry volumes Victor® Multi Plus to one volume dry sand). The grade and moisture content of the sand will influence the water requirement
- Ensure mixing equipment and water is clean
- Use 1.1–1.2 litres of water to 2kg of the Victor® Multi Plus and Sand Mixture (11–12 litres of water per 20kg bag)
- Place one volume of water in the container and

then sprinkle two volumes of compound into the water. DO NOT use lime

- Briefly mix until plaster is blended (by hand or electric drill fitted with mixing blade). Note: maximum drill speed 600rpm, as over-mixing can accelerate setting and reduce working time
- Add 1 volume of sand and thoroughly remix, adjusting consistency if necessary. Note: do not retain product that has started to harden (or intermix with previously prepared material), as this will affect the finish and give an unpredictable setting time
- Wire brush surface to provide key for subsequent coats if the surface has been 'polished'



Mixing Instructions – Finish Coat

- Ensure mixing equipment and water is clean
- Use 1–1.06 litres of water to 2kg of Victor® Multi Plus (10–10.6 litres of water per 20kg bag)
- Place water in the container and then sprinkle the compound into the water. DO NOT add lime
- Allow to soak for 3–5 minutes
- Mix until plaster is smooth (by hand or electric drill fitted with mixing blade). Note: maximum drill speed 600 rpm; as over-mixing can accelerate setting and reduce working time

Adjust consistency if necessary by adding water sparingly. Note: do not retain product that has started to harden (or intermix with previously prepared material), as this will affect the finish and give an unpredictable setting time.

Application of Undercoat and Finishing Coat

- Application thickness should be approximately 3mm for a finishing coat. For thicker filling of uneven surfaces such as recessed mortar joints (up to 15mm), it is preferable to lay on an undercoat. The undercoat should be ruled off and trowelled to a flush, but unpolished finish. The Victor® Multi Plus finishing coat may be applied once the undercoat has adequately set (if applied too early the undercoat may distort and fail)
- The finishing coat of Victor® Multi Plus is applied and lightly trowelled to fill imperfections and then finished to a smooth surface. Do not attempt to feather out the gauge as the minimum coating thickness is 3mm. After the background has absorbed most of the water from the finish coat, trowel the surface to make it denser. Light dampening of the surface with water may be necessary to enhance trowelling. As the final set takes place, close in with the trowel to provide a dense smooth surface. Walls should be worked from the top to the base
- Victor® Multi Plus may be applied to a suitably prepared base (which must be sound and free of oil, grease, wetting agents, shiny smooth finishes, dirt or other loose material). If the surface will not provide a key (as for some precast concretes), then it should be roughened or coated with a suitable bonding agent. Check with the concrete manufacturer for bonding agent recommendations

Concrete Masonry, Blocks and Bricks

The surface should be:

- dampened with water if dry
- under coated with Victor® Multi Plus, render, then the finishing coat is applied. Check with a concrete manufacturer for sealing agent recommendations

If the undercoat has dried out, it should be uniformly and lightly dampened down with water (immediately prior to the finish coat application).

Precast or 'Off the Form' Concrete

- Generally application of a bonding agent is required before plastering is commenced. If the surface is uneven, undercoating is recommended
- The finish coat can be applied as soon as the undercoat has set

Low Suction Backgrounds

Precast slab construction, high density concrete, no-fines cement, etc.

- The substrate has a very large influence on the nature of application where a low suction background limits the Victor® Multi Plus thickness
- If too thick a coating is applied in the first coat (above 5mm), there may be a tendency for the material to “slump” on the wall. In any low suction background situation, a bonding agent MUST be used to avoid failure

Medium to High suction Backgrounds

Sand/cement undercoats, aerated concrete slabs and blocks, normal unglazed porous brick work, etc.

- In high suction background situations, the substrate must be adequately dampened down with water (or preferably a diluted bonding agent applied) to control the porosity/suction

These types of substrate do aid the application of a thicker coating, with the subsequent higher suction holding the coats more firmly onto the substrate. Ideally the final coat should be between 3mm–5mm thick.

7.0 REPAIRS AND MAINTENANCE

7.1 PLASTERBOARD REPAIRS

Plasterboard repairs are necessary for a number of reasons. Cracks in plasterboard or sheet joints are generally the result of movement of a building. A common example of this is where joints are made at the high stress points above and/or below the corners of windows and doors. If you notice these cracks forming, it is suggested you leave these for approximately 1 year before repairing. This allows the building to settle and should reduce the likelihood of problems recurring, but is no guarantee the same problems will not occur.

We also include some useful pointers when repairing dings and holes in GIB® plasterboard. In addition we cover the mounting of fixtures to GIB® plasterboard when fixing into a stud with screws or nails is not possible.

Note: These instructions are NOT suitable when conducting repairs to fire rated walls or ceilings. Similarly, mounting fixtures in GIB® fire rated walls **MUST BE AVOIDED** as this will affect the performance of the fire rated system (see GIB® Fire Rated Systems literature).

Tools

Some, or all, of the following tools will be required depending on the actual work being carried out.

- Rubber spatula (or similar) for mixing plaster
- Plastic Bowl
- 150mm Broad-knife
- Sanding Block
- Sharp Craft Knife
- 280mm Trowel

All tools should be clean and free of any old and set plaster. Stainless steel tools are recommended as these are less likely to corrode.

Tip: A light spray with lubricant and a wipe with a cloth or paper towel will also help keep metal tools in the best condition.

Remember that as these tools, e.g. broad-knives, are being used to create a smooth finish, any kinks or scratches in the edge of the tool will cause rough areas in the plaster. Do not use broad-knives for scraping, opening paint cans, etc.



Repairing Dings, Cracks and Scratches

The following procedure should be used for repairing dings, cracks and scratches less than 2mm deep.

- Sand the area around the repair to ensure the best adhesion between the compound and the painted surface
- Using a broad-knife apply GIB RediFilla® to the damaged area
- Leave the compound to dry (at least 24 hours for areas up to 1mm thick and 48 hours for thicker areas)
- Using 220 grit sandpaper (or finer), sand the area in one direction (not in a circular motion)
- Decorate as required





Repairing Minor Holes

Occasionally a plasterboard patch will be required to repair a damaged wall.

- GIB RediFilla® is a pre-mixed, air drying compound that can be used to repair dings, marks, dents, and blemished surfaces on plasterboard and other surfaces
- It's an easy-sand product to which paint adheres, so can be used as a total repair system for minor repairs
- GIB RediFilla® is available in handy 2 litre pails

Minor holes or construction of small joints for one-off hole repairs

- GIB TradeFilla® is a setting compound. When mixed with water, it has a 10 minute working life
- It changes viscosity during its working life, enabling differing surfaces to be filled by the same product (e.g. repairing a grazed or rough surface when thin, and filling holes as it thickens up)
- When dry, GIB TradeFilla® is a sandable product to which quality paints adhere
- It can be used for the entire repair process, or for the first two coats (in conjunction with GIB® air drying compound as the top coat)
- GIB TradeFilla® is available in a 5kg bag

Larger or multiple repairs

GIB Tradeset® 20 is a setting compound that sets hard in approximately 10–30 minutes when mixed with water.

- Complete drying may take a further 24 hours depending on how thick the compound is applied
- GIB Tradeset® 20 is available in 5kg and 20kg bags
- Tip: As a guide when mixing powder compounds, sprinkle in just enough powder until the water no longer soaks through. If water soaks through, sprinkle in a little more powder
- Tip: It is preferable to mix the compound too thick than too thin. It is easier to add water than to add powder
- Leave the mixture to soak for approximately 30 seconds
- Mix using a rubber spatula or similar for approximately 90 seconds until the mixture is smooth and lump free.

Drying Time

Joint compound must be allowed to dry before it is painted.

Approximate drying times for air drying compounds is a minimum of 24 hours between coats (and longer if the conditions are cold and/or damp). See p. 84.

Water, air and mix temperatures should be kept above 10°C. If temperatures are low, place a fan heater in the room and leave on a moderate setting (no more than 20°C) for a couple of hours. Complete the job, then leave the fan heater going for 24 hours, with the door open to allow exchange of air into the room. This will ensure the taping coat dries out in a reasonable time.

Buy only as much product as is necessary to complete the work you will be doing.

Clean Up

Leave any spilt material to harden before scraping up and disposing of to landfill. A little warm water on a cloth is normally sufficient to remove any residue.

Repairing Small To Medium Holes (up to 150mm in diameter)

Winstone Wallboards recommends the use of GIB Tradeset® 20 or GIB TradeFilla® for base coats and GIB Plus 4® or GIB RediFilla® for the finishing coats.

1. A GIB® plasterboard patch will be required for holes up to 150mm in diameter
2. Cut away the damaged area to a neat rectangular hole
3. Sand the area around the repair to ensure the best adhesion between the compound and the painted surface
4. Cut a piece of GIB® plasterboard that is approximately 20mm longer than the hole, but small enough to fit through the hole
5. Place a 60mm flat head nail through the centre of the piece of GIB® plasterboard and coat the ends with compound
6. Insert the patch into the hole and pull toward the front using the nail
7. Once hard (approximately 1 hour) gently push the nail back through the patch
8. Cut a piece of GIB® plasterboard to loosely fit the hole
9. Use compound to fix the patch in place
10. Apply compound over the joints
11. Immediately place a length of paper jointing tape over the four edges into the compound, using the broad-knife to remove any air bubbles under the tape
12. Once the first coat is hard, apply a second coat of compound over the joint areas, feathering the edges, so that it is approximately 250mm wide
13. Leave the compound to dry for at least 24 hours
14. Scrape away any rough edges using a broad-knife
15. Apply a thin finishing coat over the patched area
16. Leave to dry and sand smooth
17. Decorate the area as required

Note: These instructions are NOT suitable when conducting repairs to fire-rated walls. Similarly mounting fixtures in fire-rated walls **MUST BE AVOIDED** as this will affect the performance of the fire rated system.





Repairing Large Holes (over 150mm in diameter)

For larger holes it becomes necessary to cut away the damaged area back to one or two studs and use a GIB® plasterboard patch.

- Cut away the damaged area to either one or both studs surrounding the damage to form a rectangular hole
- Sand the area around the repair to ensure the best adhesion between the compound and painted surface
- Cut a length of GIB® plasterboard that is 100mm wide and 100mm longer than the height of the hole.
- Tip: If you have cut away to both studs this will not be required. Fixing to both studs is the easier method of repair, but is not always possible
- Using GIB Tradeset® 20 or GIB TradeFilla®, fix the plasterboard to the side of the hole which is not over the stud
- Cut a new piece of GIB® plasterboard to fit the hole and fix this to the stud(s) and/or plasterboard back-block
- Apply a coat of GIB Tradeset® 20 or GIB TradeFilla® over the four joints using a broad knife
- Immediately place a length of paper jointing tape into the compound, using the broad knife to remove any air bubbles under the tape

Tip: If any blisters appear in the tape this is usually an indicator that insufficient compound is present behind the tape. Lift the area of tape away using the corner of the broad-knife, apply a small amount of compound and press the tape back into the compound once more.

- Once the first coat is hard apply a second coat of GIB Tradeset® 20 or GIB TradeFilla® over the joint areas, feathering the edges, so that it is approximately 250mm wide
- Leave the compound to dry for at least 24 hours
- Scrape away any rough edges using a broad knife
- Apply a thin coat of GIB RediFilla®, or any other GIB® air drying compound, over the patched area
- Leave to dry and sand smooth
- Decorate the area as required



7.2 MOUNTING FIXTURES TO GIB® PLASTERBOARD

The first option for attaching fixtures to plasterboard walls is to try and locate any framing behind the fixture. If it is not possible to make use of the framing to attach the fixture, there is a wide range of proprietary fastenings for attaching fixtures of varying weights.

Strictly follow the manufacturer's instructions regarding weight limits.

Tools

Some, or all, of the following tools will be required depending on the actual work being carried out.

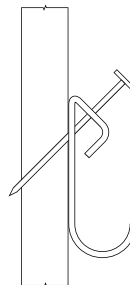
- Drill and bits
- Screw Driver

Systems

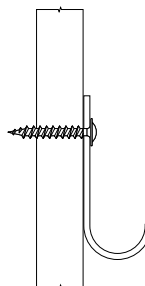
- Some options are shown in the diagrams on the right hand side of this page
- These can be used in GIB® plasterboard walls that are NOT fire-rated
- They are suitable for fixing lightweight items such as pictures, coat hooks and fire extinguishers (up to 20kg), etc. in situations where fixing into the stud with nails or screws are not possible.
- These systems are NOT suitable for heavy items such as shelving, cupboards or vanity units which require additional framing for support
- The fixing method depends on the thickness of the GIB® plasterboard and the distance that the fixture hangs out from the wall

The following guidelines are indicative only. If in any doubt, consult the fixing manufacturer or distributor. The capacities shown are given for 10mm GIB® Standard plasterboard.

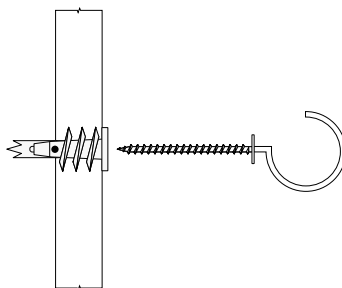
Allowable Fixture Weight 3kg



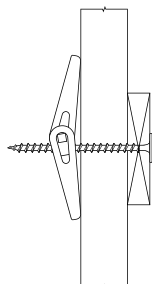
Allowable Fixture Weight 6–8kg



Allowable Fixture Weight 8kg



Allowable Fixture Weight 15–20kg





8.0 GIB® TROUBLESHOOTING

Blisters in Tape

Description

- Bubbles appear in areas of the paper jointing tape (ranging in size from approximately 10mm to 40mm, or more)

Remedy

- Slit tape to open up blistered area
- Fill out with compound, then press tape back in place with broad-knife
- When dry, smooth to level finish

Cause

- Insufficient compound used under tape
- Tape not initially pressed into good contact with compound
- Too much compound forced from under tape by excessive tool pressure when embedding
- Not enough compound in recess
- Compound gauge is too dry

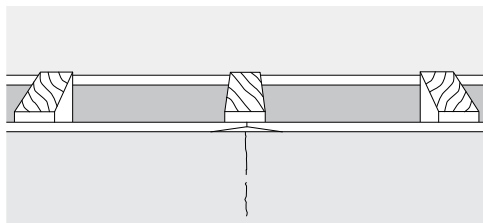
Prevention

- Provide sufficient compound under entire tape – 0.8mm

Centre Cracking

Description

- Cracks appear in the joint down the centre of the joint tape



Remedy

Relieve stress, i.e. providing adequate isolation by installing a control joint and re-taping, then feathering compound over broad area to disguise build-up

Cause

- Abnormal stress build-up resulting from structural deflection or racking
- Excessive stresses resulting from hygrometric and/or thermal expansion and contraction

Prevention

- Correct unsatisfactory environmental conditions
- Provide sufficient relief and re-tape
- Provide proper isolation from structure to prevent stress build-up
- Provide adequate control joints
- Structurally brace underlying framing
- Ensure moisture content of timber is 18% or less

Joint Darkening

Description

- A dark area occurs in the area of the joint commonly as a result of set compound being darker than dried compound

Remedy

- Redecorate after joints are thoroughly dry

Cause

- Occurs most commonly with colour-tinted paint rather than white. Most severe when applied in humid weather or when joints have not fully dried

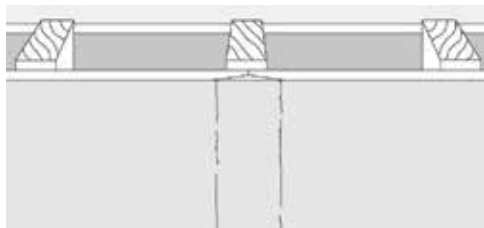
Prevention

- Be sure joints are thoroughly dry before painting

Edge Cracking

Description

- Cracks at edge of GIB® tape or GIB® Goldline® trims



Remedy

- Remove all poorly bonded tape, then reapply compound and tape in correct manner

Cause

- Fast drying of taping compound due to high temperature and low humidity, or excessive drafts
- Improper application, e.g. over-dilution of compound, use of wrong compound, or no second coat over tape
- Cold, wet application conditions (also causes poor bond)

Prevention

- In hot, dry conditions, use GIB Tradeset® 45
- In extreme conditions use a multi-purpose air drying compound. Note: these dry rather than set, so provide more open time
- Place shielding devices over room openings to prevent drafts. Do not apply joint treatment over hot surfaces
- During cold weather, control heat at minimum 10°C and supply good ventilation
- Avoid practices listed under "Cause" opposite

Excessive and/or Delayed Shrinkage

Description

- Shrinkage that occurs after longer time periods or is unusually high

Remedy

- See 'starved joints' (p. 108)

Cause

- Atmospheric conditions – slow drying and high humidity
- Insufficient drying time between coats of compound
- Excessive water added in mixing compound
- Excessive compound depth
- Combinations of the above

Prevention

- Ensure that each coat of compound is properly dry before applying the next. Ensure a minimum temperature of 10°C is maintained during application and drying of compounds



Shadowing	
Description <ul style="list-style-type: none"> Shows as a build-up of dust, typically once the wall has been decorated 	Remedy <ul style="list-style-type: none"> Wash painted surfaces with warm water and redecorate surface if necessary
Cause <ul style="list-style-type: none"> Temperature differentials in outside walls or top floor ceilings cause airborne dust to collect on colder condensation spots of interior surface 	
Starved Joints	
Description <ul style="list-style-type: none"> Joint area is under filled in relation to the surrounding plasterboard 	Remedy <ul style="list-style-type: none"> Reapply a full coat of compound over tape. Since this is the thickest application most shrinkage occurs in this coat, making it easier to fill taper properly. Finish by standard procedure
Cause <ul style="list-style-type: none"> Delayed shrinkage caused chiefly by insufficient drying time between coats of compound Insufficient compound applied for second taping coat to fill joint recess/taper. Shrinkage usually progresses until drying is complete Over-thinning compound, particularly with boxes 	Prevention <ul style="list-style-type: none"> Allow each coat of compound to dry thoroughly before applying succeeding coat, or use a low-shrinkage setting compound such as GIB Tradeset® or GIB Lite Blue®
Finish Gloss Variation	
Description <ul style="list-style-type: none"> Variations in gloss level of paint between the plasterboard and joint area 	Remedy <ul style="list-style-type: none"> Allow to 'age' for 3–4 weeks then redecorate. Ensure that the paint is roller applied
Cause <ul style="list-style-type: none"> Differences in suction of the board paper and joint compound. Problem accentuated by strong side lighting with slight angle of incidence to ceiling or wall surface. May also be chemical incompatibility of joint compounds and paint system 	Prevention <ul style="list-style-type: none"> Before painting with high gloss paint, apply skim coat of compound over entire surface (or use a spray on skim coat system) Consider where critical lighting is coming from and move if possible

Paint Sheen Variation

Description

- A differential in gloss levels over the whole area of the wall. This variation can be greater on nail holes and joints, and is highlighted by the use of semi and full gloss paints

Remedy

- Sand back and allow joint compound to fully dry before applying a sealer coat. Then apply correct paint system as per the manufacturer's instructions

Cause

- Nail holes and joints not sealed and undercoated correctly
- Joint compound not fully dry before paint application
- Burnish marks caused by rubbing or washing the wall
- Incorrect sealer used which does not equalise surface absorption of paper and compound

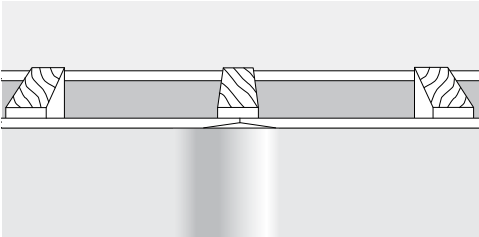
Prevention

- Use correct paint system and apply as per manufacturer's instructions

High Crowns

Description

- Joint area is higher than the surrounding plasterboard and may result in shadowing across the joints



Remedy

- Sand joints to flush surface (take care to avoid scuffing paper or joint tape by over-sanding)

Cause

- Excessive compound over joint
- Compound not feathered out beyond shoulders
- Improper bedding of tape
- Framing out of alignment or sheet edges not tight against framing
- Improper adjustment of mechanical tools
- Misuse of, or worn, tools

Prevention

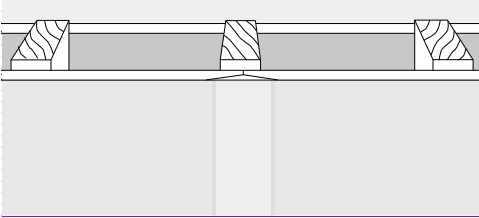
- Embed tape properly, using only enough compound to cover tape. Adequately feather compound



Tram Lines/Tracks

Description

- Shrinkage of the joint adjacent to the paper tape. Looks like the tape is visible on the joint



Remedy

- Lightly sand affected areas
- Apply a skim coat to the joint with an air drying compound, and sand and decorate

Cause

- The first coat of compound is not sufficiently dry before the second coat is applied. When the first coat dries it shrinks and pulls the tape back into the joint
- The second and top coat are too thin
- Compound is too thin or watery
- Inadequate drying between coats
- Poor drying conditions
- Slow drying due to excessive filling in one coat
- Premature paint application

Prevention

- Allow joint compound to fully dry between coats

Trim Defects

Description

- Cracks appearing at the edge of GIB® Goldline® Platinum trims

Remedy

- Remove all poorly bonded trims and reapply compound and trims as recommended

Cause

- Taping compound drying too fast, due to high temperatures and low humidity (or excessive drafts) or not enough compound
- Improper application, such as over-dilution of compound, use of wrong compound, excessive compound under tape, or no second coat over tape
- Cold, wet application resulting in poor bond

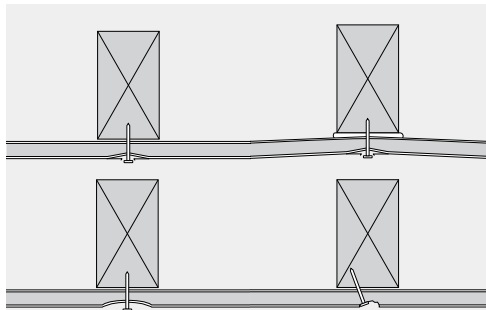
Prevention

- Do not install at temperatures below 10°C. During cold weather, control heat at a minimum 10°C and supply good ventilation. In hot, dry conditions, place shielding devices over room openings to prevent drafts. Do not apply joint treatment over hot surfaces. Lightly wet down floors if room humidity is too low
- Avoid practices listed under “Causes” opposite

Nail/Screw Pops

Description

- Protrusions or bumps directly over the nail/screw head
- Rupture of the surface around nail/screw head
- Looks like nail/screw head protruding above the surface of the board



Cause

- Timber shrinkage (timber shrinks as it dries, causing the fastener to protrude). Nail/screw pops may not become apparent for some considerable time after installation
- Fixing through glue – if screws or nails are applied through adhesive, a pop can occur as the glue dries and shrinks back; pulling the plasterboard closer to the framing member
- Plasterboard not held in close contact with the framing members. If the plasterboard is not held firmly against the stud while fixing, it increases the possibility of over-driving the nail (resulting in a blister-like defect the size of the hammerhead)
- Overdriven or skewed nails/screws can puncture the face paper, which results in no holding power
- Air trapped between the fixture and the compound, when the compound is placed
- Nail heads/screw heads puncturing face paper

Remedy

- Nail pops that occur after at least one month's heating cycle are probably caused by timber shrinkage. Because further shrinkage is likely to occur and pops reappear, do not repair until the end of a heating season
- A screw should be reapplied 50mm from the popped fastener. Drive in a new fastener whilst applying firm pressure, to ensure firm contact with framing. Use a nail punch to seat the popped fastener beneath the surface of the plasterboard
- Remove compound. Apply two coats of setting compound followed by an air dry compound coat, then redecorate

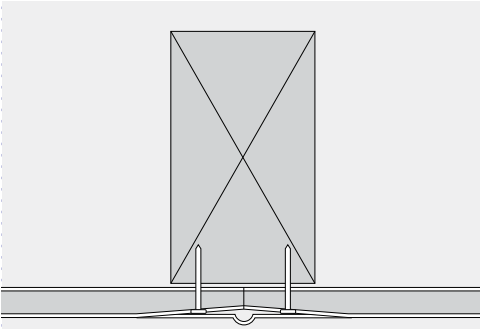
Prevention

- Avoid timber shrinkage by using GIB® Rondo® metal ceiling battens for ceilings or kiln dried timber. Close in the building and protect the framing from the elements as soon as possible. Ensure that timber moisture content is 18% or less at the time of lining. Use of steel battens for large ceiling areas will eliminate shrinkage factors
- Fixing through glue – for walls, use nails/screws around the perimeter and GIBFix One® or GIBFix® All-Bond adhesive in the centre of the sheet. No mechanical fastener should be within 200mm of an adhesive daub. Never nail/screw through glue
- Plasterboard not in close contact with the framing members – when fixing ceilings, fix the centre of the plasterboard first. In all cases hold the plasterboard firm against the framing member whilst fixing
- Drive nails/screw in straight so they are neatly seated slightly below the surface of the sheet
- Apply compound in critical light areas by pressing the compound into the fixings, rather than trowelling it on. This removes trapped air

Peaking

Description

- A condition where joints are visible under critical lighting
- More prevalent when board has been installed in cold weather
- Often called ridging or beading
- Looks like a continuous ridge along the length of the joint, with a uniform peak-like pattern at the centre
- Commonly occurs in conjunction with 'nail popping'



Remedy

- Ridges must only be repaired after a full heating cycle (6 months to a year). Mid-summer is generally the best time for rectifications
- Apply a coat of setting compound over the joints using a 300mm trowel to widen the joint. Scrape back and apply a light coat of a topping coat. Reseal affected area. Examine the surface with harsh lighting to determine whether the ridge has been concealed. If all right, then decorate

Cause

- Excessive gaps (i.e. over 2mm) left between sheets
- Timber movement due to excessive moisture content of timber at time of lining and subsequently drying out. This is more prevalent with 10mm plasterboard than thicker plasterboards
- No gaps at the base of wall sheets. This can cause pressure on the base of the sheets thus transferring tension to the joints
- Inadequate ventilation with concrete floor slabs, resulting in a build-up of water vapour

Prevention

- Use GIB® Rondo® metal ceiling battens on ceilings
- Ensure timber framing moisture content is 18% or less at time of lining
- Use a back blocking system on ceilings
- Gaps between sheets should be pre-filled with a setting compound and allowed to completely dry before application of tape and subsequent coats of compound
- Always allow a 5mm-10mm gap at the base of wall sheets to allow for shrinkage of the wall plates and studs
- Ensure compound materials are maintained at a minimum temperature of 10°C during, and following, installation. Allow adequate ventilation

Peeling/Flaking, Severe Cracking

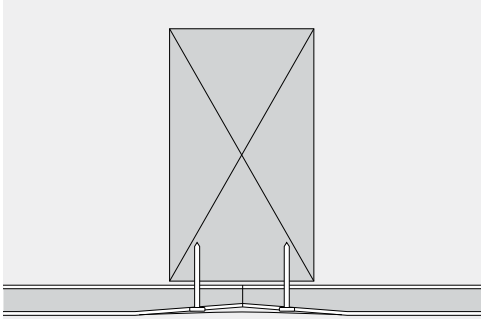
Description

- Large flakes that adhere loosely to the surface
- This problem is an extension of cracking and the causes and remedies are the same

Shrinkage

Description

- Compound shrinking back when it dries, causing a depression at the joint or on a fastener
- Looks like depressions at the joint



Remedy

- Lightly sand affected areas and apply air drying compound, then sand (using 220 grit or finer sand paper)
- Seal repaired areas and then re-decorate

Cause

- Compound too thin or watery
- Inadequate drying between coats
- Slow drying due to excessive filling in one coat
- Under slow drying conditions, joints and plasterboard may hold moisture for weeks

Prevention

- Provide proper drying conditions for compound. The two setting coats must be thoroughly dry prior to top coating. The top coat must be thoroughly dry prior to application of sealer
- Use compound at heaviest workable consistency and allow to stand for 2–3 minutes before applying
- In slow drying conditions apply a number of thinner coats rather than a few thick coats
- Under slow drying conditions use shorter set time joint compounds
- Allow joint compound to fully dry between coats

Paint Checking/Cracking

Description

- Small splits or star shape cracks on paint film surface

Remedy

- Remove paint allow joint compound to fully dry, repair any damage and reapply paint (as per manufacturer's instructions)

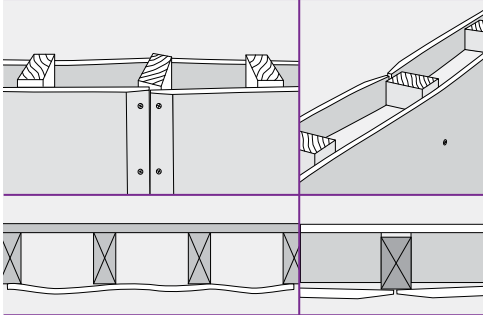
Cause

- Joint or topping compound not fully dry before paint application
- Paint not fully dried before next application
- Paint applied too thick
- Incorrect paint used

Wavy surfaces

Description

- Plasterboards are not flat but have a bowed, dished or undulating surface
- Studs or ceiling joists not on the same plane as other framing members
- A twisted framing member
- Shadows being cast across the joint
- Plasterboard forced into place



Remedy

- It is extremely difficult to rectify some of these problems without having to resort to full replacement of the linings after rectifying underlying factors
- Replace all warped or crooked studs

Cause

- Framing oversights
- Framing out of alignment with adjacent framing, making it difficult to bring the sheet into firm contact with framing members
- Excessive moisture in the timber framing can also cause warping, twisting or bowing as it dries
- Fixing the perimeter of the sheet prior to the centre
- Fixing of damp plasterboard
- Excessive loading from insulation or light fittings causing too much weight on plasterboard
- Incorrect placement of vapour barrier causing moisture build-up within the plasterboard
- Exceeding maximum span of fasteners when fixing
- Not allowing a 5mm–10mm gap between the floor and the plasterboard
- Incorrect fastening sequence for lining light gauge steel framing
- High temperatures in the ceiling space causing board expansion, particularly in skillion roofs with poor ventilation
- Incorrect storage – storing of plasterboard on edge on damp concrete floors

Prevention

- Timber members must be brought into alignment
- Check stud, batten and joist alignment, correcting wherever necessary
- Always fix from the centre outwards
- Sheets must be touch fitted and not forced into place

Fibre Raise Adjacent to Joint Areas	
Description <ul style="list-style-type: none"> — A shadow adjacent to the stopped area 	Prevention <ul style="list-style-type: none"> — Lightly sand between all coats
Cause <ul style="list-style-type: none"> — Commonly encountered with spray applied sealer and top coats which have not been lightly sanded back between coats — Also common where alkyd sealers are used and not sanded back before the application of top coats — Excessive sanding of paper raising fibres 	
Compound Defects	
Grit <ul style="list-style-type: none"> — Small pieces of raw material or contaminant that show up when the compound is trowelled 	Shrinkage <ul style="list-style-type: none"> — The compound shrinks back into the joint when it dries. Caused by thick coats of compound, not allowing the compound to dry between coats and using incorrect mixing ratios
Seeding/Lumps <ul style="list-style-type: none"> — Small lumps of hard compound that can form towards the end of a compounds working time. Can be due to contamination, over mixing, dirty tools, or particles of dry compound left in the mixing bowl 	Inconsistent Set Time <ul style="list-style-type: none"> — Setting compounds having a different set time to those stated on the bag. There are a number of probable causes including contamination, particles of dry compound left in the mixing bowl, variable water temperature, over mixing and re-working, as well as inappropriate product storage
Board Defects	
Delamination <ul style="list-style-type: none"> — Separation of the paper ply from the main body of the paper. Paper still adhered to the core with weak inter-ply bond. 	Peeler <ul style="list-style-type: none"> — Paper liner coming away cleanly from the core with no paper adhesion. Caused by calcinated (over dried) board. Also occurs when the plasterboard is damp
End Split <ul style="list-style-type: none"> — Peeling or splitting 50mm–100mm from end of sheet — Usually caused by soft board at the knives during the manufacture of plasterboard 	Shoulder <ul style="list-style-type: none"> — The thickness of the board at the inner edge of the taper is greater than that in the body of the board itself
Cupped or Hooked Edges <ul style="list-style-type: none"> — Scalloped or hooked. Taper does not have regular profile — Can be caused during manufacture or incorrect storage of the board edge on damp concrete surfaces 	Soft Edges <ul style="list-style-type: none"> — Soft core or calcinated due to over drying of the edge — Damp due to storage on damp concrete surfaces
Blisters <ul style="list-style-type: none"> — Intermittent splitting of the core and paper 	



FOR MORE INFORMATION VISIT

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SUPPORTING DOCUMENTS

Ardex WPM 001

Ref 19884. Uploaded 4 Feb 2021

Purpose: Performance

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk



BRANZ Appraised

Appraisal No. 472 [2017]

ARDEX UNDERTILE INTERNAL LIQUID WATERPROOFING MEMBRANES

Appraisal No. 472 [2017]

This Appraisal replaces BRANZ
Appraisal No. 472 [2011]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 ARDEX Undertile Liquid Membranes are premixed and two-part liquid-applied waterproofing membranes for use under ceramic or stone tile finishes in internal wet areas.

Scope

- 2.1 ARDEX Undertile Liquid Membranes have been appraised for use as waterproofing membranes for the internal wet areas of buildings, within the following scope:
 - on floor substrates of concrete, flooring grade particleboard, plywood, compressed fibre cement sheet and fibre cement sheet tile underlay, and on wall substrates of concrete, concrete masonry, wet area fibre cement sheet lining systems and wet area plasterboard lining systems; and,
 - when protected from physical damage by ceramic or stone tile finishes; and,
 - where floors are designed and constructed such that deflections do not exceed 1/360th of the span.
- 2.2 The use of ARDEX Undertile Liquid Membranes on concrete slabs where hydrostatic or vapour pressure is present from below is outside the scope of this Appraisal.
- 2.3 Movement and control joints in the substrate must be carried through the membrane and tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.4 The ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membranes must be installed by trained installers, approved by ARDEX New Zealand Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, ARDEX Undertile Liquid Membranes, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. ARDEX Undertile Liquid Membranes meet these requirements. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Internal wet area floors and walls incorporating ARDEX Undertile Liquid Membranes meet this requirement. See Paragraphs 11.1-11.6.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. ARDEX Undertile Liquid Membranes meet this requirement and will not present a health hazard to people.

Technical Specification

4.1 Materials supplied by ARDEX New Zealand Limited are as follows:

- **ARDEX WPM 001** is a one part, polymer-based, ready-to-use, liquid-applied membrane containing micro-fibres. It is supplied as a light blue thixotropic paste 20 kg [approximately 15 litres] pails.
- **ARDEX WPM 002** is a fast drying, two part, flexible, cementitious-based, liquid applied membrane containing micro-fibres. It is supplied as ARDEX WPM 002 Part A Liquid in 20 kg pails and ARDEX WPM 002 Part B Powder in 10 kg multi-wall bags. When dry, the membrane is light grey in colour.
- **ARDEX WPM 155 Rapid** is a one part, water-based polyurethane-acrylic, ready-to-use, liquid applied, rapid setting membrane. It is supplied as blue/grey colour in 4 and 15 litre pails.
- **ARDEX STB Tape** is an uncured butyl tape with a fleece layer that is used in the ARDEX WPM 155 Rapid under tile waterproofing system.
- **ARDEX Multiprime** is a water-based primer used to seal substrates and enhance the adhesion of the membranes. It is supplied as a red coloured liquid in 1, 4 and 20 litre plastic containers.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and freezing conditions. The membrane products have a shelf life of 12 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the ARDEX Undertile Liquid Membranes. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 ARDEX Undertile Liquid Membranes are for use in buildings where an impervious waterproof membrane is required to floors and walls to prevent damage to building elements and adjoining areas.
- 7.2 ARDEX WPM 002 and ARDEX WPM 155 Rapid are designed to be used where a quicker curing time is required, such as in cool or humid conditions.
- 7.3 The membrane must be protected from physical damage by the application of ceramic or stone tile finishes.
- 7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ Good Practice Guide - Tiling.
- 7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

- 8.1 Plywood must be a minimum of 17 mm thick complying with AS/NZS 2269, CD Grade Structural with the sanded C face upwards and treated to H3 [CCA treated]. LOSP treated plywood must not be used.
- 8.2 The plywood must be supported with dwangs or framing with a maximum span of 400 mm in each direction, fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres along the sheet edges and 200 mm centres through the body of the sheets.

Fibre Cement Compressed Sheet/ Fibre Cement Sheet Tile Underlay

- 8.3 Fibre cement compressed sheet and tile underlay must be manufactured to comply with the requirements of AS/NZS 2908.2 and must be specified by the manufacturer as being suitable for use as a wet area membrane substrate. Installation must be carried out in accordance with the instructions of the manufacturer.

Particleboard

- 8.4 Particleboard must be specified for the end use in accordance with NZS 3602.

Concrete and Concrete Masonry

- 8.5 Concrete and concrete masonry substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101, concrete slab-on-ground to NZS 3604 or NZS 4229, and concrete masonry to NZS 4229 and NZS 4230.

Wet Area Wall Linings

- 8.6 Plasterboard wall linings must be manufactured to comply with AS/NZS 2588 and be suitable for use in internal wet areas.
- 8.7 Fibre cement sheet must be suitable for use in wet areas and comply with AS/NZS 2908.2.
- 8.8 Installation of plasterboard or fibre cement wall linings must be carried out in accordance with the instructions of the manufacturer.

Durability

Serviceable Life

- 9.1 ARDEX Undertile Liquid Membranes, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tile finishes with a design serviceable life of 15-25 years.

Maintenance

- 10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.
- 10.3 Drainage outlets must be maintained to operate effectively, and tile finishes must be kept clean.



BRANZ Appraised
Appraisal No. 472 [2017]

BRANZ Appraisal

Appraisal No. 472 [2017]

17 January 2018

ARDEX UNDERTILE INTERNAL

LIQUID WATERPROOFING

MEMBRANES

Internal Moisture

- 11.1 ARDEX Undertile Liquid Membranes are impervious to water, and when appropriately designed and installed will prevent water from penetrating behind linings or entering concealed spaces.
- 11.2 Surfaces must be finished with ceramic or stone tiles. A means of compliance with NZBC Clause E3.3.3 and E3.3.4 is given in NZBC Acceptable Solution E3/AS1 Paragraph 3.1.1 [b], 3.1.2 [b] and 3.3.1 [b].
- 11.3 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.
- 11.4 ARDEX Undertile Liquid Membranes are suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of compliance for overflow is given in NZBC Acceptable Solution E3/AS1, Section 2.
- 11.5 The waterproofing membranes must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, BRANZ Good Practice Guide – Tiling, and the flooring and wall lining manufacturers.
- 11.6 Where water resistant wall finishes such as prefinished sheet materials are used, they must overlap the membrane a minimum of 30 mm.

Installation Information

Installation Skill Level Requirement

- 12.1 Installation of the membranes must be completed by trained installers, approved by ARDEX New Zealand Limited.
- 12.2 Installation of substrates must be completed by, or under the supervision of, licensed Building Practitioners with the relevant Licence Class, in accordance with instructions given within the ARDEX New Zealand Limited Technical Literature and this Appraisal.

Preparation of Substrates

- 13.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be even and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents.
- 13.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer as set out in BRANZ Bulletin No. 585.
- 13.3 All voids, cracks, holes, joints and excessively rough areas must be filled to achieve an even and uniform surface. Junctions of substrate abutments, such as at wall/floor and wall/wall junctions must have reinforcements installed as set out in the Technical Literature.
- 13.4 Substrates must be primed with ARDEX Primer and allowed to dry fully before the membrane is installed.

Membrane Installation

- 14.1 Installation must not be undertaken where the substrate surface temperature is below 10°C or above 35°C.
- 14.2 ARDEX WPM 002 liquid and dry components must be mixed and left to stand for 5 minutes before re-mixing, then applying. ARDEX WPM 001 and ARDEX WPM 155 Rapid must be thoroughly stirred before application.
- 14.3 The membranes must be applied in a minimum of two coats at the rates set out in the Technical Literature to give a total finished thickness of 1.0 - 1.5 mm. Subsequent coats must be applied at an opposite direction to the previous coat.
- 14.4 Application can be made by roller (medium/long nap), brush (long bristle), or a flat steel trowel.
- 14.5 Reinforcement fabric is bedded into the wet layer between coats to provide movement protection at wall/wall and wall/floor junctions, and at any other areas such as joints in the flooring substrate, floor cracks or around penetrations in the membrane. ARDEX STB Tape must be used with ARDEX WPM 155 to take advantage of the rapid/fast drying features.
- 14.6 Clean up may be undertaken with water.

Tiling

- 15.1 The membrane must be fully cured before tiling. The cured membrane must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.
- 15.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide - Tiling. The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer or ARDEX New Zealand Limited.

Inspections

- 16.1 Critical areas of inspection are:
 - Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the supplier's instructions, particularly installation to the correct thickness and use of reinforcement.
 - Membrane curing and integrity prior to the installation of tiles including protection from mechanical damage during curing and prior to tile installation.

Health and Safety

- 17.1 Safe use and handling procedures for the membrane are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 18.1 The following testing of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by ARDEX Australia Pty Ltd research and development laboratory: water vapour transmission; water absorption; tensile strength and elongation before and after UV exposure, immersion in bleach, immersion in industrial detergent and immersion in water. Test methods and results were reviewed by BRANZ and found to be satisfactory.
- 18.2 The following testing of ARDEX WPM 001 was undertaken by the Commonwealth Scientific Industrial Research Organisation [CSIRO] Australia:
 - In accordance with ANSI A118.10 for ICBO Evaluation Service - dimensional stability; waterproofness; shear strength to ceramic tile and cement mortar; and fungal and micro-organism resistance.
 - In accordance with AS 1145 - behaviour under cyclic strain.
- 18.3 Testing of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by BRANZ for low temperature flexibility and peel adhesion after heat/humidity aging.
- 18.4 The following testing of ARDEX WPM 155 Rapid was undertaken by various organisations:
 - Durability testing to AS/NZS 4858 Appendix A including effect of heat aging, bleach, detergent and water on tensile strength and elongation.
 - Cyclic movement resistance requirements of AS/NZS 4858:2004 Appendix B.
 - Water Vapour Transmission using both wet and dry cup methods from ASTM E96.
 - Water transmission behaviour following the procedures of AS/NZS 4858 Appendix C.
- 18.5 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 19.1 An assessment was made of the durability of the ARDEX Undertile Liquid Membranes by BRANZ technical experts.
- 19.2 Site inspections have been carried out by BRANZ to examine the practicability of installation.
- 19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 20.1 The manufacture of the membrane has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 20.2 The quality management system of membrane's manufacturer has been assessed and found to be satisfactory.
- 20.3 The quality of supply of the membrane system materials to the market is the responsibility of ARDEX New Zealand Ltd.
- 20.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrate.
- 20.5 Quality on site is the responsibility of the trained installers, approved by ARDEX New Zealand Ltd.
- 20.6 Building owners are responsible for the maintenance of the ceramic or stone tiles in accordance with the instructions of ARDEX New Zealand Ltd.



BRANZ Appraised
Appraisal No. 472 [2017]

BRANZ Appraisal

Appraisal No. 472 [2017]
17 January 2018

ARDEX UNDERTILE INTERNAL
LIQUID WATERPROOFING
MEMBRANES

Sources of Information

- AS 3740 – 2010 Waterproofing of wet areas within residential buildings.
- AS 3958.1: 2007 Ceramic Tiles - Guide to the installation of ceramic tiles.
- AS/NZS 1170: 2002 Structural design actions
- AS/NZS 2908.2: 2000 Cellulose-cement products - flat sheet.
- AS/NZS 4858 – 2004 Wet area membranes.
- AS/NZS 2269: 2012 Plywood - Structural.
- Good Practice Guide – Tiling, BRANZ, April 2015.
- NZS 3101: 2006 Concrete Structures Standard.
- NZS 3602: 2003 Timber and wood-based products for use in buildings.
- NZS 3604: 2011 Timber framed buildings.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Code of practice for the design of masonry structures.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraisal
Appraisal No. 472 [2017]
17 January 2018

ARDEX UNDERTILE INTERNAL
LIQUID WATERPROOFING
MEMBRANES



In the opinion of BRANZ, **ARDEX Undertile Internal Liquid Waterproofing Membranes** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **ARDEX New Zealand Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **ARDEX New Zealand Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **ARDEX New Zealand Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **ARDEX New Zealand Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

17 January 2018

7221 Gas Appliances

Architects & Builders Installation Guide

Ref 27345. Uploaded 16 Jun 2021

Purpose: Installation

Added Notes: For DF960 Series

ESCEA DF/DFS SERIES INSTALLATION/SERVICE GUIDE

Ref 27348. Uploaded 16 Jun 2021

Purpose: Installation

ESCEA HORIZONTAL POWERFLUE

Ref 27350. Uploaded 16 Jun 2021

Purpose: Installation

INFINITY CONTINUOUS FLOW WATER HEATERS OPERATION GUIDE

Ref 27338. Uploaded 16 Jun 2021

Purpose: Maintenance

INFINITY EF25 & A-SERIES CONTINUOUS FLOW WATER HEATERS INSTLLATION GUIDE

Ref 27337. Uploaded 16 Jun 2021

Purpose: Installation

INFINITY GAS CONTINUOUS FLOW WATER HEATING SPECIFICATION GUIDE

Ref 27340. Uploaded 16 Jun 2021

Purpose: Performance

RINNAI INFINITY - Warranty

Ref 27344. Uploaded 16 Jun 2021

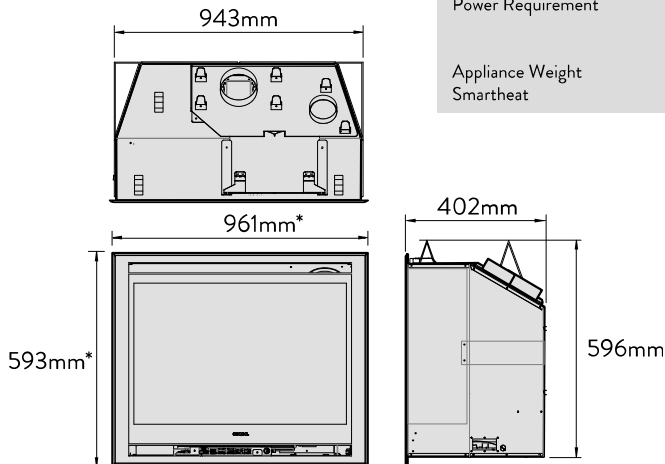
Purpose: Performance, Warranty



Appliance Information

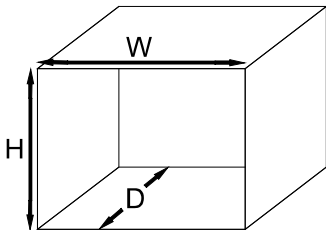
Product Dimensions

All outside dimensions taken from the appliance are with the standoffs attached.



Cavity Shape

The side standoffs installed on the outside may only be removed when being installed into a masonry cavity.



		Height	Width	Depth
False Cavity installation (timber standoffs must be adjusted to the upright position when framing)	Framing	600mm	945mm	405mm + minimum 65mm flue clearances
	Wall Lining	560mm + allowance for fascia clearance		
*Masonry install with the side standoffs and timber standoffs removed.		560mm + allowance for fascia clearance	935mm	400mm

NOTE: A top is not required when creating the cavity.

NOTE: Measure the indicated framing dimensions from the base of the appliance.

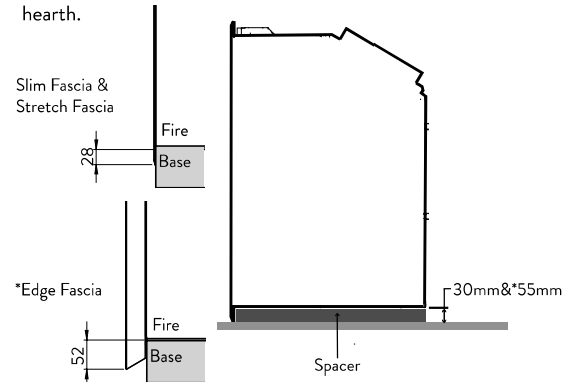
*NOTE: Installation into masonry, brick, and other cavities is possible. Please contact architectural advisory aa@escea.com for more information.

Cavity Base

This appliance MUST be fully supported on a continuous base (product weight: 120kg). The base must be levelled to prevent vibration from possible fan imbalance. The fireplace must be seismically restrained in a manner appropriate to the installation location and accessible once the secondary glass is removed.

Fascia Base Clearance

It requires a spacer below the appliance to allow room for the fascia to sit flush with the non combustible floor or a hearth.



Floor and Hearth Clearances

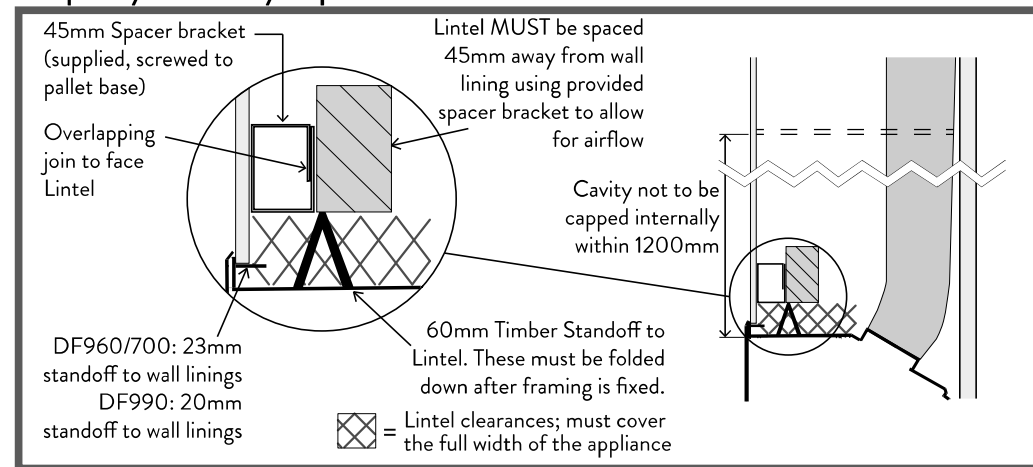
If the appliance is mounted above a "heat resistant floor" (including but not necessarily limited to: ceramic tiles, concrete, and stone) then it may be positioned with the bottom of the fascia level with the finished floor if desired.(30mm or 55mm spacer required under the fire in this case depending on the fascia type.)

If the appliance is mounted above a "heat sensitive floor" (including but not necessarily limited to: carpets, vinyl, carpet tiles, rugs and mats, timber, joinery, wooden flooring - see materials guide), then we recommend a distance of 100mm from the bottom of the fascia to the finished floor or hearth.

A finished floor level hearth is not required, however it may be used for decorative purposes or for protection of soft/ heat sensitive flooring as stated in the section above to allow a smaller floor clearance. The hearth should not obscure the front face of the fire, must protrude at least 200mm from the face of the fireplace and be at least the width of the appliance.

A raised hearth or joinery should conform to the above guideline.

Compulsory False Cavity Requirements



*WARNING: The top standoffs must be adjusted to the upright position before the fireplace installation. All standoffs must remain in place for fireplace installation and then folded down once framing is fixed.

NOTE: Wall lining MUST NOT be installed until after the fireplace is inserted into the cavity.

NOTE: Wall lining should hang below the lintel to meet the appliance edge.

NOTE: If cavity dimensions significantly exceed those specified, a register plate is available for purchase through your local Escea retailer (New Zealand Only).

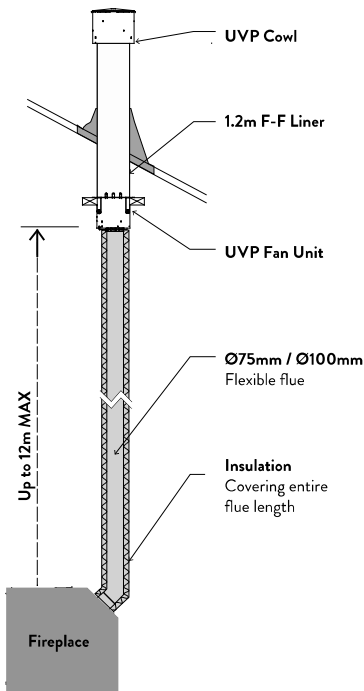
Flue Configuration (If more than 4m flue length is required)

If your flue system is less than 4m long:

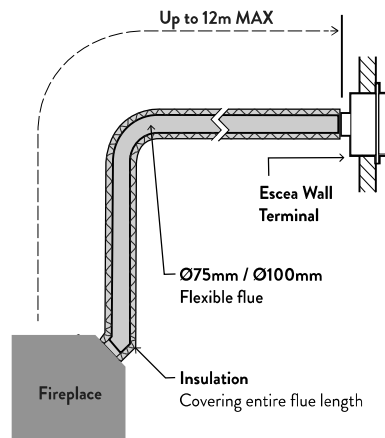
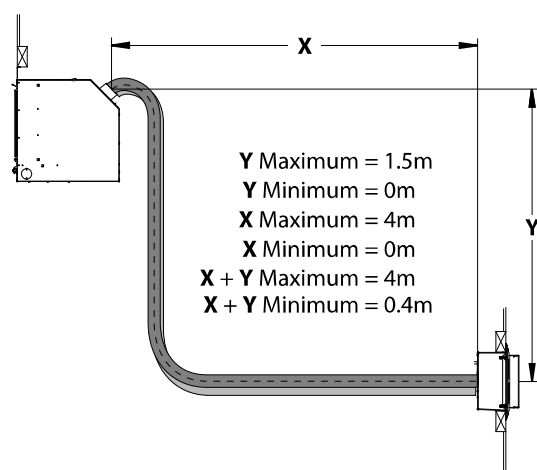
- A simple aluminium flexible flue is required **without insulation** (see diagrams below).

If your flue system is greater than 4m long (as shown in diagrams below), then there are the following options:

- For flue run installations beyond 4m and up to 12m, flexi flue must be used for the entire flue run and must be fully insulated from appliance connection to fan unit. Beyond 12m (up to 40m) please contact the Escea Advisory Team at aa@escea.com.



Vertically Terminated: utilises the Escea vertical power flue enclosure kit.



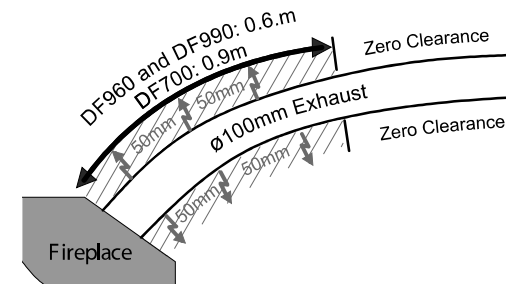
Horizontally Terminated: utilises the Escea horizontal power flue enclosure kit

Horizontally Terminated Downwards Flueing: utilises the Escea horizontal power flue enclosure kit

Chassis and Flue Clearance

The fire chassis is zero clearance rated.

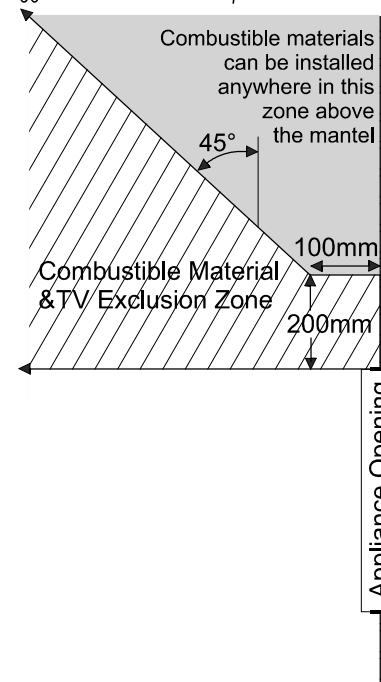
A 50mm clearance must be maintained from the exhaust flue for the distances described below:

**Television & Mantle Clearance**

The diagram (shown below) shows the recommended minimum clearances for the location of any electrical equipment (such as Plasma TV, LCD TV or home theatre) above a DF-Series gas fire.

NOTE: Dimensions from the top edge of the air opening.

NOTE: The television clearance recommendations are to be treated as a suggestion of a suitable installation only. It is the responsibility of the end user to check the installation instructions of their electrical appliances to ensure that the location in relation to the gas fire is suitable. Escea in no way guarantees or takes responsibility that the recommended installation suggestion will be suitable for all electrical or home entertainment appliances.



For DF700 & DF960
the minimum height for TV
installation without a
mantel installed: 200mm
For DF990 a mantel is required

FIRE BY **escea.**

IMPORTANT: There are new false cavity framing requirements that must be adhered to (refer to section B1).

IMPORTANT: The flueing has been significantly changed for DF700, 960, & 990 (refer to section C2).

IMPORTANT: The fascia and secondary glass are critical components of the fire and must be properly fastened prior to running the fire (refer to sections D2 and F1).

Installation / Service Instructions

DF / DFS-Series Gas Fireplace

For the latest documentation, visit www.escea.com

630381_20

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Important:

The appliance shall be installed in accordance with;

- This installation instruction booklet
- Local gas fitting regulations
- Municipal building codes
- Electrical wiring regulations
- Any other relevant statutory regulations.
- AS/NZS 5601.1:2013 Gas Installations



WARNING:

This appliance must be installed by a qualified person. Replacement of the appliance mains supply cord should only be made by the manufacturer, its service agent, or a similarly qualified person.

Do not modify this appliance.

This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.

Young children should be supervised to ensure that they do not play with the appliance.

Failure to follow these instructions could cause a malfunction of the heater, which could result in death, serious bodily injury, and/or property damage. Failure to follow these instructions may also void your fire insurance and/or warranty.

Who can install this product:

Installation must be carried out by a registered installer who, on completion of the installation, must issue a:

AUS: Certificate of Compliance

NZ: Certificates that comply with the latest legislation in accordance with national and/or local codes. If these are not issued then the Escea warranty may be void.

Warranty Repair and Annual Servicing:

Please contact Escea if you require warranty work. Warranty repair work must be carried out by a recognised gas fire technician. It is recommended that recognised Escea Gas Fire Technicians are also used to carry out annual servicing requirements (particularly during the warranty period). For contact details of recognised Escea Gas Fire Technicians in your area, or for replacement parts, please contact the retailer from whom the appliance was purchased or visit our website.

The heater must be installed according to these instructions and in compliance with all relevant building, gas fitting, electrical and other statutory regulations (eg. AS/NZS 5601). Any shortcomings in the appliance and flue installation will be the responsibility of the installer, and Escea will not be accountable for any such failings or their consequences.

Manufactured by: Escea Ltd, PO Box 5277 Dunedin NZ, Ph: +64 3 478 8220.

