Open Architecture Limited

P R O J E C T S P E C I F I C A T I O N

43 Burdon Loop

43 Burdon Loop

Longview

Otago

Issued for Consent

2624

PROJECT OVERVIEW

Scope

New four bedroom two bathroom house.

Address

Site Address	43 Burdon Loop
Suburb	Longview
Region	Otago
Lot #	97
DP #	605685

Site Conditions

Wind Zone	H - High Wind Speed
Earthquake Zone	Zone 3
Exposure Zone	Zone B - Low
Snow Loading Zone	Zone N5

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1 PRELIMINARIES & GENERAL

1.1 Project Specifics

1.1.1 Insurance of the Works

Insurance of the works is at the risk of the Contractor, and shall be completely in accordance with the Conditions of Contract.

1.1.2 Other Insurance

The minimum amount of the Contractor's public liability insurance shall be $2,000,000, the minimum amount of the Contractor's motor vehicle liability insurance shall be $200,000, the Contractor shall insure all appliances, machinery and apparatus required for the Contract Works but not incorporated into the Contract Works, and no Contractor's professional indemnity (design) insurance is required.

1.1.3 Sundry

The Contractor is responsible for accurate setting out of the works. It is recommended that the Contractor engage a Registered Surveyor to establish the basic site set-out and the floor levels.

A Registered Surveyor, engaged by the Contractor, shall check and confirm the accuracy of the Contractor's detailed setting out of the works and shall certify this in writing to the Architect/Designer.

Note that the 'Project North' direction is identified on the Site Plan, and that all direction or orientation references within this specification or on the drawings are in terms of this Project North.

A competent foreman shall be constantly on the works and any instructions or explanations given to such persons shall be deemed to have been given to the Contractor.

Notify the Principal each time it is necessary to isolate sections of the heat detectors system. Ensure that the duration or these periods of isolation are absolutely minimised.

Contractor and Subcontractors must familiarise themselves with egress routes from the building, and must ensure that egress routes are NEVER obstructed with construction materials such as to prejudice egress.

Power, water and cable communucations services are already on the site. Arrange and pay for adequate temporary connections to these services for the duration of the contract.

1.1.4 Warranties

1.1.4.1 Warranty for Weathertightness and Watertightness

The Contractor shall provide a warranty, for a minimum period of 2 years, covering the weathertightness of the completed building envelope and the watertightness of all liquid supply and liquid disposal systems and fittings.

1.1.4.2 Installer/Applicator Warranties

Provide Installer/Applicator warranties in favour of the Principal, covering execution and materials of proprietary products or complete installations.

- An Installer/Applicator warranty may be offered in lieu of the warranty otherwise required for that section of work, but only when it is subject to similar conditions and period stated in the Schedule of Warranties.
- The terms and conditions of the Installer/Applicator warranty shall not negate the minimum remedies available under common law as if no warranty had been provided.
- Failure to provide the required Installer/Applicator warranty does not reduce liability for execution and materials required for that section of work.
- Conform to the Installer's/Applicator's standard warranty form, or to the Warranty Agreement form included in the contract documents if a standard form is unavailable.
- Commence all Installer/Applicator warranties from the date normally applicable for the work.
- Maintain the effectiveness of all Installer/Applicator warranties for the period stated.
- Provide all Installer/Applicator warranties before practical completion.

1.1.4.3 Manufacturer/Supplier Warranties

Provide Manufacturer/Supplier warranties in favour of the Principal, covering materials, equipment, appliances, proprietary products, etc.

- The terms and conditions of the Manufacturer/Supplier warranty provided shall not negate the minimum remedies available under common law as if no warranty had been offered.
- Failure to provide the required Manufacturer/Supplier warranty does not reduce liability for execution and materials required for that section of work.
- Conform to the Manufacturer's/Supplier's standard warranty form.
- Commence all Manufacturer/Supplier warranties from the date normally applicable.
- Maintain the effectiveness of all Manufacturer/Supplier warranties for the period stated.
- Provide all Manufacturer/Supplier warranties before practical completion.

1.1.4.4 Provision of Warranties

Provide executed warranties in favour of the Principal covering, but not limited to, materials, components, service, application, installation, finishing, etc., required for that section of work.

- The terms and conditions of the warranty provided shall not negate the minimum remedies available under common law as if no warranty had been offered.
- Failure to provide the required warranty does not reduce liability of warranty conditions required for that section of work.
- Where an Installer/Applicator warranty is included in this specification, it shall be provided in lieu of the warranty otherwise required, but only when it is subject to similar conditions and warranty period stated in the Schedule of Warranties.
- Conform to the Warranty Agreement form included in the conditions of contract.
- Commence all warranties from the date of practical completion of the contract works (unless otherwise stated).
- Maintain the effectiveness of all warranties for the period stated.
- Provide all warranties before practical completion of the contract works.

1.2 Project Overview

1.2.1 Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the Contract together with Schedules as specified below, any written documentation clarifications issued during tendering/estimating, any manufacturer/supplier information issued with this Specification, any list of agreed Subcontractors, the contract establishment letter and any other relevant correspondence, and any Site Instructions or additional details or instructions issued as Variations.

If the Architect/Designer has not been engaged to administer the Contract or observe the works, then the term Architect/Designer, where referred to in this specification, means Contract Administrator.

These Project Specific Conditions supersede the Standard Conditions where they are in conflict. Refer any ambiguity or apparent discrepancy within or between any Contract Documents to the Architect/Designer, whose interpretation shall be binding on all parties.

Ensure that all Trades are aware of all Conditions and that subcontract prices are accepted on this basis, and in a form acceptable to the Registered Master Builders Federation or the Certified Builders Association. Ensure that all persons engaged on the works are aware of all items in this specification and on the drawings that may in any way affect their section of the works.

1.2.2 Site

Relevant site conditions are believed to be correctly represented in the Contract Documents, however the Contractor (and Subcontractors where appropriate) are requested to inspect the site to ascertain for themselves the nature and extent of the works and the rights and interests that may be interfered with in the execution of the works, as no claims for additional payment will be recognised on the grounds of insufficient description.

1.2.3 Adjacent Owners

Carry out whatever actions or precautions are required to avoid or to absolutely minimise noise, dirt, dust, access, etc. inconvenience or disruption of any nature to the adjacent owners or tenants. Indemnify the Principal against any claims arising from this source.

1.2.4 Protection

Take all appropriate precautions to protect all third party property, services, etc., and indemnify the Principal against any claims arising from the construction operations. Any damage to third party property caused by construction activities or failure to protect shall be rectified as soon as possible by the person causing the damage, or by appropriately qualified trades-persons employed by the person responsible for the damage if necessary.
Suspend operations during weather which would affect the quality of work in progress. Secure the works as soon as possible against adverse weather, dust and vandals. Avoid structural damage that is caused by overloading.
Adequately protect all finished work and maintain until the date of Practical Completion. Each trade shall protect the work of all other trades, and each trade is responsible for making good any damage

they cause to finished works. Arrange special protection as required for windows and doors, finished timber work, plumbing fittings and hardware, cabinets and other joinery, and similar items.

1.2.5 Responsibility

The Contractor will be held responsible for the full period of their legal responsibility in connection with this Contract for ensuring that all work execution, materials, and fittings, are completely in accordance with Contract requirements.
The Contractor is responsible to the Principal for the appropriateness and fitness, in relation to a reasonable expectation or requirement, of all of the materials and workmanship incorporated into the works by themselves or their subcontractors; for this reason few specific guarantees are required in these contract documents. The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.
No apparent expression of the Architect's/Designer's reasonable satisfaction shall be deemed to be acceptance of defective materials or workmanship within the terms of the Contract or to be an authority for any Variation except where such Variation is authorised as provided for in the Contract. Instructions that are given verbally are deemed to be instructions for proper execution of the works and do not involve extra charges.

Workmanship in all trades is required to be equal to or better than recognised good trade practice. The Contractor shall provide all necessary setting out information and component dimensions for subcontractors and shall check and be responsible for the accuracy of their work.

Should any tradesperson consider that the surface finish or general conditions of previous work are unsatisfactory to ensure a proper finish for their own work thereon, that tradesperson shall give immediate notice to the Contractor or Architect/Designer as appropriate and shall not proceed until all necessary improvements have been made. Failing such notice the trade concerned will not be relieved of responsibility for a poor finish due to such unsatisfactory condition.
Specialist Finishes Subcontractors are responsible for ensuring that substrates are completely appropriate for them to achieve first class results, and to this end shall, in sufficient time, instruct the Contractor with regard any fixings, primings, sealings or whatever for the substrate that vary in any way from the substrate manufacturer's standard recommendations. The Contractor shall advise the Architect/Designer with regard these variances, and not proceed until the Architect/Designer has agreed to them.

The Contractor and all Subcontractors affected shall be jointly and severally responsible for completion of the whole of the works in a completely watertight condition and shall therefore examine all details to be satisfied that this condition can be achieved. If any detail is considered unsatisfactory the Architect/Designer shall be notified immediately and he/she will then either interpret the detail to the Contractor's satisfaction, or accept responsibility for watertightness at the points in question, always assuming reasonable workmanship.

Ensure that all materials or items incorporated into any particular construction or finish are compatible and that their individual use is approved by the manufacturers and/or suppliers of the other parts of the system.
For all electronic/electrical/mechanical operating systems all work and all necessary materials and

items incidental to the primary item specified, that are incorporated into the works, shall be such as to leave a neat, efficient, easily maintained and robust installation, completely in accordance with all of the recommendations of the primary items' manufacturers. Where appropriate, source all parts of a system from a single supplier or manufacturer.

The Contractor shall make provision for all temporary works and services required for the satisfactory completion of the contract works. The Contractor shall pay all associated costs and fees; carry out all necessary maintenance, alterations and servicing requirements; and remove temporary works and services on completion of the contract works. Temporary works and services shall comply with the requirements New Zealand Building Code.

1.2.6 Specification

This Specification covers contract administration, standards, materials quality, workmanship and the scope of works only: the exact nature of the works and all specialist items, descriptions, etc., are contained on the drawings, which also take full precedence.
All clauses in all specification sections apply to their full extent and meaning to the entire Contract.
Trade sections and paragraphs have been introduced into this specification for reference only and it shall not be construed that each trade section is a complete segregation of the materials and labour of that trade. The onus is on all trades to be conversant with any and all clauses which in any way affect their work.
(Be aware that the ‘scope’ noted in the ‘Project Overview’, and scope and general extent clauses within this specification, are included to provide a general indication only and must NOT be interpreted as schedules of quantities - the exact nature and extent of all aspects of the works are shown on the drawings).

1.2.7 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), British Standards (BS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in these Contract Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue, and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.
Where Standards have a number of Divisions, e.g. AS/NZS 3500.1, AS/NZS 3500.2, etc., each of the Divisions relevant to this project is deemed to form part of this specification.
Retain current copies of significant cited documents and manufacturer's technical literature on the site.

1.2.8 Authorities and Charges

Comply with all relevant provisions of the NZ Building Code, and with all relevant territorial or statutory authority regulations, by-laws, obligations, etc. Give all required notices.

The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the Contractor as quickly as possible after they are

issued by the Territorial Authority. Note: It is an offence under the Building Act to carry out work not in accordance with a Building Consent.
Should the Building Consent be subject to any conditions which modify the requirements of the Contract Documents in any way, the Architect/Designer reserves the right to negotiate any or all of these modifying conditions with the Building Consent Authority. If after these negotiations additional work is required, it will be handled as a Variation to the Contract.

1.2.9 Code Compliance Certificate

The Principal will apply for the Code Compliance Certificate (CCC) and any other licenses or approvals for the building to be used. However, Practical Completion will NOT be certified until the CCC inspection has occurred and any additional works required by the local Building Consent Authority have been completed. To this end it is recommended that the Contractor obtains all required certificates, guarantees, Producer Statements, as-built drawings, etc., required for the CCC application as work proceeds, to facilitate application for the CCC as soon as the works are completed. For their part, the Principal hereby undertakes to apply for the CCC within one day of all required material being in hand. Likewise, the Contractor should have capacity available to attend as quickly as possible to any items identified by the Building Consent Authority as being required prior to the issue of the CCC.

1.2.10 Coordination of the Works

Coordinate the works of all trades to ensure efficient progress of the works. Ensure that all holes, sleeves, penetrations, supports, etc., that are required for services are correctly incorporated as work proceeds. Identify and sufficiently forward-notify the appropriate persons of all deadlines for the supply of fittings, components, information, etc.

1.2.11 Documents Interpretation

Except where they are clearly to the contrary, all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes. Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.
The word ‘provide' and the word ‘fix' used separately in the Documents shall be taken to mean ‘provide and fix' unless otherwise stated.
When the term ‘allow' occurs in the Documents, except with reference to Monetary Allowances, the cost of the item shall be at the risk of the Contractor.
The terms ‘approved', ‘directed', and ‘selected' when used in the Documents refers to the approval, direction or selection of or by the Architect/Designer. Please give adequate notice of when these decisions are required. ‘Architect/Designer' shall mean the Architect or Designer, their representative or any Consulting Engineer engaged by the Architect/Designer.

1.2.12 Work Shown and Mentioned

The Contract Documents show the extent and nature of the works but there is no warranty expressed or implied that they show each and every minor detail or item required to be included by the Contractor. Should any material, structural member, fixing, or item or work appear to be

inadequately described, yet obviously necessary for the neat, strong and satisfactory completion of the work, it shall be incorporated into the Contract Works.

1.2.13 Site Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance. Comply with the relevant provisions of the New Zealand Building Code, in particular Clause F5.

So far as is reasonably practicable and according to a PCBU's (person conducting a business or undertaking) primary duty of care, take all necessary steps required to make the site and the contract works safe, and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the site safety rules and are not unnecessarily exposed to hazards.

Each PCBU, so far as is reasonably practicable, must ensure the health and safety of workers, and that other people are not put at risk by its work. If more than one PCBU has a duty in relation to the same matter, each PCBU with the duty must, so far as is reasonably practicable, consult, co-operate with, and co-ordinate activities with all other PCBUs who have a duty in relation to the same matter. PCBUs can enter reasonable agreements with other PCBUs to meet their duties, but cannot contract out of their duties.

Notify WorkSafe as soon as possible when a notifiable event occurs. Take all reasonable steps to preserve the site of the notifiable event in accordance with WorkSafe requirements. Ensure that the site of the event is not disturbed until authorised otherwise by WorkSafe. Keep records of all notifiable events.

Scaffolding shall comply with all Statutory and Local Authority Regulations, with the WorkSafe 'Best Practice Guidelines for Scaffolding', AS/NZS 1576 (Scaffolding equipment), AS/NZS 4576 (Guidelines for Scaffolding), and AS/NZS 4994 (Roof edge scaffolding), and shall be maintained for the duration and removed on completion.

The use of ballistic fixings must absolutely comply with all relevant safety recommendations at all times. No rubbish fires are allowed on site. Portable/personal disc/tape players, radios and iPods must not be used anywhere on the site. No smoking on site, except in the designated location in accordance with the Smoke Free Environments Act 1990, the location of which will be determined by the Contractor, with the approval of the Principal.

A PCBU's primary duty of care includes, but is not limited to, so far as is reasonably practicable:
- providing and maintaining a work environment that is without risks to health and safety;
- providing and maintaining safe plant and structures;
- providing and maintaining safe systems of work;
- ensuring the safe use, handling and storage of plant, structures and substances;
- providing adequate facilities for the welfare at work of workers in carrying out work for the business or undertaking, including ensuring access to those facilities;
- providing any information, training, instruction, or supervision that is necessary to protect all

persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking;
- monitoring the health of workers and the conditions at the workplace for the purpose of preventing injury or illness of workers arising from the conduct of the business or undertaking.

Before commencing work on the site, the Contractor shall prepare and submit to the contract administrator a health and safety plan. The health and safety plan shall include, but not be limited to:
- the health and safety of all people on the site and on other properties, and the general public;
- identification of existing and potential construction hazards and risks;
- safety procedures to eliminate, isolate or minimise construction hazards;
- the equipment to be used to minimise the hazards;
- the maintenance of a register of hazards for the site;
- the name and qualifications of the site safety person;
- emergency procedures;
- first aid facilities and safety equipment;
- the methodology for notifying, recording and investigating accidents and injuries.

Carry out all construction operations in accordance with the submitted health and safety plan.

1.2.14 Cleaning and Completion

Clear construction debris and rubbish from the works at regular intervals, and additionally if so instructed by the Architect/Designer. Clean each space thoroughly before commencing any finishing works.

In preparation for the Practical Completion inspection carry out the following:
- Clean the works thoroughly, removing all debris, surplus materials, splashes, marks, temporary markings, etc. (All cleaning methods and materials shall be as recommended by the manufacturer of the item being cleaned).
- Remove protective wrappings and coverings unless otherwise directed.
- Touch up minor painting faults, carefully matching colour, and brushing out edges. Repaint any badly marked surfaces back to suitable break-lines.
- Adjust, ease and/or lubricate as required all doors, drawers, controls and other moving parts to ensure their efficient operation.
- Any other works required to leave all spaces ready for immediate occupation and all electronic/electrical/mechanical systems fully operational.
- Clean out all spoutings, gutters, downpipes, and gullies and flush out all drains.
- Clean all sanitary appliances and check all aspects of the water services.
- Thoroughly re-inspect all aspects of the works (and have any defects fully rectified) to be certain that the works are completely ready for the Practical Completion inspection - if an unreasonable number of items are noted by the Architect/Designer during the inspection it will be terminated and then rescheduled for at least a week forward to allow proper completion to be achieved.
(Note that a Code Compliance Certificate must be obtained before Practical Completion will be certified. Obtain all required certificates, guarantees, as-built drawings, etc., as work proceeds to enable the CCC application to be submitted as soon as construction is completed).

1.3 Establishment & Enabling

1.3.1 Site Establishment

1.3.1.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

1.3.1.2 Site Inspection Assessment

The Contractor (and sub-contractors where appropriate) shall be deemed to have examined and inspected, prior to tender, the site and its surroundings, and to have satisfied themselves as regards to access to the site, the form and nature of the site, all existing services, structures and features on the site, the risk of injury or damage to property, and the nature and extent of the work and materials and methodologies necessary for the execution of the works.

1.3.1.3 Site Boundaries

Establish the accurate location of property boundaries prior to setting out the works.

1.3.1.4 Regulatory Authorities

Comply with all statutory obligations and regulations required by the Regulatory Authority controlling the execution of the works.

The work shall be carried out in strict compliance with the relevant consents and approvals issued by the controlling Territorial Authority (TA). No work shall be undertaken until all necessary consents and approvals have been obtained.

Accept responsibility for notifying the Territorial Authority and arranging for any inspections and testing and commissioning procedures required by them at various stages of construction.

1.3.1.5 Network Utility Operators

The work shall also be carried out in accordance with all network utility operators having jurisdiction over utilities in or around the site.

Notify the network utility operators of the proposed works, and ascertain and become familiar with any particular requirements and the location of existing services prior to commencing site operations.

Attend on network utility operators as necessary to obtain approvals (in addition to Building Consent approval) for the satisfactory completion of the works.

Accept responsibility for notifying network utility operators and arranging for any inspections and testing and commissioning procedures required by them at various stages of construction.

1.3.1.6 Existing Services

Locate all existing services before commencing work in any area, and locate all underground services affected by the contract works. Any detail of an existing private underground service provided by the owner is done so in good faith.

As necessary:
- obtain all records of existing underground services held by the relevant utility network operators;
- give all required notices to the service authorities or companies and the Territorial Authority, and pay all relevant fees and charges;
- carry out a detection survey of the site to ensure there are no buried operative electric cables;
- protect existing services on the site, and rectify any damage or interference to them, and provide temporary services while repairs are being carried out;
- extinguish and remove existing services designated redundant by the contract works.

1.3.1.7 Temporary Buildings & Site Amenities

As necessary, make arrangements for the provision of all site services and amenities and facilities required for the works and site staff, including storage sheds, offices, lunch rooms, sanitary facilities and other temporary buildings and facilities required for storage and the management of the works.

These temporary services and amenities shall be for the use of site staff while on site, and as required by the relevant Regulations and Acts, and shall be located in a position within the site boundaries - refer to the Site/Enabling drawings for designated area(s).

Rubbish and contained wastewater from site amenities and facilities shall be removed from the site as appropriate and at least on a weekly frequency.

1.3.1.8 Setting Out

Accept responsibility for the correct and accurate setting out of the works to conform to the drawings, and that specified locations, orientations, depths and levels are strictly adhered to.

As necessary, locate and verify survey marks and datum points and maintain their accurate position.

Establish reference points, datums, profiles or similar clear of excavations and to allow for easy and accurate checking at all stages of construction. Ensure these are not damaged or dislodged during construction operations.

Where required, employ a licensed cadastral surveyor to establish and set out the positions of the foundations, grid lines and floor levels.

Where required, issue to the Building Consenting Authority a copy of the surveyor's certificate (Pegging Certificate or Building Location Certificate) in accordance with the conditions of the Building Consent.

1.3.2 Temporary Works & Services

1.3.2.1 General

Make provision for all temporary works and services required for the satisfactory completion of the contract works.

Pay all associated costs and fees; carry out all necessary maintenance, alterations and servicing requirements; and remove temporary works and services on completion of the contract works. Temporary works and services shall comply with the requirements New Zealand Building Code.

1.3.2.2 Site Water

Make all necessary arrangements for the provision and reticulation of clean, fresh potable water required for site amenities and for the construction works.

1.3.2.3 Site Electricity

Make all necessary arrangements for the availability and connection of temporary electrical power required for operating site facilities and amenities, health and safety and security requirements, and plant operation and general construction use in strict accordance with electrical regulations.

Comply with the network utility operators requirements, and be responsible for maintaining and servicing temporary electrical distribution plant and equipment as necessary.

1.3.2.4 Site Perimeter Fencing

Provide and maintain all necessary fencing at the perimeter of the site in accordance with NZBC F5/AS1, prior to commencing the works, in order to prevent unauthorised entry by the public onto the site.

Site fences adjacent to public spaces shall:
- extend at least 2.0m from ground level on the side accessible to the public; and
- have a maximum 100mm gap between bottom of the fence and ground; and
- be constructed of galvanised chainlink netting with maximum 50 x 50mm grid size; and
- have posts spaced apart at maximum 2.5m.

1.3.2.5 Site Cleaning & Waste Management

Accept responsibility for and make all necessary provisions for periodic site cleaning, and for the management and disposal of all construction waste material, recyclable waste, and materials requiring special disposal during the contract period.

The Contractor and their subcontractors shall:
- conform to applicable regulations for disposal and removal of common and hazardous waste; and
- handle and dispose of all hazardous and banned materials in accordance with national and local regulations - such materials include, but are not limited to asbestos, underground storage tanks, polychlorinated biphenyls (PCBs), abandoned chemicals (petrol, pesticides, herbicides, flammable and combustible substances), freon from cooling equipment, lead-based paints, smoke detectors and mercury-containing switches; and
- pay all associated disposal fees.

If a project-specific waste management plan is to be implemented and deployed, ensure that all site personnel, including management and staff, subcontractors and material suppliers, are fully aware of the specific procedures and requirements and have access to or copies of the waste management plan.

The disposal of rubbish and construction waste materials by burning on the site is NOT permitted under any circumstances.

1.3.2.6 Site Security

Accept responsibility for the security of the site, the works, plant and materials during and after working hours, over the period of the contract, and:
- take all reasonable precautions and make provision for the general security of the site, including unauthorised access to the site, to the works and to adjoining properties; and
- safeguard the site, the works, plant and materials from damage and theft.

1.3.2.7 Dust & Noise Control

Take measures to minimise nuisance from dust, noise and other causes affecting adjoining properties and the public.

Dust:
- The effects of dust shall be appropriately managed within the boundary of the site.
- Comply with the conditions of the Resource Consent/Building Consent related to dust control.

Noise:
- Permitted construction noise levels shall be less than the maximum limits required by the Territorial Authority and NZS 6803.
- Comply with the conditions of the Resource Consent/Building Consent related to noise control.
- As required, prepare a site-specific Construction Noise Management Plan.

1.3.2.8 Stormwater & Sediment Control

Carry out excavation and construction works and operations to ensure that they fully comply with the relevant controlling environmental authority's sediment control and stormwater discharge guidelines.

Provide suitable measures to prevent or minimise sediment generation and silt runoff. If at any time the performance of the stormwater and sediment control works, or ongoing review of them, indicates that they need to be extended or modified, the design modification and construction shall be undertaken at no extra cost to the Principal.

1.3.2.9 Construction Vibration

Comply with the conditions of the Resource Consent/Building Consent related to vibration control. Where required, prepare a site-specific Construction Vibration Management Plan.

Construction vibration monitoring shall be undertaken and assessed during construction in accordance with DIN 4150-3:1999; to demonstrate that vibrations to third-party buildings and structures generated from on-site construction activities are less than the maximum limits recommended in DIN 4150-3:1999 and conform to the conditions of the Resource Consent/Building

Consent. Peak particle velocity (ppV) limits applied shall be as required by the Resource Consent/Building Consent.

Vibration monitoring shall be carried out at the property boundary. Additional monitoring inside the neighbouring property shall be carried out where the vibration limits at the boundary exceed the permitted level or when complaints are received. Where access is granted such additional monitoring shall be carried out either outside the building but connected to the building foundation or inside the building.

1.3.2.10 Shoring

Accept responsibility for and make all necessary arrangements, for the provision and maintenance of shoring required during the course of the contract works to prevent subsidence and collapse of adjacent ground, structures and public and private property, and to ensure the safety of site personnel and the public.

Shoring shall remain in place as necessary and until foundations and below ground structures have been completed, and the stability of adjacent ground, structures and public and private property is secured.

Shoring - generally:
- Shoring shall be undertaken in accordance with the 'Approved Code of Practice for Safety in Excavation and Shafts for Foundations'.
- Shoring must be designed in accordance with sound engineering practice, and materials used must be suitable and of sound quality.
- Shoring for large and extensive excavations shall be designed by a Registered Engineer.
- Shoring must be placed in a proper and workmanlike manner.
- Drawings of the temporary works must be available at the job site.
- The shoring of a face must be carried along with the excavation with the least possible delay between the excavation of the face and the completion of the shoring.
- Shoring must not be altered, dismantled or interfered with, except on the instructions of the Contractor.

1.3.2.11 Construction-Keyed Locksets

Locksets shall be temporarily keyed alike for construction use to access approved spaces, and replaced with master-keyed cylinders in accordance with the Door Hardware Schedule and security requirements.

1.3.3 Protection of Existing Features

1.3.3.1 Survey Marks

Preserve and maintain in their true position all survey marks other than marks which are required to be covered or removed by the contract works. Accept responsibility to reinstate/replace any survey mark that is disturbed or obliterated by the works.

1.3.3.2 Adjacent Sites

Take all necessary care to prevent damage to adjoining public and private property, such as existing buildings, existing roads, footpaths, fences, site services, trees, landscaping site features, until completion of the works. Any adjoining public or private property damaged by the Contractor's construction activities, or failure to protect these, shall be reinstated/made good to the required standard.

Accept responsibility for keeping all public thoroughfares clear and free of debris and contamination from the contract works.

1.3.3.3 Existing Buildings & Structures

Take all necessary precautions and make appropriate provisions to protect from damage and contamination any existing building or other structure within the site designated to remain intact while the contract works are being carried out.

1.3.3.4 Existing Trees & Site Features

Take all necessary precautions and make appropriate provisions to protect from damage existing trees, gardens, fences, walls, gates, hard paving or other existing site feature designated to remain intact while the contract works are being carried out.

Requirements when working around protected trees:
- comply with Territorial Authority requirements and with the requirements of the Resource Consent/Building Consent.
- provide and erect protective fencing around the drip line of all existing trees to be protected. Note: for fastigiate species (those with erect, almost parallel branches) the tree-protection zone equals half the height of the tree and the tree root zone may extend well beyond the canopy drip-line.
- if any protected tree requires pruning to allow for scaffold installation, crane or vehicle movements, or materials' storage, notify the Contract Administrator and seek written instruction before undertaking any pruning.
- when operating plant or machinery near the tree-protection zone all care must be taken to avoid damage to the trunk and branches of the tree.
- no vehicles may be parked within the tree-protection zone.
- no construction materials, equipment or liquids may be stored within or near the tree-protection zone and care must be taken to stop run-off from construction debris, fuel or rinsing of plant and equipment from entering the soil in or around the root zone.
- do not attach notice boards, telephone cables, taps or other services to any part of a protected tree.
- Cconcrete mixing should not be carried out within 10m of the tree-protection zone.
- any excavation inside the drip line or root zone of a protected tree shall be dug by hand, air-spade or hydro jet.
- any roots exposed during excavation must not be ripped, pulled or torn by machinery, and should be immediately covered with sacking or similar material and kept moist.
- should roots larger than 20mm be discovered during excavation inside the drip line of a protected tree, notify the Contract Administrator and only recommence work when written approval has been obtained from them.

1.3.3.5 Existing Site Services

Take all necessary precautions and make appropriate provisions to protect from damage and contamination existing services (buried, fixed, suspended) within the works area that are designated to remain intact while the contract works are being carried out.

Accept responsibility to:
- as required, cooperate with the requirements of the utility network operators; and
- provide as necessary all temporary covers, caps, etc., to prevent any moisture, dust and other contaminants entering service ducts, conduits, pipes, control boards, etc.; and
- ensure that manholes, pits, hydrants, tobys and other surface openings in the vicinity of the works are not concealed by construction amenities, plant, materials, etc.

1.3.3.6 Access Routes

Take all necessary precautions and make appropriate provisions to protect access routes through the building(s) and areas adjacent to work area(s) that are designated to remain in place and operational while the contract works are being carried out, and in accordance with any staging plan(s) programmed for the execution of the works.

Comply with Fire Egress and Territorial Authority requirements and conditions of the Building Consent at all times.

1.3.3.7 Explosives

The use of explosives in the contract works is prohibited.

1.3.4 Traffic Control, Crossings & Plant

1.3.4.1 Traffic Control & Management

Comply with all Resource Consent/Building Consent conditions related to vehicular and pedestrian traffic movements and control.

The normal flow of traffic, including pedestrian traffic, on any public road or private access road, or railway, or property affected by the works, shall not be unreasonably interrupted during any operations covered by the contract.

Adequate safeguards to the public in respect of temporary fences, signals, signs and lights shall be provided by the Contractor at all times. Where traffic signs are necessary, these shall be provided and operated in accordance with the Regulatory Authority or NZ Transport Agency (NZTA) guidelines, as applicable, but erected only with the prior written approval of the Regulatory Authority or NZTA and the Contract Administrator.

Where a Traffic Management Plan (TMP) is required, prepare, operate and update this plan as necessary throughout the duration of the works. The TMP shall conform to the requirements of the Regulatory Authority or the NZTA, as applicable. Obtain TMP prior-approvals, and maintain the TMP for the entire construction duration.

Vehicle movements shall only take place during the hours of work specified elsewhere herein.

Provide adequate signs, safety cones, barriers, etc., to control on-site traffic entering restricted and dangerous areas, and as necessary for the movement and control of on-site traffic.

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

1.3.4.2 Protect Existing Vehicle Crossing

Provide protection to existing vehicle crossings designated for use by construction traffic for the duration of the contract.

Comply with Regulatory Authority requirements for the installation of any temporary protection required for the crossing. Ensure the temporary protection is capable of supporting the heaviest loads to be delivered to the site.

Maintain the crossing to the required standard until it is no longer required for construction traffic. Carry out any required remedial/replacement work to the crossing, as a result of damage caused by the works during the contract period, in accordance with the requirements of the Regulatory Authority.

2 CARPENTRY

2.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

2.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
1491:1996(AS/NZS)	Finger jointed structural timber
1859.1:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 1: Particleboard
1859.2:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 2: Dry process fibreboard
2270:2006(AS/NZS)	Plywood and blockboard for interior use
2271:2004(AS/NZS)	Plywood and blockboard for exterior use
2295:2006(NZS)	Pliable, permeable building underlays
2588:2018(AS|NZS)	Gypsum plasterboard
2589:2017(AS/NZS)	Gypsum linings - Application and finishing
2904:1995(AS/NZS)	Damp-proof courses and flashings
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3601:1973(NZS)	Metric dimensions for timber
3602:2003(NZS)	Timber and wood-based products for use in building
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
3617:1979(NZS)	Specification for profiles of weatherboards, fascia boards, and flooring
3622:2004(NZS)	Verification of timber properties
3631:1988(NZS)	New Zealand timber grading rules
3640:2003(NZS)	Chemical preservation of round and sawn timber
4219:2009(NZS)	Seismic performance of engineering systems in buildings
AS/NZS 1080.1:2012	Timber - Methods of test - Method 1: Moisture content
AS/NZS 2269.0:2012	Plywood - Structural - Part 0: Specifications
AWCI Code of Practice	For Design, Installation and Seismic Restraint of Suspended Ceilings
NASH Standard	Residential and Low-rise Steel Framing - Part 1: Design Criteria

NZBC B2/AS1	Durability
NZBC C/AS2-AS6	Protection from Fire
NZBC G6	Airborne and Impact Sound

2.3 General

This section includes the receiving, stacking and storage of all Carpenter's materials and the fabrication, erection and fixing of all framing, sheathings and finishing timbers, including all work incidental to neatly finishing in other trades and all temporary work and temporary bracing.

The Carpenter shall attend upon all trades, and shall supply and fix all obviously necessary but not specifically mentioned fixings and materials.

2.4 Timber Framing

2.4.1 Scope

Supply and install timber framing to the floors, walls, roofs, and other timber framed elements, as identified and detailed on the drawings. All aspects of this work shall be in accordance with NZS 3604, product manufacturers' recommendations, and as shown on the drawings and the specification.

2.4.2 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be carried out to current best trade practise by experienced and competent tradesmen, familiar with the materials and installation techniques, in accordance with NZS 3604 and as shown on the drawings.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings prior to installing timber framing.
Co-ordinate with other trades to install timber framing as required.

2.4.3 Timber Framing

2.4.3.1 Timber Grade and Quality

Unless otherwise noted or specified on the drawings or specification, all framing timber shall be minimum structural grade SG 8 Radiata pine in accordance with NZS 3622.
Framing timber shall be seasoned or kiln dried, and be straight and true and free from wind, warp and distortion, and in lengths suitable for the members required, and shall have a moisture content of between 12% and 18% before installation.
Do not used damaged, faulty or defective materials.

2.4.3.2 Timber Treatment

All non-durable timber framing shall be appropriately treated against moisture and/or insect decay by treatment plants with recognised quality assurance systems that are administered by the Timber Preservation Council (NZTPC). Treatment of timber and wood-based building products shall be to the

requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.
Carefully manage treated framing during installation to avoid accidental use of timber with a lower performance or durability treatment than that required or specified.

2.4.3.3 Storage & Handling

Check timber framing upon delivery and reject sub-standard or damaged material.
Store timber framing dry under cover, fillet stacked and well clear of the ground, and protect from damage, moisture, and contamination.
Ensure all appropriate personal protection equipment is worn at all times when handling and cutting treated framing.

2.4.3.4 Framing Installation

All timber framing members, including all dwanging, strutting, blocking, bracing etc, shall be sized, setout, fitted and fixed to the requirements of NZS 3604 and as shown on the drawings to accommodate structural loadings, cladding and lining setout and support, and the installation of other building components, fixtures and fittings.

All framing shall be erected without deviation, true to line, level, angle and plumb, and evenly aligned and square, and within the tolerances allowed in NZS 3604 Table 2.1. Framing members accurately cut, lapped, housed, joined, and seated so as to provide full contact over the bearing surfaces.

Temporarily prop, brace, tie, and secure framing members and elements as required until the framing is complete and self supporting. Leave in place for safety purposes as long as required.

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

2.4.3.5 Concrete Separation

Separate timber framing with an approved continuous damp proof course when in direct contact with concrete or masonry. Ensure that the DPC material is compatible with the timber treatment.
Free draining separations to external vertical faces shall be 12mm minimum and as noted on the drawings.

2.4.3.6 Timber Re-treatment

All cut or drilled surfaces of H4 and H5 treated timber framing shall be flood coat re-treated, with a suitable product recommended by the original treatment plant, before installation.

2.4.3.7 Edge Notching and Centre Holes

The notching, checking, and boring of framing members shall be in strict accordance with the requirements of NZS 3604.
Avoided checking and cutting where possible and keep to such dimensions so as not to prejudice the purpose for which the member is used. Keep edge notching to a minimum and where possible use centrally bored holes instead.

Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the lining's fixing reach.

2.4.3.8 Framing Protection

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

2.4.3.9 Built-up Framing Members

Except for jack studs, bottom plates and top plates, framing members may be substituted with built-up members in accordance with the limitations of NZS 3604 2.4.4.7 with the prior approval of the Architect/Designer only.

2.4.4 Steel Fixings

2.4.4.1 Fastenings and Connectors

Unless otherwise noted or specified, timber framing fastenings and connectors shall be as specified in the relevant fixing schedules of NZS 3604 or have an equivalent capacity as specified therein. Timber framing connectors and fixings shall comply with the product information as required in NZS 3604 2.4.6, and shall be used and installed in accordance with the manufacturer's recommendations. Pre-drill nail holes in split-prone framing as necessary.

2.4.4.2 Durability of Fixings & Fastenings

Unless otherwise noted or specified, the minimum durability of timber framing fixings and fastenings, excluding nails and screws, shall comply with the durability requirements of NZS 3604 Table 4.1.
Galvanised steel fixing components, excluding nails and screws, shall have galvanised coating masses in accordance with NZS 3604 Table 4.2.
Unless noted or specified otherwise, the materials for nails and screws shall be as given in NZS 3604 Table 4.3.
Steel fixings and fastenings in contact with timber treated with copper based timber preservatives (H3.2 or higher) shall be in accordance with NZS 3604 4.4.4.
Stainless steel nails shall be minimum Grade 304 unless otherwise specified or noted.

2.4.4.3 Bolts and Coachscrews

Unless specified or shown otherwise, all bolted and coach screwed connections shall be M12 or M16 in accordance with the relevant fixing requirements given in NZS 3604.
Bolted and coach screwed connections shall have either a 50mm x 3mm square, or a 55mm x 3mm round, washer to each head and nut for M12 and M16 fixings. Washers shall be of the same material and durability as the bolt or coach screw.

2.4.5 Floor Framing

Unless specified or shown otherwise, timber floor joists shall be to the dimensions and spacings given in NZS 3604 Table 7.1.
Floor joists shall be laid on edge true to line and level, have a minimum support bearing of 32mm (except when cantilevered), and so that any crook will straighten under load.

Floor joists shall be jointed over supports (except when cantilevered beyond the support) in accordance with NZS 3604 7.1.1.7.

Unless specified or shown otherwise, boundary joists shall be continuous 45mm thick x joist depth as lateral support, and fixed to each end of the floor joists in accordance with NZS 3604 Table 7.5.

Unless specified or shown otherwise, solid blocking shall be 45mm thick x joist depth and installed between joist ends at maximum 1.8m centre spacings as lateral edge support, and fixed in accordance with NZS 3604 Table 7.5. Floor joists supported by by a foundation wall shall have solid blocking over a distance of minimum 1.8m at joist ends.

Floor joists with a span of 2.5m or greater and a depth of at least 4 times the joist thickness shall have 45mm thick continuous solid blocking at mid span, fixed in accordance with NZS 3604 Table 7.5.

Loadbearing walls run parallel to the line of joists shall be supported directly over double joists located at no more than 200mm centre-to-centre from a pile row.

Loadbearing walls run at right angles to the line of joists shall be located at no more than 200mm centre-to-centre from a bearer or subfloor loadbearing wall (running parallel to the loadbearing wall).

Non-loadbearing walls, without a bracing element, within 150mm and parallel to a floor joist, shall be supported by minimum 90mm x 45mm solid blocking on-edge at maximum 1.2m centres and at each side of door openings.

Non-loadbearing walls, with a bracing element, parallel to floor joists and not supported by a floor joist, shall be supported by minimum 90mm x 45mm solid blocking on-edge at maximum 1.2m centres and at each side of door openings.

2.4.6 Wall Framing

2.4.6.1 Plates

Top and bottom plates shall be to the dimensions and layout shown on the drawings. Unless specified or shown otherwise, top and bottom plates shall be fixed in accordance with NZS 3604 7.5.12 and Tables 8.18 and 8.19, true to line and level or angle.
Joints in top plates shall be made over a stud or over blocking between studs, and all top plate connections shall be in accordance with NZS 3604 8.7.3. Form all holes and edge notches in top and bottom plates in accordance with NZS 3604 8.7.5.

2.4.6.2 Studs

Studs shall be to the dimensions and spacings shown on the drawings, and installed true to line and plumb in both directions between top and bottom plates.
Unless noted otherwise, non-load bearing wall studs shall be to the spacings given in NZS 3604 Table 8.4, stud width as shown on the drawings.
Form all holes and edge notches in studs in accordance with NZS 3604 8.5.1.5. Do not notch, check, cut, or bore holes in the middle third of any trimming stud.

Should the need arise, studs shall be straightened in accordance with NZS 3604 8.5.3 with prior approval from the Architect/Designer only.

Unless noted otherwise, studs in loadbearing walls for 3 kPa floor loads shall be in accordance with NZS 3604 Table 14.10.

2.4.6.3 Lintels

Lintels shall be to the dimensions and locations shown on the drawings, and installed true to line and level, and shall be supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud, and secured against uplift in accordance with NZS 3604 8.6.1.8 as required.
The thickness of a lintel may be made from two or more members, where each member is the length of the lintel, in accordance with NZS 3604 2.4.4.7.

2.4.6.4 Sill & Head Trimmers

Unless specified or shown otherwise, sill and head trimmers to openings shall be the same width as the wall stud and to the thickness given in NZS 3604 Table 8.15, and installed at the required opening height true to line and level, and supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud.

2.4.6.5 Dwangs

Dwangs shall be the same width and thickness as the wall stud, and installed at the centres noted on the drawings, and accurately cut and fixed in place true to line and level and flush with stud edges.
Dwangs fixed in accordance with NZS 3604 Table 8.19.

2.4.7 Roof Framing

2.4.7.1 Rafters

All rafters (including hip, valley and jack rafters) shall be to the dimensions, spacings, pitch, and layout shown on the drawings.
Rafters shall be aligned and paired at the required spacings to ridge boards, ridge beams, hip rafters and valley rafters, and as shown on the drawings, and installed parallel, true to line, pitch and plane, and fixed in accordance with NZS 3604 Table 10.1.
Any required jointing of rafters shall be made over supports shown on the drawings only.
Unless shown otherwise, rafter seating to top plates, beams, and lintels shall have a minimum bearing of 32mm without reducing the rafter depth to less than 65mm, or 80%, at the birds mouth.
Extend rafter ends to form eaves as detailed on the drawings and in accordance with NZS 3604 10.2.1.14.
Fly rafters and outriggers installed to form gable verges as detailed on the drawings and in accordance with NZS 10.2.1.15.3

2.4.7.2 Ridge Boards

Ridge boards shall be to the dimensions and locations shown on the drawings, and installed true to line and level.

2.4.7.3 Purlins

Purlins shall be to the dimensions and spacings shown on the drawings and as required by the cladding material, and fixed to rafters and/or trusses in accordance with NZS 3604 Table 10.10 (purlins on their flat) and/or Table 10.11 (purlins on their edge).
Purlins on their flat shall be continuous over a minimum of two spans.
Provide all necessary blocking and lateral support to purlins laid on edge in accordance with NZS 3604 10.2.1.16.6, and as detailed.
Extend purlins to form gable verges as detailed and in accordance with NZS 3604 10.2.1.15.

2.4.7.4 Roof Bracing

Roof bracing shall be as shown on the drawings and in accordance with NZS 3604 10.3 and 10.4 as necessary.

2.5 James Hardie Eaves & Soffits

2.5.1 Scope

Supply and install the specified James Hardie products as a fibre-cement sheet lining material to the eaves and soffits identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with James Hardie Eaves And Soffits Installation Manual (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

2.5.2 Eaves & Soffit Lining

Hardie™ Flex Eaves Lining - 4.5mm. 4.5mm thick fibre-cement sheet lining with an un-sanded surface finish. The sheets are to be finished with a paint system. Installed in accordance with the James Hardie Eaves And Soffits Installation Manual to the locations shown on the drawings.

2.5.3 Co-operation

Co-ordinate with other trades to ensure that the panels correctly allow for fascia and wall cladding installation and associated flashings etc., and that services penetrations are correctly handled to maintain full weathertightness and sheet integrity.

Ensure that other trades are aware of the James Hardie Safe Working Practices.

2.5.4 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements. The fascia and framing shall be in true alignment, complete and suitable for the sheets, and maximum moisture content as per NZS 3602. Ensure that the framing is true in line with no projections due to structural and bracing bracketry etc. Ensure that any hold-downs from the roof framing to the wall framing are correctly installed.

Check that the building underlay or rigid air barrier to the wall framing has been installed in full accordance with the manufacturer’s requirements and the drawings. Check junctions to all other

building elements and ensure that all necessary works have been completed eg. flashings etc that will enable the sheets and all accessories to be installed.

2.5.5 Flexible Sealant

Flexible silicone sealant to be SIKA AT Facade. Use to seal the sheets and accessories in accordance with the sealant manufacturer's recommendations and to James Hardie requirements. Ensure sealant compatibility with selected finish.

2.5.6 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with James Hardie Eaves And Soffits Installation Manual and other relevant product manufacturers' recommendations.

2.5.7 Delivery & Handling

Carry all sheets on edge. Stack sheets flat on a level platform off the ground ie. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm crs maximum). Keep sheets and accessories dry at all times. Avoid damage to sheet edges, ends, and surfaces. Keep uPVC flashings etc. out of direct sunlight, and store all accessories on flat and avoid damage. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Installation Manual, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished sheets or accessories.

2.5.8 Installation

Install the sheets to the framing in accordance with the Installation Manual, complete with all accessories eg. mouldings, sealant, underflashings, etc.

Ensure that all cut edges of panels are primed prior to installation with Dulux 1 Step Prep, Resene Quick Dry, or similar. Ensure that the bottom edge of the fascia forms a drip edge of 15mm minimum to the sheet. Seal around services penetrations to maintain weathertightness and air pressure resistance.

Install James Hardie mould accessories as shown on the drawings.

Hardie™ Flex Eaves Lining joints to be formed as express joints with a backing strip.

2.5.9 Fixings

Hardie™ Flex Sheet 4.5mm sheets with galvanised nails in accordance with James Hardie requirements.

2.5.10 Completion

Ensure that the sheets have been fixed correctly, that all joints and accessories have been completed correctly, and that all penetrations have been taped correctly. Check that no damage has occurred to any installed sheet element or associated component, and replace as necessary. Ensure that the sheets are painted within 90 days of the sheet installation, complete with all accessories and flashings. Hand over a copy of the latest edition of the **James Hardie Hardie™ Flex Eaves Lining**

Product Warranty to the client. Hand over a copy of the latest James Hardie Eaves and Soffits Installation Manual to the client for their maintenance information.

2.6 GIB® Rondo® Metal Batten Systems

2.6.1 Scope

Supply and install the specified GIB® Rondo® Metal Batten Systems to the locations identified on the drawings, incorporating all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB® Rondo® Metal Batten Systems - System and Installation Manual publication and the current GIB® Site Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB® Rondo® Metal Batten Systems.

This specification section should be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated.

For the purpose of this specification, the GIB® Rondo® Metal Batten Systems - System and Installation Manual publication is referred to as the 'GIB® Rondo® Metal Batten Systems Manual'..

2.6.2 Requirements

2.6.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

2.6.2.2 Warranty

GIB® Product & System Warranty:

- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

2.6.3 GIB® Rondo® Metal Batten Systems

2.6.3.1 GIB® Rondo® 310 Ceiling Batten System

GIB® Rondo® 310 Ceiling Batten System. Incorporating 35mm deep, concealed metal ceiling battens that are either fastened with proprietary metal support clips (recommended) to the support frame or fixed directly to the support frame.

Suitable for 10mm,13mm,16mm and 19mm thick GIB® plasterboard ceiling linings for residential and commercial applications. Plasterboard ceiling linings are generally screw-fixed directly to the

underside of the ceiling battens. Maximum 130mm clearance from the underside of the support frame (joist/rafter) to the top of the ceiling batten.

GIB® Rondo® System Components:
- 310 Batten: 35mm deep, galvanised steel furring channel (batten).
- 340 Perimeter Channel: 35mm deep, galvanised steel perimeter 'U' channel.
- NZ18 Perimeter Angle: 32 x 32mm, galvanised steel perimeter angle.
- 311 Clip: 92mm long, galvanised steel batten fastening clip. Provides 30mm max. clearance from supporting joist or truss.
- 313 Clip: 192mm long, galvanised steel batten fastening clip. Provides 130mm max. clearance from supporting joist or truss.
- A311 GIB Quiet Clip®: 92mm high, galvanised steel batten fastening clip with rubber cushioning grommets.
- 312 Jointer: Galvanised steel batten jointing clip.

GIB® Rondo® 311 or 313 clips can be installed to provide additional restraint and accurate batten alignment when the battens are direct-fixed to the support frame. Use GIB Quiet Clip® for GIB® Noise Control Systems.

When installed as a ceiling diaphragm, the battens must be fixed directly to the support framing. If GIB® Rondo® clips are used, then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

Installed with all system components and accessories required for proper installation and performance, in accordance with the GIB® Rondo® Metal Batten Systems Manual, to the locations, layout, levels and details shown on the drawings.

Where electrical earthing of GIB® Rondo® 310 Ceiling Batten System is required, the electrical earthing shall be carried out by a qualified electrician in accordance with the electrical standards and regulations.

Installed Location:

2.6.4 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades to ensure that the GIB® Rondo® Metal Batten System correctly allows for ceiling lining installation, and for the locations of recessed lights and other fittings installed by others, and to install GIB® Rondo® Metal Batten Systems as required.

2.6.5 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB® Rondo® Metal Batten Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified systems and installation techniques, in accordance with the GIB® Rondo® Metal Batten Systems - System and Installation Manual, to fully comply with all warranty requirements, and relevant requirements of AS/NZS 2785 (suspended systems). Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

All cutting, jointing, fixing and supporting techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

2.6.6 Delivery & Handling

Store all materials and accessories indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep materials and accessories dry and protected from damage, distortion, moisture and contamination at all times.

Do not use damaged or defective materials and products.

Handle all materials in accordance with the manufacturer's requirements and Product Data Sheets, and in a manner that prevents damage and distortion to the component.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

2.6.7 Preparation

2.6.7.1 General

The building must be fully enclosed, weathertight and suitably dry before installation commences.

Check that all preliminary and preparatory building works have been completed to specification and as shown on the drawings.

Check that any required building services installations, including electrical, plumbing, mechanical, fire, or other service located behind the ceiling line and/or wall line, have been completed.

Supporting timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of installation.

Supporting light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170.

Supporting steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings.

Supporting steel structures shall comply with NZS 3404.

Supporting concrete structures shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days.

Supporting concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary substrate inspections and preparatory work in accordance with the GIB® Rondo® Metal Batten System Manual and the GIB® Site Guide prior to installation.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

2.6.8 Installation

2.6.8.1 GIB® Rondo® 310 Ceiling Batten System (600mm c/c battens)

GIB® Rondo® 310 Ceiling Batten System. Installed in accordance with the GIB® Rondo® Metal Batten Systems Manual, to the locations, layout, levels and details shown on the drawings. Suitable for 13mm thick, single layer, internal plasterboard ceiling linings for residential applications.

Ceiling Batten Set-out:
- Batten Spacing: Maximum 600mm centreto-centre spacings.
- Batten Span: Maximum 1200mm for multi-span battens. Maximum 900mm for single-span battens (non-jointed), and for garage ceilings.

Confirm the ceiling lining fixing and installation requirements prior to installing GIB® Rondo® 310 Metal Ceiling Battens. Make allowance for the lining thickness when establishing the finished batten datum level.

For Multi-span Battens: Set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 1200mm, to the areas, levels and details shown on the drawings.

For Single-span Battens (non-jointed): Set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 900mm.

Screw-fix GIB® Rondo® perimeter angle and/or channel to walls, true to line and level, with 32mm x 8g x GIB® Grabber® wafer head needle tip screws at 300mm centres max.

Fix GIB® Rondo® batten clips along the batten lines, 900mm or 1200mm apart (as above), to the support framing with 32mm x 8g GIB® Grabber® wafer head needle tip screws or pairs of 40 x 2.8mm GIB® Nails. Batten clip fixings and set-out shall be to the manufacturer's installation requirements for the clip type, batten type and batten set-out.

Securely fasten the clips in place so that the battens are fixed at the correct datum level and are parallel, straight and true to line. Support batten ends on perimeter angle or channel, or alternatively, cut, fold and fix the batten end to the top plate.

Use full length battens. When jointing is necessary, joint battens using the manufacturer's proprietary batten jointer for the batten type.

Do not fix batten clips directly to H3.2, CCA, CuAz or ACQ treated timber - fully separate the clips from timber with DPC or other approved material.

Where required, provide additional battens for ceiling-mounted fixtures and fittings at the set-out shown on the drawings.

Ceiling Diaphragms:
- When installed as a ceiling diaphragm, the battens must be fixed directly to the support framing.
- If GIB® clips are used then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

2.6.9 Completion

Carry out a final inspection immediately after installation. Check that the GIB Rondo Metal Batten System has been installed correctly in accordance with the GIB® Rondo® Metal Batten Systems Manual and installation tolerances, to the correct set-out and details shown on the drawings, and that the installations are accurately aligned true to line, level (and/or plumb) and plane.

Check that the installed layout allows for the correct positioning and installation of all penetrations and services fixtures and fittings as indicated on the drawings.

Check for any damage and defective work - repair or replace as necessary to the required standard.

Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings.

Leave completed works and surrounding surfaces clean and free of rubbish and debris. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the a copy of the GIB® Product and System Warranty.

Provide all necessary Producer Statements.

2.7 GIB® EzyBrace® Systems

2.7.1 Scope

Supply and install the specified GIB EzyBrace® Systems to the locations identified on the drawings, incorporating GIB® plasterboards and all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB EzyBrace® Systems publication, GIB EzyBrace® Bracing Software and the current GIB® Site Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), BRANZ Appraisal No.928, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB EzyBrace® Systems, GIB® Plasterboard Linings, or GIB® System components and accessories.

This specification section must be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated..

2.7.2 Requirements

2.7.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

2.7.2.2 Warranty

GIB® Product & System Warranty:

- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

2.7.2.3 Quality Assurance

Ensure that the installation and finishing of GIB EzyBrace® Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

2.7.2.4 Inspection & Acceptance of GIB EzyBrace® Systems

Carry out all necessary pre-installation, installation and finishing inspections necessary for GIB EzyBrace® Systems for each area of work in accordance with the requirements of the GIB EzyBrace® Systems Manual, GIB® Site Guide, and BRANZ Appraisal No.928.

Complete the GIB® Site Guide Pre-Installation Checklist prior to installing GIB® plasterboard linings.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

2.7.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB EzyBrace® System materials and/or work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

2.7.2.6 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB EzyBrace® Systems components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB EzyBrace® Systems Manual and GIB® Site Guide: 2.3 - Board Substitution Options. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® plasterboard linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

2.7.3 Performance

2.7.3.1 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

GIB EzyBrace® Systems must NOT be used in showers or behind baths. GIB EzyBrace® Systems may be used in watersplash areas provided they are protected with an impervious finish in accordance with the requirements of NZBC E3/AS1, and the GIB Aqualine® Wet Area Systems publication.

2.7.3.2 Bracing Performance - Timber Framing

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, BRANZ Appraisal No.928, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

2.7.3.3 Wet Areas

Wet Area Plasterboard Linings - GIB Aqualine® Wet Area Systems. To the areas noted as ‘Wet Area’ on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems (2007) publication, BRANZ Appraisal No.427, and other relevant product manufacturers'

recommendations. GIB EzyBrace® Systems must not be located in shower cubicles or behind baths or the like. Refer to separate specification GIB Aqualine® Wet Area Systems.

2.7.4 GIB EzyBrace® Systems - Timber Frame

2.7.4.1 GS1-N

GIB EzyBrace® System - GS1-N. A timber frame, external or internal wall bracing system incorporating one layer of any 10mm or 13mm GIB® Standard Plasterboard on one side. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

2.7.4.2 GS2-NOM

GIB EzyBrace® System - GS2-NOM. A timber frame, internal wall bracing system incorporating one layer of any 10mm or 13mm GIB® Standard Plasterboard on each side. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

2.7.4.3 BL1-H

GIB EzyBrace® System - BL1-H. A timber frame, external or internal wall bracing system incorporating one layer of 10mm or 13mm GIB Braceline® on one side with panel hold downs. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

2.7.4.4 BLP-H

GIB EzyBrace® System - BLP-H. A timber frame, external or internal wall bracing system incorporating one layer of 10mm or 13mm GIB Braceline® on one side, and one layer of minimum 7mm structural plywood on the other, and panel hold-down fixings with panel hold downs. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

2.7.5 Components & Accessories

2.7.5.1 Components & Accessories

GIB EzyBrace® Systems components and accessories, including, but not limited to:
- GIB® Plasterboard Linings;
- GIB® Plasterboard Fasteners;
- Plywood Sheathing;
- GIB® HandiBrac® Panel Hold-down Bracket with Bowmac® Blue Head Screw Bolt;
- Galvanised Steel Strap Plate Connectors;
- Ceiling Diaphragm Ceiling Battens;
- GIB® Adhesives - GIBFix® One and/or GIBFix® All-Bond;
- GIB® Metal Trims & Paper Faced Trims;
- GIB® Plasterboard Control Joints;

- GIB® Joint and Finishing Compounds;
- GIB Soundseal® Acoustic Sealant;
- Fire Resistant Sealant.

Refer to the GIB EzyBrace® Systems literature and the GIB® Site Guide for further information.

2.7.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB EzyBrace® Systems to the required set-out and standard, and to ensure:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- GIB® plasterboard linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

2.7.7 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB EzyBrace® Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified materials and installation techniques, in accordance with the manufacturer's installation requirements, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

Carry out all necessary installation inspections in accordance with the GIB EzyBrace® Systems Manual and the GIB® Site Guide, and to fully comply with the manufacturer's warranty requirements as the works progress.

All cutting, jointing, fixing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

Make all necessary provisions to protect adjacent work and surfaces from damage during installation.

On Completion:
- Check that GIB EzyBrace® Systems have been correctly installed and finished in accordance with the requirements of the GIB EzyBrace® Systems Manual and GIB® Site Guide, to the correct set-out, dimensions and details shown on the drawings.
- Check for any damage and defective work - repair or replace as necessary to the required standard.
- Ensure that inspection and assessment of the plasterboard Finish Level have been carried out, and

that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.
- Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.
- Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.
- Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and sanding dust. Remove all associated rubbish and excess material from the site.
- Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

2.7.8 Delivery & Handling

Store all GIB EzyBrace® Systems plasterboard linings and system components indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep stored plasterboard linings and system accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life. Cracked or damaged GIB Aqualine® sheets must never be used.

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.

Handle all materials in accordance with the manufacturer's requirements and relevant Product Data Sheets, and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

2.7.9 Preparation

2.7.9.1 General

All framing shall be complete and ready for GIB® Ezybrace Systems and associated GIB® plasterboard linings installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified.

Concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

2.7.9.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:

- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.

- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.
- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

2.8 GIB® Plasterboard Linings

2.8.1 Scope

Supply and install GIB® Plasterboard Linings specified herein, as sheet lining materials to the walls, ceilings and other elements identified on the drawings, complete with all accessories required for proper installation, finishing and performance. All aspects of this work shall be in complete accordance with the current GIB® Site Guide and relevant GIB® Systems literature (check www.gib.co.nz, or call 0800 100 442 for the latest editions), and other relevant product manufacturers' recommendations.

No substitutions are permitted for GIB® Plasterboard Linings, GIB® Systems or GIB® System components and accessories.

This specification must be read in conjunction with relevant GIB® Systems specifications - GIB® EzyBrace® Systems, GIB® Fire Rated Systems, GIB® Noise Control Systems, GIB® Aqualine® Wet Area Systems, GIB® X-Block® Systems, GIB® Quietline®, GIB® Intertenancy Barrier System, and GIB® Rondo® Metal Batten Systems - and other specifications sections, as they are interrelated

2.8.2 Requirements

2.8.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

2.8.2.2 Warranty

GIB® Product & System Warranty:

GIB Systems Durability.
The following systems have, unless stated otherwise in GIB® 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.

Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form. Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

2.8.2.3 Quality Assurance

Ensure that the installation and finishing of GIB® Plasterboard Linings and associated GIB® Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

2.8.2.4 Inspection & Acceptance of GIB® Plasterboard Linings

Carry out all necessary pre-installation, installation and finishing inspections of GIB® Plasterboard Linings for each area of work in accordance with the requirements of the GIB® Site Guide and associated industry Code of Practice (AWCI) recommendations.

Complete the GIB® Site Guide Pre-Installation Checklist prior to installing GIB® plasterboard linings, and relevant GIB® Performance Systems Installation Checklists.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

2.8.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB® Plasterboard Linings and GIB® Systems materials and work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

2.8.2.6 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB® System components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB® Site Guide: 2.3 - Board Substitution Options, and relevant GIB® Systems literature. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® Plasterboard Linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

2.8.3 Performance

2.8.3.1 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

2.8.3.2 Bracing Performance - Timber Framing

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, BRANZ Appraisal No.928, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

2.8.3.3 Wet Areas

Wet Area Plasterboard Linings - GIB Aqualine® Wet Area Systems. To the areas noted as 'Wet Area' on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems publication, BRANZ Appraisal No.427 (2021), and other relevant product manufacturers' recommendations. Refer to separate specification GIB Aqualine® Wet Area Systems.

2.8.4 GIB® Plasterboard Linings

2.8.4.1 GIB® Standard Plasterboard, 10mm

GIB® Standard Plasterboard, 10mm. A 10mm thick standard plasterboard interior lining. Suitable for use in residential and commercial applications on walls. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

2.8.4.2 GIB® Standard Plasterboard, 13mm

GIB® Standard Plasterboard, 13mm. A 13mm thick standard plasterboard interior lining. Suitable for use in residential and commercial applications on walls and ceilings. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

2.8.4.3 GIB Braceline® & GIB Noiseline®, 10mm

GIB Braceline® & GIB Noiseline®, 10mm. A 10mm thick dual purpose plasterboard interior lining, with a high-density core for extra bracing and noise control performance. Suitable for use in residential and commercial applications on walls and ceilings where increased bracing and noise control performance is required. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

2.8.4.4 GIB Aqualine®, 10mm

GIB Aqualine®, 10mm. A 10mm thick moisture resistant plasterboard interior lining, with a water resistant polymer impregnated core to help prevent moisture penetration. Suitable for use in residential and commercial applications on walls and ceilings in spaces at risk from water or moisture damage. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

2.8.4.5 GIB Aqualine®, 13mm

GIB Aqualine®, 13mm. A 13mm thick moisture resistant plasterboard interior lining, with a water resistant polymer impregnated core to help prevent moisture penetration. Suitable for use in residential and commercial applications on walls and ceilings in spaces at risk from water or moisture damage. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

2.8.5 Components & Accessories

2.8.5.1 Metal Ceiling Battens

Metal Ceiling Battens - GIB® Rondo® Metal Batten Systems. Installed in accordance with the manufacturer's requirements to the layout and details shown on the approved drawings. Refer to the GIB® Site Guide, and to separate specification GIB® Rondo® Metal Batten Systems.

2.8.5.2 Plasterboard Fasteners

GIB® Plasterboard Fasteners. Fasteners for fixing GIB® Plasterboard Linings shall be selected and used according to best fixing practices and the GIB® Site Guide and relevant GIB® Systems literature. Fastener heads shall be set slightly below the plasterboard sheet surface without breaking the paper facing.

Screw Fixing to Timber Framing:
- GIB® Grabber® High Thread Drywall Screws: A coarse high-thread screw for fixing into timber with superior holding power and ease of penetration.
- GIB® Grabber® Self Tapping Drywall Screws: A fine self-tapping thread, needle point screw, suitable for fixing to timber and light gauge steel framing.
- GIB® Grabber® Dual Thread Drywall Screws: A dual coarse/fine threaded, needle point screw, as a component of the GIBFix® Framing System and for fixing to timber framing.

Nail Fixing to Timber Framing:
- GIB Nail: Passivated coated, annular grooved, bugle head drywall nails with chequer-keyed head.

Screw Fixing to Light Steel Framing:
- GIB® Grabber® Self Tapping Drywall Screws: A fine self-tapping thread needle point screw, suitable for fixing to light gauge (0.45-0.95mm) steel framing.
- GIB® Grabber® Dual Thread Drywall Screws: A dual coarse/fine threaded, needle point screw, suitable for fixing to light gauge (0.45-0.95mm) steel framing.

2.8.5.3 Adhesives

GIB® Adhesives. In addition to GIB® plasterboard fasteners, fix GIB® Plasterboard Linings using GIB® adhesives in accordance with the requirements of the GIB® Site Guide and GIB® System literature.

GIB® Adhesives:
- GIBFix® One: An acrylic based plasterboard adhesive with ultra low VOC, suitable for use on timber and metal substrates, including all treated timber. Minimum application temperature - 10°C.
- GIBFix® All-Bond: A solvent based plasterboard adhesive, suitable for use on timber and metal substrates, including all treated timber. Do not use on polystyrene surfaces.

2.8.5.4 Paper Faced Metal Trims

GIB® Goldline® Paper Faced Metal Trims. Paper-faced metal corner beads and edge trim made with a patented, high quality paper laminated to galvanised steel forms. Paper faced metal trims shall be embedded in jointing compound - do not mechanically fasten paper faced trims. Installed in accordance with the requirements of the GIB® Site Guide and GIB® Systems literature.

GIB® Goldline® Profiles:
- External 90° Corner Trim (G1-W): profile available in 2.4/2.7/3.0m lengths.
- External 135° Corner Trim (G1-O): profile available in 2.4m lengths.
- Internal 90° Corner Trim (G2): profile available in 2.4/2.7/3.0m lengths.
- Internal 135° Corner Trim (G2-O): profile available in 2.4m lengths.
- Bullnose External 90° Corner Trim (G1-B): profile available in 2.4/2.7/3.0m lengths.
- Reveals (GR): profiles available for 10mm thick and 13mm thick plasterboard.
- L-Trims (G4): profiles available for 10mm thick and 13mm thick plasterboard.

2.8.5.5 Joint & Finishing Compounds

GIB® Compounds. Use the most suitable GIB® Compounds to joint and finish GIB® Plasterboard Linings according to the plasterboard type, location, application, durability, and quality of finish required. GIB® Compounds shall be applied and finished in accordance with the manufacturer's requirements to the specified finish level, and used in conjunction with GIB® Paper Joint Tape and GIB® Plasterboard Trims.

GIB® Compounds:
- GIB TradeSet®: Setting type compound. Suitable for Tape Coat, 2nd Coat. Easy to scrape. 20/45/90/150 minute working/set times.
- GIB MaxSet®: Setting type compound. Suitable for Tape Coat, 2nd Coat. Scrape while 'green'. 90 minute working/set time.
- GIB Lite Blue®: Setting type compound. Suitable for 2nd Coat. Easy sanding. 90 minute working/set time.
- GIB Trade Finish® Heavy Weight: Air drying ready-mix type compound. Suitable for Finishing Coat. Moderate sanding.
- GIB Trade Finish® Multi: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat; Finishing Coat. Easy sanding.
- GIB Trade Finish® Lite: Air drying ready-mix type compound. Suitable for Finishing Coat. Very easy sanding.
- GIB Promix® Lite: Air drying ready-mix type compound. Suitable for Finishing Coat. Very easy

sanding.
- GIB® U-Mix: Air drying powder-mix type compound. Suitable for Finishing Coat. Easy Sanding.
- GIB Plus 4®: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat, Finishing Coat. Very easy sanding.
- GIB Promix® All Purpose: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat, Finishing Coat. Moderate sanding.
- GIB-Cove® Bond: Setting type compound. Suitable for bonding GIB-Cove® cornice, back-blocking plasterboard linings, and direct-bonding plasterboard to concrete and masonry walls. Hard to scrape. 45/90 minute working/set times.
- GIB X-Block® Jointing Compound: Used in conjunction with GIB X-Block® plasterboard wall and ceiling linings in accordance with the GIB X-Block® Radiation Shielding publication.

2.8.5.6 Joint Tape

GIB® Paper Joint Tape. A 50mm wide, spark perforated paper joint tape used to strengthen joints between plasterboard sheets. Centre-creased for internal and external corner applications. Recommended for jointing GIB® plasterboard wall and ceiling linings in accordance with the GIB® Site Guide and GIB Systems literature.

2.8.5.7 Wet Area Sealant

Wet Area Sealant. A mould resistant, flexible, neutral curing silicone sealant with strong adhesion, suitable for wet area applications and where there is high humidity, including bathrooms, toilets, showers, wash-down areas, kitchens, laundries.

Applied in accordance with the sealant manufacturer's instructions, as required by the GIB® Site Guide and GIB® System literature. Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio.

Manufacturer & Brand:

2.8.5.8 Gap Filler

GIB® Gapfiller. A general purpose, gun applied, one-part water based, paintable acrylic gap filler. Provides excellent adhesion for gaps and cracks and other low movement joints. Used in strict in accordance with the manufacturer's requirements. Refer to the GIB® Site Guide.

2.8.6 Level of Finish

2.8.6.1 Level of Finish

To the areas noted as a specific Level of Finish (3-5) on the drawings, additionally comply with all relevant aspects of the GIB® Site Guide and AS/NZS 2589, complete with all system accessories, and other relevant product manufacturers' recommendations.

NOTE: Unless stated otherwise, Level 4 is the default Level of Finish.

2.8.6.2 Acceptance of Levels of Finish

Carry out all necessary inspections and assessments of completed plasterboard jointing and finishing prior to hand-over for subsequent decoration.

Do not apply surface sealers and decorative treatments until written agreement between the Contractor and Painter/Decorator is given confirming the specified Finish Levels have been achieved and the plasterboard linings are ready for subsequent sealing and decoration.

2.8.7 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB® Plasterboard Linings as required, and to ensure that:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- the linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

2.8.8 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation and finishing work of GIB® Plasterboard Linings shall be carried out by qualified and experienced tradespersons, familiar with the specified materials and installation and finishing techniques, in accordance with the GIB® Site Guide and the relevant GIB® product technical literature, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

GIB® Plasterboard Linings shall be jointed and finished to the specified Finish Levels in accordance with AS/NZS 2589 and GIB® Site Guide. Make all necessary arrangements for the quality assessment of plasterboard jointing and finishing Finish Levels prior to commencing decorating.

All cutting, fixing, jointing, finishing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard and free from damage and defects.

Protect surrounding surfaces and areas from jointing compound splashes and sanding dust.

2.8.9 Delivery & Handling

Store GIB® Plasterboard Linings indoors, in neat, flat stacks off the floor, in dry conditions and without any sagging or distortion, in accordance with the GIB® Site Guide. Keep plasterboard linings, compounds and accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life.

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.

Handle all products and materials in accordance with the manufacturer's requirements and relevant Product Data Sheets and GIB® Site Guide, and in a manner that prevents damage. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall be familiar with and comply with the requirements of the GIB® Site Guide precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice.

2.8.10 Preparation

2.8.10.1 General

All framing and substrates shall be complete and ready for GIB® Plasterboard Lining installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified. For of direct bonded plasterboard linings, concrete substrates must below 75% relative humidity prior to installation.

Concrete masonry substrates shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design. For of direct bonded plasterboard linings, concrete masonry substrates must below 75% relative humidity prior to installation.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

2.8.10.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:
- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.
- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according to the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.
- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

2.8.10.3 Work above Ceilings

Check that all building work, mechanical, plumbing, electrical, fire protection and other services installed above the ceiling are completed and independently supported by the building structure - not by the ceiling system.

2.8.11 Installation

2.8.11.1 General

Install GIB® Plasterboard Linings and accessories in accordance with the requirements of the GIB® Site Guide and product technical literature and associated fixing schedules, to the locations and details shown on the drawings. For GIB® Performance Systems, refer to the relevant GIB® system specification.

Prior to installation, confirm:
- The locations and construction details of all movement control joints;

- The locations and installation details of all building services items within framed structures;
- The specified GIB® plasterboard installation and fixing requirements;
- The specified Finish Level(s) for the plasterboard linings.
- Subsequent surface treatments and finishes applied to GIB® plasterboard.

2.8.11.2 Standard Ceiling Fixing - Metal Ceiling Battens

GIB® Plasterboard Ceiling Linings - Standard Ceiling Fixing with Metal Ceiling Battens. Metal ceiling battens shall be from the GIB® Rondo® Metal Batten Systems - refer to separate specification GIB® Rondo® Metal Batten Systems.

Unless independently supported, uniformly distributed loads (fixtures and fittings and/or overlaid insulation) supported by GIB® plasterboard ceiling linings shall not exceed 3.0 kg/m².

Metal ceiling batten spacings shall be shall be as given in the GIB® Site Guide according to the specified plasterboard thickness - 600mm for 13mm or greater thickness, 450mm for 10mm thickness. Ceiling battens shall all run in the same direction within the ceiling area. In no case shall ceiling battens be continuous over movement control joints in the structure.

Install GIB® Plasterboard sheets right angles to ceiling battens, with sheet end-joints staggered minimum 600mm and located off battens and back-blocked. Fully support sheets during positioning and fixing - for ceiling installations, the use of a mechanical lifting machine is recommended.

Plasterboard sheets shall be fixed to ceiling battens in conjunction with GIBFix® adhesive applied at maximum at 200mm centres. Do not apply adhesive at sheet edges or within 200mm of fasteners. Firmly press the plasterboard where adhesive has been applied to ensure full contact.

Fix sheets to timber ceiling battens with GIB® Grabber® Self Tapping Screws in accordance with GIB® Site Guide fastener schedule according to the plasterboard thickness. Position fasteners no closer than 12mm from a tapered edge or 18mm from a cut sheet edge.

Install all necessary paper-faced metal beads, casing beads, shadow and reveal beads and other edge trims to plasterboard corners and edges as necessary and as detailed on the drawings.

Form movement control joints to the locations and details shown on the approved drawings. Where not indicated on the drawings, movement joints shall be positioned at maximum 12m intervals in both directions on any single ceiling, and where there is a change in ceiling lining material, and shall coincide with the junctions between adjoining spaces.

Accommodate recessed light fittings, heating and ventilating diffusers and grilles and other utility fixtures and fittings that penetrate the ceiling lining.

2.8.11.3 Wall Linings - Horizontally Fixed - Timber Frame

GIB® Plasterboard Wall Linings Horizontally-Fixed to Timber Framing. Install GIB® plasterboard sheets horizontally, at right angles to studs, with any end-joints staggered, and with the bottom edge of the lower sheet gapped 5–10mm off finished floor level.

All joints between sheets shall be touch fitted. Eliminate or minimise the butting of sheet end-joints by using full-length or long-length sheets. Give careful consideration to the placement of sheet joints. Where possible, place joints in situations where they are less likely to be affected by critical lighting.

It is recommended that sheet end joints in horizontally fixed plasterboard be unsupported, off-stud and back blocked - stud centres must not exceed 600mm. For plasterboard linings with Level 3 Finish and Level 4 Finish, sheet end joints can be located on-stud.

Sheet end joints at openings, such as window and door openings, shall not coincide with the vertical edges of the opening - sheets shall be fitted so that the vertical end joint falls minimum 200mm either side of the edge of the opening.

Plasterboard sheets shall be fixed to timber framing in conjunction with GIBFix® adhesive applied at maximum at 300mm centres to intermediate studs. Do not apply adhesive at sheet edges or within 200mm of fasteners. Firmly press the plasterboard where adhesive has been applied to ensure full contact.

Fix sheets to timber framing with GIB® Grabber® High Thread Screws or GIB® Nails in accordance with GIB® Site Guide fastener schedule. Place fasteners at 300mm centres to top and bottom plates and to perimeter studs, and to each stud where the horizontal joint crosses the stud, with screws no closer than 12mm from sheet edges. It is recommended that fasteners at wall corners are placed 50mm in from the corner in each direction (horizontal/vertical).

Install all necessary paper-faced and metal beads, casing beads, shadow and reveal beads and other edge trims to plasterboard corners and edges as necessary and as detailed on the drawings.

Form movement control joints to the locations and details shown on the approved drawings. Where not indicated on the drawings, movement joints shall be positioned at maximum 12m intervals in both directions (horizontally/vertically), and shall coincide with movement joints in the primary structure, and where there is a change in wall lining material.

Accommodate piped and cabled services and other building services fixtures and fittings that penetrate the wall lining.

2.8.11.4 Jointing & Finishing

Joint and finish GIB® Plasterboard Linings with GIB® joint and finishing compounds appropriate for the plasterboard type and durability, and the finish level required. Refer to Joint & Finishing Compounds clause.

Carry out jointing and finishing according to the specified Finish Level in accordance with the GIB® Site Guide and GIB® Compounds brochure. Reinforce sheet joints and internal corners with joint tape or paper-faced trim embedded into the Taping (first) Coat.

Sheet joints, internal and external corners, and fastener heads shall be evenly finished with GIB® compounds. When dry, lightly sand to a smooth finish with 220 grit sandpaper or drywall sanding

screen to remove tool marks, ridges and other imperfections prior to subsequent sealing and decorating.

2.8.12 Completion

Check that GIB® Plasterboard Linings have been installed in accordance with the GIB® Site Guide and GIB® Systems literature, and are finished to the specified finish levels.

Check for any damage and defective work - repair or replace as necessary to the required standard.

Ensure that inspection and assessment of the plasterboard Finish Level has been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.

Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.

Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.

Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and dust. Remove all associated rubbish and excess material from the site.

Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

Preparation and painting (by others) of GIB® Plasterboard Linings shall be carried out in accordance with AS/NZS 2311 and with the paint manufacturer's recommendations. Refer to separate specification section Painting & Decorating.

Preparation, including application of under-tile waterproofing membranes, and tiling (by others) of GIB® Plasterboard Linings shall be carried out in accordance with AS 3589.1 and the BRANZ Good Practice Guide: Tiling. Refer to separate specification section Tiling.

2.9 Workmanship & Materials

2.10 James Hardie Stria™ Cladding Smooth - with Timber Cavity Batten

2.10.1 Scope

Supply and install Stria Cladding Smooth with Timber Cavity Battens as a fibre-cement panel cladding material to the walls identified on the drawings, complete with all accessories, ready for paint finishing. All aspects of this work shall be in complete accordance with the James Hardie Stria Cladding Timber Cavity Batten Technical Specification and/or Stria Cladding Vertical Installation Technical Specification (check www.jameshardie.co.nz, or call 0800 808 868 for the latest editions) and other relevant product manufacturers' recommendations.

2.10.2 Substrate Preparation

2.10.2.1 Vertical Cladding

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements. Framing shall be plumb and in true alignment, complete and suitable for the panels, and maximum moisture content as per NZS 3602. Ensure that the framing is true in line with no projections due to structural and bracing bracketry, etc. Ensure that the bottom plate hold-downs are correctly installed.

The following framing is required:
- Studs must be provided at 600mm centres maximum.
- Nogs/dwangs must be provided at 800mm centres
- An extra stud is required in internal corners.
- For specific design projects exposed to wind speeds higher than 50m/sec, the stud size and spacing must be as per the design requirements but not exceeding 400mm maximum.

Check that the flexible underlay or rigid air barrier has been installed in full accordance with the manufacturer's requirements and the drawings, and completely finished to all penetrations including doors, windows, services, etc.

Check junctions to all other building elements and ensure that all necessary works have been completed, e.g. flashings, etc., that will enable the panels and all accessories to be installed.

Check that the ground levels are sloping away from the building so that there will be no ponding water against the building, and that the ground will be remain clear of the panels by at least 100mm at all times in accordance with E2/AS1.

2.10.3 Cavity Battens

2.10.3.1 Vertical Cladding Cavity Battens

Hardie™ Horizontal Cavity Battens - ex 50 x 25mm, H3.1 treated Radiata timber cavity, with a fluted face and bevelled edged. Battens installed horizontally over the flexible underlay or rigid air barrier, and directly over nog/dwang lines at maximum spacing in accordance with the Stria Cladding Vertical Installation Technical Specification. Ensure that LOSP solvents in the cavity battens have flashed-off before installing the cladding. Fix cavity battens and aluminium flashings with 40 x 2.8mm or longer Hardie™ Flex Nails in accordance with James Hardie requirements.

2.10.4 Installation

2.10.4.1 Stria Cladding Smooth Vertical Cladding

Install Stria Cladding panels vertically in accordance with James Hardie requirements.

Install uPVC vent strip over the flexible underlay or rigid air barrier, and fix to structure. Ensure that the openings in the vent strip are kept clear and unobstructed at all times.

Fix Hardie™ Horizontal Cavity Battens through the flexible underlay or rigid underlay to the framing, horizontally along top and bottom plates along nog/dwang lines, vertically at corners and end junctions, and around openings.

Install the cladding panels vertically plumb, and fix through the cavity battens and flexible underlay or rigid air barrier into the framing in accordance with the Stria Cladding Vertical Installation Technical Specification, complete with all accessories, e.g. corner mouldings, sealant, soakers, etc. Install full length panels where possible. Where panel end-joints are unavoidable, end-joints shall be formed over cavity batten framing with a scarf joint, cut at 20°-45°, and adhesive sealant.

to

Install Stria Cladding Smooth panels vertically in accordance with James Hardie requirements.

Install Hardie uPVC vent strip over the flexible underlay or rigid air barrier, and fix to structure. Ensure that the openings in the vent strip are kept clear and unobstructed at all times.

Fix Hardie™ 20mm Horizontal Cavity Battens through the flexible underlay or rigid underlay to the framing, horizontally along top and bottom plates along nog/dwang lines, vertically at corners and end junctions, and around openings.

Install the cladding panels vertically plumb, and fix through the cavity battens and flexible underlay or rigid air barrier into the framing in accordance with the Stria Cladding Smooth Vertical Installation Technical Specification, complete with all accessories, e.g. corner mouldings, sealant, soakers, etc. Install full length panels where possible. Where panel end-joints are unavoidable, end-joints shall be formed over cavity batten framing with a scarf joint, cut at 20°-45°, and adhesive sealant or Hardie 14mm aluminium trimline joint flashing.

2.10.5 Panel Fixings

For Cavity Construction over Flexible Underlay: Fix vertical Stria Cladding Smooth panels using 65 x 2.87mm, galvanised steel, D-head ring shank nails, in accordance with James Hardie requirements.

The nails must achieve a minimum 30mm penetration into timber framing. Where a James Hardie rigid air barrier is installed over the framing, fix vertical Stria Cladding Smooth panels using 75 x 3.06mm, galvanised steel, D-head ring shank nails in accordance with James Hardie requirements. When another rigid air barrier is used, increase length of nail minimum thickness of the rigid air barrier.

The nail heads must be set 2mm below the panel surface, and flush-filled with CRC ADOS Builders Fill or similar two-part external grade filler.

2.10.6 Flexible Sealant

Flexible sealant shall be SIKA Sikaflex AT-Façade high performance joint sealant. Use to seal the panels and accessories in accordance with the sealant manufacturer's recommendations and to James Hardie requirements. Ensure sealant compatibility with selected finish.

2.10.7 Workmanship

All installation work shall be carried out by a LBP, or supervised by a LBP, in accordance with theJames Hardie Stria Cladding Smooth Horizontal Technical Specification or Stria Cladding Smooth Vertical Installation Technical Specification (vertical cladding), and other relevant product manufacturers' recommendations.

2.10.8 Co-operation

Co-ordinate with other trades to ensure that appropriate clearances are allowed from roofing products and associated flashings etc., that the framing and slab edges are true, that the panels correctly allow for door and window installation, and that services penetrations are correctly handled to maintain full weathertightness and panel integrity.

Ensure that other trades are aware of the James Hardie Safe Working Practices.

2.10.9 Delivery & Handling

Carry all panels on edge. Stack panels flat on a level platform off the ground, i.e. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm centres maximum). Keep panels and accessories dry at all times. Avoid damage to panel edges, ends, and surfaces. Keep uPVC flashings etc. out of direct sunlight, and store all accessories on flat and avoid damage.

All installers shall be familiar with and comply with the James Hardie Safe Working Practices in the Technical Specification, use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged, blemished or defective panels or accessories.

2.10.10 Completion

Check that the Stria Cladding Smooth panels have been installed and fixed correctly, that all joints and accessories have been completed correctly, and that all penetrations have been taped correctly.

Check that no damage has occurred to any installed cladding panel element or associated component - replace as necessary to the required standard.

Check that no dirt has been mounded up within 175mm of the cladding panels, and maintain the clearance.

Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements.

Ensure that the cladding panels are painted within 90 days of the sheet installation, complete with all accessories and flashings.

Issue to the Owner a copy of the Stria Cladding Smooth Maintenance Schedule, and a copy of the Stria Cladding Smooth Product Warranty.

2.11 GIB® Wet Area Systems

2.11.1 Scope

Supply and install the specified GIB Aqualine® Wet Area Systems to the locations identified on the drawings, incorporating GIB® plasterboards and all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB Aqualine® Wet Area Systems publication and the current GIB® Site Guide (check GIB® Wet Area Systems | GIB®, or call 0800 100 442 for the latest editions), BRANZ Appraisal No.427, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB Aqualine® Wet Area Systems, GIB® Plasterboard Linings, or GIB® System components and accessories.