For contact details of your local Escea distributor or dealer in New Zealand, please visit: www.escea.com or email: info@escea.com. From Australia, please visit www.escea.com.au, call AU: 1800 460 832 or WA: 1800 730 140, or email us at info@escea.com

DF700 PRODUCT SPECIFICATION

MODEL NAME		DF700		
Description of Appliance		Powerflued Gas Fire Heater		
Star Rating		4-5 Stars		
Max. Heat Output		5.9kW		
A/NZ Approval No.		AS/NZS 5263.1.3		
Gas Type		Natural	Propane	ULPG
Gas input	High	25 MJ/hr	25 MJ/hr	24 MJ/hr
	Low	11 MJ/hr	11 MJ/hr	9.5 MJ/hr
Inlet Pressure	Max	5.0 kPa	5.0 kPa	5.0 kPa
	Min	1.13 kPa	2.75 kPa	2.75 kPa
Operating Pressure on High		1.0 kPa	2.30 kPa	2.30 kPa
Operating Pressure @ Front Burner Jet on High		0.95 kPa	2.29 kPa	2.29 kPa
Burner Jet Size		Front: 1.70mm Rear:1.40mm	Front: 1.05mm Rear:0.9mm	Front: 1.05mm Rear:0.85mm
Aeration Collar Hole Size		1 hole @ Ø3.5mm	No Collars	No Collars
Pilot injector		#42	#27	#27
Appliance Dimensions (mm)	Width	693.0 mm		
	Height	596.0 mm		
	Depth	387.0 mm		
Weight	Kg	45 kg		
Ignition System		Electronic Ignition to pilot system		
		Escea PCB		
Ignition Activation		7 secs (approx)		
Flame Safeguard		Flame Rectification		
Consumption		8.1W @ 0.35A 230V		
Remote controls		Yes		
Timers		Yes		
Clock		Yes		
Function lock / child		Yes		
Temperature control		Yes		
Connections	Electric	230V AC		
	Gas	1/2" BSPP female lower right of fireplace chassis		
	Flue Type	4" and 3" Flexi Flue		
	Spigot Location	Rear and centre		
Data badge location		On Chassis Base		

DF960 PRODUCT SPECIFICATION				
MODEL NAME		DF960		
Description of Appliance		Powerflued Gas Fire Heater		
Star Rating		4.4-4.9 Stars		
Max. Heat Output		7.7kW		
A/NZ Approval No.		AS/NZS 5263.1.3		
Gas Type		Natural	Propane	ULPG
Gas input	High	31 MJ/hr	31 MJ/hr	28 MJ/hr
	Low	15 MJ/hr	14 MJ/hr	12 MJ/hr
Inlet Pressure	Max	5.0 kPa	5.0 kPa	5.0 kPa
	Min	1.13 kPa	2.75 kPa	2.75 kPa
Operating Pressure on High		1.0 kPa	2.30 kPa	2.30 kPa
Operating Pressure @ Front Burner Jet on High		0.94 kPa	2.20 kPa	2.20kPa
Burner Jet Size		Front: 1.85mm Rear: 1.70mm	Front: 1.20mm Rear: 1.05mm	Front: 1.10mm Rear: 1.02mm
Aeration Collar Hole Size for Logs & Embers/ Flakes		1 holes @ Ø4mm	No Collars	No Collars
Aeration Collar Hole Size for Coals		1 hole @ Ø2.5mm	No Collars	No Collars
Pilot injector		#42	#27	#27
Appliance Dimensions (mm)	Width	943.0 mm		
	Height	596.0 mm		
	Depth	402.0 mm		
Weight	Kg	70 kg		
Ignition System		Electronic Ignition to pilot system		
		Escea PCB		
Ignition Activation		7 secs (approx)		
Flame Safeguard		Flame Rectification		
Consumption		84W @ 0.35A 230V		
Remote controls		Yes		
Timers		Yes		
Clock		Yes		
Function lock / child		Yes		
Temperature control		Yes		
Connections	Electric	230V AC		
	Gas	1/2" BSPF female lower right of fireplace chassis		
	Flue Type	4" and 3" Flexi Flue		
	Spigot Location	Rear and centre		
Data badge location		On Chassis Base		

DF990 PRODUCT SPECIFICATION

MODEL NAME		DF990		
Description of Appliance		Powerflued Gas Fire Heater		
Star Rating		4.9 stars		
Max. Heat Output		8.2kW		
A/NZ Approval No.		AS/NZS 5263.1.3		
Gas Type		Natural	Propane	ULPG
Gas input	High	35 MJ/hr	30 MJ/hr	30 MJ/hr
	Low	16 MJ/hr	12 MJ/hr	12 MJ/hr
Inlet Pressure	Max	5.0 kPa	5.0 kPa	5.0 kPa
	Min	1.13 kPa	2.75 kPa	2.75 kPa
Operating Pressure on High		1.0 kPa	2.3 kPa	2.3 kPa
Operating Pressure @ Front Burner Jet on High		0.94 kPa	2.2 kPa	2.2 kPa
Burner Jet Size		Front: 2.1mm Rear: 1.8mm	Front: 1.2mm Rear: 1.02mm	Front: 1.2mm Rear: 1.02mm
Aeration Collar Hole Size for Logs & Embers/ Flakes		2 holes @ Ø7.5mm	Spacer (no restriction)	Spacer (no restriction)
Aeration Collar Hole Size for Coals		2 holes @ Ø7.5mm	Spacer (no restriction)	Spacer (no restriction)
Pilot injector		#42	#27	#27
Appliance Dimensions (mm)	Width	943.0 mm		
	Height	884.0 mm		
	Depth	402.0 mm		
Weight	Kg	90 kg		
Ignition System		Electronic Ignition to pilot system		
		Escea PCB		
Ignition Activation		7 secs (approx)		
Flame Safeguard		Flame Rectification		
Consumption		84W @ 0.35A 230V		
Remote controls		Yes		
Timers		Yes		
Clock		Yes		
Function lock / child		Yes		
Temperature control		Yes		
Connections	Electric	230V AC		
	Gas	1/2" BSPP female lower right of fireplace chassis		
	Flue Type	4" and 3" Flexi Flue		
	Spigot Location	Rear and centre		
Data badge location		On Chassis Base		

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SERVICE

A Product Description and Installation Process

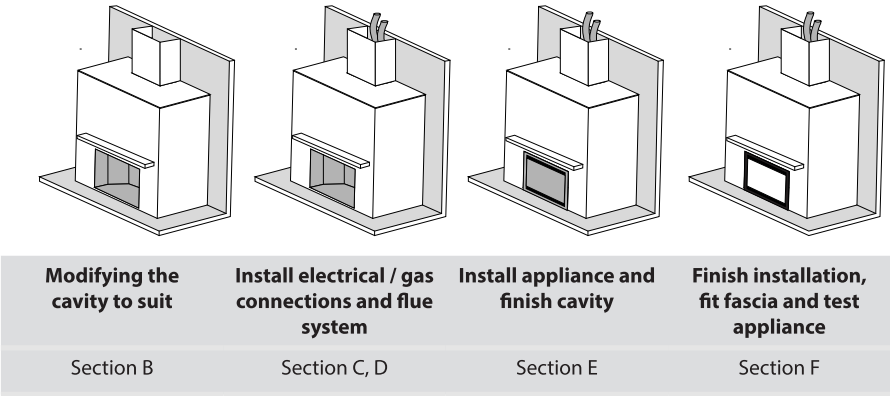
A1 Product Description

The Escea DF-Series gas fire is a room sealed gas appliance designed to be built into a masonry cavity or a false chimney cavity. DF-series products are provided with standoffs to ensure adequate clearances to combustible materials. DF990 is provided with an additional lintel spacer (see section; creating the cavity). These appliances are flued using co-linear flexible aluminum flue (with PolyPro flue extensions for some models) connected to a Power Flue. The user will control their fire with the Radio Frequency (RF) remote that will normally be located in it's wall mount cradle. In addition to the RF remote the appliance has a single auxiliary On/Off button on the unit. When not in operation it is in a standby mode unless it is physically isolated from the mains supply.

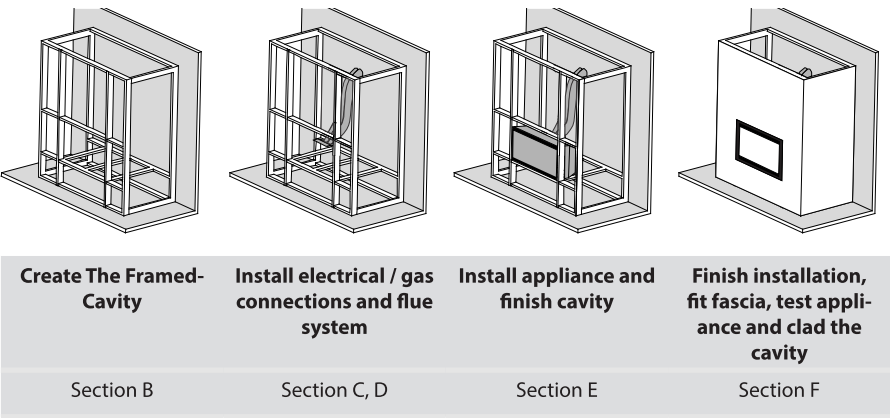
A2 Recommended Install Process

The following diagram illustrates the steps required to install your gas fire. The sequence in which you choose to do these tasks will vary depending on your individual scenario. Please read these instructions fully before proceeding with the installation.

Masonry Installation



False Cavity Installation



Important: Installations that are not specifically outlined in this manual should be referred to the Escea Architectural Advisory Team.

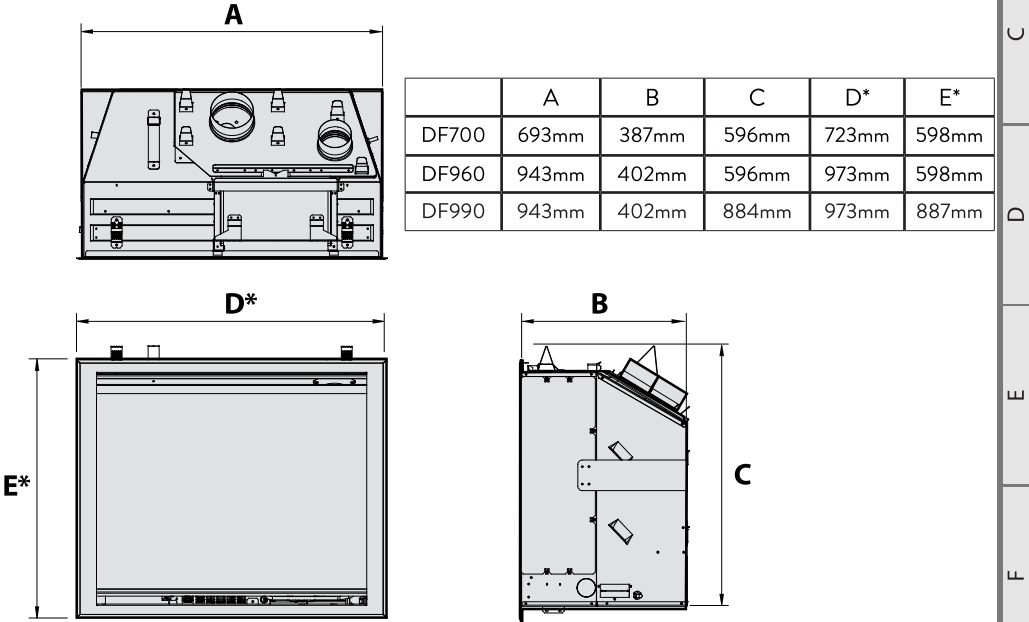
Please email aa@escea.com

i.e. Hutch, under bench, recessed, and joinery enclosed installations.
 i.e. Use of heat sensitive materials such as resin stone or laminated timber.
 i.e. DF flue installations over 4 metres.

To ensure that your installation is fully complete, please use the “Installation Checklist” on page 51.

A3 Product Dimensions

NOTE: All outside dimensions taken from the appliance are with the standoffs attached



*Slim Fascia Dimensions.

END OF SECTION A

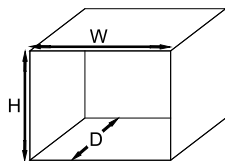
By the end of this section, you should have:

- ☐ A framed false cavity
- OR
- ☐ A masonry cavity sized to suit the appliance

B Creating the Cavity

B1 Cavity Shape

The side standoffs installed on the outside must only be removed when being installed into a masonry cavity.



Note: a top is not required when creating the cavity

			Height	Width	Depth
DF700	False Cavity installation (top standoffs must be adjusted to the upright position when framing)	Framing	600mm	695mm	390mm + minimum 65mm flue clearances
		Wall Lining	560mm + allowance for fascia clearance		
	*Masonry install with the side stand-offs and timber standoffs removed.		560mm + allowance for fascia clearance	685mm	385mm
DF960	False Cavity installation (timber standoffs must be adjusted to the upright position when framing)	Framing	600mm	945mm	405mm + minimum 65mm flue clearances
		Wall Lining	560mm + allowance for fascia clearance		
	*Masonry install with the side stand-offs and timber standoffs removed.		560mm + allowance for fascia clearance	935mm	400mm
DF990	False Cavity installation (timber standoffs must be adjusted to the upright position when framing)	Framing	888mm	945mm	405mm + minimum 65mm flue clearances
		Wall Lining	848mm + allowance for fascia clearance		
	*Masonry install with the side stand-offs and timber standoffs removed.		848mm + allowance for fascia clearance	935mm	400mm

WARNING: Wall lining **MUST NOT** be installed until after the fireplace is inserted into the cavity. Please follow the steps in the figures shown.

WARNING: Ensure adequate allowances are made for fascias: see section B9 on page 15.

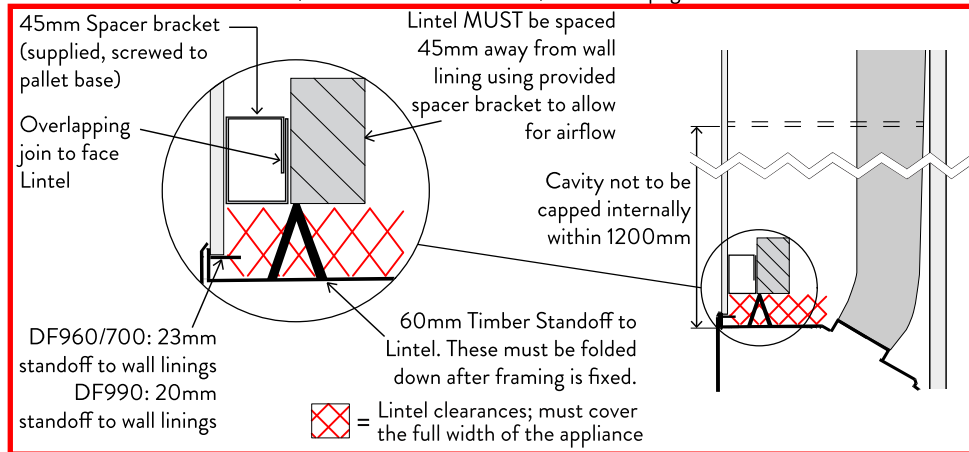
NOTE: Measure the indicated framing dimensions from the base of the appliance.

NOTE: If cavity dimensions significantly exceed those specified, a register plate is available for purchase through your local Escea retailer (New Zealand Only).

Compulsory False Cavity Requirements

Ensure the fireplace is inserted first before the wall lining is built.

For floor-mounted installations, allow for fascia clearance, see B9 on page 15.



WARNING: DF700, DF960, and DF990: the top standoffs must be adjusted to the upright position before the fireplace installation. All standoffs must remain in place for fireplace installation and then folded down once framing is fixed.

NOTE: Wall lining should hang below the lintel to meet the appliance edge.

NOTE: If your installation requirements do not align with the diagram above, please contact our architectural advisory team: aa@escea.com

B2 Floor Clearances

If the appliance is mounted above a “**heat resistant floor**” (including but not necessarily limited to: ceramic tiles, concrete, and stone) then it may be positioned with the bottom of the fascia level with the finished floor if desired. (30mm or 55mm spacer required under the fire in this case depending on the fascia type.)

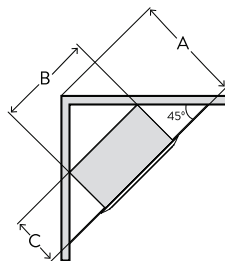
If the appliance is mounted above a “**heat sensitive floor**” (including but not necessarily limited to: carpets, vinyl, carpet tiles, rugs and mats, timber, joinery, wooden flooring - see materials guide.) then we recommend a distance of 100mm from the bottom of the fascia to the finished floor or hearth.

NOTE: Excerpt from AS/NZS 5601.1-2013 Sec. 6.2.5. “A gas appliance shall be installed such that the surface temperature of any nearby combustible surface will not exceed 65C above ambient.” Refer to section B4 on page 12 for hearths.

B3 Corner Installations

If a cavity is to be created in a corner, the following drawing gives the minimum sized interior wall dimensions.

	A	B	C
DF700	775mm	695mm	420mm
DF960	915mm	945mm	435mm
DF990	915mm	945mm	435mm



B4 Hearth

A finished floor level hearth is not required, however it may be used for decorative purposes or for protection of soft/ heat sensitive flooring as stated in the section B2 on page 11 to allow a smaller floor clearance. The hearth should not obscure the front face of the fire, must protrude at least 200mm from the face of the fireplace and be at least the width of the appliance.

A raised hearth or joinery should conform to the above guideline.

B5 Cavity Base

This appliance **MUST** be fully supported on its base. The base must extend over the entire area of the underside of the appliance. The base must also be levelled to prevent vibration from possible fan imbalance. The base of the cavity must be strong enough to support 120kgs.

The fireplace must be seismically restrained in a manner appropriate to the installation location and accessible once the secondary glass is removed.

B6 Wall Linings

NOTE: For false cavity installations, DO NOT line the wall before the fireplace has been fitted into the cavity; the top standoffs are required to be upright for this installation type and then folded down once framing is fixed.

The DF-Series fireplace has standoff rails installed on the outside of the chassis. The standoff rails may only be removed when installing the fire into a masonry cavity. The side-front flanges of the appliance must be on top of the finished wall surface in order for the fascia to mount properly. Take into account any plaster board, tiles, or any other finishing surface that may be intended for the finished wall surface.

The wall board that lines the outside of this opening can be normal dry wall (plaster board) and does not need to be non-combustible.

If, for some reason, the cavity dimensions exceed those specified in section B1 on page 10, a register plate is available (New Zealand only) for purchase through your local Escea distributor.

NOTE: The temperature of the wall lining directly above the heater does get warm and hence may discolour paint finishes that are susceptible to temperature damage or distort vinyl wall coverings. For durability of finishes and surfaces you should contact the relevant manufacturer for their specification.

B7 Television & Mantel Clearances

Television

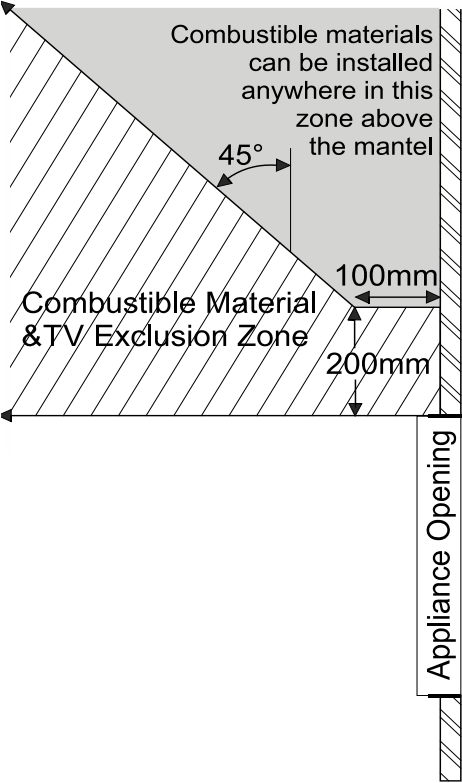
The diagram (shown below) shows the recommended minimum clearances for the location of any electrical equipment (such as Plasma TV, LCD TV or home theatre) above a DF-Series gas fire. For DF990, a mantel/recess is required to comply with our recommendation of TV installation. Contact architectural advisory at aa@escea.com if you wish to install electrical equipment without a mantel/with a recess.

NOTE: Dimensions from the top edge of the air opening.
 NOTE: The television clearance recommendations are to be treated as a suggestion of a suitable installation only. It is the responsibility of the end user to check the installation instructions of their electrical appliances to ensure that the location in relation to the gas fire is suitable. Escea in no way guarantees or takes responsibility that the recommended installation suggestion will be suitable for all electrical or home entertainment appliances.

Mantel

Mantels or protruding ledges above the heater must not be installed lower than the dimension shown to the right of the diagram below.

NOTE: Dimensions are from the top edge of the air opening.



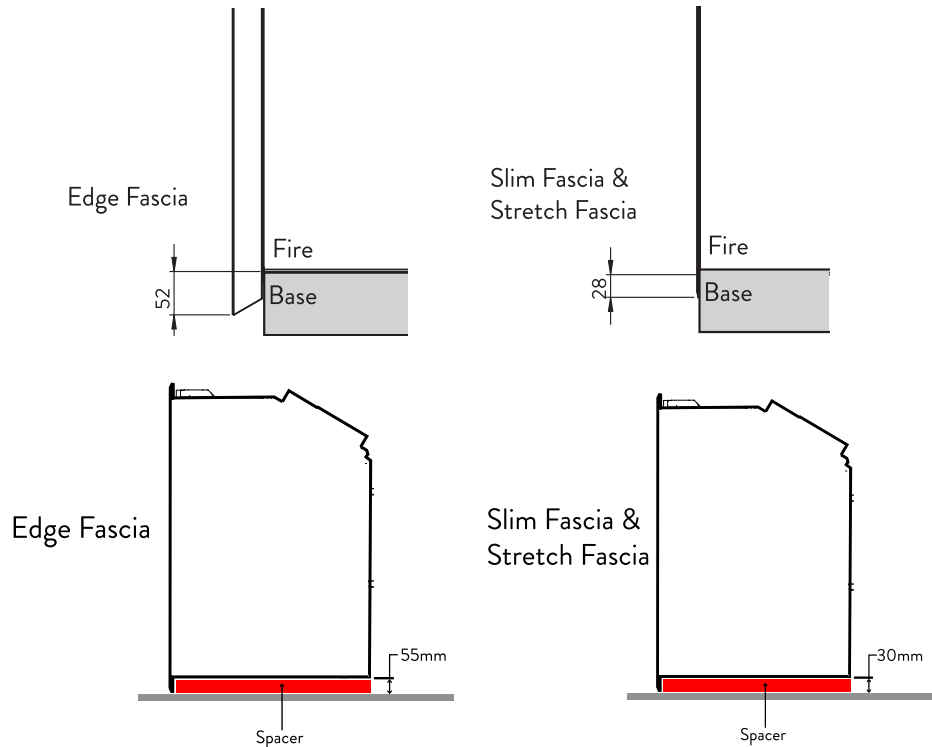
For DF700 & DF960 the minimum height for TV installation without a mantel installed: 200mm
 For DF990 a mantel is required

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B9 Distance from Fireplace to Fascia Base

The installation requires a spacer below the appliance to allow room for the fascia to sit flush with the non combustible floor or a hearth.

The following side-on view shows the measurement from the base of the fireplace to the base of the fascia:



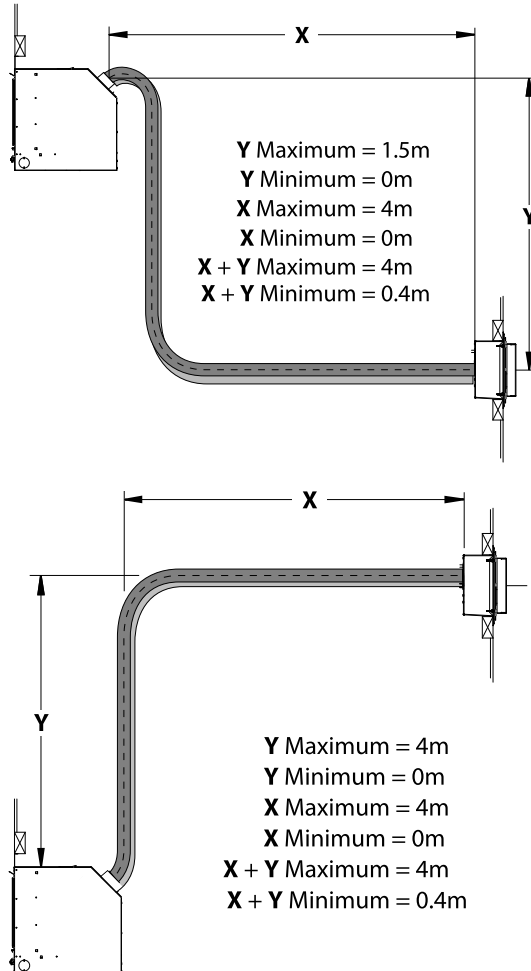
C Installing the Flue

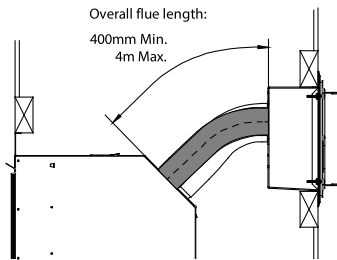
C1 Flue Configuration (If less than 4m flue length is required)

If your flue system is less than 4m long (as shown in diagrams below), then a simple aluminium flexible flue is required. If you wish to install a longer flue run, see either section C2 on page 18 or C3 on page 19.

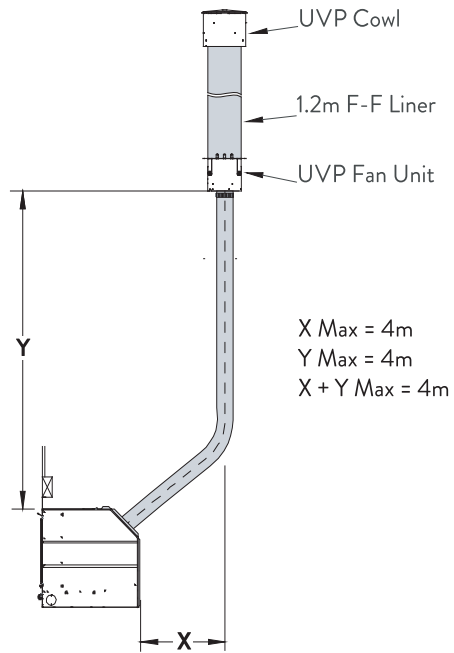
Horizontally Terminated: Utilizes the Escea Horizontal Power Flue enclosure kit.

The horizontal offset of the terminal can be any amount up to the total flue length listed below. Please consult with Escea's technical staff if your intended flue configuration steps outside of the bounds of the flue configurations shown below.





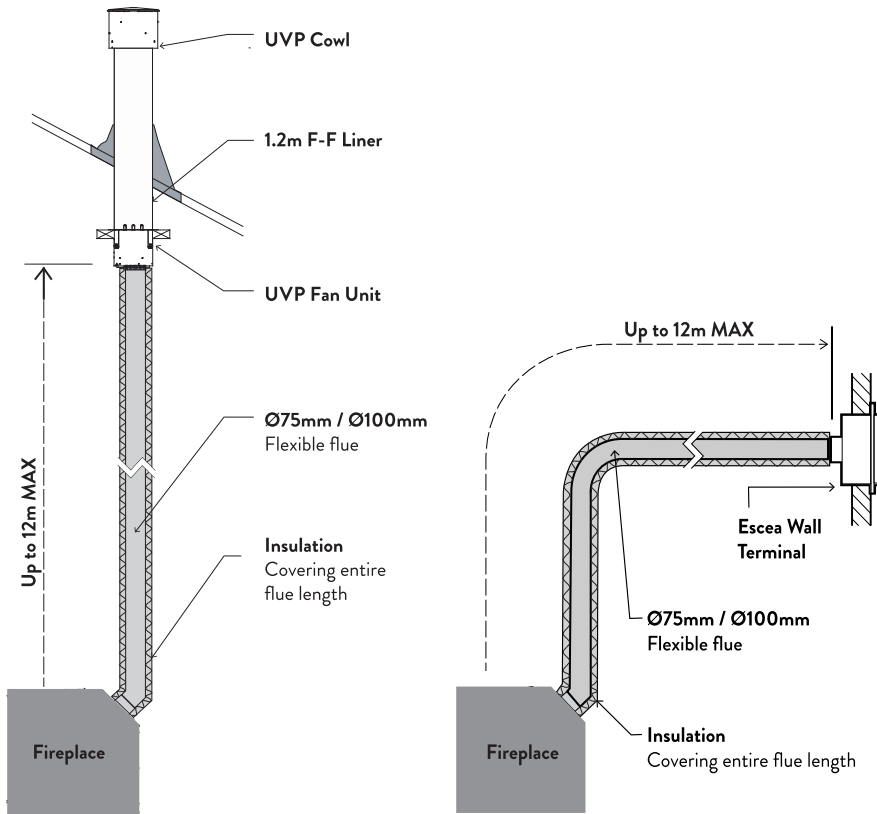
Vertically Terminated: Utilizes the Escea Vertical Power Flue enclosure kit.



C2 Flue Configuration (If more than 4m flue length is required)

If your flue system is greater than 4m long (as shown in diagrams below), then there are the following options:

- DFS Only: Flexible flue with condensate trap and rigid PolyPro tube lengths (see diagrams below).
- DF: For flue run installations beyond 4m and up to 12m, flexi flue must be used for the entire flue run and must be fully insulated from appliance connection to fan unit. For information on the insulation installation see section C10 on page 29. Beyond 12m (up to 40m) please contact the Escea Advisory Team at aa@escea.com.

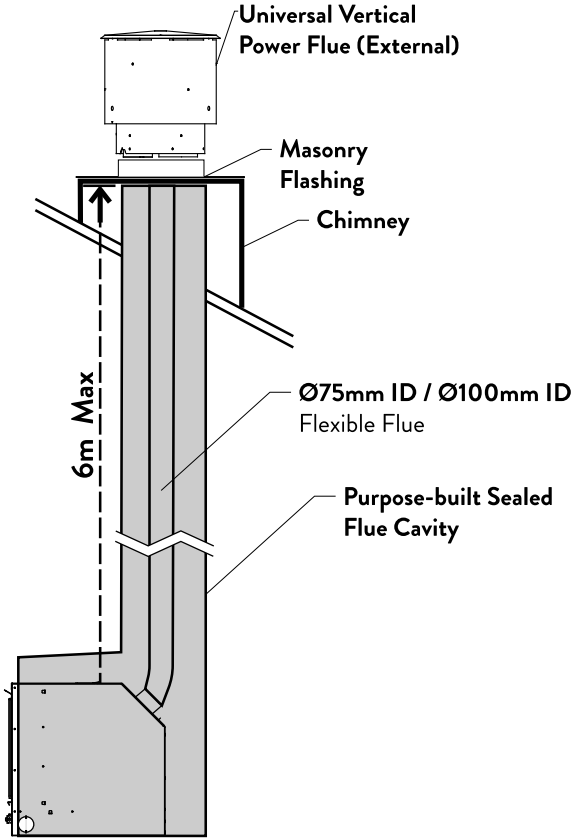


C3 Masonry Vertical Power Flue Kit (up to 6m)

The following kit enables the installation of the aluminium flexi into vertical masonry chimneys for extending the flue system from the appliance spigot to 6.0 meters while providing the masonry flashing.

Including, but not limited to, installations into: a complete masonry chimney, a flue liner, or a combustible sealed false chimney.

If your flue system is to be run vertically through a purpose-built sealed flue cavity (the cavity must remain sealed up to the terminal); PolyPro and a condensate drain is not required. An extension kit can be purchased to extend the maximum length to 12m, see section C4 on page 20. Only the Universal Vertical Power Flue (UVP-External) kit can be used for this installation type.



NOTE: 225mm wide x 240mm long 906624-Masonry flue liner extension kit can be purchased to add extra protection for the high snow and rainfall areas.

NOTE: If any gap occurs in between the 400mm x 400mm masonry flashing and the chimney due to the chimney dimensions, the suitable chimney cap flashing can be built as keeping the spigot diameter 225mm.

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C4 Masonry Vertical Power Flue Extension Kit (6 to 12m)

The following kit enables the installation of the aluminium flexi into vertical masonry chimneys for extending the flue system to 12.0 meters from 906602-Masonry Vertical Power Flue kit that is required and supplemented by the 12m Masonry Vertical Power Flue Extension Kit.

Including, but not limited to, installations into: a complete masonry chimney, a combustible sealed false chimney.

NOTE: This installation type cannot be used on a DFS730. If required, please contact architectural advisory aa@escea.com for more information.

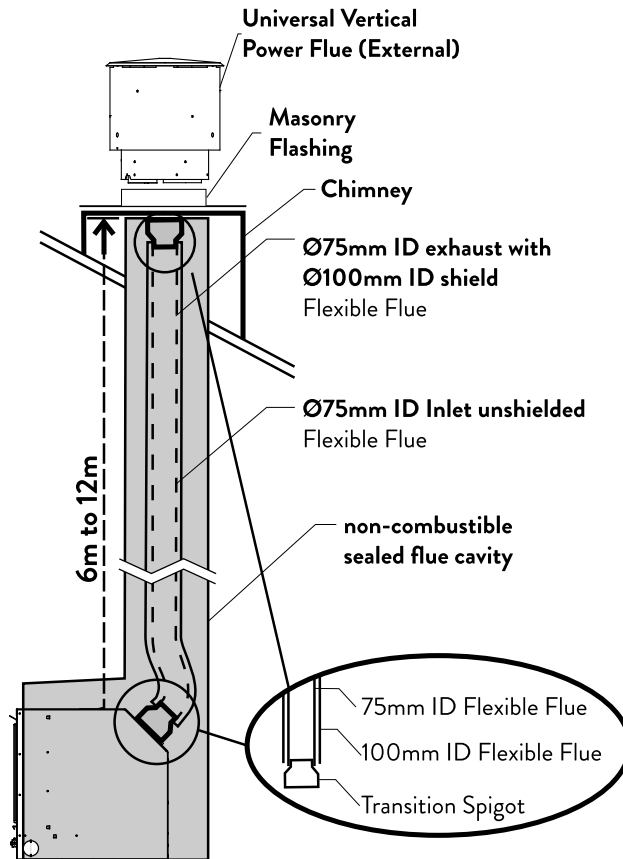
If your flue system is to be run vertically through a purpose-built sealed flue cavity (the cavity must remain sealed up to the terminal); PolyPro and a condensate drain is not required. Only the Universal Vertical Power Flue (UVP-External) kit can be used for this installation type.

The exhaust/inlet flue **MUST BE** NO longer than 12.0M.

The 100mm flue shroud must cover the entire length of the exhaust flue.

The intake and shrouded exhaust flue must be entirely enclosed within a fully vertical masonry or purposely constructed, a combustible sealed cavity/masonry chimney.

Feed the power flue cable down through the chimney cavity and connect to the appliance and Power Flue.



NOTE: This kit supplements and requires 906602-Masonry vertical Power Flue kit.

NOTE: If any gap occurs in between the 400mm x 400mm masonry flashing and the chimney due to the chimney dimensions, the suitable masonry flashing can be built as keeping the spigot diameter 225mm.

C5 Installing the Horizontal Power Flue

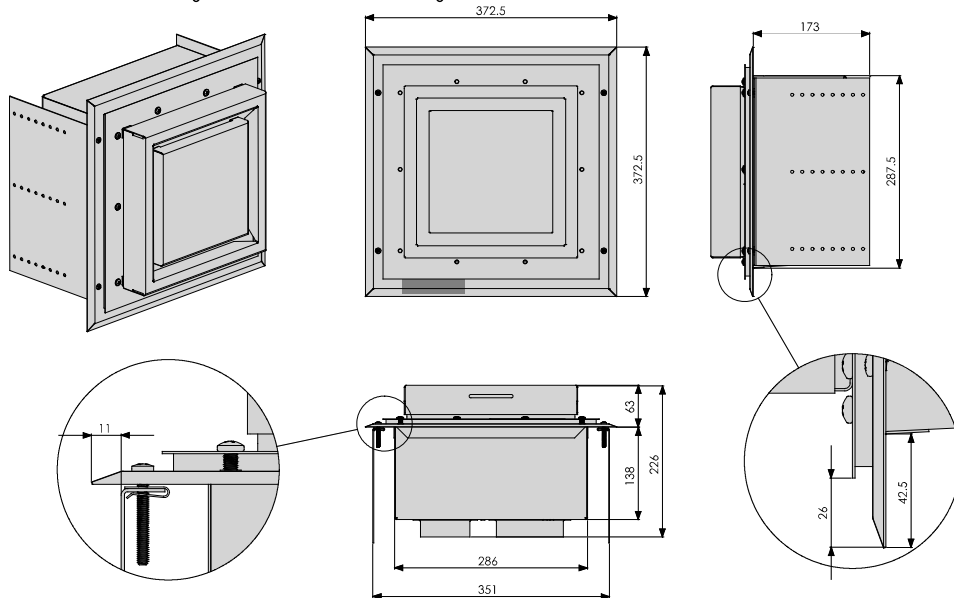
NOTE: The appliance is designed only to operate using the approved flexible or PolyPro flue supplied by Escea. Other brands of flue may not fit, and this will affect the appliance warranty.

The Horizontal Power Flue Wall Terminal must be installed in the correct orientation (the small horizontal slot should be at the bottom). This allows for the correct operation of the flue system and prevents the ingress of water.

The Horizontal Power Flue Wall Terminal must be weather tight when installation is complete to prevent damage to the dwelling. It must be installed by a suitably qualified person.

Fit the Horizontal Power Flue Wall Terminal into the hole and fix in place, making sure the installation is sealed appropriately to prevent the ingress of water from outside the wall cladding. Take notice of the label on the termination which shows the correct orientation of the terminal.

NOTE: It is the responsibility of the installer to ensure the Horizontal Power Flue Wall Terminal is installed to all relevant building codes to ensure weather tightness.

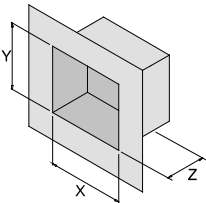


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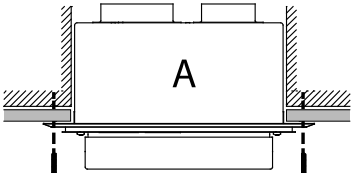
Creating the Hole in the Outside Wall

When cutting the hole in the outside wall, be mindful of how the installation of the Horizontal Power Flue Wall Terminal will be finished; the installation must be weatherproof.

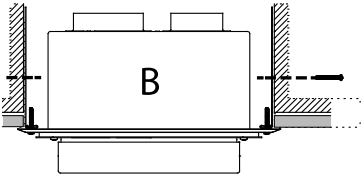
Ideal hole/cavity size for horizontal Power Flue		
	Without Side Brackets	With Side Brackets
X	298mm	360mm
Y	298mm	298mm
Z	175mm Excluding allowance for flue which exits here	



The Horizontal Power Flue Wall Terminal can be attached to the wall in two ways:
 A) From the front of the terminal:



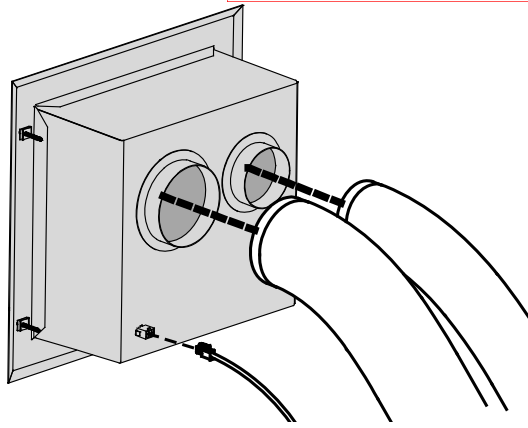
B) By attaching the optional wall terminal installation brackets to the sides of the cavity and attaching the Horizontal Power Flue Wall Terminal to these, from the front:



Attach the Ø100mm and Ø75mm flexible aluminium flues to the spigots on the rear of the Horizontal Power Flue Wall Terminal using the hose band clamps supplied. Plug the Power Flue electrical cable into the back of the Horizontal Power Flue Wall Terminal.

For information on the PolyPro flue, see the installation manual which is supplied with the flue components.

Ensure that the electrical cable is firmly secured to the wall terminal or building to prevent damage or disconnection if pulled.



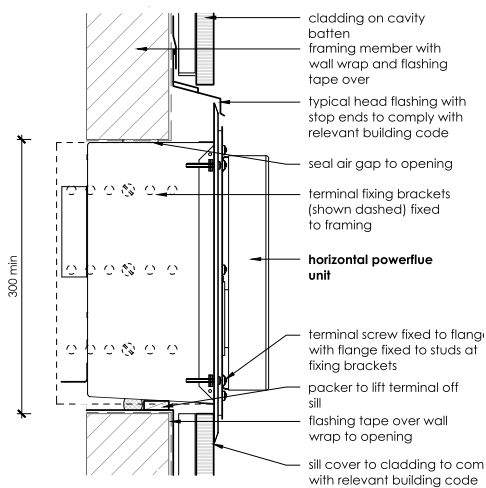
Fit the Horizontal Power Flue Wall Terminal into the hole and fix it in place, making sure the installation is sealed appropriately to prevent the ingress of water from outside the wall cladding.

NOTE: It is the responsibility of the installer to ensure the horizontal Power Flue wall terminal is installed to all relevant building codes to ensure weather tightness. This may necessitate the use of appropriate flashing material where appropriate.

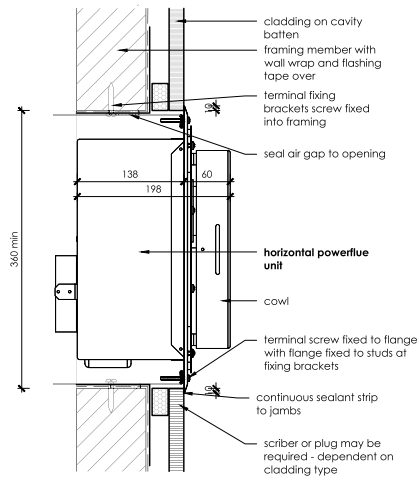
IMPORTANT: Ensure that flashings do not restrict the air intake slot around the periphery of the cowl.

How to Flash the Horizontal Power Flue

The following diagrams are excerpts from the Escea architect drawings and are available in full on our website. These diagrams are recommendations, and your installation must comply with any local or national building codes.



Head and Sill scale 1:5



Jamb scale 1:5

C6 Installing the Universal Vertical Power Flue (Internal Install)

NOTE: For information regarding an external install of the UVP, go to section C7 on page 26.

The Universal Vertical Power Flue (UVP) internal configuration is designed to have the fan, mounted within the roof space of the house, and the vertical Ø225mm diameter liner, containing a Ø100mm flexi, penetrate through the roof. The UVP internal conversion kit comes with a 1200mm liner that is specific to the internal installation and must always be used.

Note: The flue setup must comply with either section C1 on page 16 or C2 on page 18.

Use standard methods to flash the roof penetration. The installation must be weatherproof and conform to all local council standards including powered flue termination rules.

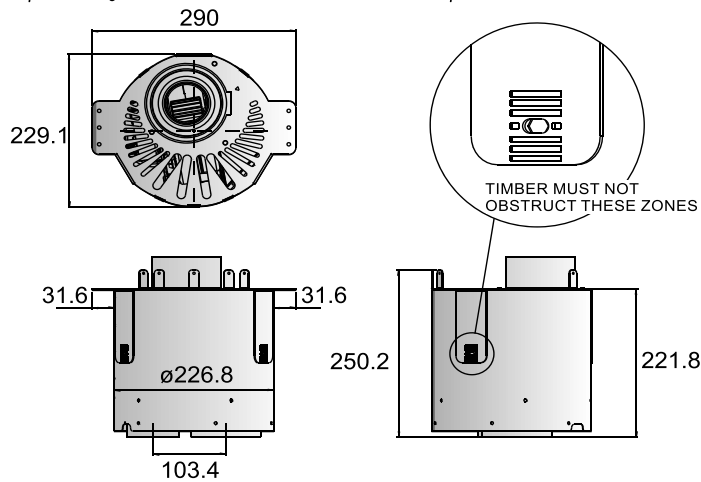
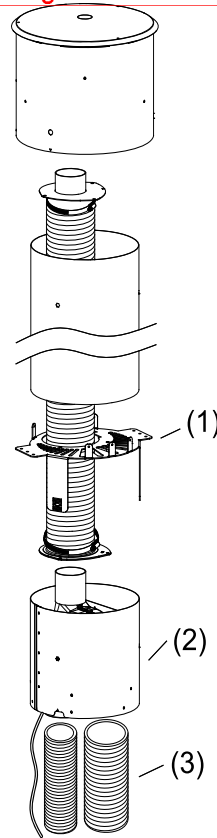
Mount the fan mount bracket (1) to the roof framing and strapping using timber ensuring that the flue is rigid and vertical. Ensure that the mounting timber does not obstruct access to the 3xM5 screw threads on the side of the fan unit.

Aim to have the fan enclosure (2) mounted as high as possible, mainly to allow sufficient fall for condensation drainage if the flexi-flue is to run horizontally.

Ensure there is sufficient space below fan enclosure (2) to have access to fit the flexi-flue tubes (3) and allow flowing bends if required.

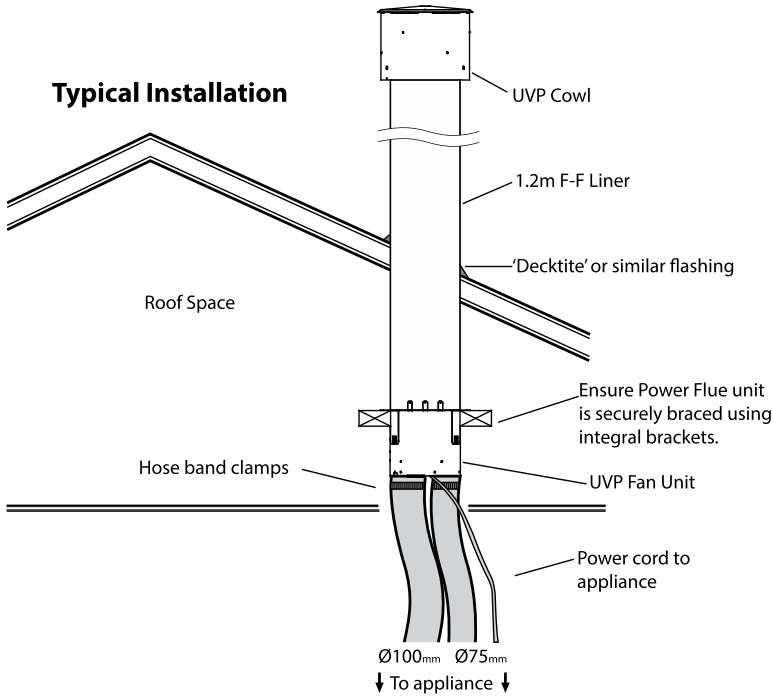
NOTE: The UVP-Internal and the flexi flue connections must be installed in a location accessible for service or replacement; a service hatch or removable flashing to allow access is required.

NOTE: When installing the unit onto a flue liner, ensure the length of flue liner above the roof is the minimum required length. **ENSURE** the Ø25mm restriction plate is installed on the inlet.



The UVP-Internal kit is intended for use within an accessible roof space or ‘chimney’ construction.
Service access must be provided.

Ensure installation complies with relevant building codes and regulations.



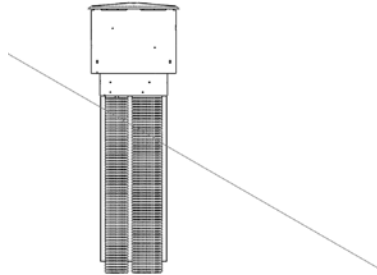
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C7 Installing the External Vertical Power Flue (UVP)

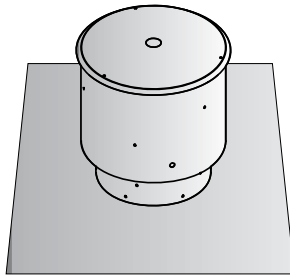
NOTE: For information regarding an internal install of the UVP, go to section C6 on page 24.

The UVP is designed to have the enclosure containing the fan unit mounted externally; an example is shown below.

Note: When installing the unit onto a flue liner, ensure the length of flue liner above the roof is the minimum required length. **ENSURE** the Ø25mm restriction plate is installed on the inlet.



The cowl surround should be fixed in place as shown.



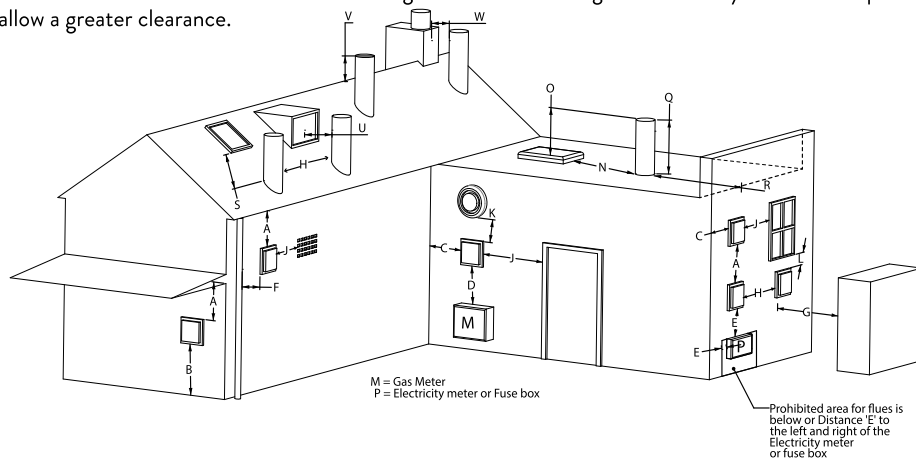
Mount the UVP kit to the top of a chimney flashing plate or penetrate the roof with an optional flue liner accessory and fit the UVP kit over the flue liner, sealing the penetration with a decktite or similar flashing. Ensure the terminal is vertical and rigidly mounted and the flexi flue attached below is fixed to the terminal spigots using the supplied hose clamps. The flexi flue is held in place by drilling 3 holes and screwing 3 self tapping screws evenly around each hose band clamp (as shown in the picture below).



C8 Installing in Accordance with Relevant Codes

The location of the Horizontal Power Flue Wall Terminal must be installed in accordance with AS/NZS 5601 and any other relevant building codes. If possible, avoid installing the Horizontal Power Flue Wall Terminal in areas exposed to high winds and extreme weather.

Some of the minimum clearances for a fan assisted wall terminal are listed below; please refer to AS/NZS 5601 Gas installation standard for full guidance on the design of the flue system. Where possible allow a greater clearance.



A	Below eaves, balconies and other projections	200mm
B	From the floor, above a balcony or other surface	300mm
C	From a return wall or external corner	300mm
D	From a gas meter or regulator vent	1000mm
E	From electricity meter or fuse box	500mm
F	From a drain pipe or soil stack	75mm
G	Horizontally from any building structure or obstruction	500mm
H	From any other flue terminal or combustion air intake	300mm
J	Horizontally from any openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub floor ventilation	300mm
K	From a mechanical air inlet or spa blower	1000mm
L	Vertically below any openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub floor ventilation	300mm
N	Horizontally from a roof light	600mm
O	Vertically from a roof light	500mm
Q	Vertically from a flat roof	500mm
R	Horizontally from a vertical structure	500mm
S	Below a roof window	2000mm
T	Above or either side of a roof window	600mm
U	From a dormer window	1500mm
V	Above the apex of the roof (see note 1 on following page)	300mm
W	From an open flue	1500mm

Notes:

- Should the flue not extend past the apex of the roof, the bottom opening of the flue should extend at least 200mm from the roof (or 300mm in regions with heavy snow).
- The installation of a flue into a carport is not recommended.
- The flue terminal will get very hot when in use. Precautions should be taken to protect people and animals from injury.

C9 Running the Flue

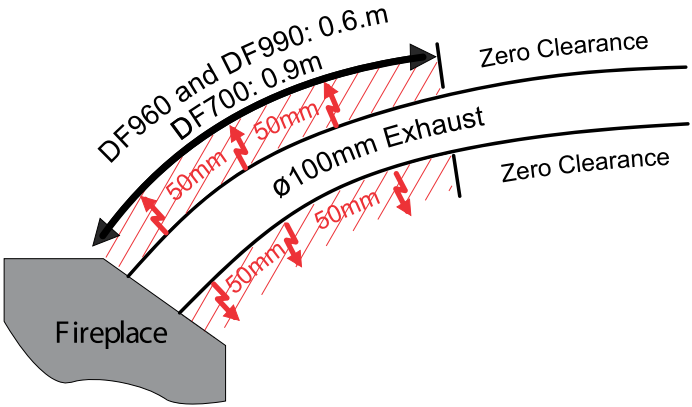
Use the following table to determine the exhaust flue clearances to combustibles:

Model	Clearance to Combustibles
DF700	50mm clearance for first 0.9m
DF960	50mm clearance for first 0.6m
DF990	50mm clearance for first 0.6m

Run the Ø100mm ID and Ø75mm ID (Ø110mm OD and Ø85mm OD) flexible aluminium hoses from the cavity to the rear of where the Horizontal or Vertical Power Flue Terminal will be installed. Allow enough stretch in the flexible aluminium flue to allow it to be able to protrude through the wall/ceiling/roof/flue liner to enable it to be connected to the Power Flue Terminal. The flue should be expanded at each end in order for the flue to be attached to the fire/Power Flue. It is advisable to secure the flexi flue at regular intervals to prevent vibration, movement and sagging. Steel wire or ‘builders strapping’ may be used for this purpose.

NOTE: The flexible flue is shipped in a ‘compressed’ form. Extend it to your desired length by stretching.

For information on running the PolyPro flue , see the installation manual which is supplied with the flue components.



C10 Insulation Specification and Installation

Type of Insulation to use

Insulation R-value to be R1.5 and of malleable/flexible construction (rock wool or glass wool) and certified to withstand 230°C.

Insulation Installation

Tape must be used for all overlapping joints and the entire flue must be wrapped. Care must be taken not to compress insulation.

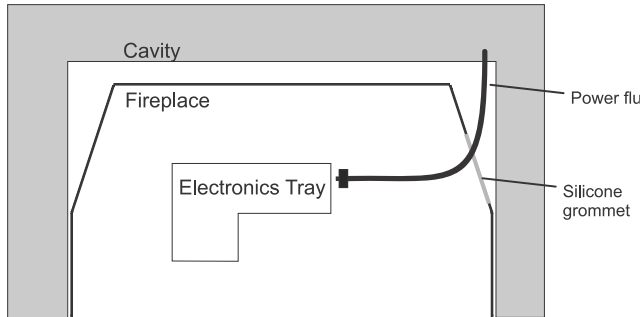
C11 Running the Power Flue Electrical Cable

Note: The Power Flue Terminal is powered from the appliance, and must be connected to the appliance with the supplied electrical cable only.

Note: Ensure that the appliance power supply is disconnected before making the connection to the terminal.

The supplied electrical cable is 7m long, flue extension kits also include a Power Flue electrical cable extension.

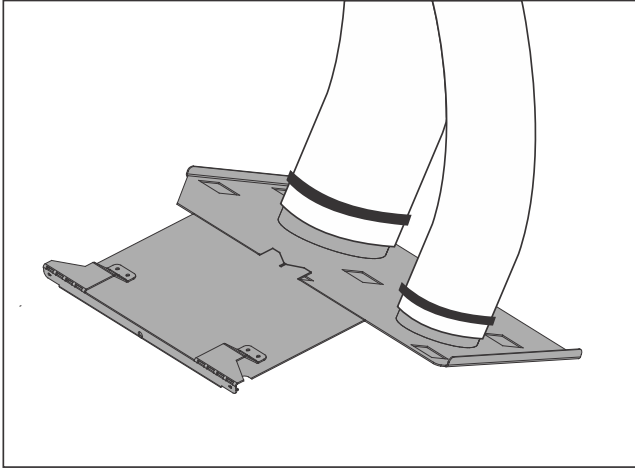
Run the electrical cable from the cavity where the appliance will be installed to the hole in the outside wall. Ensure it is not draped over, or in contact with, the outer shell of the appliance or the exhaust flue and kept clear from any other possible heat sources, sharp edges, or moisture. Fix it appropriately and allow enough cable looped to be able to pull both the appliance and the Horizontal Power Flue Wall Terminal out from their installed positions.



**If you do not connect the power flue electrical cable to both the fireplace and the Powerflue, this will result in an error when the fireplace is turned on.
Test the fan before continuing with the rest of the installation.**

C12 Setting up the Flue Spigot Plate

Connect the flexi flue to the spigot plate using the hose band clamps provided while the cavity is still empty. **Do not over stretch the aluminium flexi flue.**



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D Installing the Electricity and Gas to the Appliance

In order to install gas to the fireplace, check the operating pressure or install the network cable, the glass and burner tray needs to be removed.

D1 Power Supply

While the cavity is being created, consideration must be given to the location of an appropriate power supply. An earthed 230/240 volt mains power connection (typically a standard 3 pin outlet) must be available within 1m of the bottom right of the appliance. This connection **must** be accessible after the heater has been fully installed so that the appliance can be safely disconnected from the mains power supply prior to servicing.

A mains isolation switch (compliant to AS:NZS 5601 Clause 6.2.8) which is accessible from outside the cavity can also be used to disconnect the power.

Regardless of the method used, it **MUST ALWAYS** be possible to safely isolate the electrical supply to the appliance after it has been fully installed.

This appliance must not be located immediately below a socket outlet. This appliance will draw a maximum of 2 Amps from a 230/240V supply. No additional power supply is required for the Power Flue.

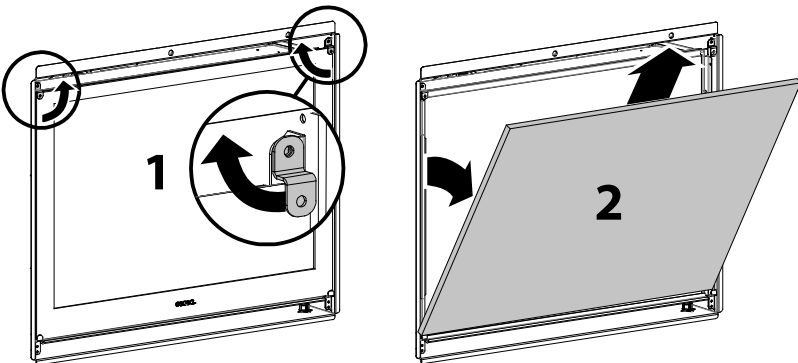
An electrical wiring diagram is located underneath the electronic tray, and also in the rear of this manual (Service Section S12 on page 61).

D2 Removing the Glass

The DF-Series fireplace has two layers of glass: the inner glass seals the firebox and is called the primary glass; the outer glass is called the secondary glass.

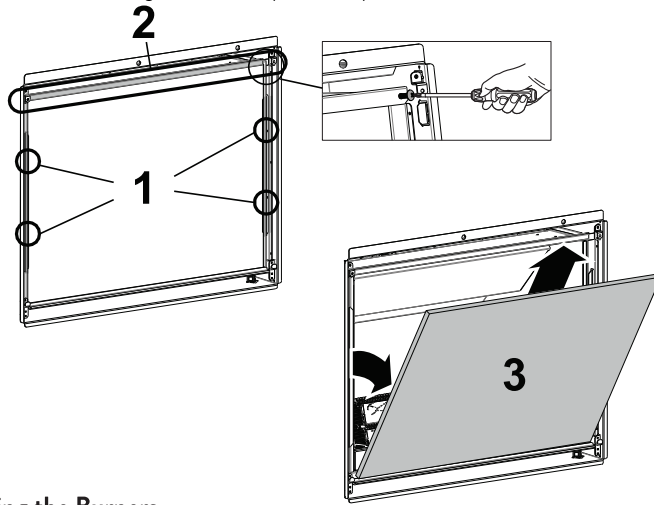
Secondary Glass

1. Turn the upper glass brackets towards the centre of the fire to release the glass.
2. Pull the top of the glass toward you slightly, lift the glass out of the bottom glass retainer and carefully set glass aside.