This specification section must be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated.

For the purpose of this specification, the GIB Aqualine® Wet Area Systems publication is referred to as the GIB® Wet Area Systems Manual..

2.11.2 Requirements

2.11.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

2.11.2.2 Warranty

GIB® Product & System Warranty:

- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

2.11.2.3 Quality Assurance

Ensure that the installation and finishing of GIB Aqualine® Wet Area Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

2.11.2.4 Inspection & Acceptance of GIB® Wet Area Systems

Carry out all necessary pre-installation, installation and finishing inspections necessary for GIB Aqualine® Wet Area Systems for each area of work in accordance with the requirements of the GIB® Wet Area Systems Manual, GIB® Site Guide, and BRANZ Appraisal No.427.

Complete the GIB® Wet Area Systems Manual and GIB® Site Guide Pre-Installation Checklists prior to installing GIB® plasterboard linings.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

2.11.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB Aqualine® Wet Area System materials and/or work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

2.11.2.6 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB Aqualine® Wet Area Systems components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB Aqualine® Wet Area Systems Manual and GIB® Site Guide: 2.3 - Board Substitution Options. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® plasterboard linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

2.11.3 Performance

2.11.3.1 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

In addition to the limitations above, GIB Aqualine® plasterboard must NOT be:
- used for bracing purposes in shower cubicles or above baths; or
- applied directly to solid plaster (gypsum or cement), wood based sheet linings or similar materials, masonry or concrete; or
- installed over a vapour barrier or a wall acting as a vapour barrier.

2.11.3.2 Bracing Performance - Timber Framing

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, BRANZ Appraisal No.928 (2016), and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

2.11.4 GIB Aqualine® Non-Tiled Wall Systems

2.11.4.1 Non-Tiled Walls - Timber Frame

GIB Aqualine® Wet Area Systems - Non-Tiled Walls - Timber Framing. A timber frame, wet area lining system for non-tiled walls incorporating one layer of 10mm or 13mm GIB Aqualine® on the wet area side. Refer to the GIB® Aqualine® Systems literature.

2.11.5 GIB Aqualine® Tiled Wall Systems

2.11.5.1 Tiled Walls (tile weight - max. 26kg/m²) - Timber Frame

GIB Aqualine® Wet Area Systems - Tiled Walls - Timber Frame. A timber frame, wet area lining system for tiled walls with a maximum tile weight of 26kg/m², incorporating one layer of 10mm GIB Aqualine® on the wet area side. Refer to the GIB® Wet Area Systems literature.

2.11.6 GIB Aqualine® Ceiling Systems

2.11.6.1 Metal Ceiling Battens

GIB Aqualine® Wet Area Systems - Ceilings - Metal Ceiling Battens. A wet area drywall ceiling lining system over metal ceiling battens incorporating one layer of 10mm or 13mm GIB Aqualine®. Refer to the GIB® Wet Area Systems literature.

2.11.7 Components & Accessories

2.11.7.1 Components & Accessories

GIB Aqualine® Wet Area Systems components and accessories, including, but not limited to:
- GIB® Plasterboard Linings;
- GIB® Plasterboard Fasteners;
- GIB® Adhesives - GIBFix® One and/or GIBFix® All-Bond;
- GIB® Rondo® NZ18 Perimeter Angle: shower corner reinforcing, 32 x 32 x 0.55mm thick galvanised steel angle.
- GIB® Metal Trims & Paper Faced Trims;
- GIB® Plasterboard Control Joints;
- GIB® Joint and Finishing Compounds;
- Wet Area Sealant.

Refer to the GIB® Wet Area Systems literature and the GIB® Site Guide for further information.

2.11.8 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB Aqualine® Wet Area Systems to the required set-out and standard, and to ensure:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- GIB® plasterboard linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

2.11.9 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB Aqualine® Wet Area Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified materials and installation techniques, in accordance with the manufacturer's installation requirements, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

Carry out all necessary installation inspections in accordance with the GIB® Wet Area Systems Manual and the GIB® Site Guide, and to fully comply with the manufacturer's warranty requirements as the works progress.

All cutting, jointing, fixing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

Make all necessary provisions to protect adjacent work and surfaces from damage during installation.

On Completion:
- Check that GIB Aqualine® Systems have been correctly installed and finished in accordance with the requirements of the GIB® Wet Area Systems Manual and GIB® Site Guide, to the correct set-out, dimensions and details shown on the drawings.
- Check for any damage and defective work - repair or replace as necessary to the required standard.
- Ensure that inspection and assessment of the plasterboard Finish Level have been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.
- Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.
- Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.
- Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and sanding dust. Remove all associated rubbish and excess material from the site.

- Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

2.11.10 Delivery & Handling

Store all GIB Aqualine® Wet Area Systems plasterboard linings and system components indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep stored plasterboard linings and system accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life. Cracked or damaged GIB Aqualine® sheets must never be used.

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.

Handle all materials in accordance with the manufacturer's requirements and relevant Product Data Sheets, and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

2.11.11 Preparation

2.11.11.1 General

All framing shall be complete and ready for GIB Aqualine® Wet Area Systems and associated GIB® plasterboard linings installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified.

Concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

2.11.11.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:
- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.
- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.
- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

2.12 Timber Weatherboard Cladding

2.12.1 Scope

Supply and install the selected Timber Weatherboard Cladding type(s) to the locations shown on the drawings, complete with all accessories. All aspects of this work shall be carried out to comply with the requirements of the New Zealand Building Code, relevant Standards, and in accordance with any specific manufacturer's requirements, other relevant product manufacturers' recommendations, and as noted and detailed on the drawings.

The following is a list and a general description of the extent of Timber Weatherboard Cladding work, which are more specifically defined in the contract documents, required for the completion of the contract works:

2.12.2 Vertical Weatherboard Profile

Vertical Shiplap Weatherboard: ex.150mm x 25mm, machined to NZS 3617 and/or BRANZ Bulletin 411. Manufactured from the selected timber species to the finish specified.

2.12.3 Preparation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to ensure that the weatherboards correctly allow for door and window installation, and for the locations of pipes, outlets, and fittings installed by others.

Vertical Weatherboards Cavity-Fixed on Timber Framing - check all aspects of preparatory works, including, but not limited to:
- Check that the timber wall framing complies with the approved design drawings, is plumb and in true alignment, has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres for vertical cladding, that any additional framing required for fixing at corners, openings and soffits is correctly in place, and has a maximum moisture content of 20% at the time of weatherboard cladding installation.
- Check that the flexible wall underlay, as specified, has been installed in accordance with the manufacturer's recommendations and NZBC requirements, with all finishing tapes, flashings, etc., at windows, doors, corners and penetrations all correctly incorporated to give a continuous seal, and that all preparatory materials are lapped such that any water will run down to the exterior
- Check that the fluted/castellated horizontal cavity battens and base vent strip are correctly installed and appropriate for the weatherboard cladding installation.
- For cavity construction without a rigid wall underlay and where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed against the underlay to prevent bulk insulation from pushing the underlay into the cavity space.
- Check junctions to all other building elements and cladding systems and ensure that all necessary works have been completed that will enable the weatherboards to be installed, and that the work of other trades does not negatively impact on or reduce the minimum clearances required by the NZ Building Code between the cladding and ground, roof and/or deck junctures.

2.12.4 Flashings

Flashing materials shall be in accordance with the requirements of NZBC E2/AS1 Sections 2.2 Materials, 4.0 Flashings, Table 20 - Material Selection, Table 21 - Compatibility of Materials in Contact, and Table 22 - Compatibility of Materials Subject to run-off, and as noted on the drawings.
All flashings around windows, doors and other openings and apertures, at internal and external corners, inter-storey junctions, soffit junctions, and at junctions with other building elements and cladding systems, etc., shall all be carefully constructed, fixed and finished to the details shown on the drawings.

2.12.5 Installation

2.12.5.1 Vertical Shiplap Weatherboard - Cavity Fix

Back flash all internal and external corners as detailed.
Carefully set-out Vertical Shiplap Weatherboard cladding vertically over the fluted/castelated horizontal cavity battens, to straight plumb lines, and fix to the framing with side laps directed away from prevailing weather and with the base overhang 50mm minimum, or as detailed, below the bottom plate or floor structure. Install full length weatherboards boards where possible. Where joints are unavoidable, scarf the weatherboards at 45º and fix to solid framing through the top overlapping board above the joint (not through the joint). Where boards are coated, ensure all cut ends and fresh timber is double coated with a suitable sealer/primer.
Check for and eliminate any creep and/or spread of shiplap weatherboards during installation.
Finish Standard Vertical Weatherboards, weatherboard trim, flashings and accessories at internal and external corners, window and door openings, parapets, and at junctions with other building elements and cladding systems exactly to the details shown on the drawings.

2.12.6 Delivery & Handling

2.12.6.1 Delivery & Handling

Upon delivery to site, inspect weatherboards and accessories and reject any items found to be damaged, defective or substandard. Contact the manufacturer/supplier for replacement.

Store weatherboards, flashings and accessories undercover, flat and true, clear of the ground by at least 150mm and supported on dry, clean timber bearers at maximum 900mm centres, or as recommended by the weatherboard manufacturer. Keep stored materials and accessories dry and protected from damage and contamination at all times, and free from bending, distortion or excessive compression. Do not allow water to enter the stack.

Do not use damaged or defective weatherboards or accessories. Dock any oversized knots, unacceptable grade characteristics or damaged areas of weatherboard.

Weatherboards must be dry prior to installation. Do not install weatherboards during periods of wet weather. Seal all cut ends and fresh-cut timber with two coats of the selected exterior primer or coating.

Handle weatherboards in accordance with the manufacturer's recommendations and in a manner that prevents damage to or deterioration of the material, including surface marking.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice, including Best practice guidelines for working at height in New Zealand and General risk and workplace management – part 1.

3 EXTERNAL WINDOW & DOOR JOINERY

3.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

3.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
1866:1997(AS/NZS)	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
2208:1996(AS/NZS)	Safety glazing materials in buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

3.3 Aluminium Windows & Doors

3.3.1 Scope & Design Performance

3.3.1.1 Scope:

Supply and install Aluminium Windows and Doors, as specified herein, to the locations and details shown on the design drawings, complete with all necessary components and accessories required for proper installation and performance.

All aspects of this work shall comply with the NZ Building Code, related manufacturer's technical literature and other relevant product manufacturers' recommendations. test

3.3.1.2 Wind Performance - Wind Zone - High:

Aluminium Windows & Doors shall comply with the requirements of NZS 4211 for all relevant clauses.

Wind Load - Non-Specific Design Wind Zone Classification:

- Aluminium Window and Door joinery installation is located in a NZS 3604 Wind Zone: H - High; with a maximum pressure of 0.97kPa SLS and 1.36kPa ULS.

3.3.1.3 Thermal Performance - Climate Zone 6:

Aluminium Window & Door joinery installation is located within the boundaries of Climate Region Zone 6 as defined in NZBC - H1/AS1. Unless specified otherwise, the combination of glazing and window/door frame shall have a minimum required R-Value in accordance with this Climate Zone. Refer to drawings and schedules.

3.3.1.4 Durability Performance - Exposure Zone B - Low:

Aluminium Window and Door joinery installation is located in a NZS 3604 Exposure Zone B: Low - within an inland area with little risk from wind-blown sea-spray salt deposits.

ISO 9223 Category: C2 Low: Characterised by no obvious marine influences. Typically, more than 1000 metres from the exposed coasts or more than 500 metres from industrial emissions.

All aspects of the Aluminium Window and Door joinery, including hardware, shall meet the durability requirements for the given Exposure Zone in accordance with NZBC B2.

3.3.2 Requirements

3.3.2.1 Safety:

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

3.3.2.2 Warranty:

Window & Door Materials & Workmanship Warranty:

- Standard Manufacturers Window and door product warranty periods apply unless noted otherwise in the contract documents
- Commence the warranty from the date of practical completion of the contract works.

3.3.2.3 Shop Drawings:

Prepare and submit to the Main Contractor for verification and approval prior to the commencement of fabrication works, Shop Drawings describing the general arrangement and connection to the building envelope of the specified window & door systems.

These shall include, but not be limited to:

- Design calculations - where required;
- Dimensioned elevations of all joinery elements (typical scale = 1:50; minimum scale = 1:100);
- Complete details of the installation construction, connections and all support systems (typical scale = 1:2; minimum scale = 1:5);

- Sealant types and backing rods, etc;
- Provision for movement, thermal, wind load and/or seismic - where required;
- Coordination requirements/issues with other works and trades - where applicable;
- A schedule of materials, finishes, componentry, fittings, fixings and fastenings - where required.

3.3.3 Aluminium Windows

3.3.3.1 Aluminium Windows:

Aluminium Windows shall be manufactured to manufacturer's standard details.

Specification:

- Mullions and transoms, with or without external fins, shall be thermally broken, and in accordance with the manufacturer's Span Tables for compliance with the project wind load.
- Sashes shall be box sashes - glass captive, or beaded sash - capable of reglazing without dismantling sashes.
- Thermal breaks are to be provided as indicated on the Window & Door schedule.
- Glass: Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause
- Furniture: Refer to Hardware clause.

Configuration (as indicated on the drawings):

- Casement
- Awning
- Sliding
- Double hung
- Bi-fold

Refer to the Window & Door Schedule drawings for specific requirements of individual elements.

Manufactured and installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.

3.3.4 Aluminium Doors

3.3.4.1 Aluminium Doors:

Aluminium Doors shall be manufactured to standard manufacturer's requirements.

Specifications:

- Frames shall be manufactured, in accordance with the manufacturer's Span Tables, and to suit joinery configurations and opening swings.

- Stiles and rails shall be box sections - glass captive, or beaded - capable of reglazing without dismantling doors.
- Thermal breaks are to be provided as indicated on the Window & Door schedule.
- Glass: Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause.
- Furniture: Refer to Hardware clause.

Configurations (as indicated on the drawings):

- Hinged Doors (single): Inward opening; outward opening. Left-hand swing LH; Right-hand swing RH. With coupled overlight; with coupled sidelight.
- French Doors (double): Inward opening; outward opening. Single-paired; double-paired (open-out fold-away). With coupled overlight; with coupled sidelight.
- Bifold door - 2-Panel Layback, 3-Panel Layback, 2-/2-Panel Layback. Can be combined with 1-Panel Hinged, 1-Panel Fixed.
- 'S' sliding panel, and 'F' fixed panel: F-S, S-F, F-S-F, F-S/S-F. Moving panels slide inside/behind fixed panels.

Refer to the Window & Door Schedule drawings for specific requirements of individual elements.

Manufactured and installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.

3.3.5 Glazing Platform

3.3.5.1 Standard Double Glazing:

Maximum 22mm thick, air-filled and sealed insulating glass units (IGUs); with 4mm thick clear float glass in accordance with NZS 4223.1 and NZS 4223.3. Double glazed IGUs shall be manufactured and installed in accordance with AS/NZS 4666. Factory-fitted to Aluminium Windows & doors, as identified on the drawings and schedules.

3.3.6 Glass

3.3.6.1 Low - E Glass:

Heat-reflective coated surface, annealed float glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

3.3.6.2 Obscured & Patterned Glass:

Surface patterned glass and/or obscure glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

3.3.6.3 Toughened Safety Glass:

Toughened Grade 'A' Safety Glass, complying with AS/NZS 2208 and AS/NZS 4667 and in accordance NZS 4223.1. Installed to the locations identified on the drawings and schedules. All cutting and drilling and other processing requirements must be done prior to toughening.

3.3.7 Finish

3.3.7.1 Powder Coated Aluminium:

Polyester powder coating in accordance with WANZ Powder Coating Quality Assurance System and AAMA 2603-98 performance is required.

3.3.8 Flashing & Support Bars

3.3.8.1 Aluminium Head Flashing:

Aluminium Head Flashings shall be manufactured from extruded aluminium, suitably sized to suit the claddings and construction types in accordance with NZBC E2/AS1 and as shown on the drawings.

Except where specified otherwise, aluminium head flashings shall be powder coated and colour-matched to the aluminium joinery.

3.3.8.2 Aluminium Sill Support Bar - Cavity Fix:

Extruded mill-finish aluminium sill support bar, with built-in drainage and ventilation, for continuous support to the window or door unit. Sill support bars shall be used and installed in accordance with the requirements of NZBC E2/AS1, and comply with BRANZ Evaluation Method EM6, and be sized to suit the cladding thickness and weight of the window or door.

3.3.9 Hardware

Hardware as selected in the 'Door and Window' schedule is to be installed to Manufacturers requirements. Where not specified hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer shall be used. Factory fit all required and scheduled hardware.

Where specified, all lockable window & door hardware is to be keyed alike. Provide all keys with the joinery and provide to Client as required.

3.3.10 Fabrication

3.3.10.1 Fabrication:

Fabricate Aluminium Windows & Doors in accordance with the approved window schedule, approved workshop drawings and other project documentation.

Unless noted otherwise, the approved window schedule, joinery fabrication shall include the installation of all glazing, hinges, stays, running gear, and other hardware items scheduled on the approved shop drawings.

As necessary, provide protection and temporary bracing required for the general handling of the joinery elements. Ensure that all opening doors and windows are temporarily secured for transportation and general handling.

3.3.11 Co-operation

3.3.11.1 Co-operation:

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades, as required, on the installation of the Aluminium Windows & Doors to the required layout, details and tolerances.

3.3.12 Workmanship

Aluminium Windows & Doors will be manufacturerd in workshops containing all mechanical equipment appropriate for the work, and by experienced and competent tradesmen who are familiar with the techniques and materials specified.

The manufacturer will co-ordinate with other trades to establish the exact sizes for all frames before fabrication. Frames and sashes will be fabricated true, square, rigid, and 'out of wind', with all joints strongly mechanically fixed, and with mitres tight and fully sealed. Potential thermal, wind and seismic movements will be accommodated within the construction. All cavities will drain to the exterior, and all drilling swarf etc. will be removed during fabrication.

Stays, hinges, running gear and glazing will be installed as scheduled (the Designer will be notified if any scheduled hardware of fixing position appears to be inappropriate for this project).

Hardware will be fixed true to line and position, and adjusted and oiled as required for correct operation.

Glass will be cut true and square, sized to provide correct edge clearances, blocked into place as required, and all units will be delivered either pressure fit, pocket glaze, or beaded/wedged, unless site glazing is required. Glazing gaskets will be compatible with all adjacent materials, and cut 1% over-length to absolutely avoid stretching during installation. Frames will be braced etc. as necessary for transportation to the site.

Flashings as detailed will be supplied. Flashing materials will be compatible with the Aluminium Windows & Doors.

3.3.13 Preparation

3.3.13.1 Preparation:

Prior to installation, carry out all necessary inspections of the supporting structure to ensure all preliminary work is complete. Do not commence installation until all necessary preliminary work by others is complete and to the required standard. The commencement of work on each section of the

installation shall be deemed to indicate full acceptance by the Installer that all preliminary work by other trades is complete and to the required standard.

Supporting structures shall comply with the NZ Building Code, and must be structurally sound and dimensionally stable and in the correct alignment, true to line and level (and grade for sloped balustrades).

Confirm the location of all movement control joints prior to the commencement of the works.

Concrete:
- Supporting reinforced concrete elements shall comply with NZS 3101, or NZS 3604.
- New concrete must have aged for a minimum of 28 days prior to installation.

Concrete Masonry:
- Supporting reinforced concrete masonry elements shall comply with NZS 4229, or NZS 4230 and AS/NZS 1170.

Timber Framing:
- Supporting timber-framed structures shall comply with NZS 3604, or NZS 3603 and AS/NZS 1170.

Structural Steel:
- Supporting steel structures shall comply with NZS 3404.

3.3.14 Delivery and Installation

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and the construction principles that are embodied in the Acceptable Solutions.

Arrange for delivery of the Alumnium Windows & Doors to the site only when a suitable storage situation is available for them, handle the joinery in accordance with the manufacturers requirements, avoid any frame distortion, avoid rubbing damage, avoid contact with concrete, plaster, mud etc. and keep them dry. Retain protective coverings for as long as possible, and remove them at completion.

Experienced and competent tradesmen who are familiar with the techniques and materials specified shall carry out all installation work. Fix in accordance with the manufacturer's instructions. Take utmost care to avoid damage to anodized or powder coated surfaces - correction of any such disfigurement requires written authority - replace any badly damaged items.

Use fixings compatible with the materials involved, as recommended by the windows manufacturer and to comply with the DWP requirements, basically aluminium or Type 316 stainless steel where exposed externally; galvanized to AS/NZS 4680, 610g/m2, may be used where not exposed.

Thoroughly check all preparatory work to openings prior to installation, including underlay, corner seal tapes, adjacent cladding, pre-installed flashings, waterproofing systems etc. as appropriate. Use

inert barriers or coatings to prevent contact between dissimilar metals or between aluminium and concrete.

Install flashings as detailed and supplied by the manufacturer, installed tightly and neatly with absolute minimum tolerances, with head weathering jamb, jamb weathering sill, and sill open (draining) to exterior. Except where the window is recessed all head flashings shall extend 30mm minimum beyond the frame.

Air-seal all frame perimeters to adjacent structure to a depth of 15 - 20mm with expanding foam or appropriate sealant including a PEF rod at head, sill and jambs to retard the spread of sealant.

Weather-seal frame jambs etc. to adjacent surfaces (or to each other) as detailed or as required by the windows manufacturer, to achieve a fully watertight installation. In preparation for sealant the joints shall be clean, dry, and primed if necessary. Insert closed cell polyethylene backer rods or a polyethylene tape slip layer if required. Mask adjacent surfaces if appropriate, install the sealant fully in accordance with the sealant manufacturer's recommendations, and finish to even smooth surfaces.

Remove trade debris progressively, appropriately clean any affected adjacent surfaces, thoroughly clean the Aluminium Windows & Doors, check that all hardware is in full working order, and provide safety indication of the glass for the balance of adjacent works.

3.3.15 Completion

3.3.15.1 Completion:

Check the Aluminium Windows & Doors have been correctly installed in accordance with the manufacturer's requirements to the locations, layout and details shown on the design drawings.

Check the installation for damage and defects, including surface marking. Carry out any necessary repairs in accordance with the manufacturer's requirements to the required standard. Replace Aluminium Window and Door elements where repair is not possible or will not be accepted.

Leave all of this work complete, clean and free from damage and defects, and to the required standard in accordance with the manufacturer's requirements.

Leave surrounding surfaces clean and free of rubbish and debris. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the manufacturer's maintenance requirements and a copy of the manufacturer's Warranty. test

4 PLASTER CLADDINGS

4.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

4.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2588:2018(AS|NZS)	Gypsum plasterboard
2589:2017(AS/NZS)	Gypsum linings - Application and finishing

4.3 Plasterboard Finish

4.3.1 Scope

Plasterboard linings shall be finished to the specified finish level.

4.3.2 Plasterboard Finish Level

Level 4 Finish, in accordance with AS/NZS 2589. Unless specified otherwise, all decorated plasterboard shall be finished to Level 4 Finish.
All joints and interior angles shall have shall have jointing tape embedded in jointing compound and minimum of two separate coats of jointing compound applied over all joints, angles, fastener heads and accessories.
Jointing and finishing compounds shall be applied and finished evenly and free of ridges and tool marks in preparation for decoration in accordance with the manufacturer's requirements.
Agree in writing with the Decorator that a Level 4 Finish has been achieved when complete and before decorating commences.

Location:
Manufacturer, brand name and type:

4.3.3 Jointing Tape

Plasterboard sheet joints shall be reinforced with a suitable paper jointing tape compatible with the jointing and finishing compounds.

Manufacturer, brand name & type:

4.3.4 Workmanship

Plasterboard finishing work shall be carried out by experienced applicators familiar with the application and finishing techniques and materials specified and in accordance with the manufacturer's requirements.

Plasterboard linings shall be finished to the specified finish level in accordance with AS/NZS 2589.
Make all necessary arrangements for the quality assessment of plasterboard finishes prior to commencing decorating.
Protect surrounding surfaces from jointing compound splashes and sanding dust.

Handle and store plasterboard finishing materials and accessories in accordance with the manufacturer's requirements. Keep products dry and protect from damage. Do not use damaged or faulty products or products beyond their expiry date.
Dry powder compounds mixed to the manufacturer's instructions.

4.3.5 Installation

Ensure that plasterboard sheets have been installed correctly to the sheet manufacturer's requirements, that they are clean and dry, and that fixing heads are correctly set.
Install all necessary metal beads and trim to corners and edges and metal control joints as required and as shown on the drawings.
Apply jointing and finishing compounds to the required build and specified finish level in accordance with the manufacturer's instructions. Reinforce joints with the selected jointing tape. Where required sand top coats smooth and even with fine sandpaper, as recommended by the manufacturer, when completely dry.

4.3.6 Completion

Ensure that the plasterboard sheets have been finished correctly to the specified finish level. Check for damage and repair as necessary. Ensure that assessment of the plasterboard finish level has been carried out and that agreement that the finish level is acceptable for subsequent decorating has been provided.
Clean up thoroughly on completion and remove all waste and rubbish from site.

5 G L A Z I N G

5.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

5.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.0:2002(AS/NZS)	Structural design actions - Part 0: General principles
2208:1996(AS/NZS)	Safety glazing materials in buildings
3604:2011(NZS)	Timber-framed buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4232.2:1988(NZS)	Performance criteria for fire resisting enclosures - Part 2: Fire resisting glazing systems
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

5.3 Non-Structural Glazing

5.3.1 Scope

Supply and install the selected glass products to the windows, doors, curtain wall systems, roofs and canopies, balustrades and barriers, partitions and screens, and other non-structural glazing elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the glass manufacturer's installation requirements and recommendations, other relevant product manufacturers' recommendations, and as shown on the drawings.

5.3.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades for all necessary holes and cut-outs, etc., for glass-mounted hardware, fittings and fixtures, and to install all glass and glazed elements as required.

5.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen familiar with the products specified and installation techniques, to the manufacturer's requirements and recommendations, and the requirements of the relevant Glazing Standards, and to the layout and details shown on the drawings.
Handle and store glass in accordance with the manufacturer's recommendations.
Provide temporary safety markings to all glass panes as the installation work progresses.
Finish all external glazing wind and watertight.
Do not use damaged, marked or faulty materials.

5.3.4 Glass Type

5.3.4.1 Toughened Safety Glass

Toughened Safety Glass. Toughened Grade 'A' Safety Glass, complying with AS/NZS 2208 and AS/NZS 4667 and in accordance NZS 4223.1. Installed to the locations identified on the drawings and schedules. All cutting and drilling and other processing requirements must be done prior to toughening.

5.3.4.2 Mirrored Safety Glass

Mirrored Safety Glass. Clear Grade 'A' Safety Glass with a reflective silvered coating and manufacturer applied protective backing, complying with AS/NZS 2208 and AS/NZS 4667 and in accordance NZS 4223. Installed to the locations identified on the drawings and schedules.

5.3.5 Components & Accessories

5.3.5.1 Aluminium Framed Glazing

Provide all necessary glazing components and accessories including glazing tape, setting and distance blocks, sealants, gaskets, etc., to complete aluminium framed glazing as required.

5.3.6 Frameless Doors & Screens

Frameless glass doors and screens shall be safety glass in accordance with NZS 4223.3.

Frameless glass doors and screen panels cut to the dimensions shown on the drawings, and factory pre-drilled and cut as required for all necessary fixings, brackets, cleats, hinges, locks, latches, closers and other hardware or fixtures, and edge finished as specified, prior to installation.

Install frameless glass doors and screen panels to the layout and details shown on the drawings and in accordance with any proprietary fixing manufacturer's requirements.

Glass screen panels set straight, true to line and plumb. Panel joints plumb and parallel as detailed.

Fixings, clamps, brackets, and hardware etc. neatly set-out and aligned as detailed.

Note: where relevant, new structural glass barriers shall comply with NZBC B1/AS1 (Amendment 13) and must have an interlinking rail, unless the barrier is laminated safety glass and has features to retain panes of glass or prevent collapse, in the event of breakage. The interlinking rail shall be

designed to resist serviceability limit state (SLS) loads, specified in AS/NZS 1170 and B1/VM1, in the event that a glass pane of the barrier breaks.

5.3.7 Mirrors

Frameless mirrors to the dimensions noted on the drawings, all edges finished as specified. Install to the locations indicated on the drawings with an approved adhesive and double sided adhesive tape in accordance with the glazing manufacturer's recommendations.

5.3.8 Splashbacks

Splashbacks to the dimensions and shapes noted on the drawings, all edges finished as specified. Install to the locations indicated on the drawings with an approved adhesive and double sided adhesive tape in accordance with the glazing manufacturer's recommendations.

5.3.9 Edge Finishing

Smooth arrised exposed edges and corners to frameless glass doors and screens, and where noted on the drawings.

Smooth arrised edges to frameless mirrors.

5.3.10 Completion

Check that all glass has been installed correctly to the required standard and as shown on the drawings. Check for damage and surface marking and replace as necessary. Clean off and remove all temporary safety markings, as programmed and when instructed, and leave glass trade clean. Remove all rubbish and waste material from site.
Issue to the Owner a copy of the Glass Manufacturer's maintenance requirements and all necessary Manufacturer Warranties.

6 INSULATION

6.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

6.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

4218:2009(NZS)	Thermal insulation - Housing and small buildings
4220:1982(NZS)	Code of practice for energy conservation in non-residential buildings
4243.1:2007(NZS)	Energy efficiency - Large buildings - Building thermal envelope
4246:2016(NZS)	Energy efficiency - Installing bulk thermal insulation in residential buildings
4859.1:2018(AS|NZS)	Thermal insulation materials for buildings - Part 1: General criteria and technical provisions
NZBC B2/AS1	Durability
NZBC F2	Hazardous Building Materials
NZBC H1	Energy Efficiency

6.3 EXPOL Timber UnderFloor Insulation

6.3.1 Scope

Supply and install EXPOL Timber Underfloor Insulation, floors, mid-floors areas as identified on the drawings, complete with accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with EXPOL timber underfloor insulation product manuals and installation guides, (visit www.expol.co.nz, or call 0800 86 33 73 for the latest editions), EXPOL timber underfloor insulation BRANZ Appraisals were applicable, other relevant product manufacturers' recommendations, and as shown on the drawings.
Further information can be found HERE regarding perimeter insulation of concrete slab foundations, BRANZ Study Report SR352

No substitutions are permitted for the specified EXPOL insulation products.

6.3.2 Requirements

Safety
Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

Extent of Work
The following is a list and a general description of the extent of the EXPOL timber underfloor insulation works, which are more specifically defined in the contract documents, required for the completion of the contract works:

Defective Materials & Work
Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected EXPOL materials and work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the principal.

Should a problem be encountered with any EXPOL product during use or delivery, immediately contact EXPOL on 0800 86 33 73 or email tech@expol.co.nz. Contact EXPOL within 48 hours of finding the defective product. Do not continue to use the product that is not performing to specification or expectation. Keep the product in question, and where possible, the document batch numbers and/or manufacturing details.

Transportation
When transporting, storing or installing, ensure the EXPOL EPS Sheet is not exposed to:
Petroleum based solvents, or
Fire, or
Do not store in direct sunlight. Product could be damaged and warranty will be void.

6.3.3 Workmanship

6.3.3.1 Workmanship

Installation of EXPOL Timber Underfloor Insulation must be completed by an installer with an understanding of insulation installation. In accordance with the manufacturer's installation requirements, NZS 4246 and as noted and detailed on the drawings.
Store and handle all materials and products in accordance with the manufacturer's recommendations.

6.3.4 EXPOL Timber UnderFloor Insulation

EXPOL R3.1 UnderFloor Insulation
EXPOL R3.1 UnderFloor Insulation - A rigid panel infused with graphite. Manufactured from Expanded Polystyrene material, 1200mm in length, 100mm thick in four standard widths 360, 410, 470, 560.
Width: 360, 410, 470, 560

6.3.5 System Components

WIREGUARD
EXPOL WireGuard is a waxed paper strip used to separate exposed electrical cables from EXPOL insulation.

Styro–Fix Construction Adhesive
Styro–Fix is an advanced single component polyurethane-based construction adhesive

EXPOL L Brackets - Existing Floors R2.5 & R3.1
EXPOL L Brackets are designed as a push fit - fixed with the supplied stainless steel nail to the joist.

6.3.6 Installation

EXPOL Timber UnderFloor Insulation - New Floors
Install EXPOL Joist Saddles from the upper side of the joist. Install polystyrene insulation panels, complete with accessories, friction fitted between the floor joists against the underside of the flooring and secure in place in accordance with the manufacturer's recommendations. Ensure all perimeter insulation edges and all insulation joints are fully closed as the work progresses, seal gaps with a manufacturer approved urethane foam sealant the thickness of the insulation panels. Neatly cut insulation panels around pipes etc. and seal gaps as above. Separate polystyrene panels from installed electrical cables with EXPOL WireGuard barrier strip only. Do not insulate over electrical cables, leave cables exposed and uncovered.
Take extreme care when working around electrical cables.

For recessed luminaires LEDs & Control-gear, rated IC, IC-F & IC-4 to cover, follow manufactures instruction on insulation in line with NZS4246.

For all other separate insulation 200mm from recessed light fittings and other recessed electrical fittings; refer to the drawings for containment requirements around recessed electrical fittings. A minimum gap of 200mm must be left around metal heating flues and a 50mm gap is required around brick/concrete chimneys.

6.3.7 Completion

Completion
EXPOL Timber UnderFloor Insulation has been installed allowing no gaps. Check for damage and faults and repair as necessary. Leave the surrounding area clear of rubbish and any EXPOL off-cuts, remove from site.

Complete the EXPOL “UNDERFLOOR 50 YEAR PRODUCT WARRANTY” at EXPOL Underfloor Warranty.
Upload a photo of EXPOL receipt.

6.4 Pink Batts Insulation

6.4.1 Scope

Supply and install Pink® Batts® Insulation, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. No substitutions are permitted for Pink® Batts® Insulation. All aspects of this work shall be in complete accordance with Pink® Batts® technical information and installation requirements and as shown on the drawings:
https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

6.4.2 Requirements

6.4.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

6.4.2.2 Warranty - applies to BRANZ Appraised Pink® Batts® Ceiling & Wall products

Pink® Batts® Lifetime Product Warranty:

- 50 Years Warranty for BRANZ Appraised Pink® Batts® ceiling and wall products installed according to the warranty conditions.
- Provide the Pink® Batts® Lifetime Product Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of permanent installation.

6.4.2.3 Substitutions

Pink® Batts® Insulation shall be as specified herein and as indicated on the approved drawings. The substitution of Pink® Batts® branded products for alternative brands is not permitted under any circumstances.

The substitution of a specified Pink® Batts® product for an alternative Pink® Batts® branded product by the Installer (PinkFit® or other) shall only be permitted with the Contract Administrator's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative Pink® Batts® branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Installer.

6.4.3 Wall Thermal Insulation

6.4.3.1 Pink® Batts® Ultra® R2.8 Wall

Pink® Batts® Ultra® R2.8 Wall - product code 7127128. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-2.8. 90mm thick x 560mm wide x 1140mm long segments.

BRANZ Appraised for use as a thermal insulating material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings according to the conditions and limitations of BRANZ Appraisal No.238. Refer to product data - https://www.pinkbatts.co.nz/assets/Products/April-2022-changes-/Wall-Product-Sheet_April22_1075-RevF.pdf

Pink® Batts® Ultra® R2.8 Wall is licenced with Environmental Choice New Zealand: Thermal Building Insulants Licence No.2504017.

Installed as wall cavity thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

6.4.3.2 Pink® Batts® Ultra® R4.0 140mm Wall

Pink® Batts® Ultra® R4.0 140mm Wall - product code 7127140. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-4.0. 140mm thick x 560mm wide x 1140mm long segments.

BRANZ Appraised for use as a thermal insulating material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings according to the conditions and limitations of BRANZ Appraisal No.238. Refer to product data - https://www.pinkbatts.co.nz/assets/Products/April-2022-changes-/Wall-Product-Sheet_April22_1075-RevF.pdf

Pink® Batts® Ultra® R4.0 140mm Wall is licenced with Environmental Choice New Zealand: Thermal Building Insulants Licence No.2504017.

Installed as wall cavity thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

6.4.4 Ceiling Thermal Insulation

6.4.4.1 Pink® Batts® Superbatts® R7.0 Ceiling

Pink® Batts® Superbatts® R7.0 Ceiling - product code 7113170.

Glasswool insulation manufactured from over 80% recycled New Zealand glass.

Product is BRANZ Appraised, and supported by an EPD and Eco Choice certification.

275mm thick x 460mm wide x 1220mm long segments.

6.4.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with trades to install Pink® Batts® Insulation as required.

6.4.6 Workmanship

All installation work shall be carried out by registered PinkFit® installers; the preferred Pink® Batts® installers, or by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer’s requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to: https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

6.4.7 Delivery & Handling

Store the Pink® Batts® Insulation materials undercover, in a weatherproof environment, off the floor, on a flat, even surface in accordance with the manufacturer's requirements. Keep materials dry and protected from damage, moisture and contamination at all times.

For best practice, refer to Pink Batts Product and Installation Guides.
Further assistance contact 0800 746 522

Store the Pink® Batts® Insulation materials undercover, in a weatherproof environment, off the floor, on a flat, even surface in accordance with the manufacturer's requirements. Keep materials dry and protected from damage, moisture and contamination at all times.

Conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Workplace and facilities requirements

6.4.8 Installation

6.4.8.1 General

Install Pink® Batts® Insulation in accordance with NZS 4246.
All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:
https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

6.4.8.2 Pink® Batts® Wall

Install Pink® Batts® Wall Insulation in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

6.4.8.3 Pink® Batts® Ceiling - Truss/Framed Roof

Install Pink® Batts® Ceiling Insulation in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

6.4.9 Completion

Check that all specified Pink® Batts® Insulation products have been installed correctly in accordance with the manufacturer's requirements.

Check for damage and defects - replace damaged and defective insulation as necessary to the required standard.

Ensure the installed insulation will be adequately protected for durability and performance in accordance with the manufacturer's warranty requirements.

Leave all of this work complete, and in the condition required for proper performance, including for the installation of subsequent linings, in accordance with the manufacturer's warranty requirements.

Leave adjacent surfaces and finished work clean and free of damage. Remove all associated rubbish and waste material from site.

Issue to the Owner a copy of the Pink® Batts® Lifetime Product Warranty for all Pink® Batts® Insulation products installed.

7 ROOFING

7.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

7.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1397:2001(AS)	Steel sheet and strip - Hot-dip zinc-coated or aluminium/zinc-coated
1562.2:1999(AS/NZS)	Design and installation of sheet roof and wall cladding - Corrugated fibre-reinforced cement
1562.3:1996(AS/NZS)	Design and installation of sheet roof and wall cladding - Plastic
2295:2006(NZS)	Pliable, permeable building underlays
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4389:2015(AS/NZS)	Roof safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0

7.3 Rainwater Goods

7.3.1 Prefinished Steel Rainwater Goods

Standard 'half round' (or equal) profile longrun prefinished steel spouting as for the roofing with flanged downpipe droppers siliconed into the gutter to take 65mm dia. PVC downpipes. Standard external spouting brackets at approximately 600mm centres.

The downpipes shall drop directly into the stormwater drains - ensure the drains are accurately positioned.

(Any offsets and bends required in a downpipe shall be verified with the Architect/Designer before fabrication - ugly items fabricated in contravention of this must be replaced). Close off joints between downpipes and stormwater pipes with a upvc transition piece. Fix bird proof plastic 'wire' balloons to the top inlet of all downpipes.

7.4 Profiled Metal Roofing

7.4.1 Scope

7.4.1.1 Inland Moderate (ISO 9223 Category: C2)

Supply and install profiled metal rigid-sheet roofing, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the roofing manufacturer's technical literature and installation requirements, the NZ Metal Roof and Wall Cladding Code of Practice, other relevant product manufacturers' recommendations, and as shown on the drawings.

7.4.2 Requirements

7.4.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

7.4.2.2 Warranty - Roofing Material

Roofing Material Product Warranty. Warrant this work against failure of materials under normal use and environmental conditions:
- 15 Years for Perforation: according to the roofing material manufacturer/supplier warranty conditions.
- 15 Years for Coatings: according to the roofing material manufacturer's warranty conditions.
- Provide the Product Warranty on the roofing manufacturer's Standard Warranty Form.
- Commence the warranty from the date of practical completion of the contract works.

7.4.2.3 Warranty - Installation

Installation Warranty. Warrant this work under normal environmental conditions and use against waterproofing failure:
- 15 Years for Workmanship.
- Provide the Installation Warranty on the roofing installer's Standard Warranty Form.
- Commence the warranty from the date of practical completion of the contract works.

Include a copy of the roofing manufacturer's maintenance requirements with the Installation Warranty.

7.4.2.4 Wind Performance - High Wind Zone

Profiled Metal Roofing Wind Performance - Non-Specific Design Wind Zone Classification:
- NZS 3604 Wind Zone: H = High.
- Wind Speed: <44m/s.
- Ultimate Limit State: 1.16kPa.

Refer to the roofing manufacturer's technical literature for wind load design parameters.

7.4.3 Roofing Profile

Corrugated Profiled Metal Roofing. Standard corrugated profile; 18mm nominal crest height; 76mm nominal crest pitch. Manufactured from the material type, thickness and finish specified.

Minimum roof pitch: 8° (1:7).

Corrugated metal roofing shall be fixed with self-drilling screws through the profile crest in accordance with the requirements of the NZMRM Code of practice.

Sheets shall be continuous from ridge to gutter, or where a step is designed into the roof, sheets shall be continuous from ridge to step and step to gutter. Sheet ends must be stop-ended under flashings.

Installed in accordance with the requirements of the roofing manufacturer's technical literature and the NZMRM Code of Practice, to the locations and details shown on the drawings.

Installed Location:

7.4.4 Components & Accessories

7.4.4.1 Roof Insulation

Roof Insulation. Refer to separate specification section - Insulation.

7.4.4.2 Roof Underlay

Roof Underlay. Refer to separate specification section.

7.4.4.3 Plastic Cavity Battens

Plastic Cavity Battens: Cavibat Cavity Battens, or similar-approved, 45 x 18mm, polypropylene ventilating (fluted) cavity battens.
- Installed in continuous runs directly over the roofing underlay, and fixed to purlins; as detailed on the approved drawings.
- Fix to timber framing using 40 x 2.5mm hot-dipped galvanised flat head nails spaced at maximum 800mm centres.
- Fix to steel framing using Class 3, 6g x 30mm, countersunk head, self-drilling screws, spaced at maximum 800mm centres.

7.4.4.4 Profiled Foam Closure Strip

Profiled Foam Closure Strip. Non-bituminous, compressible, closed-cell foam strips profiled to fit the metal roofing profile. Installed to the details shown on the drawings and in accordance with NZMRM Code of Practice recommendations.

7.4.4.5 Sealant

Sealant. Use only neutral-curing silicone sealant that is compatible with the specified metal roofing and flashing materials and finishes, and suitable for the required application and use, in accordance with the sealant manufacturer's instructions and to the NZMRM Code of Practice recommendations. All sealed joints must be mechanically fastened, and excess sealant neatly removed to prevent

unnecessary dirt buildup. Sealant shall only be used to seal between two metal surfaces, do not fill holes or gaps with sealant.

7.4.4.6 Proprietary Collar Flashings

Proprietary Collar Flashings. EPDM or silicone-polymer proprietary flexible collar flashings for weatherproofing roof-penetrating pipes/flues/ducts. Sized to suit the applicable pipe/flue/duct and installed in strict accordance with the manufacturer's requirements and the NZMRM Code of Practice. Use only high-temperature silicone (not EPDM) collar flashings for heated flues and pipes with temperature range between 60°C - 200°C.

7.4.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate to ensure that all roof members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly installed.

Coordinate with the roof drainage system, and generally with other trades as required, to install the specified profiled metal roofing.

Ensure that each section of roof is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

7.4.6 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the requirements of the NZMRM Code of Practice, and to fully comply with all warranty requirements. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

All cutting, fixing and installation techniques, fasteners and sealants shall be exactly as recommended by the roofing manufacturer in accordance with the NZMRM Code of Practice, and with the use of suitable tools and equipment appropriate for the application.

Always maintain isolation of dissimilar materials in accordance with the NZMRM Code of Practice. Isolate dissimilar materials (metal and nonmetal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact, or allow runoff from these, with galvanised or Zincalume® materials.

7.4.7 Delivery & Handling

Upon delivery to site, inspect roofing materials and reject those items that are found to be damaged, defective or contaminated. Contact the manufacturer/supplier for replacement of rejected items at time of delivery to site.

Store profiled metal roofing, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the roofing manufacturer. Keep stored materials and accessories dry and protected from damage and contamination at all times.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the material, including surface marking. Do not used damaged or defective materials or products, or products that are beyond their designated shelf life.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Best practice guidelines for working on roofs and the General risk and workplace management - part 1.

For all work undertaken on the roof, installers shall always wear soft, clean footwear with a light-coloured sole. Do not walk on translucent/natural lighting sheet.

7.4.8 Preparation

7.4.8.1 General

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the approved drawings.

Do not commence installation until all necessary preliminary works by others is complete and to the required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.

Supporting timber structures shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content in accordance with the requirements of NZS 3603 at the time of installation.

Supporting lightweight steel framed structures shall meet the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria.

Supporting steel structures shall comply with NZS 3404.

7.4.8.2 Roof Structure Check

Roof Structure - check all aspects of preparatory works, including but not limited to:
- Check that the purlins are set-out to the required set-out and spacings, are straight and true to line

and plane, and are securely fixed.
- Check that barge and fascia boards have been installed to the correct line and plane, with all edge blocking complete and secure.
- Check that valley gutter and hidden gutter framing is to the required dimensions, with solid backing supports securely fixed, true to line and plane.
- Check that internal gutter membrane linings are properly dressed back and adhered to a solid substrate along the roof edge as shown on the drawings.
- Check that trimming for roof penetrations, and roof/wall junction blocking, and all necessary work by other trades is complete.
- Check that solid backing required for fully supported roofing is complete and securely fixed in accordance with the approved drawings.

7.4.9 Installation

7.4.9.1 Roof Underlay

Install roof underlay in accordance with the underlay manufacturer's requirements with minimum 150mm side and end laps, and lapped such that any water will be shed to the outside of the underlay.

Non self-supporting underlay must be supported by hexagonal galvanised wire mesh, safety mesh or alternative support, as specified and/or shown on the drawings, in accordance with the underlay manufacturer's recommendations.

Underlay shall be installed in a manner so that it is sufficiently tensioned without sagging, overhangs fascia boards 20mm - 25mm, and finished along roof edges, ridges, valley gutters, roof/wall junctions and at penetrations to the details shown on the drawings.

Underlayment for fully-supported roofing shall be in accordance with NZMRM Code of Practice - Sections 4.3.11 Separation, 11.4.2 Substrate, and 11.5.1 Ventilation.

7.4.9.2 Insulation

Insulation. Refer to separate specification section - Insulation.

7.4.9.3 Roofing - Corrugated/Trapezoidal Profile

Install profiled metal roofing in accordance with the NZMRM Code of Practice and as shown on the drawings, and to fully comply with all warranty requirements. As shown on the drawings, confirm any specific roofing detailing requirements prior to installation.

Accurately set-out roofing sheets exactly square to the building axis and with sheets lapped away from the prevailing wind; maintain this accurate set-out throughout installation. Check for and eliminate any creep and/or spread of sheets during installation.

Cut metal roofing and flashings by shear only – do not use abrasive cutting tools on or near the roof. Do not use black lead pencils for marking pre-finished roofing and flashings.

Prevent contact with, or run-off from, incompatible materials in accordance with the recommendations in the NZMRM Code of Practice. Observe the roofing material manufacturer’s

recommendations where flues discharge above roofs, and for the installation of solar heating panels. Protect roofing surfaces from damage at all times; replace the whole sheet where a significant depth of the material or coating has been damaged (including flashings).

Screw-fixed sheets shall be fixed with fasteners appropriate for the roofing profile and material, substrate/structure and the environment in accordance with the Roofing Industries Profile Technical Summary and the NZMRM Code of Practice recommendations (minimum Class 4).

Screw fastening placement and spacings shall be strictly in accordance with the roofing manufacturer's requirements and the NZMRM Code of Practice, to fully comply with the Wind Zone requirements, purlins spacings, etc.

Use fixing systems that will accommodate thermal expansion for long lengths and/or dark colours.

All roofing jointing techniques and sealants shall be in accordance with the roofing manufacturer's recommendations and the NZMRM Code of Practice, and shall be compatible with the roofing material and finish. Joints shall be sealed with an approved neutral-cure sealant or approved closed-cell lap tape.

Ridges, hips, barges and flashings generally, shall be in accordance with the NZMRM Code of Practice and the roofing manufacturer's requirements.

7.4.9.4 Flashings

Install flashings to roof edges, ridges, roof/wall junctions, parapets and roof penetrations as detailed on the drawings and in accordance with the NZMRM Code of Practice and the roofing manufacturer's requirements.

All flashings shall be neatly formed and finished, securely fastened to the structure, weatherproof and have falls set to avoid water ponding.

For highly visible flashings, plan each flashing joint and/or junction with specific regard to aesthetic requirements.

7.4.9.5 Penetrations

Penetrations greater than 150mm in any direction must have support framing installed around the perimeter of the penetration. Penetration flashings shall not rely solely on silicone sealant to achieve weathertightness of the flashing.

Flash pipes penetrating the roofing with a proprietary pipe collar flashing.

7.4.9.6 Cleaning

Completely clean off all drill and other swarf and pop-rivet shanks as the work proceeds (at least daily), and keep them and other rubbish out of the spoutings.

Remove associated trade debris from the roof and from the site progressively, and on completion leave the roof and rainwater system completely clean.

7.4.10 Completion

Check that the profiled metal roofing and associated components and flashings have been installed and finished correctly.

Check for defective work and materials - replace and/or repair as necessary.

Sweep down the completed roof and clean out spouting, gutters and rainwater pipes.

Leave all of this work complete and weathertight in accordance with the roofing manufacturer's requirements and the NZMRM Code of Practice, and to fully comply with all warranty requirements.

Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the roofing manufacturer's maintenance requirements on completion.

Issue to the Owner the roofing material manufacturer/supplier 'Product Warranty', and a copy of the installer's 'Installation Warranty'

7.5 Workmanship

7.5.1 Guarantees

The whole of the roof covering work shall be complete in all respects and absolutely watertight. Commencement of roofing works by any Subcontractor indicates their full agreement to and acceptance of an unwritten guarantee to maintain the whole of their work in a satisfactory and watertight condition, and to arrange and pay for any damage consequential upon the failure of their materials or workmanship, for the periods stated below, irrespective of the 90 day general maintenance period.

- Butyl roofer - ten years from completion.
- Galvanised steel roofer - two years after completion.
- Aluminium roofer - ten years after completion.
- Acrylic/f.glass roofer - ten years after completion.

7.5.2 Co-operation

Co-operate with other trades to ensure that framed roofing substrates have appropriate spacings, alignments and fixings, and to ensure that sheet roofing substrates have the correct edge and central fixings, appropriate alignments and gradients, edge priming if necessary, and are completely clean.

Ensure that each section is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

7.5.3 Alternatives

Tenderers are invited to submit a price variation for similar roofing products. Consideration of finished roofs in the alternative product and the extent that drawings will need to be modified to incorporate it will be the main items in the decision on the alternative proposed.

8 INTERNAL DOORS & JOINERY

8.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

8.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1491:1996(AS/NZS)	Finger jointed structural timber
1859.1:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 1: Particleboard
2208:1996(AS/NZS)	Safety glazing materials in buildings
2924.1:1998(AS/NZS)	High pressure decorative laminates - Sheets made from thermosetting resins - Classification and specifications
3601:1987(NZS/BS)	Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes
3602:2003(NZS)	Timber and wood-based products for use in building
3610:1979(NZS)	Specification for profiles of mouldings and joinery
3619:1979(NZS)	Specification for timber windows
3631:1988(NZS)	New Zealand timber grading rules

8.3 Workmanship

8.3.1 Workmanship

All work shall be carried out by or under the direct supervision of competent and experienced joiners in accordance with recognised good trade practice, and shall be carried out in a properly established workshop complete with all mechanical equipment appropriate for the work. All work shall be in strict accordance with the drawings.

Confer with the Main Contractor to check openings sizes, fittings limiting dimensions and available access dimensions (and make provision for site assembly if appropriate). Additional dimensions will be supplied by the Architect/Designer if required.

All items assembled by appropriate joints customarily employed in good quality work. Joints shall be accurately cut, fitted and full surface glued and shall be tongued, mortice and tenon, doweled or housed in preference to scarfed or mitred. Use screws in preference to nails or brads. Install glue blocks in appropriate locations. Unavoidable screw pockets matching buttoned in clear finished work.

Fine machine sand all visible surfaces and handsand finish to a clean, even surface all clear finished cabinets. Lightly sand arris all projecting edges.

All veneers shall be A grade, completely free of bark pockets, checks, gum streaks, resin pockets, stains, knots (of any size), or pith. Adjacent veneers and boards in clear finished work shall be carefully selected to provide good continuity of colour and grain pattern; this particularly applies to clashing strips on veneered MDF which shall be 2mm thickness solids.

The following are unacceptable defects and will most likely result in rejection of cabinets specified for clear finishing:
a) Scratches, bruises, machine or hammer marks on exposed surfaces;
b) Glue stains on clear finish specified work;
c) Iron-on veneers;
d) Corrugated fasteners and machine staples;
e) Baseboard showing through veneers through excessive sanding (to remove marks presumably).

8.3.2 Delivery

Brace and / or crate all items as required to prevent distortion or disfigurement during transit. Arrange for delivery to site, not during inclement weather. Attend upon the carpenter to identify items and instruct in assembly procedures.

9 PAINTING & DECORATING

9.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

9.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2017(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards

9.3 General

9.3.1 Co-operation

Co-operate with all trades and attend upon Concretor, Joiner, Carpenter, etc. to ensure that the surfaces provided by these trades are completely suitable for the Painter works that are required.

9.3.2 Preparation

No painting or varnishing or other surface coating work shall be undertaken unless the surfaces to be coated are in a correct and proper condition to ensure first class results.

Inspect the works of other trades on which Painter work is scheduled and report to the Main Contractor and the Architect/Designer any defects or irregularities that would affect the permanency or finish of the painting work, and do not proceed until the defects or irregularities have been completely rectified. Failure to examine and report will be construed as an acceptance that all preparatory works are completely satisfactory.

This clause does not relieve the Painter of any of the usual preparatory work to surfaces customarily performed by this trade.

Clean down all surfaces with sugar soap, strippers, mould killers, etching agents, etc. as required. Sand or rub all sharp edges off exterior timbers and other materials as appropriate before painting. Finish rub down ALL surfaces. Ensure that the moisture content of all substrates is appropriate. Remove locks, fastenings, and similar hardware before painting and refix on completion. Remove all electrical switch and power plates before painting and refix them on completion. Mask adjacent surfaces as required to a true line and remove the masking on completion. Dust and wipe down all surfaces for Painter work and completely remove all dust, rubbish, dirt etc. from areas involved immediately prior to commencement. To each area of the works complete all surface preparation before applying paint to any surface.

9.3.3 Protection

Take adequate precautions to prevent paint spots falling on prefinished or similar surfaces, and extreme care to keep absorbent materials (e.g. cedar, sawn framing, decking, paving) completely clean during all adjacent painting work. Correction of any such disfigurement shall be to the Architect/Designer's approval.

9.3.4 Qualifications

The Painting Subcontractor must be a member of the Master Painters Association. All work shall be of the highest reasonable standard, and executed by experienced and competent tradesmen to the Architect/Designer's approval.

9.3.5 Workmanship

Strictly adhere to all Manufacturers' instructions.

Strictly observe Manufacturers' requirements with regard to surface and air temperatures for painting. No work shall be carried out on surfaces that are not completely dry, and no external work shall be carried out during damp or wet conditions.

In all finishes any irregularities or brushmarks or dust etc. in each preceding coat shall be rubbed down to provide a smooth clean surface for the following coat. Each coat shall be finished over all surfaces before a further coat is applied, and each coat shall be completely dry before subsequent coats. Finish broad areas before painting trim, paint ceilings before walls and walls before joinery, trim and other items.

Each coat and the full completed system shall be of uniform finish, colour, texture and sheen, shall have proper covering of thin edges, corners, end grain etc. and shall be free of blemishes such as runs, sags, fat edges, entrained hairs, brush marks, starved patches etc.

9.3.6 General

The schedules indicate the general extent of the works to be carried out but are in no way exhaustive in their description of the actual items for painter work. Complete all work necessary for the proper and entire completion of the works. All items and portions of items reasonably inferable but not specifically mentioned are deemed included, i.e. cupboard interiors, the top and bottom of doors, unseen cabinetry tops, etc. All doors shall have equal painter work on ALL surfaces.

Where timber work is specified for priming before fixing the priming shall be thoroughly brushed in to all surfaces, and all exterior timber work for paint finishing shall be fully primed within one week of fixing. Should more than one month elapse between priming and undercoating the timber shall be fully reprimed.

Stopping up work shall be carried out immediately the priming or sealing coat is dry, and shall be solidly placed to finish clean and dry. Stopping tinted to match the timber for clear finished work.

Paint putties within one month of glazing timber frames; paint to impinge on glass to assist sealing.

9.3.7 Materials

All Painter materials shall be ready mixed and delivered in unopened containers. Materials shall be used only for the purpose and in the manner intended by the manufacturer; any apparent scheduled discrepancy in this respect shall be referred to the Architect/Designer immediately for clarification.

Where surfaces are specified to be finished in a particular manner or material, all preparatory work, priming, or undercoating, that is necessary to ensure a proper finish shall be provided, irrespective of any apparent omission herein.

Thinning shall only be to manufacturer's specification. Thoroughly stir as required to lift any settled pigment and ensure the paint is homogeneous. Paints shall be factory or shop tinted to the colour required. Undercoats shall be fully tinted to match the final colour scheduled. All paints shall have the finished film thickness that is specified by the manufacturer (checked by monitoring the coverage per litre).

9.3.8 Completion

Allow to touch up to approval any Painter work which is damaged during the finishing works of other trades. Replace all hardware, remove all masking, covers, containers etc., thoroughly clean all affected surfaces, and leave all spaces ready for immediate occupation. Avoid scratching or abrading glass or hardware during any cleaning.

10 PLUMBING

10.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

10.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1477:2017(AS|NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1596:2014(AS/NZS)	The storage and handling of LP Gas
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3000:2018(AS|NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3500.1:2015(AS|NZS)	Plumbing and drainage - Part 1: Water services
3500.1:2018(AS|NZS)	Plumbing and drainage Part 1: Water services
3500.1:2021(AS/NZS)	Plumbing and drainage, Part 1: Water services
3500.2:2015(AS|NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.2:2021 (AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021(AS|NZS)	Plumbing and drainage, Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
3500.3:2021(AS|NZS)	Plumbing and drainage, Part 3: Stormwater drainage
3500.4:2015(AS|NZS)	Plumbing and drainage - Part 4: Heated water services
3500.4:2018(AS|NZS)	Plumbing and drainage Part 4: Heated water services

3500.4:2021(AS|NZS)	Plumbing and drainage, Part 4: Heated water services
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation
4020:2018(AS|NZS)	Testing of products for use in contact with drinking water
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
4606.1:1989(NZS)	Storage water heaters - General requirements
4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems
4613:1986(NZS)	Domestic solar water heaters
4614:1986(NZS)	Installation of domestic solar water heating systems
4617:1989(NZS)	Tempering (3-port mixing) valves
4692.1:2005(AS/NZS)	Electric water heaters - Energy consumption, performance and general requirements
5601.1:2013(AS|NZS)	Gas installations - Part 1: General installations
7602:1977(NZS)	Specification for polyethylene pipe (Type 5) for cold water services
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
7646:1978(NZS)	Specification for polyethylene pipes and fittings for gas reticulation
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC B2/AS1	Durability
NZBC G11	Gas as an Energy Source
NZBC G12	Water Supplies
NZBC G13/AS1	Sanitary Plumbing

10.3 General

Carry out all works necessary to leave the water, waste, vent and soil systems serving the sanitary fittings and the plumbing hardware shown on the drawings or specified below in correct working order complete with all ancillary systems (safetrays, floor drains, overflows, relief valves, etc.) required, and with all normal incidentals customarily installed by this trade.

Comply with the Building Code, Territorial Authority By-laws and statutory authority Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange for all tests and pay all fees and customary charges in connection with the required works.

10.4 Materials

10.4.1 Materials

Materials shall be delivered with packaging and labeling intact. Incidentals (jointing compounds, PTFE tape, seals, washers, silfos, solvent cements, etc.) shall be completely appropriate for the application involved. The use of imperfect items or items damaged in any way is always subject to approval.

10.4.2 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

10.4.3 Materials Separation

Separate dissimilar metals in any circumstances which could produce contact or electrolytic action by a water film, with thick plastic tape, bituminous felt or other inert material. Pipes in contact with or built into concrete or masonry shall be fully spiral wrapped in Denso tape or equal.

10.5 Systems

10.5.1 Wastes & Vents

All traps sized to AS 3500.2. Wastes and vents all uPVC. Wastes shall be to AS 3500.2 falls as a minimum. Vents shall be generally as indicated, but avoid where permissible in compliance with AS 3500.2, or shall be combined above the flood level of the fittings.

Fit bird proof domes to all vents.

10.5.2 Cold Water System

10.5.2.1 Supply From Existing Toby

All cold water supply pipework shall be medium/high-density polyethylene (MDPE/HDPE), arranged and fixed so that all joints are in a fully ‘relaxed' condition, without any stress or tension.
Lay on a 20mm main from the existing toby along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, protection, backfilling, signal strip etc. to comply with all Supply Authority requirements). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessibly positioned cleanable in-line sediment and dirt filter.
Primary distribution from the water filter shall be in 20mm piping, reducing to 15mm for the final feed to individual items. Install conveniently located isolating valves to turn off each group of fittings, and install a small isolating valve alongside each toilet cistern not integrally fitted with one. (Note that these isolating valves and the hosecocks are not covered by the Plumbing Hardware Prime Cost Sum).

10.5.3 Hot Water System

10.5.3.1 Gas Instant Hot Water Device

Supply the gas instant hot water device complete with a wall recess box as noted on the drawings and install it where shown on the plan and elevation.
Install pressure relief valves, cold water expansion valves, flow control valves, pressure limit valves, and non-return/isolating valves as required to leave the hot water systems in full design operational order.
Install a tempering valve to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 50°C.
Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.
Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the showers temperature and pressure remain as even as possible.

10.5.4 Gas Fitting

Is included in the Plumbing trade, although all work must be carried by Registered Gasfitters, and be in complete accordance with all relevant Regulations and standards and be in full accordance with best trade practice.

Obtain all necessary permits and pay all fees. If necessary obtain a Dangerous Goods Licence for the storage installation in the name of the Owner; and if the Owner's signature is required forward all relevant papers to the Architect/Designer.

Supply two 45kg (1220 x 380mm diameter) LPG storage cylinders and install them in the position shown on the drawings. Installation to allow straightforward switchover to the second cylinder.

Test the full systems to all relevant requirements; if any faults are discovered rectify them and then re-test the full system.

Check that all necessary flues comply in all respects with the regulations and the item manufacturer’s requirements.

10.6 Workmanship

10.6.1 Co-operation

Co-operate with all other trades. Attend upon Concretor, Drainlayer and Carpenter to set out the exact positions of pipe runs before adjacent work is put in hand, and to ensure that all pipes, sleeves, fixings, flashings etc. are correctly incorporated into the structure as construction proceeds.

10.6.2 Workmanship

All plumbing work shall be carried out by, or under the direct control of, properly qualified tradesmen, and shall be to recognised high standards.

Observe best local trade practice to avoid problems which arise from freezing winter conditions.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

Weatherseal wherever pipes, screws, bolts or other fastenings penetrate an external surface, and particularly roofing; seal with gaskets, flashings (and overflashings if necessary) or mastic as appropriate - any damage that results from failure of such seals will be made good at the Plumber's expense.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Plumber's expense.

10.6.3 Pipework

Joints between pipes of different materials shall always be to the approval of the TA Plumbing Inspector.

Pipework set-out neatly with a minimum number of bends, and more or less parallel to and at right angles to structural elements - avoid diagonal piping.

All internal pipework shall be concealed except where otherwise is either shown or approved. Exposed pipework shall be accurately and neatly run. Arrange all pipework (and particularly traps) in a manner which will allow maximum future accessibility for repairs or maintenance. Arrange for access panels to any primary maintenance positions, and install conveniently located isolating valves for each group of fittings. Wingbacks securely and squarely fixed. Crox unions usually acceptable only at the final connection to fittings. Install white plastic flanges where pipes penetrate linings in visible locations.

Where pipes are covered with nail fixed linings and trim ensure that their positions are marked on the linings to minimise the risk of subsequent nailings penetrating the pipe. Any such damage shall be rectified immediately, with all consequential damage made good.

Set pipework out in straight runs to even gradients. Fix all pipes to the structure sufficiently to fully support and to prevent sagging or vibration. Clips and saddles shall be the same material as the pipe. Exterior pipes on stand-off brackets. Fixings to the exterior or damp locations shall all be hot dip galvanized unless otherwise noted. Sleeves for pipes or drains penetrating concrete or masonry shall be uPVC, 20mm minimum larger internal diameter than the external diameter of the pipe, finished flush with concrete or masonry, and packed and mastic sealed.

Close open ends of the systems during construction to prevent the entry of foreign matter.

10.6.4 Temperature Movement

All work shall respect in full all probable thermal movements - layouts, fixings and jointings shall be arranged to allow thermal movement without risk of prejudice to watertight conditions, or risk of damage from straining of the pipes which will generate failures.
In particular, observe best local trade practice to avoid problems arising from freezing conditions.

10.6.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

10.6.6 Testing

All plumbing services shall be completed in stages which will allow for proper testing under normal working pressures prior to the application of insulation, concealment or other enclosure. Testing of piped water services shall be by hydrostatic testing in accordance with AS/NZS 3500.1 and shall not show any leakage when subjected to a hydrostatic pressure of 1500kPa for a period of not less than 30 minutes. All leaks remedied and retested. On completion the whole of the plumbing services to be subjected to full operational tests in the presence of the plumbing inspector, with any defects revealed in these tests properly remedied.

10.6.7 Warranties

Warranty cards and manufacturer's guarantees for all items supplied and installed by this trade shall be correctly filled in and handed over at Practical Completion.

10.7 Rinnai Hot Water Systems

10.7.1 Scope

Supply, install and commission the selected Rinnai Water Heaters to the locations shown on the drawings, complete with all necessary fittings and accessories for proper operation and functionality. All aspects of this work shall be in strict accordance with Rinnai technical literature and installation requirements (check www.Rinnai.co.nz, info@rinnai.co.nz or call 0800 RINNAI (0800 746 624) for the latest editions), other relevant product manufacturers' recommendations, with all relevant Standards, Regulations and Acts, and the Plumbing specification, and as shown on the drawings.

No substitutions are permitted for Rinnai Hot Water Systems.

10.7.2 Rinnai Enviroflo™ GR Series Hot Water Heat Pump

Rinnai Enviroflo™ GR Series Hot Water Heat Pump – 215L
EHPG215VM
Storage Capacity 215L
Hot water recovery rate 66 L/h
COP 4.0W/W
Cylinder element rating 2.4 kW
Dimensions Assembled: 275L – height 1875 mm, Ø640 mm

10.7.3 Workmanship

Workmanship
Rinnai Domestic Electric Water Heater installation shall be carried out by experienced tradesmen, familiar with the specified products and installation techniques, under the direct supervision of a NZ certified Registered Plumber, in accordance with the manufacturer's instructions and with the

requirements of AS/NZS 3500.4, AS/NZS 3000, NZBC G12, and with all local codes and regulatory authority requirements.

Electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

Adequately protect all surrounding work surfaces during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Plumber's expense.

10.7.4 Delivery & Handling

Delivery & Handling
Store Rinnai Hot Water Systems and accessories under cover on a flat surface in accordance with the manufacturer's recommendations. Keep products clean and dry, and protect from damage and contamination. Do not use damaged or defective products. Handle Rinnai products in accordance with the manufacturer's recommendations.

Do not tilt more than 45degs from vertical any heat pump hot water systems.

10.7.5 Installation

Rinnai Hot Water System – Heat Pump Hot Water Systems
Install the selected Rinnai Hot Water Systems, complete with accessories, to the locations shown on the drawings in accordance with the Rinnai Installation Instructions and complying with the New Zealand Building Code.

Do not tilt more than 45degs from vertical any heat pump hot water systems.

Ensure that the required clearances are provided for the servicing and removal of the water heater and accessories, and that the water heater information label / rating plate and thermostat can be viewed and read when installed.
Ensure that the pipework is correctly sized and that a non-return valve is installed on the cold water line to the water heater. Provide a 50mm minimum clear opening around pipes and fittings connected to the water heater that pass through the support platform or floor.
Where required, install a safe tray below the water heater to prevent water damage to the building or property in the event of a leak.
Install a suitable moisture barrier under indoor water heaters installed on a concrete surface that is not fully cured or prone to dampness.
Ensure that the water heater sacrificial anode, if fitted, is the correct anode type.
Seismically restrain water heaters in accordance with NZBC G12/AS1 6.11.4, or Section 203 of NZS 4603, or with the specific design shown on the drawings.

Connect Rinnai water heaters to the mains pressure hot and cold-water system, with all necessary safety devices, valves, fittings and accessories, to achieve the required operation performance and functionality.
Install relief valve drains to expansion control valves and pressure relief valves in accordance with NZBC G12/AS1 or AS/NZS 3500.4, and follow all requirements when water heaters are located where freezing is likely.

Electrical connections to water heaters must be made in complete accordance with AS/NZS 3000 and the Rinnai Installation Instructions. A 20mm flexible conduit is required for the electrical cable to the water heater. The power supply to the water heater must not be switched on until the water heater is filled and a satisfactory megger reading is obtained.

Commission Rinnai Hot Water Systems in accordance with the manufacturer's instructions.

10.7.6 Completion

Completion
Rinnai Hot Water System - Cylinders
Check that the Rinnai Hot Water Systems have been installed correctly and have been commissioned and are operating at the required performance and functionality. Check that pipework connections are leak free. Check that the water heaters are properly restrained against earthquake forces.
Check for damage, defects, faults and leaks and replace/repair as necessary.
Leave the works area clean and free of rubbish. Remove rubbish and waste material from the site.

Issue to the Owner a copy of the Rinnai Domestic Electric Water Heater maintenance requirements and a copy of the Rinnai Warranty for the installed water heaters.

Issue all As-Built Documentation required to the relevant parties.

11 DRAINAGE

11.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

11.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1547:2012(AS/NZS)	On-site domestic wastewater management
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.0:2003(AS/NZS)	Plumbing and drainage - Glossary of terms
3500.2:2018(AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021 (AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
NZBC G13/AS2	Foul Water Drainage

11.3 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals.

Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

11.4 Stormwater Drainage

11.4.1 Scope

Supply, install, test and commission new, gravity-flow stormwater drains on the site, to the locations, layout and details shown on the drawings, complete with all necessary components and accessories required for the satisfactory completion and performance of the stormwater system. All aspects of this works shall comply with the requirements of the NZ Building Code, related compliance Standards, Regulations and Acts, and to the requirements of the Territorial Authority, and as specified herein and

on the design drawings and schedules. Ancillary work and/or services not specifically mentioned but necessary to complete the installation shall be deemed included.

Install stormwater drains in natural ground, beneath and/or external to the building, for the distances indicated on the drawings. Allow for all inspection openings, bends, branches, manholes, inspection chambers, etc., as required and indicated on the drawings. Unless shown otherwise on the drawings, the stormwater drains shall be connected to the roof and surface stormwater installations, and discharge to the stormwater network.

The stormwater drainage plans are diagrammatic only. Allow for all necessary inspection fittings, cleaning eyes, and traps in accordance with AS/NZS 3500.3 and to comply with the New Zealand Building Code, and as required by the Territorial Authority. Refer to the drawings for the dimensioned locations of roof drainage system rainwater pipes and outlets, and surface drainage outlets, etc.

11.4.2 Requirements

11.4.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

11.4.2.2 Compliance

Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the stormwater drainage works.

The Drain Layer shall be deemed to have allowed for all work associated with the safe and orderly execution of the stormwater drainage work, including complying with all Territorial Authority requirements, Building Consent, Building Act, Health and Safety requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the work.

11.4.2.3 Work on Public Property

Excavation and reinstatement of public property shall comply with the requirements of the relevant controlling authorities.

Obtain all necessary approvals and permits from the controlling authorities before commencing work on public property.

Arrange and pay for any excavation and reinstatement inspections of public property required by the controlling authorities.

Before commencing any excavation in or reinstatement work to public footpaths, driveway crossings, roads or other public property, make all necessary enquiries to the relevant controlling authority for their standards for excavation and reinstatement.

Provide at all times, adequate safeguards to the public in respect of temporary fences, signals, signs and lights. Where traffic signs are necessary, these shall be provided and operated in accordance with the Regulatory Authority or NZ Transport Agency (NZTA) guidelines, as applicable, but erected only with the prior written approval of the Regulatory Authority or NZTA and the Contract Administrator.

Where a Traffic Management Plan (TMP) is required, prepare, operate and update this plan as necessary throughout the duration of the works. The TMP shall conform to the requirements of the Regulatory Authority or NZTA, as applicable. Obtain TMP prior-approvals, and maintain the TMP for the entire construction duration.

Remove dirt and contamination deposited on public property to the satisfaction of the controlling authorities.

11.4.2.4 Notifiable Work

Notify WorkSafe NZ of work that is notifiable (particular hazardous work) under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

11.4.2.5 Explosives

The use of explosives is NOT permitted.

11.4.2.6 Inspections

Inspections of stormwater drainage works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Obtain and pay all fees for any required inspections which are additional to the Building Consent.

11.4.2.7 Testing

Carry out all necessary testing of the stormwater drainage installations, and demonstrate to the Contract Administrator and the Territorial Authority that the installations are watertight and comply with the requirements of the New Zealand Building Code, related compliance Standards, and the design documents.

11.4.2.8 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades as necessary to install stormwater drains to the required locations and layout.

11.4.2.9 Workmanship

Stormwater drainage work shall be carried out by qualified and experienced tradespersons, familiar with all required installation requirements, under the direct supervision of a NZ certified Registered Drain Layer, in accordance with AS/NZS 3500.3 and to comply with the New Zealand Building Code, and all local codes and regulatory authority requirements, and the conditions of the Building Consent.

All pipe cutting, jointing, and supporting techniques shall be exactly as recommended by the pipe manufacturer. Pipes, fittings and accessories shall be handled and installed in such a manner that prevents any damage to the component.

All work shall be such as to leave a neat, efficient, robust and watertight installation.

Carry out all necessary inspections and tests during installation to ensure compliance with the design specifications and regulatory requirements. Provide test result sheets to the Contract Administrator to show compliance has been achieved.

Take all necessary precautions during installation to protect the stormwater drainage system from damage, and to prevent the entry of:
- soil, sand, or rock;
- sewage, including the contents of any septic tank, or trade waste; or
- any other substance that could damage or impede the operation of the stormwater drainage network.

Ensure that any installed drain is adequately protected from any damage and excessive loading during the remaining construction period.

Protect adjacent finished work and surfaces from damage and contamination during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Drain Layer's expense.

Any associated electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

11.4.2.10 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. All rejected stormwater drainage materials and work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional expense to the Principal.

11.4.2.11 Delivery & Handling

Store stormwater drain pipes and accessories undercover, out of direct sunlight, clear of the ground, on an even surface, and protected from damage and contamination in accordance with the manufacturer's requirements. Keep pipes and accessories out of direct sunlight and protected from damage and contamination at all times.

Store loose PVC-U pipes on evenly spaced bearers at maximum 1.0m centres, with pipe sockets alternated so the the sockets do not bear on each other, and with side supports if pipes are stacked more than two layers high. When loose PVC-U pipes are stacked in a pyramid, the maximum stack height shall be 1.0m and the bottom pipes shall be chocked.

Do not used damaged or faulty materials or products, or products that are beyond their designated shelf life. Do not use PVC-U materials that have been exposed to or stored in direct sunlight longer than the period specified by the manufacturer.

Handle all products and materials in accordance with the manufacturer's requirements, and in a manner that prevents damage or deterioration of the material/product.

Installers shall be familiar with and comply with manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

11.4.2.12 As-Built Drawings

On completion and before application for Code Compliance Certificate, prepare As-Built Drawings of the stormwater drainage system, that accurately record the new and/or modified stormwater drainage installation.

Information shall include, but not limited to, type, class and size of all pipes, the location, grade and direction of flow of all pipes, the location of all bends, changes in direction, cleaning access positions, manholes, and all dimensions, levels, inverts, etc.

Submit prepared as-built drawings to the Contract Administrator for review. Issue as-built drawings in accordance with the Contract Administrator's instruction, and in the required format.

11.4.3 Materials

11.4.3.1 General

Supply and deliver to the site all pipes, junctions, precast manholes, granular bedding material and other materials required for the satisfactory completion of the stormwater drainage works. All drainlaying materials shall be fit for purpose, new and free from damage and defects.

11.4.3.2 PVC-U Pipes & Fittings

PVC-U stormwater drain pipes and fittings for non-pressure applications shall comply with AS/NZS 1254: 'PVC-U pipes and fittings for stormwater and surface water applications'. Installed in accordance with AS/NZS 3500.3 and AS/NZS 2032 or AS/NZS 2566.2

Pipe Classification:
Class SN4-SN6 - Rubber Ring Joint or Solvent Welded Joint. For domestic and residential applications,

and low load areas.
Class SN8-SN10 - Rubber Ring Joint or Solvent Welded Joint. For commercial and industrial applications, and medium load areas.
Class SN16 - Rubber Ring Joint or Solvent Welded Joint. For heavy traffic load areas.

11.4.3.3 Concrete

Cast insitu concrete used for stormwater drainage installation shall be 20 MPa Normal Concrete complying with NZS 3104. Where specified, used as bedding, capping and surround concrete, and for any cast-insitu concrete elements (to NZS 3104 unless specified otherwise).

11.4.3.4 Bedding & Surround Material

Except where specified otherwise, bedding (underlay, side support, overlay) material for PVC-U pipes shall be GAP 7 - General All Passing 7mm - clean, granular, non-cohesive crushed rock or gravel screenings, that is free from organic material and clay, with a moisture content appropriate to the degree of compaction required. If the bedding material is contaminated or an excessive amount of oversized particles are present, the bedding material shall be rejected and not used.

11.4.3.5 Backfill Material

Except where specified otherwise, backfill material above the pipe embedment layer (150mm above the top of pipe) shall be selected ordinary excavated material that is free from any builder's waste, any organic material, any rocks or hard matter larger than 20mm, and any soil lumps larger than 75mm.

Except where specified otherwise, pipes beneath private roadways and where subject to vehicular traffic - all backfill from the top of the embedment layer (150mm above top of pipe) to the underside of the pavement layer shall be GAP 65 - General All Passing 65mm.

Mechanically compact backfill material in layers not exceeding 300mm to a relative compaction no less than 95% of the NZ Standard Compaction.

Trenches in public footpaths and roads shall be backfilled in accordance with the requirements of the controlling authority.

11.4.4 Trench Excavation

11.4.4.1 Clearing of Surfaces

Where trenches are to be excavated in a grassed area, garden or a berm, the topsoil shall be stripped from the area of the excavation and stockpiled separately adjacent to the trench for use in reinstating the surface.

Where trenches are to be excavated in existing concrete or asphalt paved areas, the paving shall be cut to neat, straight lines, parallel to the trench prior to excavation, with a nominal 100mm trimming allowance either side of the excavation width. The excavation shall be carried out with minimal damage to the existing paved surface.

Where trenches are to be excavated in existing segmental paved areas, the pavers shall be removed by hand, cleaned and set aside for later reinstatement.

Subsequent trench backfill shall be adequately compacted to avoid subsidence of reinstated surfaces.

11.4.4.2 Excavation

Locate all existing buried services before commencing excavation work in any area.

Excavations for trenches and pits shall be properly executed and supported in accordance with the requirements of AS/NZS 3500.3.

Carry out excavation work to comply with all relevant health and safety regulations and guidelines, including the 'Excavation Safety - Good Practice Guidelines'.

Unless specified otherwise, the excavation of trenches shall be taken out by open cut to the levels and grades shown or implied on the drawings. Excavate trenches to the depths which will provide for the appropriate type of bedding.

Trench excavations shall be of sufficient width to allow all operations necessary for the jointing of pipes and placing of the specified backfill. The bottom width of the trenches shall at least the combined measurement of the outside diameter of the pipe plus 200mm - with a minimum clearance of 100mm on each side of the drain barrel. The trench width at the top of the pipe shall not exceed the outside diameter of the pipe plus 600mm unless the pipe in the trench is covered with concrete. The trench above the top of the pipe may be cut wider, either by excavating a wider bench or by battering the trench wall.

Where a trench has been excavated deeper than required without authorisation, the excess depth shall be filled either with bedding material compacted to achieve a density as near to the original soil density as possible, or with concrete.

11.4.4.3 Shoring

Make all necessary provisions for shoring trench walls to comply with all regulations and for health and safety measures.

Trench shoring materials and equipment must be suitable for the purpose for which they are to be used, of sound quality, and adequate in strength for the particular use.

Shoring shall be placed by experienced operators under competent supervision, and shall not be altered, dismantled, or interfered with except on the instruction of the authorised supervisor.

Ensure no voids are left in the backfill when shoring is removed, and the required compaction density of the backfill is achieved.

11.4.4.4 Dewatering

Take all necessary precautions to keep trenches and pits free from water. Provide all necessary pumps, drainage pipes and other equipments required for dewatering. Install all necessary filtering and detention measures required by the Territorial Authority.

If the bottom of the trench is likely to be adversely affected by rain, remove the final 80mm of excavation as a separate operation immediately before placing the bedding material.

11.4.5 Pipe Laying

11.4.5.1 Bedding Pipes

Provide a minimum 75mm thick underlay layer of well compacted bedding material for all pipes. A chase shall be excavated in the bedding to accommodate any jointing socket or fitting in the drain. The pipe embedment material shall be laid and compacted so that the pipe is evenly and continuously supported along its length on either side of the pipe, and with an overlay layer minimum 150mm thick.

When trench support systems are used, the bedding material shall be placed and compacted in a manner so that no loss of compaction results from removal of the trench side support systems. The trench support shall be removed in such a way as to ensure that the placing and compaction of the bedding material occurs below the trench supports and directly against the undisturbed ground of the trench walls.

After completion of the jointing and inspection of drain pipes, place and compact the bedding surround material around the pipe to the required depth over the pipe. The material shall be carefully placed around and over the pipe using hand tamping and in a manner that ensures the pipe is uniformly supported all round its perimeter and without voids. Take care during placement and compaction to ensure the pipe is not displaced or damaged.

11.4.5.2 Laying Pipes

Install stormwater drains in accordance with AS/NZS 3500.3 to the layout, levels and grades shown on the drawings. Drain pipes shall be laid to provide maximum falls, in straight lines and at an even grade, without obstruction to flow, and with full allowance for bedding.

Before installing the pipes, check the bore of each pipe is free from foreign matter and that the pipe exterior and the socket have not been damaged in handling or storage. All pipelines shall be kept clean and free of dirt and debris at all times during installation, testing and commissioning.

PVC-U stormwater drain pipes shall be properly jointed (rubber ring joint or solvent welded joint) to produce a watertight seal in accordance with the manufacturer's instructions.

Start laying main drains at the point of outfall and insert junctions for branch drains as the work proceeds. Pipes shall be laid with the least number of bends, in the centre of the trench, in straight lines between bends, and to the grades and locations shown on the drawings.

Install all necessary fittings, including inspection openings, bends and junctions, to the locations shown on the drawings and in accordance with the manufacturer's instructions. Where not specified on the drawings or schedules, fittings for inspection openings, bends, and junctions shall be selected from the PVC-U pipe system range of products and installed in accordance with the manufacturer's instructions.

Other than precautions against damage by displacement or floating pipes, no bedding surround material or backfill shall be placed until the laying of the drain has been inspected by the Territorial Authority.

11.4.5.3 Steep Gradients

Where the gradient of a stormwater drain pipe exceeds 1:5 (20%), anchor blocks shall be installed at the bend or junction at the top and bottom of the inclined drain, and at intervals not exceeding 3m. Anchor blocks shall be constructed in accordance with AS/NZS 3500.3: Section 7.9.

11.4.5.4 Underground Drains Near & Under Buildings

Protect underground drains near and under buildings against damage in accordance with AS/NZS 3500.3 where the minimum cover specified cannot be provided.

11.4.5.5 Jointing - Rubber Ring Joints

PVC-U drain pipes shall be jointed using rubber ring seals in preference to the solvent welded method - which shall be used where rubber ring jointed fittings are not manufactured. Only use seals and lubricants recommended by the pipe or fitting manufacturer. The marking of pipes by scoring is not permitted. All joints shall be watertight and prevent the infiltration of groundwater and the intrusion of tree roots.