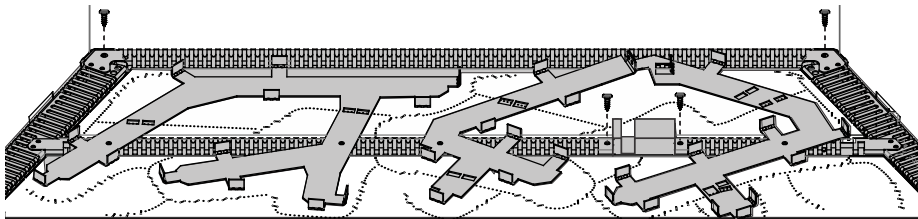
Primary Glass

1. Remove the two screws in each of the two side brackets and take the brackets off.
2. Remove both machine screws holding in the top bracket and slide forward.
NOTE: Some fireplaces may have an aluminium extrusion instead which is not fixed with screws, that needs to be lifted up to remove.
NOTE: Please slide the top bracket forward with caution to avoid scratches to the finish as the front of the part is visible.
3. Pull the top of the glass toward you slightly, lift the glass out of the bottom glass retainer and carefully set glass aside. Note that the fiberglass tape around the glass can mark carpet and furnishings - use a dropcloth to protect furniture.

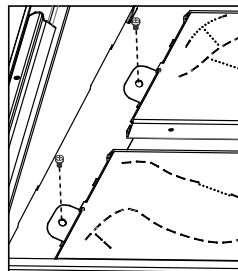


D3 Removing the Burners

Remove the 2 screws in the rear corners of the infill assembly and the 2 screws either side of the pilot guard (shown in diagram below). Lift the infill assembly up and out of the firebox; place it carefully aside.



Remove the 2 machine screws at the left hand end of each burner. The burner can now be carefully moved left to detach the burner tube from the burner jets and lifted out of the firebox.



D4 Gas Pipe Sizing

Gas pipe should be sized as per the requirements of AS/NZS 5601. The pipe sizing must be sufficient to deliver the following volume of gas to the heater with all other gas appliances in the home running at the same time:

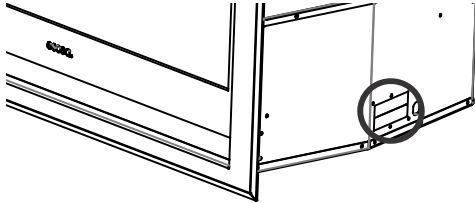
DF700 Gas Consumption = 25MJ/hr

DF960 Gas Consumption = 31MJ/hr

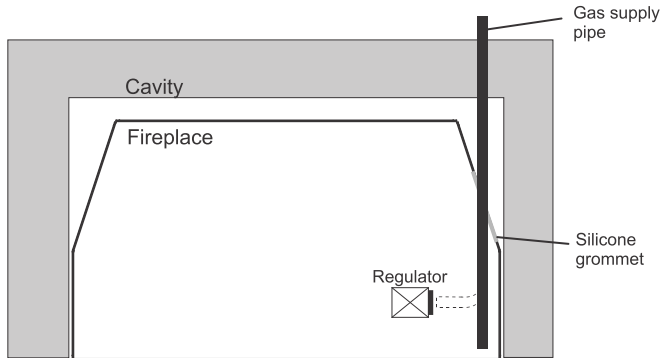
DF990 Gas Consumption = 35MJ/hr

D5 Gas Pipe Position

The DF-Series fireplace gas pipe entry point is located in the lower right corner; a sheet of silicone is used as a grommet (circled below).



Get the gas pipe lined up with the silicone grommet so that when the chassis is pushed into the cavity in section E on page 34 the fire will look like the diagram shown below.



E

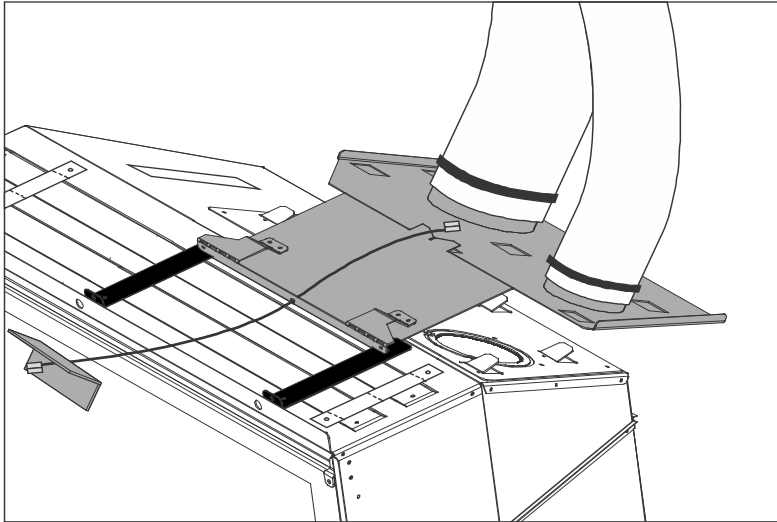
Installing The Appliance

E1 Installation

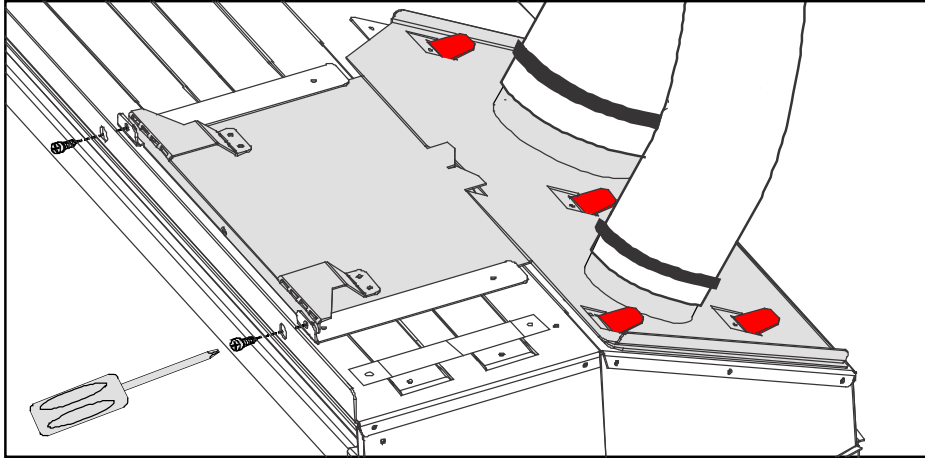
NOTE: Ensure the wall has been correctly framed to the dimensions specified in section B1 on page 10 before starting the appliance install. The wall must be lined after the fire has been fitted into the cavity with the appliance electrical cord plugged into an outlet, carefully place the appliance in front of the cavity base.

E2 Connecting the Flue

Carefully push the fireplace into the cavity just enough to bring the gas connection through the silicone grommet of the appliance (as shown in the second diagram of section D5 on page 33). The appliance should have enough room above the fireplace to reach in and align the flue spigot plate onto the rails (highlighted in the diagram below). Use the cable tool provided for pulling the flue spigot plate up the railing in a tight cavity. Use the tool as shown in the diagram below: with the cable threaded through the hole in the front face of the flue spigot plate, locate the end of the tool into the “V” in the centre of the main fold in the flue spigot plate.



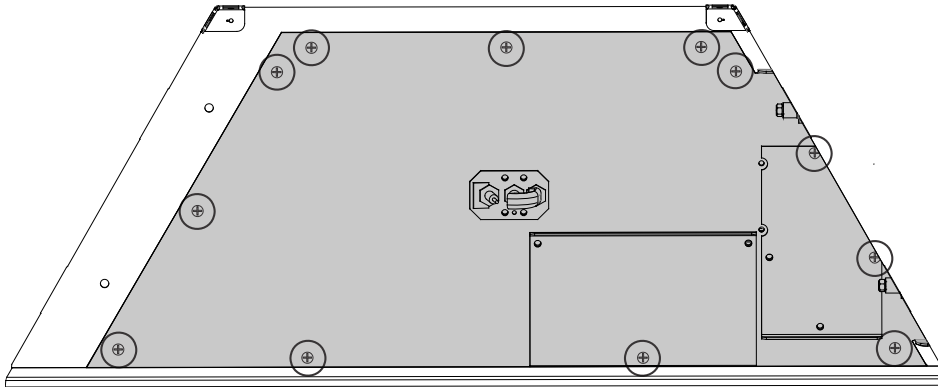
Make sure that all six of the fold up tabs (shaded in the diagram below) used for locating the flue spigot plate onto the chassis are poking through the flue spigot plate.



Insert the 2 long self tapping screws into the location shown in the diagram above to secure the flue spigot plate to the chassis.

E3 Removing the Burner Tray

Remove the screws circled in the diagram below.

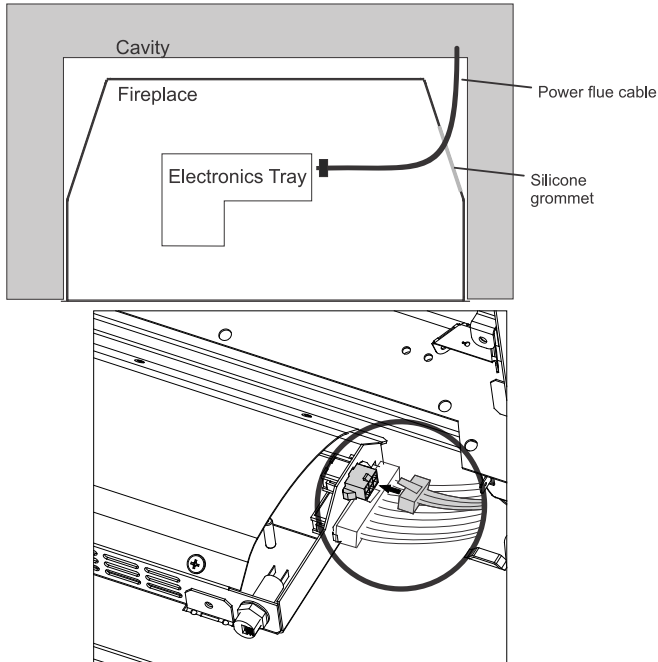


The left hand side of the burner tray can now be carefully tilted and lifted out of the firebox slightly to detach the 2 ignition leads, 8-way teddington valve connector and the earth lead.

E4 Connecting the Power Flue Cable

NOTE: Make sure to turn off the power supply before connecting the power flue cable. Feed the Power Flue cable through the silicone grommet on the lower right hand side of the chassis and connect it to the terminal on the electronics tray shown in the diagram below.

NOTE: the burner tray must be removed to access the electronics tray as shown in section E3 on page 35.



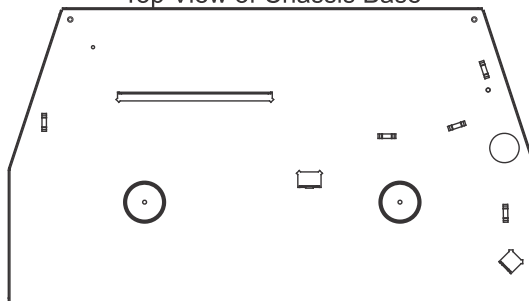
Test the fan now to ensure that it will run prior to continuing with installation. Failure to plug in the fan will result in an error code when starting the fireplace.

E5 Fixing the Appliance to the Base

An appropriate fastening can be screwed down to the cavity base through the 2 circled holes in the diagram. For Freestanding installations, 2 machine screws will need to be removed from two rivnuts in the support base of the freestanding and re-applied.

Ensure that the fire is seismically restrained in a manner appropriate to the installation location.

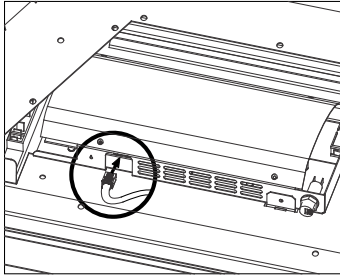
Top View of Chassis Base



E6 Network Cable

If the appliance is to be wired to a home automation system or internet router/network being installed then provision must be made for the network cable to get to the electronics tray. An opening in a silicone sheet in the rear bottom right hand corner is provided for the gas supply, Power Flue cable, and network cable to pass through the chassis.

Plug the network cable into the electronics tray using the location below as a guide.

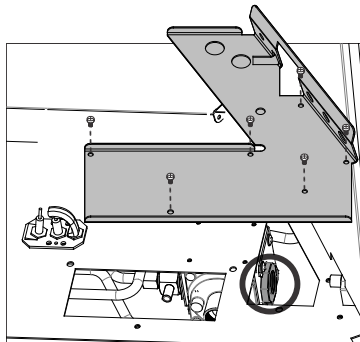


E7 Connecting the Gas Pipe to the Regulator

NOTE: The regulator that is supplied with the fire **MUST NOT BE REMOVED**. Removal of the regulator, or replacing it with one not intended for use with an Escea fire, will void the limited appliance warranty.

The gas connection on the appliance regulator is a 1/2" female BSPP at the front right of the appliance; the regulator is located on the underside of the main burner tray (circled below). The gas supply section of the piping will need to be flexible inside the chassis to allow for pipe disconnection and burner tray removal.

With the burner tray out, the flexible gas supply pipe may be bent into position to align with the regulator connection point when the burner tray is replaced. The gas supply can be tightened onto the regulator through the access hatch shaded in the diagram below.



E8 Gas Isolating Valve

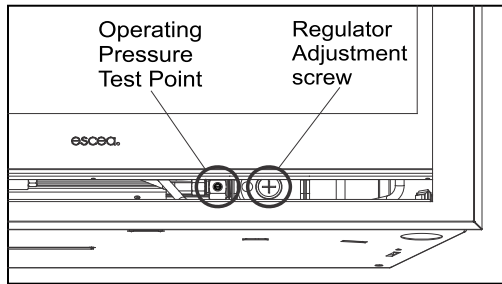
It is recommended that a gas isolating valve be installed as close to the regulator on the gas inlet side as possible with easy access if the fascia is removed. This will allow for easier servicing in the future.

E9 Pressure Test Point

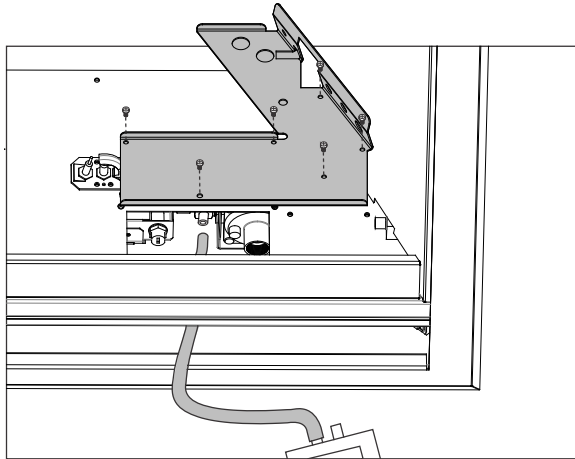
As per AS/NZS 5601, a pressure test point shall be provided by the installer prior to the inlet of the appliance.

E10 Checking the Operating Pressure

WARNING: The regulator that is supplied with the fire **MUST NOT BE REMOVED**. Removal of the regulator, or replacing it with one not intended for use with an Escea fire, will void the limited appliance warranty.



- ☐ Check the inlet pressure to the appliance. Attach manometer tube to the first test point upstream of the appliance (typically at the gas utility meter or auto change device for a propane bottle station)
- ☐ Run the heater on full (both burners running) and measure inlet pressure with all the other gas appliances in the building running. If pressure does not fall within the maximum or minimum pressures listed on the specification sheet at the start of this manual then reassess installation pipe size or upstream regulator settings.
- ☐ Loosen the operating pressure test point screw. Connect the manometer tube and measure the operating pressure with the fireplace running on full (both burners running) and with all the other gas appliances in the building running. The manometer tube can be applied to the test point by removing the access hatch and feeding the tube through the front (as shown in the diagram below).



- ☐ Adjust the operating pressure by feeding a screw driver through the front face of the fireplace and turning the regulator adjustment screw.
- ☐ Tighten the operating test point screw and leak test both test points using a soapy water solution.
- ☐ Replace the test point hatch

E11 Converting the Appliance Gas Type

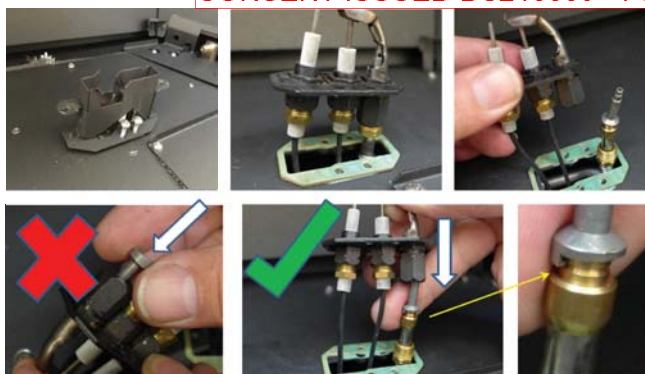
This appliance has been factory set to operate on Natural Gas only. To convert the appliance to operate on **propane or ULPG**, OR to install a **coal** fuelbed in a DF960, proceed as follows:

DF700 ONLY				
Jets	Front Burner	Rear Burner	Aeration Collar (2x)	Pilot Jet
NG	Ø 1.70 mm	Ø 1.40 mm	1 hole @ Ø 3.5mm	#42
Propane	Ø 1.05 mm	Ø 0.90 mm	No Collar	#27
ULPG	Ø 1.05 mm	Ø 0.85 mm	No Collar	#27

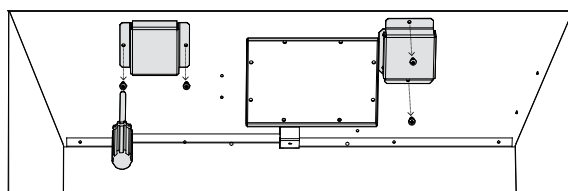
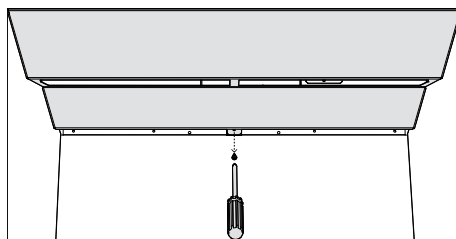
DF960 ONLY				
Logs & Embers/Flakes				
Jets	Front Burner	Rear Burner	Aeration Collar (2x)	Pilot Jet
NG	Ø 1.85 mm	Ø 1.70 mm	1 hole @ Ø 4mm	#42
Propane	Ø 1.20 mm	Ø 1.05 mm	No Collar	#27
ULPG	Ø 1.10 mm	Ø 1.02 mm	No Collar	#27
Coals				
Jets	Front Burner	Rear Burner	Aeration Collar (2x)	Pilot Jet
NG	Ø 1.85 mm	Ø 1.70 mm	1 hole @ Ø 2.5mm	#42
Propane	Ø 1.20 mm	Ø 1.05 mm	No Collar	#27
ULPG	Ø 1.10 mm	Ø 1.02 mm	No Collar	#27

DF990 ONLY				
Jets	Front Burner	Rear Burner	Aeration Collar (2x)	Pilot Jet
NG	Ø 2.10 mm	Ø 1.80 mm	2 hole @ Ø 7.5mm	#42
Propane	Ø 1.20 mm	Ø 1.02 mm	Spacer (no restriction)	#27
ULPG	Ø 1.20 mm	Ø 1.02 mm	Spacer (no restriction)	#27

- ☐ Replace (or remove) the aeration collars using the table above (for the DF960 coals fuelbed on natural gas, ignore the rest of the steps).
- ☐ Remove the front and rear burner jet and replace with the correct jet as stated in the above table.
- ☐ Remove the 4 screws (shown below) securing the pilot assembly to the burner tray.
- ☐ Carefully lift the pilot assembly away from the burner tray to access and unscrew the pilot pipe nut. Slowly pull the pipe, nut and olive away from the pilot assembly to let the pilot jet down. Remove the existing pilot jet and replace with the jet supplied in the conversion kit. Tip: removing the test point hatch and guiding the pilot pipe up from below can make this process easier (shown below).



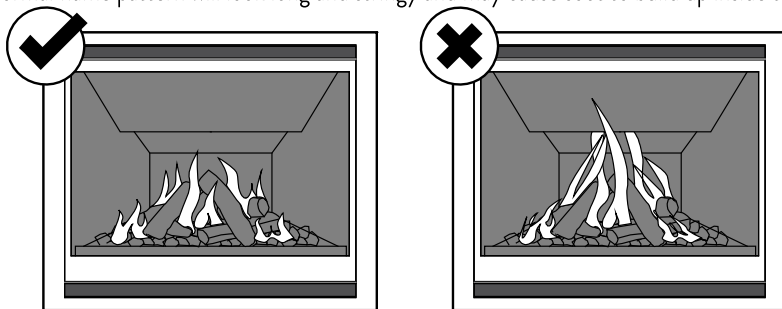
- ☐ Remove the left access hatch (shaded in the second diagram of section E9 on page 37). Remove the regulator screw cap and screw out the nylon adjuster screw to remove the existing spring.
- ☐ Replace the current spring with the purple spring supplied in the conversion kit and refit the nylon adjuster screw.
- ☐ Refit the access hatch using one screw to hold it in place.
- ☐ Refit the burners.
- ☐ **For DF990:** Remove the firebox baffle screw (shown below on the top figure in grey) and then remove the baffle by sliding it upward to release it from the side pins. Remove the heat exchanger restrictors by unscrewing the 4 fasteners (shown below on the bottom figure in grey). Rescrew 4 fasteners and then refit the firebox baffle.



- ☐ Operate the fire with the glass off and adjust the operating pressure to 2.3kPa for Propane / ULPG by turning the nylon adjuster screw whilst the appliance is running on maximum.
- ☐ Turn the fire off and remove the burners and access hatch again to replace the metal regulator cap
- ☐ Adhere the conversion label over the top of the Natural Gas data label on the appliance data plate.
- ☐ Refit the access panel (all screws), burners, infill and fuel bed.
- ☐ Adhere the 'Propane' or 'ULPG' label over the top of the existing Natural Gas label on the side of the appliance (if accessible).

E12 Flame Picture

An abnormal flame pattern will look long and stringy and may cause soot to build up inside the firebox.



An abnormal flame pattern will likely be the result of incorrect settings (jet size, burner aeration collar, flue restriction), and if present you must check these are correct before proceeding. If an abnormal flame pattern is still present, please contact Escea.

It is the responsibility of the installer to ensure a correct flame pattern.

E13 Coal Fuelbed Installation

NOTE: The log retainer bracket must be removed when installing the coals.

Place all the coals in a **single layer** atop the burners, covering the entire area except the pilot and pilot guard.

For the DF960 only, the collars on the burner must be changed to install the coal fuelbed (see E11 on page 39).



E14 Log Fuelbed Installation

Place logs 1,2,3 and 4 down first, locating them on the log retainer, followed by logs 5 and 6. The final layout should replicate the picture shown below. Place the embers or flakes in a single even layer after the logs have been located correctly (excess embers or flakes should NOT be added if one even layer has been achieved). The embers or flakes must not cover the pilot or pilot guard.

NOTE: Logs must be located correctly as stated/depicted in this section or the warranty may void.

DF700 Log Layout



DF960 Log Layout



DF990 Log Layout



Use the index below as a guide for selecting the correct logs:



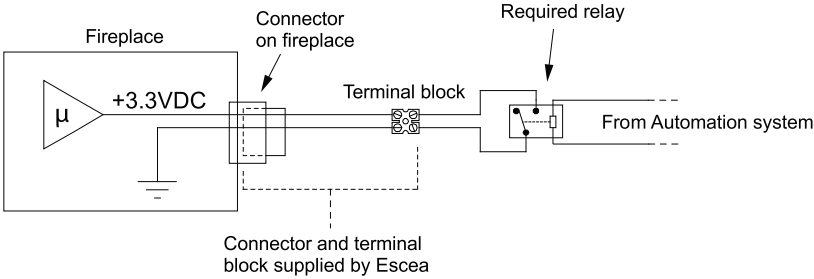
E15 Installing the Glass

Refer to section D2 on page 31 and reverse the steps to reinstall the glass.

E16 Home Automation Setup

Escea DF-Series fireplaces have a simple interface for connection to a home automation system. This allows the fireplace to be woken up, started, and then shut down. The “Close to Wake” connection (shown below) is essentially taking one of the 3.3 volt DC pins on the fireplace microcontroller and shorting it to ground.

In order to isolate the fireplace from the automation system, a relay needs to be used (as shown). This allows you to keep the fireplace’s 3.3V supply isolated.



The home automation connection can be found in your fireplace accessory pack (shown right).

This connects to the fireplace via the lower RH outside panel of the fireplace, next to the primary network cable access point, as shown in section D2 on page 31.

Home Automation Operation

Relay closed

The fireplace will start in a medium setting until the remote control talks to the fireplace and picks up the ‘ON’ signal (which can take up to 4 minutes). Once the remote has communicated with the fireplace it will turn on and begin operating thermostatically. The remote will use whatever temperature the user has previously set and cannot be altered by the home automation system. The fireplace will continue to operate while the relay is closed.

Note: If the fireplace cannot communicate with the remote within 10 minutes of the relay contact closure then the fireplace will shut down and return to standby. The remote controller is required to be within operating range of the fireplace for its safe operation.

Relay open

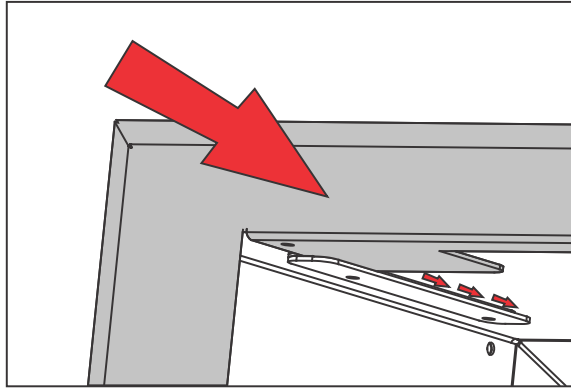
If the fireplace is operating with a closed relay then, upon opening the relay contacts, the fireplace will shut down and return the remote controller to its standby mode when it next updates (which can take up to 4 minutes). While the relay is open the fireplace will be in standby mode and available for manual operation by the user.

F Fitting the Fascia and Finishing Installation

F1 Fitting the Fascia

Warning: The fascia is a critical component of your gas fire and is integral to the airflow. Never run the fire without the fascia properly fastened.

Slide the top of the fascia (the side with two prongs facing away from the front face) into the fascia rails attached to the chassis in the two top corners. Push the bottom fascia lip above the chassis base. The fascia **MUST** now be flush with the wall.



F2 Locating Wall Mount Cradle for Remote

The appliance's remote contains the thermostat that will sense the room temperature and communicate this back to the heater via radio frequency.

A wall mount cradle has been provided for the wireless control and where possible the control should be housed in this cradle.

The location of this cradle should be decided by taking into account the following factors:

- ☐ Simple and convenient access for the user
- ☐ Away from air flow and drafts through the room
- ☐ The parts of the room that people are likely to spend time
- ☐ Away from direct sun light
- ☐ A suitable distance away from the heater
- ☐ Ideally 1.2m to 1.5m from the floor



The radio frequency signal will go through some walls but for best results Escea suggest that the cradle position is less than 10 metres away from the heater.

The best height off the ground to locate the cradle is about chest height. This gives a good average room temperature and easy access for the user.

Please ensure that the cradle is screwed firmly onto the wall using the screws provided.

F3 Operating the Appliance for the First Time

Remove the battery cover on the rear of the remote. Insert the new “AA” size batteries, paying attention to the polarity.

You should now see on the display of the remote the time showing “0:00”.

To turn the fire on, press the “POWER” button once, and within a few seconds the appliance will begin its startup sequence.

NOTE: once the rear burner has lit there will be a fixed 15 second delay before the front burner will light.

When the appliance has lit, set the room temperature by pressing the ‘plus’ or ‘minus’ button repeatedly until the display is showing the desired temperature. The remote will then revert back to the ‘current’ room temperature 30 seconds after making the change.

Run the appliance on full for an hour with the windows and doors open in the dwelling. This will ensure any running-in smells have the chance to dissipate.

The appliance is turned off by pressing the “POWER” button once more. The remote will display the time only.

Run the appliance again and check the operation of the thermostat by increasing and reducing the set temperature. Check the Flame Effect function and the Fan Boost functions work correctly.

For further operation instructions please refer to the User Guide.

F4 Normal Operating Sounds and Smells

Note: Each time the fire is lit from cold the glass may fog up with condensation. This is normal and the condensation will disappear within a few minutes once the glass heats up.

Sounds

It is possible that you will hear some sounds from your gas appliance. This is perfectly normal due to the fact that various types of materials are used within your appliance. Listed below are some examples. These are all normal operating sounds and should not be considered as defects in your appliance.

Fan:

Escea gas appliances use electric fans to push heated air into the room. It is not unusual for the fan to make a “whirring” sound when ON. This sound will increase or decrease in volume depending on the speed setting of your fan.

Gas Control Valve:

As the gas control valves turn ON and OFF, a dull clicking sound may be audible. This is the normal operation of a valve. When the fire is switched off after being run for a while, there may be popping and fluttering noises as the residual gas in the burners burns away. These are normal and are no cause for concern.

A
B
C
D
E
F
G
SERVICE

Unit Body/Firebox:

Different types and thicknesses of steel will expand and contract at different rates resulting in some “cracking” and “ticking” sounds being heard throughout the heating and cool down processes.

Smells

The first few times the unit is operated, the unit may release an odour and the flames will appear orange due to: the curing of the paint, the burning off of the starch in the gas logs and the oils in the metal. This is a temporary curing process which will disappear with use.

F5 Cleaning the Glass

A deposit on the inside of the inner glass, caused by the starch in the logs, may appear as a build up after several uses. If this film is not removed, it will bake on and may become difficult to remove.

When the inner and outer glass are cold, remove both and place carefully aside. Note that the fiberglass tape around the glass can mark carpet and furnishing so the use of a drop cloth is recommended. Clean the glass, paying particular attention to the inside of the inner glass, with a non-abrasive cleaner. A standard, ammonia-free, glass cleaner is recommended.

DO NOT ATTEMPT TO CLEAN THE GLASS WHILE IT IS HOT. NEVER OPERATE THE UNIT WITH THE GLASS REMOVED.

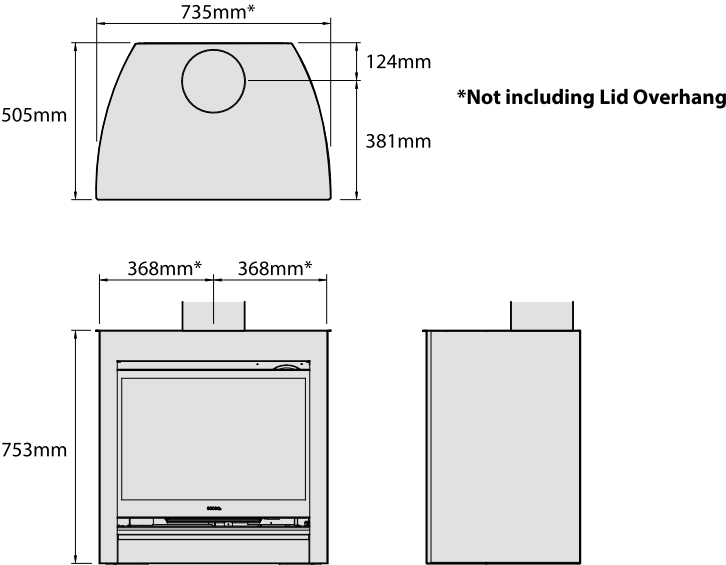
END OF SECTION F

By the end of this section, you should have:

- ☐ A correctly fitted fascia
- ☐ The remote control mounted on its cradle on a wall
- ☐ Operated the fire and verified that it lights reliably and safely
- ☐ Run the appliance on full for an hour with the doors & windows open
- ☐ Checked the operation of the thermostat, Flame Effect & Fan Boost functions

G Freestanding Unit (DFS730) Installation

G1 Product Dimensions

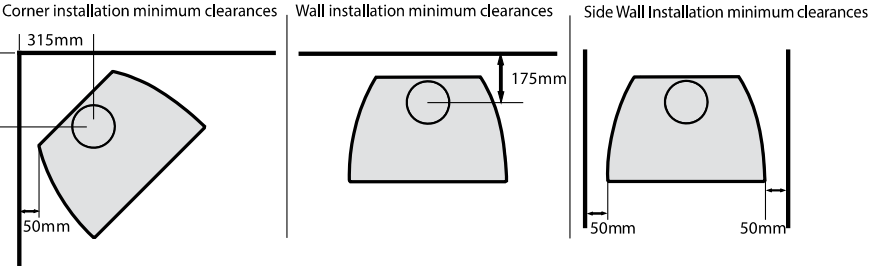


G2 Hearth and Clearances

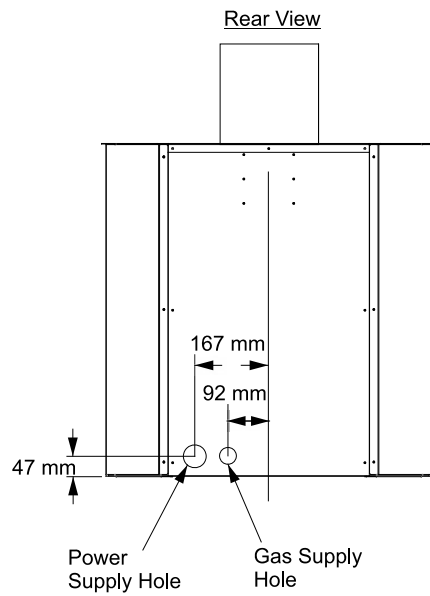
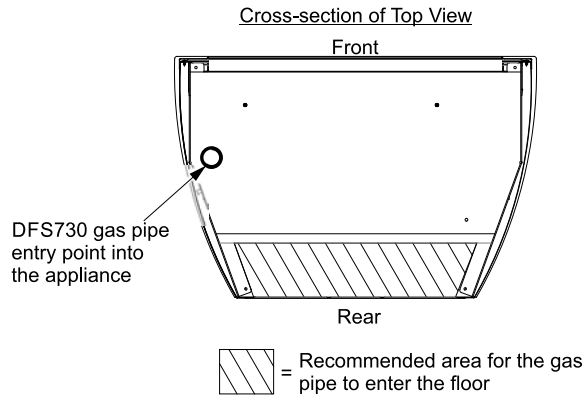
A hearth is not required, however it may be used for decorative purposes or for protection of sensitive flooring. The hearth should not obscure the air inlet of the fire.

Do not place items or furnishings on top of the freestanding fireplace, and **ensure soft furnishings do not come in contact with the freestanding fireplace.**

G3 Locating the DFS730



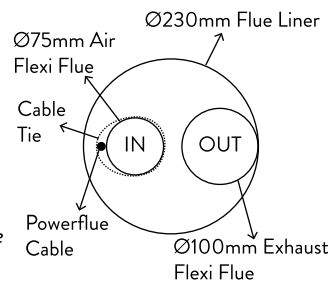
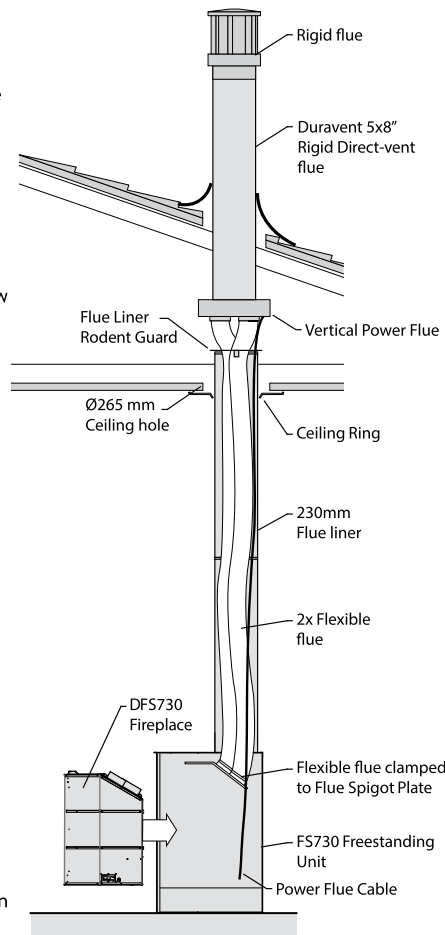
G4 Gas Pipe Routing Information



G5 Flue Installation

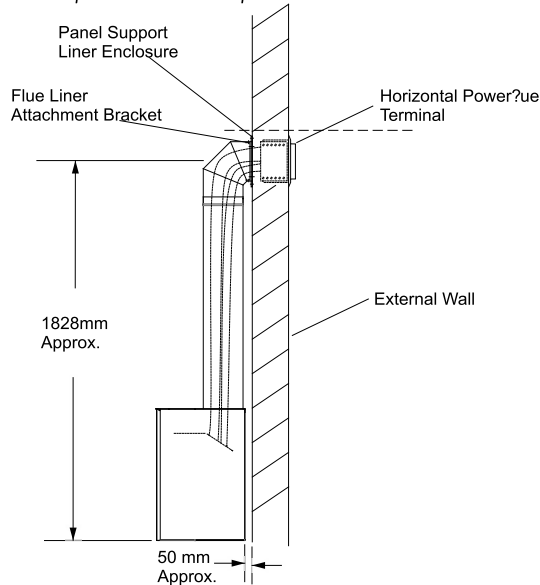
The freestanding unit and flue system should be installed prior to the DF-Series fireplace being installed (for horizontal termination for DFS730: see G6 on page 50).

- Place the freestanding unit in the correct location, complying with the clearances specified in the previous section.
- Remove 2 screws on each side of the fascia just below the top panel and pull towards you to remove the fascia.
- Fix the DFS730 unit to the floor using the four securing holes in each corner of the unit.
- Refer to Section B3 on page 11 for flexi flue clearances.
- Refer to section C on page 16 of this installation manual for minimum and maximum flue lengths, restrictor settings for your installation, and all other flue information.
- Run the black Ø230mm flue liner lengths from the top of the freestanding unit until it penetrates the Ø265mm ceiling hole.
- Use the supplied ceiling plate for tidying the internal termination point of the Ø230mm flue liner.
- Run the 2x flexible flues down through the Ø230mm flue liner and attach it to the Flue Spigot Plate as per section C on page 16 of this manual.
- Run the Power Flue cable down through the Ø230mm flue liner while tying it onto the Ø75mm Air Flexi Flue as shown on the bottom right corner. It must be kept away from the Ø100mm Exhaust Flexi Flue.
- Open the flue liner rodent guard and close around the flexi flue and Power Flue cable. Rivet, screw or cable tie the open end to prevent it from opening. Bend the two perpendicular tabs down and screw into the flue liner using a short self tapping screw. **NOTE: Take care when installing the rodent guard to not cause damage to the flexi flue or Power Flue cable.**
- Install flue termination as per section C on page 16 of this manual
NOTE: Ensure a power supply is within 1m of the rear of the appliance.



G6 Horizontal Flue Kit

NOTE: Instructions for installation are provided with the kit.

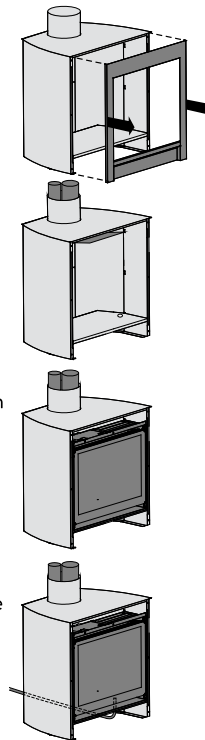


G7 DF700 Fireplace Installation into DFS730 Freestanding Unit

Once the freestanding unit is in place, and the flue system installed, the DF700 fireplace installation can commence.

Note: for the Apartment Flue Kit, see the instructions provided with the kit.

- ☐ Place the freestanding unit in the correct location, complying with the clearances specified in the previous section.
- ☐ Remove 2 screws on each side of the fascia just below the top panel and pull towards you to remove the fascia.
- ☐ Refer to section C on page 16 of this installation manual for minimum and maximum flue lengths, and all other flue information.
- ☐ Take the plastic grommet in the back panel out. Push the power cable through the hole in the rear, then push the grommet over the power cable and fix the grommet back to the back panel.
- ☐ Run the Power Flue cable through the silicone grommet on the RH side of the chassis and connect it as per section E4 on page 36.
- ☐ Install the DF700 fireplace into the freestanding unit while sliding on the flue spigot plate as per section E on page 34.
- ☐ Run gas piping to the front right of the fireplace as shown, where you will find a hole positioned so the gas pipe can run directly to the regulator and be connected as per section E on page 34.



Go through the following checklist to ensure you have installed the appliance correctly

- ☐ Correctly sized cavity to suit your fascia and flue configuration
- ☐ Correct clearances to combustibles and mantles around the fascia
- ☐ An electrical isolating switch to the appliance, accessible after finished installation
- ☐ Correctly sized gas supply with a pressure test point, ensuring adequate supply with all other gas appliances in the dwelling running
- ☐ A weather-tight installed Horizontal or Vertical Flue Terminal with clearance as specified by AS/NZ5601
- ☐ Power flue cable connected correctly to the Power Flue Terminal and the electronics tray within the appliance
- ☐ Reasonable access to the Horizontal or Vertical Flue Terminal for maintenance purposes
- ☐ Flue attached to the rear/bottom of the flue terminal leading back to the appliance
- ☐ The appliance fixed to the cavity base
- ☐ The appliance plugged into a mains electricity supply
- ☐ All gas joints and pressure points leak tested, and soapy water and drop tests completed on gas pipework
- ☐ Gas type conversion process carried out if required
- ☐ Log or coal fuel bed correctly installed
- ☐ Primary and secondary glass correctly fitted
- ☐ A fitted fascia
- ☐ The remote control mounted on its cradle on a wall
- ☐ Operated the fire and verified that it lights reliably and safely
- ☐ Run the appliance on full for an hour with the doors & windows open
- ☐ Appliance functions checked, including thermostat operation, Flame Effect and Fan Boost
- ☐ Home-owner shown how to operate the appliance correctly
- ☐ Warranty card filled in with installer details and appliance serial number
- ☐ User Guide made available for end user
- ☐ Plumbing Industry Commission Compliance Certificate given to end user

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SERVICE



IMPORTANT:





- This appliance must be serviced every 12 months.
- Any service operation should be carried out only by a suitably qualified and trained person.
- Gas and electricity supply **MUST** be isolated before any service operation is carried out on this appliance.
- This manual should be left with the appliance.
- **DO NOT MODIFY THIS APPLIANCE.**

S1 Error Codes

This gas fire has been designed to show error codes to help explain and identify any fault situation that occurs. These codes will appear on the remote in the form of a large letter “E” with a number beside it. Codes can normally be reset by turning the fireplace off then on again at the mains power wall switch.

The following table shows what each code means and possible ways to rectify the situation. In the case of persistent or repeated shutdown errors, action must be taken immediately to find and repair the fault.

Error Code	Suggestion action
 <p>Electronics Over Temp</p>	<p>The electronics have gone over temperature.</p> <ul style="list-style-type: none"> • Check for excess lint and dust build-up on the PCB/Controller. • Ensure correct gaps are present around glass. • Room air fans may be slowed or stalled. Remove firebox, check that fans are plugged in, clean, and free turning. <p><i>Note: This error has a permanent lock out and will require the unit to be reset after the initial error (turning the power to the fire off “at the wall” then on again after a few seconds).</i></p>
 <p>Flame Failure or Power Flue trip</p>	<p>The fire has tried to light three times and failed.</p> <ul style="list-style-type: none"> • Check gas supply and check other gas appliances to see if they are affected. If you have two separate LPG cylinders, switch over to the full bottle or contact your gas supplier. You may need to retry igniting the fire a few times after re-establishing gas supply. • Check correct gas pressure to the appliance with all other appliances running. • Check the electrode placement in relation to the pilot flame. Ensure it is well enveloped in flame as per the diagram in the installation instructions. Ensure no small coals have dropped onto the ignition electrodes between the burners. • Ensure the electrode is not contacting any metalwork including the burners and has the correct air gap.

 <p>Appliance Over Temperature Sensor Trip</p>	<p>The bimetallic snap disk mounted on the exhaust collector box has tripped.</p> <ul style="list-style-type: none"> • Check that fans are plugged in, cleaned, and free turning - room air fans may be slowed or stalled. • Check the regulator -being set too high may result in excess heat build-up. • Check flues are securely connected at both ends - if the inlet flue is not connected the appliance may draw warm air from the cavity. • Check the jets 	A
 <p>Valve Solenoid Check Failure</p>	<p>The valve solenoids have failed the pre-ignition test. A wire may have dislodged or the valve solenoid is faulty.</p> <ul style="list-style-type: none"> • Check that the connections to each solenoid are secure and in place. The connections on the ends of the wires may need to be tightened (e.g. with a pair of pliers) to ensure a robust connection to the valve terminal. • Disconnect and reconnect the firebox connectors ensuring they are firmly pushed into place. • One of the solenoids on the valve inside the fire may have failed. If this is the case, the valve will need to be replaced. 	B
 <p>Internal Remote Error</p>	<p>The remote cannot communicate with the fire.</p> <ul style="list-style-type: none"> • Check if the fire is turned off "at the wall" i.e. a loss of power to the fire or the remote is outside of its effective radio frequency range (too far away from the fire). Typical remote range is 1m to 10m. • Ensure there is power to the fire by pressing the auxiliary on/off (red) button on the fire, then press the on/off button on the remote to clear the error. 	C
 <p>Combustion Air Flow Error</p>	<ul style="list-style-type: none"> • Check whether the pressure switch is activating at startup (there is an orange indicator LED in the control tray). If not, check that the pressure switch electrical connection is correct. • Check that the hoses are connected at both ends. Ensure the hoses are not kinked. • Ensure the pressure switch is mounted vertically and the diaphragm is operational. The black hose should be connected to the low pressure port and the translucent to the high pressure port • Check that both flues are securely connected at both ends to the appliance and the Power Flue wall terminal and that the flue is not damaged • Check that the fan inside the Power Flue wall terminal is running during startup. This fan may need servicing if it is slowed or stalled. 	D

S2 Serial Number

The serial number for the fire can be found in two places. The first is in the battery compartment of the remote under the batteries. The second is on the data sticker on the chassis under the firebox on the left hand side.

S3 Checking Operating Pressure

See section E9 on page 37 of this manual.

S4 Cleaning the Fascia

The outside of an Escea Fascia must only be cleaned with a soft microfibre cloth. If heavier cleaning is required for the likes of grease or stubborn fingerprint removal we recommend the use of a dedicated stainless steel cleaner for stainless steel fascias or warm soapy water for powder coated fascias. These wipes have been tested by Escea technicians and produce very satisfying results, when used correctly. Instructions for their use follow.

NEVER RUB THE FASCIA.

For Stainless Steel Fascias:

1. Ensure that the Gas Fireplace is off and that the fascia is cold to the touch.
2. Using the gloves provided with your fascia, a stainless steel cleaner and a clean cloth, apply a small amount of cleaner to the cloth and wipe the fascia with even, straight strokes.
3. Make sure your strokes follow the direction of the grain or brush finish. Wiping across the grain can leave small scratches.
4. The wipe will leave a very fine film over the fascia, ensure this film is distributed evenly.
5. If the film is applied too heavily and is quite visible, you can remove the excess by gently wiping dry with a microfibre cloth. Ensure your strokes still follow the direction of the grain or brush finish.
6. Ensure that no film is applied to the glass of your Escea Gas Fireplace. If applied accidentally, wipe off with an absorbent microfibre cloth.

For Powder Coated Fascias:

1. Ensure that the Gas Fireplace is off and that the fascia is cold to the touch.
2. Using the gloves provided with your fascia, gently clean the fascia with a cloth and warm soapy water.
3. Wipe off with an absorbent microfibre cloth.

Cleaning the Log Set and Glass

This is a service procedure that will need to be carried out whenever soot builds up on logs and/or inside of glass. If soot build up becomes excessive or regular then one of the following actions may be required:

- Check gas pressure; operating gas pressure may be too high.
- Reposition log set so that each log is sitting correctly in the log retainer bracket.
- Clear any blockage from primary air port of burner.
- Check flue tube is not damaged or disconnected.

For diagrams and further info on removing your fascia, reverse the steps found in section F on page 44.

- Refer to section D2 on page 31 for instructions on removing the glass. Note that the fiberglass tape around the glass can cause marking on carpet or furnishing.
- Clean the inside and outside of both pieces of glass with normal ammonia-free glass cleaning products. Use a CLEAN DRY cloth only. Stubborn marks may be cleaned with a ceramic glass cleaner.
- Replace in opposite order and test run heater.

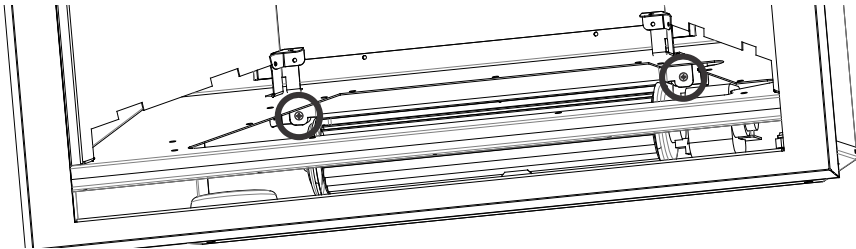
S5 Removing or Cleaning Fan

As part of regular service procedure, it is recommended that the fan is removed for cleaning. Dust will build up on the fan rotor and in the cavity where the fan is located. This can be removed by the service person using a hearth brush and a vacuum cleaner.

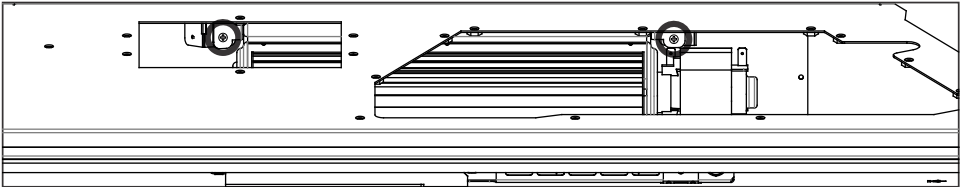
ISOLATE THE POWER AND GAS SUPPLY TO THE FIRE BEFORE COMMENCING THIS PROCEDURE.

Remove the electronic tray located on the base of the chassis (instructions provided in the next section) before attempting to remove the room air fan. Disconnect the 3-way fan connector and remove the two screws circled in the diagram below (the DF960 and DF990 requires the LH access hatch to be removed in order to get to the LH screw) . The room air fan can now be pull towards you and removed through the burner tray hole.

DF700 Fan Screw Locations



DF960 & DF990 Fan Screw Locations



S6 Removing Electronic Tray

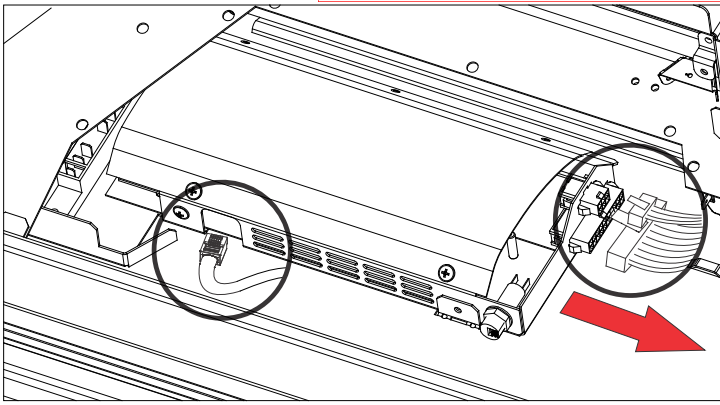
ISOLATE THE POWER TO THE FIRE BEFORE THIS PROCEDURE.

All of the electronic components of the heater have been located on a removable tray. Remove the 18-way connector & 6-way connector from the end of the tray, the network cable, if installed (both locations circled in diagram shown) and the transformer connector located in the rear LH corner of the electronics tray.

Remove one self tapping screw in the front face of the electronics tray.

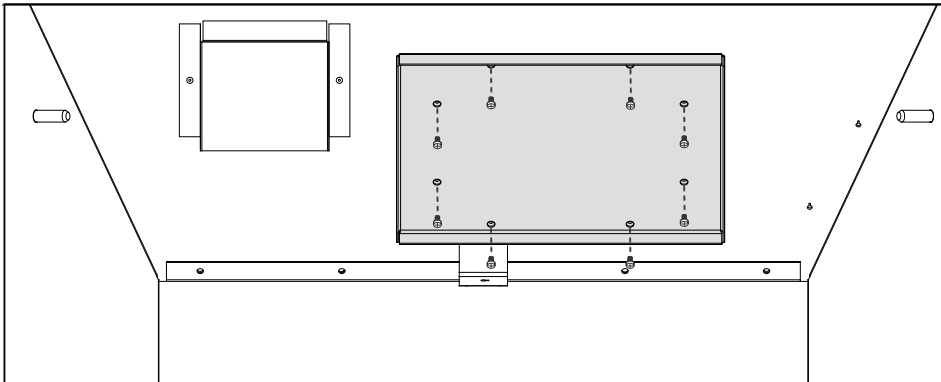
The tray can now be slid towards the RH side then lifted out of the burner tray hole in the firebox.

SERVICE

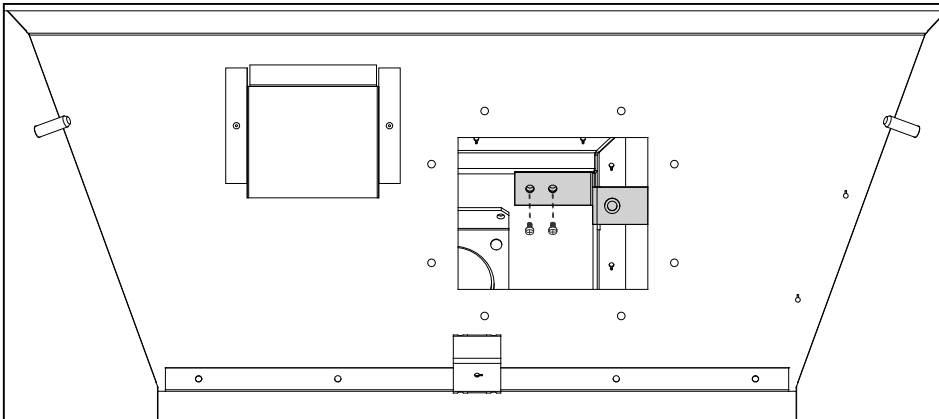


S7 Replacing the Thermal Cut Out

Once the screw is removed from below the stepped firebox baffle, gently lift the baffle up and bring towards you. Remove the 8 machine screws in the access panel (as shown in the diagram below).



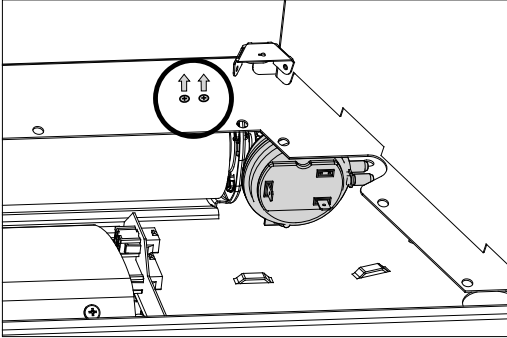
Remove the 2 machine screws from the TCO bracket (as shown in the diagram below)



Disconnect the two wires from the TCO and the bracket with the TCO may then be removed from the fire box for replacement.

S8 Removing the Pressure Switch

Remove the two machine screws located in the rear RH side of the firebox to detach the pressure switch bracket. Unplug the white and orange wires along with the two tubes to remove the bracket and pressure switch from the appliance.



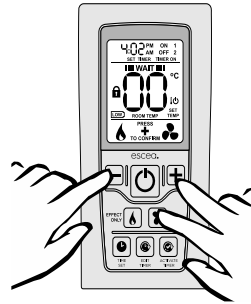
The bracket with the pressure switch may now be removed from the firebox.

S9 Replacing a Remote

If the wireless control becomes lost or damaged, a new one can be ordered from any Escea retail agent. When you have the new remote, the following procedure needs to be followed to “teach” the remote to only communicate with that fire.

1. Ensure the fire and remote are set to ‘OFF’ (only the time is displayed on the remote).

2. While the remote is in its ‘OFF’ mode with only the time showing on the display, press the MINUS, PLUS, and FAN BOOST buttons simultaneously (as shown right) until the characters “03” light up on the display. Release the buttons. The remote will count down and display “GO”. The screen will then display all characters and should be reading “00”. This will put the remote into test mode. *Note: if the digits start counting then the remote is already paired.*



3. Press and hold the MINUS button until the two large temperature digits reading “00” start to flash slowly. Release the MINUS button. The remote control is now ready to be linked to the fire.

4. Press and hold the auxiliary on/off button on the fireplace for a minimum of ten seconds or until the two large temperature digits start counting upwards from 00 to 99 repeatedly.

Note: Pressing the red auxiliary button on/off button will start the fire. Once the remote control is counting the fire can be turned off by pressing the red auxiliary button again.

5. Press the large power button in the middle of the remote control to exit the test mode and return to normal operation. The remote should only be displaying the time. Check the fire will start using the remote control by pressing the large power button. Turn it off again using the remote control.

6. The fire is now linked to the remote control.

S10 Servicing the Horizontal/Universal Vertical Power Flue

Ensure the power to the power flue is off by disconnecting the power to the appliance inside. If the appliance has been running, allow the power flue to cool before attempting to service it.

Servicing a Horizontal Power Flue:

If the Power Flue needs servicing, the fan can be accessed from the outside of the installation for horizontal termination and accessed from within the roof space for vertical termination.

Undo the screws on the outside of the Power Flue box and separate the two parts, giving you access to the fan inside.

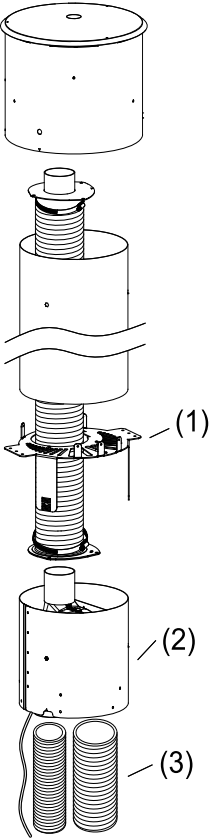
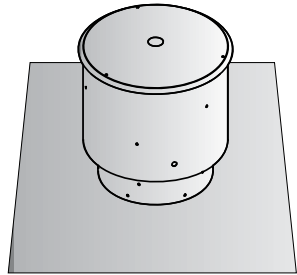
Removing this plate gives complete access to the fan for servicing or replacement. Check that all the seals are still intact. Check that the fan electrical terminals, motor, and impeller are not corroded. Ensure there are no signs of leakage in or around the terminal.

When reassembling the Power Flue, line up the round silicon grommets with the outlet tube of the fan and push the cowl back into place. Ensure all seals are still in place and replace all of the screws to hold the cowl in the correct position.

Servicing a Universal Vertical Power Flue:

If the UVP is internally installed remove the unit (2 in the right hand image) and replace the complete fan unit.

If the UVP is externally installed the cowl/fan unit pictured below is to be completely replaced by removing it from the liner or flashing.