Rubber ring joints shall be assembled in accordance with the pipe manufacturer's instructions and generally as follows:
- Ensure that all components are clean and free of dirt and debris during all stages of the jointing process;
- Ensure the pipe spigot is correctly chamfered and has a clearly visible witness mark to the correct insertion length;
- Clean and generously lubricate with jointing lubricant, especially the chamfer. Do not lubricate the ring groove;
- Where elastomeric seals are required to be fitted, clean and fit the seal, and check the elastomeric seal sits evenly in the housing;
- Apply the manufacturer’s specified lubricant to the end of the spigot and chamfer of the pipe;
- Keep the elastomeric seal and its housing free of lubricant, unless otherwise recommended by the manufacturer;
- Align the pipes so there is no deflection at the joint, then insert the spigot in the socket and push home to the witness mark;
- Hold the socket end firmly during the jointing to prevent previously assembled joints from moving;
- If excessive force is required and/or the jointing process does not comply with the manufacturer's instructions, disassemble and remake the joint.

Field cutting pipes:
- cut the spigot end square and remove all burrs;
- chamfer the cut end of the pipe with a taper of 15° to approx. half the wall thickness, or as specified by the pipe manufacturer;
- as appropriate, witness mark the pipe at the specified insert by the manufacturer.

11.4.5.6 Jointing - Solvent Welded Joints

Solvent welded joints shall be used for jointing PVC-U pipes and fittings where rubber-ring jointed fittings are not manufactured. Use only cleaner primers and solvent cements specified by the manufacturer for the application and socket type. Only sockets complying with the relevant Standard shall be installed. Do not use cleaner primers or solvent cements if the 'use by' date has expired. The marking of pipes by scoring is not permitted. All joints shall be watertight and prevent the infiltration of groundwater and the intrusion of tree roots.

Solvent welded joints shall be assembled in accordance with the manufacturer's instructions and generally as follows:
- Solvent welding shall only be carried out in dry conditions above 5°C.
- Ensure the components are dry, clean and free of dust, dirt, grease and surface contaminants during all stages of the jointing process.
- Prior to welding, the components shall be assembled dry and checked for position and alignment to ensure accurate re-assembly in the correct position.
- Mark the spigot with a witness mark (pencil, not scored) at a distance equivalent to the internal depth of the socket.
- Dry the spigot end, up to the witness mark, and the socket interior, then clean and degrease with a clean cloth moistened with the pipe or fitting manufacturer’s specified priming fluid.
- Apply an even coating of solvent cement to the internal surface of the socket for the full engagement length, and to the external section of the spigot up to the witness mark.
- Only use the minimum amount of solvent cement in the socket necessary for a fully solvent-welded joint.
- Insert the spigot close to, but not beyond, the witness mark. Do not use excessive force. Firmly restrain the joint for the minimum period recommended by the pipe manufacturer.
- Wipe off excess solvent cement from the outside of the joint, and where possible from the inside.
- Adhere to the manufacturer's specified procedures and time frames for filling and testing pipework.
- Allow all solvent welded joints to fully cure before subjecting pipework to any imposed load or testing.

11.4.5.7 Pipe Cover

Unless specified otherwise on the drawings, the minimum pipe cover (finished surface to top of pipe) shall be:
- where not subject to vehicular loading: 300mm.
- where subject to vehicular loading - not in roadways: 450mm.
- where subject to vehicular loading - in sealed roadways: 600mm.
- where subject to vehicular loading - in unsealed roadways: 750mm.
- pipes in embankment conditions or subject to loading from heavy construction equipment: 750mm.

11.4.6 Manholes

11.4.6.1 Manholes

Construct stormwater manholes to the locations, dimensions, levels and details shown on the drawings, and make all necessary connections to the private stormwater drainage system.

Manholes shall be circular precast concrete manholes, constructed to NZS 4404 and the requirements of the Territorial Authority, and to the dimensions and details shown on the drawings.
- Concrete precast manhole risers: manufactured to the requirements of AS/NZS 4058.
- Concrete precast manhole flanged bases and lids: manufactured to NZS 3109, with a surface finish to NZS 3114.
- Manhole covers and cover frames: cast iron or steel construction conforming to AS 3996 and the requirements of the Territorial Authority.

Connect stormwater drains to concrete precast manholes using purpose-made manhole connectors and pipe stubs/shorts in accordance with the requirements of the Territorial Authority and as shown on the drawings.

11.4.7 Connection

11.4.7.1 Public Network - Street Mains Connection

Connect to discharge the stormwater drainage line directly to the public stormwater mains in accordance with the requirements of the Territorial Authority and as shown on the drawings.

11.4.8 Testing

11.4.8.1 Stormwater Drains

Test the stormwater installation, including all drains, connections and system components, for water tightness in accordance with the requirements of the Territorial Authority (TA).

Where required by the Territorial Authority, the testing shall be undertaken in the presence of the representative of the TA. Demonstrate to the Contract Administrator and the Territorial Authority that the installation complies with the requirements of the contract documents, related standards and regulatory bodies. Lodge all certificates of approval with the Contract Administrator.

Unless specified otherwise by the Territorial Authority, the testing procedure shall be the Water Test procedure as defined in AS/NZS 3500.3: Section 9. Where appropriate, the procedures in NZBC E1/VM1 may be used as an alternative. The acceptability of other test methods are be subject to the approval of the Territorial Authority and the Contract Administrator.

Provide all necessary plant, equipment and instruments required for the specified testing procedure. All testing and commissioning shall be undertaken by suitably skilled and experienced technicians.

Pressure testing shall be carried out after the pipes have been laid and the bedding material has been placed over the pipes as specified.

Prior to testing ensure that all pipe junctions and inspection eyes are exposed, and pipelines have been flushed and all residual debris cleaned out.

Stormwater manholes shall be free of visible faults, or permeable zones, and jointing or penetration repairs shall be to best trade practice and standards.

Test results shall be recorded clearly on properly formatted test result sheets, and submitted to the Contract Administrator within 48 hours of completion of testing.

Repair or replace any materials or workmanship found to be defective or faulty during testing, and repeat the test until a satisfactory test result is achieved.

Leave the installation watertight and free of defects, and operating to the required performance standard.

The work shall be deemed incomplete unless all required testing and commissioning has been carried out and has passed the requirements of the testing specification and the Territorial Authority.

11.4.8.2 Water Test Procedure - to AS/NZS 3500.3

Water test procedure of stormwater drains (non-pressure) - to AS/NZS 3500.3: Section 9.4: The head of water on any section of drain shall not exceed 3m.

The procedure shall be as follows:
- Seal all openings except the top of the section of the below-ground drain to be tested.
- Fill the below-ground drain with water to the highest level in that section.
- 10 minutes for vitrified clay drains; or
- 5 minutes for drains of any other material.

The drain shall be deemed to have passed the test if no make-up water is required.

11.4.9 Backfilling

11.4.9.1 Backfilling

Trenches shall be backfilled as soon as possible after the laying, inspecting and testing of the pipeline.

Where required, lay marker tape along the length of the drain, just above the top of the pipe embedment zone, before backfilling.

Trench backfill materials shall be placed on the pipe embedment, and compacted to restore the trench as near as practicable to the normal surrounding ground surface level and reduce the likelihood of subsidence. Backfill material shall be placed in uncompacted layers not exceed 300mm, then mechanically compacted to the required density.

Temporary trench support systems shall be lifted progressively above each layer of backfill to ensure each layer is compacted against undisturbed ground.

Any deficiencies of trench filling exposed by settlement shall be corrected to the required standard.

11.4.10 Reinstatement of Surfaces

11.4.10.1 Reinstatement of Surfaces

Refer to separate specification section - Siteworks - Reinstatement of Surfaces. Ground and paved surfaces above excavated stormwater drainage trenches shall be reinstated to the standard specified. Reinstatement shall generally achieve a standard equal to or better than the pre-existing situation - in no case will a lower standard be accepted.

Hedges, fences and other features to be retained that have been damaged or removed during the work shall be reinstated to the satisfaction of the Contract Administrator.

11.4.10.2 Public Property

Reinstatement of surfaces to public property shall comply with the requirements of the relevant controlling authorities.

11.5 Foul Water Drainage

11.5.1 Scope

Supply, install, test and commission new, gravity-flow foul water drains on the site, to the locations, layout and details shown on the drawings, complete with all necessary components and accessories required for satisfactory completion and performance of the foul water drainage system. All aspects of this works shall comply with the requirements of the NZ Building Code, related compliance Standards, Regulations and Acts, and to the requirements of the Territorial Authority, and as specified herein and on the approved drawings and schedules. Ancillary work and/or services not specifically mentioned but necessary to complete the work to specified levels of performance shall be deemed included.

Install foul water drains in natural ground, beneath and external to the building, for the distances indicated on the drawings. Allow for all ventilation requirements, inspection openings, bends, branches, manholes, inspection chambers, overflow gully traps, etc., as required and indicated on the drawings. Unless shown otherwise, the foul water drains shall be connected to the building's sanitary drainage system, and discharge to the foul water network.

The foul water drainage plans are diagrammatic only. Allow for all necessary vents, inspection fittings, cleaning eyes, traps and venting in accordance with AS/NZS 3500.2 and to comply with the New Zealand Building Code, and as required by the Territorial Authority. Refer to the drawings for the dimensioned locations of sanitary waste pipes and outlets.

11.5.2 Requirements

11.5.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

11.5.2.2 Compliance

Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the foul water drainage works.

The Drain Layer shall be deemed to have allowed for all work associated with the safe and orderly execution of the foul water drainage work, including complying with all Territorial Authority requirements, Building Consent, Building Act, Health and Safety requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the work.

11.5.2.3 Work on Public Property

Excavation and reinstatement of public property shall comply with the requirements of the relevant controlling authorities.

Obtain all necessary approvals and permits from the controlling authorities before commencing work on public property.

Arrange and pay for any excavation and reinstatement inspections of public property required by the controlling authorities.

Before commencing any excavation in or reinstatement work to public footpaths, driveway crossings, roads or other public property, make all necessary enquiries to the relevant controlling authority for their standards for excavation and reinstatement.

Provide at all times, adequate safeguards to the public in respect of temporary fences, signals, signs and lights. Where traffic signs are necessary, these shall be provided and operated in accordance with the Regulatory Authority or NZ Transport Agency (NZTA) guidelines, as applicable, but erected only with the prior written approval of the Regulatory Authority or NZTA and the Contract Administrator.

Where a Traffic Management Plan (TMP) is required, prepare, operate and update this plan as necessary throughout the duration of the works. The TMP shall conform to the requirements of the Regulatory Authority or NZTA, as applicable. Obtain TMP prior-approvals, and maintain the TMP for the entire construction duration.

Remove dirt and contamination deposited on public property to the satisfaction of the controlling authorities.

11.5.2.4 Notifiable Work

Notify WorkSafe NZ of work that is notifiable (particular hazardous work) under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

11.5.2.5 Explosives

The use of explosives is NOT permitted.

11.5.2.6 Inspections

Inspections of foul water drainage works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Obtain and pay all fees for any required inspections which are additional to the Building Consent.

11.5.2.7 Testing

Carry out all necessary testing of the foul water drainage installations, and demonstrate to the Contract Administrator and the controlling Territorial Authority that the installations are watertight and comply with the requirements of the New Zealand Building Code, related compliance Standards, and the design documents.

11.5.2.8 Redundant Drains

Where an existing foul water drain or part thereof is no longer required, it shall be disconnected from the service at the junction of the live drain or at the property boundary, and be appropriately sealed-off watertight in accordance with AS/NZS 3500.2. Advise the controlling Territorial Authority of the final sealing treatment.

11.5.2.9 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades as necessary to install foul water drains to the required locations and layouts.

11.5.2.10 Workmanship

Foul water drainage work shall be carried out by qualified and experienced tradespersons, familiar with the required installation requirements, under the direct supervision of a NZ certified Registered Drainlayer, in accordance with AS/NZS 3500.2 in compliance with the New Zealand Building Code, and all local codes and regulatory authority requirements, and the conditions of the Building Consent.

All pipe cutting, jointing, and supporting techniques shall be exactly as recommended by the pipe manufacturer. Pipes, fittings and accessories shall be handled and installed in such a manner that prevents any damage to the component.

All work shall be such as to leave a neat, efficient, robust and watertight installation.

Carry out all necessary inspections and tests during installation to ensure compliance with the design specifications and regulatory requirements. Provide test result sheets to the Contract Administrator to show compliance has been achieved.

Take all necessary measures during installation to protect the foul water drainage system from damage, and to prevent the entry of:
- extraneous water;
- soil, sand, or rock,

- the contents of any septic tank; or
- any other substance, the discharge or which could impede the operation of the foul water drainage network.

Ensure that any installed drain is adequately protected from any damage and excessive loading during the remaining construction period.

Protect adjacent finished work and surfaces from damage and contamination during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Drain Layer's expense.

Any associated electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

11.5.2.11 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. All rejected foul water drainage materials and work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional expense to the Principal.

11.5.2.12 Delivery & Handling

Store foul water drain pipes and accessories undercover, out of direct sunlight, clear of the ground, on an even surface, and protected from damage and contamination in accordance with the manufacturer's requirements. Keep pipes and accessories out of direct sunlight and protected from damage and contamination at all times.

Where possible, store pre-packed PVC pipes in the original delivery crate.
Store loose PVC pipes on evenly spaced bearers at maximum 1.0m centres, with pipe sockets alternated so the the sockets do not bear on each other, and with side supports if pipes are stacked more than two layers high. When loose PVC pipes are stacked in a pyramid, the maximum stack height shall be 1.0m and the bottom pipes shall be chocked.

Do not used damaged or faulty materials or products, or products that are beyond their designated shelf life. Do not use PVC materials that have been exposed to or stored in direct sunlight longer than the period specified by the manufacturer.

Handle all products and materials in accordance with the manufacturer's requirements, and in a manner that prevents damage or deterioration of the material/product.

Installers shall be familiar with and comply with manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes

of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

11.5.2.13 As-Built Drawings

On completion and before application for Code Compliance Certificate, prepare As-Built Drawings of the foul water drainage system, that accurately record the new and/or modified foul water drainage installation.

Information shall include, but not limited to, type, class and size of all pipes, the location, grade and direction of flow of all pipes, the location of all bends, changes in direction, cleaning access positions, manholes, and all dimensions, levels, inverts, etc.

Submit prepared as-built drawings to the Contract Administrator for review. Issue as-built drawings in accordance with the Contract Administrator's instruction, and in the required format.

11.5.2.14 Warranties

On completion and before Practical Completion, provide all relevant manufacturer/supplier warranties in favour of the Principal, covering materials, equipment, proprietary products, etc., supplied and installed.

11.5.3 Materials

11.5.3.1 General

Supply and deliver to the site all pipes, fittings, precast manholes, granular bedding material and other materials required for incorporation in the drainlaying work. All drainlaying materials shall be fit for purpose and intended use, new, of good quality and free from defects, and as specified herein and on the approved drawings and schedules.

11.5.3.2 PVC-U Pipes & Fittings

PVC-U foul water drain pipes and fittings for non-pressure applications shall comply with AS/NZS 1260: 'PVC-U pipes and fittings for drain, waste and vent application'. Installed in accordance with AS/NZS 3500.2, and AS/NZS 2032 or AS/NZS 2566.2.

Pipe Classification:
Class SN4-SN6 - Rubber Ring Joint or Solvent Welded Joint. For domestic and residential applications, and low load areas.
Class SN8-SN10 - Rubber Ring Joint or Solvent Welded Joint. For commercial and industrial applications, and medium load areas.
Class SN16 - Rubber Ring Joint or Solvent Welded Joint. For heavy traffic load areas.

11.5.3.3 Gullies

Gully traps shall be of an approved type and installed in accordance with AS/NZS 3500.2 and the requirements of the Territorial Authority.

Gully traps shall be PVC construction, including dish and lid.

The overflow level of gully dishes shall be set no less than 25mm above paved surfaces, and no less than 100mm above unpaved surfaces.

Provide adequate support to gully riser and dish with compacted bedding or concrete.

Where subject to damage, protect gully traps with a smooth-finished concrete surround, or with 2:1 sand/cement mortar, surrounding the entire gully and separated from the building foundation, in accordance with AS/NZS 3500.2 and as shown on the drawings.

11.5.3.4 Insitu Concrete

Cast insitu concrete used for foul water drainage installation shall be 20 MPa Normal Concrete complying with NZS 3104. Where specified, used as bedding, capping and surround concrete, and for any cast-insitu concrete elements (to NZS 3104 unless specified otherwise).

11.5.3.5 Reinforcing Steel

Steel reinforcing materials for cast-insitu concrete elements shall comply with AS/NZS 4671. Unless specified otherwise on the drawings, bars shall be Grade 300 deformed.

11.5.3.6 Cement Mortar

Cement mortar shall consist of one part cement and two parts of fine aggregate measured by volume, properly mixed with the minimum amount of clean water necessary to render the mix workable. Do not use cement mortar that has been mixed and left standing for more than one hour.

11.5.3.7 Bedding & Surround Material

Except where specified otherwise on the drawings, bedding (underlay, side support, overlay) material shall be compacted clean granular non-cohesive material - crushed rock or gravel screenings - of nominal particle size range of 7-10mm with a maximum particle size of 20mm, that is free from organic material and clay, and have a moisture content appropriate to the degree of compaction required. If the bedding material is contaminated or an excessive amount of oversized particles are present, the bedding material shall be rejected and not used.

11.5.3.8 Backfill Material

Except where specified otherwise, backfill material above the pipe embedment layer (150mm above the top of pipe) shall be selected excavated material that is free from any builder's waste, any organic material, any rocks or hard matter larger than 20mm, and any soil lumps larger than 75mm.

Except where specified otherwise, pipes beneath private roadways and where subject to vehicular traffic - all backfill from the top of the embedment layer (150mm above top of pipe) to the underside of the pavement layer shall be GAP 65 - General All Passing 65mm.

Mechanically compact backfill material in layers not exceeding 300mm to a relative compaction no less than 95% of the NZ Standard Compaction.

Trenches in public footpaths and roads shall be backfilled in accordance with the requirements of the controlling authority.

11.5.3.9 Marking Tape

Marking tape shall be located just above the top of the pipe embedment zone, and centred over the pipe.

Non-Detectable Marking Tape:
- Non-detectable marking tape shall comply with AS/NZS 2648.1.
- Tape width shall be 100mm minimum.
- Height of message letters shall be 40mm minimum.

Detectable Marking Tape:
- Detectable marking tape shall comply with AS/NZS 2648.1.
- Tape width shall be 100mm minimum.
- Tracer wire shall be stainless steel grade 316 or copper alloy designation 122.
- Tracer wire shall allow at least 25% elongation of the plastic tape before breakage of the wire.
- Height of message letters shall be 40mm minimum.

11.5.4 Trench Excavation

11.5.4.1 Clearing of Surfaces

Where trenches are to be excavated in a grassed area, garden or a berm, the topsoil shall be stripped from the area of the excavation and stockpiled separately adjacent to the trench for use in reinstating the surface.

Where trenches are to be excavated in existing concrete or asphalt paved areas, the paving shall be cut to neat, straight lines, parallel to the trench prior to excavation, with a nominal 100mm trimming allowance either side of the excavation width. The excavation shall be carried out with minimal damage to the existing paved surface.

Where trenches are to be excavated in existing segmental paved areas, the pavers shall be removed by hand, cleaned and set aside for later reinstatement.

Subsequent trench backfill shall be adequately compacted to avoid subsidence of reinstated surfaces.

11.5.4.2 Excavation

Locate all existing buried services before commencing excavation work in any area.

Excavations for trenches and pits shall be properly executed and supported in accordance with the requirements of AS/NZS 3500.2.

Carry out excavation work to comply with all relevant health and safety regulations and guidelines, including the 'Excavation Safety - Good Practice Guidelines' where appropriate.

Unless specified otherwise, the excavation of trenches shall be taken out by open cut to the levels and grades shown or implied on the drawings. Excavate trenches to the depths which will provide for the appropriate type of bedding.

Trench excavations shall be of sufficient width to allow all operations necessary for the jointing of pipes and placing of the specified backfill. The bottom width of the trenches shall at least the combined measurement of the outside diameter of the pipe plus 200mm - with a minimum clearance of 100mm on each side of the drain barrel. The trench width at the top of the pipe shall not exceed the outside diameter of the pipe plus 600mm unless the pipe in the trench is covered with concrete. The trench above the top of the pipe may be cut wider, either by excavating a wider bench or by battering the trench wall.

11.5.4.3 Shoring

Make all necessary provisions for shoring trench walls to comply with all regulations and for health and safety measures.

Trench shoring materials and equipment must be suitable for the purpose for which they are to be used, of sound quality, and adequate in strength for the particular use.

Shoring shall be placed by experienced operators under competent supervision, and shall not be altered, dismantled, or interfered with except on the instruction of the authorised supervisor.

Ensure no voids are left in the backfill when shoring is removed, and the required compaction density of the backfill is achieved.

11.5.4.4 Dewatering

Take all necessary precautions to keep trenches and pits free from water. Provide all necessary pumps, drainage pipes and other equipments required for dewatering. Install all necessary filtering and detention measures required by the Territorial Authority.

If the bottom of the trench is likely to be adversely affected by rain, remove the final 80mm of excavation as a separate operation immediately before placing the bedding material.

11.5.5 Pipe Laying

11.5.5.1 Bedding Pipes

Provide a minimum 75mm thick underlay layer of well compacted bedding material for all pipes. A chase shall be excavated in the bedding to accommodate any jointing socket or fitting in the drain. The pipe embedment material shall be laid and compacted so that the pipe is evenly and continuously supported along its length on either side of the pipe, and with an overlay layer minimum 150mm thick.

When trench support systems are used, the bedding material shall be placed and compacted in a manner so that no loss of compaction results from removal of the trench side support systems. The trench support shall be removed in such a way as to ensure that the placing and compaction of the bedding material occurs below the trench supports and directly against the undisturbed ground of the trench walls.

After completion of the jointing and inspection of drain pipes, place and compact the bedding surround material around the pipe to the required depth over the pipe. The material shall be

carefully placed around and over the pipe using hand tamping and in a manner that ensures the pipe is uniformly supported all round its perimeter and without voids. Take care during placement and compaction to ensure the pipe is not displaced or damaged.

11.5.5.2 Laying Pipes

Install foul water drains in accordance with AS/NZS 3500.2 to the layout, levels and grades shown on the drawings Drain pipes shall be laid to provide maximum falls, in straight lines and at an even grade, without obstruction to flow, and with full allowance for bedding.

Before installing the pipes, check the bore of each pipe is free from foreign matter and that the pipe exterior and the socket have not been damaged in handling or storage. All pipelines shall be kept clean and free of dirt and debris at all times during installation, testing and commissioning.

PVC-U foul water drain pipes shall be properly jointed (rubber ring joint or solvent welded joint) to produce a watertight seal in accordance with the manufacturer's instructions.

Start laying main drains at the point of outfall and insert junctions for branch drains as the work proceeds. Pipes shall be laid with the least number of bends, in the centre of the trench, in straight lines between bends, and to the grades and locations shown on the drawings.

Install all necessary fittings, including vents, inspection openings and access points, bends and junctions, to the locations shown on the drawings and in accordance with the manufacturer's instructions. Where not specified on the drawings or schedules, fittings for inspection openings, bends, junctions, etc., shall be selected from the PVC pipe system range of products and installed in accordance with the manufacturer's instructions.

Other than precautions against damage by displacement or floating pipes, no bedding surround material or backfill shall be placed until the laying of the drain has been inspected by the Territorial Authority.

11.5.5.3 Steep Gradients

Where the gradient of a foul water drain pipe exceeds 1:5 (20%), anchor blocks shall be installed at the bend or junction at the top and bottom of the inclined drain, and at intervals not exceeding 3m. Anchor blocks shall be constructed in accordance with AS/NZS 3500.2: Section 3.4.4.

11.5.5.4 Underground Drains Near & Under Buildings

Protect underground drains near and under buildings against damage in accordance with AS/NZ 3500.2 where the minimum cover specified cannot be provided.

11.5.5.5 Concrete Support

Concrete pads used to support foul water drains, gully traps, risers, etc., shall be minimum 100mm thick and in accordance with AS/NZS 3500.2: Section 5.3.

11.5.5.6 Jointing - Rubber Ring Joints

PVC-U drain pipes shall be jointed using rubber ring seals in preference to the solvent welded method - which shall be used where rubber ring jointed fittings are not manufactured. Only use seals and

lubricants recommended by the pipe or fitting manufacturer. The marking of pipes by scoring is not permitted. All joints shall be watertight and prevent the infiltration of groundwater and the intrusion of tree roots.

Rubber ring joints shall be assembled in accordance with the pipe manufacturer's instructions and generally as follows:
- Ensure that all components are clean and free of dirt and debris during all stages of the jointing process;
- Ensure the pipe spigot is correctly chamfered and has a clearly visible witness mark to the correct insertion length;
- Clean and generously lubricate with jointing lubricant, especially the chamfer. Do not lubricate the ring groove;
- Where elastomeric seals are required to be fitted, clean and fit the seal, and check the elastomeric seal sits evenly in the housing;
- Apply the manufacturer’s specified lubricant to the end of the spigot and chamfer of the pipe;
- Keep the elastomeric seal and its housing free of lubricant, unless otherwise recommended by the manufacturer;
- Align the pipes so there is no deflection at the joint, then insert the spigot in the socket and push home to the witness mark;
- Hold the socket end firmly during the jointing to prevent previously assembled joints from moving;
- If excessive force is required and/or the jointing process does not comply with the manufacturer's instructions, disassemble and remake the joint.

Field cutting pipes:
- cut the spigot end square and remove all burrs;
- chamfer the cut end of the pipe with a taper of 15° to approx. half the wall thickness, or as specified by the pipe manufacturer;
- as appropriate, witness mark the pipe at the specified insert by the manufacturer.

11.5.5.7 Jointing - Solvent Cement Welded Joints

Solvent welded joints shall only be used for jointing PVC-U pipes and fittings where rubber-ring jointed fittings are not manufactured. Use only cleaner primers and solvent cements specified by the manufacturer for the application and socket type. Only sockets complying with the relevant Standard shall be installed. Do not use cleaner primers or solvent cements if the 'use by' date has expired. The marking of pipes by scoring is not permitted. All joints shall be watertight and prevent the infiltration of groundwater and the intrusion of tree roots.

Solvent welded joints shall be assembled in accordance with the manufacturer's instructions and generally as follows:
- Solvent welding shall only be carried out in dry conditions above 5°C.
- Ensure the components are dry, clean and free of dust, dirt, grease and surface contaminants during all stages of the jointing process.
- Prior to welding, the components shall be assembled dry and checked for position and alignment to ensure accurate re-assembly in the correct position.
- Mark the spigot with a witness mark (pencil, not scored) at a distance equivalent to the internal depth of the socket.

- Dry the spigot end, up to the witness mark, and the socket interior, then clean and degrease with a clean cloth moistened with the pipe or fitting manufacturer's specified priming fluid.
- Apply an even coating of solvent cement to the internal surface of the socket for the full engagement length, and to the external section of the spigot up to the witness mark.
- Only use the minimum amount of solvent cement in the socket necessary for a fully solvent-welded joint.
- Insert the spigot close to, but not beyond, the witness mark. Do not use excessive force. Firmly restrain the joint for the minimum period recommended by the pipe manufacturer.
- Wipe off excess solvent cement from the outside of the joint, and where possible from the inside.
- Adhere to the manufacturer's specified procedures and time frames for filling and testing pipework.
- Allow all solvent welded joints to fully cure before subjecting pipework to any imposed load or testing.

11.5.5.8 Pipe Cover

Unless specified otherwise on the drawings, the minimum pipe cover (finished surface to top of pipe) shall be:
- where not subject to vehicular loading: 300mm.
- where subject to vehicular loading - not in roadways: 500mm.
- where subject to vehicular loading - in sealed roadways: 500mm.
- where subject to vehicular loading - in unsealed roadways: 500mm.
- pipes in embankment conditions or subject to loading from heavy construction equipment: 750mm.

11.5.5.9 Marking Tape

Install marking tape on top of the pipe embedment zone and centred over the pipe before commencing backfilling.

11.5.6 Connection

11.5.6.1 Public Network - Boundary Connection

Connect to discharge the foul water drainage line directly to the public mains street-edge/boundary connection in accordance with the requirements of the Territorial Authority and as shown on the drawings.

11.5.7 Testing

11.5.7.1 Foul Water Drains

Test the foul water drainage installation, including all drains, connections and system components, for water tightness in accordance with the requirements of the Territorial Authority (TA).

Where required by the Territorial Authority, the testing shall be undertaken in the presence of a representative of the TA. Demonstrate to the Contract Administrator and the Territorial Authority that the installation complies with the requirements of the contract documents, related standards and regulatory bodies. Lodge all certificates of approval with the Contract Administrator.

Unless specified otherwise by the Territorial Authority, the test method shall be the Water Test procedure for non-pressure pipelines as defined in AS/NZS 2302. Where appropriate, the procedures in NZBC E1/VM1 may be used as an alternative. The acceptability of other test methods are be subject to the approval of the Territorial Authority and the Contract Administrator.

Provide all necessary plant, equipment and instruments required for the specified testing procedure. All testing and commissioning shall be undertaken by suitably skilled and experienced technicians.

Pressure testing shall be carried out after the pipes have been laid and the bedding material has been placed over the pipes as specified.

Prior to testing ensure that all pipe junctions and inspection eyes are exposed, and pipelines have been flushed and all residual debris cleaned out.

Foul water manholes shall be tested for watertightness by plugging all pipes and filling with water. After absorption has taken place the water level shall remain constant for thirty minutes.

Test results shall be recorded clearly on properly formatted Test Result sheets, and submitted to the Contract Administrator within 48 hours of completion of testing.

Repair or replace any materials or workmanship found to be defective or faulty during testing, and repeat the test until a satisfactory test result is achieved.

Leave the installation watertight and free of defects, and operating to the required performance standard.

The work shall be deemed incomplete unless all required testing and commissioning has been carried out and has passed the requirements of the testing specification and the Territorial Authority.

11.5.7.2 Water Test Procedure - to AS/NZS 2302

Water test procedure of foul water drains (non-pressure) - to AS/NZS 2302: Section 7.3.2.

- The pipeline shall be filled with water to a height of not less than 1m above the natural ground level at the highest point of the section being tested, or to the flood level of the lowest sanitary fixture, but not exceeding 5m at the lowest point of the test section.
- The pressure shall be maintained without leakage for at least 15 minutes.
- The source of any leaks shall then be ascertained and any defects repaired.
- The pipeline shall then be retested.

Note: Testing should not be carried out if groundwater is present above the pipeline. If groundwater is present, the test pressure should be increased to compensate for the depth of groundwater at a rate of 10 kPa for every 1m of groundwater depth.

11.5.8 Backfilling

11.5.8.1 Backfilling

Trenches shall be backfilled as soon as possible after the laying, inspecting and testing of the pipeline.

Where required, lay marker tape along the length of the drain, just above the top of the pipe embedment zone, before backfilling.

Trench backfill materials shall be placed over the pipe embedment, and compacted to restore the trench as near as practicable to the normal surrounding ground surface level and reduce the likelihood of subsidence. Backfill material shall be placed in uncompacted layers not exceed 300mm, then mechanically compacted to the required density.

Temporary trench support systems shall be lifted progressively above each layer of backfill to ensure each layer is compacted against undisturbed ground.

Any deficiencies of trench filling exposed by settlement shall be corrected to the required standard.

11.5.9 Reinstatement of Surfaces

11.5.9.1 Reinstatement of Surfaces

Refer to separate specification section - Siteworks - Reinstatement of Surfaces.

Ground and paved surfaces above excavated foul water drainage trenches shall be reinstated to the standard specified. Reinstatement shall generally achieve a standard equal to or better than the pre-existing situation - in no case will a lower standard be accepted.

Hedges, fences and other features to be retained that have been damaged or removed during the work shall be reinstated to the satisfaction of the Contract Administrator.

11.5.9.2 Public Property

Reinstatement of surfaces to public property shall comply with the requirements of the relevant controlling authorities.

11.6 Drainlaying Elements

11.6.1 Drainlaying

Commence drainlaying at the low end of even fall sections of drains and proceed in a continuous sequence to the fittings connections.

Sumps, gullies, etc. solidly bedded. Lay 110mm uPVC drains to connect gullies, sumps, stacks, and downpipes through to the street edge connections.

Every junction and bend shall be an inspection position. Temporarily seal the open ends of incomplete drains to prevent entry of foreign matter. Make appropriate provision for any anticipated differential settlement. Place signal strip above all drains.

Ensure that stormwater drains are very accurately positioned so that downpipes can drop directly into them, without offsets.

11.6.2 Soakage Pits

Where shown on the site plan, Soakage Pits shall be dimensioned and filled in accordance with best local trade practice, and to the complete satisfaction of the Territorial Authority Inspector.

11.6.3 Testing

The sewer and stormwater systems shall both be fully tested to the approval of the Territorial Authority Inspector before being covered in. If any defects show rectify and then fully retest.

11.6.4 As Built Drawings

During drainlaying plot the location of all bends and changes in direction and all cleaning access positions. Locate each item by two diagonal measures from structure corners, etc. and record on a blank plan copy (supplied by Architect/Designer when requested).

Note that Practical Completion of the contract will not be certified until this as-built drawing has been produced (made available to the Contractor in time for the Code Compliance Certificate application.

11.7 Workmanship

11.7.1 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals. Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

11.7.2 Co-operation

Cooperate with all trades and attend upon the Concretor and Plumber to set out exact pipe runs before any adjacent work is put in hand and ensure that all sleeves etc. are correctly incorporated as work proceeds.

11.7.3 Materials

All pipes and other materials shall comply with the appropriate Standards, and shall be protected from damage of any kind until installation is complete. All incidentals appropriate for the applications involved. Concrete shall be 17.5MPa and as specified under Concretor, Mortar shall be as specified in Blocklayer.

11.7.4 Workmanship

All drainlaying shall be carried out by, or under direct control of, properly qualified tradesmen, and shall be to recognised high standards. Ensure cast-in items are installed when required so that no delay is caused by this trade. Adequately protect all adjacent surfaces - clean down to remove dirt etc., and any damage shall be made good by the appropriate trade at the Drainlayer's expense.

On completion of drainlaying clean up full area affected by this trade to the condition it was in before drainlaying commenced.

Site is to be returned as close as possible to its present condition on completion of the contract.

11.7.5 Excavation

As required for sewer and stormwater. Check for other service lines before excavation - the Drainlayer is responsible for making good any damage. Trenches true to line and with even gradients between gullies, soil stack terminations or downpipes, etc.

Keep the bottom of trenches clear of loose material. All pipes shall be laid in appropriate bedding material, compacted as required. Shore trenches if required to suit ground conditions. Backfilling shall be by this trade, to the standards required in Siteworks.

12 ELECTRICAL

12.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

12.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2053.1:2001(AS/NZS)	Conduits and fittings for electrical installations - General requirements
2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:2019(AS|NZS)	Emergency lighting and exit signs for buildings - Part 2: Routine service and maintenance
3000:2018(AS|NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3100:2009(AS/NZS)	Approval and test specification - General requirements for electrical equipment
3112:2011(AS/NZS)	Approval and test specification - Plugs and socket-outlets
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60335.2.30:2015(AS|NZS)	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.30:2015(AS|NZS)INCIEC	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.35:2013(AS/NZS)	Household and similar electrical appliances - Safety - Part 2.35: Particular requirements for instantaneous water heaters
60598.2.2:2016(AS|NZS)	Luminaires - Part 2.2: Particular requirements - Recessed luminaires
6104:1981(NZS)	Specification for emergency electricity supply in buildings

12.3 Workmanship

12.3.1 General

Supply and install all materials, including all necessary minor and incidental items, for proper completion of all of the electrical services specified or shown on the drawings. The contract will not be deemed to be complete until the Electrician has provided an Electrical Certificate of Compliance (made available to the Contractor in time for the Code Compliance Certificate application).

Obtain all necessary permits and consents, serve all notices and pay all fees in and customary charges connection with the works.

The position of switches, light and power outlets and other fittings, although shown specifically in some instances, are in general only shown diagrammatically. The exact location of each of these items will be as directed on site by the Architect/Designer; the Electrician shall give reasonable notice of when this information is required. Items positioned in contravention of this shall be repositioned if directed, including rewiring if necessary, all at the Electrician's expense.

Unless drawn (on 1:20 wall elevations) or specified otherwise the mounting height to the centreline of the following items above the floor shall be:

-1000mm for lighting switches;
-2000mm for wall mounted lights;
-2100mm for the bayonet of pendant lights;
-300mm for power points, except at benches.

(Notify the Architect/Designer if either the actual fitting or mounting position seem to make the mounting height noted above inappropriate).

Warranty cards and manufacturers guarantees for items supplied and installed by this trade shall be filled in correctly and handed over at Practical Completion. Arrange all circuits to obtain an optimum balance of the system, and check and reconnect where necessary to achieve this on completion. Leave the works clean and tidy and in full operational order.

12.3.2 Co-operation

Co-operate with all other trades and attend upon the Concretor and Carpenter to set out all required penetrations and to ensure that all wiring and fittings are correctly incorporated as work proceeds. The Carpenter will provide and fix all necessary dwangs and timber supports in locations determined by the Electrician.

12.3.3 Workmanship

All electrical work shall be carried out by, or under the direct control of, registered tradesmen, and shall be to recognized high standards. All work shall be such as to leave a neat, efficient and robust installation. Neatly label switchboards to identify each circuit.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604: 2011 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials shall be only to approval.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Electrician's expense.

12.3.4 Wiring

Joints within cable runs will not normally be accepted. TPS cable shall be adequately supported, and clipped at regular intervals. At terminations all strands of conductors shall be fully secured in a terminal block or clamped under a screw head washer; do not cut away any strands. Wiring which terminates in enclosed fittings and/or where subject to heat liable to cause deterioration, shall be

high temperature type, with the tails made off with heat resisting sleeves, to protect the permanent wiring.

Wire lights in 1.5mm 3 core - 7.5 amps loading max per circuit (allow for 100w to all light fittings unless identified otherwise).
Wire power outlets in 2.5mm 3 core - 7 maximum GPO singles or doubles per circuit. Assess power outlets for specific equipment and allow accordingly.

Conceal all wiring except as noted on drawings or below. All wiring cast into concrete shall be run in conduit pipes. All cables shall be stranded (single core is unacceptable).

Wire more or less parallel to and at right angles to the structural elements - avoid any diagonal wiring. Layout of the principal distribution wiring shall be to approval. Position all wires to minimise the risk of damage from subsequent nailing of linings etc.

Generally, do not run TPS horizontally within timber walls except in the area up to 300mm above floor. Wire in the ceiling framing and drop vertically to outlets and switches.

Wire exterior lighting in screened cable.

12.4 Systems

12.4.1 Earth

Provide a driven main earth suitable for the full installation, close to the meterboard, complying fully with all appropriate regulations and to the complete approval of a certified inspector. Bond all exposed metals, including light fittings and piped services and provide earth conductors for the entire system. Sheathing to any neutral screened cables may be used for earthing.

12.4.2 Mains

Install a neutral screened 16mm main cable underground (depth, cover/protection, backfilling, signal strip etc. to comply with all relevant regulations) from the grid connection position noted on the Site Plan along the route indicated to the meterboard, positioned where shown on the Floor Plan, and make appropriate arrangements for the grid connection. Install pilot as required. The meterboard shall be metalclad with a meter reading window, recessed maximum depth into the wall and at 2m to the top of the board, with the meters and water heater controllers by the supply company nominated by the Principal. Install all switches and fuses that are necessary. From the meterboard run (route to approval) a neutral screened 16mm main plus controllers etc. to the switchboard.

1. James Hardie Eave & Soffit Installation Manual (Feb 2025)
2. BRANZ 256 Expol Underfloor Insulation
3. Pink® Batts® Wall Installation
4. Pink® Batts® Ceiling - Truss/Framed Roof
5. BRANZ Appraisal No. 238 PINK® BATTS® INSULATION
6. Branz Appraisal No. 1225 Stria™ Cladding Vertical
7. James Hardie Stria Cladding Codemark Certificate
8. Heat Pump HWC
9. GIB® Rondo® Metal Batten Systems Installation
10. BRANZ Appraisal No.928 - GIB EzyBrace Systems
11. EXPOL R3.1 Black Underfloor Insulation – Technical Data Sheet
12. BRANZ Appraisal No.427 (2021) - GIB Aqualine Wet Area Systems

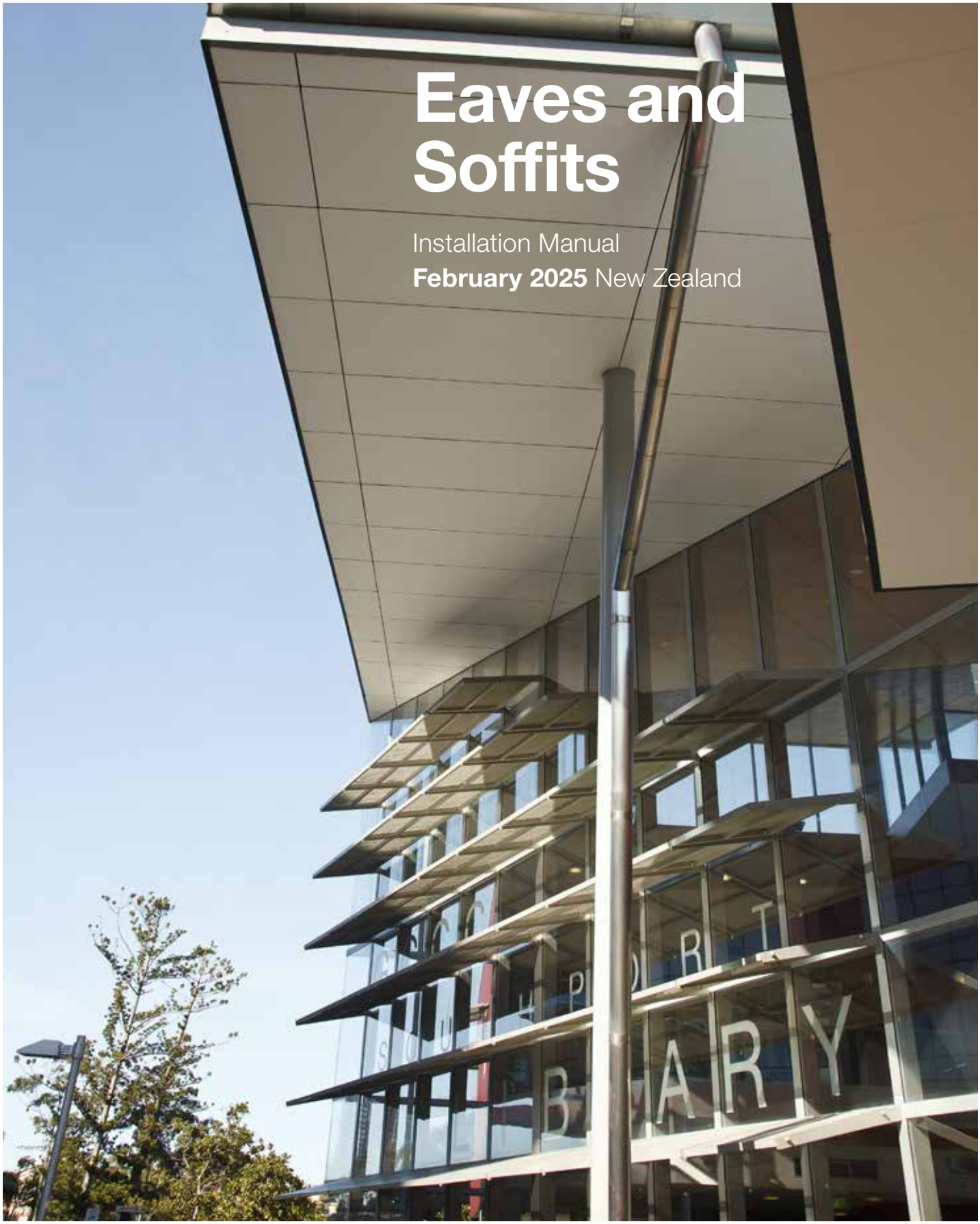
JamesHardie™

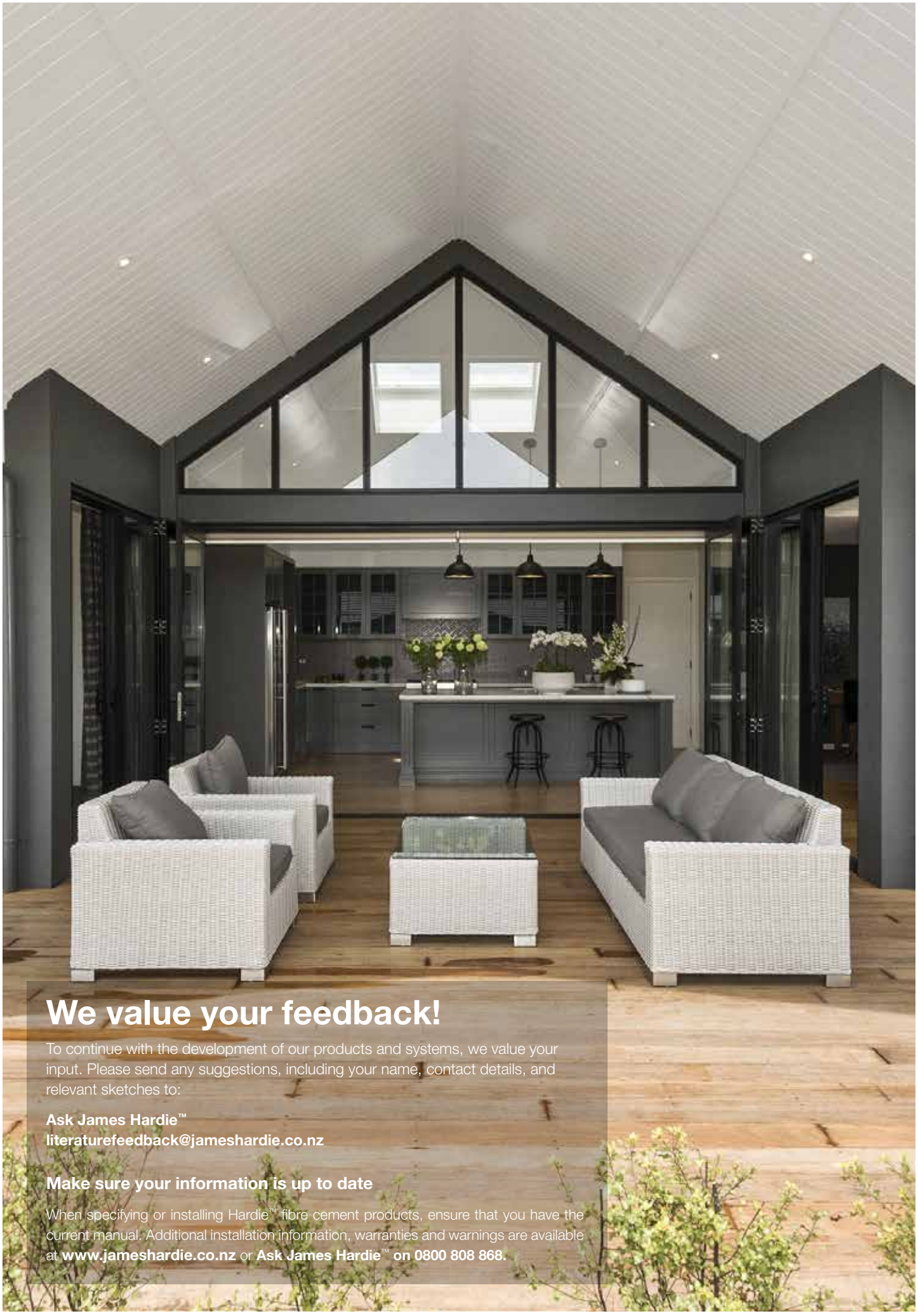
jameshardie.co.nz

Eaves and Soffits

Installation Manual

February 2025 New Zealand





We value your feedback!

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

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

Make sure your information is up to date

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

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1 Introduction

Eaves and soffit linings and pre-finished eaves and soffit linings by James Hardie enable you to create the look you want.

Cool, wide soffits and verandahs have, over the years, been a feature which specifiers have used to provide shade from the hot summer sun and to give UV protection to exterior paintwork and interior fabrics.

Today's high energy costs demand that all avenues be explored to develop cost-efficient ways for keeping our homes cool. One of these methods — tried and proven — is the use of wide soffits, verandahs and covered outdoor living areas. Hardie™ fibre cement products are resistant to fire, rot resistant and resistant to moisture damage when installed and maintained as directed.

This manual covers the use of Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining, and Villaboard™ Lining in external eave and soffit applications. Further technical literature relating to these products and internal linings are available from James Hardie in the following manuals:

- Hardie™ Flex Sheet Technical Specification.
- Villaboard™ Lining Installation Manual.
- Hardie™ Groove Lining Installation Manual.
- Fire and Acoustic Design Manual.





The specifier or other responsible party for the project must ensure the information and details in this manual are appropriate for the intended application and specific design and detailing is undertaken for areas which fall outside the scope of this document.

Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining are not suitable for use as a cladding.

1.1 Hardie™ Flex Eaves Lining

Hardie™ Flex™ Eaves Lining are 4.5mm in thickness and are available for the narrow soffit around the perimeter of the house or building and in wider widths for use in wider soffits, ceilings and verandahs

- Hardie™ Flex Eaves Lining have an unsanded finish suitable for semi-gloss acrylics or lightly textured coatings. Smooth high-gloss coatings must be avoided as some surface undulations may be visible in critical light.
- Hardie™ Flex Eaves Lining can be uPVC jointed or the joints can be left expressed.
- Hardie™ Flex Sheet 6mm, can also be used in eaves application for extra rigidity on larger spanning eaves.
- When higher impact or wind resistance is required, 6mm thick Hardie™ Flex Sheet must be used.

1.2 Eclipsa™ Eaves Lining

Eclipsa™ Eaves Lining is a 4.5mm thick, pre-finished acrylic white eave providing innovative style and enduring performance.

- Easy to install, saving both time and money.
- A slipsheet minimises surface marks on paint during transportation and installation.



1.3 Hardie™ Groove Lining

Hardie™ Groove Lining has the charm of traditional tongue and groove timber panelling, but has all the qualities of a modern Hardie™ fibre cement product. It's perfect for enhancing design lines on modern buildings or renovating old villas and bungalows.

- Hardie™ Groove Lining comes with a half groove length ways along the edge of the sheet to achieve continuity of pattern.





1.4 Villaboard™ Lining

Villaboard™ Linings are 6mm and 9mm in thickness to suit both residential and commercial applications. The recessed edges are suitable for flush jointing to give a smooth flush finish. Ideal for larger sized soffits.

- The sheets are fully sanded to give a smoother surface.
- Two long sheet edges are supplied with a recessed finish and site recessed edges can be readily formed on site. Other combinations are also available. Refer Table 4, page 7.
- Square-edge sheets are also available. These sheets can be used for the alternative expressed or uPVC joint finish.



Make sure your information is up to date

When specifying or installing Hardie™ fibre cement products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets their aesthetic expectations before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation. James Hardie will only offer a replacement product if Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining or Villaboard™ Lining supplied are found to be out of its manufacturing specification.

1.5 Product Description

Table 1

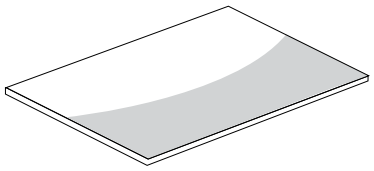
Hardie™ Flex Eaves Lining Sheet Sizes					
Square-cut edge for use with jointers 	**Width (mm)**	**Mass (kg/m²)**	**Length (mm)**		
			2400	**2700**	**3000**
	4.5mm thickness	6.5			
	450		**401948**		
	600		**401947**		
	750		**401946**		
	1200		**400187**	**400185**	**400183**

Table 2

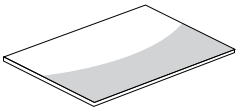
Eclipsa™ Eaves Lining Sheet Sizes				
Pre-finished square-cut edge sheet for use with jointers 	**Length (mm)**	**Mass (kg/m²)**	**Width (mm)**	
			600	**1200**
	4.5mm thickness	6.6		
	2400		**404807**	**404808**

Table 3

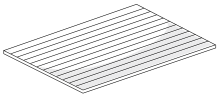
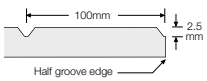
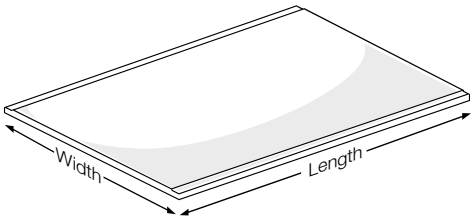
Hardie™ Groove Lining Sheet Sizes			
Half groove length ways to achieve concealed joints  	**Length (mm)**	**Mass (kg/m²)**	**Width (mm)**
			1200
	7.5mm thickness	10.4	
	2400		**400246**
	2700		**400245**
	3000		**404917**

Table 4

Villaboard™ Lining Sheet Sizes				
Smooth recessed edge for flush jointing. Square-cut edge also available for use with jointers. Villaboard™ Lining has no chamfer on square edge sheet. 	**Length (mm)**	**Mass (kg/m²)**	**Width 1200mm**	
			Edge Finish	
			2 rec/ edges (long)	**Square edges**
	6mm thickness	8.6		
	2400		**400429**	**400444**
	3000		**400427**	**400442**
	9mm thickness	12.4		
	2400		**400436**	**400445**
	2700		**400435**	
	3000		**400434**	**400059**

1.6 Accessories

Table 5

Hardie™ Flex Eaves Lining — Accessories/Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Soffit 4.5mm PVC 2-way Jointer** 2400mm long, uPVC/White	**300915**		**Hardie™ Jointer 5mm** uPVC/White 2400mm long 450mm long 600mm long 750mm long	**300729** **300919** **300920** **300921**
	**6mm Hardie™ Jointer** uPVC/Bone colour 2400mm long 3000mm long	**300730** **300734**		**Hardie™ Flex 5mm Capping Mould** 2400mm long, uPVC/ White	**300538**
	**6mm Capping Mould** uPVC/Bone colour 2400mm long 3000mm long	**300539** **300540**		**Soffit Scotia Mould (base and cap)** 2400mm long, uPVC/ White	**300916**
	**Fastfix Fasteners** 38 x 12mm, Nylon/ White	**300632**		**Inseal® 3259** 1.5mm thick 48mm wide x 50m long, Black compressible foam	**300767**
	**Hardie™ Knife** Scoring tool for easy cutting.	**305926**		**Hardie™ Blade Saw Blade** 184mm poly crystalline diamond blade, for fast, clean cutting of Hardie™ fibre cement.	**300660**

Table 6

Eclipsa™ Eaves Lining — Accessories/Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Hardie™ Jointer 5mm uPVC** 450mm long 600mm long 750mm long 2400mm long	 **300919** **300920** **300921** **300729**		**Soffit 4.5mm PVC 2-way Jointer** 2400mm long, uPVC/White	**300915**
	**Soffit Scotia Mould (base and cap)** 2400mm long, uPVC/White	**300916**		**Hardie™ Flex Capping Mould 5mm** 2400mm long, uPVC/White	**300538**
	**Fastfix Fasteners** 38 x 12mm, Nylon/ White	**300632**		**Inseal® 3259** 1.5mm thick 48mm wide x 50m long, Black compressible foam	**300767**
	**Hardie™ Knife** Scoring tool for easy cutting.	**305926**			

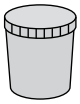
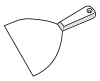
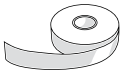
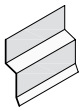
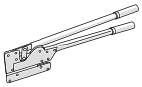
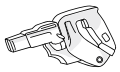
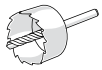
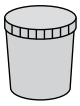
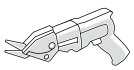
Table 7

Hardie™ Groove Lining — Accessories/Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Soffit Scotia Mould (base and cap)** 2400mm long, uPVC/white	**300916**		**Inseal® 3259** 1.5mm thick 48mm wide x 50m long, black compressible foam	**300767**
	**Hardie™ Drive Screw s/s 316** 30mm x 7g. 100 per jar For fastening to timber frames.	**300928**		**Hardie™ Top Coat** Base compound for filling over screws. 3kg Pail 15kg Pail	 **304492** **304493**
	**Hardie™ Knife** Scoring tool for easy cutting.	**305926**		**Villadrive™ Screw 7g x 30mm** For fastening to timber frames. 100/jar 5kg Box Collated/1000	 **300992** **300993** **300994**
	**Hardie™ Blade Saw Blade** 184mm poly crystalline diamond blade, for fast, clean cutting of Hardie™ fibre cement.	**300660**		**Hardie™ Steel Frame Screw** For fastening to steel frames. 8g x 30mm 5kg box (1000)	 **306300**

Table 8

Villaboard™ Lining — Accessories/Tools Supplied by James Hardie					
Accessories	**Description**	**Product Code**	**Accessories**	**Description**	**Product Code**
	**Soffit Scotia Mould (base and cap)** 2400mm long, uPVC/White	**300916**		**Inseal® 3259** 1.5mm thick 48mm wide x 50m long, Black compressible foam	**300767**
	**Hardie™ Jointer 6mm** uPVC/Bone colour 2400mm long 3000mm long	**300730** **300734**		**Hardie™ Jointer 9mm** uPVC/Bone colour 3000mm long	**300736**
	**Hardie™ Flex Capping Mould 6mm** uPVC/Bone colour 2400mm long 3000mm long	**300539** **300540**		**Control Joint** 2700mm long, uPVC/White	**300978**
	**Corner Angle** uPVC 3000mm long	**300669**		**Hardie™ Top Coat** Topping compound for flush finished jointing. 3kg Pail 15kg Pail	**304492** **304493**
	**Hardie™ Base Coat** Base compound for flush finished jointing. 4kg Pail 15kg Bag	**304490** **304491**		**Hardie™ Blade Saw Blade** 184mm poly crystalline diamond blade, for fast, clean cutting of Hardie™ fibre cement.	**300660**
	**Hardie™ Drive Screw s/s 316** 30mm x 7g 100 per jar For fastening to timber frames.	**300928**		**Villadrive™ Screw 7g x 30mm** For fastening to timber frames. 100/jar 5kg Box Collated/1000	**300992** **300993** **300994**
	**Hardie™ Knife** Scoring tool for easy cutting.	**305926**		**Hardie™ Steel Frame Screw** For fastening to steel frames. 8g x 30mm 5kg Box Collated/1000	**306300** **306301**

Table 9

Components Not Supplied by James Hardie			
James Hardie recommends the following products for use in conjunction with its eaves and soffit linings. James Hardie does not supply these products. Please contact component manufacturer for information on their warranties and further information on their products.			
Accessories	**Description**	**Accessories**	**Description**
	**Hardie™ Flex Nail** 40 x 2.8mm galvanised or stainless steel nails.		**Acrylic paint** Dulux® X10 or similar brand
	Rondo P35 Control joint used in movement joints.		**Broadknife 150mm** For setting of joints on Villaboard™ Lining.
	**Perforated paper tape** Joint reinforcing tape.		**Flashing to Table 20 'E2/AS1'** Flashing fabricator
	**Level/straight edge** For checking straightness of frame.		**Flexible joint sealant** Tube Sikaflex® MS or similar
	**Hand guillotine** Guillotine for cutting fibre cement.		**Paperback corners** 'Goldline' corner moulds
	**Collated screw gun**		**Adhesive sealant** Sikaflex®-11FC by Sika® Seal N Flex®-1 by Bostik®
	**Hole saw**		**Waterproofing admixture** Cemix Cemkey® Concentrate, ARDEX® Multiprime or similar. Used in diluted form over Villaboard™ Lining sheet edges to control moisture suction before flush stopping.
	**Electric shear/fibreshear** For cutting Villaboard™ Lining, Hardie™ Groove Lining, Hardie™ Flex Eaves Lining.		**Masking tape** 3M® Scotch® Blue 2090 - I8E 70006576972 or Sellotape® Premium+™ Washi® DELICATE
	**Flashing tape** Proprietary tape to adhere to flexible underlay. Tyvek®, Protecto® wrap or similar		**Polypropylene tape** Tape spec premium joining tape or similar for butt joint
	**Rondo battens**		

2 Safe Working Practices

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

Hardie™ fibre cement products products contain sand, a source of respirable crystalline silica

May cause cancer if dust from product is inhaled. Causes damage to lungs and respiratory system through prolonged or repeated inhalation of dust from product.

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

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

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

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

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

Avoid breathing in crystalline silica dust

Safe working practices

- ✕ NEVER use a power saw indoors or in a poorly ventilated area
- ✕ NEVER dry sweep
- ✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up
- ✕ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the Hardie™ Blade name or one with at least equivalent performance – connected to an M Class or higher vacuum
- ✓ Before cutting warn others in the area to avoid dust
- ✓ ALWAYS follow tool manufacturers' safety recommendations
- ✓ ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- ✓ ALWAYS wear a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

Use one of the following methods for cutting Eclipsa™ Eaves Lining, Hardie™ Flex Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining:

Best

- Hardie™ Knife
- Hand guillotine
- Fibreshear

Better

Dust reducing circular saw equipped with Hardie™ Blade Saw Blade and connected to a M Class or higher vacuum.

When cutting outdoors

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

When cutting indoors

✗ Never cut using a circular saw indoors

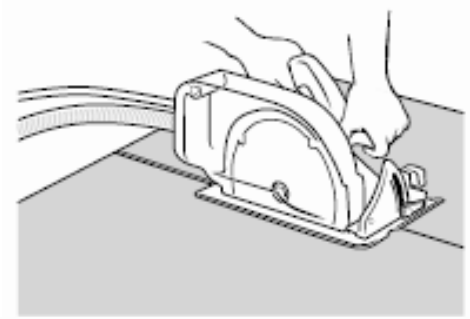
✓ Position cutting station in a well ventilated area

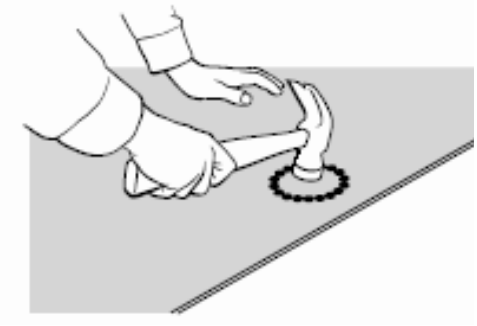
✓ Cut ONLY using a Hardie™ Knife, hand guillotine or fibreshears (manual, electric or pneumatic)

✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

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

Working instructions





Hardie™ Blade Saw Blade

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

Hole forming

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a ‘pilot’ hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

2.1 Storage and Delivery

Keeping products and people safe

Off loading

- ✓ Hardie™ fibre cement products should be off-loaded carefully by hand or by forklift
- ✓ Hardie™ fibre cement products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

Hardie™ fibre cement products should be stored:

- ✓ In their original packaging
- ✓ Under cover where possible or otherwise protected with a waterproof covering to keep products dry
- ✓ Off the ground – either on a pallet or adequately supported on timber or other spacers
- ✓ Flat so as to minimise bending

Hardie™ fibre cement products must not be stored:

- ✕ Directly on the ground
- ✕ In the open air exposed to the elements

James Hardie is not responsible for damage due to improper storage and handling.

2.2 Tips for safe and easy handling of Hardie™ fibre cement sheet products

- ✓ Carry with two people
- ✓ Hold near each end and on edge
- ✓ Exercise care when handling sheet products to avoid damaging the edges/corners

3 Compliance

James Hardie products used in the eaves and soffit applications installed as per the information in this manual have been tested and verified to meet the performance requirements of clause B1, B2 and E2 of the New Zealand Building Code (NZBC).

4 Framing

4.1 Timber Frame

Timber framing must be in accordance with the NZS 3604 (Timber-framed buildings) or specific engineering design to the NZS 3603 and the AS/NZS 1170 providing that:

- the framing centres do not exceed those given in this specification
- the framing member width conforms to this specification.

Also refer to the Approved Document for the NZBC Clause B2 'Durability' and the NZS 3602 (Timber and Wood-Based Products for use in Buildings) regarding timber treatment requirements and allowable moisture contents in timber frame. Also refer to the framing manufacturer's literature for further guidance on the use of treated timber.

4.2 Steel Frame

The figures in this brochure are drawn for timber framing. However, steel framing and furring channels can also be used.

All metal framing centres are to be same as specified for timber frame in this manual.

Steel framing members must be fabricated from light-gauge sheet steel 0.55mm thick minimum to 1.6mm maximum. Refer to specific details for the minimum flange width requirements.

For fixing 4.5mm thick fibre cement sheet products to steel frame, a pan head or wafer head screws must be used.

For fixing 6mm or thicker fibre cement sheet products to steel frame, a counter sunk screw may be used.

Screw fixings can be finished flush or sunk a maximum of 0.5mm below the sheet surface ready for filling.

NOTE: The fasteners must not be over driven as will reduce the holding capaciity of the sheet.

4.3 Framing Set-Out

Soffit framing must be provided as per Tables 10 to 16. For the soffits of up to 600mm-wide refer to **Figures 1 to 4**.

For the soffits between 601mm to 1200mm wide refer to **Figure 5 and 6.**

NOTE: For Eclipsa™ Eaves Lining refer to Section 5.1.4.

5 Installation

This installation manual covers the use of James Hardie's Eaves and Soffits for buildings within the scope of the NZS 3604 and the buildings covered under specific engineering design (SED).

5.1 General

Refer to Tables 10 to 16 and Figures 1 to 6 regarding framing set out and nail fixing centres, for framing and types of fasteners.

The eaves/soffits must be sealed against claddings to minimise moisture ingress behind the claddings. The roof must have been installed before installing the soffits linings. Where the soffits are sloping upwards away from the wall, a mechanical flashing must be provided in the soffit to wall junction. The flashing is fixed under soffit lining and laps over the face of cladding by 35mm minimum. Refer to Figures 18 and 19.

Note: Do not fix to the bottom chord of roof trusses. Instead fix to battens or furring channels.

5.1.1 Hardie™ Flex Eaves Lining

All sheet edges are to be supported by framing or a fascia board. Refer Figures 1 to 6.

NOTES:
1. Sheets can be jointed as per Section 6.
2. Do not screw fix 4.5mm thick sheets.

5.1.2 Villaboard™ Lining

Villaboard™ Lining recessed edge sheet is suitable for:

- Flush-jointed narrow strip soffits around a building
- Flush-jointed ceilings over verandahs, porches and entryways to residential and small-scale commercial buildings
- All edges to be supported by the framing or back blocking when flush jointed.

Villaboard™ Lining square edge sheet is suitable for:

- Expressed jointed or uPVC jointed eaves and soffits/ceilings where a smooth panelised surface finish is required

Villaboard™ Lining can either be fixed with nails or screws.

5.1.3 Hardie™ Groove Lining

Hardie™ Groove Lining offers a concealed joint look when the long sheet edges are butt jointed together. Refer to Figures 15 and 16.

5.1.4 Eclipsa™ Eaves Lining

- Eclipsa™ Eaves Lining is suitable for fixing up to VH wind zone only as per 'Simple Spanning Soffit' Table 10 or 'Boxed Frame Soffits' Table 11. Refer to Figures 1 to 6 and 17, 24 and 25 for installation information.
- For simple spanning soffit application, fix the Eclipsa™ Eaves Lining into the fascia board groove and nail into the ribbon board at 300mm centres with 40 x 2.8mm Hardie™ Flex nails. Ensure the nails will be hidden by the scotia mould or timber scotia (refer Figures 1 and 2).
- For larger soffit/ceiling or veranda applications provide a full perimeter frame to support all sheet edges as well as the intermediate frame. Fix the eaves lining sheets using Fastfix Fasteners. Use a 6mm diameter masonry bit to drill holes and fix Fastfix Fasteners (refer to Figures 24 and 25)
- Ensure sheets are all from the same batch to ensure no colour variation.

Note: Eclipsa™ Eaves Lining is only suitable for wind zone up to VH.

5.2 Simple Spanning Soffit

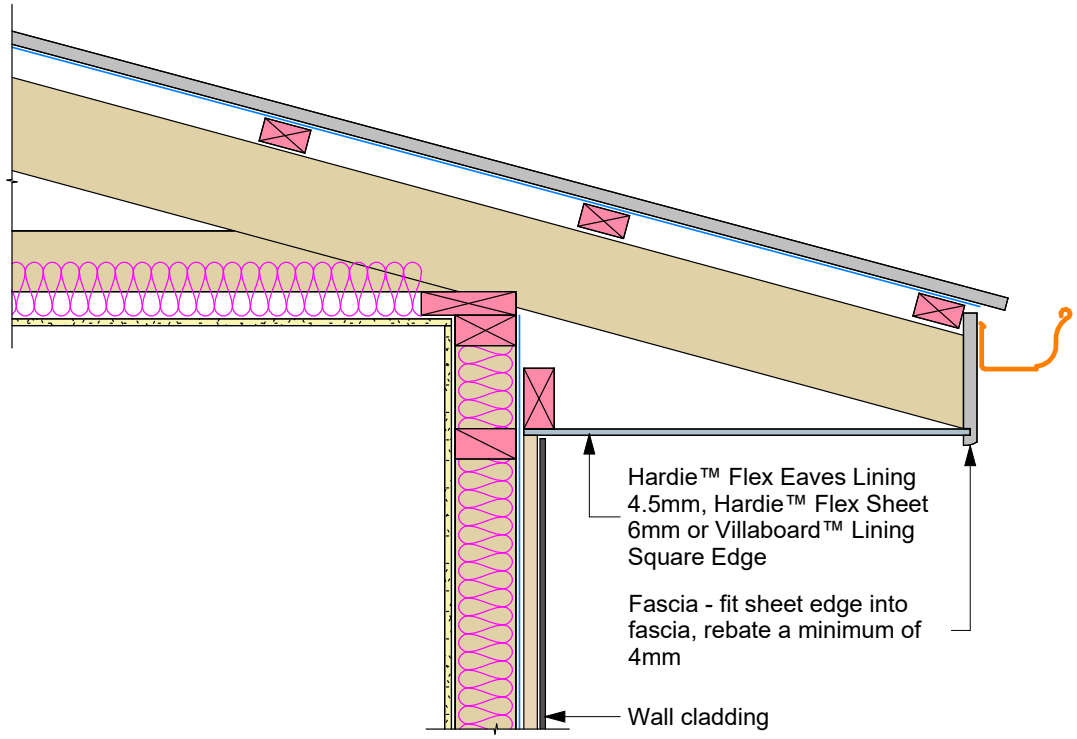
The soffit sheet spans between the ribbon board and fascia board. No soffit bearers are used in this case. Refer to Figures 1 and 2. Soffits are fixed to ribbon board as per Table 10.

Table 10

Simple Spanning Soffit				
Product	**Soffit Width Max.**	**Wind Zone Max.**	**Fixing to Ribbon Board Max.**	**Refer Figure**
Hardie™ Flex Eaves Lining 4.5mm	300mm	Up to EH	300mm	1 and 2
	400mm	Up to M	300mm	1 and 2
Hardie™ Flex Sheet 6mm	600mm	Up to H	200mm	1 and 2
Villaboard™ Lining Square Edge	600mm	Up to H	200mm	1 and 2

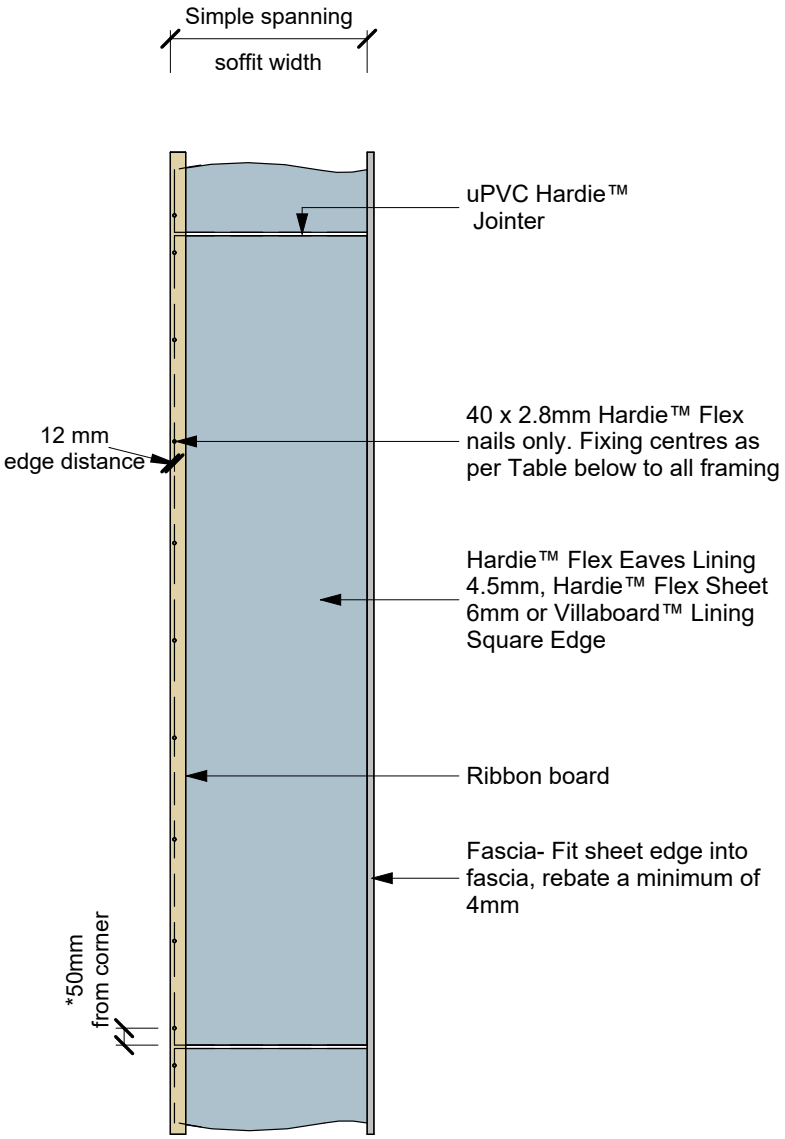
Note: Eclipsa™ Eaves Lining is only suitable for use upto VH wind zone.

Figure 1: Simple spanning eaves and soffits



Simple spanning Eaves and Soffits			
Product	**Maximum soffit width**	**Maximum wind zone**	**Fixing centres to ribbon board**
Hardie™ Flex Eaves Lining 4.5mm	300mm	Up to EH	300mm
	400mm	Up to M	300mm
Hardie™ Flex Sheet 6mm	600mm	Up to H	200mm
Villaboard™ Lining Square Edge	600mm	Up to H	200mm

Figure 2: Simple spanning eaves and soffits



Simple spanning Eaves and Soffits			
Product	**Maximum soffit width**	**Maximum wind zone**	**Fixing centres to ribbon board**
Hardie™ Flex Eaves Lining 4.5mm	300mm	Up to EH	300mm
	400mm	Up to M	300mm
Hardie™ Flex Sheet 6mm	600mm	Up to H	200mm
Villaboard™ Lining Square Edge	600mm	Up to H	200mm

5.3 Boxed Frame Soffit

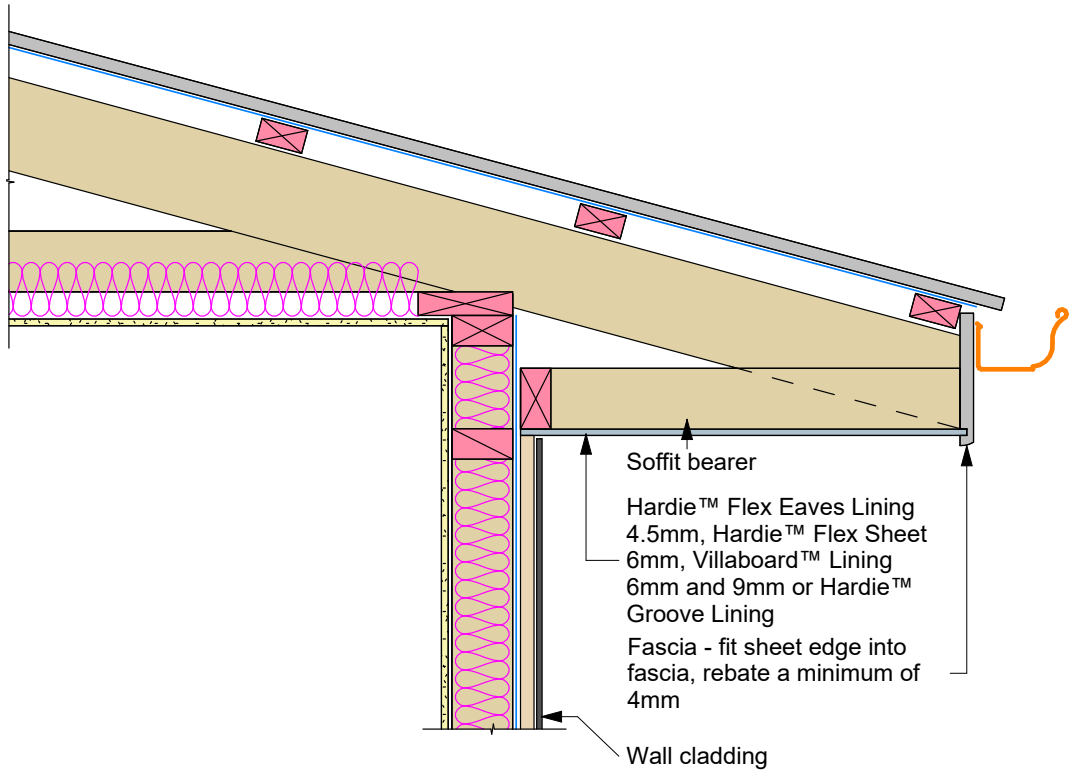
The soffit sheet is fixed to the ribbon board and soffit bearers as per Table 11. Refer to Figures 3 to 4.

Table 11

Boxed Frame Soffit					
Product	**Soffit Width Max.**	**Wind Zone Max.**	**Soffit Bearers**	**Fixing Centres**	**Refer to Figure**
Hardie™ Flex Eaves Lining 4.5mm	Up to 450mm	Up to VH	900mm	200mm	3 and 4
	451 to 600mm	Up to VH	600mm	150mm	5 and 6 *
	601 to 750mm	Up to H	600mm	200mm	5 and 6 *
Hardie™ Flex Sheet 6mm Villaboard™ Lining 6 and 9mm	451 to 600mm	Up to EH	900mm	200mm	3 and 4
	601 to 900mm	Up to VH	900mm	150mm	3 and 4
	901 to 1200mm	Up to EH	600mm	150mm	5 and 6 *
Hardie™ Groove Lining	Up to 600mm	Up to H	900mm	200mm	3 and 4
	1200mm	Up to VH	600mm	200mm	5 and 6 *
	1200mm	Up to EH	400mm	150mm	5 and 6 *

* Solid blocking is required behind the fascia board to facilitate soffit bearer and sheet fixing.

Figure 3: Boxed frame eaves and soffits

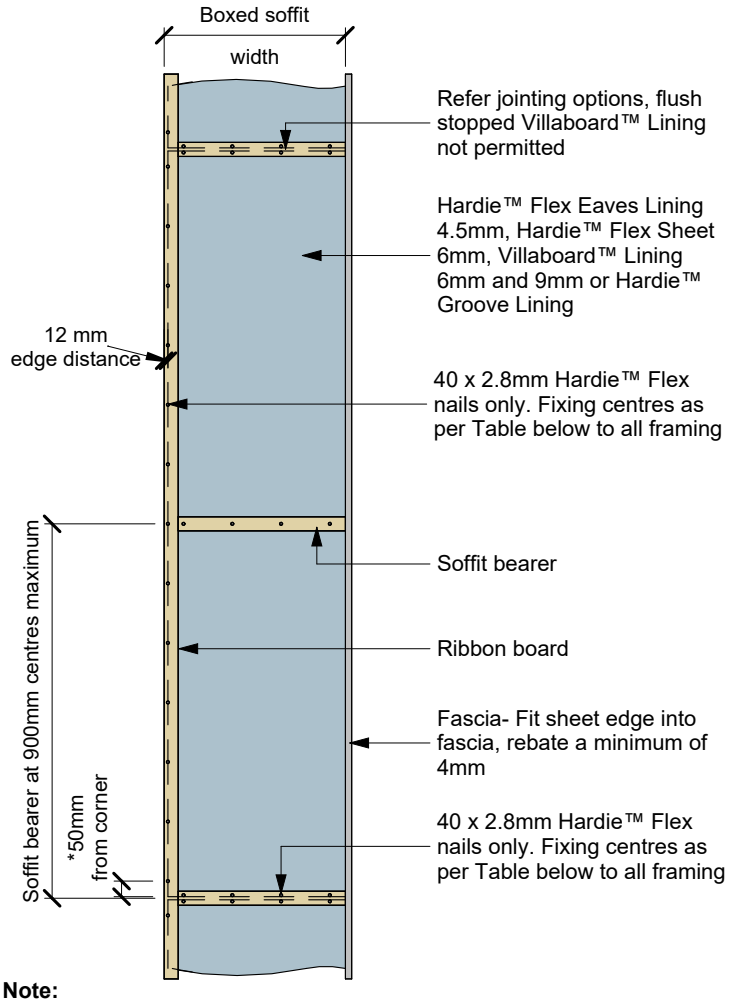


Note:
- Villaboard™ Lining and Hardie™ Groove Lining can be fixed with nails or screws

Boxed frame Eaves and Soffits

Product	Maximum soffit width	Maximum wind zone	Maximum soffit bearer centres	Fixing centres
Hardie™ Flex Eaves Lining 4.5mm	450mm	Up to VH	900mm	200mm
Hardie™ Flex Sheet 6mm Villaboard™ Lining 6mm and 9mm	600mm	Up to EH	900mm	200mm
	900mm	Up to VH	900mm	150mm
Hardie™ Groove Lining	600mm	Up to H	900mm	200mm

Figure 4: Boxed frame eaves and soffits



Note:
- Villaboard™ Lining and Hardie™ Groove Lining can be fixed with nails or screws

Boxed frame Eaves and Soffits

Product	Maximum soffit width	Maximum wind zone	Maximum soffit bearer centres	Fixing centres
Hardie™ Flex Eaves Lining 4.5mm	450mm	Up to VH	900mm	200mm
Hardie™ Flex Sheet 6mm Villaboard™ Lining 6mm and 9mm	600mm	Up to EH	900mm	200mm
	900mm	Up to VH	900mm	150mm
Hardie™ Groove Lining	600mm	Up to H	900mm	200mm

5.4 Large Soffits (up to 1200mm)

For the installation of large span soffits (up to 1200mm) a solid blocking is required behind the fascia board for the installation of soffit lining.

Villaboard™ Lining is used when a smooth sanded sheet is required to achieve a painted flush finish.

Refer to the framing fixing schedule Section 4 Tables 10 to 16, Figures 1 to 6, and finishing schedules on Section 7.

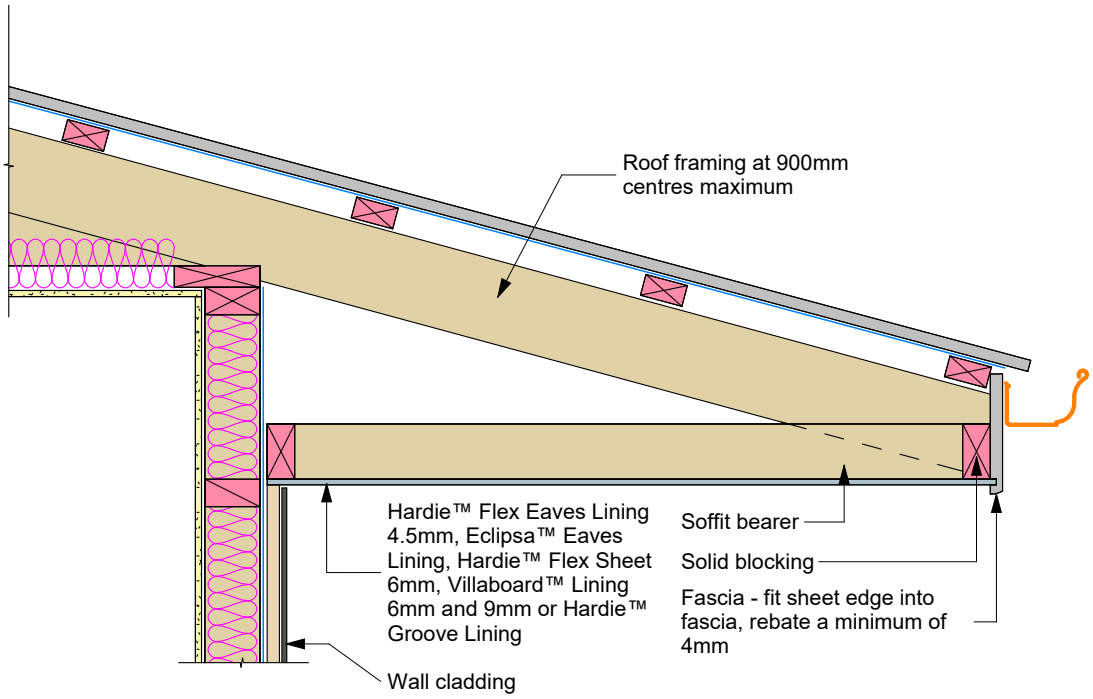
Refer to the flush jointing procedures, Section 7.