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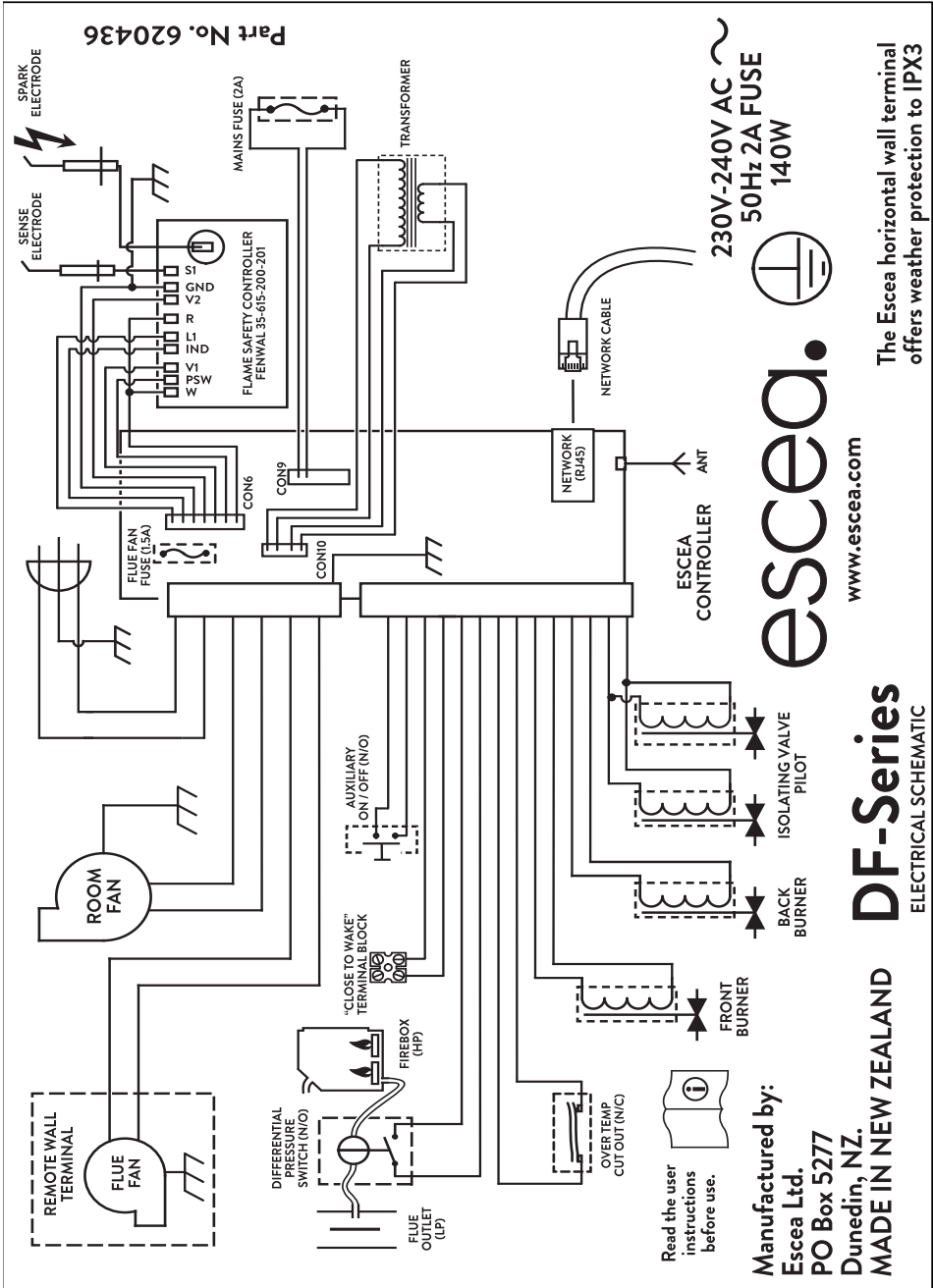
SERVICE

S11 Annual Service Procedure

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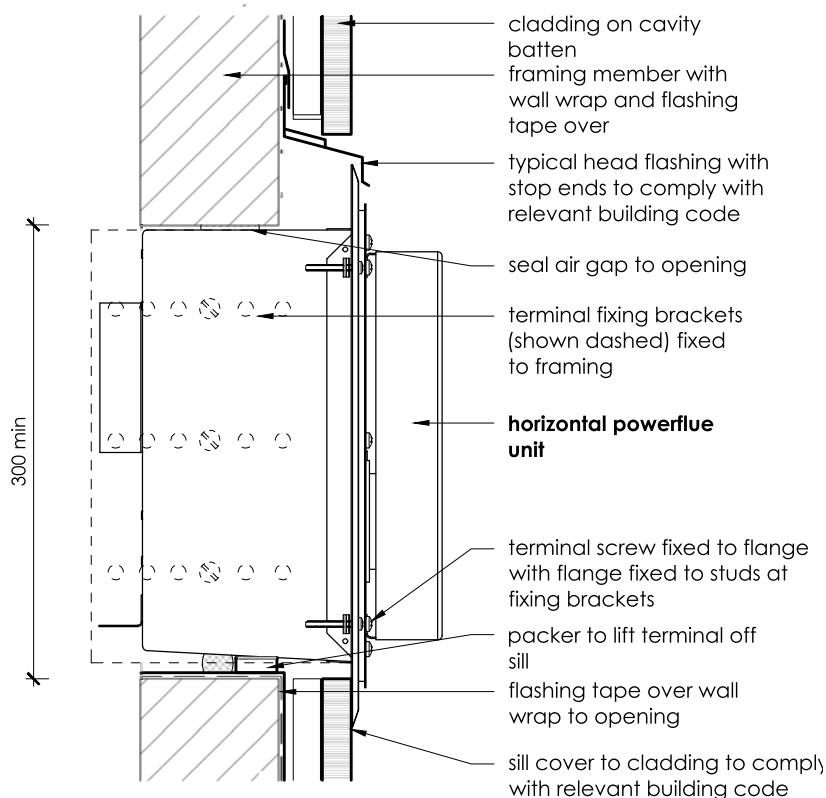
- ☐ Isolate power and gas supply to fire.
- ☐ Remove front glass and clean inside of glass.
- ☐ Remove fuel bed and brush off any soot.
- ☐ Clean electrode and pilot hood of any carbon build up and ensure correct gaps between electrode and pilot hood
- ☐ Remove burners and blow compressed air through the burner ports.
- ☐ Remove jets and clean injector hole (with solvent if necessary).
- ☐ Remove the control tray to give access to fan; brush and vacuum any dust build up from fan blades.
- ☐ Vacuum any dust from the cavity that houses the fan and from the underside of the fire box around the valve and solenoids.
- ☐ If the gas piping includes a flexible hose connected to the regulator, check the hose for signs of wear (discolouration, loss of flexibility, cuts, worn covers, cracks, crushing, kinking, flattening or loose end fittings) and replace if worn, or more than five years old.
- ☐ Test all joints for gas tightness.
- ☐ Reassemble heater and check that operating pressure is correct.
- ☐ Check glass sealing tape and replace if necessary.
- ☐ Check to make sure that flue system is intact and not in any way blocked.
- ☐ Trial heater with several start/stop cycles and trial fan-boost, flame effect only and thermostat modes to ensure that all modes function correctly.
- ☐ Ensure that the fascia is properly installed and is sitting flush with the wall after service.

S12 Wiring Diagram



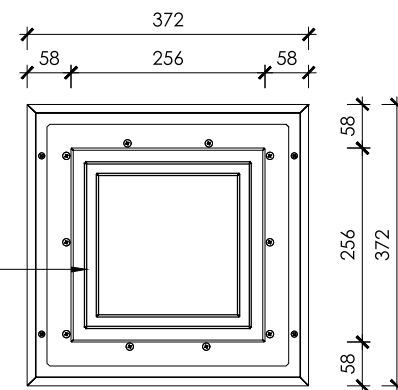
Horizontal Powerflue Detail

FIRE BY **escea.**

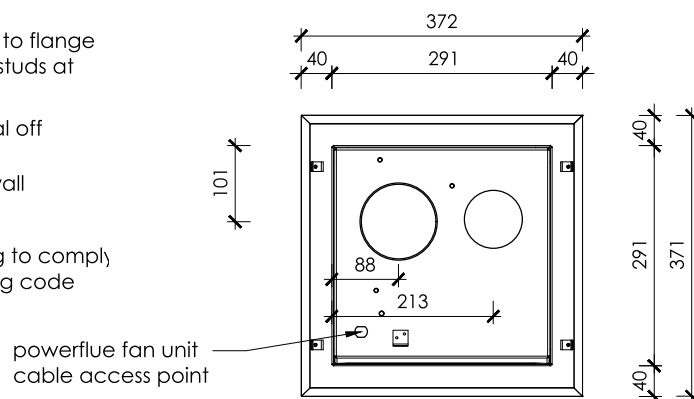


Head and Sill scale 1:5

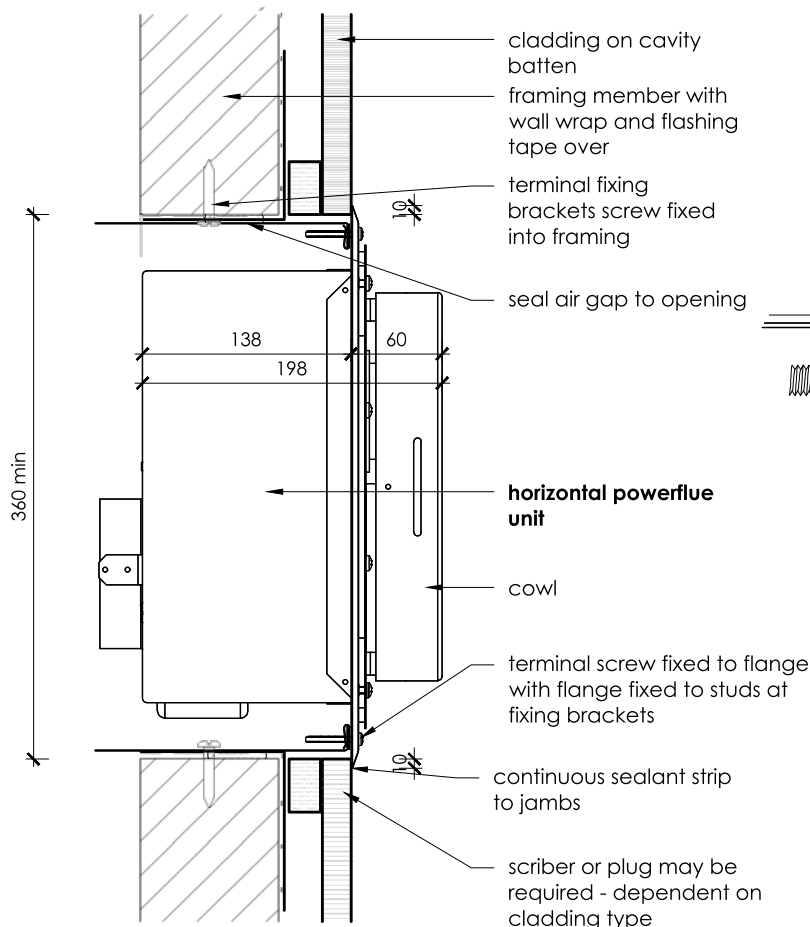
IMPORTANT:
Ensure that flashings do not restrict the air intake slot around the periphery of the cowl.



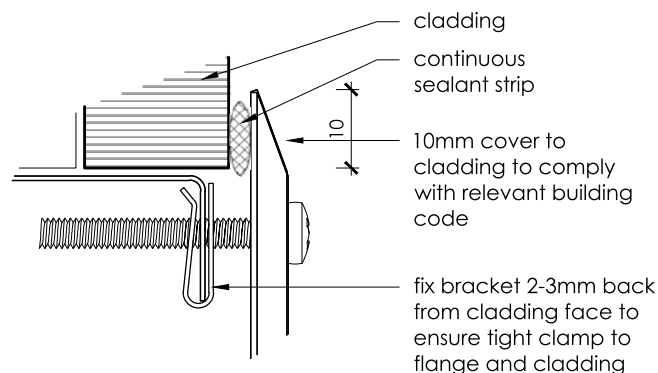
Front Elevation scale 1:10



Rear Elevation scale 1:10



Jamb scale 1:5



Fixing Detail scale 1:1

IMPORTANT:
This technical sheet must be read in conjunction with the requisite Escea D-Series Gas Fire Installation Manual, the latest version can be found on our website www.escea.com/nz/technical/

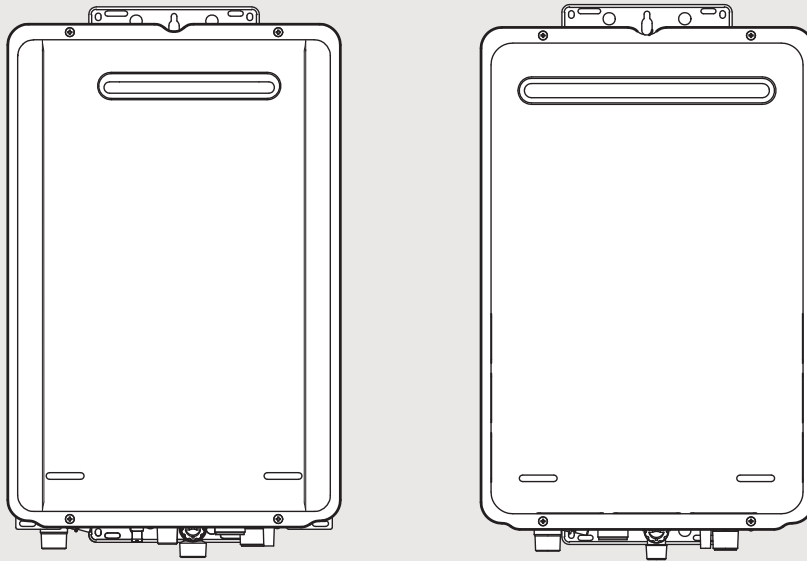
Contact the ESCEA Architectural Advisory Team for assistance with installation of this fire - aa@escea.com

GENERAL CONSTRUCTION AND FINISHES SHOWN INDICATIVE ONLY

file: D-Series FLUE Master File.dwg	scale: as shown	ecn: ECN-2155	drawing no: EDA-0006	revision: V. 02	date: 08.12.2017	drawn: MG
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Suitable for the following Rinnai INFINITY models:

- A16 (REU-A1620WG-ZK)
- A20 (REU-A2024WG-ZK)
- A24 (REU-A2426WG-ZK)
- A26 (REU-A2626WG-ZK)
- EF26 (REU-E2626W-ZK)



INFINITY EF26 and A-Series continuous flow water heaters

Installation guide

Rinnai

Important

This appliance must be installed in accordance with:

- Manufacturer's installation instructions
- Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 and G12/AS1

For use with Natural Gas or Universal LPG as indicated on the appliance.

Not suitable as a spa or swimming pool heater.

Not suitable for hydronic applications.

Not suitable for commercial or solar applications.

Not suitable for locations greater than 1000 m above sea level.

Appliance must be installed, commissioned and serviced by an authorised person, being in New Zealand a licensed gasfitter.

Warning

Improper installation, adjustment, alteration, service and maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624).

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[youtube.com/rinnainz](https://www.youtube.com/rinnainz)
[facebook.com/rinnainz](https://www.facebook.com/rinnainz)

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Before installation

Unpack the appliance and check for damage. DO NOT install any damaged items.

Check all components and that the correct gas type has been supplied.

Get an overview of the steps required before starting the installation. Failure to follow these instructions could cause a malfunction of the appliance. This could result in serious injury and property damage.

These instructions apply only to the continuous flow water heater models listed on the front of this guide.

Specification

Designed and made in Japan, the Rinnai INFINITY EF26 and A-Series are continuous flow gas hot water heaters with inbuilt frost protection. The EF26 is a condensing model. They have electronic ignition and require electricity to operate. They are factory preset to 55 °C (maximum set temperature is 65 °C).

Scope of use

Suitable for **residential** applications only. They are designed to be externally mounted on an outside wall and located as close as practicable to the most frequently used hot water outlet(s), to reduce the delay for hot water delivery.

They are not suitable as a spa or swimming pool heater, and for hydronic heating. They are also not suitable as a gas boost for solar installations as the temperature cannot be set high enough.

Hard or acidic water will need to be treated to use this product.

Specification summary

	A16 REU-A1620WG-ZK	A20 REU-A2024WG-ZK	A24 REU-A2426WG-ZK	A26 REU-A2626WG-ZK	EF26 REU-E2626W-ZK
Thermal efficiency	80.5%	80.5%	81%	80.5%	91.5%
Hot water capacity	1.5-20 L/min	1.5-24 L/min	1.5-26 L/min	1.5-26 L/min	1.5-26 L/min
Hot water capacity at a 25° rise	16 L/min 960 L/h	20 L/min 1200 L/h	24 L/min 1440 L/h	26 L/min 1560 L/h	26 L/min 1560 L/h
Input	16.3-124 MJ/h	19.9-156 MJ/h	16.3-184 MJ/h	16.3-199 MJ/h	16.3-175 MJ/h
Output	27.8 kW	34.9 kW	42.0 kW	44.5 kW	44.5 kW
Weight	13 kg	14 kg	15 kg	15 kg	18 kg
Water, nominal operating pressure	120-1000 kPa	160-1000 kPa	200-1000 kPa	200-1000 kPa	220-1000 kPa
Ingress protection	IPX4	IPX4	IPX4	IPX4	IPX5
Power consumption:					
- Normal	47 W	58 W	56 W	65 W	63 W
- Standby	2 W	2 W	2 W	2 W	2 W
- Frost protection	68 W	68 W	68 W	68 W	92 W

Safety devices

- Flame failure
- Boil-dry protection
- Overheat protection (OHS)
- Fusible link
- Pressure relief valve
- Combustion fan rpm check

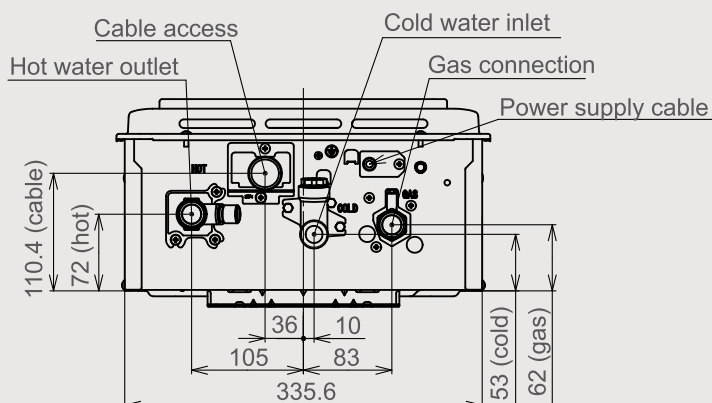
Line pressures

- NG 1.13-3.0 kPa
- LPG 2.75-3.0 kPa

The maximum line pressure is 3.5 kPa, with the maximum standing pressure under abnormal intermittent conditions 5.0 kPa. In the case of commercial metering (i.e. 35-37 kPa coming in), there may be a requirement to regulate the incoming line pressure down.

Connections and fittings

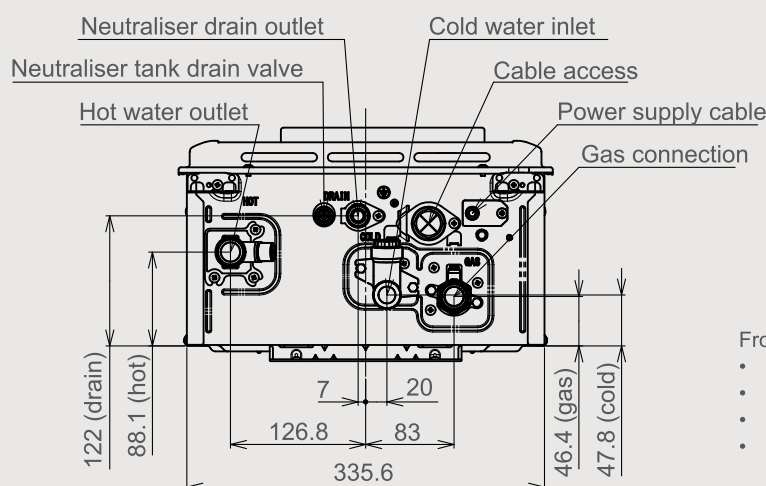
A-Series



From bottom of unit:

- Hot 41 mm (A16 39 mm)
- Cable 29 mm
- Gas 40 mm
- Cold 50 mm

EF26



From bottom of unit:

- Hot 41 mm
- Cable 26 mm
- Gas 38 mm
- Cold 50 mm

		Hot	Cold	Gas	Condensate
A16 external	REU-A1620WG-ZK	R $\frac{1}{2}$ (15 mm)	R $\frac{1}{2}$ (15 mm)	R $\frac{3}{4}$ (20 mm)	N/A
A20 external	REU-A2024WG-ZK	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	N/A
A24 external	REU-A2426WG-ZK	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	N/A
A26 external	REU-A2626WG-ZK	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	N/A
EF26 external	REU-E2626W-ZK	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{3}{4}$ (20 mm)	R $\frac{1}{2}$ (15 mm)

Service connection points

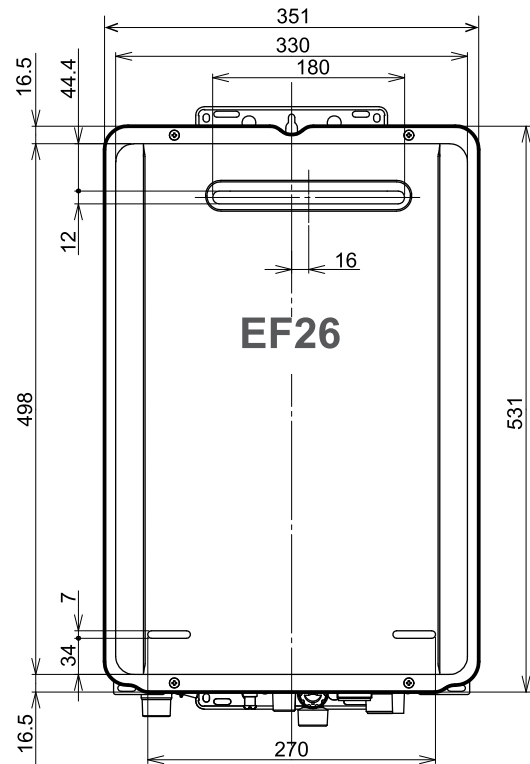
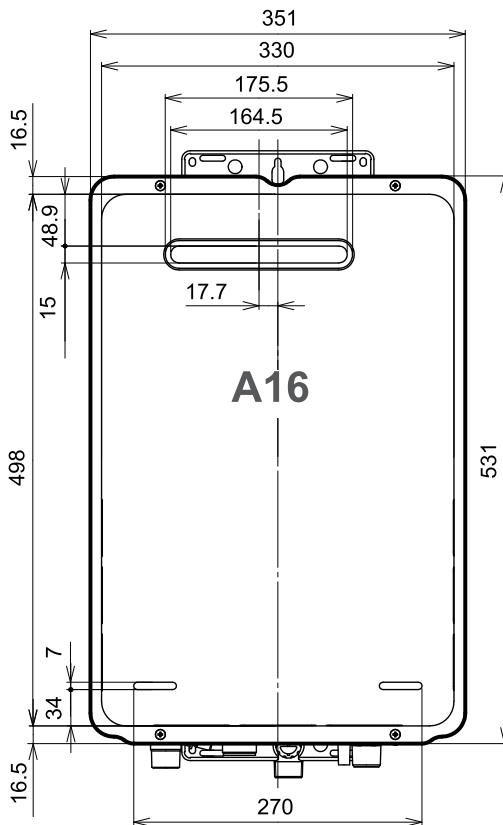
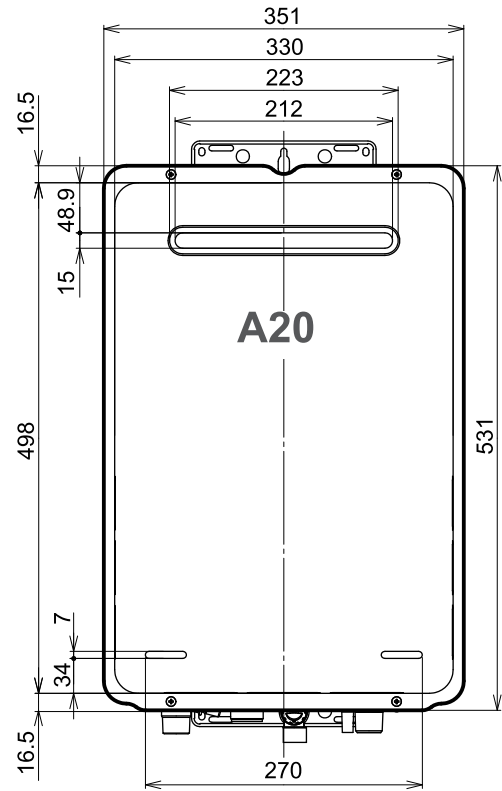
An approved full flow isolation valve and disconnection union **MUST BE** fitted to the cold water inlet. A non-return valve is not required unless stipulated by local regulations.

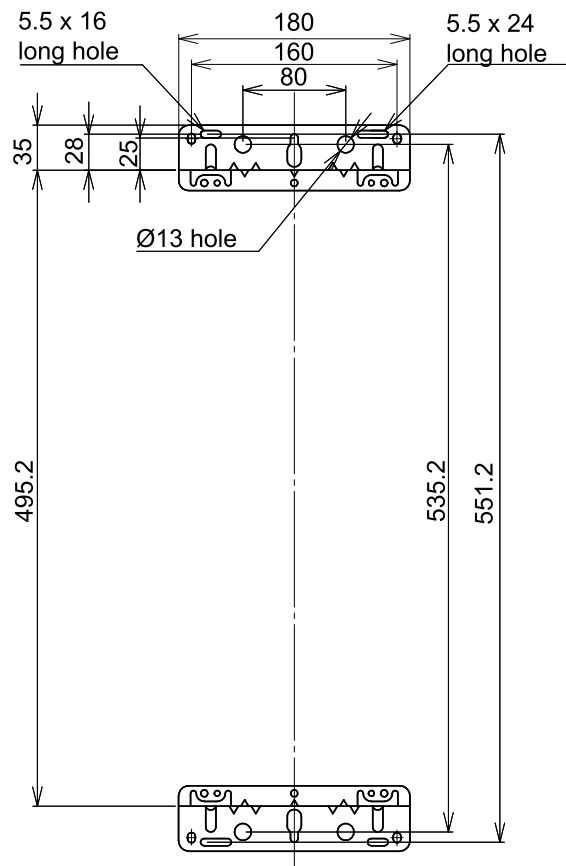
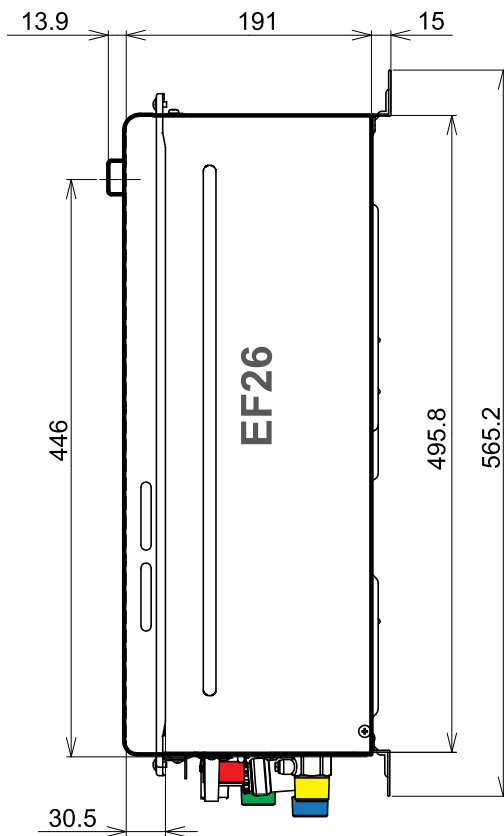
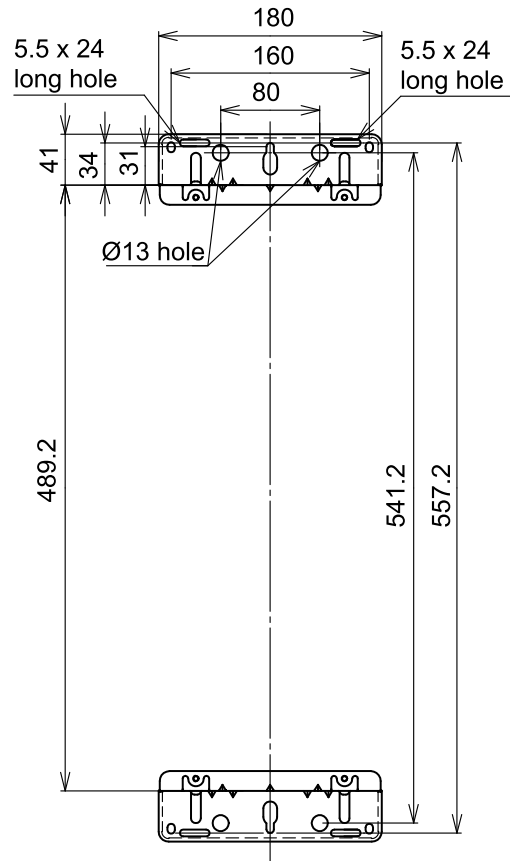
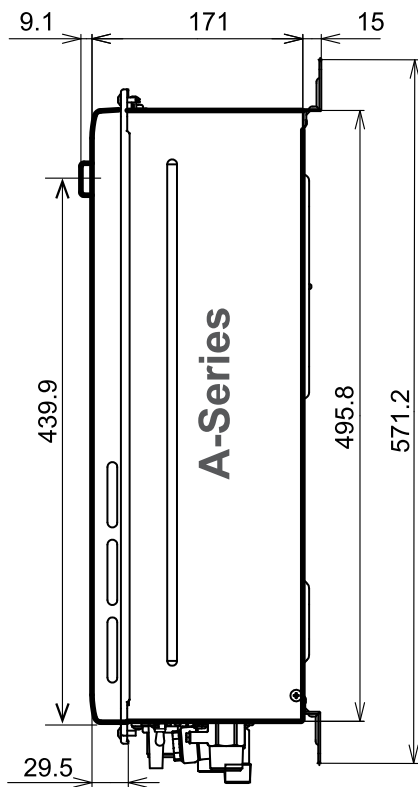
Isolation valves **MUST NOT** be fitted directly the appliance.

It may be necessary to fit a temperature limiting device for delivery to areas used primarily for the purposes of personal hygiene, refer page on 'Water delivery temperature' for more information.

Purge gas and cold water supply lines to remove air and swarf before final connection. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.

Dimensions (mm)





Appliance location

This appliance is designed for outdoor installations only. It **MUST BE** located above ground in open air with natural ventilation, without stagnant areas, where gas leakage and products of combustion can be rapidly dispersed by wind and natural convection.

This appliance **MUST BE** placed as close as possible to the most frequently used hot water outlet(s) to minimise the delay for hot water delivery¹. For installations where the distance between the water heater and outlets is considerable, a flow and return system can be used to minimise the waiting time for hot water delivery. Alternatively multiple appliances can be strategically placed to serve outlets with minimal delay.

An AC 230 V, 10 A earthed power point must be provided adjacent² to the appliance. This power point must be weatherproof. It must be clear of the gas and water connections to the appliance and also the flue exhaust and water pressure relief valve. The power cord of the appliance is 1.5 m long.

All appliances **MUST BE** installed to ensure access can be gained without hazard or undue difficulty for maintenance and servicing. Sufficient clearances shall allow access and removal of all serviceable components. Appliances should not be mounted more than 2.5 m above the ground or floor level unless the customer can arrange permanent and safe access, or can provide another means of safe access.

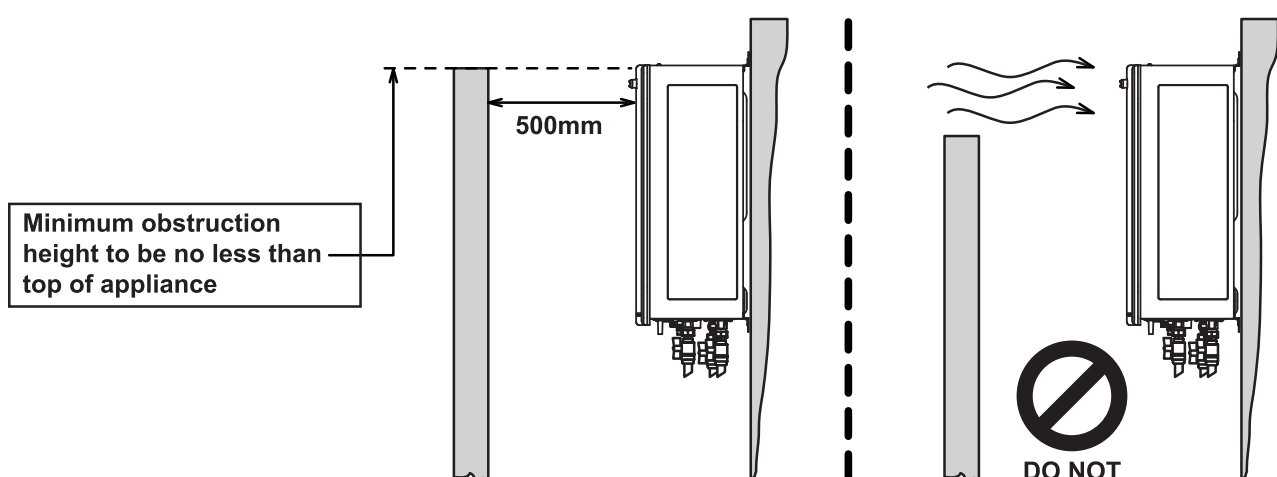
The appliance **MUST BE** mounted on a vertical structure with the water and gas connections on the underside pointing downwards.

Location of the flue terminal **MUST BE** in accordance with Section 6 and Figure 6.2 of AS/NZ 5601.

The E26 / A-Series are suitable for installations up to 1000 m above sea level. They are not suitable for alpine areas.

Horizontal obstructions

AS/NZS 5601 states a minimum horizontal clearance of 500 mm between a building structure and obstruction facing the terminal. At 500 mm the obstruction needs to be the full height of the unit, as shown below, and not a partial obstruction. A partial obstruction of less than 1 m could result in wind pushing the flue gases back into the flue terminal.



There **MUST** be **NO** partial obstructions to the appliance front cover or any other part of the appliance casing. This will avoid the appliance from failing to operate under windy conditions.

¹ Rinnai recommend a maximum pipe run of 10 m.

² Power point can be within the pipe cover if a pipe cover is installed—must comply with AS/NZS Wiring rules

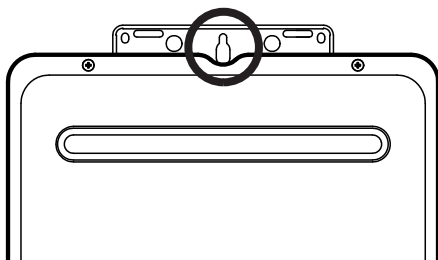
General installation information

Securing the Rinnai INFINITY

The wall structure on which units are mounted **MUST BE** capable of supporting the weight of the appliance and associated pipe work.

Ensure that suitable fixing screws or bolts are used to secure the unit to the wall, in accordance with AS/NZS 5601 section 6. Wooden plugs shall not be used.

The top bracket has a keyhole slot so that the appliance can be positioned by hanging it on one screw. Once in position the appliance can be secured with appropriate fixings.



The appliance can be mounted directly against the wall or structure. There is no need to use non-combustible sheeting or leave an air gap between the appliance back panel and the wall or structure to meet the temperature hazard requirements of AS/NZS 5601.

Pipe sizing

If the gas pipe sizing is insufficient the appliance won't perform properly. Gas pipe sizing must consider the gas input into this appliance as well as other gas appliances in the premises. The gas meter and regulator must be specified for this gas rate.

An approved sizing chart such as the one in AS/NZS 5601 should be used. Refer specification for gas consumption details.

Water pipe sizing and layout should be performed in accordance with AS/NZS 3500. All hot water pipe work should be insulated to optimise performance and energy efficiency.

Water supply

The appliance is intended to be permanently connected to the water mains.

Refer specification for operational water pressure limitations. Approved pressure limiting valves may be required if the maximum rated water supply pressures are exceeded. To achieve the rated flow, the minimum water supply pressures must be met.

The water heaters will operate at lower pressures but will not achieve the rated flow. Contact Rinnai for gravity fed or low pressure installations.

Water chemistry and impurity limits are detailed in the operation guide within the warranty section. Most metropolitan water supplies fall within these requirements.

If you are unsure about the water quality contact your water authority. If sludge or foreign matter is present in the water supply, a suitable filter or strainer is required in the water supply to the water heater to prevent unwarranted damage and loss of performance.

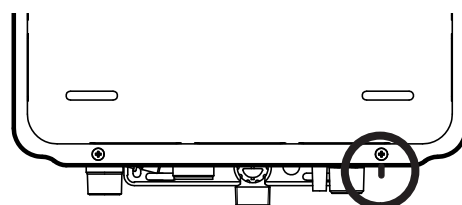
Frost protection

Frost protection operates automatically, as long as the appliance is connected to the electrical power supply, by activating when the temperature inside the unit drops below 3.5 °C¹, and turns off once the temperature inside the unit reaches 7 °C¹.

¹ Approximate temperatures

Frost protection thermistor

The EF26 and A-Series models have an external thermistor to control frost protection. It is a small black indicator located on the bottom right hand side of the unit, directly underneath the cover screw (circled below). The frost protection thermistor needs to be exposed to the outside air to correctly function—do not insulate the frost protection circuit will not work correctly.



Water delivery temperature

Requirements of AS/NZS 3500 MUST BE considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene. The temperature of these areas may be limited to 55 °C or less.

If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, school, nursing home or similar facility as defined in AS/NZS 3500.4, a Temperature Limiting Device (TLD), such as a tempering valve may be required, even if the appliance is set to 55 °C or less. For these types of applications contact Rinnai.

Requirements for Rinnai INFINITY units installed without controllers

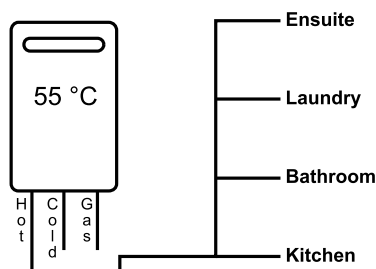


Diagram 1 - 55 °C Appliance

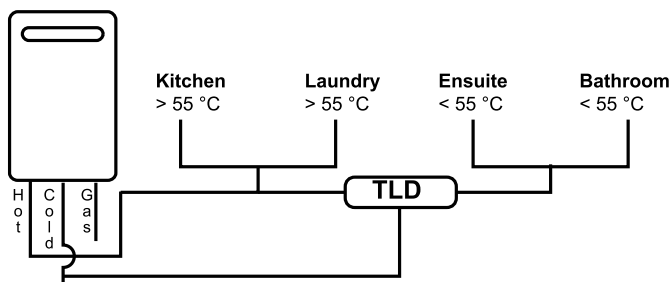


Diagram 2 - Not a 55 °C Appliance
(TLD = Temperature Limiting Device)

When the Rinnai INFINITY is set to deliver water at a temperature higher than 55 °C, it will be necessary to fit a Temperature Limiting Device for delivery to areas used for the purposes of personal hygiene.

Controller installation

The maximum number of controllers that can be fitted is **four**, refer water controller configurations section below.

General information

Other manufacturers water controllers are NOT compatible with Rinnai water heaters. Water controllers MUST NOT be used with any solar boost water heater. Rinnai water controllers bought in from other countries are not compatible with Rinnai appliances sold in New Zealand.

Water controllers and transceivers (for those with wireless controllers) DO NOT contain serviceable parts and must only be serviced by an authorised person.

Master controller

Only one master controller can be designated as a 'master' water controller. This water controller is normally used in the kitchen. The remaining controllers are 'sub-controllers' and are for use in bathrooms, toilets, and laundries. The temperature limit for all sub-controllers is 50 °C, this is a safety feature, to reduce the risk of burns in these areas. A master controller MUST NOT be installed in a bathroom.

Water controller configurations

- A maximum of four Compact controllers (MC-601) can be fitted.
- Only one master controller can be installed. This can be a Kitchen Deluxe¹ (MC-100V), or any other Compact controller (MC-601).

¹ When a Kitchen Deluxe controller is fitted, it will always function as a master controller, this is the default setting and cannot be changed.

- In addition to a master controller, up to three additional controllers can be fitted

Controller location

- Do not install water controllers near a heat source, such as a cook top, stove or oven. Heat steam, smoke, and hot oil may cause damage.
- Do not install water controllers outdoors unless protection from water/dust ingress and sunlight are provided.
- Do not install water controllers in direct sunlight.
- Do not install water controllers against a metal wall unless the wall is earthed in accordance with AS/NZS 3000.
- Water controllers must not be installed where chemicals such as benzene, alcohol, turpentine, hydrogen sulphide, ammonia, chlorine or other similar chemicals are in use.

The water controller is water resistant, however excessive exposure to water may result in damage. Durability is improved when positioned OUTSIDE the shower recess.

- Avoid direct exposure to water or steam as these may cause the controller to malfunction.
- Water controllers must be installed in shaded and clean locations. They should be fitted out of reach of children (suggested height 1.5 m from the floor), and installed at least 400 mm above the highest part of a sink, basin or bath.

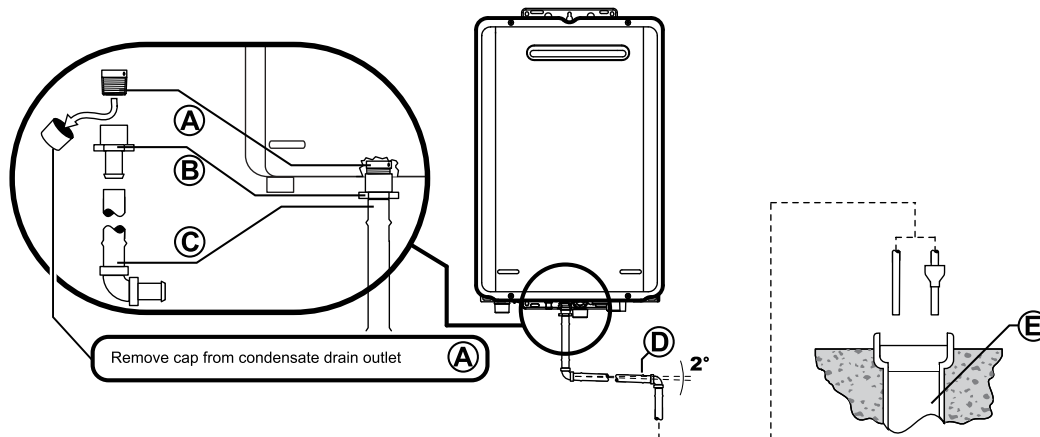
When cleaning your water controller use only a damp cloth and mild detergent.

EF26 condensate neutraliser tank and drain

The Rinnai INFINITY EF26 water heater generates condensate continuously at a rate of up to 5 litres per hour as a by-product of a highly efficient gas burner. This condensate has been neutralised by having an inbuilt condensate neutraliser kit.

Important considerations for the neutraliser drain pipe

The content of AS/NZS 3500 'Temperature / Pressure Relief and Expansion Control Valve Drain Lines' has been used as a guide in preparing the information below.



A. Water heater drain outlet connection, R $\frac{1}{2}$ " (15 mm) BSP male. Condensate / neutraliser drain outlet connection, $\frac{1}{2}$ " (15 mm) BSP male nylon.

N.B: The black plastic shipping cap **MUST BE** removed from the condensate / neutraliser drain outlet prior to water heater operation.

B. PE R $\frac{1}{2}$ " BSP (15 mm) female to barbed irrigation system connector (13-19 mm) or equivalent plastic fitting¹.

C. Drain pipe and fittings to match B.

D. Continuous fall of at least 2° from water heater to discharge point. Lengths and bends in accordance with the table below.

Lengths and changes of direction				
Max. length (m)	9	8	7	6
Max. changes of direction greater than 45°	3	4	5	6

E. Suitable points of discharge are deemed to be drains, sewers or pits. **DO NOT** discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond.

Installation

The drain line **MUST NOT** discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond.

The point of discharge from each drain line shall be located so that the release of condensate / neutraliser does not cause a nuisance, is readily discernible and incurs no risk of damage to the building.

There shall be no tap, valve or other restrictions in any line.

Each line shall fall continuously from the valve to the approved point of discharge.

Drain lines shall not discharge into a storage water heater safe tray.

The end of the condensate line shall be:

- Not lower than 200 mm or higher than 300 mm above an unpaved surface; or
- Not lower than 75 mm, or higher than 300 mm above a gravel pit not less than 100 mm in diameter in a paved surface.
- Where discharging over a tundish or gully trap, drain lines shall have an air gap of a size at least twice the diameter of the drain line.

¹ Non-PE plastics will fail over time due to contact with the acidic condensate. Damage caused by installation of non-PE plastics will not be covered by warranty.

Interconnection of condensate drain lines

Condensate / neutraliser drain lines from multiple water heaters may be joined together provided they conform with the requirements detailed on the previous page.

Common stack discharge

Where individual water heaters are installed in a multi-storey building, the condensate / neutraliser drain lines may discharge into a common stack, subject to the following:

- The discharge from the common stack is to a tundish, having a discharge line, that is not less than the size of the common stack, directly connected to a fixture trap, and installed in connection with any adjacent soil or waste stack.
- The discharge point of the common stack is such that any discharge is readily visible and will not cause any nuisance.
- The common stack is vented by extending the pipe upwards, above the roof level.

Tundish drain lines

The drain line from any tundish shall not be less than DN 20 or less than one size larger than that of the largest drain line discharging into a tundish. Tundish drain lines shall comply with the requirements detailed on the previous page.

Areas subject to freezing

In areas where water pipes are prone to freezing, the drain pipe from any valve shall be insulated and not exceed 300 mm in length. It shall discharge into a tundish through an air gap of not less than 75 mm and not more than 150 mm measured from the outlet of the drain pipe to the rim of the tundish.

Commissioning

AS/NZS 5601.1, clauses 2.6.8 and 6.11.2, states that every part of a gas installation shall be commissioned prior to initial use. It is the installer's responsibility to ensure all current AS/NZS 5601 requirements are met. The URL's provided are links to short videos on how key steps are performed.



The appliance operation must be tested after installation. Ensure the building occupants do not have access to the hot water outlets during this procedure.

Please note


The Rinnai INFINITY EF26 and A-Series come with a factory preset outlet temperature of 55 °C. The high and low gas operating

pressures are also factory preset. Under normal conditions the operating pressures do not require adjustment during installation. Make adjustments **ONLY** if the unit is not operating correctly and all other possible causes for incorrect operation have been eliminated.

Inlet supply pressure to the appliance **MUST BE** checked and set within the operating parameters of the appliance in all instances.

If the appliance can not be adjusted to perform correctly call 0800 RINNAI (0800 746 624) for assistance.

Commissioning steps

1	Flush water pipes and gas line	Before final connection of the water heater , flush the gas, hot and cold water supply lines. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.
2	Connect the gas line	
3	Purge the gas line of air	
4	Final connection test	
5	Check supply pressure	<p>Operate ALL other gas appliances at their maximum rate. With all gas appliances on maximum the supply pressure must read between 1.13-3.0 kPa on Natural gas and on LPG 2.75-3.0 kPa.</p> <p>If the pressure is lower, the gas supply is inadequate and the appliance will not operated to specification. It is the installer's responsibility to check the gas meter, service regulator and pipe work for correct operation and sizing, and rectify as required.</p>
6	PCB settings checked	<p>Refer sideways flue diverter information on the next page and the PCB interface layout and functions page.</p> <p>PCB settings checked if the factory default temperature has been changed.</p> <p>Dip switch settings checked if a sideways flue diverter is fitted.</p> <p> Short video: http://rinnai.co.nz/007</p>
7	Operate and test for gas leaks	Replace the appliance front cover otherwise the unit won't operate correctly, and operate and test for gas leaks using an electronic leak detector.
8	Operational test	<p>Confirm the water flow and hot water delivery temperature using a thermometer.</p> <p>If water controllers are fitted, it is necessary to test their operation through the complete range of functions, refer separate instructions provided with the water controllers.</p>

9 Check cold water inlet filter

Inspect and clean the water inlet filter. This may need to be repeated to ensure the filter remains clear, especially on new installations.

▶ Short video: <http://rinnai.co.nz/006>

If you feel the customer is capable of doing this check it would be beneficial to show them how to inspect and clean the water filter as well.

10 Customer handover

After testing is completed, explain to the customer the function and operation of the water heater and water controllers (if fitted).

Also talk to them about:

- The gas, power, and water connections
- How frost protection works
- Procedure for draining the water heater
- Where to find the data plate
- Maintenance and servicing

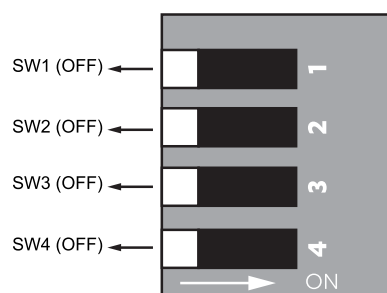
If the customer is not there try and contact them by phone to discuss these important points.

Ensure the installer details section is completed in the operation guide, the commissioning checklist has been completed and signed, and that the guide and checklist are left with the customer.

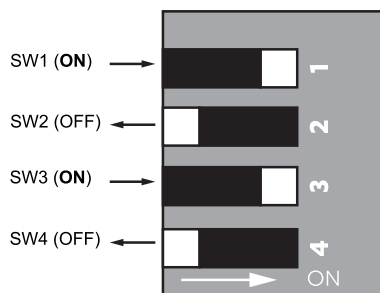
Sideways flue diverter dip switch changes

When delivered ex-factory, by default SW1, SW2, SW3, and SW4 of the DipSW are set to the OFF position.

If a sideways flue diverter is installed onto the water heater, SW1 and SW3 of the DipSW must be set to the ON position.



Default dip switch settings as they are ex-factory.



Dip switch settings required for a sideways flue diverter installation.

The dip switch change for a sideways flue diverter is required to increase the combustion fan speed, which helps overcome the friction losses from having a sideways flue diverter installed on the water heater.

PCB interface and dip switch settings

The PCB interface and dip switch settings must only be changed by a licensed gasfitter. They have been provided as there may be a requirement to change the temperature of the water delivered from the water heater or change the dip switch settings if fitting a sideways flue diverter.



Care must be taken when changing the temperature or dip switch settings as they can be easily switched or bumped into the wrong position. Fully check the operation of the water heater before leaving including the temperature of the water delivered.

The cover of the water heater will need to be removed to carry out this operation. As this will expose live mains voltage wiring **please disconnect the power supply before removing the front cover.**

We wish to draw your attention to the requirements of the New Zealand Building Code and compliance document G12. This requires that water delivered to sanitary fixtures be no more than 55 °C. Increasing the water heater set temperature will require that you protect all sanitary fixtures to which the appliance is plumbed with suitable tempering valves or something similar.

Rinnai will accept no liability for issues arising out of the use of this information.

If you have any doubts about the performance of the water heater, please contact Rinnai by phoning 0800 RINNAI (0800 746 624).

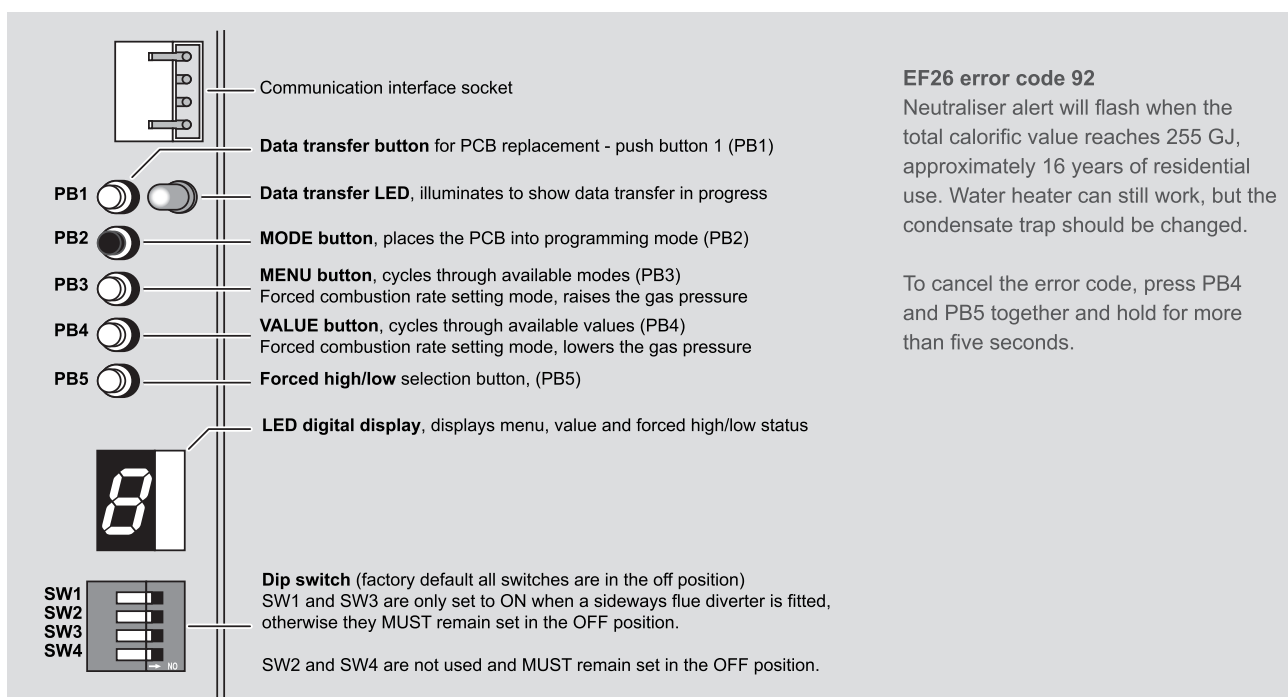
The following information details settings for the Rinnai INFINITY EF26 and A-Series models only. They are not applicable for other models.

Basic operation of the PCB interface

- To place the PCB into programming mode press PB2 until the LED digital display shows 1, noting that the current set value will be displayed shortly afterwards.
- To alter a value press PB4, each press of the button will select the next available value.
- To change to another menu, press PB3, each press of the button will select the next available menu.
- To exit the programming mode and save the selected settings press PB2 until the LED display goes blank.


Note:

- If no buttons are pressed the PCB will automatically exit programming mode after 10 mins.
- Exiting programming mode sets the value last viewed as the current value.



Menu	Menu description	Value							
		A	b	C	d	E	F	H	J
1	Gas type	ULPG	NG	N/A	N/A	N/A	N/A	N/A	N/A
2	Model	2626	2426	2024	1620	N/A	N/A	N/A	N/A
3	Fixed / Max. temp	55 °C	65 °C	60 °C	50 °C	42 °C	40 °C	N/A	N/A
4	OFF water flow rate	+ 3 °C	+ 6 °C	N/A	N/A	N/A	N/A	N/A	N/A
5	50 °C delivery adjustment temp.	0	N/A to NZ—Australian models only					+1 °C	+2 °C
6	Remote controller safe program	ON	OFF	N/A	N/A	N/A	N/A	N/A	N/A
7	OHS	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A
8	EF26 only Condensation prevention on manifold	Default							
9	A24/A26 only Fan revolution	180 Hz	100 Hz	Setting change to reduce fan noise if customer states unit is too noisy (Ver. 7, PCB label G)					
0	Post fan time	65 sec	120 sec	240 sec	480 sec	To reduce the HEX temp. after combustion			

If the settings are changed, please note these on this sheet for future reference. These will be needed if a PCB replacement is required and a manual data transfer is needed.

 Dark shaded sections = default setting

Parameter setting notes

- 2: Values in Menu 2 cannot be adjusted.
- 4: Menu 4 OFF water flow rate
The temperature of the outgoing hot water is monitored by a built-in sensor. If the temperature of the outgoing hot water rises more than 3 °C (default, or 6 °C if 4b) above the selected temperature shown on the digital monitor or the preset limit when water controllers are fitted, the burner will automatically go out.
- 6: Menu 6 Remote controller safe program
Factory default is ON. If a controller has been continuously connected for more than six hours, the PCB automatically defaults to controller only mode, making the assumption that the water heater will always be connected to and operated by a controller. This means if a controller is disconnected, the inbuilt safe program will only allow the unit to deliver a maximum temperature of 42 °C. If this safe program is not needed, change menu 6 from A (ON) to b (OFF).
- 7: OHS for solar applications
N/A for New Zealand models, this is for Australian models only that have different temperature settings. Please remember that the A-Series and the EF26 are not suitable and will not be warranted for solar applications.
- 8: Prevention of condensation on the manifold (EF26 only)
If exhaust gases go back into the combustion chamber, condensation on the manifold nozzle causes error 11. To prevent this, the post-fan time (fan revolution after combustion) can be controlled as follows.

8	Prevention of condensation on the manifold	A	b	C	d
	Post fan time	Outside temp. > 15 °C → 15 sec. Outside temp. ≤ 15 °C → 120 sec.	15 sec	240 sec	480 sec
	Post fan revolution	X (Hz), X depends on the model, e.g. 180 Hz	X (Hz)	X(Hz) + 50 Hz	X(Hz) + 50 Hz

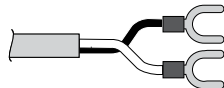
A-Series controller communication cables

Wired water controllers operate at an extra low voltage (12 V DC) which is supplied from the water heater, a 10 m long communication cable is supplied for connection to the water heater. Only Rinnai supplied communication cables may be used.

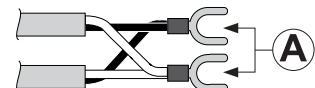
The water heater end of the cables is fitted with spade terminals. Only two pairs of cables (four spade connectors in total) may be terminated. When attaching three or four cables it is necessary to join the cable terminators as shown below.

For each pair cut off the existing spade connectors and re-terminate each pair into a new spade connector (A). Spade connectors are available from your local electrical component retailer

Single cables can be used when terminating up to two communication cables.



Paired cables are to be used when terminating three or four communication cables.

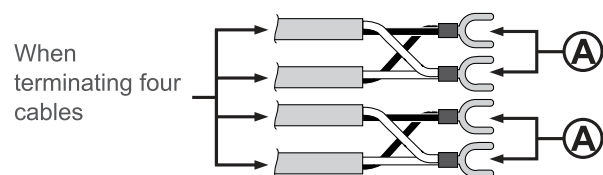
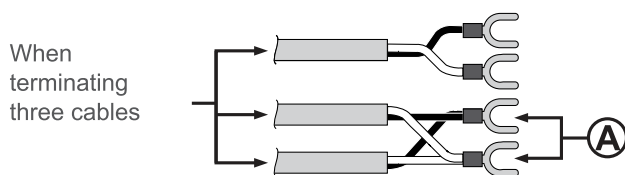


Connecting one or two communication cables

Follow steps one through five below to terminate the cables to the water heater.

Connecting three or four communication cables

To connect three or four cables, separate all the cables to be fitted into pairs.

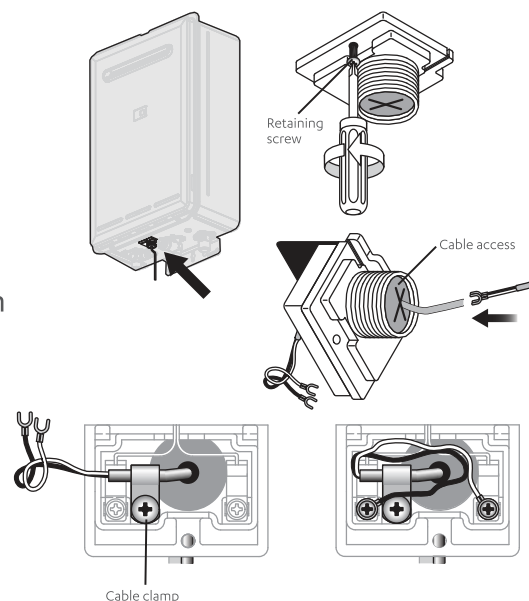


Follow steps one through five below to terminate the joined cable pairs to the water heater.