Fix with either Hardie™ Flex nails 40 x 2.8mm (galvanised or 316 stainless steel), Villadrive™ wood screws or Hardie™ Drive stainless steel 30mm x 7g wood screws.

Screws finished 0.5mm below surface.

Nails finished flush with surface.

Figure 5: Boxed frame large soffit up to 1200mm

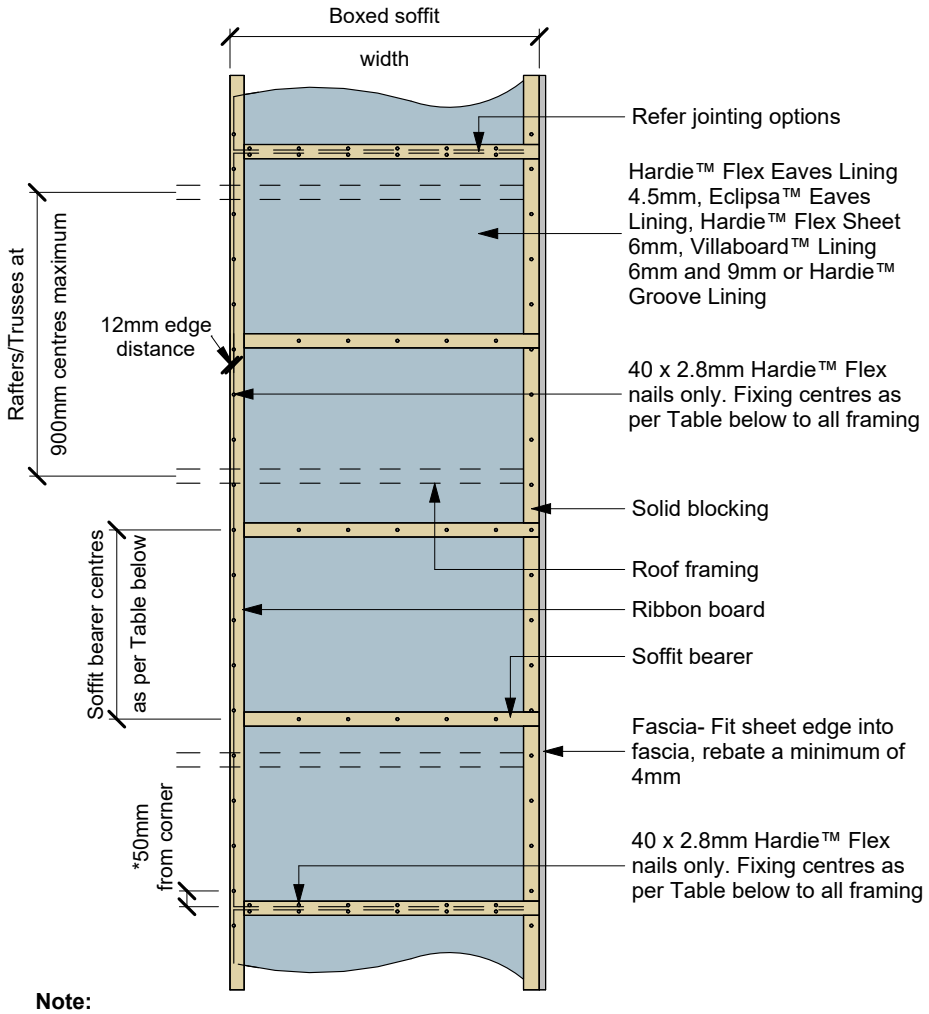


Note:
- Eclipsa™ Eaves Lining fixed to soffit bearers/fascia nogs with Fastfix Fasteners
- Villaboard™ Lining and Hardie™ Groove Lining can be fixed with nails or screws

Large Soffits

Product	Maximum soffit width	Maximum wind zone	Maximum soffit bearer centres	Fixing centres
Hardie™ Flex Eaves Lining 4.5mm Eclipsa™ Eaves Lining	1200mm	Up to VH	600mm	200mm
Hardie™ Flex Sheet 6mm Villaboard™ Lining 6mm	1200mm	Up to EH	600mm	150mm
Hardie™ Groove Lining	1200mm	Up to VH	600mm	200mm
	1200mm	Up to EH	400mm	150mm

Figure 6: Boxed frame large soffit up to 1200mm



Note:
- Eclipsa™ Eaves Lining fixed to soffit bearers/fascia nogs with Fastfix Fasteners
- Villaboard™ Lining and Hardie™ Groove Lining can be fixed with nails or screws

Boxed frame large Soffits

Product	Maximum soffit width	Maximum wind zone	Maximum soffit bearer centres	Fixing centres
Hardie™ Flex Eaves Lining 4.5mm Eclipsa™ Eaves Lining	1200mm	Up to VH	600mm	200mm
Hardie™ Flex Sheet 6mm Villaboard™ Lining 6mm	1200mm	Up to EH	600mm	150mm
Hardie™ Groove Lining	1200mm	Up to VH	600mm	200mm
	1200mm	Up to EH	400mm	150mm

5.4.1 Villaboard™ Lining Flush Jointed Soffit - Control Joint

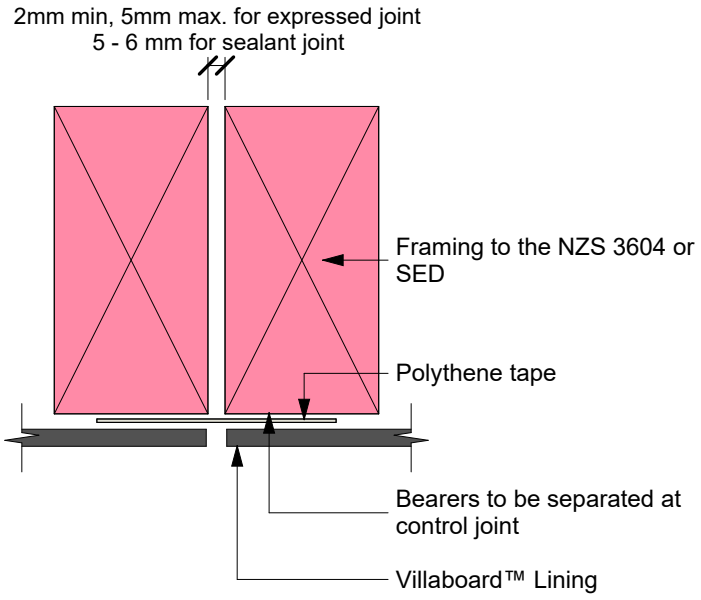
In these applications Villaboard™ Lining recessed edge sheets must be jointed on the framing as shown in Figure 6. Control joints, as shown in Figures 7, 9 and 10, must be located at a distance as specified in Table 12. Sheets must not be fixed to the bottom cord of roof trusses.

For skillion roof structures, refer to section 5.10.1 of this manual for control joint spacing.

Table 12

Maximum spacing for control joints (m)		
	Steel Framing	**Timber Framing**
General	4.8	7.2

Figure 7: Control joint



Note: The joint can be expressed or flexible silicone sealant filled

5.4.2 Drip Edge

All soffit linings must either be installed with a grooved fascia, refer Figures 1, 3 and 5, or with exterior cladding which forms a drip edge below the soffit lining by 15mm minimum. Soffit linings are generally fitted into the recess formed in fascia board to form the drip edge.

5.4.3 Curved Applications

Hardie™ Flex Eaves Lining and Villaboard™ Lining can be used for curved applications.

The minimum bending radii are shown below.

Table 13

Curved Soffit/Ceiling Minimum Bending Radii	
Product	**Along length (mm)**
Villaboard™ Lining 9mm	3000
Villaboard™ Lining 6mm	1800
Hardie™ Flex Sheet 6mm	1800

NOTE: The bending radii given above require no pre-wetting of the sheet. Mechanical fix at 200mm centres maximum to entire framing. To maintain the smoothness of the curve, ceiling battens are generally required at spacings as shown below.

Table 14

Curved Lining — Soffit Batten Spacing	
Range of Radii (mm)	**Soffit batten spacing (mm)**
1800 to 3000	300
Above 3001	400

5.4.4 Fire rated soffits

For the use of 6mm or thicker products by James Hardie in fire rated soffit applications, refer to the Fire and Acoustic Design Manual by James Hardie or Ask James Hardie™ on 0800 808 868.

5.4.5 Pre-finished Steel Fascia/gutters

When pre-finished steel fascia/gutters are used the soffit edge must be supported 4mm minimum into the fascia recess.

Ribbon board to be continuous for product fixing.

5.5 Large Soffit/Ceiling Area

Table 15

Large Soffit/Ceiling - Villaboard™ Lining 9mm			
Longitudinal batten Spacing	**Transverse Batten Spacing**	**Wind Pressures**	**Fixing Centres**
600mm	1200mm	2kPa	200mm
400mm	1200mm 1200mm	3kPa 4kPa	200mm 150mm

Table 16

Large Soffit/Ceiling - Hardie™ Groove Lining			
Longitudinal batten Spacing	**Transverse Batten Spacing**	**Wind Pressures**	**Fixing Centres**
600mm	1200mm	1.5kPa	200mm
400mm	1200mm	3kPa	200mm

5.5.1 Structural Ceiling Diaphragms

Hardie™ Flex Eaves Lining, Hardie™ Flex Sheet, Villaboard™ Lining and Hardie™ Groove Lining are suitable for use in structural ceiling diaphragms as per the NZS 3604. Refer to the Bracing Design Manual by James Hardie.

5.6 Villaboard™ Lining Ceiling (Large Areas)

For commercial soffits and ceilings, framing must be at 600mm maximum centres and 6mm thick Villaboard™ Lining can be used. For high-wind areas in commercial buildings with framing at 600mm maximum centres, 9mm thick Villaboard™ Lining must be used. Sheets must not be fixed to the bottom cord of roof trusses. Timber or steel ceiling battens must be fixed to the underside of the roof truss. Sheets must be laid in an offset pattern so that adjacent end joints do not coincide. Timber ceiling battens must comply with the requirements of the NZS 3604 or the specific engineering design. Steel ceiling battens must be a minimum of 37mm wide x 23mm deep x 0.55mm thick and have a bearing surface of 37mm minimum. Battens must be galvanised steel (275 g/m^2 zinc coating), have a suitable coating to meet the durability requirements and be fixed to the manufacturer's specifications. Refer to the flush-jointing and finishing procedures on Section 7.

For specific engineering design projects consideration must be given to framing deflections expected due to loadings and appropriate selection of sheet jointing method must be made.

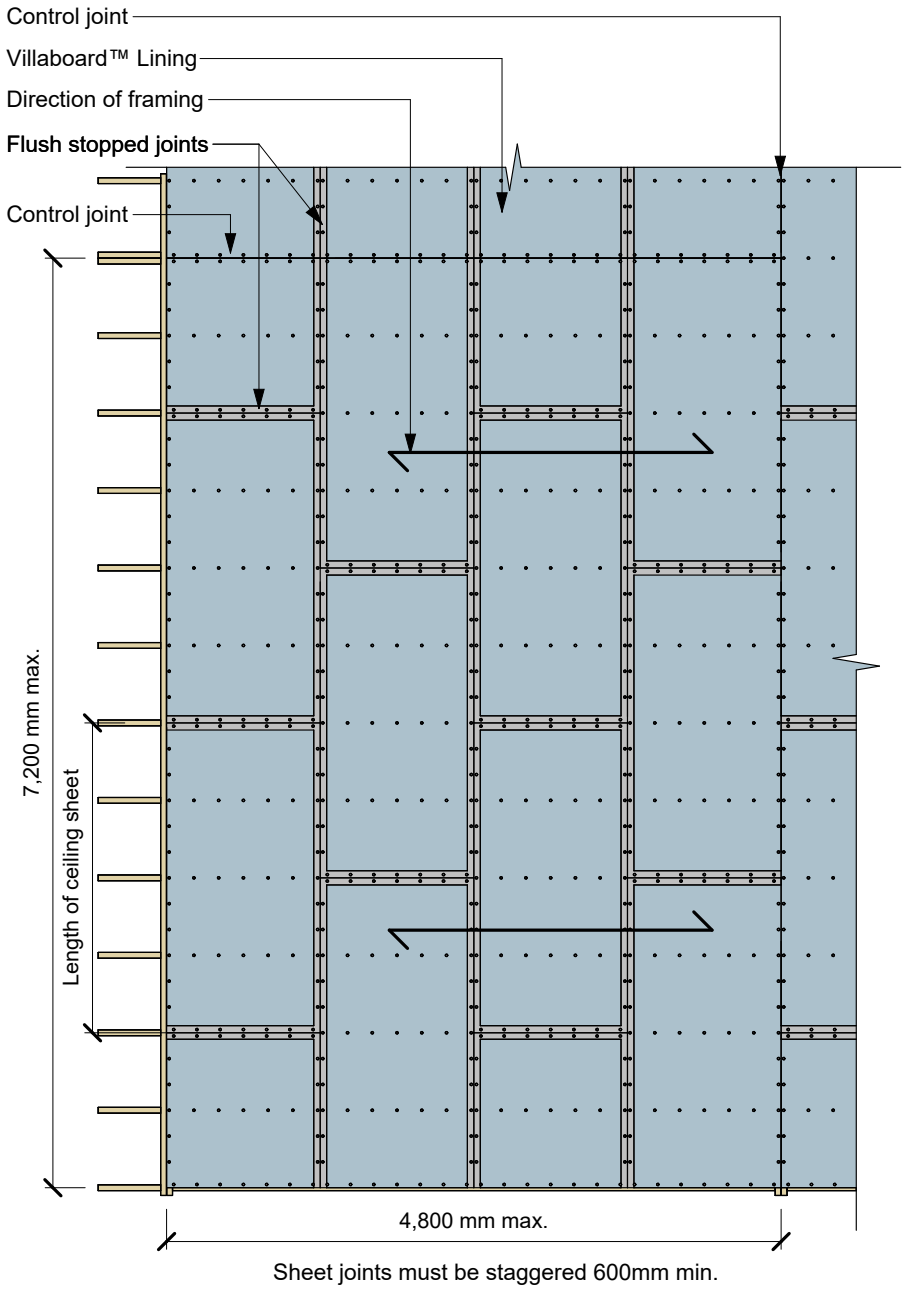
NOTE: It is recommended that flush stopping of joints only is suitable when using recessed edge Villaboard™ Lining.

5.6.1 Control Joints for Flush Stopped Ceilings

Control joints must also be provided where the soffits change in direction, change in level, where there is a construction joint in framing or where the soffits continue into passage ways etc. See Table 12 for maximum control joint spacing and Figures 7, 9 and 10 for a typical control joint detail.

The flush stopped ceiling area must be divided into bays not exceeding 7.2 x 4.8m. To permit movement, control joints must be formed at the perimeter of each bay (refer Figures 8 to 10) and at the junction of large ceilings with narrow passage strips or where there is a change in direction. The ceiling framing for each bay must be independent of adjacent bays and the surrounding building structure. Framing members (to which the sheet is fixed) must not continue across this control joint. Sheets shall be fixed across or along the ceiling joists or ceiling battens (refer Figures 12 and 13). Figures 7 and 10 show control joints with the battens running in the same direction as the sheet joint. When these ceilings are wider than one sheet width the sheets can be fixed to the framing provided the control joints are placed to limit the bay size to 7.2m x 4.8m maximum.

Figure 8: Villaboard™ Lining ceiling flush stopped



Villaboard™ Lining 9mm			
Longitudinal batten spacing	**Transverse batten spacing**	**Wind pressures**	**Fixing centres**
600mm	1200mm	2 kPa (ULS)	200mm
400mm	1200mm	3 kPa (ULS)	200mm
		4 kPa (ULS)	150mm

Figure 9: Steel ceiling batten control joint detail

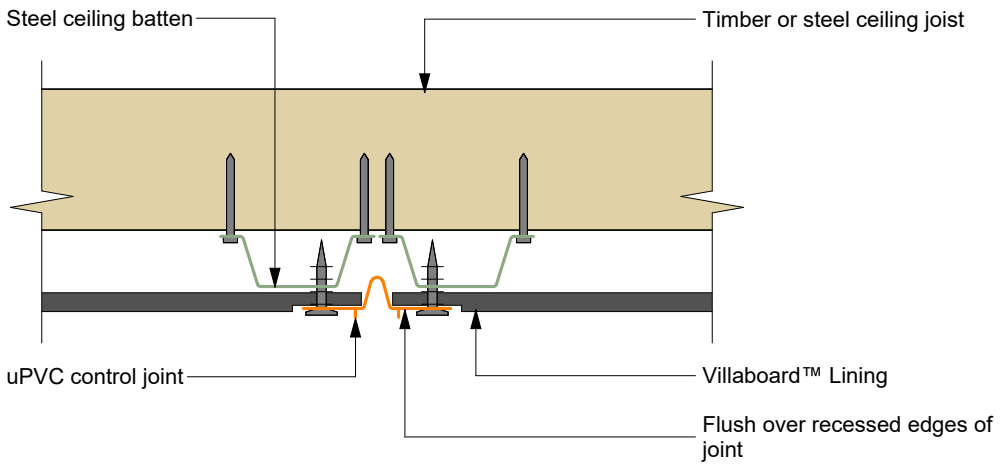


Figure 10: Timber control joint detai

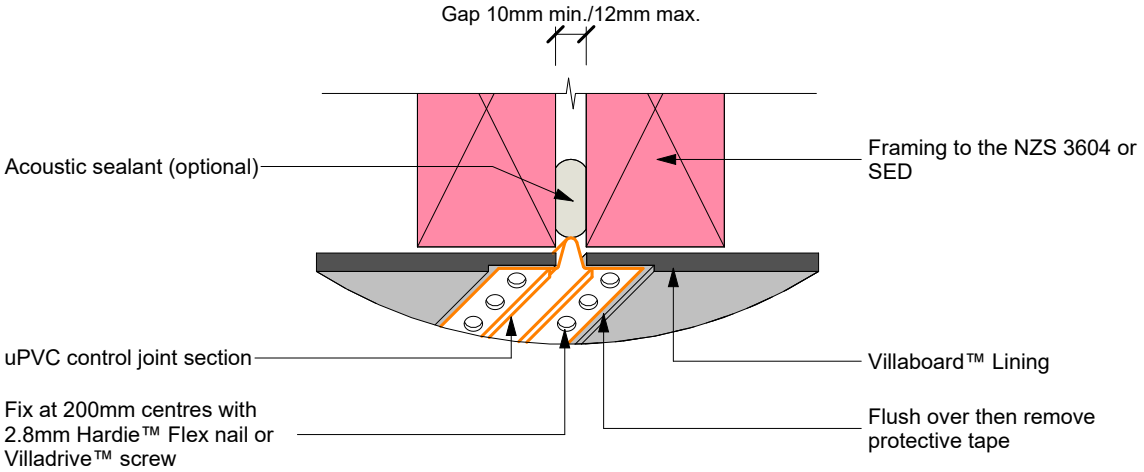
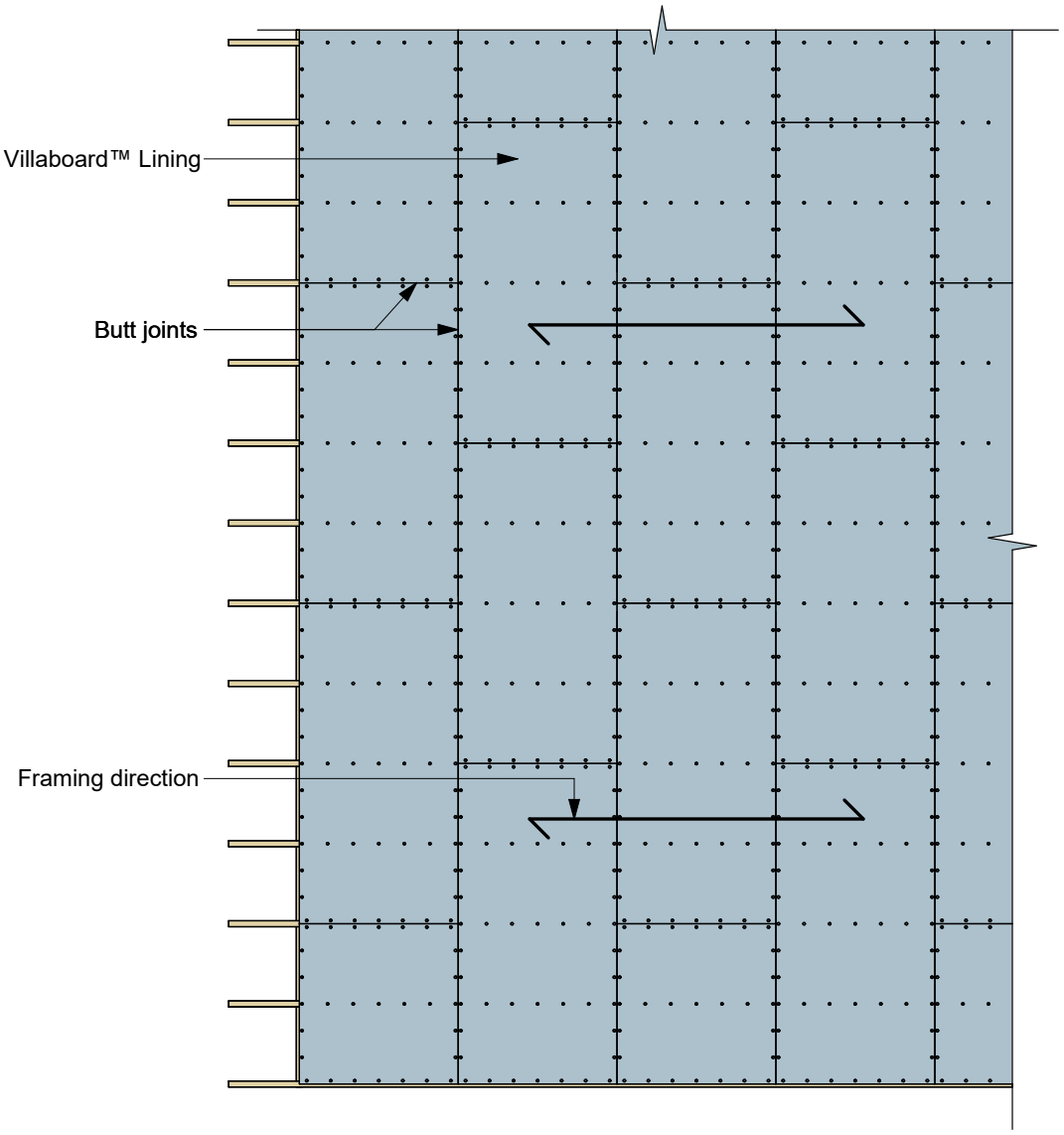


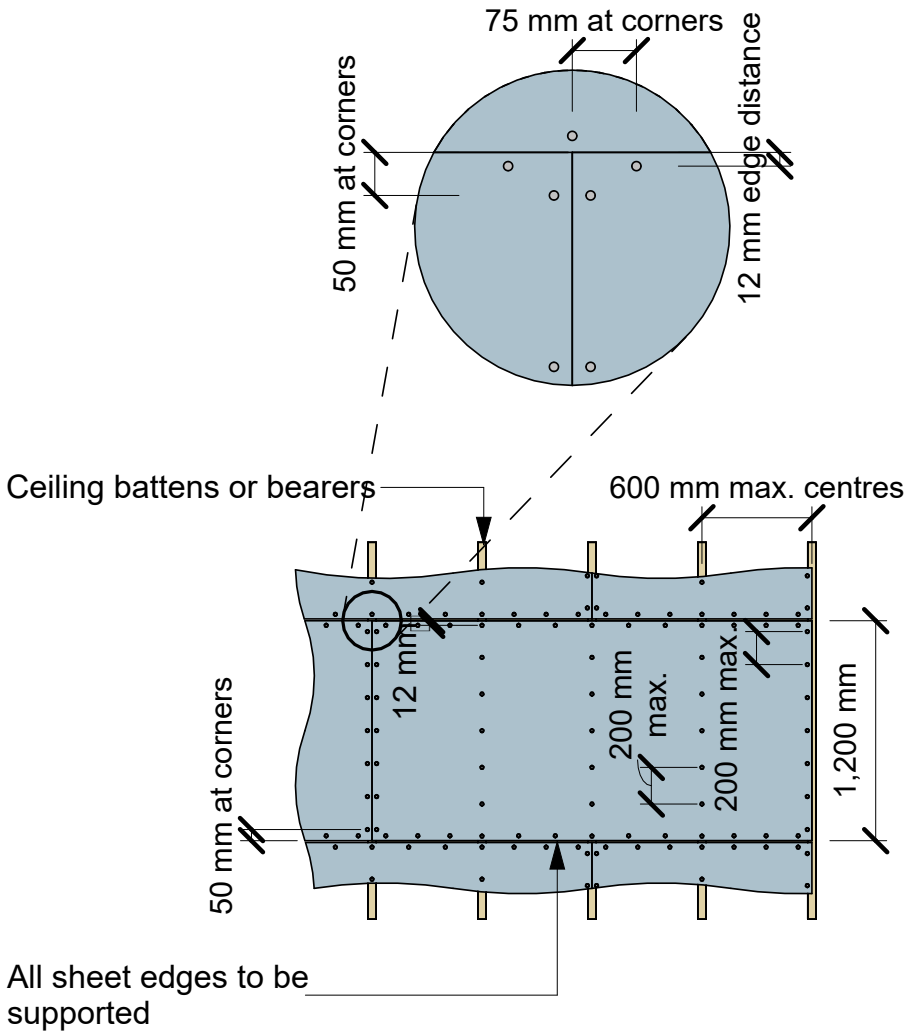
Figure 11: Villaboard™ Lining square edge ceiling butt joints



Note: Sheet joints can be staggered or aligned

Villaboard™ Lining 9mm			
Longitudinal batten spacing	**Transverse batten spacing**	**Wind pressures**	**Fixing centres**
600mm	1200mm	2 kPa (ULS)	200mm
400mm	1200mm	3 kPa (ULS)	200mm
		4 kPa (ULS)	150mm

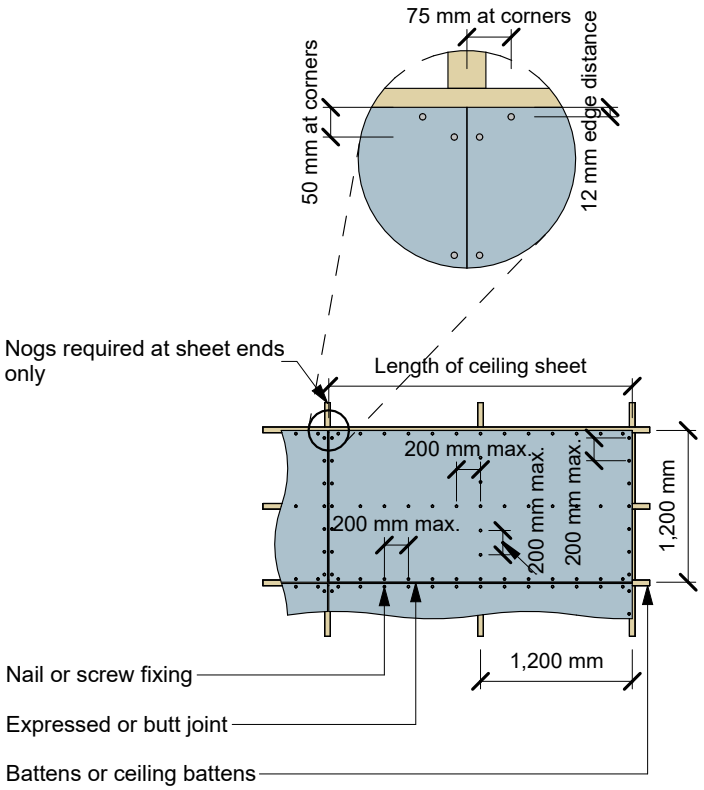
Figure 12: Villaboard™ Lining - across ceiling battens



5.6.2 Column or Wall Abutments

Soffit sheeting must be free to move independently from the building element it abuts with. This is critical for flush-jointed sheeting, otherwise cracking at the joint may occur.

Figure 13: Villaboard™ Lining - along ceiling battens



Note: Refer to Table 15 and 16 for maximum framing spacing

5.7 Fastener Durability

Fasteners used in external applications must meet the minimum durability requirements of the NZBC. The NZS 3604 specifies the requirements for fixing's material to be used in relation to the exposure conditions and are summarised below in Table 17.

Table 17

Exposure conditions and nail selection prescribed by the NZS 3604	
Zone	**Nail/material**
Zone D	Stainless steel 304/316
Zone C* - outside sea spray zone and Zone B and geothermal hot spots	Hot-dipped galvanised ** or Stainless steel 304/316
All zones - Bracing	Stainless steel 304/316

*Zone C areas where local knowledge dictates that increased durability is required, appropriate selection shall be made.

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

When using screws to fix into steel framing a minimum class-3 coated screw must be used.

5.8 Internal Swimming Pool Application

For fixing Villaboard™ Lining and Hardie™ Groove Lining in internal swimming pool areas;

- The sheets must be back and edge sealed before installation.
- When fixing Villaboard™ Lining to the ceiling under a skillion roof, roof ventilation must be considered to minimise thermal movement and sheet joint cracking.
- All Villaboard™ Lining recessed sheet joints must be stopped.
- Alternatively, when using square edge Villaboard™ Lining, the sheet joint must be butted over an Inseal® 3259 tape with an appropriate flexible sealant in the 1mm joint.
- All Hardie™ Groove Lining joints must have continuous bead of sealant applied to edge of sheet before butting together.

Only stainless steel fasteners must be used.

- Full perimeter fixing required.
- In addition, it is recommended that H3.1 treated timber ceiling battens are used to resist decay due to higher condensation levels present in this area.

5.9 Special Framing/Fixing Requirements

Battens are required when sheets are fixed over:

- Gypsum board
- Concrete

Timber battening is to be a minimum of 35mm deep x 45mm wide minimum

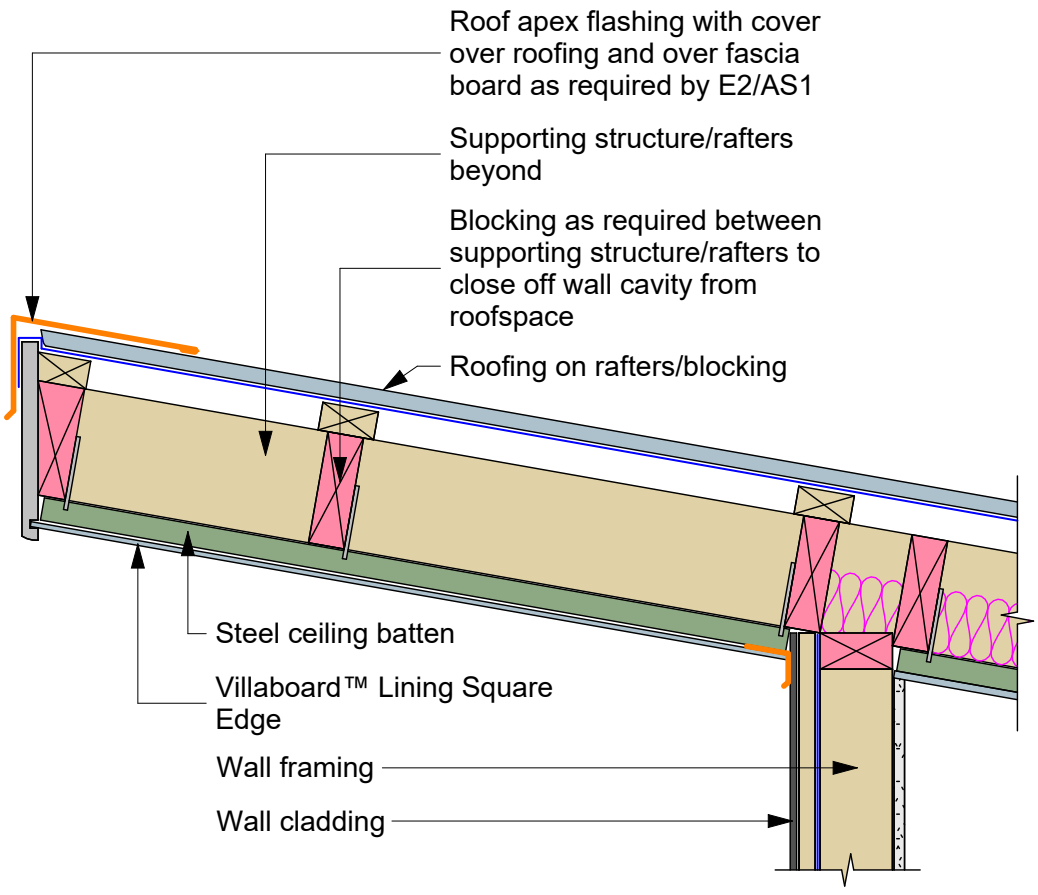
5.10 Special Details

5.10.1 Skillion Roof

When installing soffit linings direct to skillion roof framing ensure that sufficient ventilation has been provided within the roof space. The temperatures within these smaller roof spaces can reach very high levels in certain conditions and this can cause cracking in flush stopped joints due to excessive movement in framing. Therefore it is recommended to use square edge Villaboard™ Lining sheets in this application to avoid the problem of joint cracking. The negative joint detail is formed using Villaboard™ Lining square edge sheets as per Figure 22.

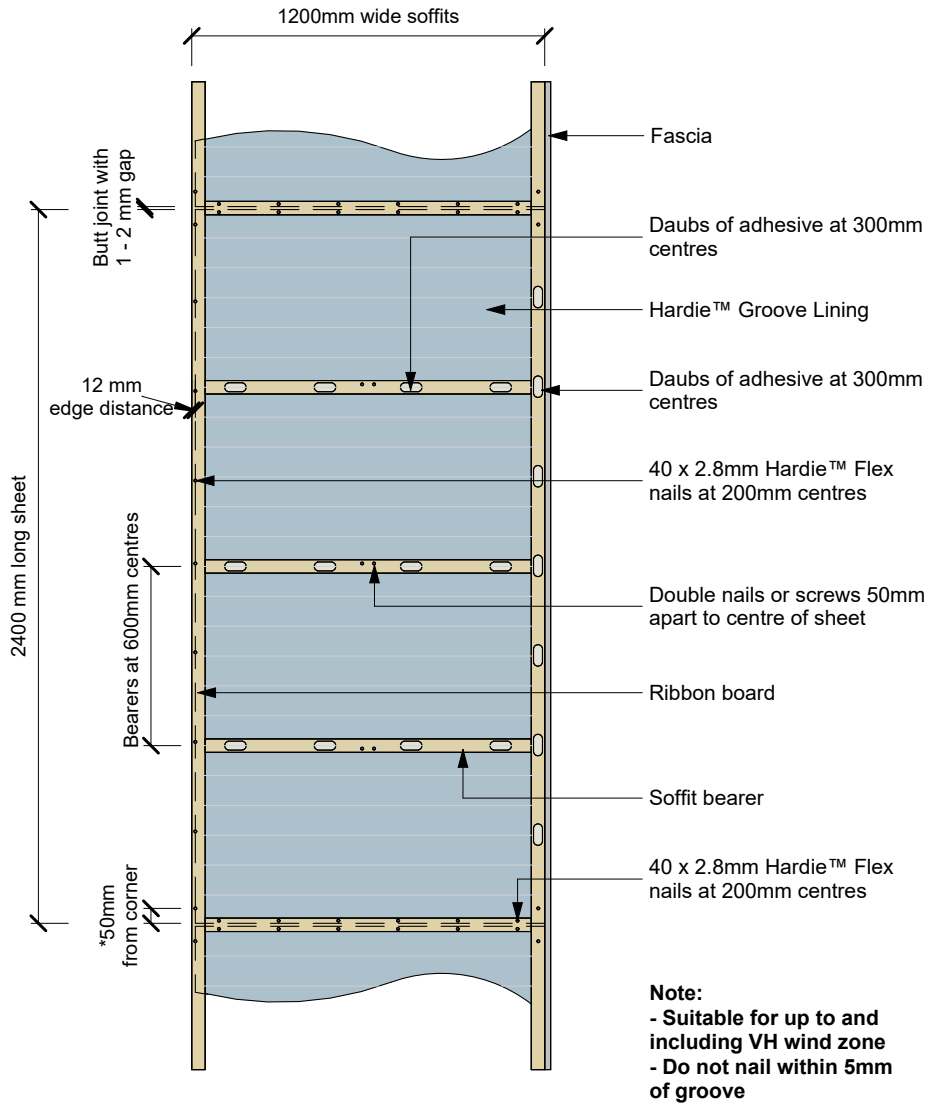
All sheet edges are to be fully supported by framing to facilitate sheet fixing to meet wind pressure exposure requirements.

Figure 14: Villaboard™ Lining Skillion Roof/Ceiling



5.10.2 Hardie™ Groove Lining

Figure 15: Hardie™ Groove Lining nail or screw and adhesive fixing



NOTES

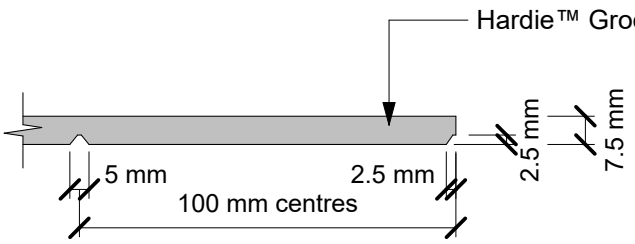
1. Do not place nails or screws within 100mm of the adhesive daubs.
2. Fix with either Hardie™ Flex nails 40 x 2.8mm (galvanised or 316 stainless steel), Villadrive™ wood screws or Hardie™ Drive stainless steel 30mm x 7g wood screws.
3. Use only stainless steel fixings in sea spray zones.
4. When butt jointing short ends of Hardie™ Groove Lining in ceiling/soffit applications, the short edges must be cut square and have chamfer formed.
5. Screw and adhesive fixing option is suitable only up to VH wind zone.

Once the Hardie™ Groove Lining sheets are fixed in place, fill over all driven fixings with Hardie™ Top Coat to the required level of finish and paint.

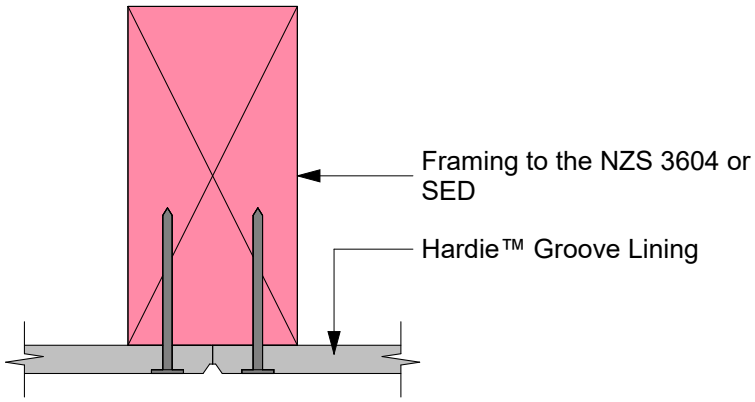
Nails must be finished flush with the sheet surface. Screw heads can be finished 0.5mm below the sheet surface and stopped.

In steel framing the fasteners should be driven as close as possible to the stud corners to avoid deflection of the stud flange.

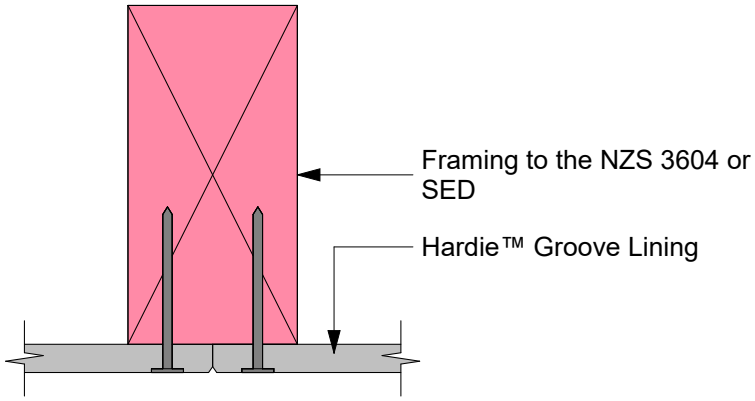
Figure 16: Hardie™ Groove Lining sheet edge and groove detail



Note: Sheets are grooved along the length of the sheet



Note: Typical long edge joint



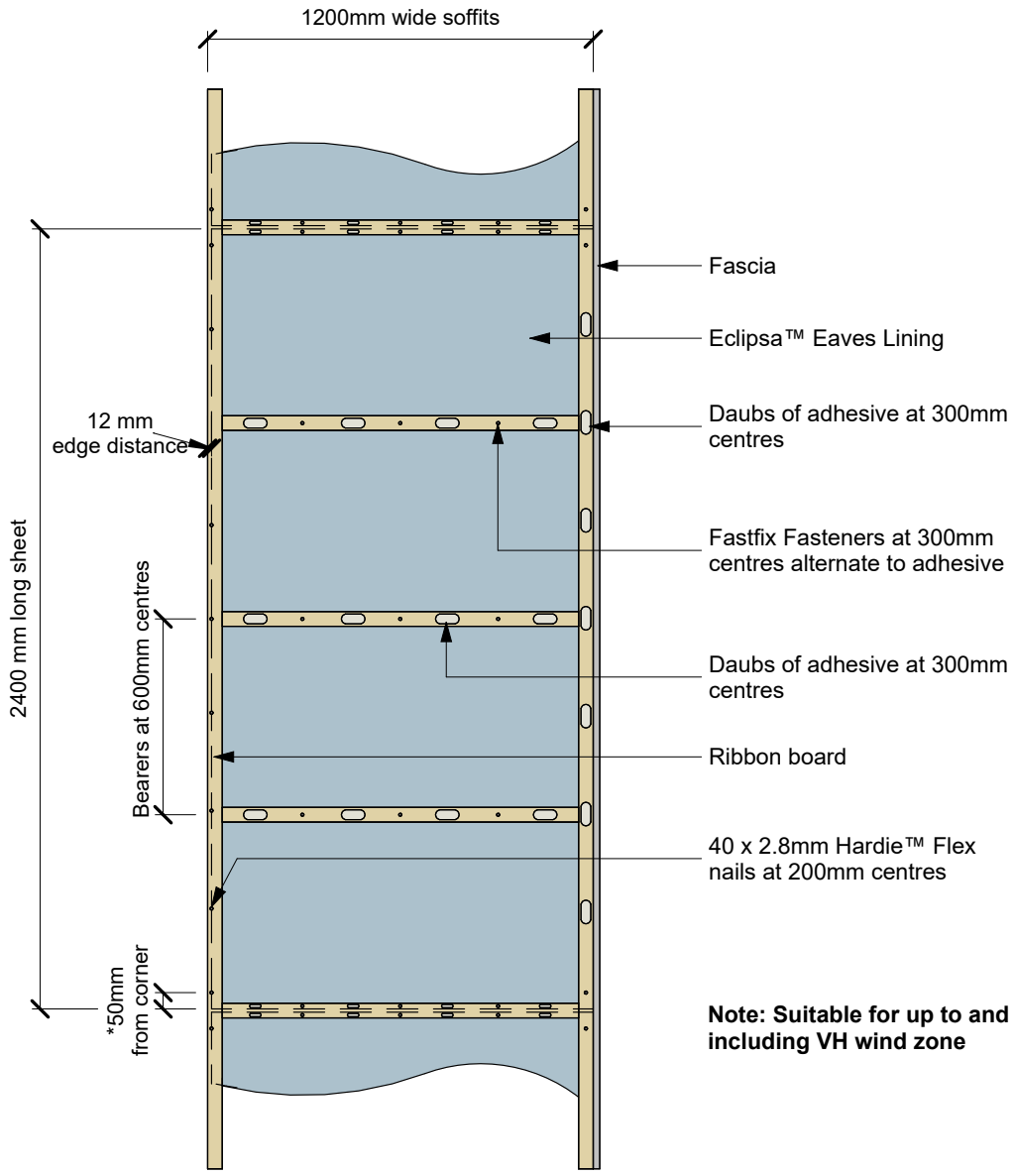
Note: Typical short edge site cut and chamfer

5.10.3 Eclipsa™ Eaves Lining

Fastfix Fasteners (38mm long) can be used as an alternative fixing for prefinished soffit and ceiling systems in conjunction with adhesives. Drill a 6mm-diameter hole through the sheet and framing to insert the Fastfix fastener. In timber the hole must be 40mm deep.