1. Isolate the power supply by switching the power point off and removing the power plug of the water heater from the electric power socket.
2. Removing the retaining screw of the cable connector at the base of the unit.
3. Swing the cable connector door open and thread the cable through the weather seal of the cable access hole, allowing sufficient cable length so that the sheath of the cable can be secured with the cable clamp supplied with the transceiver.
4. Loosen the screw terminals and connect the cable spade connectors to these terminals and re-tighten.

Polarity is not important, either wire colour can be connected to either terminal.

5. Return the cable connector to the original position, taking care not to damage the cable wires in the process, and replace the retaining screw.



EF26 controller communication cables

Wired water controllers operate at an extra low voltage (12 V DC), which is supplied from the water heater. A 10 m long communication cable is supplied for connection to the water heater. Only Rinnai supplied communication cables may be used.

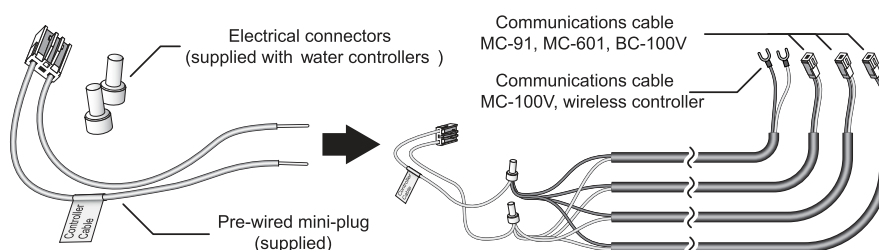


Connecting communication cables to the mini-plug

DO NOT attempt to connect water controller cables to the mini-plug when it is plugged into the PCB unless the power to the water heater is switched OFF, otherwise damage to electrical components may occur.

Water controllers are connected to the PCB by a dedicated pre-wired mini-plug.

Standard electrical cable connectors can be used to terminate the water controller wires to those on the mini-plug. The existing spade connectors, of the communication cables, will need to be removed prior to termination. Controllers are not polarity sensitive, however to avoid confusion it is recommended that like coloured wires be terminated together.

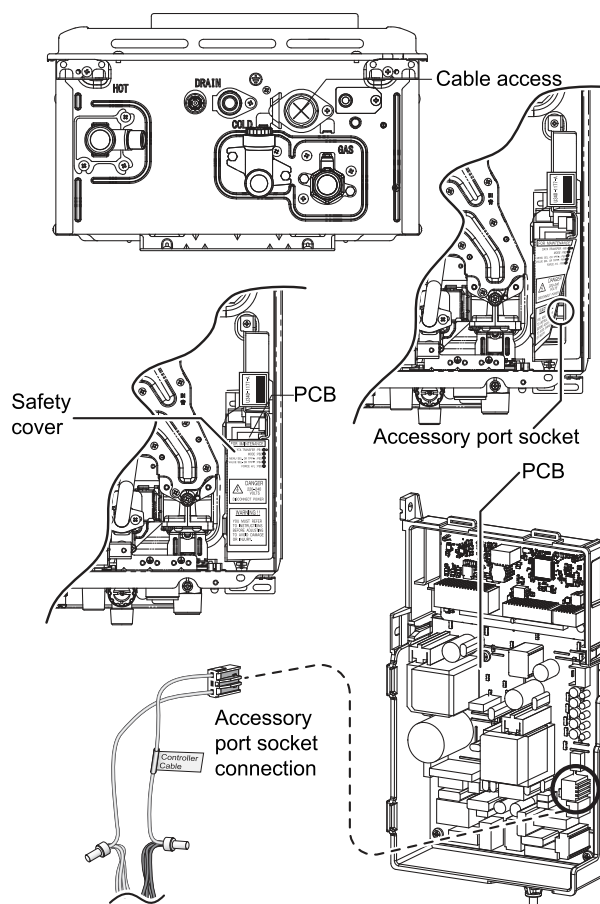


Connecting communication cables to the PCB (refer image below)

DO NOT attempt to connect the mini-plug or water controller cables to the water heater unless the power to the water heater is switched OFF, otherwise damage to electrical components may occur.

1. Isolate the power supply by switching the power point off and removing the water heater plug from the power socket.
2. Remove the front cover of the appliance.
3. Insert the mini-plug and the connected water controller cables through the cable access at the base of the appliance. Ensure the cable connectors are located inside the appliance for protection.
4. Locate the PCB (bottom right of the appliance), and carefully move the plastic safety cover out of the way.
5. Locate the accessory port socket (bottom front of PCB).
6. Plug the mini-plug into the accessory port socket, the plug and socket are keyed so that they can only be plugged into the one direction).

7. Proceed with the water controller installation and connect the communication cables to the controllers.



Rinnai.co.nz

Tel: 0800 746 624
<http://www.youtube.com/rinnainz>
<http://facebook.com/rinnainz>

Installation guide

U340-1336X02(00)
REU-A/E(NZ)



INFINITY continuous flow water heaters

Operation guide

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

Rinnai

Important

This guide is applicable for continuous flow water heaters manufactured from 2019 onwards serial number 18.12-xxxx.

This appliance must be installed in accordance with:

- Manufacturer's installation instructions
- Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 and G12/AS1

For use with Natural Gas or Universal LPG as indicated on the appliance.

Not suitable as a spa or swimming pool heater.

Not suitable for hydronic applications.

The EF26 and A-Series models are not suitable for solar installations.

Appliance must be installed, commissioned and serviced by an authorised person, being in New Zealand a licensed gasfitter.

Warning

Improper installation, adjustment, alteration, service and maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624).

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Continuous flow water heaters, like cars, require regular maintenance and servicing. For reliable operation Rinnai INFINITY continuous flow water heaters, in residential applications, should be serviced **every two years**.

Warning about hot water

Excessively hot water is dangerous. Rinnai INFINITY continuous flow water heaters, through the use of water controllers, allow you to control the temperature of hot water to safe levels.



Always

- Test the water temperature with your elbow before placing your child in the bath, and feel the water yourself before bathing or showering.
- Supervise children whenever they are in the bathroom.
- Make sure the hot water tap is turned off.

Consider

Installing child proof tap covers or child resistant taps, both will prevent a child being able to turn on a tap.

Never

Leave a toddler in the care of another child. They may not understand the need to have the water temperature set at a safe level.

Safety and important messages

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.



If the supply cord is damaged, it must be replaced by a licensed tradesperson. This must be a genuine replacement part available from Rinnai.

DO NOT:

- Touch the unit cover or the flue outlet
- Insert objects into the flue outlet
- Spray water directly into the flue outlet
- Spray aerosols in the vicinity of this appliance while it is operating
- Use or store flammable materials near this appliance
- Place articles on or against the water heater
- Store pool chemicals near this appliance
- Modify this appliance

Keep trees, shrubs, and other obstructions well clear of the flue outlet.

About your water heater

Before using or operating your water heater, ensure your installer talks to you about the use and care of this appliance, and that you understand these instructions.

Your installer needs to complete:

- Their details at the back of this guide
- The commissioning checklist supplied with the unit—this verifies the water heater has been installed and commissioned correctly

The installer needs to leave the commissioning checklist and this operation guide with you.

Damage prevention in freezing conditions



IMPORTANT

The Rinnai INFINITY water heaters require power to prevent damage in freezing conditions. **DO NOT** disconnect the power if there is a likelihood of freezing without draining the water heater. Instructions for draining the water heater can be found on p.10.

How the water heater operates

The burner lights automatically when the hot water tap is opened, and goes out when the tap is closed. Ignition is electronic, there is no pilot light. When the hot water tap is off there is no gas used.

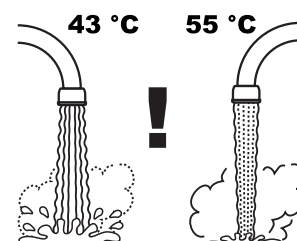
In the event of a power failure

The water heater will not operate without electricity. If the power fails water heating will cease. When the power is restored the water flow may need to be stopped and restarted (and a controller, if fitted, switched on) in order for water heating to continue.

Water flow

The flow will vary slightly depending on the incoming water temperature and temperature selected. For example, the water flow will be higher at 43 °C than at 55 °C.

There is also a minimum flow rate required for the continuous flow unit to start, so if a hot water tap is only opened a fraction, there may not be enough flow to start the unit.



General information

Frost protection

Frost protection is fitted as standard on all models. Frost protection operates automatically, as required, whenever the appliance is connected to power.

If the power has failed and there is a risk of damage from frost, turn off the gas supply to the unit and open a tap to allow flow through the unit, this may prevent damage from freezing.

If the INFINITY is not going to be used for a period and the power supply is disconnected, turn off the water and gas supplies, and arrange for a plumber to drain the water to prevent frost damage. If for practical reasons a plumber is unable to drain the INFINITY, there is an instruction on p.10.

Installation by a licensed tradesperson

Only a licensed tradesperson can install, adjust, maintain, and service this water heater. Any work carried out by a non-licensed tradesperson is illegal and will void any warranty.

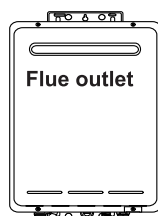
Safety devices

The Rinnai INFINITY has the following safety devices fitted:

- flame failure
- boil-dry protection
- overheat protection (OHS)
- fusible link
- pressure relief valve
- combustion fan rpm check

Discolouration of flue outlets

The colour of the flue outlet may change over time due to condensate in the exhaust gases. This is normal. The discolouration will not damage the unit and will not affect the performance of the water heater.



Environmental

The Rinnai INFINITY is manufactured from a number of recyclable materials. At the end of its useful life please consider what parts could be recycled, for example scrap metal, PCB etc.



Servicing

Rinnai has a maintenance, service and spare parts network with personnel who are fully trained and equipped to give the best advice on your Rinnai appliance.

Servicing and repair should only be carried out by authorised personnel, please call Rinnai (0800 746 624).

For reliable operation Rinnai INFINITY water heaters in residential applications should be serviced every two years*.

Regular maintenance and servicing is not covered by the Rinnai warranty. Do not attempt to carry out any service work other than that mentioned in this guide. If you have any other faults or problems, please contact your installer or Rinnai.

* Including the flue system if you have an internal unit

* Installations located in or near coastal areas may require additional maintenance due to corrosive airborne ocean salt

INFINITY controllers

Temperature controllers are available to allow precise digital temperature control—a great safety feature if you have young children. Controllers can be fitted at any time during or after installation of the Rinnai INFINITY.



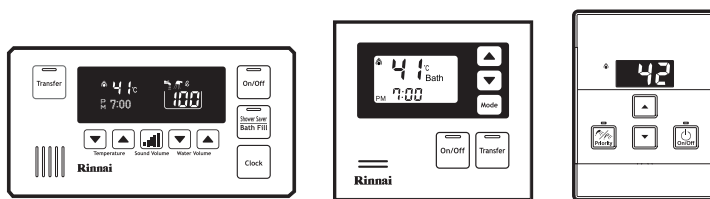
Solar installations

There is a recommended solar layout for continuous flow water heaters used in solar installations. It is important your installer configures your solar system correctly as water heaters in solar installations produce higher than normal temperatures.

INFINITY controllers cannot be used with Rinnai continuous flow water heaters in solar installations as the hot water does not always pass through the unit.

The EF26 and A-Series range of water heaters are not suitable for solar installations as they cannot be set to 75 °C.

INFINITY controllers



Water controllers are an optional extra. They allow precise temperature control—no need to mix hot and cold water.

General controller information

When used correctly the Rinnai INFINITY, when combined with digital controllers will deliver the selected temperature at the controller, even when the water flow varies, or when more than one tap is in use.

Each digital water controller can be individually programmed, though the INFINITY can only deliver one set temperature at a time. For example, someone is showering at a temperature of 43 °C, and another person uses the kitchen tap. The kitchen tap can only deliver 43 °C until the person in the shower is finished.

Available Rinnai controllers

- Compact, temperature selection only
- Kitchen Deluxe, temperature selection and voice prompting
- Bathroom Deluxe, temperature selection, shower saver, bath fill, and voice prompting

Controller configurations

A maximum of **four** (three for the N-Series) water controllers can be fitted, with the following provisos:

- Only one Kitchen Deluxe controller can be fitted. A Kitchen Deluxe is only installed if a Bathroom Deluxe controller is installed.
- Only two Bathroom deluxe controllers can be fitted.
- Only one controller can be set to deliver 55 °C, this cannot be the controller in the bathroom.

Controllers need to be turned on

The Rinnai INFINITY will not heat the water unless the controller(s) are turned on. If water is flowing before a controller is turned on, the Rinnai INFINITY will not heat the water. Turn off the tap for a few seconds then turn on again.

Ignition problems

If the Rinnai INFINITY fails to ignite the 'In Use' indicator will not illuminate. The Rinnai INFINITY will not attempt re-ignition until the water flow is stopped for a few seconds and then restarted.

When gas bottles have been changed or the gas supply is disrupted (controller may display error code 11 or 12) ignition may fail and the 'In Use' indicator won't be on. The water flow may need to be stopped and restarted several times before the appliance will operate.

Available temperatures on controllers (°C)

Kitchen (domestic)	37, 38, 39, 40, 41, 42, 43, 44, 46, 48, 50, 55
Kitchen (commercial)	60, 65, 75
Bathroom (hot water)	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50
Bathroom (bathfill)	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48

For water temperatures lower than 37 °C, add cold water.

Troubleshooting without controllers

Fault	Possible solution
Unit doesn't start	Check power is on at the unit. Check the gas isolation valve at the unit and gas meter are fully open.
Units starts and then immediately shuts down	Check power is on at the unit. Check the gas isolation valve at the unit and gas meter are fully open. Open your hot water tap fully.
Excessive temperature fluctuation while the water is flowing	Service call
Excessive noise or vibration from the water heater	Service call

Faults caused by insufficient gas supply, insufficient water supply, gas quality, water quality, installation errors or operation errors are not covered by warranty.

Troubleshooting with controllers

Rinnai INFINITY continuous flow water heaters have self-diagnostic capability. If a fault occurs, an error code will flash in the digital water controllers (or status monitor on selected models). This assists in diagnosing the fault—please state the code displayed when contacting Rinnai.

In all cases you may be able to clear the error code by turning the hot water tap off, then on again. If this does not clear the error code, trying pushing the On/Off button Off, then On again. If the error code remains, contact Rinnai for advice.

Error code	Fault	Possible solution
-	Noticeable reduction in water flow	Inlet water filter needs to be cleaned—service call.
03	Power interruption during bathfill, water will not flow when the power is back on	Turn off all hot water taps and press On/Off twice.
05	Bypass flow control failure	Service call
10	Air intake or flue blocked	Service call
11	No ignition, no gas supply	Check gas is turned on at the water and gas meter, or cylinder.
12	Flame failure, low gas flow	Check gas is turned on at the water heater and gas meter, or cylinder. Check there are no obstructions to the flue outlet.
14	Thermal fuse or overheat switch failure	Service call
15	Venturi control failure	Service call

Error code	Fault	Possible solution
16	Over temperature warning	Service call
17	Venturi blockage	Service call
19	Electrical earthing fault	Service call. Will require checking the harness and remote controller cable.
21	EF26/A-Series - dip switch setting fault N-Series - data transfer error	Service call
25	Condensate trap error	Check condensate drain for blockage
32	Outgoing water temperature sensor faulty	Service call
33	Heat exchanger thermistor failure	Service call
34	Combustion air temperature sensor failure (internal models only)	Service call. Will require; checking sensor wiring for damage, measuring resistance of sensor, checking combustion fan, checking internal flue leakage, checking flue system integrity, and possibly replacing sensor.
38	Exhaust thermistor failure	Service call
41	Freeze protection thermistor failure	Service call
51	Inlet thermistor failure	Service call
52	Gas modulating valve faulty	Service call
54	High exhaust gas temperature failure	Service call
55	Scheduled service reminder ¹	Service call
61	Combustion fan failure	Service call
65	Water flow control failure—does not stop flow properly	Service call
70	PCB failure	Service call
71	Solenoid valve circuit failure	Service call
72	Flame rod failure	Service call
92	Neutraliser alert	Service call, condensate trap needs changing.
LC	Scale build-up in heat exchanger—when checking maintenance code history, 00 is substituted for LC	Service call
5E	Cascade diagnostic display. Displays 5E when an error code displays on any secondary unit with a cascade connection.	Service call

¹ **Service reminder:** Rinnai recommends commercial appliances are serviced annually. N-series models display a scheduled service reminder code 55 (when programmed to do so) when the annual service period has elapsed as a reminder that the water heater is due to be serviced. The reminder code flashes intermittently on the status monitor and water controllers (if fitted)—normal operation of the appliance is not affected.

Draining the water heater

Frost protection is fitted as standard on all Rinnai INFINITY water heaters. Frost protection operates automatically, as required, as long as the appliance is connected to the power supply.

If you live in an area prone to frost and will be away for an extended period with the power supply disconnected, Rinnai recommend draining your appliance to prevent frost damage, which is not covered by warranty.

We strongly recommend having your water heater drained by a plumber or gasfitter, but understand that remote locations and cost may prohibit this.

About these instructions

These instructions are intended as a guide only. Rinnai does not accept liability for issues arising from the use of this information. In particular Rinnai will not be responsible for damage caused by water freezing where this procedure was not followed and insufficient water was drained from the unit.

Procedure

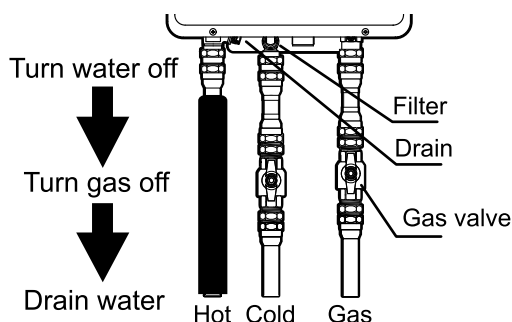
You will need:

- A bucket if water cannot be drained into a garden or drain
- Approximately 15 minutes to complete the procedure



Wait until the water cools before draining as hot water will drain from the unit if there has been recent hot water use.

1. Turn off any water controllers in the building and then turn off the water, gas, and power to the unit.



2. To flush the water heater open all hot water taps in the building.
3. If required, place the bucket under the unit and unscrew the water filter and hot water drain plug.
4. Drain the water heater—the unit and surrounding pipes can hold up to one litre of water.

Refilling the Rinnai INFINITY

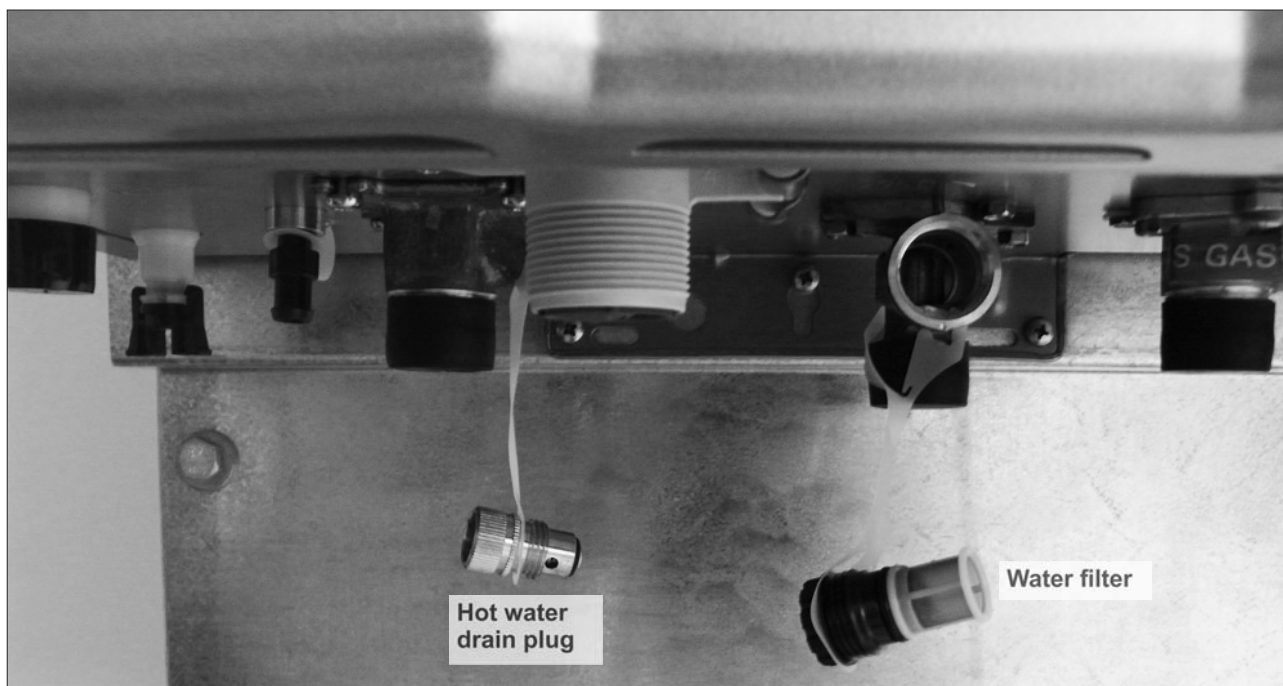
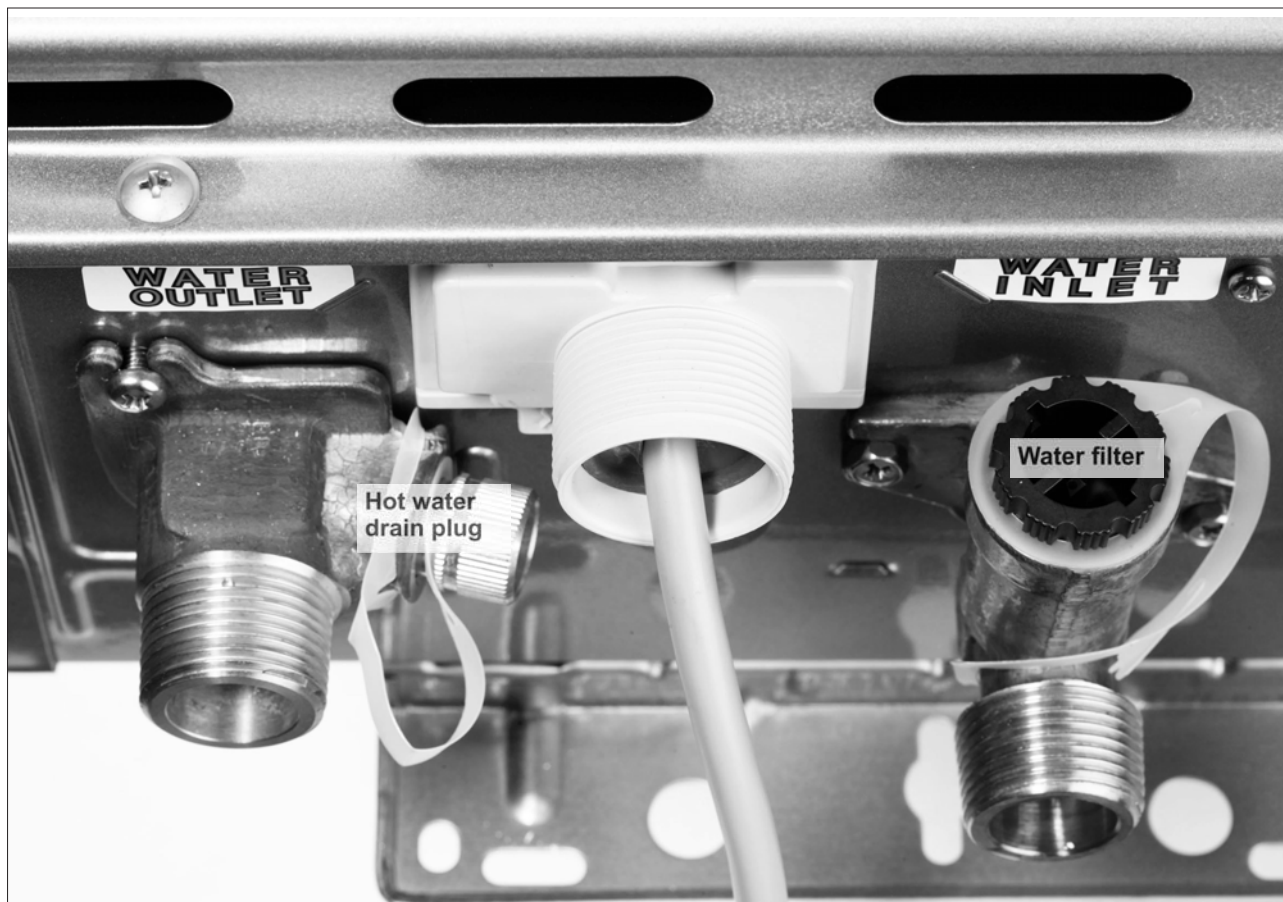
1. Check the gas and power are turned off. Turn off any open hot water taps.
2. Screw in the water heater drain plugs and the water filter in the cold water inlet.
3. Turn on the cold water at the water heater.
4. Turn on the hot tap to purge air from the pipe work and unit, then turn off the hot tap.
5. Turn on the gas and power at the Rinnai INFINITY and turn on any digital controllers (if fitted).

When the water heater or external pipes have frozen

DO NOT operate the Rinnai INFINITY if the water heater or the external pipes have frozen. Close the gas and water valves, and turn off the power. Wait until the water thaws, check this by opening the water supply valve.

Check the Rinnai INFINITY and pipes for leaks.

Please note: The hot water drain plug and water filter positions will vary depending on the model. The images below are to highlight what they look like.



Limited Warranty

Rinnai INFINITY Continuous Flow Water Heaters

Rinnai warranty summary table

This warranty is applicable from all Rinnai INFINITY continuous flow water heaters manufactured from 2019 onwards. All terms of the warranty, subject to the conditions below, are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. Proof of purchase and installation date will be required at the time of any warranty claim. This warranty is only valid within the country of purchase.

Rinnai INFINITY	Application	HEAT EXCHANGER		ALL OTHER PARTS	
		Parts	Labour	Parts	Labour
EF26 and A-Series models	Residential WITHOUT controllers	10 years pro rata ¹	3 years	3 years	3 years
	Residential WITH controllers	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²
HD and N-Series models	Residential	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	5000 hours or 3 years pro rata ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²

¹ Under a pro rata warranty, if the heat exchanger fails before the end of the warranty, Rinnai will replace the heat exchanger at a cost that depends on the age of the heat exchanger at the time of the fault. For further details refer to the pro rata table on p.14.

² Whichever comes first

Residential application

A residential application is defined as an installation where a continuous flow unit is set to 55 °C³ or lower, delivering hot water to a single residential dwelling (not used for commercial purposes⁴).

All other installations are defined as commercial applications.

For constant use applications, such as circulating ring mains, the water heater, must be sized and installed according to written guidelines from Rinnai.

General warranty terms

Rinnai reserves the right to make modifications and change specifications and its parts without notice.

For the purposes of the Consumer Guarantees Act 1993, Rinnai only guarantees the availability of repair facilities and spare parts for the express warranty period recorded in the table above.

This warranty does not limit any consumer rights or guarantees that may apply under the Consumer Guarantees Act 1993. If the product is being acquired for the purposes of a business, the provisions of the Consumer Guarantees Act 1993 do not apply and no other warranties (either express or implied by law) apart from those stated in the warranty will apply.

³ A solar installation using a Rinnai INFINITY continuous flow unit (excluding EF26 and A-Series models) in a single residential dwelling is considered a residential application.

⁴ Examples of a commercial application in a residential dwelling; hair salon, catering kitchen, communal care facility etc. An accommodation business such as a motel, where a continuous flow unit serves the equivalent of a single family dwelling, is deemed to be a residential application.

Warranty terms and conditions

1. All terms of the warranty are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. The installer must issue a certificate of compliance by law in New Zealand. Warranty claims may be invalid if not accompanied by details of the installing or supervising gasfitter's registration number and the gas certification number.
2. All Rinnai appliances must be installed, commissioned, serviced, repaired and removed in accordance with the manufacturer's installation instructions, local regulations, and building codes by persons authorised by local regulations to do so.
3. All appliances must be operated and maintained in accordance with the manufacturer's operating instructions.
4. Servicing of the product is to be carried out by a Rinnai authorised service centre.
5. The warranty applies only to the components supplied by Rinnai. It does not apply to components supplied by others, such as electrical switches, electrical cables, fuses, isolating valves, pipework, and where applicable flue systems, but it is not limited to these.
6. Where the appliance has not been sited in accordance with the installation instructions or installed such that normal access is difficult, a service charge will apply. If at the discretion of the attending service person the installation is deemed illegal or access is dangerous, service will be refused. Any work required to gain reasonable access to the appliance will be chargeable by the attending service person (for example, removal of cupboards, doors, walls, or the use of special equipment to move components, but not limited to these).
7. Where the failed component is replaced under warranty, the balance of the original warranty will remain effective.
8. Rinnai reserves the right to transfer functional components from defective appliances if they are suitable.
9. Rinnai reserves the right to have installed product returned to the factory for inspection.
10. Where the water heater is installed outside the metropolitan area or further than 40 km from a Rinnai authorised service centre, travel costs shall be the owner's responsibility.

Warranty exclusions

The following exclusions may cause the warranty to become void and will result in a service charge and costs of parts (if required).

1. Accidental damage and acts of God.
2. Failure due to abuse or misuse, improper maintenance or improper storage.
3. Failure due to incorrect or unauthorised installations.
4. Failure or damage caused by alterations, service or repair work carried out by persons other than Rinnai service persons or service centres.
5. Where the water heater has failed directly or indirectly as a result of poor water quality outside the limits specified.
6. Where it is found that there is no fault with the appliance and the issue is related to the installation or is due to failure of electric or gas supplied.
7. Subject to any statutory provisions to the contrary, Rinnai does not accept
 - a. liability for consequential damage or incidental expenses resulting from any breach of the warranty.
 - b. claims for damage to building or any other consequential loss either directly or indirectly due to leaks from the appliance or any other faults.

Pro rata heat exchanger warranty table

Under a pro rata warranty, if the **heat exchanger** fails before the end of the warranty, Rinnai will replace the heat exchanger at a cost that depends on the installation application and the age of the heat exchanger at the time of the fault.

Year	EF26 and A-SERIES		HD and N-SERIES	
	Residential WITHOUT controllers	Residential WITH controllers	Residential	Commercial
1	100%	100%	100%	33.3%
2	100%	100%	100%	33.3%
3	100%	100%	100%	33.3%
4	70%	90%	90%	-
5	60%	80%	80%	-
6	50%	70%	70%	-
7	40%	60%	60%	-
8	30%	50%	50%	-
9	20%	40%	40%	-
10	10%	30%	30%	-
11	-	20%	20%	-
12	-	10%	10%	-

The percentages above relate to the heat exchanger component only. It does not include labour.

Water quality

Water quality outside the limits (as set down below) will void this warranty.



Water quality and impurity limits

TDS (Total Dissolved Solids)	Total hardness CaCO ₃	Alkalinity (as CaCO ₃)	Dissolved (free) CO ₂	pH	Chlorides	Magnesium	Sodium	Iron	Langelier Index
Up to 600 mg/L or ppm	Up to 200 mg/L or ppm	Up to 200 mg/L or ppm	Up to 25 mg/L or ppm	6.5-8.5	Up to 300 mg/L or ppm	Up to 10 mg/L or ppm	Up to 150 mg/L or ppm	Up to 1 mg/L or ppm	Between -1.0-0.8

Most metropolitan water supplies fall within these limits. If sludge or foreign matter is present in the water supply, a suitable filter should be incorporated in the water supply.

Some examples of water quality issues where water may need to be treated:

- Hard water (areas including Whanganui)
- Aggressive water (areas including Christchurch)
- Both hard and aggressive water (some bore water)

Purchase details

Record your purchase details below

ATTACH YOUR PROOF OF PURCHASE HERE:

Retailer:

Retailer address:

Date of purchase:

Product details:

Please keep these details in a safe place for future reference.

Register your Rinnai INFINITY online at www.rinnai.co.nz/register/ for service reminders, product updates and special offers—you can unsubscribe at any time.

Installer details

Company name:

Installer name:

Address:

Phone: Mobile:

Certificate of compliance number for installation:

Signed: Date:

Rinnai.co.nz

Tel: 0800 746 624
<http://www.youtube.com/rinnainz>
<http://facebook.com.rinnainz>

Operation guide

barcode placeholder

U340-1335X03(00)



INFINITY gas continuous flow water heating

Specification guide: A-Series, EF26, HD, and N-Series

Rinnai

Important

Rinnai is constantly improving its products, and as such, information and specifications are subject to change without notice. For the most up-to-date information, go to www.rinnai.co.nz.

Help is here

For more information about buying, using, and servicing of Rinnai appliances call 0800 RINNAI (0800 746 624).

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Web: www.rinnai.co.nz
www.youtube.com/rinnainz
www.facebook.com/rinnainz

Online training at www.rinnai.co.nz/TradeSmart

We are proud of being New Zealand's largest provider of industry online learning, giving vital advice and support to technical institutes and other learning organisations, as well as all the people involved in selling, specifying, and installing Rinnai product.

There are a number of courses available for Rinnai INFINITY water heaters with new courses being uploaded regularly.

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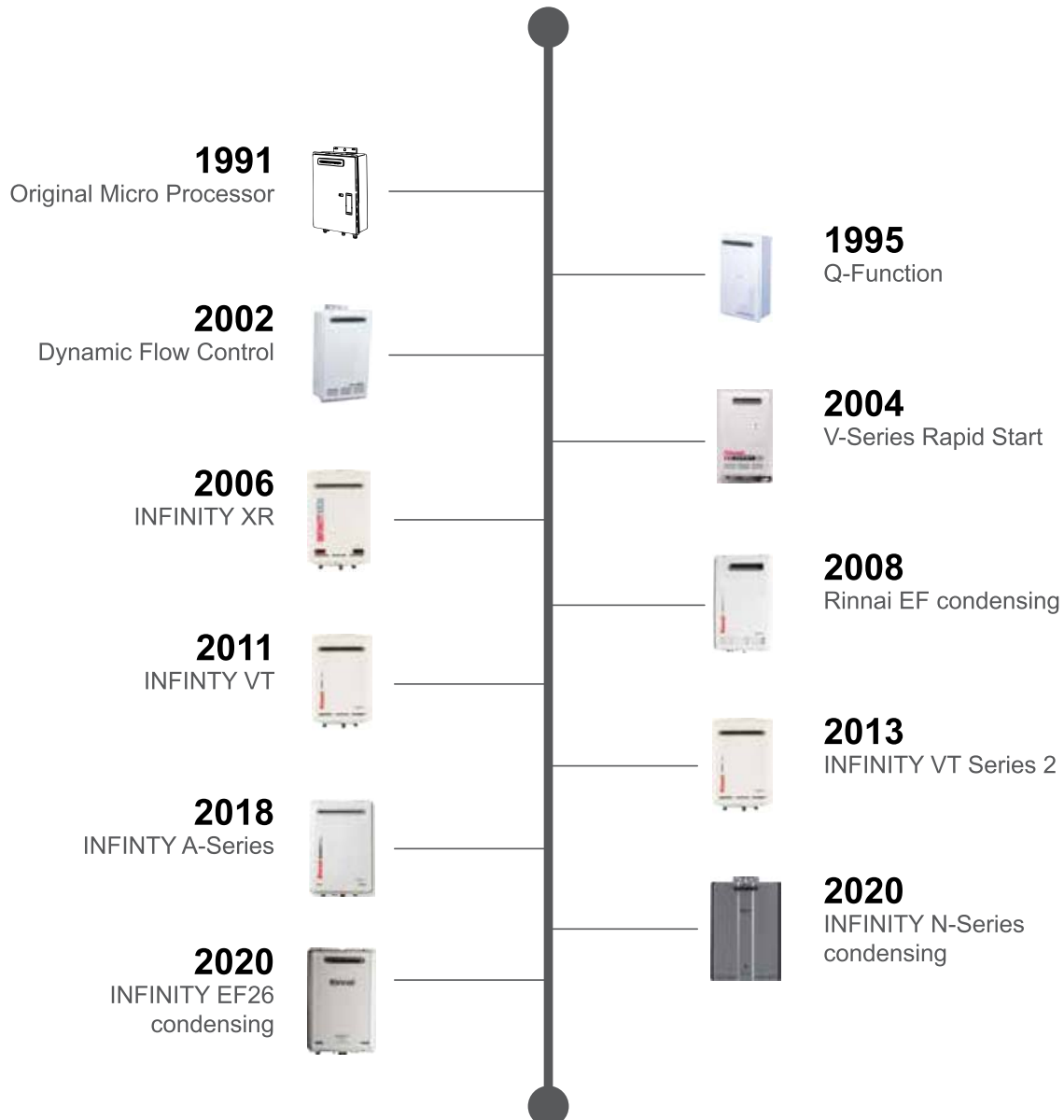
Leaders in gas continuous flow

When you turn on a tap you want water at the right temperature fast, which is why over the years we've devoted considerable time and resource to leading edge research and development.

We were the first to introduce continuous flow technology and have been tirelessly working on improving this ever since.







Rinnai continuous flow technology timeline



Rinnai INFINITY range

The Rinnai INFINITY range is made up of four categories to cater for a variety of hot water demands and installation requirements.

Category	Suitability	
Rinnai INFINITY A-Series Improved accessibility for easier and faster service	Residential applications only	
Rinnai INFINITY HD Heavy duty on demand for demanding jobs.	Residential and commercial applications	
Rinnai INFINITY N-Series Condensing technology to deliver higher efficiencies.	Residential and commercial applications	
Rinnai INFINITY EF26 Condensing technology, replacing the EF24.	Residential applications only	

Model	Mounting position	Input	Output	Thermal efficiency on high	Status monitor
A16	External	16.3-124 MJ/h	27.8 kW	80.5%	No
A20	External	19.9-156 MJ/h	34.9 kW	80.5%	No
A24	External	16.3-184 MJ/h	42.0 kW	81%	No
A26	External	16.3-199 MJ/h	44.5 kW	80.5%	No
EF26	External	16.3-175 MJ/h	44.5kW	91.5%	No
HDi200	Internal	16.0-195 MJ/h	44.5 kW	83%	No
HD200	External	16.0-199 MJ/h	45.9 kW	82%	Yes
HD250	External	20.0-249 MJ/h	57.8 kW	83%	No
N56kWi	Internal	16.0-209 MJ/h	55.5 kW	97%	Yes
N56kWe	External	16.0-209 MJ/h	55.5 kW	97%	Yes

Service and maintenance

For reliable operation Rinnai INFINITY continuous flow water heaters in residential applications should be serviced every two years. For commercial applications Rinnai has a maintenance and servicing schedule, please contact us for more information.

What is continuous flow?

A continuous flow hot water system only heats water when it passes through the unit. It will deliver a continuous flow of heated water at a predetermined flow rate, depending on the model, as long as the unit is connected to the power and gas.

General principle of operation

Each Rinnai INFINITY has a number of components that control the water temperature and water flow. These are:

- PCB (onboard computer)
- water flow control valve
- water flow sensor
- modulating gas valve
- outlet water temperature sensor

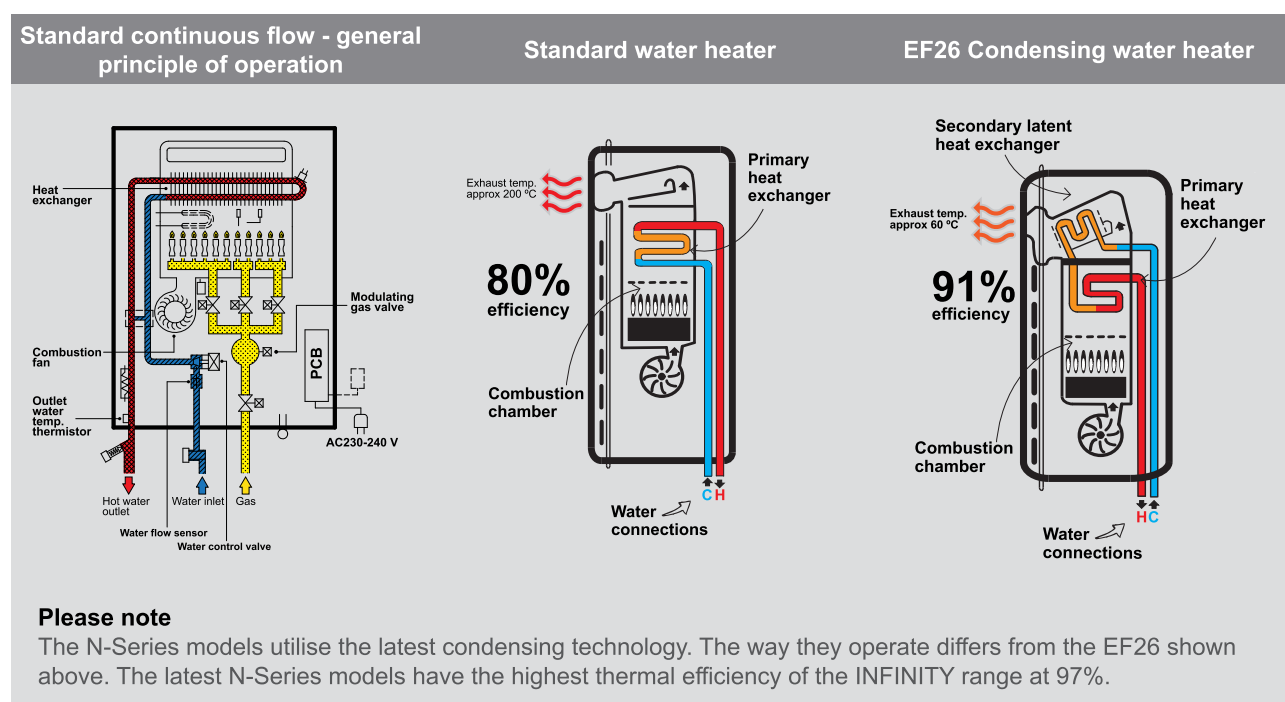
They do this by preheating the incoming water through the transfer of heat from the exhaust gas, which in a standard unit would otherwise be wasted.

Water then flows to the primary heat exchanger and is heated. as the water is already preheated it uses less gas to reach the required temperature.

When a tap is turned on the unit senses the need to start. The combustion fan starts, ignition begins (electronic requiring electricity), and the gas valve opens. Once the flame is established the appliance will heat the water through the heat exchanger (as required) until the tap is turned off.

What is condensing continuous flow?

The Rinnai N-Series and EF26 utilise condensing technology to deliver higher efficient water heaters, requiring less gas to operate. These water heaters, via a secondary heat exchanger, unlock energy that would otherwise be wasted.



Model selection for residential applications

When specifying residential applications there are some questions you need to ask to determine what model(s) are required. Keep in mind future requirements of the building. Water heating solutions should be designed to the number of hot water outlets and not the number of people.

How many bathrooms?

An A16 or A20 unit may be suitable for a one bathroom home, a two or three bathroom home will need a larger Rinnai INFINITY, or even multiple units.

Where are the bathrooms and other hot water outlets in the building?

Where are the bathrooms and other hot water outlets in relation to where the water heater is to be installed? In most cases it is better to site the Rinnai INFINITY closer to the kitchen where there is an immediate demand for hot water. If bathrooms are situated at opposite ends of the house two units may be required.

Simultaneous demand?

How likely will hot water outlets, such as showers, be used at the same time?

Scenario one: Two bathroom home with a couple who rarely use the second shower—an A20 may be suitable.

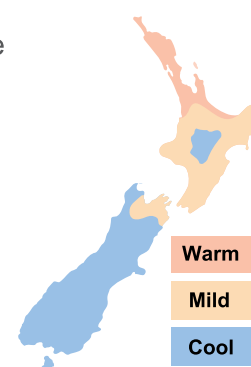
Scenario two: Two bathroom home with a family of five who fight for two showers in the morning—a larger Rinnai INFINITY would be needed.

What type of tapware is installed?

There is a large range of tapware in the market, some with very high flow rates. The main consideration is the type of shower rose installed and how many litres it puts out—typical flow rates for showers is around 8-12 L/min. This needs to be factored when determining the model. To measure the flow rate of a shower, hold a bucket under the shower rose for one minute and measure the water volume.

Location in New Zealand?

Use the NZ map to determine the climate zone.



Ambient water temperatures will vary throughout the country, especially in winter. This is important when determining incoming water temperature and the temperature required at the hot water outlet as this will affect how much hot water the unit can deliver. For more information refer to Appendix 1 on p.36.

Model selector example

Determine the hot water outlets that will run simultaneously and list the flow rates against them.

Hot water outlet	Typical flow rate	Worked example
Bathroom 1	9 L/min	9 L
Bathroom 2	9 L/min	9 L
Kitchen	6 L/min	6 L
Laundry	6 L/min*	
Other	Allow 6 L/min	
TOTAL		24 L

* Some washing machines, particularly front loaders, have a cold-only connection as they have an internal heater. Hot water in this instance would not need to be factored into this calculation.

In the column for the geographical region move down until a number bigger than your total appears.

Warm (L/min)	Mild (L/min)	Cool (L/min)	A-Series	HD	EF26 & N-Series
16	13	11	16	200	EF26
20	17	14	20	200	EF26
24	20	17	24	200	EF26
26	22	19	26	200	N56
30	26	22	26	250	N56
32	27	23		250	N56

Read across the model, e.g. for 24 litres per minute in the mild zone an A26 is selected. If you find the flow rate is greater than the figures listed in the table please contact Rinnai for advice. Multiple units or an alternative hot water heating solution may be required.

Location of a Rinnai INFINITY

To provide safe and effective water heating it is important to adhere to all the relevant gas installation standards. If in doubt it pays to consult a licensed gasfitter to double check where the unit can be located.

General installation considerations

The Rinnai INFINITY should be placed as close as possible to the most frequently used hot water outlet(s) to minimise the delay for hot water. In most cases it's better to site the unit closer to the kitchen where there is an immediate demand for hot water.

For installations where the distance between the water heater and outlets is considerable, a flow and return system with a buffer tank can be used to minimise the waiting time for hot water delivery. Alternatively multiple units can be strategically placed to serve different outlets.

Operating noise

Some people are susceptible to low level noise. INFINITY units operate at around 50-54 dB(A). This needs to be considered if locating the appliance near a bedroom.

Easy access

All continuous flow water heaters must be installed so that access can be gained for servicing and repair without hazard or undue difficulty.

If mounting the unit at height the owner must arrange permanent and safe access, or provide another means of safe access such as scissor or boom lifts.

External models

External models are designed for outdoor installations only. They must be located above ground where products of combustion can be naturally dispersed. They should not be in enclosed areas as the unit can suffocate on its own flue gases, which will cause the unit to malfunction. Refer to the general flue clearances diagram below.

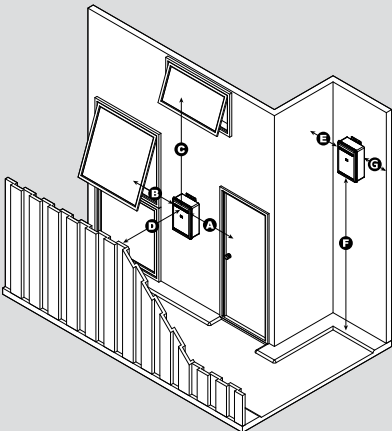
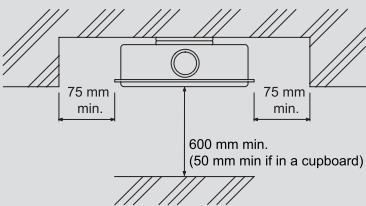
Internal models

Internal models are designed for indoor installations only. They are a flued appliance. They may be installed in an enclosure if the requirements of AS/NZS 5601.1 are met. An enclosure is defined as a compartment, enclosed area, or partitioned off space primarily used for the installation of the appliance.



Example of an HDi200 installed in a cupboard - Rinnai Auckland showroom

For internal units we recommend a 600 mm clearance in front of the unit for servicing access. This can be reduced to 50 mm if installed in a cupboard, refer clearances below.

General flue clearances:			External models	Internal models
Dim.	A-Series, HD200, EF26	N-Series, HD250		
A	Min. 300 mm	Min. 500 mm		
B	Min. 300 mm	Min. 500 mm		
C	Min. 1.5 m	Min. 1.5 m		
D	Min. 500 mm	Min. 500 mm		
E	Min. 300 mm	Min. 300 mm		
F	Min. 300 mm*	Min. 300 mm*		
G	Min. 300 mm	Min. 300 mm		
Below eaves, balconies, and other projections, min. 300 mm.				
From a gas meter 1000 mm.				
From an electricity meter or fuse box, min. 500 mm.				
* Rinnai recommend 1.5 m to give enough clearance for the pipe work, and to safely expel flue gases.				

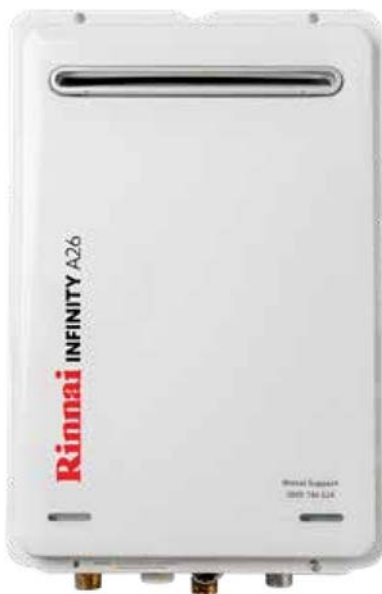
Rinnai INFINITY

product specification pages

Instant vs continuous flow hot water

If an outlet is more than 15 m away from the INFINITY there could be a time delay for hot water of approximately 10-15 seconds. To minimise hot water delivery times, pipe sizing, INFINITY model selection and location are important. Consult a licensed gasfitter for more information.

Rinnai INFINITY A-Series



Description

Designed and made in Japan, the Rinnai INFINITY A-Series are gas continuous flow hot water heaters with inbuilt frost protection. They have electronic ignition and require electricity to operate. They are factory preset to deliver water at 55 °C (maximum set temperature is 65 °C).

Scope of use

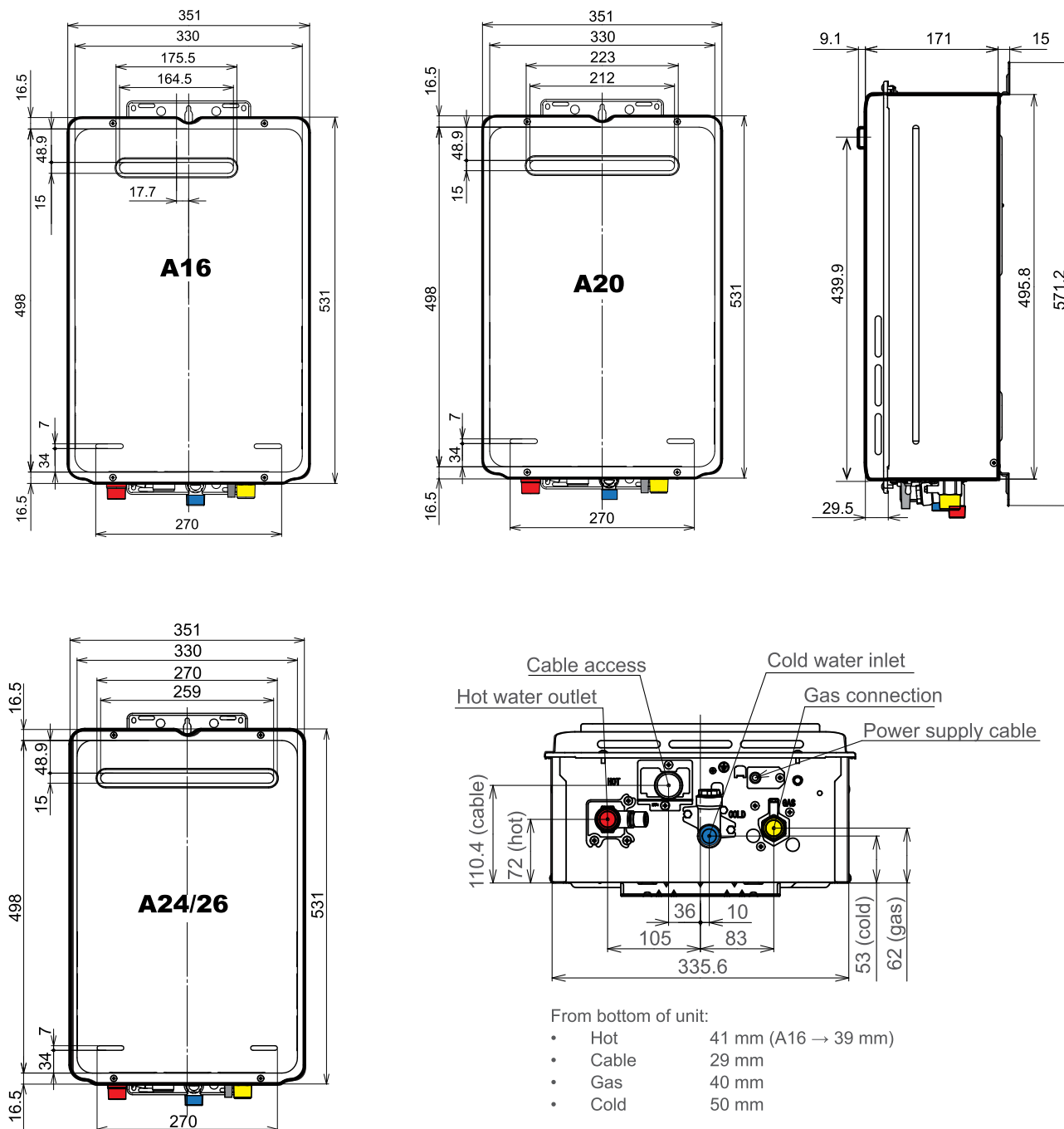
Suitable for RESIDENTIAL applications only. They are designed to be externally mounted on an outside wall and located as close as practicable to the most frequently used hot water outlets to reduce the delay for hot water delivery.

They are not suitable as a spa or swimming pool heater, or for hydronic applications. They are also not suitable as a gas boost for solar installations as the temperature cannot be set high enough.

Hard or acidic water will need to be treated to use this product.

	A16	A20	A24	A26
REU number	A1620WG-ZK	A2024WG-ZK	A2426WG-ZK	A2626WG-ZK
Code Natural Gas	INFA16N	INFA20N	INFA24N	INFA26N
Code LPG	INFA16L	INFA20L	INFA24L	INFA26L
Thermal efficiency on high	80.5%	80.5%	81%	80.5%
Hot water capacity¹	1.5-20 L/min	1.5-24 L/min	1.5-26 L/min	1.5-26 L/min
Hot water capacity at a 25° rise	16 L/min 960 L/h	20 L/min 1200 L/h	24 L/min 1440 L/h	26 L/min 1560 L/h
Input	16.3-124 MJ/h	19.9-156 MJ/h	16.3-184 MJ/h	16.3-199 MJ/h
Output	27.8 kW	34.9 kW	42 kW	44.5 kW
Weight	13 kg	14 kg	15 kg	15 kg
Nominal operating pressure	120-1000 kPa	160-1000 kPa	200-1000 kPa	200-1000 kPa
Connection - hot	R ½ (15 mm)	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Connection - cold	R ½ (15 mm)	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Connection - gas	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Ingress protection rating	IPX4	IPX4	IPX4	IPX4
Noise level (1 m) away	54 dB(A)	55 dB(A)	54 dB(A)	55 dB(A)
Power consumption				
• normal	47 W	58 W	56 W	66 W
• standby	2 W	2 W	2 W	2 W
• automatic frost protection	68 W	68 W	68 W	68 W

¹ The higher figures for the A16, A20, and A24 are only applicable in areas where the incoming water temperatures are high, for example 20 °C. Rather than all the water going through the heat exchanger, some of the water will go through the bypass tube allowing a greater capacity of water to be delivered.



Additional notes

Dimensions

The basic dimensions, height, width, and depth, are the same. The difference between the models is the position and dimensions of the flue outlet.

Joining units together is not possible

A-Series models are unable to be electronically manifolded.

Rinnai INFINITY HD



HD250 external model pictured

Description




Designed and made in Japan, the Rinnai INFINITY HD units are gas continuous flow hot water heaters with inbuilt frost protection. They have electronic ignition and require electricity to operate. The internal unit is a room sealed appliance. The INFINITY HDi200 and HD250 are factory preset to 55 °C, the HD200 is factory preset to 75 °C.

Scope of use

Suitable for residential and commercial applications. The external HD200 / HD250 units are designed to be externally mounted on an outside wall. The internal HDi200 is designed for internal installations only and can be installed in an enclosure if the requirements of AS/NZS 5601.1 are satisfied. They are designed to be located as close as practicable to the most frequently used hot water outlets to reduce the delay for hot water delivery.

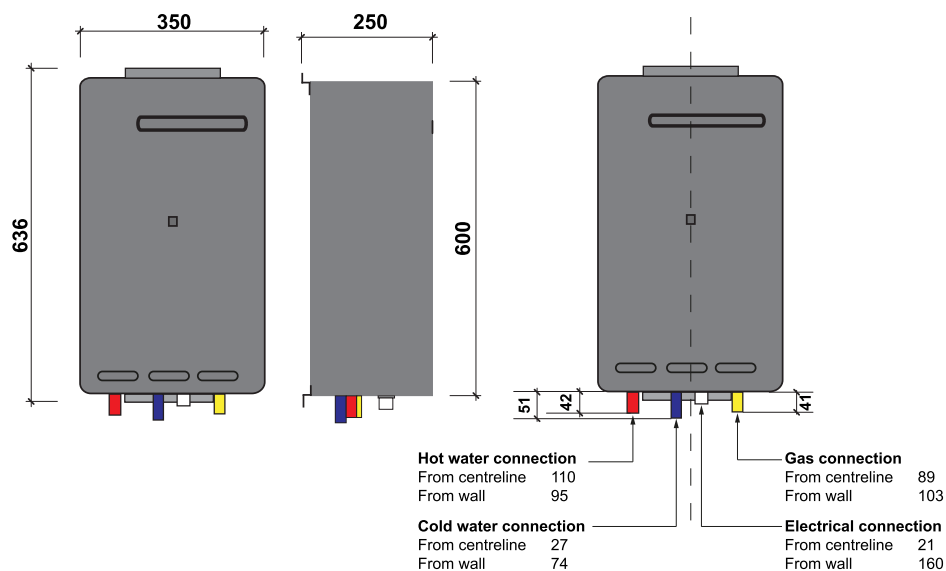
They are not suitable as a spa or swimming pool heater, or for hydronic applications.

Hard or acidic water will need to be treated to use this product.

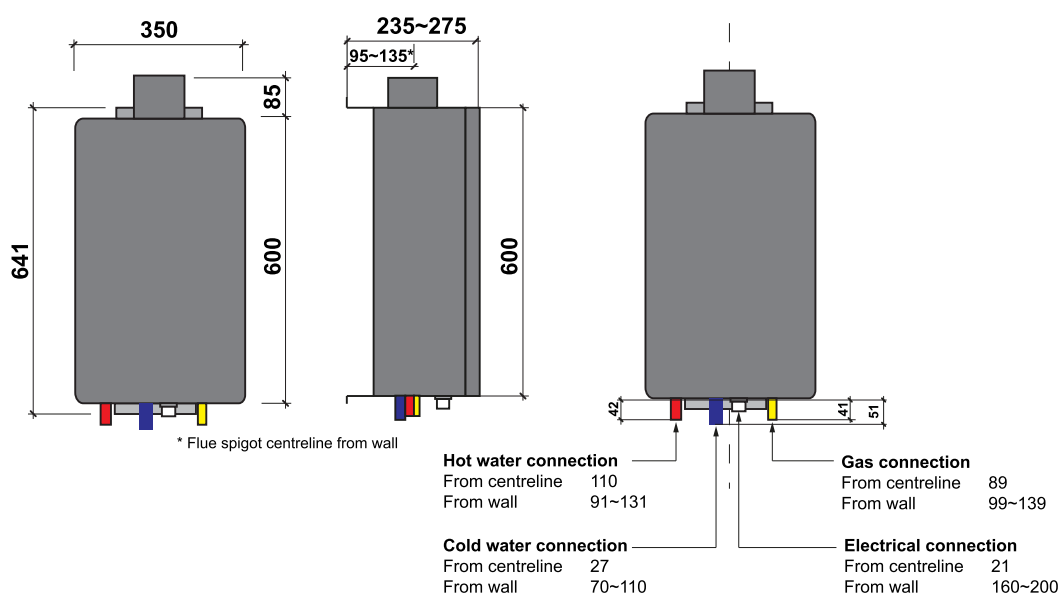
	HD200 external	HDi200 internal	HD250 external
			
REU number	VRM2632WC	VR2632FFUG	VR3237WG
Code Natural Gas	INFHD200HNCN	INFHD200FFNCFN	INFHD250HNCN
Code LPG	INFHD200HNCL	INFHD200FFNCFL	INFHD250HNCL
Thermal efficiency on high	82%	83%	83%
Hot water capacity¹	2.4-30 L/min	2.4-32 L/min	3.2-37 L/min
Hot water capacity at a 25° rise	26 L/min 1560 L/h	26 L/min 1560 L/h	32 L/min 1920 L/h
Input	16-199 MJ/h	16-195 MJ/h	20-249 MJ/h
Output	45.9 kW	44.5 kW	57.8 kW
Weight	21 kg	21 kg	29 kg
Nominal operating pressure	130-1000 kPa	140-1000 kPa	200-1000 kPa
Connection - hot	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Connection - cold	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Connection - gas	R ¾ (20 mm)	R ¾ (20 mm)	R ¾ (20 mm)
Ingress protection rating	IPX4	IPX4	IPX4
Noise level (1 m) away	50 dB(A)	50 dB(A)	50 dB(A)
Power consumption			
• normal	60 W	67 W	72 W
• standby	2 W	2 W	2 W
• automatic frost protection	100 W	100 W	116 W

¹ The higher figures are only applicable in areas where the incoming water temperatures are high, for example 20 °C. Rather than all the water going through the heat exchanger, some of the water will go through the bypass tube allowing a greater capacity of water to be delivered.

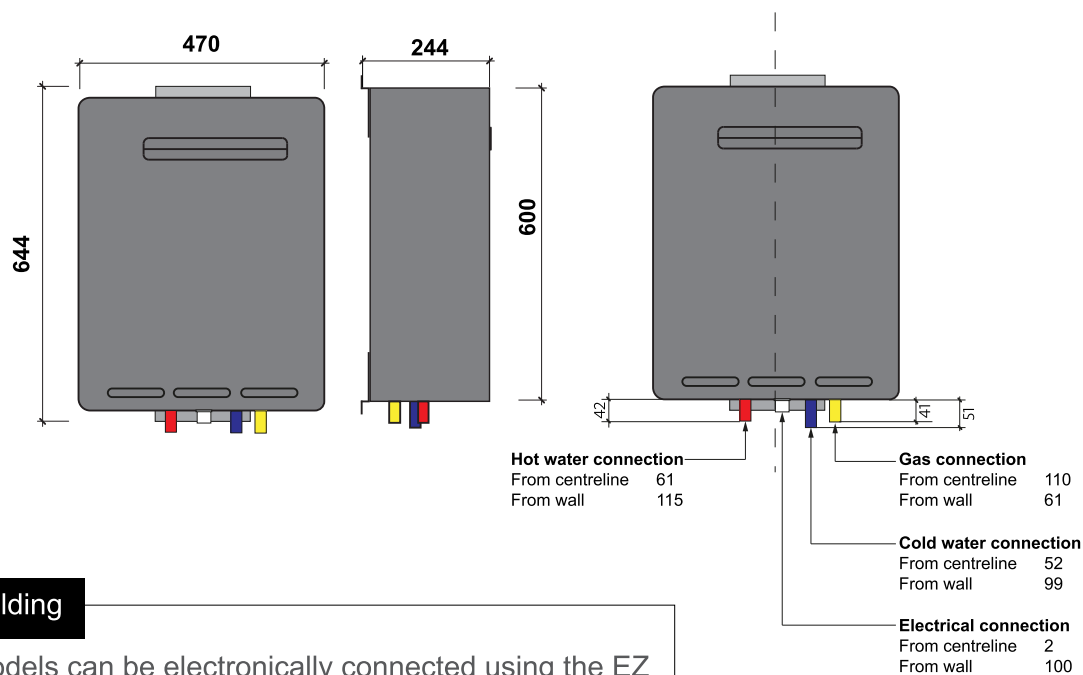
HD200 external



HD200 internal



HD250 external



Manifolding

HD models can be electronically connected using the EZ connect cable (2 units) or the MECS for up to 25 units.

Rinnai INFINITY EF26



Description

Designed and made in Japan, the Rinnai INFINITY EF26 is an external gas condensing continuous flow hot water heater with inbuilt frost protection. It has electronic ignition and requires electricity to operate. It is factory preset to deliver water at 55 °C (maximum set temperature is 65 °C).

Scope of use

Suitable for RESIDENTIAL applications only. The EF26 is designed to be externally mounted on an outside wall and located as close as practicable to the most frequently used hot water outlets to reduce the delay for hot water delivery.

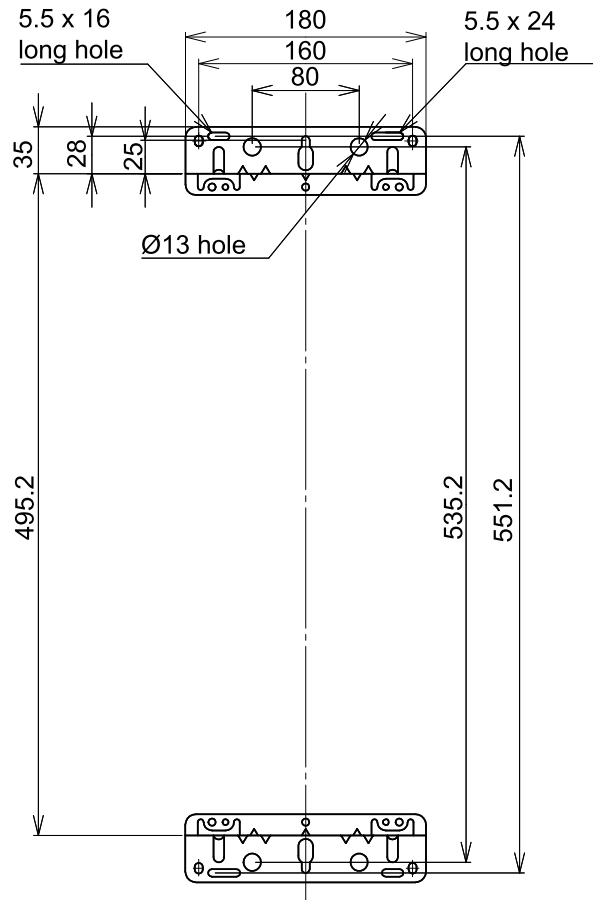
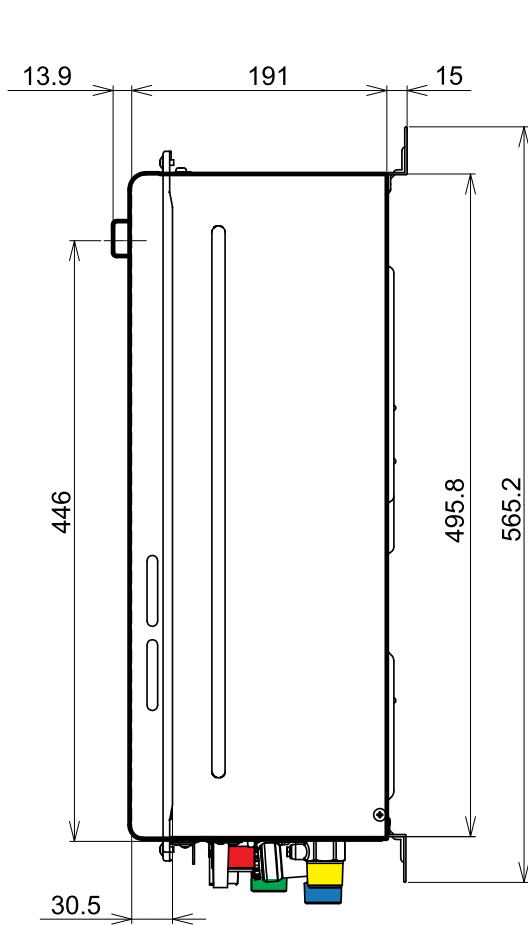
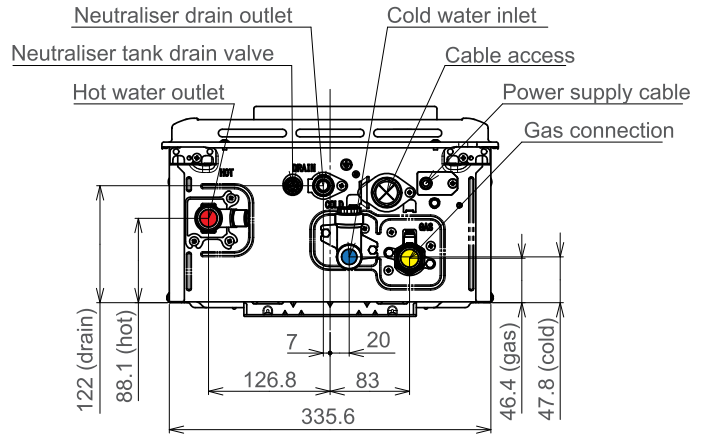
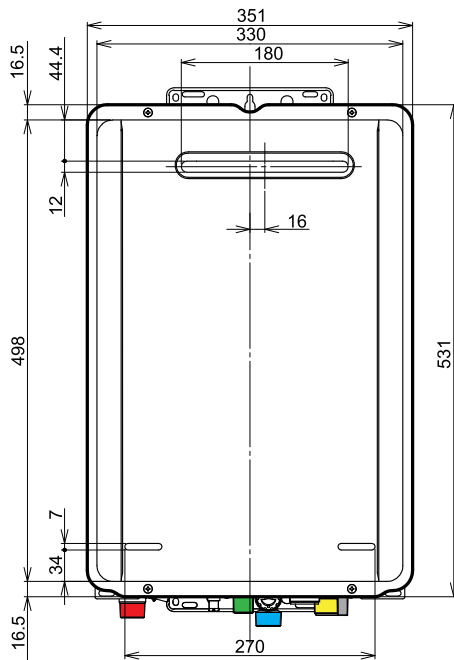
It is not suitable as a spa or swimming pool heater, or for hydronic applications. It is also not suitable as a gas boost for solar installations as the temperature cannot be set high enough.

Hard or acidic water will need to be treated to use this product.

REU number	E2626W-ZK
Code Natural Gas	INFEF26N
Code LPG	INFEF26L
Thermal efficiency on high	91.5%
Hot water capacity	1.5-26 L/min
Hot water capacity at a 25° rise	26 L/min 1560 L/h
Input	16.3-175 MJ/h
Output	44.5 kW
Weight	18 kg
Nominal operating pressure	220-1000 kPa
Connection - hot	R ¾ (20 mm)
Connection - cold	R ¾ (20 mm)
Connection - gas	R ¾ (20 mm)
Connection - condensate	R ½ (15 mm)
Ingress protection rating	IPX5
Noise level (1 m) away	50 dB(A) approx.
Power consumption	
• normal	63 W
• standby	2 W
• automatic frost protection	92 W

Please note

Joining units together is not possible. The EF26 model is unable to be electronically manifolded.



Rinnai INFINITY N-Series



N56kWe external model pictured

Description

Designed and made in Japan, the Rinnai INFINITY N-Series are condensing continuous flow water heaters with inbuilt frost protection. They have electronic ignition and require electricity to operate. The internal unit is a room sealed appliance.



The INFINITY N-Series units are factory preset to 75 °C. This will be changing in the later part of the year to 55 °C.

Scope of use

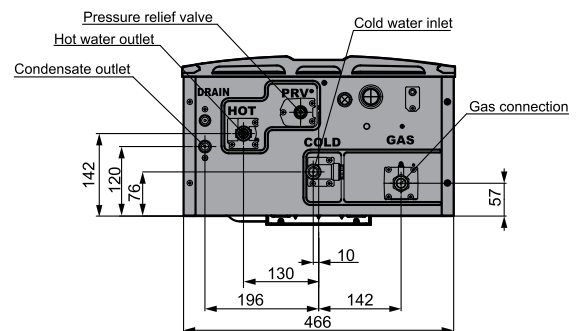
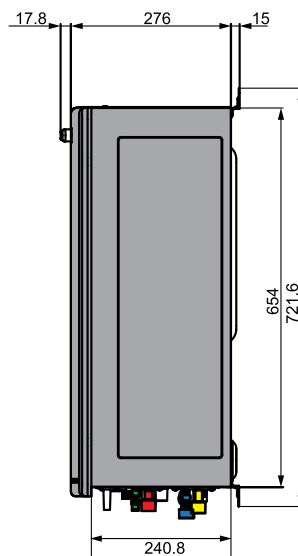
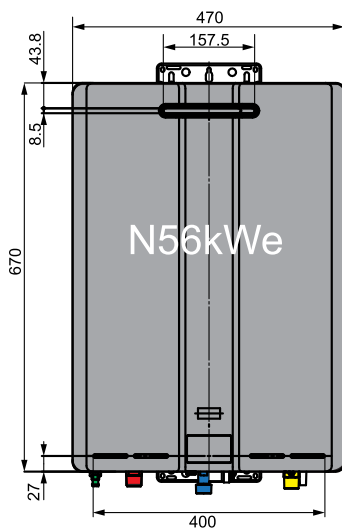
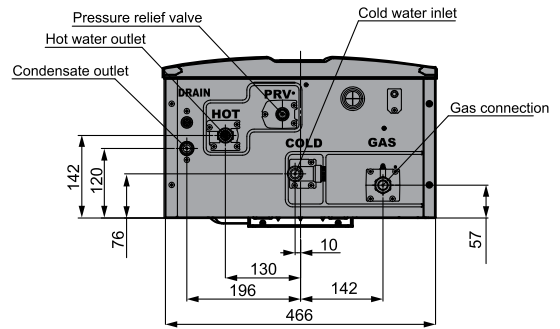
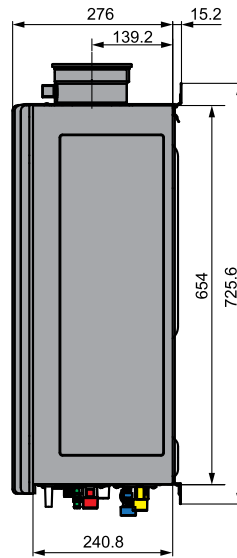
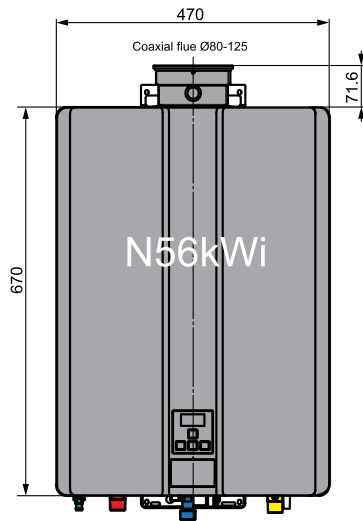
Suitable for residential and commercial applications. The external N56kWe is designed to be externally mounted on an outside wall. The internal 56kWi is designed for internal installations only and can be installed in an enclosure if the requirements of AS/NZS 5601.1 are satisfied. They are designed to be located as close as practicable to the most frequently used hot water outlets to reduce the delay for hot water delivery.

They are not suitable as a spa or swimming pool heater, or for hydronic applications.

Hard or acidic water will need to be treated to use this product.

	N56kWi internal	N56kWe external
		
REU number	N3237FFUC-ZK	N3237WC-ZK
Code Natural Gas	INFN56FFN	INFN56N
Code LPG	INFN56FFL	INFN56L
Thermal efficiency on high	97%	97%
Hot water capacity¹	1.5-37 L/min	1.5-37 L/min
Hot water capacity at a 25° rise	32 L/min 1920 L/h	32 L/min 1920 L/h
Input	16-209 MJ/h	16-209 MJ/h
Output	55.5 kW	55.5 kW
Weight	29 kg	29 kg
Nominal operating pressure	300-1000 kPa	300-1000 kPa
Connection - hot	R ¾ (20 mm)	R ¾ (20 mm)
Connection - cold	R ¾ (20 mm)	R ¾ (20 mm)
Connection - gas	R ¾ (20 mm)	R ¾ (20 mm)
Connection - condensate	R ½ (15 mm)	R ½ (15 mm)
Ingress protection rating	IPX5	IPX5
Noise level (1 m) away	49 dB(A)	54 dB(A)
Power consumption		
• normal	70 W (NG), 85 W (LPG)	70 W (NG), 85 W (LPG)
• standby	2 W	2 W
• automatic frost protection	150 W	100 W

¹ The higher figures are only applicable in areas where the incoming water temperatures are high, for example 20 °C. Rather than all the water going through the heat exchanger, some of the water will go through the bypass tube allowing a greater capacity of water to be delivered.

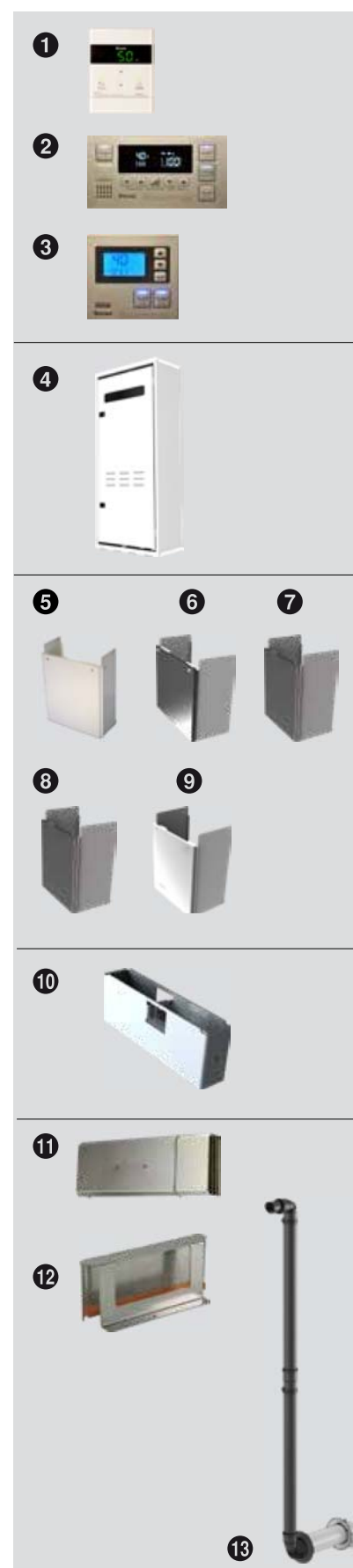


Manifolding

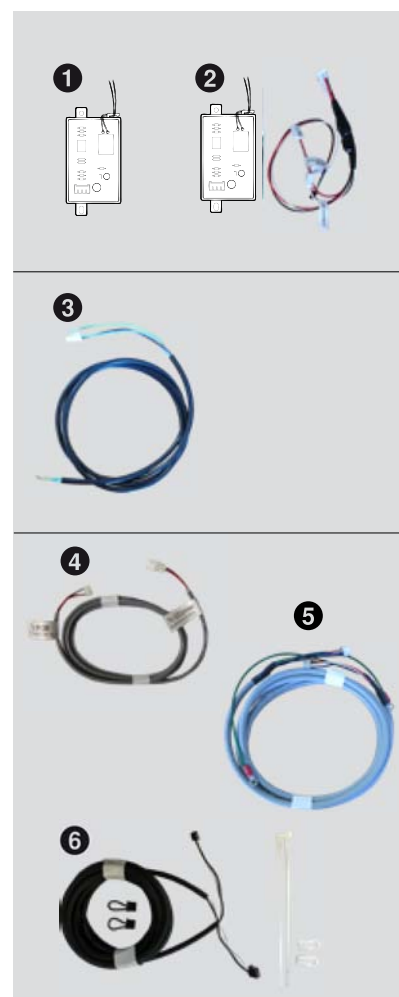
N56 models can be electronically connected (up to 24 units) using the N-Series cascade cable.

Rinnai INFINITY accessories matrix

CONTROLLERS		
Part number	Description	Image
MC601A	Compact controller Suitable for ALL Rinnai INFINITY units	1
BC100V1Z	Bathroom Deluxe Controller Suitable for ALL Rinnai INFINITY units	2
MC100V1Z	Kitchen Deluxe Controller Suitable for ALL Rinnai INFINITY units	3
RECESS BOX		
R1405	Metal recess box Suitable for all A-Series models	4
R1407	Metal recess box Suitable for the HD200 and EF26 models only	4
PIPE COVERS		
R1385	White pipe cover Suitable for all A-Series models	5
R1402SC	HD250 pipe cover (silver) Suitable for the HD250 model only	6
R1408SC	HD200 pipe cover (silver) Suitable for the HD200 and HDi200 models only	7
R1415	N-Series pipe cover (gunmetal grey) Suitable for the N56kWe and N56kWi models only	8
R1416	EF26 pipe cover (white) Suitable for the EF26 only	9
SECURITY BRACKET		
ACC1395	Security bracket Suitable for ALL Rinnai INFINITY units	10
FLUE DIVERTERS		
FDS16A	Sideways flue diverter Suitable for the A16 model only	11
FDS20	Sideways flue diverter Suitable for the A20 model only	11
FDS24	Sideways flue diverter Suitable for the A24 and A26 models only	11
FDS26E	Sideways flue diverter Suitable for the EF26 model only	11
FDU16	Upwards flue diverter Suitable for the A16 model only	12
FDU20	Upwards flue diverter Suitable for the A20 model only	12
FDU32	Upwards flue diverter Suitable for the HD250 only	12
FFP100DIV	N-Series flue diverter Suitable for the N56kWi internal model only	13





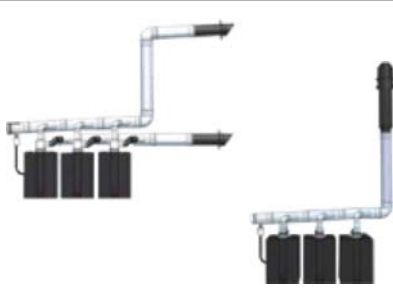
ERROR SWITCHES		
	Description	Image
R1070	HD error indication switch Suitable for HD models only	1
REUOPU3	N-Series error indication switch Suitable for N56kW and N56kWi models only	2
N-SERIES PUMP ACCESSORIES		
R1071	N-Series pump cable 2 m Suitable for N56kWe and N56kWi models only	3
CONNECTING CABLES		
REUEZC	EZ connect cable Suitable for HD models only	4
REUMSBM	HD internal master manifold Suitable for HD models only	-
REUMSBMB	HD external master manifold Suitable for HD models only	-
REUMSBC1	HD manifold slave cable Suitable for HD models only	5
REUMSBC2	HD manifold joiner Suitable for HD models only	-
REUCSAC1	N-Series cascade cable Suitable for N56kWe and N56kWi models only	6



Rinnai INFINITY internal flueing

With the introduction of the high efficiency N56kWi internal water heater, we now have three flueing options. These flueing options are specific to the model of water heater and type of installation, they **cannot be interchanged**.

Detailed in this section is a high level view of the options available and the flue components.

HDi200		N56kWi		N56kWi																																																																																																																																																																																																																								
Individual flueing		Individual flueing (concentric)		Common flueing																																																																																																																																																																																																																								
Stainless steel inner pipe and thermoplastic outer pipe		Polypropylene concentric flueing		Polypropylene common flueing																																																																																																																																																																																																																								
																																																																																																																																																																																																																												
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Important and detailed information on each of the flueing options is available in the flueing installation guides available on www.rinnai.co.nz.



Internal flueing guidelines

The flue terminal is to terminate in a location so as not to cause a nuisance, in accordance with AS/NZS 5601.

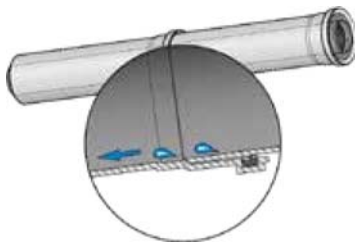
White plastic polypropylene (PP) flueing



This flueing must NEVER be used with the HDi200 or EFi250 units as the heat of the flue gases will melt the plastic and cause an unsafe installation.

Flue fall back to the water heater

The flue terminal in all applications must FALL BACK towards the water heater and not towards to the flue terminal. The degree in which this occurs is dependent on the flueing application, refer below.



- **Stainless steel flueing (HDi200)**
Slope horizontal flues back towards the water heater at a 20 mm fall per meter to drain condensate.
- **PP individual flueing (N56kWi)**
Slope horizontal flues back towards the water heater at a 25 mm fall per meter to drain condensate.
- **PP common flueing (N56kWi)**
Slope horizontal flues back towards the water heater at a 54 mm fall per meter to drain condensate.

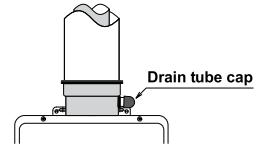
Condensate

The condensate trap (HDi200) or condensate drain (N56kWi) collects any condensate from the unit and prevents it entering the water heater and causing damage.

Condensate is a by-product of high efficiency gas combustion and is mildly acidic. For this reason copper tube and fittings must not be used as it will corrode. Instead Rinnai recommends plastic pipe and fittings such as UPVC or PE.

Handling condensate for the HDi200

A condensate trap kit (FFSSCOND) is required for lengths over 1.5 m. If flueing is less than 1.5 m the flue spigot on top of the unit is capped using the drain tube cap supplied with the unit.



Handling condensate for the N56kWi

A condensate tray kit is not needed for the N56kWi as there is a different method for draining condensate.

As there is a continuous flow of condensate being produced the unit must be drained via a pipe to a suitable discharge point. Refer to the install guide for further information.

Vertical terminations (all applications)

To ensure products of combustion are cleared adequate clearance from the building is required. The vertical cowl should have a 500 mm clearance from any part of the building. This also applies to steeped and pitched roofs, where the flue cowl should be 500 mm clear of the ridge line. An adequate flow of fresh air must exist around the flue cowl following installation.







Minimum clearances are shown in AS/NZS 5601.1.

Flue supports

Ensure the flue is supported independently of the appliance by use of suitable clips or brackets in accordance with AS/NZS 5601.







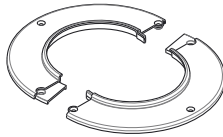

For individual stainless steel and polypropylene flueing, flue supports are supplied with each roof cowl and flue pipe. For polypropylene common flueing, flue supports are not provided with any components and must be ordered separately.

Rinnai INFINITY HDi200 internal flueing stainless steel flue kits and components

Code	Description	Image
FFSSKIT	Direct flue kit for horizontal installations—can be cut to size. Includes black and white wall seals.	
FFSSROOFCOWL	Roof cowl for vertical installations—can be cut to size. Includes two black UV flue protectors, shown below, for covering and protecting the white flue pipe from UV damage. These can also be ordered as a spare (12693, one protector). Kit also includes a flue pipe clamp to support the flue.	
FFSSPIPE1000	1000 mm flue pipe—can be cut to size. Includes Munzing ring to support the flue.	
FFSSBEND90	Single 90 degree bend.	
FFSSBEND45	Two 45 degree bends, sold as a pair.	
FFSSCOND	Condensate trap kit for the HDi200 ONLY. Comes with approximately 500 mm of black rubber hose, refer image below.	

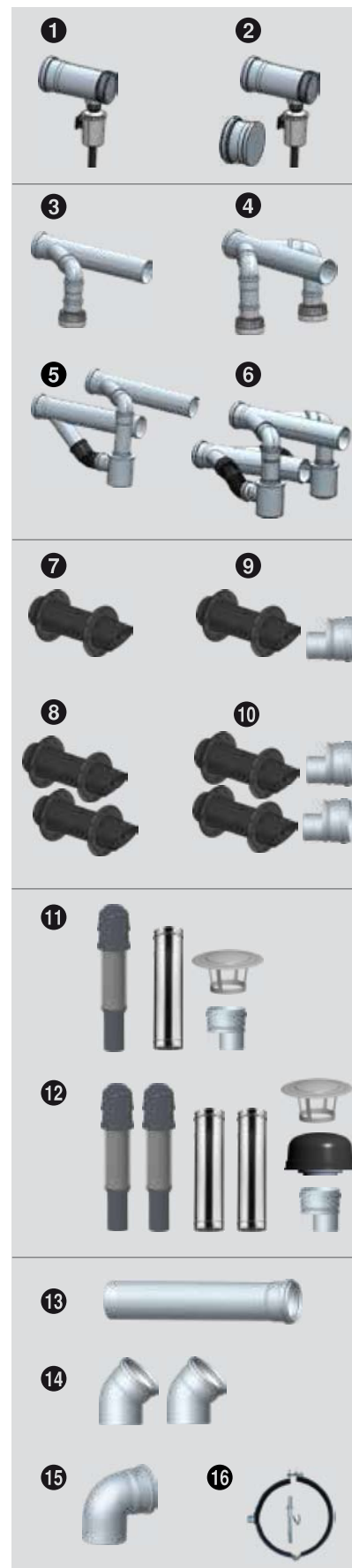


Rinnai INFINITY N56kWi concentric flueing polypropylene flue kits and components

Code	Description	Image
FFP100HKIT	Direct flue kit for horizontal installations—can be cut to size. Includes horizontal adapter, black and white wall seals and a tube of centrocerin lubricant.	
FFP100VKIT	Vertical termination kit—can be cut to size. Includes the vertical adapter, which reduces the flue diameter from Ø80/120 mm to Ø60/100 mm, and black UV flue protectors, for covering and protecting the white flue pipe from UV damage. Also includes a flue clamp to support the flue, and a tube of centrocerin lubricant.	
FFP1000PIPE	1000 mm flue pipe—can be cut to size. Includes Munzing ring to support the flue.	
FFP100HADAPT	Horizontal adapter 60/100, required in combination flueing where the flue starts off horizontally. The horizontal adapter connects into the flue spigot of the N56kWi.	
FFP100BEND	Two 45 degree bends, sold as a pair. One 90° bend equates to 3 m, and one 45° equates to 1.1 m.	
FFP100BRACKET	Flue bracket support—white. Purchased if additional support is required. Every length of flue should be supported. Please note: The FFP100BRACKET is supplied with each flue pipe.	
FFP100PLATE	Inside wall plate—internal white wall plate/seal, used to tidy up any installation work. Comes as part of the FFP100HKIT, but can be ordered for other flueing applications. Comes in two pieces.	
CF790025	Centrocerin lubricant. Water soluble lubricant designed to ease assembly of flue components. Other lubricants are not suitable as they will damage the flue. Please note: This comes with the horizontal and vertical flue kits.	

Rinnai INFINITY N56kWi common flueing polypropylene flue kits and components

Starter kits , one starter kit is required for each application		
Code	Description	Image
CFKRS110	Room air starter kit 110 mm. Contains; room air vent, condensate trap, and centrocerin lubricant.	1
CFKOS110	Outside air starter kit 110 mm. Contains; room air vent, end cap, condensate trap, and centrocerin lubricant.	2
Header connection kits		
<ul style="list-style-type: none"> inline, one kit for each water heater back-to-back, one kit for every two water heaters 		
CFKRCS110	Room air inline connection kit. Contains; collector Ø110 mm 1-branch, 90° bend, extension 500 mm, room air adapter.	3
CFKRCS110	Room air back-to-back connection kit. Contains; collector Ø110 mm 2-branch, 90° bend (x2), extension 500 mm (x2), room air adapter (x2).	4
CFKOC110	Outside air inline connection kit. Contains; collector Ø110 mm 1-branch (x2), 90° bend, extension 500 mm, outside air adapter and rubber flex.	5
CFKOC110	Outside air back-to-back connection kit. Contains; collector Ø110 mm 2-branch (x2), 90° bend (x2), extension 500 mm (x2), room air adapter (x2)	6
Horizontal termination kits		
CFKRWT110	Room air Ø110 mm horizontal termination kit	7
CFKOWT110	Outside air Ø110 mm horizontal termination kit	8
CFKRWT160	Room air Ø160 mm horizontal termination kit, includes flue adapter	9
CFKOWT160	Outside air Ø160 mm horizontal termination kit, includes flue adapters	10
Vertical termination kits		
CFKRVT160	Room air Ø160 mm vertical termination kit. Contains; vertical terminal, stainless UV sleeve, exhaust rain cap, Ø110-160 mm adapter.	11
CFKOV160	Outside air Ø160 mm vertical termination kit. Contains; vertical terminal (x2), stainless UV sleeve (x2), exhaust rain cap, intake rain cap, Ø110-160 mm adapter.	12
Common parts		
CF790028	Flue pipe Ø110 mm	13
CF790089	Flue pipe Ø160 mm	13
CF790026	45 ° bends Ø110 mm	14
CF790086	45 ° bends Ø160 mm	14
CF790087	90 ° bend Ø160 mm	15
CF790091	Flue support Ø110 mm	16
CF790092	Flue support Ø160 mm	16



Rinnai INFINITY

accessory product pages



Digital controllers



With a Rinnai INFINITY controller you choose your own personalised settings. Just select the water temperature you want between 37-55 °C in up to four different locations.

Why have controllers?




- Safety feature for young children, control the temperature coming out of the hot water tap.
- Reduce temperature fluctuations when other taps are used in the house.
- An extra two year warranty on your Rinnai INFINITY when controllers are installed.
- Use as a troubleshooting diagnostic tool, error codes will display when there is a problem with the INFINITY

Controller configurations

For residential applications a maximum of four (three for the N-Series) can be fitted, with the following provisos:

- Only one Kitchen Deluxe controller—only installed if a Bathroom Deluxe controller is installed
- Maximum of two Bathroom Deluxe controllers
- Only one controller can be set to deliver 55 °C, this cannot be a controller in a bathroom

Each controller can be individually programmed, but the water heater can only deliver one set temperature at any time. For example, John is in the shower and has set the controller to 42 °C. Megan can only change the programmed temperature at the kitchen once John is out of the shower.

	Compact controller	Bathroom Deluxe controller	Kitchen Deluxe controller
			
Code	MC601A	BC100V1Z	MC100V1Z
Colour	Off-white	Silver	Silver
Dimensions	H - 120 mm W - 90 mm D - 20 mm	H - 97 mm W - 195 mm D - 20 mm	H - 120 mm W - 128 mm D - 20 mm
Suitable for	Anywhere in the house	Bathrooms ¹	Kitchens and laundries ²
Cable	Comes with 10 m of cable	Comes with 10 m of cable	Comes with 10 m of cable
Additional cable	Additional 10 m cable R1069	Additional 10 m cable R1069	Additional 10 m cable R1369

¹ Set the desired temperature and water level and walk away. A voice message will let you know when your bath is ready. If you have other deluxe controllers around the house the message will play on all of them.

² The Kitchen Deluxe controller is designed to be used in conjunction with the Bathroom Deluxe controllers.

Water temperature control

Only the Kitchen Deluxe controller can be designated as the master water controller, typically, as the name suggests, the location for this is in the kitchen. All the remaining controllers are designated sub-controllers and are for use in bathrooms, toilets, and laundries. The maximum temperature for sub-controllers is 50 °C, to minimise the risk of burns.

Any controller that has priority is capable of setting the water temperature to be delivered. Priority can only be given to one controller at a time, and changing priority can only be done when all hot water taps have been closed.

Available controller temperatures are:

Controller	Temperature °C
Kitchen	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50, 55, 60*, 65*, 75*
Bathroom (hot water)	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50
Bathroom (bath fill)	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48

* Some Rinnai water heaters can be programmed to deliver higher temperatures from the master water controllers, i.e. in commercial applications

To obtain water temperatures lower than 37 °C, open the cold water tap and add cold water until the desired lower temperature is reached.

Controllers are not suitable for all installations

Some limitations and exclusions to be aware of:

- If an EZ Connect cable is used, the bath fill function on the Bathroom Deluxe controller won't work
- Controllers cannot be used with Rinnai INFINITY units connected to a solar system as they are not compatible with the higher temperatures coming from the INFINITY (dip switch change from 55 to 75 °C).
- Controllers are not suitable for ring main applications using N-Series models

Metal recess box



A recess box enables an external continuous flow water heater to be partially or fully recessed into an external wall, covered, and out of sight.

Positioning

A Rinnai INFINITY unit positioned inside a recess box operates at a slightly louder level than a Rinnai INFINITY installed on an outside wall. Please keep this in mind if positioning near a bedroom as the operating noise could affect some people.

Building code compliance

Local councils may have their own requirements regarding a recess box installation, as it is similar in detail to installing a meter box. If in doubt over compliance, it is advisable to consult the local council prior to installation.

Suitability

- Outdoor installations only
- New construction or major renovation—installation needs to commence during the framing stage and before internal linings, cladding, or building wrap is applied

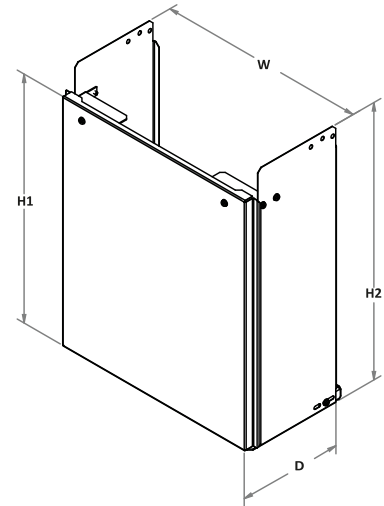
Code	R1405	R1407
Construction	Folded galvanised steel, powder coated white—can be painted to match the exterior cladding.	
Colour	White	White
Dimensions	H - 945 mm W - 417 mm D - 205 mm	H - 945 mm W - 514 mm D - 270 mm
Suitable for - current range	Current A-Series units (A16, A20, A24, A26)	Current HD200 and HD250 EF26
Suitable for - discontinued range	Discontinued VT range (VT16, VT20, VT24, VT26)	Soon to be discontinued EF24

Pipe covers



If you want a clean smooth finish to the installation, the Rinnai INFINITY pipe cover can be used to cover pipes, valves, and even the external power point. There are five pipe cover kits that vary in size and colour depending on the model.

The pipe cover kits are sold as a flat pack and require assembly. With our current range of water heaters assembly can be done by the homeowner—this is because assembly does not require taking the cover off the water heater.



	A-Series pipe cover	HD250 pipe cover	EF26 pipe cover	HD200 / HDi200 pipe cover	N-Series pipe cover
Code	R1385	R1402SC	R1416	R1408SC	R1415
Colour	White	Silver	White	Silver	Gunmetal grey
Suitable for	A16, A20, A24, A26	Current model REU-VR3237-WG	EF26	REU models: - VRM2632WC - VR2632FFUG	N56kWi and N56kWe
Dimensions	H1 - 394 mm	H1 - 394 mm	H1 - 450 mm	H1 - 394 mm	H1 - 450 mm
	W - 334 mm	W - 453 mm	W - 350 mm	W - 334 mm	W - 465 mm
	D - 167 mm	D - 230 mm	D - 186 mm	D - 230 mm	D - 243-254 mm
	H2 - 438 mm	H2 - 428 mm	H2 - 496 mm	H2 - 448 mm	H2 - 465 mm

Note

H1 is the height of the panel in the front, H2 is the height of the panel in the back, refer line drawing above.

Sideways and upwards flue diverters

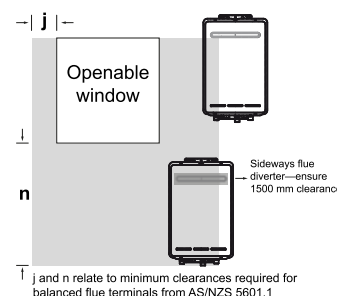


Rinnai flue diverters are an accessory that can be fitted to an external Rinnai INFINITY to expel combustion gases in either a sideways or upwards direction. The flue diverter is fitted to the flue terminal of the water heater. If fitted, the flue diverter **MUST** remain as a permanent fixture as removal could mean the water heater position no longer complies with AS/NZS 5601.1.

Specific application examples

Noise reduction, where the unit is positioned close to a neighbouring property.

Where there may be an obstruction such as a tree, fence, wall, or other structure, that even through the Rinnai INFINITY is installed with the required clearances, will perform more efficiently if the flue gases are expelled away from the obstruction.

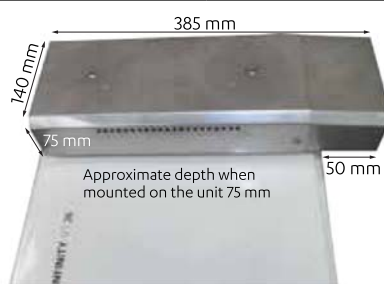


Sideways diverter pictured (EF26 sideways diverter differs to that pictured)

Sideways flue diverters

Code	FDS16A	FDS20	FDS24	FDS26E
Suitable for	A16	A20	A24/26	EF26
Applications	<ul style="list-style-type: none"> Where clearance to an openable window or other building structure is tight, the clearance shifts to the point of discharge, close to the edge of the water heater, refer image below. Externally mounted Rinnai INFINITY water heaters NOT installed in a recess box. External single water heater applications, can be installed for a left or right handed installation. Balconies, patios or enclosed areas where products of combustion can be rapidly dispersed into the open air. 			

Dimensions



A-Series sideways diverter



EF26 sideways diverter

Upwards flue diverters

Code	FDU16	FDU20	FDU24	FDU32
Suitable for	A16	A20	A24/A26	HD250
Applications	<ul style="list-style-type: none"> Externally mounted Rinnai INFINITY water heaters NOT installed in a recess box. Balconies, patios or enclosed areas where products of combustion can be rapidly dispersed into the open air. Commercial application, where multiple units are positioned facing each other, there is the potential for units to suffocate from the flue gases directly opposite. With an upwards flue diverter the gases can be expelled upwards and away from the units. 			



N-Series N56kWi internal flue diverter kit



The N56kWi internal flue diverter (black UV resistant PVC) is a flue accessory kit that allows you to move the flue terminal position up and away from the air intake by up to 1.5m.

It is designed for when a traditional horizontal terminal cannot be installed due to the flue being a nuisance or due to flue restrictions. It works in conjunction with the horizontal flue terminal (part FFP100HKIT).

Flue diverter kit includes:

- 90 ° elbows (x2)
- connecting flue pipe 1000 mm
- flue extension 695 mm
- wall brackets (x3)



Code	FFP100DIV
Construction	The N56kWi (internal) flue diverter is manufactured from polypropylene. It has been tested and can ONLY BE used with the Rinnai INFINITY N56kWi water heater.
Installation	If you don't need to extend the full 1.5 m, you can just use the connecting pipe.

Security bracket



A sturdy security bracket can be installed to act as a deterrent to thieves. Consisting of two U-shaped 2 mm powder coated galvanised steel plates, which interlock through the lower bracket of the Rinnai INFINITY. The bracket is secured with a padlock (not included).

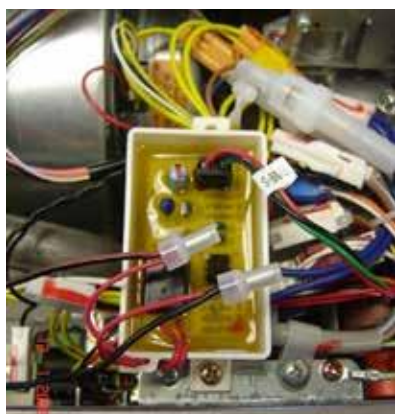
Ideal for builders who need to protect the Rinnai INFINITY before the home is sold or handed over to the new owners.

Colour is off-white—can be painted.



Code	ACC1395
Suitable for	All Rinnai INFINITY continuous flow gas water heaters—can be retrofitted to existing installations. Can be installed on all cladding systems, like weatherboard, brick, and plaster. Can also be installed inside a recess box.
Dimensions	<ul style="list-style-type: none">• Height - 70 mm• Width - 190 mm• Depth - 33.5 mm
How it works	The bracket prevents access to the bolts fixing the unit to the wall, this locks the lower section of the INFINITY in place, and prevents the unit from being quickly removed from the wall.

Commercial error switch



The Rinnai INFINITY error indication switch is a volt-free, normally open switch. The switch will shift to a closed position when there is an active error in the water heater.

The switch is intended to be connected to a monitoring system such as a building management system, or audible error indication system.

System designers should note that some errors will reset an inactive (open) state under particular conditions. It is important that this is clearly understood when developing monitoring and response systems.

Code	<ul style="list-style-type: none"> • R1070 (HD models) • REUOPU3 (N-Series)
Suitable for	Suitable for commercial applications with the HD200, HDi200, N56kW _i , and N56kW _e .
Load switching	<p>Will switch the following maximum loads. Systems requiring loads greater than this should be configured via an external relay.</p> <ul style="list-style-type: none"> • Voltage (AC or DC) → 24 Volts • Current → 1 Amp

HD EZ connect cable



The EZ connect cable allows two Rinnai INFINITY HD water heaters to be connected so they can function as one large unit.

The water heaters can be installed 5-460 mm apart. The maximum distance of 460 mm is so the cable will reach between the units, and to prevent temperature fluctuations when the water is turned on and off.

Installation by a certified tradesperson is required.

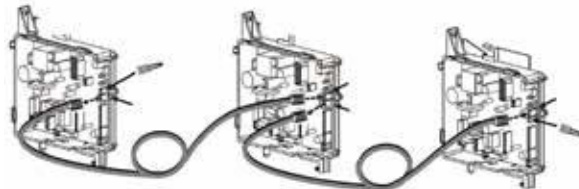
Code	REUEZC
Cable length	1850 mm
Suitable for	Suitable for the HD200 external, HDi200 internal, and HD250 Rinnai INFINITY water heaters.
	<p>Please note</p> <p>The bath fill function on the Bathroom Deluxe controller will not work if an EZ connect cable is fitted.</p>

N-Series cascade cable 3 m



With the use of the cascade cable, up to 24 N-Series water heaters can be electronically connected.

This connection will rotate the water heater operation order to ensure equal usage of each appliance and enable all water heaters connected to modulate operation and function as one hot water source.



Code	REUCSAC1
Suitable for	<p>Suitable for the N-Series water heaters. One cable is required for each water heater.</p> <p>Cable kit includes:</p> <ul style="list-style-type: none"> • One cable • Two cascade jumpers • Two cable ties and two cable tie clamps

N-Series pump cable 2m



The N-Series water heaters have the ability to control a circulation pump (ring main application) with the use of a pump cable connector. This allows hot water to cycle through the ring main, ensuring hot water is quickly available when a tap is opened.

Cable is UV resistant and rated for outdoor installation.

Code	R1071
Suitable for	<ul style="list-style-type: none"> • Single unit N56 domestic installation • Commercial / showerblock installations with multiple N56 units as specified by Rinnai commercial <p>Please note: Rinnai INFINITY digital controllers are not compatible with the N-Series pump cable and ring main applications.</p>

INFINITY HD manifolding

Rinnai INFINITY HD units can be manifolded together, in banks of five (up to 25 units), by connecting them together in parallel to enable a greater hot water flow rate than is possible with a single unit.

A manifold electronic control system (MECS) links each HD unit in the system, and will turn on each unit as required. The system is designed to ensure gas is not wasted and that an endless supply of hot water is always available.

How it works

A master, located internally or externally, and sub-communication PCB is installed in the first unit, other units have a sub-communication slave cable installed. The master communication PCB receives information about flow rates from each unit and balances the load on each unit.

Random selection of the units required to supply the demands means all units share the workload evenly.

All information is transmitted via communication cables to the slave units. The master control also has an inbuilt fault detection system and will allocate a replacement should one unit fail.

Suitability

- HD200 external REU-VRM2632WC
- HDi200 internal REU-VR2632FFUG
- HD250 external REU-VR3237WG

Codes

- REUMSBM internal master manifold kit for a connection made inside the unit
- REUMSBMB external master manifold kit for a connection made outside the unit
- REUMSBC1 manifold slave cable
- REUMSBC2 joiner for greater than five manifolded HD units

MECS	Master PCB		Slave	Joiner
Position	INSIDE the INFINITY	OR OUTSIDE the INFINITY	REUMSBC1	REUMSBC2
Code	REUMSBM	REUMSBMB		
Number of water heaters				
2	1	1	-	-
3	1	1	1	-
4	1	1	2	-
5	1	1	3	-
6	2	2	2	1
7	2	2	3	1
8	2	2	4	1
9	2	2	5	1
10	2	2	6	2
11	3	3	5	2
12	3	3	6	2
13	3	3	7	2
14	3	3	8	2
15	3	3	9	2
16	4	4	8	3
17	4	4	9	3
18	4	4	10	3
19	4	4	11	3
20	4	4	12	3
21	5	5	11	4
22	5	5	12	4
23	5	5	13	4
24	5	5	14	4
25	5	5	15	4

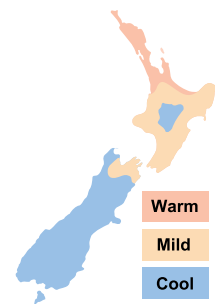
Appendices



Appendix 1

water flow and gas usage

When determining the Rinnai INFINITY model it's important to know what the incoming water temperature will be—this is usually calculated on the worst case scenario (winter). This temperature is needed to work out the temperature rise to produce the hot water needed.



Approximate incoming water temperatures in winter

- Northland and Auckland use 15 °C
- BOP, Gisborne, and Hawkes Bay use 10 °C
- Waikato, and South Island (excl. Nelson & Marlborough) use 5 °C

Degree temperature rise

In the specification pages for the Rinnai INFINITY models we express a parameter called 'nominal water capacity'. This means at a 25 ° rise, the unit will produce a certain number of litres per minute of hot water.

For example:

- The A26 external will produce 26 litres per minute at a 25 ° rise
- The A24 external will produce 24 litres per minute at a 25 ° rise

Using the above example, for incoming water at 10 °C and a required temperature of 55 °C, the A26 external will produce 14.4 litres per minute at a 45 ° rise (55-10), and the A24 external will produce 13.3 litres per minute at a 45 ° rise.

Water flow and gas usage table Rinnai INFINITY A-Series and EF26 temperature preset to 55 °C or less

Model	Approx. min. to max. gas input (MJ/h)	5 ° temperature rise				10 ° temperature rise			
		L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
A16	16.3-124	20	1200	100	31.0	20	1200	100	62.0
A20	19.9-156	24	1440	140	37.2	24	1440	140	74.4
A24	16.3-184	26	1560	180	40.3	26	1560	180	80.6
A26	16.3-199	26	1560	180	40.3	26	1560	180	80.6
EF26	16.3-175	26	1560	210	35.7	26	1560	210	71.4
		15 ° temperature rise				20 ° temperature rise			
A16	16.3-124	20	1200	100	93.0	20	1200	100	124.0
A20	19.9-156	24	1440	140	111.6	24	1440	140	148.8
A24	16.3-184	26	1560	180	120.9	26	1560	180	161.2
A26	16.3-199	26	1560	180	120.9	26	1560	180	161.2
EF26	16.3-175	26	1560	210	107.1	26	1560	210	142.7
		25 ° temperature rise				30 ° temperature rise			
A16	16.3-124	16	960	60	124.0	13.3	800	45	124.0
A20	19.9-156	20	1200	100	156.0	16.7	1000	70	156.0
A24	16.3-184	24	1440	145	184.0	20.0	1200	100	184.0
A26	16.3-199	26	1560	180	199.0	21.7	1300	110	199.0
EF26	16.3-175	26	1560	210	175.0	21.7	1300	150	175.0
		35 ° temperature rise				40 ° temperature rise			
A16	16.3-124	11.4	686	30	124.0	10.0	600	25	124.0
A20	19.9-156	14.3	857	45	156.0	12.5	750	42	156.0
A24	16.3-184	17.1	1029	70	184.0	15.0	900	45	184.0
A26	16.3-199	18.6	1114	90	199.0	16.3	975	70	199.0
EF26	16.3-175	18.6	1114	100	175.0	16.3	975	90	175.0
		45 ° temperature rise				50 ° temperature rise			
A16	16.3-124	8.9	533	20	124.0	8	480	18	124.0
A20	19.9-156	11.1	667	35	156.0	10	600	30	156.0
A24	16.3-184	13.3	800	45	184.0	12	720	40	184.0
A26	16.3-199	14.4	867	50	199.0	13	780	45	199.0
EF26	16.3-175	14.4	867	70	175.0	13	780	60	175.0

Water flow and gas usage table Rinnai INFINITY HD models temperature preset to 55 °C or less

Model	Approx. min. to max. gas input (MJ/h)	5 ° temperature rise				10 ° temperature rise			
		L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
HD200	16-199	32	1920	200	47.8	32	1920	200	95.7
HDi200	16-195	32	1920	200	47.8	32	1920	200	95.7
HD250	20-250	37	2220	200	55.3	37	2220	200	110.6
		15 ° temperature rise				20 ° temperature rise			
HD200	16-199	32	1920	200	143.5	32	1920	200	199.0
HDi200	16-195	32	1920	200	143.5	32	1920	200	195.0
HD250	20-250	37	2220	200	165.9	37	2220	200	250.0
		25 ° temperature rise				30 ° temperature rise			
HD200	16-199	26	1560	200	199.0	21.7	1302	112.5	199.0
HDi200	16-195	26	1560	200	195.0	21.7	1302	112.5	195.0
HD250	20-250	32	1920	140	250.0	26.7	1602	100	250.0
		35 ° temperature rise				40 ° temperature rise			
HD200	16-199	18.6	1116	75	199.0	16.3	978	60	199.0
HDi200	16-195	18.6	1116	75	195.0	16.3	978	60	195.0
HD250	20-250	22.9	1374	60	250.0	20	1200	50	250.0
		45 ° temperature rise				50 ° temperature rise			
HD200	16-199	14.4	864	45	199.0	13	780	40	199.0
HDi200	16-195	14.4	864	45	195.0	13	780	40	195.0
HD250	20-250	17.8	1068	40	250.0	16	960	40	250.0

Water flow and gas usage table Rinnai INFINITY HD models temperature preset to 75 °C or less

Model	Approx. min. to max. gas input (MJ/h)	5 ° temperature rise				10 ° temperature rise			
		L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
HD200	16-199	24	1440	200	34.8	24	1440	200	72.9
HDI200	16-195	24	1440	200	34.8	24	1440	200	72.9
HD250	20-250	24	1440	200	36.4	24	1440	200	72.9
		15 ° temperature rise				20 ° temperature rise			
HD200	16-199	24	1440	200	104.3	24	1440	200	139.0
HDI200	16-195	24	1440	200	104.3	24	1440	200	139.0
HD250	20-250	24	1440	200	109.3	24	1440	200	145.7
		25 ° temperature rise				30 ° temperature rise			
HD200	16-199	24	1440	200	173.8	21.7	1302	112.5	199.0
HDI200	16-195	24	1440	200	173.8	21.7	1302	112.5	195.0
HD250	20-250	24	1440	200	182.2	24	1440	140	250.0
		35 ° temperature rise				40 ° temperature rise			
HD200	16-199	18.6	1114	75	199.0	16.3	975	60	199.0
HDI200	16-195	18.6	1114	75	195.0	16.3	975	60	195.0
HD250	20-250	22.9	1371	130	250.0	20.0	1200	100	250.0
		45 ° temperature rise				50 ° temperature rise			
HD200	16-199	14.4	867	45	199.0	13.0	780	40	199.0
HDI200	16-195	14.4	867	45	195.0	13.0	780	40	195.0
HD250	20-250	17.8	1067	80	250.0	16.0	960	70	250.0
		55 ° temperature rise				60 ° temperature rise			
HD200	16-199	11.8	709	36	199.0	10.8	650	33	199.0
HDI200	16-195	11.8	709	36	195.0	10.8	650	33	195.0
HD250	20-250	14.5	873	50	250.0	13.3	800	45	250.0
		65 ° temperature rise				70 ° temperature rise			
HD200	16-199	10	600	31	199.0	9.3	557	29	199.0
HDI200	16-195	10	600	31	195.0	9.3	557	29	195.0
HD250	20-250	12.3	738	40	250.0	11.4	686	35	250.0
		75 ° temperature rise				80 ° temperature rise			
HD200	16-199	8.7	520	29	199.0	8.1	488	29	199.0
HDI200	16-195	8.7	520	29	195.0	8.1	488	29	195.0
HD250	20-250	10.7	640	30	250.0	10.0	600	25	250.0

Water flow and gas usage table Rinnai INFINITY N-Series temperature preset to 55 °C or less

Model	Approx. min. to max. gas input (MJ/h)	5 ° temperature rise				10 ° temperature rise			
		L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
N56kWi	16-209	37.0	2220	300	48	37.0	2220	300	96
N56kWe	16-209	37.0	2220	300	48	37.0	2220	300	96
		15 ° temperature rise				20 ° temperature rise			
N56kWi	16-209	37.0	2220	300	144	37.0	2220	300	192
N56kWe	16-209	37.0	2220	300	144	37.0	2220	300	192
		25 ° temperature rise				30 ° temperature rise			
N56kWi	16-209	32.0	1920	300	209	26.7	1600	300	209
N56kWe	16-209	32.0	1920	300	209	26.7	1600	300	209
		35 ° temperature rise				40 ° temperature rise			
N56kWi	16-209	22.9	1371	270	209	20.0	1200	170	209
N56kWe	16-209	22.9	1371	270	209	20.0	1200	170	209
		45 ° temperature rise				50 ° temperature rise			
N56kWi	16-209	17.8	1067	140	209	16.0	960	110	209
N56kWe	16-209	17.8	1067	140	209	16.0	960	110	209

Approximate gas consumption

Thermal efficiency calculation based on 97% from star rating test.

Pressure loss through unit

- Temperature rise 5-25 °C assumes set temperature of 37 °C → bypass fully open
- Temperature rise 30-50 °C assumes set temperature of 55 °C → bypass fully closed, actual pressure loss will be lower

Water flow and gas usage table Rinnai INFINITY N-Series **temperature preset to 75 °C or less**

Model	Approx. min. to max. gas input (MJ/h)	5 ° temperature rise				10 ° temperature rise			
		L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
N56kWi	16-209	23.0	1380	300	30	23.0	1380	300	60
N56kWe	16-209	23.0	1380	300	30	23.0	1380	300	60
		15 ° temperature rise				20 ° temperature rise			
N56kWi	16-209	23.0	1380	300	89	23.0	1380	300	119
N56kWe	16-209	23.0	1380	300	89	23.0	1380	300	119
		25 ° temperature rise				30 ° temperature rise			
N56kWi	16-209	23.0	1380	300	149	23.0	1380	300	179
N56kWe	16-209	23.0	1380	300	149	23.0	1380	300	179
		35 ° temperature rise				40 ° temperature rise			
N56kWi	16-209	22.9	1371	270	209	20.0	1200	170	209
N56kWe	16-209	22.9	1371	270	209	20.0	1200	170	209
		45 ° temperature rise				50 ° temperature rise			
N56kWi	16-209	17.8	1067	140	209	16.0	960	110	209
N56kWe	16-209	17.8	1067	140	209	16.0	960	110	209
		55 ° temperature rise				60 ° temperature rise			
N56kWi	16-209	14.5	873	90	209	13.3	800	80	209
N56kWe	16-209	14.5	873	90	209	13.3	800	80	209
		65 ° temperature rise				70 ° temperature rise			
N56kWi	16-209	12.3	738	65	209	11.4	686	55	209
N56kWe	16-209	12.3	738	65	209	11.4	686	55	209
		75 ° temperature rise				80 ° temperature rise			
N56kWi	16-209	10.7	640	50	209	10.0	600	45	209
N56kWe	16-209	10.7	640	50	209	10.0	600	45	209

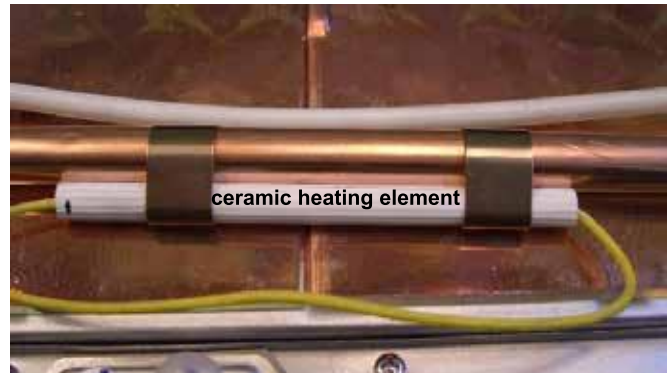
Appendix 2

Rinnai INFINITY inbuilt frost protection

Frost protection is fitted as standard on all Rinnai INFINITY models. Frost protection operates automatically, as required, whenever the appliance is connected to power.

How frost protection works

When the temperature inside the unit drops below 3.5 °C the frost protection turns on, providing heat via electricity. Once the temperature inside the unit reaches 7 °C the frost protection switches itself off.



The heat, provided by strategically placed ceramic heating elements, stops the water from freezing within the pipework of the unit.

As frost protection requires electricity to run, it is important that the unit is connected to the power supply at all times. If left off in an area prone to frost Rinnai recommend draining the appliance to prevent frost damage (not covered by warranty).

Appendix 3

gas boosted solar

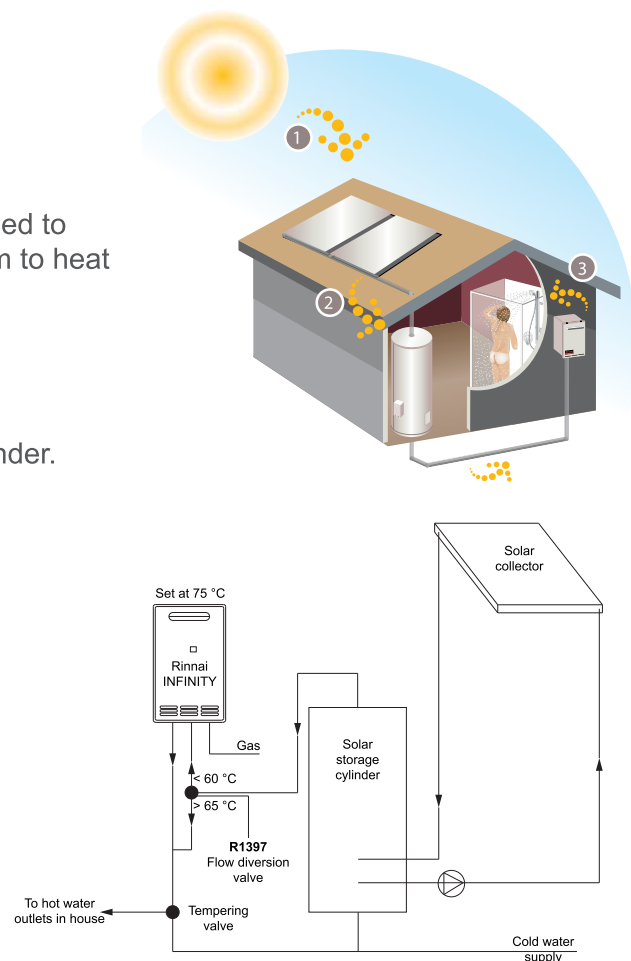
Rinnai INFINITY HD models¹ can be easily plumbed to provide additional heat to a solar hot water system to heat water when solar hot water is not available.

How a gas boosted system works

1. The sun's rays heat water in the solar panels.
2. Hot water from the panels is stored in the cylinder.
3. If the water is too cold, the Rinnai INFINITY gas boost heats the water on demand as it travels from the cylinder to the tap.

The size of the Rinnai INFINITY depends on the number of bathrooms, select the Rinnai INFINITY model as if solar hot water was not available.

¹ N-Series models are also suitable for solar installations, but are not as economical as HD models—there is no gain by having a condensing water heater, as in a solar application, the water is already pre-heated



Recommended system layout using a Rinnai INFINITY and flow diversion valve

Appendix 4

LPG gas bottle consumption and cylinder clearances

LPG gas bottle consumption

We often get asked about how long a gas bottle will last when running a gas appliance. Using the calculation below you can work this out yourself.

LPG gas bottle energy calculation

1 kg of LPG gas contains 50.4 MJ of energy. This means that a 45 kg LPG has bottle has $45 \text{ kg} \times 50.4 \text{ MJ} = 2268 \text{ MJ}$. This calculation works for different gas bottle sizes, here are the most common:

- 9 kg = 453.6 MJ
- 45 kg = 2268 MJ
- twin pack = 4536 MJ (two 45 kg bottles)

Calculating how long an LPG bottle will last

To work out how many hours an LPG bottle will last you need to divide the energy (MJ) of the gas bottle by the total MJ input of the appliance.

For example

A household has an A26 installed which runs approximately 20 minutes a day, three five minute showers and intermittent use of vanity and kitchen taps (approx. five minutes).

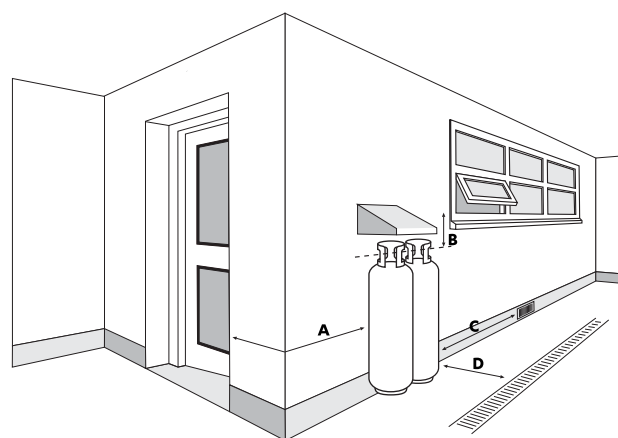
- $2268 \div 199 \text{ MJ/h}$ (maximum input of unit)
= 11.40 hours (running at full capacity)
- 11.40 hours x 60 minutes = 684 minutes
- 684 minutes \div 20 minutes (use per day)
= 34.2 days (approx. one 45 kg per month)

The above example is based on the unit operating at a maximum flow rate and MJ/h input (26 L/min and 199 MJ/h). In the real-world this won't be the case as the flow rate and gas consumption when using vanity and kitchen taps is much lower (2.4 L/min and 13 MJ/h), so in reality the gas bottle will last a little longer.

Please note: This doesn't factor other gas appliances in the house.

For more information you can search the internet (how long will a 45 kg gas bottle last) as there are additional resources and blogs available.

Overview of LPG cylinder clearances



A	Min. clearance to a door	1 m
B	Min. clearance to an openable window	150 mm
C	Min. clearance to an air vent or opening	1 m
D	Min. clearance to a drain	1 m

The above diagram is a modified version of a drawing originally produced by ongas (www.ongas.co.nz). It is intended to provide an overview of the general clearances required for LPG cylinders.

For detailed information relating to LPG cylinder placement it is advisable to consult a licensed gasfitter, your nearest LPG cylinder supplier, or consult AS/NZS 5601.1 Gas Installations.

Appendix 5

Rinnai INFINITY Limited Warranty

Rinnai warranty summary table

This warranty is applicable from all Rinnai INFINITY continuous flow water heaters manufactured from 2019 onwards. All terms of the warranty, subject to the conditions below, are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. Proof of purchase and installation date will be required at the time of any warranty claim. This warranty is only valid within the country of purchase.

Rinnai INFINITY	Application	HEAT EXCHANGER		ALL OTHER PARTS	
		Parts	Labour	Parts	Labour
EF26 and A-Series models	Residential WITHOUT controllers	10 years pro rata ¹	3 years	3 years	3 years
	Residential WITH controllers	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²
HD and N-Series models	Residential	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	5000 hours or 3 years pro rata ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²

¹ Under a pro rata warranty, if the heat exchanger fails before the end of the warranty, Rinnai will replace the heat exchanger at a cost that depends on the age of the heat exchanger at the time of the fault. For further details refer to the pro rata table on p.46.

² Whichever comes first

Residential application

A residential application is defined as an installation where a continuous flow unit is set to 55 °C³ or lower, delivering hot water to a single residential dwelling (not used for commercial purposes⁴).

All other installations are defined as commercial applications.

For constant use applications, such as circulating ring mains, the water heater, must be sized and installed according to written guidelines from Rinnai.

General warranty terms

Rinnai reserves the right to make modifications and change specifications and its parts without notice.

For the purposes of the Consumer Guarantees Act 1993, Rinnai only guarantees the availability of repair facilities and spare parts for the express warranty period recorded in the table above.

This warranty does not limit any consumer rights or guarantees that may apply under the Consumer Guarantees Act 1993. If the product is being acquired for the purposes of a business, the provisions of the Consumer Guarantees Act 1993 do not apply and no other warranties (either express or implied by law) apart from those stated in the warranty will apply.

³ A solar installation using a Rinnai INFINITY continuous flow unit (excluding EF26 and A-Series models) in a single residential dwelling is considered a residential application.

⁴ Examples of a commercial application in a residential dwelling; hair salon, catering kitchen, communal care facility etc. An accommodation business such as a motel, where a continuous flow unit serves the equivalent of a single family dwelling, is deemed to be a residential application.

Warranty terms and conditions

1. All terms of the warranty are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. The installer must issue a certificate of compliance by law in New Zealand. Warranty claims may be invalid if not accompanied by details of the installing or supervising gasfitter's registration number and the gas certification number.
2. All Rinnai appliances must be installed, commissioned, serviced, repaired and removed in accordance with the manufacturer's installation instructions, local regulations, and building codes by persons authorised by local regulations to do so.
3. All appliances must be operated and maintained in accordance with the manufacturer's operating instructions.
4. Servicing of the product is to be carried out by a Rinnai authorised service centre.
5. The warranty applies only to the components supplied by Rinnai. It does not apply to components supplied by others, such as electrical switches, electrical cables, fuses, isolating valves, pipework, and where applicable flue systems, but it is not limited to these.
6. Where the appliance has not been sited in accordance with the installation instructions or installed such that normal access is difficult, a service charge will apply. If at the discretion of the attending service person the installation is deemed illegal or access is dangerous, service will be refused. Any work required to gain reasonable access to the appliance will be chargeable by the attending service person (for example, removal of cupboards, doors, walls, or the use of special equipment to move components, but not limited to these).
7. Where the failed component is replaced under warranty, the balance of the original warranty will remain effective.
8. Rinnai reserves the right to transfer functional components from defective appliances if they are suitable.
9. Rinnai reserves the right to have installed product returned to the factory for inspection.
10. Where the water heater is installed outside the metropolitan area or further than 40 km from a Rinnai authorised service centre, travel costs shall be the owner's responsibility.

Warranty exclusions

The following exclusions may cause the warranty to become void and will result in a service charge and costs of parts (if required).

1. Accidental damage and acts of God.
2. Failure due to abuse or misuse, improper maintenance or improper storage.
3. Failure due to incorrect or unauthorised installations.
4. Failure or damage caused by alterations, service or repair work carried out by persons other than Rinnai service persons or service centres.
5. Where the water heater has failed directly or indirectly as a result of poor water quality outside the limits specified.
6. Where it is found that there is no fault with the appliance and the issue is related to the installation or is due to failure of electric or gas supplied.
7. Subject to any statutory provisions to the contrary, Rinnai does not accept
 - a. liability for consequential damage or incidental expenses resulting from any breach of the warranty.
 - b. claims for damage to building or any other consequential loss either directly or indirectly due to leaks from the appliance or any other faults.

Pro rata heat exchanger warranty table

Under a pro rata warranty, if the **heat exchanger** fails before the end of the warranty, Rinnai will replace the heat exchanger at a cost that depends on the installation application and the age of the heat exchanger at the time of the fault.

Year	EF26 and A-SERIES		HD and N-SERIES	
	Residential WITHOUT controllers	Residential WITH controllers	Residential	Commercial
1	100%	100%	100%	33.3%
2	100%	100%	100%	33.3%
3	100%	100%	100%	33.3%
4	70%	90%	90%	-
5	60%	80%	80%	-
6	50%	70%	70%	-
7	40%	60%	60%	-
8	30%	50%	50%	-
9	20%	40%	40%	-
10	10%	30%	30%	-
11	-	20%	20%	-
12	-	10%	10%	-

The percentages above relate to the heat exchanger component only. It does not include labour.

Water quality

Water quality outside the limits (as set down below) will void this warranty.



Water quality and impurity limits

TDS (Total Dissolved Solids)	Total hardness CaCO ₃	Alkalinity (as CaCO ₃)	Dissolved (free) CO ₂	pH	Chlorides	Magnesium	Sodium	Iron	Langelier Index
Up to 600 mg/L or ppm	Up to 200 mg/L or ppm	Up to 200 mg/L or ppm	Up to 25 mg/L or ppm	6.5-8.5	Up to 300 mg/L or ppm	Up to 10 mg/L or ppm	Up to 150 mg/L or ppm	Up to 1 mg/L or ppm	Between -1.0-0.8

Most metropolitan water supplies fall within these limits. If sludge or foreign matter is present in the water supply, a suitable filter should be incorporated in the water supply.

Some examples of water quality issues where water may need to be treated:

- Hard water (areas including Whanganui)
- Aggressive water (areas including Christchurch)
- Both hard and aggressive water (some bore water)

Rinnai.co.nz

Tel: 0800 746 624

<http://www.youtube.com/rinnainz>

<http://facebook.com/rinnainz>

Limited Warranty

Rinnai brings you peace of mind with a:

Rinnai INFINITY



This warranty is applicable for all Rinnai INFINITY continuous flow water heaters manufactured from 2019 onwards. All terms of the warranty, subject to the conditions below, are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. Proof of purchase and installation date will be required at the time of any warranty claim. This warranty is only valid within the country of purchase.

		HEAT EXCHANGER		ALL OTHER PARTS	
Rinnai INFINITY	Application	Parts	Labour	Parts	Labour
EF26 and A-Series models	Residential WITHOUT controllers	10 years pro rata ¹	3 years	3 years	3 years
	Residential WITH controllers	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²
HD and N-Series models	Residential	12 years pro rata ¹	3 years	5 years	3 years
	Commercial	5000 hours or 3 years pro rata ²	1500 hours or 1 year ²	1500 hours or 1 year ²	1500 hours or 1 year ²

¹ Under a pro rata warranty, if the heat exchanger fails before the end of the warranty, Rinnai will replace the heat exchanger at a cost that depends on the age of the heat exchanger at the time of the fault. For further details refer to the pro rata table on p.3.

² Whichever comes first

Residential application

A residential application is defined as an installation where a continuous flow unit is set to 55 °C³ or lower, delivering hot water to a single residential dwelling (not used for commercial purposes⁴).

All other installations are defined as commercial applications.

For constant use applications, such as circulating ring mains, the water heater, must be sized and installed according to written guidelines from Rinnai.

General warranty terms

Rinnai reserves the right to make modifications and change specifications and its parts without notice.

For the purposes of the Consumer Guarantees Act 1993, Rinnai only guarantees the availability of repair facilities and spare parts for the express warranty period recorded in the table above.

This warranty does not limit any consumer rights or guarantees that may apply under the Consumer Guarantees Act 1993. If the product is being acquired for the purposes of a business, the provisions of the Consumer Guarantees Act 1993 do not apply and no other warranties (either express or implied by law) apart from those stated in the warranty will apply.

³ A solar installation using a Rinnai INFINITY continuous flow unit (excluding EF26 and A-Series models) in a single residential dwelling is considered a residential application.

⁴ Examples of a commercial application in a residential dwelling; hair salon, catering kitchen, communal care facility etc. An accommodation business such as a motel, where a continuous flow unit serves the equivalent of a single family dwelling, is deemed to be a residential application.

Warranty terms and conditions

1. All terms of the warranty are effective from the date of first installation. The attending service person reserves the right to verify this by requesting a copy of the gas certificate of compliance prior to commencement of any warranty work. The installer must issue a certificate of compliance by law in New Zealand. Warranty claims may be invalid if not accompanied by details of the installing or supervising gasfitter's registration number and the gas certification number.
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10. Where the water heater is installed outside the metropolitan area or further than 40 km from a Rinnai authorised service centre, travel costs shall be the owner's responsibility.

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6. Where it is found that there is no fault with the appliance and the issue is related to the installation or is due to failure of electric or gas supplied.
7. Subject to any statutory provisions to the contrary, Rinnai does not accept
 - a. liability for consequential damage or incidental expenses resulting from any breach of the warranty.
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Pro rata heat exchanger warranty table

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6	50%	70%	70%	-
7	40%	60%	60%	-
8	30%	50%	50%	-
9	20%	40%	40%	-
10	10%	30%	30%	-
11	-	20%	20%	-
12	-	10%	10%	-

The percentages above relate to the heat exchanger component only. It does not include labour.

Water quality

Water quality outside the limits (as set down below) will void this warranty.



Water quality and impurity limits

TDS (Total Dissolved Solids)	Total hardness CaCO ₃	Alkalinity (as CaCO ₃)	Dissolved (free) CO ₂	pH	Chlorides	Magnesium	Sodium	Iron	Langelier Index
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Most metropolitan water supplies fall within these limits. If sludge or foreign matter is present in the water supply, a suitable filter should be incorporated in the water supply.

Some examples of water quality issues where water may need to be treated:

- Hard water (areas including Whanganui)
- Aggressive water (areas including Christchurch)
- Both hard and aggressive water (some bore water)



Ph: 07 850-4200 Fax: 07 850-4204
E-mail: rsl@simplefix.co.nz
www.simplefix.co.nz

Pryda Stren-Joist

New to the market Stren-joist has been designed to allow holes to be cut in floor & ceiling joists to enable pipes, wiring or other services to be passed through re-instating the integrity of the penetration.

Features:

1. One size fits 140-290mm joists
2. Can be retro-fitted (after services)
3. Can be nailed or screwed
4. Quick and easy to install
5. All components supplied in Kit

Benefits:

1. Only one needed
2. More convenient
3. Allows choice
4. Saves labour costs
5. No need to source

Nail Plate Stren-Joist
Code: NPSJ
BARCODE NO.
9421026210135

Note 1: Timber grade can be MSG8 or better

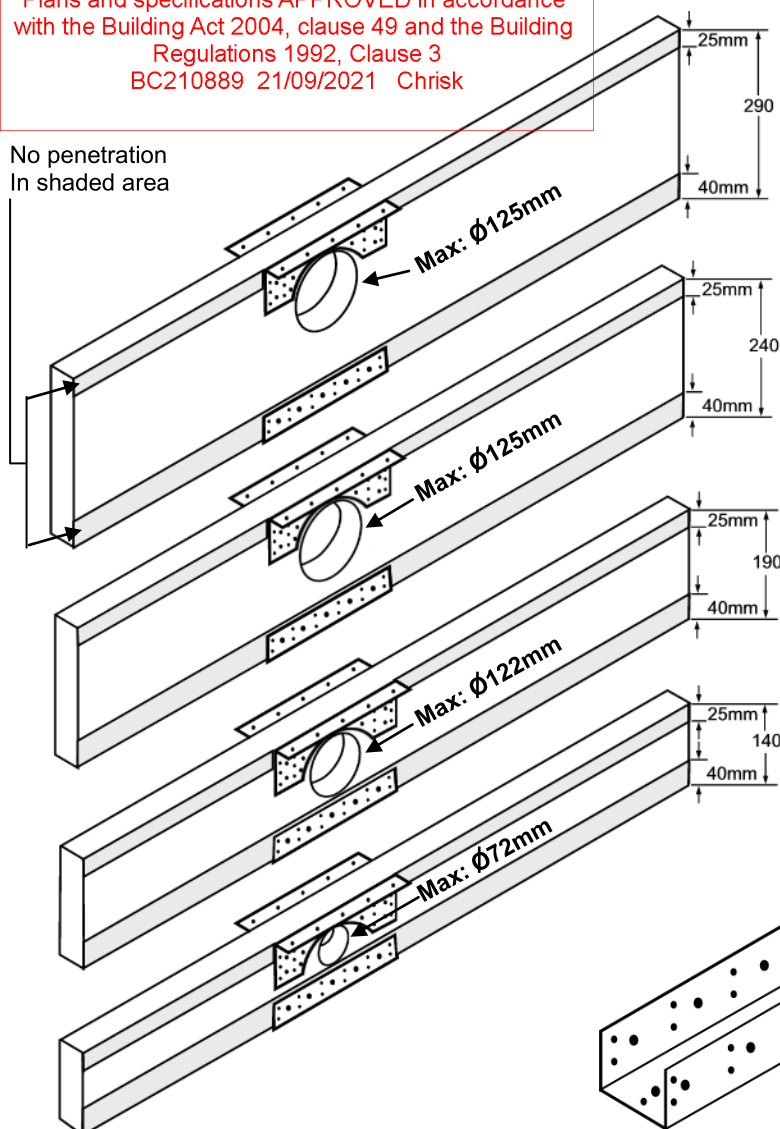
Note 2: The edge of the penetration shall be at least the joist depth from the end of the joist

Note 3: Pryda nails 30 x 3.15mm supplied with the kit are not to be substituted with nails of a lesser diameter such as standard clouts

Each kit contains: 1 x 'U' channel, 2 x arched angles, 1 x 500gm Pryda product nails and 10 of 8g x 20mm screws.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

No penetration
In shaded area



Maximum Joist Penetration (mm)

Joist Size	Max hole size
290 x 45	125
240 x 45	125
190 x 45	122
140 x 45	72

NOTE: If the hex head screw fixing option is preferred then use 20/12g x 35mm Type 17 galvanised screws Not supplied in kit but can be purchased separately.
RSL CODE: T1235/20

All screw holes filled
with screws (provided)
Into floorboard

Alternatively use
12g x 35mm hex
head Tek screws
in screw holes
(not provided)

All nail holes
filled with Pryda
product nails
(to joist)

P.T.O. For Producer Statement



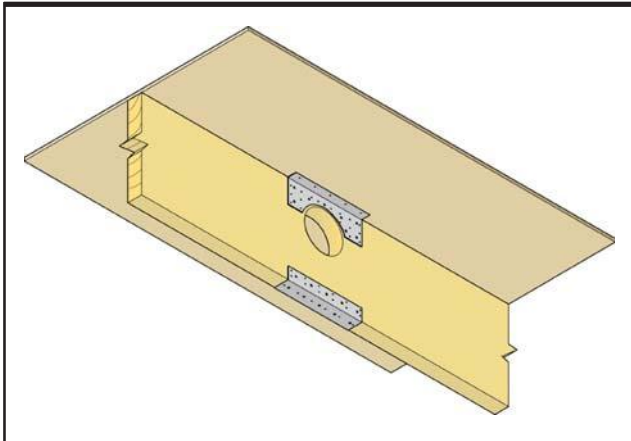
Distributed by RSL Simplefix Support Systems

Stren-Joist

Re-instates integrity of penetrated joists.



Ph: 07 850-4200 Fax: 07 850-4204
rsl@simplefix.co.nz
www.simplefix.co.nz



Specifications

Material:	1.6mm Z275 galvanised steel.
Product Code:	NPSJ
Each kit contains:	1 x 'U' channel, 2 x arched angles, 1 x 500gm of Pryda Product Nails and 10 /8g x 20mm screws. (If the hex screw fixing option is used then 30 /12g x 35mm hex head type #17 galvanised screws are required.
Packing:	1 per carton

Features

The Pryda Stren-Joist has been designed to allow holes to be cut in floor joists to enable pipes, wiring or other services to be passed through the joist. The fitting of a Pryda Stren-Joist re-instates the integrity of the penetrated joist.

Advantages

- Quick and easy to install
- Fixing option of either nailing or screwing.
- Note—Fixing to the flooring must be done with screws provided. All other holes can use either nails or screws
- Can be retro-fitted. There is no requirement to remove services to fit the Stren-Joist
- Comes in one size, designed to fit 140—290mm joists
- Allows an easy solution to fix penetrations in floor joists made by other trades
- Timber grade can be SG8 or better
- The edge of the penetration shall be at least the joist depth from the end of the joist
- All components are available in a single kit - Pryda Code NPSJ.

Installation

The Pryda Stren-Joist retrofit installation is self-evident and normal good building practice is assumed during installation. The product is suitable for the all joist sizes between 140 x 45mm to 290 x 45mm but is not suitable for 90 x 45mm joist.

Application

The Pryda Stren-Joist is intended to re-instate the structural integrity of joist that has suffered service holes after erection. The hole can be made in any position along the span of the joist provided that the hole edge is not closer than one joist depth from the end supports of the joist.

Durability

The durability of the Pryda Stren-Joist is in accordance with the acceptable solutions contained in Table 4.1 of NZS3604:2011 and is intended for internal "closed spaces". It is not suitable where this table specifies 304 stainless steel products.

Maximum Joist Penetration	
Joist Size	Max Hole size
140 x 45	72mm
190 x 45	122mm
240 x 45	125mm
290 x 45	125mm



Distributed by RSL Simplefix Support Systems



Pryda Stren-Joist

Alternative Solution to NZS3604:2011 CI 8.51.6 and 8.7.5

Alternative solution where strengthening of joists are required after a hole or notch has been made in a joist, refer to NZS3604:2011 cl 8.5.1.6 and cl 8.7.5.

Specification

Product Code:

NPSJ

Material:

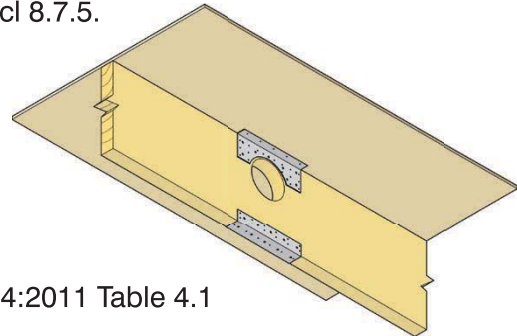
1.65mm G300 Z275 galvanised steel

Durability:

Suitable for use in closed environment as per NZS3604:2011 Table 4.1

Application:

Designed to reinstate the structural integrity of a joist after a service hole has been drilled through the member using the verification methods in accordance with the New Zealand Building Code B1 & B2.



Advantages:

- Quick and easy to install
- Fixing option of either nails or screws
- Can be retro-fitted
- One size designed for use on 140—290mm joists

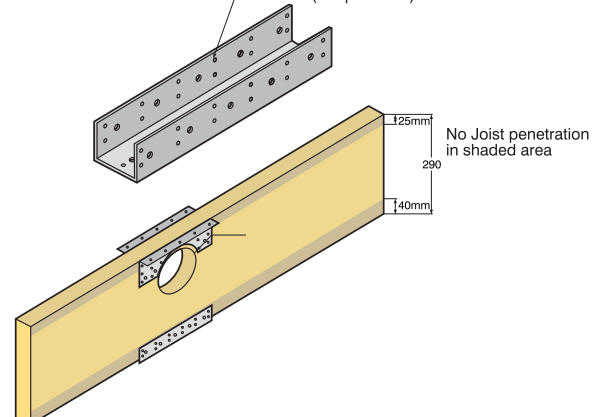
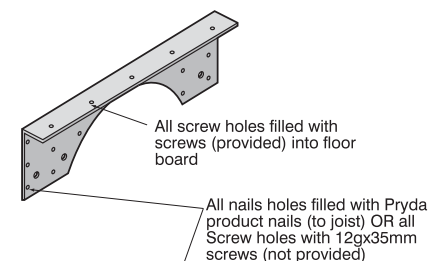
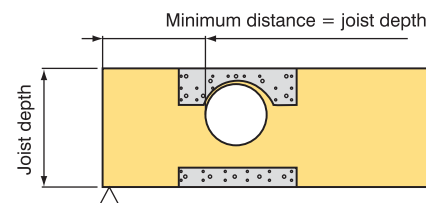
Joist Size (mm)	Max Hole Size (mm)
140 x 45	72
190 x 45	122
240 x 45	125
290 x 45	125

Installation:

1. Use NPSJ to locate and correct vertical location of hole along the joist. Care shall be exercised when installing NPSJ in 140x90mm joist where hole location is critical.
2. The hole can be made in any position along the span of the joist provided that the hole edge is no closer than one joist depth from the end supports of the joist. Refer to table for maximum hole size in joist
3. Present the two angles to either side of hole as shown and nail or screw into place ensuring a tight snug fit onto joist and underside of flooring (use 10 / 8gx20mm screws for top flange)
4. Present channel to underside of joist and nail or screw into place ensuring a tight and snug fit.

Notes:

- If hex screw fixing option is used then 30 / 12g x 35mm T17 hex head screws are required. (not supplied with the NPSJ kit.)
- All nail or screws holes shall be filled
- Intended for use in internal 'closed space' as per Table 4.1 of NZS3604:2011





ARDEX Butynol®

Installation Instructions

For installation of ARDEX Butynol® and Butyseal

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

ARDEX Australia Pty Ltd

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ARDEX New Zealand Ltd

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www.ardex.co.nz

ARDEX Butynol®

Accessories

ARDEX RELEASE TAPE

ARDEX Release tape is used on all joints and junctions of sheet substrates. It has a silicone top surface to create an unbonded joint.

WA98 ADHESIVE

ARDEX WA 98 is a high performance roofing contact adhesive. It has been specially developed for bonding butyl rubber sheeting to roofing substrates. Its convenient and economical spraying, combined with its long tack life, makes it ideal for bonding large areas.

WPM 290 SOLVENT

WPM 290 Solvent is specially formulated for clean up use with WA 98 Adhesive.

SEAM PRIMER

Seam Primer is specially formulated for use with Seam Tape. Applied with scrubber pads. Available in 4 and 1 litre cans.

SEAM TAPE

Used in conjunction with Seam Primer, Seam tape is used in all Butynol® laps.

Supplied by ARDEX in 50mm x 30.5m rolls (6 to a carton).

DETAIL TAPE (uncured)

A malleable exterior tape for flashing exterior corners etc. 150mm x 30.5m rolls.

FLASHING TAPE

A malleable tape for moulding in gussets, pipe flashings and awkward situations. Supplied in 100mm x 5m rolls. Flashing tape must not be left exposed. A cover strip of Butynol® or detail tape must be applied over flashing tape to finish.

BUTYNOL® SEALANT

Available in tubes for caulking guns.

ARDEX Butynol®

Substrates

SUBSTRATE SPECIFICATION (Plywood)

To conform with Acceptable Solution E2/AS1 plywood shall be:

A minimum of 17mm complying with AS/NZS 2269, at least CD Structural Grade plywood with the sanded C face upwards, and H3.2 with Waterborne CCA treatment and kiln dried after treatment.

Substrates must be dry when Butynol® is applied. The plywood and the timber substructure shall have a maximum moisture content of 20% when Butynol is adhered.

Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing. The maximum recommended span in E2/AS1 is 400mm. However specific design may allow 17.5mm plywood or greater to be laid on 400mm purlins with nogs or dwangs at 600mm or even 1200mm centres. Plywood shall be laid with the face grain at right angles to the supports. A 20mm triangular fillet shall be used at the base of any 90° upstand. External edges shall be chamfered with a minimum radius of 5mm.

Plywood shall be fixed with 10 gauge x 50mm stainless steel countersunk head screws with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets.

All joints in the plywood and junctions of plywood with other materials shall have 25mm ARDEX Release tape applied before application of Butynol®.

PLYWOOD QUALITY

Plywood to be installed in accordance with the plywood manufacturer's recommendation to provide a suitable surface for membrane.

Problems with plywood quality may effect long term membrane performance.

Please check with your plywood supplier.

We have duplicated the position of one supplier below.

- Face checks in plywood do not affect the structural integrity of the panel as they are confined to the surface veneer and are strictly aesthetic in nature.
- As face checking occurs naturally Carter Holt Harvey Wood products does not consider them to be a manufacturing or product fault.

Source: Specifications and Installation Guide Carter Holt Harvey.

Laying on plywood with face checking as above should be avoided and surface corrected if possible.

NOTE: The use of LOSP (Light Organic Solvent Preservative) treated plywood must NOT be used under Butynol® in any circumstances or conditions.

SUBSTRATE SPECIFICATION (Strandsarking)

Strandsarking sheets are 3.60m x 800mm x 16.3mm.

Strandsarking sheets shall be laid with staggered joints.(brick bond) The edges of all sheets shall be supported with dwangs or framing. The maximum allowable spacing for supporting roof framing is 400mm.

When a roof has a pitch below 2 degrees it is recommended to use Strandfloor H3.1.

Strandsarking sheets may be butt jointed with an Ardex release tape used over the join.

Fixings.

Shall be 50mm x 4.8mm diameter stainless steel screws fixed at 150mm centres.

If fixings are bought into 100mm centres on the intermediate supports this will allow use in wind zones very high and extra high without any further treatment. Fixings must be positioned no closer than 10mm from the sheet edges.

SUBSTRATE SPECIFICATION (Concrete)

New concrete

Must be cured for a minimum of 28 days and all curing compounds removed prior to application.

A reduction in cure time can be achieved by utilising the ARDEX HydrEpoxy System (consult ARDEX Technical Department for details).

Old concrete

Must be clean from any contaminants prior to application.

For further substrate types please consult ARDEX Technical Department.

ROOF VENTILATION

The most important precaution to observe with low slope roofs is that no construction moisture is enclosed. Low slope or flat roof structures are generally slow drying because of their impermeable cladding. All timbers should be below 20% moisture before being enclosed.

No amount of ventilation will cope with moisture problems created by drying timbers.

If there is a reason to believe that there is moisture trapped in the roof structure ARDEX can provide our standard one way substrate ventilators or our lo rise one way ventilators to provide a better visual appearance.

Soffit ventilation is the most effective way to provide effective roof cavity ventilation. Careful placement of the soffit ventilation to avoid gutters etc, will provide a natural airflow as well as cooling to a low slope membrane clad roof.

ARDEX Butynol®

Installation

Closed-in construction spaces under Butynol® roofs and decks shall have adequate ventilation to prevent the accumulation of moisture under Butynol®. There should be a minimum gap of 20mm between the underside of the substrate and any insulation.

SUBSTRATE VENTILATION

Substrate ventilation should be used to release moisture trapped under the Butynol® on concrete surfaces. Substrate ventilators are used in conjunction with vent tapes. Tapes should be laid in a grid pattern spaced at 600mm venting to the roof perimeter.

On plywood substrates ventilators are used at the junction of the ply. Ventilators are not required in most applications.

One way substrate ventilators prevent moisture vapour build up and if required can be installed every 90 square metres. Not designed to ventilate roof cavities.

For cavity ventilation - seek advice from an ARDEX Representative.

ARDEX Butynol®

Installation

LAYING SPECIFICATION

The Sub contractor for the work called for in this trade will be a Company or Person approved by ARDEX.

The approved Applicator (hereafter called the Applicator) shall examine all drawings and provide for the flashing, caulking and sealing of all vents, stacks and pipes penetrating the roofing membrane. Also all flashings at walls, parapets, verges, gutters etc., unless otherwise instructed in the specifications.

The surface to which Butynol® is to be fixed shall be clean, smooth, dry and free from sawdust, grit or sharp objects. Membrane laying shall not start until defects have been corrected.

To avoid staining care should be taken to avoid water runoff from copper downpipes or guttering on to light coloured Butynol®.

When CCA plywood is used in conjunction with a light coloured membrane it is advisable to prime any plywood that will not be covered the same day.

It is the responsibility of the Applicator to ensure that the surface to be covered by the Butynol® is in fit and proper condition, suitable in all respects for the laying of the material.

On completion the Applicator will provide the owner with a Workmanship Warranty and obtain from ARDEX a Materials Warranty.

Failure to comply with the above specifications will result in all warranties being null and void.

LAYING THE BUTYNOL®

Before applying the Butynol®, it shall be unrolled for twenty minutes to relieve stresses induced by manufacture and storage. The Butynol® sheet shall be set out in the exact position in which it will be finally required and while it is held in place, it shall be folded back lengthwise to expose half the underside. To the now exposed underside and the area of roof also left exposed, apply an even coat of WA 98 Adhesive. When the adhesive has become touch dry, work the sheet back into its original position avoiding wrinkles and the inclusion of air bubbles.

Repeat the process with the other half of the sheet and when completed, roll the whole sheet with hand press rollers or the like.

When applying the next sheet, it shall be lapped over the first sheet by 50mm. All turn ups and downs shall be neatly formed and cut to a straight line if required.

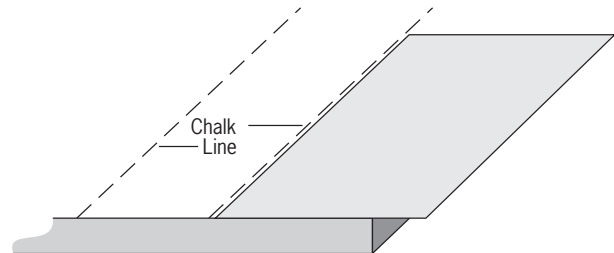
Butynol® shall not be laid under tension.

When the whole area has been covered or as work progresses, the applicator has to seal the laps.

BUTYNOL® LAYING METHOD

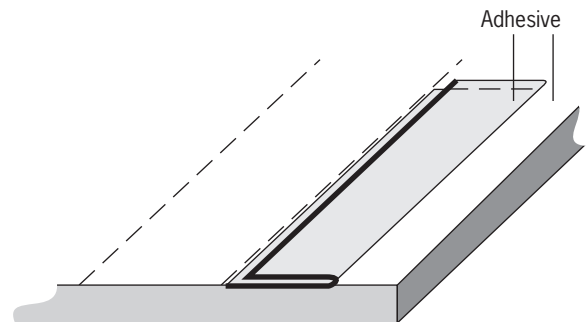
STEP 1

Accurately place sheet. Mark spacing with chalk line.



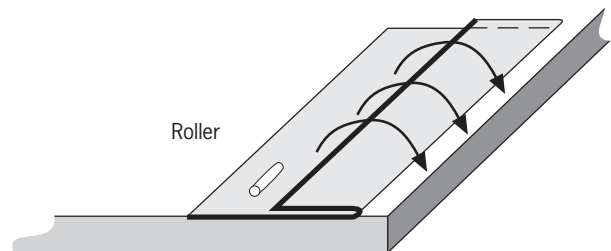
STEP 2

Fold back half sheet. Apply adhesive to both faces.



STEP 3

After flash off, fold membrane into place. Roll thoroughly.



STEP 4

Treat 2nd half of Butynol® similarly.

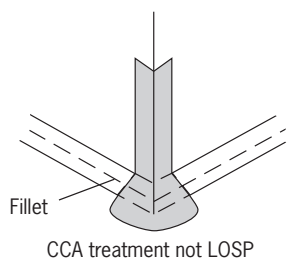
ARDEX Butynol®

Installation

EXTERNAL CORNERS

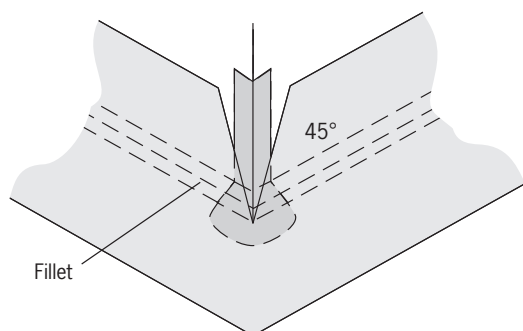
STEP 1

Bond 100mm flashing to corner as shown.



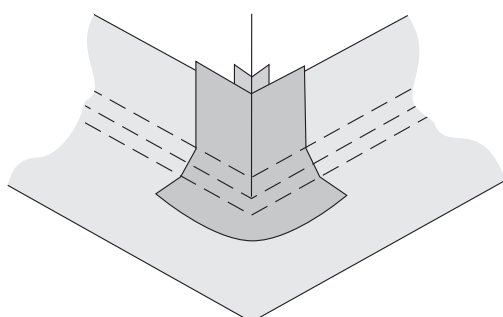
STEP 2

Bond Butynol® to deck and up wall 150mm minimum. Cut sheet from corner at 45° as shown.



STEP 3

Cover corner point with layer of detail tape.

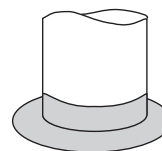


NOTE: Fillets must be used on all internal corners.

FLASHING - EXISTING PIPE

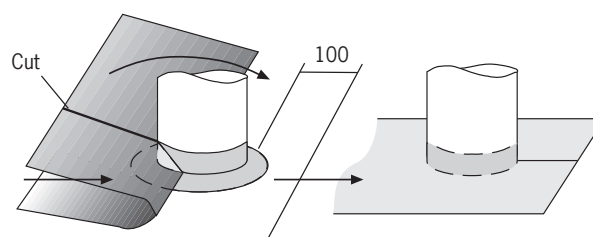
STEP 1

Under flash pipe with 100mm Butynol® flashing tape.



STEP 2

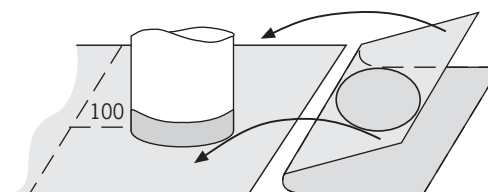
Bond Butynol® to 100mm past pipe. N.B. When flashing black Butynol® use Butynol® or detail tape.



STEP 3

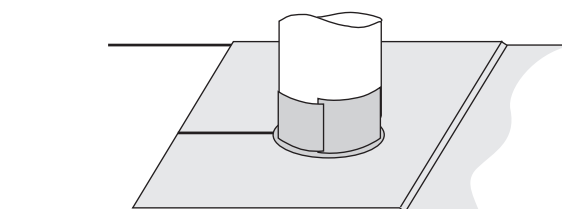
Bond continuation of Butynol® to overlap base sheet and beyond pipe 100mm.

Cut a smooth round hole 20mm smaller than diameter of penetration.



STEP 4

Apply collar of detail tape or Butynol® cover strip. DO NOT STRETCH STRIP.



N.B. Flashing tape MUST NOT be left exposed. Cover strip must be Butynol®. When detail tape is used a cover strip of Butynol® is not required.

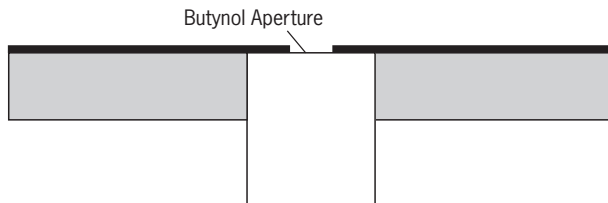
ARDEX Butynol®

Installation

FLASHING - NEW PIPE

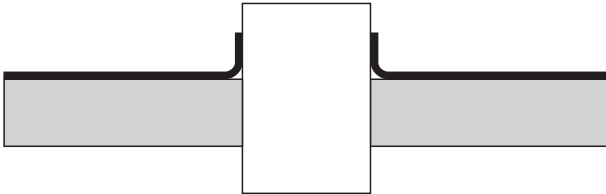
STEP 1

Cut smaller diameter hole than pipe.



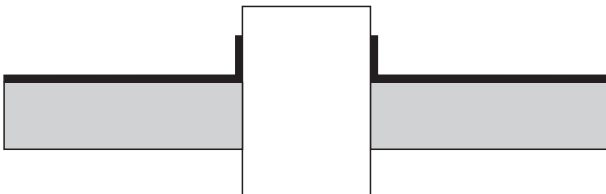
STEP 2

Pipe is raised through smaller diameter hole in Butynol®, forcing edge upwards to create upstand.



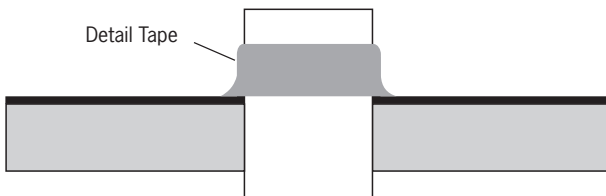
STEP 3

Pull pipe down to eliminate void.



STEP 4

After pulling pipe down approximately 1cm to sharpen corner, tape upstanding Butynol® to pipe using seam primer and detail tape.



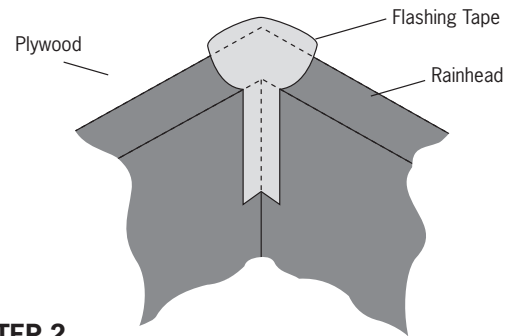
N.B. If flashing tape is used it **MUST NOT** be left exposed. A cover strip of Butynol® must be applied over the flashing tape to finish.

INTERNAL CORNERS FOR RAINHEADS

and areas where a pig's ear cannot be used.

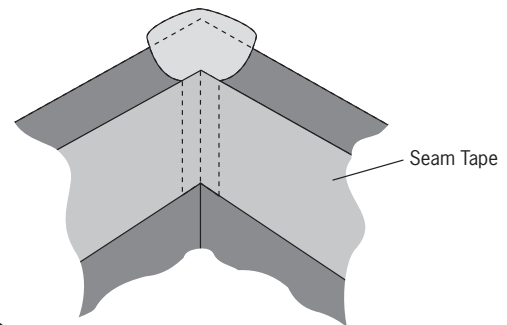
STEP 1

Apply Flashing Tape over Rainhead and Plywood.



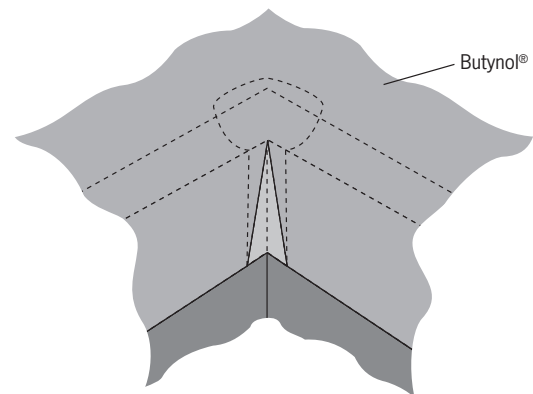
STEP 2

Run Seam Tape along all four vertical sides of Rainhead.



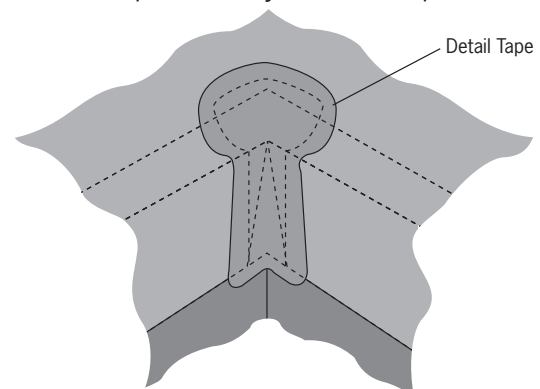
STEP 3

Cut Butynol® sheet to fit into corners.



STEP 4

Cover corner point with layer of detail tape.

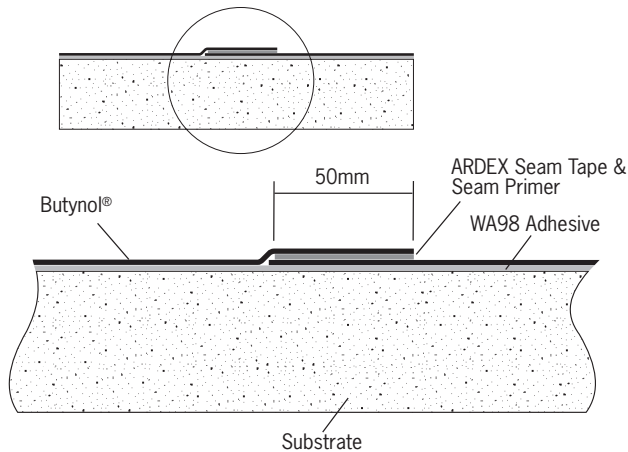


ARDEX Butynol®

Installation

BONDING THE LAPS

Seam tape and seam primer must be used for all Butynol® joints.

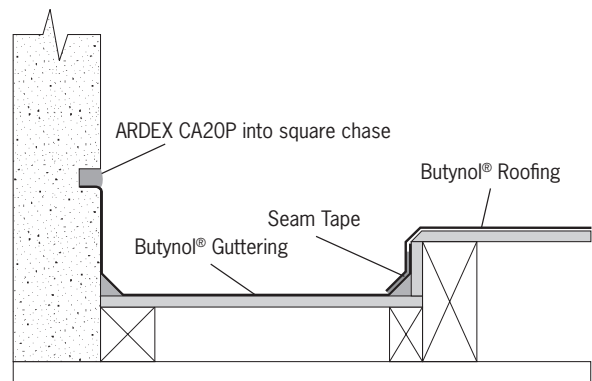


1. The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
2. The top sheet is folded back.
3. The ARDEX Seam Primer is then applied to the Butynol® in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The ARDEX Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'touch dry'.
4. Position and unroll the 50mm ARDEX Seam Tape along the seam. The edge of the seam tape should be aligned to the mark on the bottom membrane sheet. The see-through backing film makes this very simple.
5. Roll the length of the seam with backing film still in place.
6. Remove the backing film from the ARDEX Seam Tape by pulling at a 45° angle away from the seam. Keep the backing film low to the roof surface as it is removed.
7. Fold into place the primed edge of the top sheet.
8. Roll the completed seam.

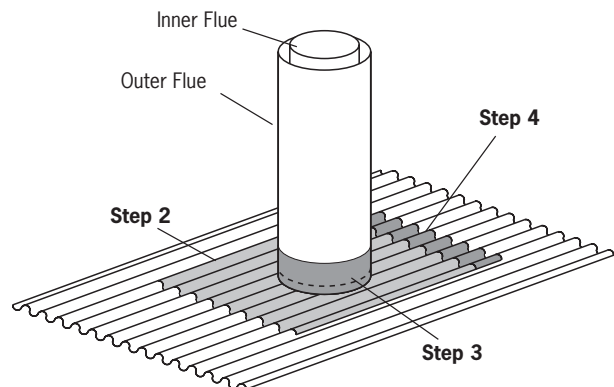
FORMING LAPS FOR GUTTERS

Laps are most important in gutter work and should be formed using ARDEX seam tape and seam primer.

All internal boxed gutters can be easily formed to any shape or size using Butynol® over any specified substrate.



FLUE FLASHING



Step 1

Measure Butynol® to suit size of pipe. Cut a smooth round hole at least 20mm smaller than diameter at flue penetration. Refer to table 21 of E2/AS1.

Step 2

Fix Butynol® Flashing onto roofing with WA 98 adhesive ensuring membrane is relaxed into roofing profile.

Step 3

Apply collar of Detail Tape sealed with Seam Primer onto 20mm Butynol® upstand.

Step 4

Apply flashing strip of Detail Tape sealed with Seam Primer onto Butynol® top edge and roofing ensuring feather edge is on the upside.

ARDEX Butynol®

Installation

LOOSE LAID APPLICATION OF BUTYNOL® ROOFING

Materials used shall be as previously specified. When the surface is suitably prepared a large fully vulcanised Butynol® sheet or sheets can be unrolled and spread over the prepared area and allowed to remain in this position for approximately one hour to relieve stresses induced by manufacture and storage. If necessary for ease of handling, these sheets can be supplied in varying sizes and vulcanised on site using an ARDEX vulcanising machine or using seam tape with seam primer.

The Butynol® sheet shall be set out in the exact position in which it will be finally required and whilst it is held firmly in place it shall be folded back at least one metre from the roof's surrounding parapet or wall to allow the application of adhesive to that area of the exposed substrate.

WA 98 adhesive may be applied to the substrate and the corresponding area of Butynol® sheeting which may then, when the adhesive is touch dry, be worked back into its required position avoiding wrinkles and the inclusion of air bubbles.

Upon completion of the detail work, parapets, drains and rainheads etc a layer of rounded gravel 30-40mm should be applied up to 50mm deep, over a layer of Geo Textile Fabric for protection of the Butynol® sheet.

Care must be taken at outlets to ensure the ballast cannot enter or cause a blockage that prevents rainwater from leaving the roof area. Maintenance paths should be created to air-conditioning or roof plant with concrete tiles.

Effects on the membrane in areas of high wind can be eliminated by stabilising the ballast with cement. Dry cement should be broadcast over the 30-40mm gravel with a broad mouth shovel and left to hydrate or lightly sprayed with water to set off.

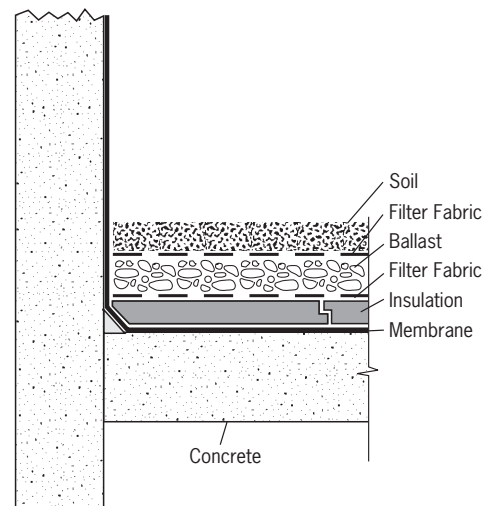
If possible a water test should be carried out prior to the application of ballast.

Note: Minimum pitch 2.0° to comply.

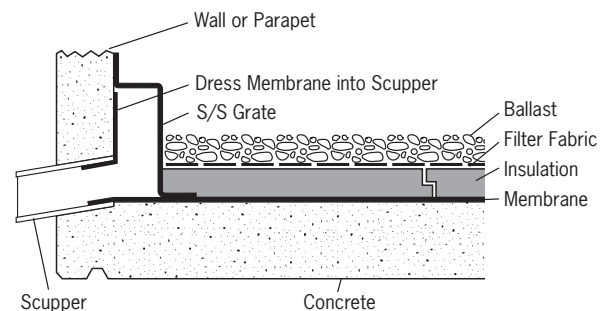
Refer NZBC Clause E2/AS1 External Moisture 8.5.1 (a).

Butynol® can be laid with zero pitch if compliance can be obtained. Lap may be welded in factory or on site if required.

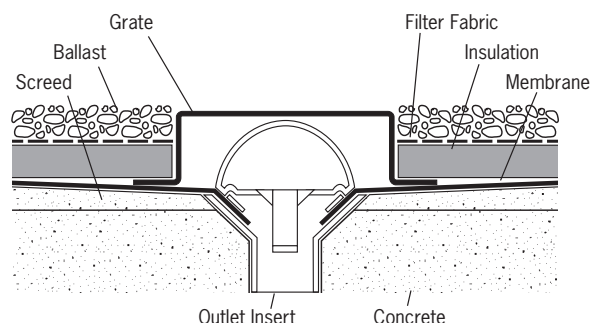
TYPICAL BALLASTED/GARDEN ROOF DETAIL



SCUPPER ROOF OUTLET



SCUPPER ROOF OUTLET & GRAVEL RETAINER





ARDEX Substrate Specifications

For External Membrane Applications

For the following substrates;

Plywood

Laminex Strandsarking

Concrete

ARDEX PolyIso Board

ARDEX Australia Pty Ltd
20 Powers Road
Seven Hills NSW 2147
Phone: 1300 788 780
technicalservices@ardexaustralia.com
www.ardexaustralia.com

ARDEX New Zealand Ltd
15 Alfred Street
Onehunga, Auckland 1061
Phone: 0800 227 339
info@ardexnz.com
www.ardex.co.nz

ARDEX Substrate Specifications

For External Membrane Applications

PLYWOOD SPECIFICATION

A minimum of 17mm complying with AS/NZS 2269

CD Structural Grade plywood with the sanded C face upwards, and H3 with Waterborne treatment.

Substrates must be dry when an ARDEX waterproofing membrane is applied. The plywood and the timber substructure shall have a maximum moisture content of 18% when an ARDEX waterproofing membrane is adhered.

Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing.

Plywood shall be laid with the face grain at right angles to the supports. A 20mm triangular fillet shall be used at the base of any 90° upstand. External edges shall be chamfered with a minimum radius of 5mm.

Plywood shall be fixed with 10 gauge x 50mm stainless steel countersunk head screws with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets.

All joints in the plywood and junctions of plywood with other materials must have a 25mm release tape applied before application of the membrane.

PLYWOOD QUALITY

Plywood to be installed in accordance with the plywood manufacturer's recommendation to provide a suitable surface for membrane.

Laying on plywood with face checking should be avoided and surface corrected.

NOTE: The use of LOSP (Light Organic Solvent Preservative) treated plywood must NOT be used under ARDEX waterproofing membranes in any circumstances or conditions.

Note: The recommended span of support in the NZBC E2 Acceptable solution is 400mm in one direction for 17mm Plywood. Specific design may allow 17.5mm plywood or greater to be laid at increased centres in accordance with the substrate manufacturers guidelines.

STRANDSARKING SPECIFICATION

Strandsarking sheets are 3.60m x 800mm x 16.3mm.

Strandsarking sheets shall be laid with staggered joints (brick bond). The edges of all sheets shall be supported with dwangs or framing. The maximum allowed spacing for supporting roof framing is 400mm centres.

When a roof has a pitch below 2 degrees it is recommended to use Strandfloor H3.1.

Strandsarking sheets must be butt jointed with an ARDEX release tape used over the join.

Fixings shall be 50mm x 4.8mm diameter stainless steel screws fixed at 150mm centres.

If fixings are bought into 100mm centres on the intermediate supports this will allow use in wind zones very high and extra high without any further treatment. Fixings must be positioned no closer than 10mm from the sheet edges.

CONCRETE SPECIFICATION

Ensure new concrete substrate has been allowed to cure for at least 28 days.

Ensure curing compounds and sealers are compatible with ARDEX membrane components before installation.

Prepare surface, including vacuum cleaning and acid etching as necessary to leave smooth, clean, dry and free of sharp edges, fines, loose or foreign materials, oil, grease or other materials which might damage the membrane.

External edges shall be radiused a minimum of 5mm.

Fillets (minimum of 20mm) shall be installed where required. Do not fix using nails. If using timber the use of LOSP treatment shall be avoided.

Consult with ARDEX for a reduction in the curing period.

For further substrate types please consult ARDEX Technical Department.

ARDEX POLYISO BOARD SPECIFICATION

Packaging, storage and precautions

1. Tuff-wrap packaging provides a durable protective covering to the top and four sides of the bundle, as well as a portion of the bottom board.
2. Keep insulation dry at all times. Insulation bundles need to be elevated above the water line to prevent moisture infiltration from the bottom side.
3. Combustible. Refer to SDS for more information.
4. Before insulation is placed on the roof deck, the substrate must be clean, dry, free of debris, water, ice or snow, and suitably prepared by removing all defects that might affect the quality of the application. Any unusual deck conditions or defects should be brought to the architect or building owner's attention prior to installation.
5. No more insulation shall be installed than can be covered with membrane and completed before the end of each day's work or before the onset of inclement weather.
6. ARDEX Polyiso is non-structural, non-load-bearing material. The finished roof assembly should be protected from excessive roof traffic with proper walkway materials.

ARDEX Polyiso insulation boards must be installed using fasteners and plates, hot bitumen or ARDEX approved insulation adhesives. Insulation shall be neatly fitted to all roof perimeters, penetrations and abutments. The ARDEX Polyiso board is suitable for adhered, ballasted and mechanically fastened single-ply roofing systems.

SUBSTRATE VENTILATION

Substrate ventilation should be used to release moisture trapped under the membrane on concrete surfaces. Substrate ventilators are used in conjunction with vent tapes. Tapes should be laid in a grid pattern spaced at 600mm venting to the roof perimeter.

On plywood substrates ventilators are used at the junction of the ply. Ventilators are not required in most applications.

One way substrate ventilators prevent moisture vapour build up and if required can be installed every 90 square metres. Not designed to ventilate roof cavities.

For cavity ventilation - seek advice from an ARDEX Representative.

ROOF VENTILATION

The most important precaution to observe with low slope roofs is that no construction moisture is enclosed. Low slope or flat roof structures are generally slow drying because of their impermeable cladding. All timbers should be below 18% moisture before being enclosed.

No amount of ventilation will cope with moisture problems created by drying timbers.

If there is a reason to believe that there is moisture trapped in the roof structure ARDEX can provide our standard one way substrate ventilators or our lo rise one way ventilators to provide a better visual appearance.

Soffit ventilation is the most effective way to provide effective roof cavity ventilation. Careful placement of the soffit ventilation to avoid gutters etc., will provide a natural airflow as well as cooling to a low slope membrane clad roof.

This document was issued in October 2018 and is valid for 3 years, in some instances a newer version may be published. Always refer to www.ardex.co.nz for the latest technical data from ARDEX New Zealand Ltd



BRANZ Appraised

Appraisal No. 436 [2017]

BUTYNOL® AND BUTYSEAL ROOFING MEMBRANE SYSTEMS

Appraisal No. 436 [2017]

This Appraisal replaces BRANZ Appraisal No. 436 [2011]

Amendment Dated 4 May 2021



Christchurch International Airport 4500 m² of 1.5 mm Grey Butynol used for flat roof areas and gutters. Completed in 2013.

BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 Butynol® and Butyseal Roofing Membrane Systems are synthetic rubber waterproofing membranes designed to be used on roofs and decks.
- 1.2 The membranes are supplied as single-ply, flexible synthetic rubber sheet in roll form. The products are installed as single layer systems.

Scope

- 2.1 Butynol® and Butyseal Roofing Membrane Systems have been appraised for use as roof and deck waterproofing membranes for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
 - the scope limitations of NZBC Acceptable Solution E2/AS1 with regards to building height and floor plan area when subject to specific engineering design; and,
 - with substrates of plywood sheet, Strandsarking (roofs only) or suspended concrete slab; and,
 - with deck size limited to 40 m²; and,
 - situated within NZS 3604 Wind Zones up to, and including Extra High; or,
 - situated in specific design wind pressures up to a maximum design differential Ultimate Limit State (ULS) of 6.0 kPa with the weathertightness detailing subject to specific design.
- 2.2 Roofs and decks must be designed and constructed with no steps within the deck level, no integral roof gardens, and no downpipe discharging directly onto the deck.
- 2.3 The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.4 The membranes must be installed by trained applicators, approved by ARDEX New Zealand Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Butynol® and Butyseal Roofing Membrane Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Butynol® and Butyseal Roofing Membrane Systems meet this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Roofs and decks incorporating Butynol® and Butyseal Roofing Membrane Systems meet these requirements. See Paragraphs 13.1 – 13.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Butynol® and Butyseal Roofing Membrane Systems meet this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 Materials supplied by ARDEX New Zealand Limited are as follows:

- **Butynol® Membranes** - All membranes are single-ply, flexible synthetic rubber membranes. They are supplied in rolls nominally 1.4 m wide by 17.86 m long. Each roll is packed in polythene wrapper trademarked 'Butynol®' with the thickness identified. Thicknesses available are 1.0, 1.5 and 2.25 mm in black; 1.2 mm in dove grey; and 1.5 mm in various colours.
- **Butyseal Membrane** - The membrane is a single-ply, flexible synthetic rubber membrane with polypropylene filaments welded to the underside. It is supplied in rolls nominally 1.4 m wide by 17.86 m long. The total thickness of the membrane is 1.5 mm.
- **Adhesive WA 98** - A specially formulated solvent-based adhesive for all Butynol® applications. Supplied in 1, 4 and 20 litre containers.
- **Solvent WA 98** - A clean up solvent for WA 98 Adhesive.
- **Seam Primer** - A water resistant primer adhesive, used with seam tape for all Butynol laps.
- **Seam Tape** - Uncured cold gum tape used for all Butynol laps. Supplied in 50 mm x 30.5 m rolls.
- **Flashing Tape** - A malleable tape for moulding gussets, pipe flashings and awkward situations. Supplied in rolls 50-100 mm wide x 5 m long.
- **Butynol Sealant CA20P** - A specially designed and formulated sealant for sealing Butynol® flashings into chases. Supplied in 375 mm tubes.
- **ARDEX Release Tape** - This is a pressure sensitive tape between two silicone release backings. One release backing is removed to allow the tape to be applied over all plywood joints. The other release backing is left in place to provide an unbonded area under the membrane which allows for substrate movement.
- **Detail Tape** - A semi-cured detail/flashing tape supplied in rolls 150 mm wide x 30.4 m long.
- **Overlay Tape** - A cured self-adhesive joint tape supplied in rolls 150 mm wide x 30.4 m long.

Handling and Storage

- 5.1 Handling and storage of all materials whether on or off site is under the control of the ARDEX New Zealand Limited approved applicators. Dry storage must be provided for all products and the rolls of membrane must be stored in a horizontal position.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Butynol® and Butyseal Roofing Membrane Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 When Butynol and Butyseal Roofing Membrane Systems are used for specifically designed buildings up to design differential 6.0 kPa ULS wind pressure, only the adhesion of the membrane to the substrate is covered within the scope of this Appraisal. All other aspects of the building, including weathertightness detailing, need to be specifically designed and are outside the scope of this Appraisal.
- 7.2 Butynol® and Butyseal Roofing Membrane Systems are for use on roofs, decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.
- 7.3 The 1.0 and 1.2 mm thick Butynol® products are designed for use on roofs, gutters and decks with protection, and will accommodate light traffic. The 1.5 mm thick product is designed for walk out decks and high maintenance areas, and the 2.25 mm thick product is designed for heavy duty areas and is custom made on request. The 1.5 mm thick Butyseal is available for use on roofs.
- 7.4 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ publication Good Practice Guide - Membrane Roofing.
- 7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported.

Building to NZBC Acceptable Solution E2/AS1

- 7.6 NZBC Acceptable Solution E2/AS1 limits the size of decks to 40 m² as covered by the scope of this Appraisal. Butynol® and Butyseal Roofing Membrane Systems are suitable for use on decks larger than 40 m². These decks are the subject of specific design and are outside the scope of this Appraisal.

Structure

- 8.1 Butynol® and Butyseal Roofing Membrane Systems are fully bonded to the substrate and are suitable for use in areas subject to maximum wind pressure of design differential 6 kPa ULS subject to the limitations of the substrate.

Substrates

Plywood

- 9.1 Plywood must be treated to H3 [CCA treated]. LQSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1, Paragraph 8.5.3 and 8.5.5. Where specific design is used [i.e. outside the scope of E2/AS1], the plywood thickness and fixing size may increase and centres may decrease to meet specific wind loadings.

Strandsarking

- 9.2 Strandsarking must be installed in accordance with the manufacturer's instructions and BRANZ Appraisal No. 946 [2016].

Concrete

- 9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Durability

Serviceable Life

- 10.1 Butynol® and Butyseal Roofing Membrane Systems when subjected to normal conditions of environment and with proper maintenance can expect to have a serviceable life of at least 20 years.

Maintenance

- 11.1 No maintenance of the membrane is normally required provided significant substrate movement does not occur.
- 11.2 In the event of damage to the membrane, the membrane must be repaired by removing the damaged portion and applying a patch as for new work.
- 11.3 Drainage outlets must be maintained to operate effectively.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to Butynol® and Butyseal Roofing Membrane Systems from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 13.1 Roofs and decks must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 for buildings within the scope of NZBC Acceptable Solution E2/AS1 is given by the Technical Literature which matches details in NZBC Acceptable Solution E2/AS1.
- 13.2 When installed in accordance with this Appraisal and the Technical Literature, Butynol® and Butyseal Roofing Membrane Systems will prevent the penetration of water, and will therefore meet code compliance with NZBC Clause E2.3.2. The membranes are impervious to water and will give a weathertight roof or deck.
- 13.3 Butynol® and Butyseal Roofing Membrane Systems are impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.
- 13.4 The minimum fall to roofs is 1 in 30, plywood decks 1 in 40, suspended concrete slab 1 in 60 and gutters 1 in 100 with no cross seams allowed in the gutter in accordance with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.1. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and may increase the risk of deterioration of the membranes. *[Note: Where possible, a minimum fall of 1 in 60 in gutters is preferred.]*
- 13.5 Roof and deck falls must be built into the substrate and not created with mortar screeds applied over the membranes.
- 13.6 Allowance for deflection and settlement of the substrate must be made in the design of the roof or deck to ensure falls are maintained and no ponding of water can occur.
- 13.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the deck or balcony does not drain to an external gutter or spouting.
- 13.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.
- 13.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Water Supplies

- 14.1 Water is not contaminated by Butynol® and Butyseal Roofing Membrane Systems. The first 25 mm of rainfall from a newly installed Butynol® and Butyseal Roofing Membrane Systems roof must be discarded before drinking water collection starts. This is to remove residues which may have developed in the processes involved in the production of Butynol® and Butyseal Roofing Membrane Systems.
- 14.2 Note that all water collected off roof surfaces made from any material is considered to be non-potable due to possible contamination from other sources. Water collection in this way can only be considered potable if it has been passed through a suitable sterilization system. Sterilization systems have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

- 15.1 Installation of substrates must always be carried out by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class, in accordance with the Butynol® and Butyseal Roofing Membrane Systems Technical Literature and this Appraisal
- 15.2 Installation and finishing of components and accessories supplied by ARDEX New Zealand Limited and its approved applicators must be carried out in accordance with the Butynol® and Butyseal Roofing Membrane Systems Technical Literature and this Appraisal by trained applicators, approved by ARDEX New Zealand Limited.

Preparation of Substrates

- 16.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.
- 16.2 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 585. The relative humidity of the concrete must be 75% or less before membrane application.
- 16.3 The moisture content of a timber substructure must be a maximum of 20% and plywood or Strandsarking sheets must be dry at the time of membrane application. This will generally require plywood or Strandsarking sheets to be covered until just before the membrane is laid, to prevent rain wetting.
- 16.4 In cases of extreme absorbency a priming coat of 50/50 solution of WA98 and adhesive solvent may be required. Consult with ARDEX New Zealand Limited if in doubt.

Membrane Installation

- 17.1 The membranes must be installed in accordance with the Technical Literature.
- 17.2 All joints in the plywood and Strandsarking substrate, and junctions of plywood and Strandsarking with other materials must have 25 mm wide ARDEX Release Tape applied before installation of the membrane.
- 17.3 The membranes must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 20 minutes prior to installation.
- 17.4 Adhesive must be applied to both the membrane and the substrate, one half at a time. When the adhesive is tack dry, the sheet is rolled onto the substrate. The process is then repeated for the other half of the sheet. Joints in all membrane laps must be completed using ARDEX Seam Tape and Seam Primer.

Inspections

- 18.1 Critical areas of inspection for waterproofing systems are:
 - Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the manufacturer's instructions.

Health and Safety

- 19.1 Safe use and handling procedures for the membrane system is provided in the Technical Literature. The products must be used in conjunction with the relevant Materials Safety Data Sheet for each membrane.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 Tests have been carried out on the membranes by Materials and Quality Consultancy Ltd. This testing covered specific gravity, shore hardness, tensile strength, modulus of elongation, elongation at break, tensile and elongation retention after heat aging, tear strength, ozone resistance and water absorption as detailed in NZBC Acceptable Solution E2/AS1, Paragraph 8.5.4 [b]. Results and test methods have been reviewed by BRANZ and found to be satisfactory.
- 20.2 Water vapour permeability tests have been undertaken by BRANZ in accordance with ASTM E96.
- 20.3 The adhesives, primers and seam tapes used with Butynol® and Butyseal Roofing Membrane Systems meet the performance requirements of NZBC Acceptable Solution E2/AS1, Paragraph 8.5.4 [c]. Results and test methods have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 21.1 An assessment was made of the durability of the Butynol® and Butyseal Roofing Membrane Systems by BRANZ technical experts using NZBC B2/VM1 History of Use.
- 21.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 21.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of the Butynol® and Butyseal Roofing Membrane Systems 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. The membrane manufacturer is the subject of AS/NZS ISO 9001: 2008 Certification by Telarc Limited.
- 22.2 The quality of supply of the products to the market is the responsibility of ARDEX New Zealand Limited.
- 22.3 Quality on site is the responsibility of trained applicators, approved by ARDEX New Zealand Limited.
- 22.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, ARDEX New Zealand Limited and this Appraisal.
- 22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of ARDEX New Zealand Limited and this Appraisal.

Sources of Information

- AS/NZS 2269: 2012 Plywood – Structural.
- ASTM E 96-02 Water vapour transmission of materials in sheet form, American Society of Testing Materials, Philadelphia, 1992.
- BRANZ Appraisal No. 946 [2016] Strandsarking for Low Slope Membrane Roofs.
- BRANZ Bulletin 585 – Measuring moisture in timber and concrete.
- Good Practice Guide – Membrane Roofing, BRANZ, October 2015.
- NZS 3101: 2006 Concrete structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code, External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 7, 01 January 2017].
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraisal
Appraisal No. 436 [2017]
05 December 2017

BUTYNOL® AND BUTYSEAL
ROOFING MEMBRANE SYSTEMS

Amendments

Amendment No. 1, dated 4 May 2021.

This Appraisal has been amended to increase the ultimate limit state to 6 kPa.



BRANZ Appraised
Appraisal No. 436 [2017]

BRANZ Appraisal
Appraisal No. 436 [2017]
05 December 2017

BUTYNOL® AND BUTYSEAL
ROOFING MEMBRANE SYSTEMS



In the opinion of BRANZ, **Butynol® and Butyseal Roofing Membrane Systems** 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 **ARDEX New Zealand Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **ARDEX New Zealand Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **ARDEX New Zealand Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **ARDEX New Zealand Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

05 December 2017



CODemark™

CERTIFICATE NO: CM20182 Rev 1

1 CERTIFICATE HOLDER DETAILS

ARDEX New Zealand Limited

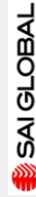
15 Alfred Street, Onehunga, Auckland, 1061, New Zealand

www.ardex.co.nz

Ph: 0800 227 339



2 PRODUCT CERTIFICATION BODY



SAI Global Certification Services Pty Limited

(ACN 108 716 669) Trading as "SAI Global"

JAS-ANZ Accreditation No. Z1440295AS

680 George St, Sydney, NSW 2000

www.saiglobal.com

PRODUCT CERTIFICATE



ARDEX Butynol® Butyl Rubber Roofing Membrane System

Date of issue: 10/11/2020
Review Date: 02/04/2023

KEY INFORMATION

3 SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT

ARDEX Butynol® is a flexible synthetic rubber waterproofing membrane supplied in rolls of 1.4m width and 17.86m long. Available in a range of thicknesses and colours: 1.0mm (black), 1.5mm (black), 2.25mm (black), 1.2mm (dove grey), and 1.5mm (various colours).

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

Matters that should be taken into account in the use or application of the building method or product can be found in item 6. Conditions and Limitations of Use

Catalogue or model identification numbers: Refer to item 9 for detailed identification information

4 SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT

ARDEX Butynol® is a single layer membrane applied to the outside of a substructure of a building for waterproofing decks, roofs, and box gutters.

Continuation of intended use can be found in item 10. Supporting Information about Intended use of Building Product or Method.

5 BUILDING CODE PROVISIONS — New Zealand Building Code (NZBC) as at JAN 2017

B1 — Structure — B1.3.1, B1.3.3(a, b, c, h, m, q), B1.3.4(a, b, c, d, e)

B2 — Durability — B2.3.1(a) (when concealed, e.g. protected by ballast or pavers), **B2.3.1(b), B2.3.2(a)**

E2 — External Moisture — E2.3.1 (contributes to), **E2.3.2, E2.3.7(a, b, c)**

F2 — Hazardous Building Materials — F2.3.1

G12 — Water Supplies — G12.3.2(c) (contributes to)

If designed, used, installed & maintained in accordance with the scope of this Certificate, the above-mentioned product will meet the following provisions of the NZBC.

How the building method or product complies or contributes can be found in item 12. Basis for Certification.

Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.



The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008.

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

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PRODUCT CERTIFICATE

ARDEX Butynol® Butyl Rubber Roofing Membrane System

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6 CONDITIONS AND LIMITATIONS OF USE

1. The Ardex Butynol Membrane system must be installed in accordance with the Manufacturer's Installation Instructions 'ARDEX Butynol® Installation Instructions (May 2018)' . ARDEX technical literature is available for download at www.ardex.co.nz
2. The Ardex Butynol Membrane system must be installed by an Ardex NZ approved installer as per the ' ARDEX Butynol® Installation Instructions (May 2018)' & product datasheet 'ARDEX Butynol® Butyl Rubber Membrane (August 2019)' . ARDEX technical literature is available for download at www.ardex.co.nz
3. May be used:
 - a. In all exposure zones excluding microclimates (as per NZS 3604:2011 para 4.2).
 - b. Up to 6.0 kPa ULS wind pressure differential for buildings subject to specific engineering design.
 - c. Where the substrate is plywood sheet or suspended reinforced concrete slab, or polyiso insulation board.
 - d. for all wind zones up to and including extra high for buildings within the scope limitations of NZBC. Acceptable Solution E2/AS1 para 1.1; or within the scope limitations of NZBC acceptable Solution. E2/AS1 with regards to building height and floor plan area subject to specific engineering design.
- In accordance with the Manufacturer's Install Instructions 'ARDEX Butynol® Installation Instructions (May 2018)' & product datasheet 'ARDEX Butynol® Butyl Rubber Membrane (August 2019)'
4. Unless protected by pavers or other protection, a minimum 1.5mm thick membrane must be used on a trafficable deck, in accordance with the Manufacturer's Install Instructions 'ARDEX Butynol® Butyl Rubber Membrane (August 2019)' Installation Instructions (May 2018)' & product datasheet 'ARDEX Butynol® Butyl Rubber Membrane (August 2019)'
5. LOSP treated plywood must NOT be used as a substrate, as per the 'Substrate Specifications For membrane Applications (December 2018)' .
6. The substrate structure must be designed and constructed to a fall not less than 0.57 degrees (1:100) to shed precipitated moisture. Allowance for deflection and settlement of the substrate must be made in the design to ensure falls are maintained.

Reference Documents:

- ARDEX Butynol® Installation Instructions (May 2018) (All ARDEX technical literature available for download at to www.ardex.co.nz)
- Substrate Specifications For Membrane Applications (December 2018) (All ARDEX technical literature available for download at to www.ardex.co.nz)
- ARDEX Butynol® Butyl Rubber Membrane (August 2019) – This is a Product Data sheet (All ARDEX technical literature available for download at to www.ardex.co.nz)

7 HEALTH AND SAFETY INFORMATION

- ARDEX Safety datasheet – Butynol 5041-52 – Version 3.1.1.1 – Issued 18/03/2016 (All ARDEX technical literature available for download at to www.ardex.co.nz)



The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008.

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PRODUCT CERTIFICATE



ARDEX Butynol® Butyl Rubber Roofing Membrane System

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8 SIGNATURES

Name and Signature of the Product Certification Body's (PCB) authorised representative and, where different, the person assigned by the PCB to make the certification decision

Heather Mahon
Global Head of Technical Services
SAI Global Assurance

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Received 27/7/2021

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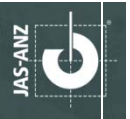
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PRODUCT CERTIFICATE

ARDEX Butynol® Butyl Rubber Roofing Membrane System

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SCHEDULE: INFORMATION THAT SUPPORTS KEY INFORMATION

9 SUPPORTING INFORMATION ABOUT DESCRIPTION

ARDEX Butynol® is a synthetic butyl rubber waterproofing membrane with properties which resist ageing from heat, sunlight and ozone. It has excellent gas permeability and toughness and remains flexible at low temperatures and is suitable in all exposure zones.

Components:

The components are detailed in the manufacturer's technical literature, and consist of;

- Butynol butyl rubber roofing membrane

Type	Weight
1.0mm Black	30kg
1.2mm Dove Grey	32kg
1.5mm Black	45kg
1.5mm all colours	47kg
2.25mm Black	32kg

- ARDEX WA 98 Adhesive

Product Name	Colour	Size	Product Code
ARDEX WA 98 A	Clear	20L	24188
ARDEX WA 98 A	Amber	20L	13052
ARDEX WA 98 A	Amber	4L	10870
ARDEX WA 98 A	Amber	1L	10869

- ARDEX WPM 290 Solvent (Ardex WA 98 Solvent)

Product Name	Size	Product Code
ARDEX WPM 290	20L	13050
ARDEX WPM 290	4L	10874
ARDEX WPM 290	1L	10873

- ARDEX Seam Tape

Product Name	Length	Width	Product Code
ARDEX Seam Tape	30.4m	50mm	10539



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PRODUCT CERTIFICATE

ARDEX Butynol® Butyl Rubber Roofing Membrane System

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- ARDEX WPM 299

Product Name	Size	Product Code
ARDEX WPM 299	1L	10880
ARDEX WPM 299	4L	10205

- ARDEX Detail Tape

Product Name	Colour	Width	Product Code
ARDEX Detail Tape	Black	150mm	10584

- ARDEX CA20P sealant

10 SUPPORTING INFORMATION ABOUT INTENDED USE

ARDEX Butynol® is a single layer membrane applied to the outside of a substructure of a building for waterproofing decks, roofs, and box gutters. The use in a Living roof system is not included as part of this certification

Reference Documents:

- ARDEX Butynol® Butyl Rubber Membrane (August 2019) – *This is a Product Data sheet*
- ARDEX Butynol® Installation Instructions (May 2018)
- ARDEX WA 98 A Solvent-Based Contact Adhesive (September 2018) – *This is a Product Data sheet*
- ARDEX WPM 290 Solvent for ARDEX WA 98 A (September 2018) – *This is a Product Data sheet*
- ARDEX Seam Tape Adhesive Tape for General Lap Bonding (October 2018) – *This is a Product Data sheet*
- ARDEX WPM 299 Seam Primer for Tape Application (September 2018) – *This is a Product Data sheet*
- ARDEX Detail Tape Self-Adhesive Butyl Detailing Tape (September 2018) – *This is a Product Data sheet*
- ARDEX CA20P Multipurpose Construction Adhesive and Sealant (July 2011) – *This is a Product Data sheet*
- Substrate Specifications For Membrane Applications (December 2018)
- BRANZ Appraisal No. 436 (2017) Butynol & Butyseal Roofing Membrane Systems – Amendment date 07/01/2019

Note: All ARDEX technical literature available for download at to www.ardex.co.nz

11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

All conditions and limitations are as stated above in item 6. *Conditions and Limitations of Use*



The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008.

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PRODUCT CERTIFICATE

ARDEX Butynol® Butyl Rubber Roofing Membrane System

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12 BASIS FOR CERTIFICATION

- **Structure** – by testing and comparison with provisions of Verification Method B1/VM1 and Acceptable Solution B1/AS1
- **Durability** – by testing and comparison with provisions of Verification Method B2/VM1
- **External Moisture** – by testing and comparison with provisions of Acceptable Solution E2/AS1
- **Hazardous Building Materials** – by analysis and by testing
- **Water Supplies** – by testing and by comparison with the provisions of Acceptable Solution G12/AS1

13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

1. **Building regulations 1992 (SR 1992/150)** – Reprinted as at 1 January 2017.
2. **Acceptable Solutions and Verification Methods** for New Zealand Building Code Clause **B1 Structure**. Amendment 17 (30 November 2018)
3. **Acceptable Solutions and Verification Methods** for New Zealand Building Code Clause **B2 Durability**. Amendment 10 (30 November 2018).
4. **Acceptable Solutions and Verification Methods** for New Zealand Building Code Clause **E2 External Moisture**. Amendment 8 (30 November 2018).
5. **Acceptable Solutions and Verification Methods** for New Zealand Building Code Clause **G12 Water Supplies**. Amendment 11 (30 November 2018)
6. **BRANZ Report DC2893/1 Testing of 1.0mm black BUTYNOL Membrane to the requirements of AS4654.1 2012 (Dated 8 August 2017)**. Waterproofing membranes for external above-ground use Part1: Materials. The test report provides results for the 1.0mm (black) product when tested to AS4654.1-2012. The results demonstrate the product satisfies the requirements as a waterproofing membrane for areas subjected only to pedestrian traffic..
7. **BRANZ Report DC2893/2 Testing of 1.5mm black BUTYNOL Membrane to the requirements of AS4654.1 2012 (Dated 21 August 2017)**. Waterproofing membranes for external above-ground use Part1: Materials. The test report provides results for the 1.5mm (black) product when tested to AS4654.1-2012. The results demonstrate the product satisfies the requirements as a waterproofing membrane for areas subjected only to pedestrian traffic.
8. **BRANZ Report DC2893/3 Testing of 1.5mm dove grey BUTYNOL Membrane to the requirements of AS4654.1 2012 (Dated 8 August 2017)**. Waterproofing membranes for external above-ground use Part1: Materials. The test report provides results for the 1.5mm (dove grey) product when tested to AS4654.1-2012. The results demonstrate the product satisfies the requirements as a waterproofing membrane for areas subjected only to pedestrian traffic.
9. **BRANZ Appraisal 436 [2017] Butynol and Buty Seal Roofing Membrane Systems (Amendment 1 dated 7 January 2019)**. The report provides an assessment of the durability and external moisture performance of Butynol® and Buty Seal Roofing Membrane Systems and forms the opinion the system is fit for purpose and will comply with the Building Code requirements to the extent specified in this certificate subject to conditions and limitations of use.
10. **Australian water Quality Centre – Report ID 101214 (18 April 2012) (NATA Accreditation No. 1115) AS/NZS 4020 Testing of products for use in contact with drinking water. Passed all requirements of the standard (Black Butynol 1.0mm)**
11. **Ardex letter [Ronald Rose, Technical Services Manager] [21/09/2018]. History of successful use in applications with hydrostatic pressure.**
12. **ARDEX Safety datasheet – Butynol 5041-52 – Version 3.1.1.1 – Issued 18/03/2016**



The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008.

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PRODUCT CERTIFICATE

ARDEX Butynol® Butyl Rubber Roofing Membrane System

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14 CONDITIONS RELATING TO NOTIFICATION

(a) the certificate holder notifies the product certification body in writing of any intended change to any of the following particulars:

- (i) the name, address, or contact details of the certificate holder;
- (ii) any address of a location where a certified product is produced or manufactured;

(b) the certificate holder notifies the product certification body in writing of any intended change, modification, or alteration to any of the following:

- (i) the certified building method or product;
- (ii) the method of its production or manufacture;
- (iii) the product quality plan prepared in respect of the certified building method or product;
- (iv) the application or installation instructions for the certified building method or product;
- (v) any documentation relating to the use and maintenance of the certified building method or product;

(c) if the certificate holder has any reason to suspect that the certified building method or product does not comply with the Building Code, the certificate holder notifies the product certification body in writing of the reason for that suspicion;

(d) if the certificate holder or the product certification body finds that a certified building method or product that has been released on the market does not comply with the Building Code, the certificate holder discloses that fact in disclosure statements published in a form that is acceptable to the product certification body and to the chief executive;

(e) if the certificate is suspended or revoked, the certificate holder –

- (i) notifies all customers to whom the building method or product is regularly supplied; and
- (ii) immediately ceases using the certificate, the mark of conformity, and any reference to the number of the certificate.

The certificate holder must maintain compliance with the conditions set out in section 15 of the Building (Product Certification) Regulations 2008.

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

This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website <http://www.building.govt.nz>.

Information regarding SAI Global's complaints process can be found at the following link: [Complaints Process](#).

CERTIFICATE V1.2

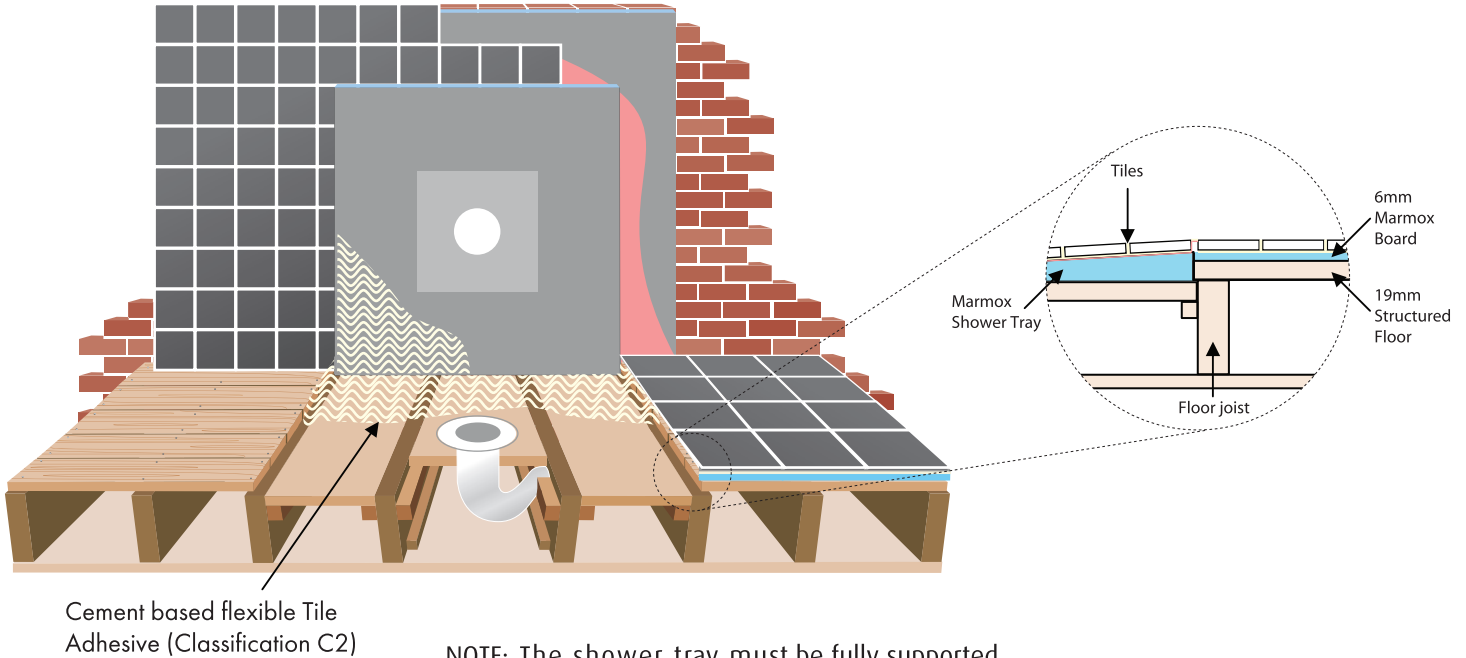
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Page 7 of 7

Ready to tile over Shower Base Installation Instructions

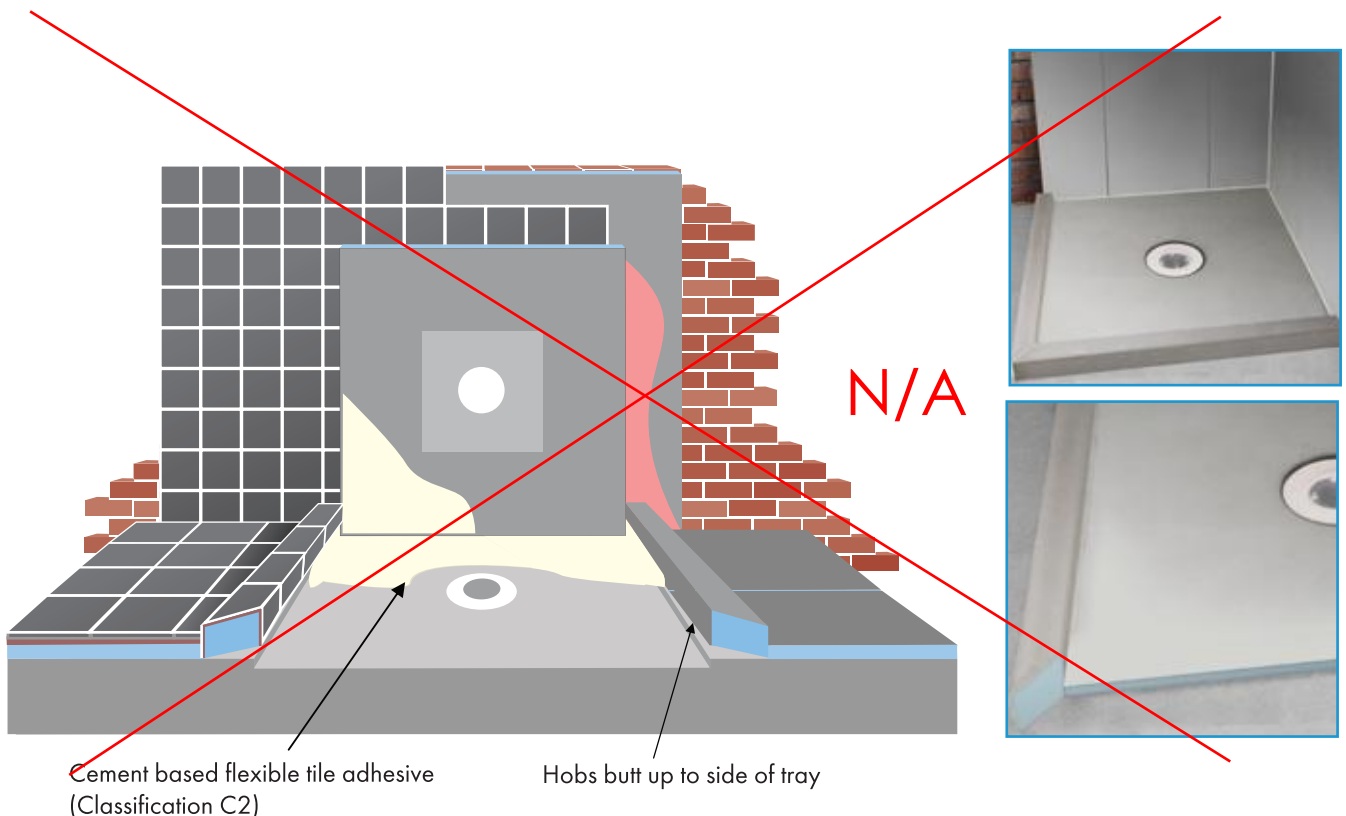


Level Entry Tray example (recessed) without hobs

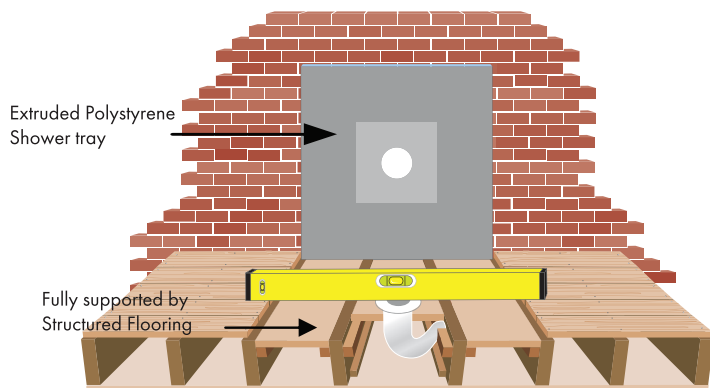


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with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
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Surface mounted tray example with hobs

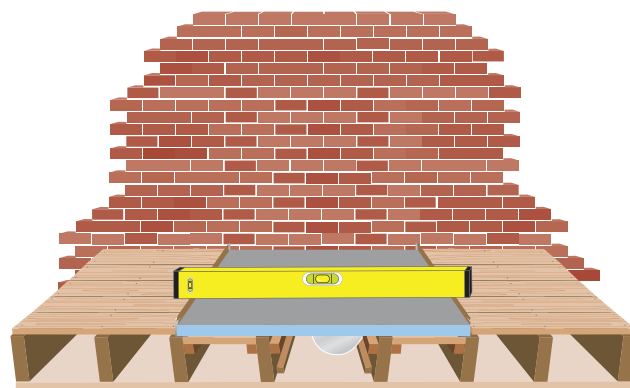


Shower tray installation



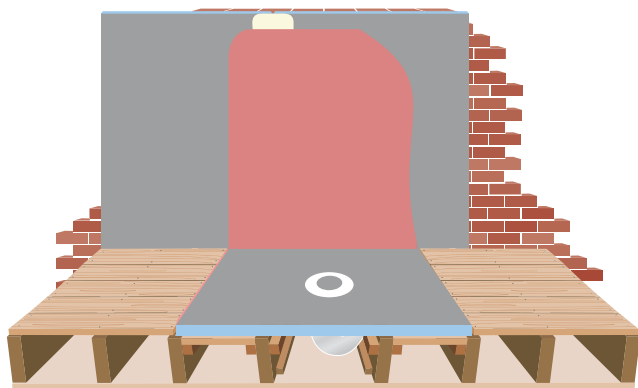
1 Check that the floor is flat and level. Clean the floor area for the shower base.

2 Dry position the shower base and mark the location of the drain, and the outside edge(s). Cut the floorboard for the pipe location and finish plumbing connections.

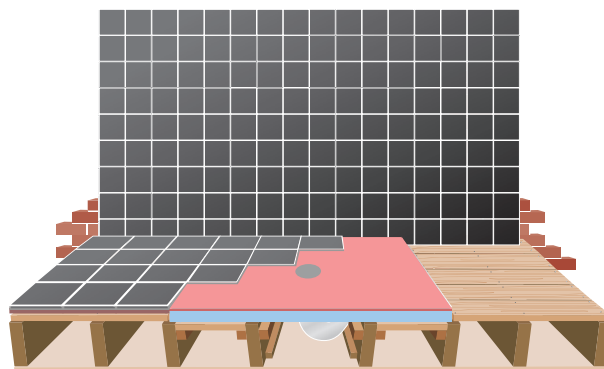


Note: If laying on a timber floor, it is recommended that a tile and slate underlay be laid first.

3 Use a flexible tile adhesive with 10mm notch trowel to fix the shower base to the floor. Place the shower base in position, apply downward pressure on the shower base and check for level.

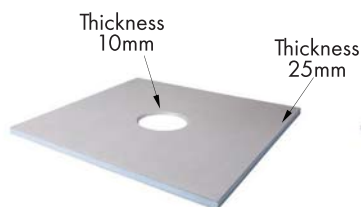


4 Apply any Branz approved water based waterproofing (non solvent based) to the entire surface of the shower base, flange and wall sheeting according to the manufacturer's recommendations.

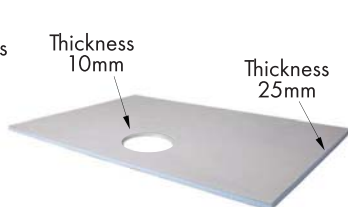


5 After the waterproofing dries, the shower can be tiled in a regular manner.

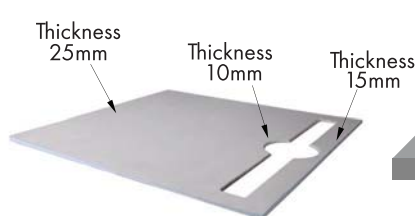
Centre drain



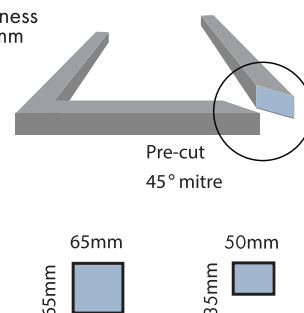
Offset drain



Trough drain traverse



Shower hobs



For more information and detailed drawings please go to the downloads section of the Marmox website

Marmox New Zealand Ltd

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TECHNICAL PROPERTIES

The major component of Marmox board is rigid extruded polystyrene foam with a closed cellular structure and a flame retardant additive. Marmox board has a 0.5mm coating on either side comprising a glass fibre mesh embedded in a polymer-cement mortar

Properties of the Foam Component

Property	Assessed to	Rating
Density	DIN 53420	36.7 kg/m ³
Thermal Conductivity (initial)	DIN 52612	0.027 Watt/mK
Thermal Conductivity (>5yrs)	ASTM C177-76	0.032 Watt/mK
Compressive Strength (10% deflections)	DIN 53421	0.3 N/mm ² (>30.0 t / m ²)
Flexural Strength	ASTM C203	2.05N
Shear Bond Strength	EN 1448	3.32kg/cm ²
Water Absorption (2-day immersion)	ISO2896	0.2% by volume
Water Absorption (Capillary)	DIN 53428	Zero
Coefficient of linear expansion	N/A	30 x 10 ⁻⁶
Water Vapour Diffusion Resistivity (μ)	DIN 52615	110 – 225 μ
Water Vapour Permeability	ASTM E-96	0.028 ng/Pa.m.s
Flammability	DIN 4102	B1
Quality Management system	ISO9001	Bureau Veritas/231739
EU controlled substances content	N/A	none

Properties of the Marmox Board

Property	Assessed to	Rating
Thermal Conductivity (> 5yrs)	BS EN 13164	0.033 - 0.036 Watt/mK
Compressive Strength (10% deflection)	ASTM D 1621	371kN/m ²
Bond Strength	BS EN 1384	0.3N/mm ²
Maximum Tile Loading Weight	CERAM121107	62kg/m ²
Water Vapour Permeability (Sd)	DIN EN 12086	3.2m
Resistance to body Impact	ETAG 003	3 x 120N/m
Bending Stiffness, EI (20mm / 30mm)	EN 12089	601KNmm ² / 1285 kN/mm ²
Fire Ignitability	BS 476, part 5	"P" not easily ignitable
Fire Propagation	BS 476, part 6	8.1, "class O"
Spread of Flame	BS 476 part 7	1, "class O"
Impact Sound Reduction	BS-ISO140-8	dLw = 21
Quality Management system	ISO9001	Bureau Veritas/231739
EU controlled substances content	N/A	none

*Working temperature range: -50 to +80OC

Technical Properties continued

Board Weights and Dimensions				
Small: 600mm x 1250mm		Medium: 600mm x 2500mm		Large: 2400mm x 2400mm
Thickness	Density (kg/m ³)	Weight (kg)	Weight (kg)	Weight (kg)
6mm	445	2.0	N/A	N/A
10mm	290	2.2	4.4	8.6
12.5mm	245	2.3	4.6	9.0
20mm	170	2.5	5.0	N/A
30mm	120	2.7	5.5	N/A
40mm	100	3.0	6.0	N/A
50mm	90	3.3	6.5	N/A
60mm	80	3.6	7.2	N/A

Dimensional tolerances for standard boards: Thickness +/- 1mm, Width +/- 2mm, Length +/- 5mm

The boards should be stored dry and flat. Slight bowing caused by incorrect storage or transport, for example, is not permanent and does not represent a technical defect. Slight curving can be rectified through storing the boards flat.

Thermal Specifications				
Nominal thickness in mm	Thickness of the foam in m	Thermal resistance R-value (m.K/W)	Thermal Transmittance (W/m ² x K) 10OC ambient temperature difference	Thermal Transmittance (W/m ² x K) 35OC ambient temperature difference
6	0.005	0.16	3.19	3.54
10	0.009	0.28	2.33	2.52
12.5	0.0115	0.36	2.69	2.06
20	0.019	0.59	1.40	1.46
30	0.029	0.91	0.99	1.03
40	0.039	1.22	0.75	0.80
50	0.049	1.53	0.62	0.65
60	0.059	1.84	0.53	0.54

Marmox Boards offer **thermal insulation** that in most constructions satisfies the U-value requirements of part L of the UK building regulations (*0.22 for floors, 0.28 for walls*). The non-conductive surface reduces condensation by masking any cold bridging from the substrate beneath.

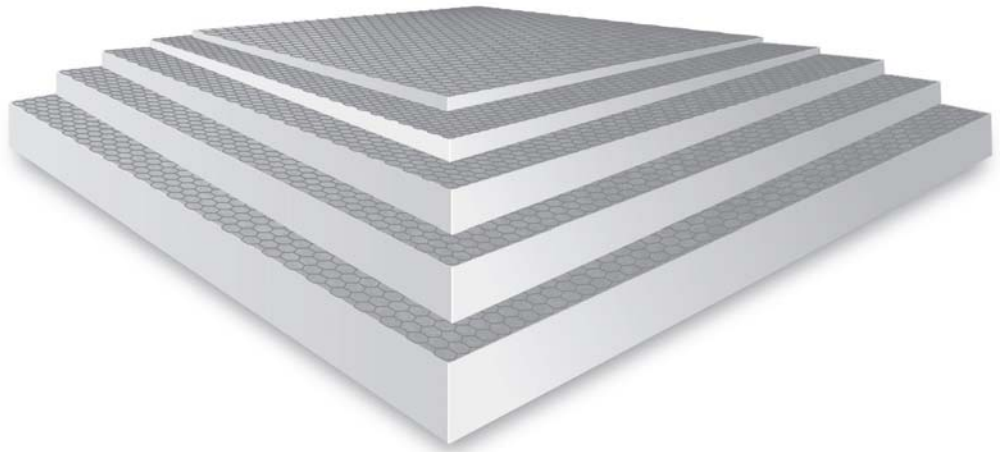
The cementitious surface is resistant to **heat and the chemicals within the sheathing around electric underfloor heating elements** making it safe to use with these types of systems.



BRANZ Appraised

Appraisal No. 895 [2018]

MARMOX BUILDING PRODUCTS



Appraisal No. 895 [2018]

Amended 18 November 2020

BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 Marmox Building Products are a range of extruded polystyrene foam boards finished on both sides with a polymer-modified mortar facing reinforced with a glassfibre mesh. The boards are for use as an intermediate substrate to ceramic and natural stone tiling on internal floors.
- 1.2 Marmox Building Products are also available pre-fabricated into shower bases, shower niches, footrests and hobs.

Scope

- 2.1 Marmox Building Products have been appraised for use as an intermediate substrate to tiling for interior areas when applied to timber, plywood, fibre cement or concrete floors.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Marmox Building Products, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Marmox Building Products meet these requirements. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.3. Marmox Building Products contribute to meeting this requirement. See Paragraphs 12.1-12.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Marmox Building Products meet this requirement.

Technical Specification

4.1 Marmox Building Products are made from extruded polystyrene, each side faced with a nominal 0.75 mm thick polymer-modified cement mortar reinforced with a glassfibre mesh.

4.2 The boards are available in the sizes given in Table 1.

Table 1: Nominal dimensions and weights

Thickness [mm]*	Board dimensions [mm]	Weight per board [kg]	kg/m²
6	600 x 1,250	2.0	2.7
10	600 x 1,250	2.2	2.9

* Insulation boards of thicknesses 20 mm, 30 mm and 50 mm are also available but have longer lead times.

4.3 Marmox Building Products are also available as pre-formed shower bases [Table 2], shower niches [Table 3], footrests and hobs [Table 4]. See Tables 2, 3 and 4 for profiles and sizes.

4.4 Accessories used with Marmox Building Products which are supplied by the building contractor, and outside the scope of this Appraisal are:

- **Cement based tile adhesive** - for fixing Marmox Building Products to the substrate.
- **Marmox fixings washers** - 38 mm diameter metal washers or 40 mm diameter plastic washers and screws, for fixing the boards to the substrate. Screws used must be at least 20 mm longer than the board thickness to be fixed.
- **Glassfibre mesh tape** - for application over joints between boards.
- **Waterproof membrane** - a BRANZ Appraised waterproofing membrane appraised for use in wet areas.
- **Tile adhesive** - a flexible waterproof tile adhesive for bonding the stone or ceramic tiles to the Marmox Building Products.

Details of these accessories for use with Marmox Building Products must be obtained from Marmox New Zealand Ltd.

Table 2: Shower Bases



Centre Drains	Offset Drains	Channel Drains	Wedge Trays
			
Sizes	Sizes	Sizes	Sizes
900 x 900 x 25 mm	900 x 900 x 25 mm	Traverse Drains	1,000 x 1,000 x 25 mm
1,000 x 1,000 x 25 mm	1,000 x 1,000 x 25 mm	1,000 x 1,000 x 25 mm	1,200 x 1,200 x 22 mm
1,200 x 1,200 x 25 mm	1,200 x 1,200 x 25 mm	1,200 x 1,200 x 25 mm	1,200 x 1,600 x 26 mm
1,000 x 1,500 x 25 mm	1,000 x 1,500 x 25 mm	1,000 x 1,500 x 25 mm	
1,000 x 2,000 x 25 mm	1,000 x 2,000 x 25 mm	1,000 x 2,000 x 25 mm	
		Longitudinal Drains	
		1,000 x 1,500 x 25 mm	
		1,000 x 2,000 x 25 mm	

Table 3: Shower Niches


Sizes
930 x 330 mm
630 x 330 mm
330 x 330 mm

Table 4: Shower Hobs


Sizes
65 x 65 mm - lengths 1,100, 1,600 and 2,100 mm
50 x 35 mm - lengths 1,100, 1,600 and 2,100 mm

Handling and Storage

- 5.1 Marmox Building Products are supplied in cardboard boxes. They must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and extremes of temperature. Care must be taken to avoid damage to the edges, ends and surfaces of the boards. The boards must always be carried on edge.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Marmox Building Products. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Marmox Building Products are designed as a tile substrate fixed over new or existing floors to provide a flat, even surface for the direct adhesion of ceramic or stone floor tiles. Where a waterproofing membrane is specified for wet areas, Marmox Building Products are suitable for use as a base for the waterproofing membrane.
- 7.2 Once fixed in place, tiles may be directly adhered to the boards and grouted to provide an impervious and easily cleaned surface. Alternatively a waterproof membrane may be installed over the boards with the tiles adhered to the membrane. Marmox New Zealand Ltd should be consulted for suitable accessories.
- 7.3 If present, mould or fungal growth on the substrate should be treated prior to fixing the boards. Marmox New Zealand Ltd should be consulted for suitable anti-fungal products.

- 7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ Good Practice Guide – Tiling.

Wet Areas

- 7.5 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. The two general categories of wet areas are as follows:
1. Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
 2. Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.
- 7.6 Marmox Building Products may be used in both wet area categories described above. Shower Areas must include a BRANZ Appraised wet area waterproofing membrane system under the tiles.

Structure

- 8.1 For best results it is essential that the floor structure is sound and not 'springy'. Any movement in the floor after tiling will cause the tile joints to move and crack, thus allowing moisture and dirt to penetrate the tile surface. Although flexible adhesives must be used to adhere the tiles to the substrate, they must not be used to accommodate deflection beyond the limits of this Appraisal.
- 8.2 Timber framing systems must comply with NZS 3604, with joist spans reduced by approximately 20% of those set out in NZS 3604, or floor framing systems to a specific engineering design complying with the NZBC.
- 8.3 All floors, new and existing, will be structurally suitable for tiling when the maximum deflection of the floor joists is 1/360th of the span.
- 8.4 The boards are capable of resisting a uniformly distributed load of 1.5 kN/m² with minimal deflection.
- 8.5 The level of resistance to concentrated loads will depend upon the size and strength of the tiles used to cover the boards.
- 8.6 Tiling must not be carried out until the flooring and timber framing is dry enough to ensure the majority of the shrinkage has occurred. Generally this will require timber moisture content of between 12 and 14% in air-conditioned spaces, and between 16 and 18% for other spaces, when tiles are laid. For new timber-framed floors, the use of kiln-dried framing is strongly recommended.

Durability

Serviceable Life

- 9.1 Where Marmox Building Products are used as an underlay for waterproofing membranes, they will be durable for at least 15 years, provided the tiling and waterproofing systems are maintained to ensure the boards and fixings remain dry in service. Tiles, adhesives, grouts and waterproofing membranes have not been assessed and are outside the scope of this Appraisal.

Maintenance

- 10.1 No maintenance of Marmox Building Products will be required, provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 Drainage outlets must be maintained to operate effectively, and the tile finishes must be kept clean.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to Marmox Building Products from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Internal Moisture

- 12.1 Surfaces must be finished with ceramic or stone tile finishes. A means of code compliance to NZBC Clause E3.3.3 is given in NZBC Acceptable Solution E3/AS1, Paragraph 3.1.1 b).
- 12.2 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1,500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.
- 12.3 A BRANZ Appraised waterproofing membrane must be used in all shower areas. The membrane must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1,500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing junctions can be obtained from AS 3740 and the BRANZ Good Practice Guide – Tiling.
- 12.4 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

Control Joints

- 13.1 Movement control joints must be provided in the following situations:
 - to coincide with any existing structural movement control joints in the floor structure; and,
 - at maximum 5 m centres in any direction; and,
 - across any doorways or openings where tiling is carried through; and,
 - to coincide with changes of direction in the floor such as will occur in 'L' shaped rooms; and,
 - around the perimeter of the tiled area where it abuts another material or surface.
- 13.2 Control joints should be spaced towards the centre of the floor if possible, so that an equal amount of floor is each side of the joint.
- 13.3 For guidance on all aspects of control joint detailing and construction refer to the BRANZ Good Practice Guide – Tiling.

Installation Information

Installation Skill Level Requirement

- 14.1 Installation of Marmox Building Products must be completed by, or under the supervision of, Licensed Building Practitioners with the relevant Licence Class, in accordance with the instructions given within the Marmox New Zealand Ltd Technical Literature and this Appraisal.

Preparation

- 15.1 Existing floor coverings must be removed before Marmox Building Products are installed, and the floor must be substantially flat. If any floorboards are cupped, misaligned or warped, the whole floor must be coarse-sanded. Loose flooring must be re-nailed, and damaged, rotten or unsound flooring or floor framing must be replaced.
- 15.2 The relative humidity of concrete substrates must be 75% or less before installation of the boards. The concrete can be checked for dryness using a hygrometer as set out in BRANZ Bulletin No. 585.
- 15.3 The floor must be free of dirt, dust and grease before installing Marmox Building Products.

System Installation

- 16.1 It is recommended that the installer dry fit the Marmox Building Products and pre-formed products before final fixing to ensure a good fit. Boards may be loosely laid out on the floor to 'mimic' the actual location of the boards and show where cuts and joints will be made. The boards are laid in a staggered pattern to ensure that four corners never meet at one point. Sheet joints are butted together.
- 16.2 Board joints must not coincide with substrate joints.
- 16.3 The boards must not bridge movement control joints. These must be carried through the board/tile bed and sealed in an appropriate manner.
- 16.4 The boards can be cut with either a hand knife or a saw. When working in enclosed areas, precautions should be taken to ensure dust levels are controlled.

Fixing to concrete and fibre cement floors

- 16.5 A suitable cementitious adhesive is applied to the prepared floor in a straight line using a notched trowel.
- 16.6 Starting in a corner, the boards are laid in a brick bond pattern, leaving a gap of about 5 mm between the board and the wall or skirting board to allow for expansion.
- 16.7 The joints between the boards are taped with a glassfibre mesh tape.

Fixing to plywood and timber floors

- 16.8 The boards are fixed in accordance with the method described for fixing the boards to concrete and other solid floors. However a 10 mm gap should be left between the boards and the wall or skirting board to allow for expansion of the floor.
- 16.9 Alternatively, provided the floor is flat, boards at least 10 mm thick can be mechanically fixed using the Marmox washers and suitable screws. At least 15 fixings per short board (600 x 1,250 mm) must be used when not using an adhesive.
- 16.10 Joints between boards are taped with a glassfibre mesh tape.

Installation in Wet Areas

- 17.1 BRANZ recommends the entire floor be covered by a waterproof membrane for bath, shower and spa rooms where timber, plywood or particleboard floors are used.
- 17.2 Shower areas must include a BRANZ Appraised wet area waterproofing membrane system under the tiles.

Tiling

- 18.1 Before tiling commences, waterproof membranes, screeds to form falls, and floor waste outlets, where required, must be installed. Waterproof membranes must be installed in accordance with the supplier's instructions and be fully cured before tiling.
- 18.2 Tiling must be carried out using a flexible tile adhesive in accordance with the tile adhesive manufacturer's instructions.
- 18.3 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide – Tiling.

Health and Safety

- 19.1 Safe use and handling procedures for Marmox Building Products are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 The following testing of Marmox Building Products has been undertaken by the following organisations:
 - Housing and Building National Research Centre (HBRC), Egypt – board density, compressive strength, linear coefficient of thermal expansion, water absorption and water vapour permeability.
 - British Board of Agrément (BBA), United Kingdom – impact resistance of tile covered boards [soft and hard body impact], compressive strength, flexural strength of wet and dry samples, compressive creep.
 - Sintef, Norway – bending moment, bending stiffness, resistance to soft body impacts, water vapour permeability.

Test methods and results have been reviewed by BRANZ and found to be satisfactory.



BRANZ Appraisal

MARMOX BUILDING PRODUCTS

Appraisal No. 895 [2018]

23 October 2018



Other Investigations

- 21.1 An assessment was made of the durability of Marmox Building Products by BRANZ technical experts.
- 21.2 Site inspections were carried out by BRANZ to assess the practicability of installation.
- 21.3 The Technical Literature for Marmox Building Products has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of Marmox Building Products has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 22.2 The quality of supply to the market is the responsibility of Marmox New Zealand Ltd.
- 22.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrates.
- 22.4 The quality on site is the responsibility of the Licenced Building Practitioner.
- 22.5 Building owners are responsible for the maintenance of the tile finish in accordance with the instructions of Marmox New Zealand Ltd.

Sources of Information

- AS 3740 – 2010 Waterproofing of wet areas within residential buildings.
- AS 3958.1: 2007 Guide to the installation of ceramic tiles.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2908.2: 2000 Cellulose-cement products – flat sheet.
- AS/NZS 2269: 2012 Plywood – Structural.
- BRANZ Bulletin No. 585. Measuring Moisture in Timber and Concrete.
- Good Practice Guide – Tiling [3rd Edition], BRANZ, 2015.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 18 November 2020

This Appraisal has been amended to update the Technical Specifications and Appraisal Title.



BRANZ Appraisal
Appraisal No. 895 [2018]
23 October 2018

MARMOX BUILDING PRODUCTS



In the opinion of BRANZ, **Marmox Building Products** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Marmox New Zealand Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Marmox New Zealand Ltd**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Marmox New Zealand Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Marmox New Zealand Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

23 October 2018

Cross Sections - Shower System

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC210889 21/09/2021 Chrisk