For boxed frame soffit or large ceiling area applications, Eclipsa™ Eaves Lining is fixed using Fastfix Fasteners and the adhesives as per Figures 17, 24 and 25.

Figure 17: Fastfix Fastener and adhesive fixing



5.10.4 Sloping soffit

Figure 18: Sloping soffit and cavity fixed flat sheet cladding

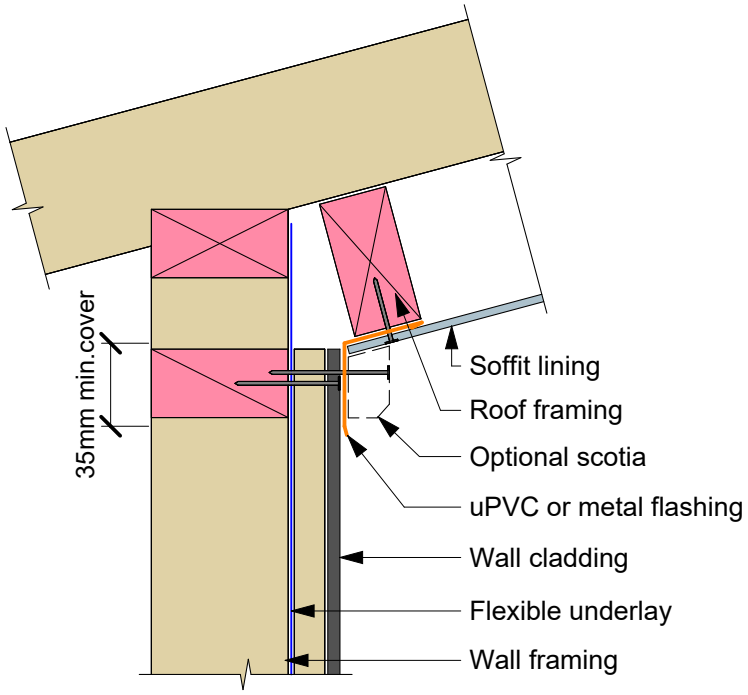
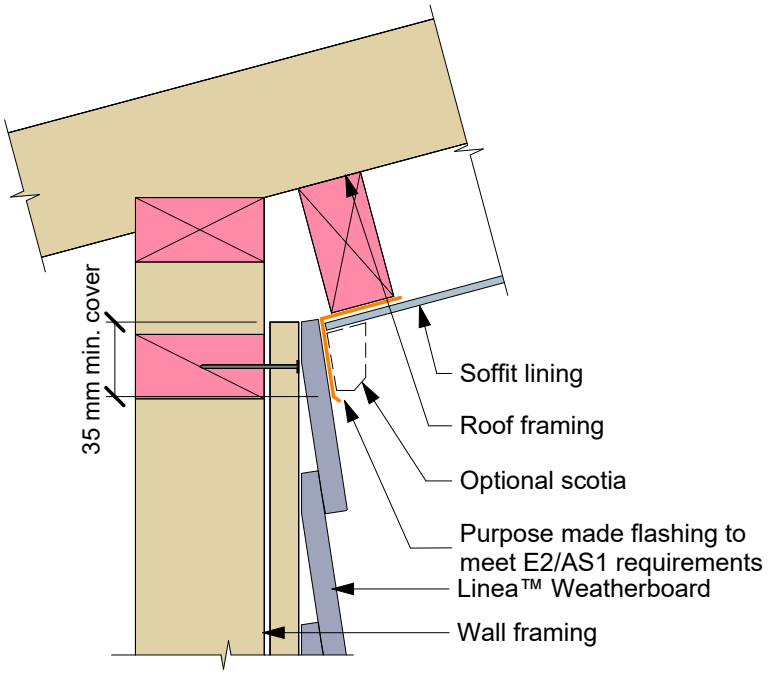


Figure 19: Sloping soffit and cavity fixed weatherboard cladding



6 Jointing options

All soffit lining sheet edges must be supported by framing and/or a fascia board.

6.1 Hardie™ Flex Eaves Lining

- Refer to Figure 20 for uPVC Hardie™ Jointer detail
- Refer to Figure 21 for square butt joint detail
- Refer to Figure 22 for express joint detail
- Refer to Figure 25 for two-way uPVC jointer

6.2 Eclipsa™ Eaves Lining

- Refer to Figure 20 for uPVC Hardie™ Jointer detail
- Refer to Figure 24 for Fastfix Fasteners fixing detail. Use a 6mm diameter masonry drill bit to drill a hole and fix fasteners
- Refer to Figure 25 for two-way uPVC Jointer

6.3 Hardie™ Groove Lining

- Refer to Figure 16 for sheets have half groove along the long edges for butt jointing
- Refer to Figure 16 for sheets to be cut square and have chamfer formed on site along the short edge for butt jointing

6.4 Villaboard™ Lining

Villaboard™ Lining recessed edge

- Refer to Figure 23 for flush joint details. Refer to Section 7 for flush jointing

Villaboard™ Lining square edge

- Refer to Figure 20 for uPVC Hardie™ Jointer detail
- Refer to Figure 21 or square butt joint detail
- Refer to Figure 22 for express joint detail

Figure 20: uPVC Hardie™ Jointer detail

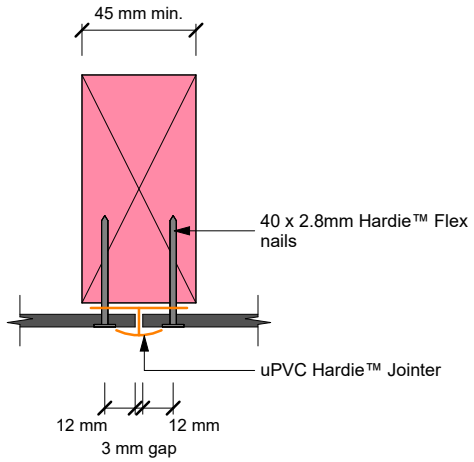


Figure 21: Square Butt joint detail

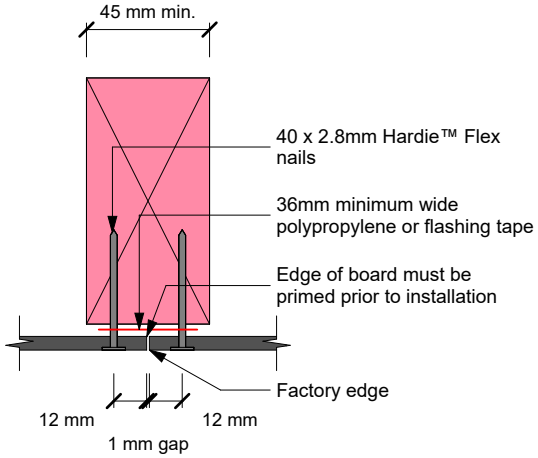
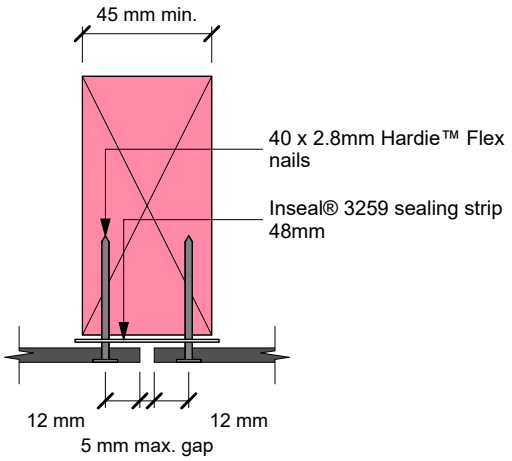


Figure 22: Expressed joint detail



Note:
- For wider joint gaps up to 10mm, framing must be 70mm wide minimum
- The joints can be filled with paintable flexible sealant

Figure 23: Vertical flush joint setout

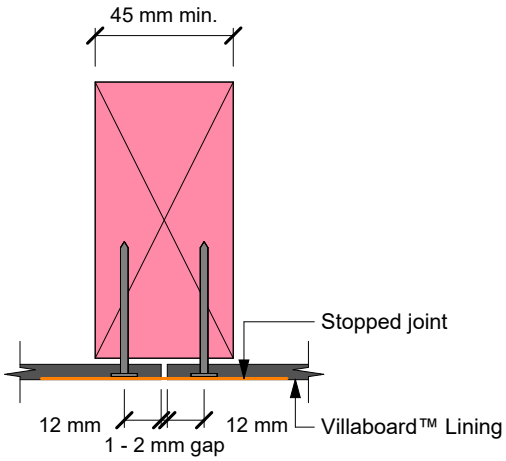
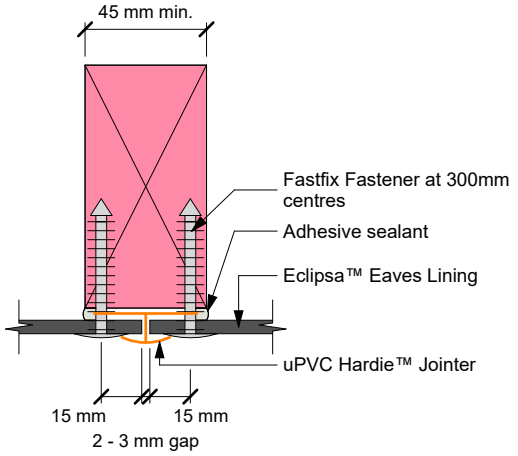
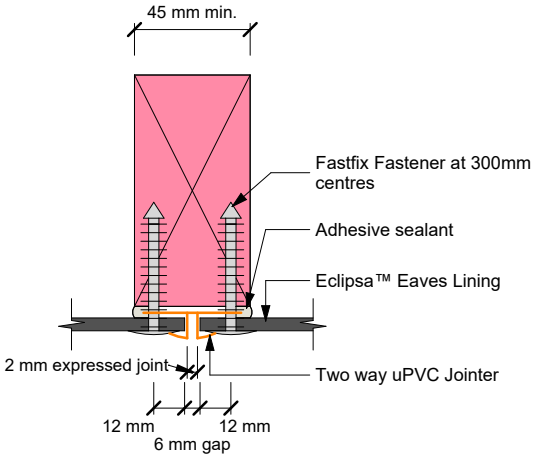


Figure 24: Fastfix Fastener fixing detail



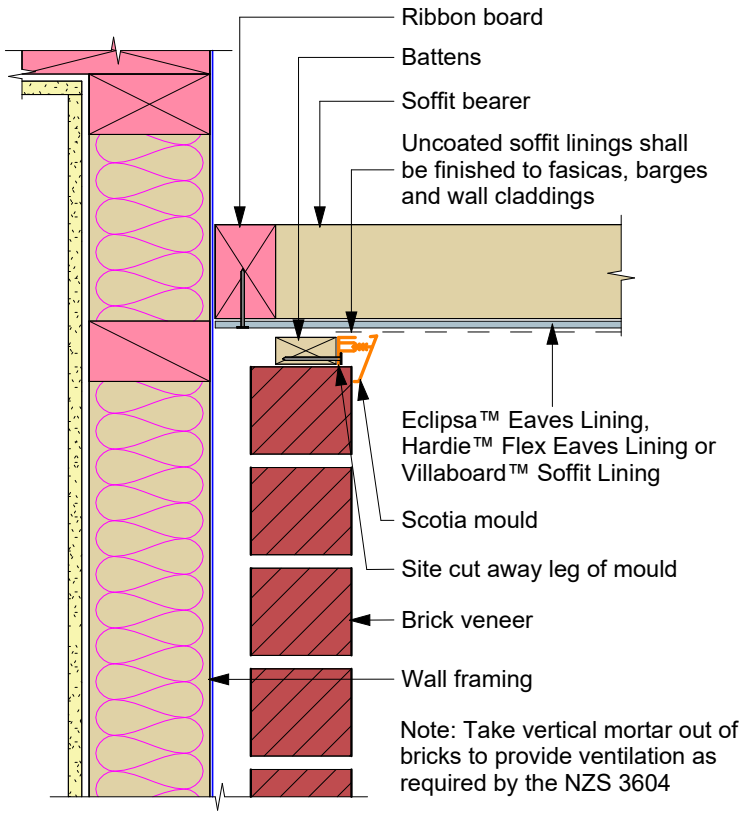
Note: Use a 6mm drill bit for drilling holes in sheet for fixing Fastfix fasteners

Figure 25: Two-way uPVC jointer



Note:
- Eclipsa™ Eaves Lining, use a 6mm drill bit for drilling holes in sheet for fixing Fastfix fasteners
- Hardie™ Flex Eaves Lining, is fixed with Hardie™ Flex Nails

Figure 26: Brick veneer with soffit scotia mould



7 Villaboard™ Lining Joint Stopping

For Villaboard™ Lining

7.1 General

Villaboard™ Lining is finished with paint complying with parts 7, 8, 9 and 10 of AS 3730. The application and maintenance must be in accordance with the manufacturer's specifications.

NOTE: Before flush stopping sheet edges must be sealed with Cemix Cemkey® Concentrate, ARDEX® Multiprime or other similar products.

7.2 Glancing Light

In some instances, due to glancing light, set joints may be noticeable in Villaboard™ Lining walls, especially where paint finishes have a high gloss level. Work closely with your builder or designer to minimise this.

Artificial lighting needs to be considered in relation to soffits.

Where glancing light is an issue its effect can be lessened by:

- Artificial light shading devices.
- The use of light coloured, matt finish paints.

7.3 Level of Finishes

Different levels of finishes are typically specified for different applications. Higher levels of finishes are used to address the glancing light issues with painted Villaboard™ Lining referred to above. A description of the various levels of finishes and the jointing/coating requirements can be found in Table 18.

Table 18

Levels of Finishes			
Level of finish	**Definition***	**Typical jointing/setting**	**Finish**
0	This level of finish may be useful in temporary construction.	No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/ nailing sheets in place.	For use in areas where finishing and stopping is not considered necessary.
1	For use in plenum areas above ceilings, in areas where the work would generally be concealed, or in building service corridors and other areas not normally open to public view.	Joints and corner joints will be set with Hardie™ Base Coat reinforced with perforated paper tape.	Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.
2	For use in warehouse, storage or other areas where surface appearance is not of primary concern.	Joints and corner joints will be set with Hardie™ Base Coat reinforced with perforated paper tape and Hardie™ Top Coat.	Minor tool marks and ridges are generally acceptable.
3	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall paper coverings are to be applied as the final decoration. This level of finish is not generally suitable where smooth painted surfaces or light to medium wall coverings are specified.	Joints and corner joints will be set with Hardie™ Base Coat reinforced with perforated paper tape and Hardie™ Top Coat.	This level of finish must be sufficiently smooth to accept heavy vinyl, tiles or textured coatings without blemishes.
4	This is generally the accepted level of finish for domestic construction. It is used where light textures or wall coverings and smooth textured finishes and satin/flat/low sheen paints are illuminated by non-critical lighting.	Refer to flush jointing recommendations in Section 7.5. All joints and corner joints will have tape embedded in Hardie™ Base Coat applied over all joints, angles, fastener heads and accessories. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	For use where light-texture coatings or wallpaper or other lightweight wall coverings are to be applied. For painted finishes in non-critical lighting areas flat and low-sheen textured paints are to be applied. Gloss and semi-gloss paints are not generally suitable over this level of finish as any minor blemish will show under critical light. The weight, texture and sheen level or wall coverings applied over this level of finish must be carefully evaluated. Joints and fasteners must be adequately concealed if the wall-covering material is lightweight, contains limited pattern, has a gloss finish, or any combination of these features is present. Unbacked vinyl wall coverings are not suitable over this level of finish.
5	This level of finish is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheet paints.	Refer to Section 7.5 steps 1–4 for jointing. Final Hardie™ Base Coat application should be feathered out to approximately 200mm + each side of the joint. Then a full skim coat of Hardie™ Top Coat must be applied over entire sheet surface in order to achieve a uniform finish. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.	This level of finish is for use where gloss, semigloss, low-sheen or non-textured paints are specified or where critical lighting conditions occur.

*Reference: AS/NZS 2589.1: 'Gypsum lining in residential and light commercial construction — Application and finishing. Part 1: Gypsum plasterboard'

7.4 Villaboard™ Lining Jointing and Stopping

Villaboard™ Lining joints are set with Hardie™ jointing compounds reinforced with perforated paper tape. Recessed edge sheet joints require joint setting by using the jointing products outlined. The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanship applied. However, James Hardie considers that the recommendations provided in Tables 12, 18 and 19 describe best practice to reduce the risk of joint cracking or other problems. There are various factors that can affect the performance of jointing compounds on edge recessed fibre cement substrates. These factors include the framing, movement, installation quality, vibrations, moisture, humidity, temperature, etc. To achieve satisfactory joint performance these factors need to be carefully considered and understood by the installer and designer when positioning joints and selecting jointing compounds. Furthermore, it is important that the jointing compound used has the physical attributes required to perform considering these factors. Hardie™ compounds have been specifically developed for use with Villaboard™ Lining.

In addition, provision for movement needs to be made by the installation of control joints. Refer to clause 5.6.2.

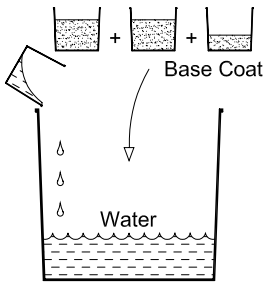
COMPOUND COVERAGE
1kg of Hardie™ Base Coat will provide approximately 5 lm of standard joints. 1kg of Hardie™ Top Coat will provide approximately 5.6 lm of standard joints.

NOTE: Follow the mixing instructions carefully when mixing Hardie™ Base Coat and Hardie™ Top Coat.

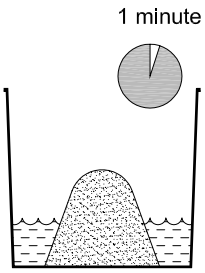
Mixing Instructions

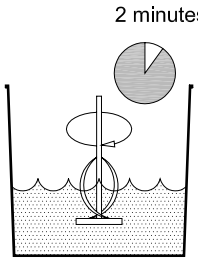
Table 19

Hardie™ Base Coat Mixing Instructions

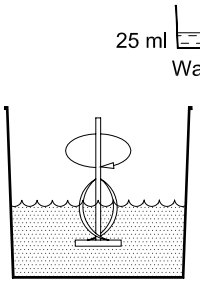


Step 1
First, add 1 part of clean water into bucket.
Then add 2½ parts Hardie™
Base Coat powder
Allow to soak for 1 minute.





Step 2
Mix for 1½ – 2 minutes using paint mixer or equivalent. (approximately 2500-3000rpm)
Hardie™ Base Coat is NOT like the plaster based compounds. Initial mixing will indicate a dry mix and further mixing WITHOUT further addition of water will deliver the ideal workable paste.
Warning: Inadequate or over mixing can lead to poor workability and can cause performance issues. Do not hand mix.



Step 3
The mix at this stage should be consistently smooth.
Based on the environmental conditions (i.e. temperature and humidity) you may add maximum of 25ml of water per 1kg of base coat powder in the mix at this stage to adjust workability. Mix it well.
(Note: Adding excess water than the recommendation may delay the drying of base coat and may cause joint cracking due to excessive shrinkage.)
Mix should be glossy and smooth. There should be no lumps in the mix.

Important Notes:

1. Do not apply Hardie™ Base Coat in temperatures above 40º C or below 5º C.
2. Allow the compounds to dry before applying the next coat. The drying time will vary between 12 to 24 hours depending upon the weather conditions.
3. Villaboard™ Lining site cut and site recessed sheet edges must be sealed with an acrylic sealer e.g. Dulux® Acraprime® 501/1, Dulux® 1 Step or similar product.
4. In corners, use Hardie™ uPVC internal/external corner mould primed with Dulux® Primerlock® or similar. A 'GIB® Goldline™ Platinum' corner mould can also be used.
5. Use only perforated paper tapes in straight joints.
6. It is recommended that one (1) base coat bag is mixed in three (3) portions.
7. Before stopping the sheet edges, Cemix Cemkey® Concentrate, ARDEX Multiprime or a similar product in diluted form must be applied over the sheet edges. Mix the resin as per the manufacturers recommendations.

Product Life:
Hardie™ Base Coat has a shelf life of 12 months in unopened bags when stored in a cool dry place.

Hardie™ Base Coat has a bag life of 1 month if opened bags are resealed and stored in a cool dry place.

7.5 Set Joints

Step 1 — Preparation

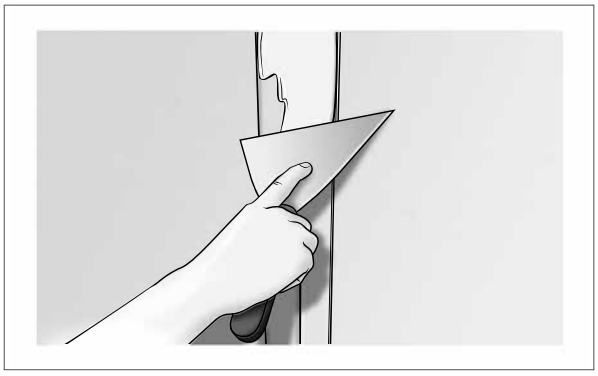
Ensure that the recesses are clean and free of dust and contaminants. Sheet edges must be sealed with Cemix Cemkey® Concentrate, ARDEX® Multiprime or other similar products. If working conditions are hot and dry, dampen the area around the joint prior to working.



NOTE: The jointing method shown below provides a Level 4 finish. For more information about this and other finishes refer to **page 42.**

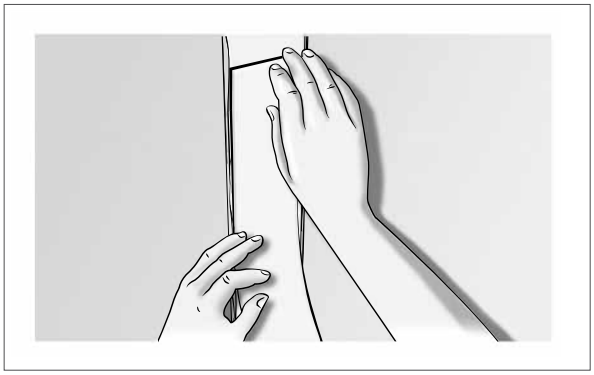
Step 2 — First Coat

Apply Hardie™ Base Coat to fill the recess with a 150mm broad knife.



Step 3 — Embed Tape

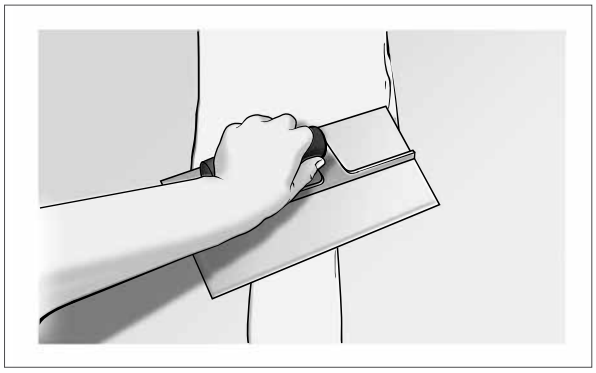
Firmly embed the perforated paper tape centrally into the joint using a 50mm broad knife. Ensure that there are no voids under the tape and remove excess compounds.





Step 4 — Thin Layer

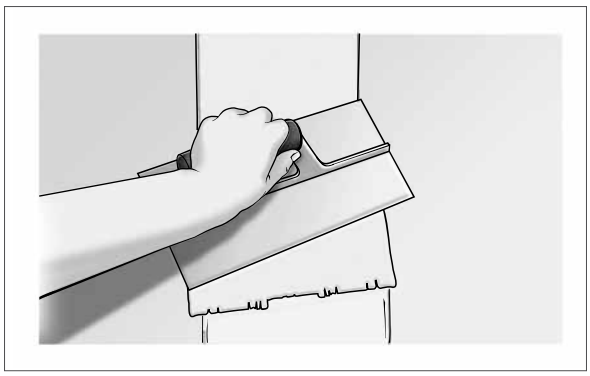
Immediately cover tape with a thin layer of Hardie™ Base Coat applied with a 150mm broadknife.



NOTE: Steps 5, 6 and 7 are only required for paint and wall paper finish.

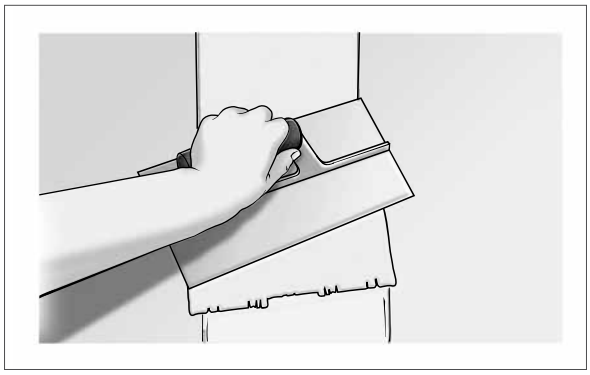
Step 5 — Second Coat

When the first coat is fully dry, use a 200mm wide second coat trowel to apply the Hardie™ Base Coat. Apply this coat approximately 180mm wide, laid down over the recess and feather the edges.



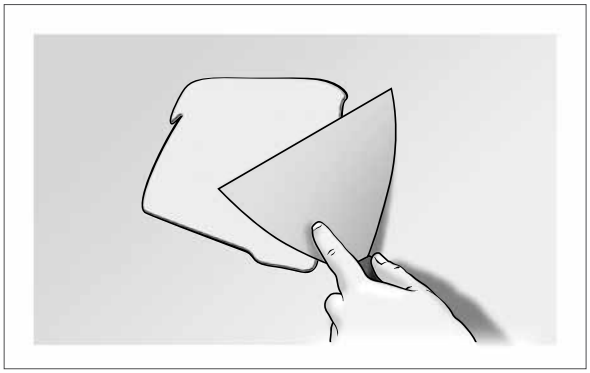
Step 6 — Finishing Coat

Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of Hardie™ Top Coat 280mm wide centrally over the joint and feather out the edges. Allow to dry fully before sanding. Sand with a 180 grit sand paper to achieve a smooth finish for painting.



Step 7 — Fastener Heads

Apply a finishing coat of Hardie™ Top Coat to fastener heads, feathering out the edges. Allow to fully dry before sanding.



8 Finishing

8.1 Painting

Hardie™ Flex Eaves Lining, Villaboard™ Lining and Hardie™ Groove Lining sheets are to have a minimum of two coats of acrylic paint applied after fixing in order to meet the requirements of the NZBC. All sheets must be coated within 90 days of installation.

Use quality 100% acrylic paints. Economy paints are not recommended because generally they are less well bound, less moisture resistant and more prone to mould growth.

In all cases the manufacturer's specification for the selected paint must be followed. Note that some paints require an undercoat before applying finish coats.

Damp, shady situations, proximity to bush, agricultural paddocks or seaspray environments may induce an extra tendency to mould growth. Use mould-inhibiting and alkaline-resistant undercoats and consult the paint manufacturer for details of maximum mould-resistant paints.

Before painting, remove any surface grime or other contaminants and ensure the Hardie™ Flex Eaves Lining, Villaboard™ Lining and Hardie™ Groove Lining is dry. Paint must not be applied when the air temperature is below 10°C.

When using uPVC moulds avoid dark colours (paints must have light reflection of 40% or more) as excessive movement may cause buckling of the uPVC when exposed to direct sunlight.

Enamel-based paints can be used, utilising a three-coat system.

For full details apply to the selected paint manufacturer before commencing the work.

8.2 Flexible Sealant

Sealant used must comply with the relevant requirements of the NZBC. Their application and usage must be in accordance with the manufacturer's instructions. Check with the sealant manufacturer prior to coating over sealant. Some sealant manufacturers do not recommend coating over their product.

8.3 Masking Tape

The recommended masking tape for use with Eclipsa™ Eaves Lining is 3M® Scotch® Blue I8E 2090 or Sellotape® Premium+™ Washi® DELICATE. This tape can only be left on the Eclipsa™ Eaves Lining for maximum 7 days, otherwise tape removal may cause paint loss.

9 Product information

9.1 General

Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining are a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre, water and proprietary additives.

Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining is manufactured in Australia to the NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets').

James Hardie is an ISO 9001 certified manufacturer. Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining are classified Type A, Category 3 in accordance with the AS/NZS 2908.2 'Cellulose-Cement Products'.

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

9.2 Durability

Resistance to Moisture/rotting

Hardie™ Flex Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove Lining and Villaboard™ Lining has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with the AS/NZS 2908.2:

- Heat rain (Clause 6.5)
- Water permeability (Clause 8.2.2)
- Warm water (Clause 8.2.4)
- Soak dry (Clause 8.2.5)

9.3 Group Number Classification

Hardie™ Groove Lining and Villaboard™ Lining have a 'Group Number' classification of 1 – S as per the requirements of Clause C of the NZBC.

10 Maintenance

It is the responsibility of the specifier to determine normal maintenance requirements for eaves and soffits to comply with the NZBC Acceptable Solution B2/AS1. The extent and nature of maintenance will depend on the geographical location and exposure of the building. As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months, using low water pressure and a brush. Do not use a water blaster to wash down the soffits.
- Pre-painted soffits, such as Eclipsa™ Eaves Lining, when used in harsh costal environments, the soffit must be washed down using a hose and soft brush minimum once every four months in addition to the other maintenance requirements.
- Re-applying exterior protective finishes. Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants.
- Cleaning out gutters, blocked pipes and overflows as required.
- Pruning back vegetation close to or touching the building.

Notes

Notes

Product Warranty

All eaves and soffit linings by James Hardie come with a 15 year product warranty. Pre-finished products such as Eclipsa™ Eaves Lining come with a 10 year coating warranty and 15 year warranty on the base sheet. All accessories supplied by James Hardie are warranted for a period of 15 years. For full warranty details visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) in each products warranty under "Conditions of Warranty". James Hardie has tested the performance of the Hardie™ Flex™ Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove™ Lining and Villaboard™ Lining, and when installed in accordance with the Hardie™ Flex™ Eaves Lining, Eclipsa™ Eaves Lining, Hardie™ Groove™ Lining and Villaboard™ Lining installation manual, in accordance with the standards and verification methods required by the New Zealand Building Code (NZBC) and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.



JamesHardie™

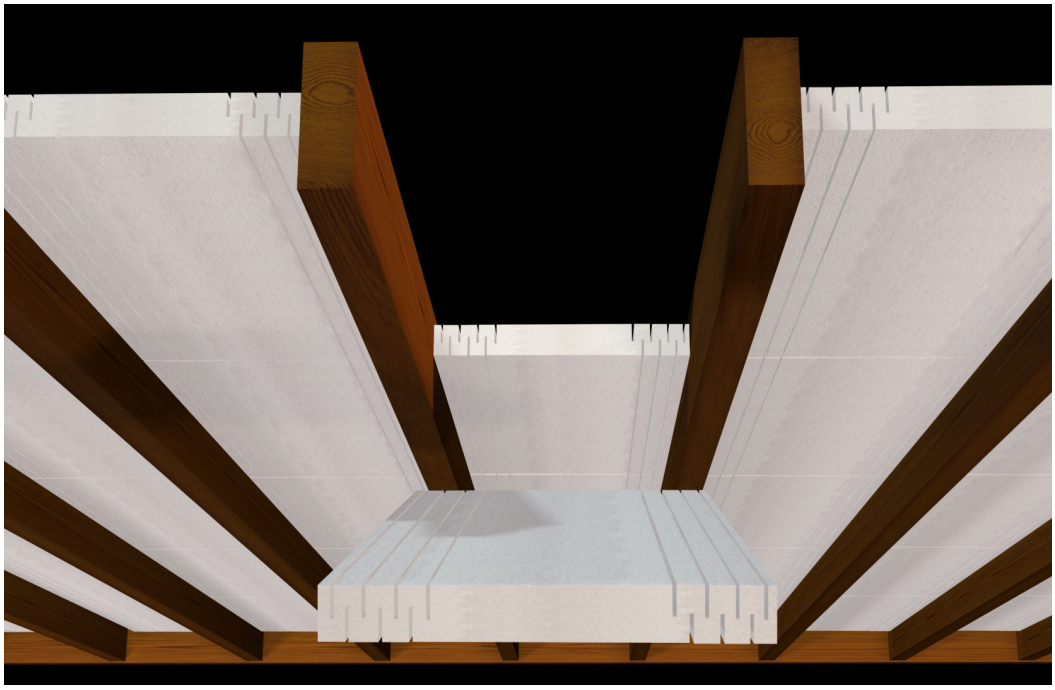
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BRANZ Appraised

Appraisal No. 256 (2026)

EXPOL UNDERFLOOR INSULATION



Appraisal No. 256 (2026)

This Appraisal replaces BRANZ Appraisal No. 256 (2020)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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BRANZ

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Product

1.1 EXPOL Underfloor Insulation is an expanded polystyrene (EPS) foam board for use as a thermal insulation for timber-framed floors. The insulation is pre-cut and compressed to fit a range of flooring joist spacings.

Scope

2.1 EXPOL Underfloor Insulation has been appraised as a thermal insulation material:

- for timber-framed floors in new or existing domestic and commercial buildings; and,
- for use under floors which have an enclosed perimeter foundation as defined in NZS 4246; or,
- for use under floors exposed to wind wash when clips are used to secure the insulation.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, EXPOL Underfloor Insulation, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (b) not less than 15 years, and B2.3.1 (c) 5 years. EXPOL Underfloor Insulation meets these requirements. See Paragraphs 8.1-8.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. EXPOL Underfloor Insulation meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. EXPOL Underfloor Insulation contributes to meeting these requirements. See Paragraph 14.1.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Technical Specification

4.1 Components and accessories supplied by EXPOL Limited are as follows:

- **EXPOL Underfloor Insulation** is expanded polystyrene (EPS) foam boards with pre-cut concertina cuts to both edges. It is manufactured from flame retardant bead to meet the manufacturing requirements of AS 1366.3. EXPOL Underfloor Insulation is white in colour and is supplied in colour coded packaging to identify the different widths. EXPOL Underfloor Insulation is available as set out in Table 1.

Table 1: EXPOL Underfloor Insulation product range

R-value	Nominal thickness (mm)	Width (mm)	Length (mm)
R2.5	100	360, 410, 470 or 560	1,200

- **EXPOL Z clips** are manufactured from non-corrosive nylon and are designed as a push fit bracket between the panel and the joist in existing floors.
- **EXPOL Joist Saddles** are manufactured from non-corrosive nylon and are designed to sit over joists in new floors.

4.2 Accessories used with EXPOL Underfloor Insulation, which are supplied by the insulation installer, are stainless steel nails as an optional method of fixing.

Handling and Storage

5.1 EXPOL Underfloor Insulation must be stored under cover and out of sunlight. Heavy objects must not be stacked on the packs.

5.2 EXPOL Underfloor Insulation is able to get wet before the installation process, but it is recommended that the product is dry during installation against the underfloor or before flooring is fitted.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Step by step Guide, Version 1.0, dated 18/8/2023.
- EXPOL R2.5 Underfloor Insulation – Technical Datasheet, Version 1.0, dated 21/8/2023.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 EXPOL Underfloor Insulation is intended for use as thermal insulation to meet the requirements of the NZBC. EXPOL Underfloor Insulation can be used to meet the requirements of the NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Greater construction R-values can be achieved where specific design is used. For construction R-values, refer to the BRANZ House Insulation Guide. Product R-values and dimensions are given in Table 1.

7.2 EXPOL Underfloor Insulation thermal resistance (R-value) has been determined by testing to AS/NZS 4859.1, which is an acceptable method in NZBC Acceptable Solution H1/AS1.

7.3 EXPOL Underfloor Insulation is designed to be compression fitted between floor joists with the option of being clipped in place with a EXPOL Z clips or joist saddles. The panels are supplied in widths to suit most installations, refer to Table 1 for dimensions.

7.4 EXPOL Underfloor Insulation, when installed following the Technical Literature, is suitable for use in suspended timber floors without a lining. EXPOL Z clips or joist saddles must be used in situations when the insulation is exposed to wind wash.

7.5 The building envelope must be constructed to ensure the insulation remains dry throughout the life of the building.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

7.6 The clearance requirements for heating appliances and downlights must be met and reference made to the manufacturers instructions and NZS 4246.

Electrical Cables

7.7 PVC cables must be prevented from direct contact with EXPOL Underfloor Insulation. Refer to Paragraph 16.6.

Durability

8.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of EXPOL Underfloor Insulation both during normal use and maintenance of the building.

Serviceable Life

8.2 Where the building is maintained so that provisions of the NZBC E2 and E3 Clauses are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance, EXPOL Underfloor Insulation can expect to have a serviceable life of at least 50 years.

8.3 EXPOL Z clips or joist saddles must be used to achieve a 50 year serviceable life.

8.4 EXPOL Z clips or joist saddles are required to support EXPOL Underfloor Insulation for underfloors that are exposed to wind wash.

Maintenance

9.1 Insulation that has become damp must be removed and the cause of the dampness repaired. The insulation must be dry and the floor framing must be clean, dry and free from all contaminants and mould before refitting the dry insulation.

9.2 Regular inspections must be completed to insure that installation integrity is maintained and any dislodged panels are reinstalled.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to EXPOL Underfloor Insulation from heat sources such as fireplaces, heating appliances, chimneys and recessed luminaries (except class IC-F). NZBC Acceptable Solutions C/AS1 and C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Control of Internal Fire and Smoke Spread

11.1 Where the completed floor system is above an occupied space, the system, including the surface lining product enclosing the EXPOL Underfloor Insulation from the adjacent occupied space, must achieve the Group Number for internal surface finish requirements as specified in the relevant NZBC Acceptable Solution C/AS1 or C/AS2.

External Moisture

12.1 The total building envelope must be weathertight and comply with the requirements of NZBC Clause E2 to ensure that the insulation remains dry in use.

12.2 The moisture content of the construction materials at the time of installing and enclosing the insulation must meet the lower requirement of either the NZBC Acceptable Solution E2/AS1 or the flooring manufacturer.

Internal Moisture

13.1 Buildings must provide an adequate combination of thermal resistance, ventilation and space temperature to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate. This does not apply to Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Energy Efficiency

14.1 EXPOL Underfloor Insulation will contribute to meeting the requirements of NZBC Clause H1 Performance H1.3.1(a) and H1.3.2 E through compliance with NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Refer to Paragraph 7.1.

Installation Information

Installation Skill Level Requirement

15.1 Installation of EXPOL Underfloor Insulation must be completed by an installer with an understanding of insulation installation.

General

16.1 Installation of EXPOL Underfloor Insulation must be in accordance with the Technical Literature and this Appraisal. NZS 4246 should be used as a guide for installing insulation into residential buildings.

16.2 It is important to achieve a tight friction fit between the edge of the board and the joist. This is achieved by the compression of the pre-cut concertina cuts to the edges of the boards.

16.3 All gaps must be filled and a tight fit made at butt joins. Small gaps can be sealed with extra material, or a urethane foam.

16.4 EXPOL Z clips or joist saddles must be used, in line with the Technical Literature, in exposed floors subject to wind wash.

16.5 EXPOL Underfloor Insulation must be separated from all sources of heat.

16.6 PVC cables must be prevented from direct contact with any EXPOL Underfloor Insulation. A physical separation must be provided by running cables around the insulation boards, or by wrapping the cables with separating material supplied by EXPOL Limited.

Inspections

16.7 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of EXPOL Underfloor Insulation installations.

Health and Safety

17.1 Refer to the Technical Literature and NZS 4246 for guidance on heath and safety requirements such as personal protective clothing and installation hazard assessment.

Basis of Appraisal

The following is a summary of the technical investigations carried out.

Tests

18.1 BRANZ has carried out thermal resistance testing of EXPOL Underfloor Insulation in accordance with ASTM C518 as part of the material test evaluation to AS/NZS 4859.1.

Other Investigations

19.1 An assessment of the durability of EXPOL Underfloor Insulation has been made by BRANZ technical experts.

19.2 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

19.3 Site inspections have been undertaken by BRANZ to assess the practicability of installation and to examine completed installations.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Quality

20.1 The manufacture of EXPOL Underfloor Insulation has been examined by BRANZ, including methods adopted for quality control. Details of the manufacturing processes were obtained and found to be satisfactory.

20.2 EXPOL Limited is responsible for the quality of the product supplied.

20.3 Quality of installation of the product on-site is the responsibility of the installer.

20.4 Maintenance of the building is the responsibility of the building owner.

Sources of Information

- AS 1366.3:1992 Rigid cellular plastics sheets for thermal insulation – Rigid cellular polystyrene – Moulded.
- AS/NZS 4859.1:2018 Thermal insulation materials for buildings.
- BRANZ House Insulation Guide (Sixth Edition), 2022.
- NZS 4246:2016 Energy efficiency - Installing bulk thermal insulation in residential buildings.
- NZS 4214:2006 Methods of determining the total thermal resistance of buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The New Zealand Building Regulations 1992.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ

In the opinion of BRANZ, EXPOL Underfloor Insulation is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to EXPOL 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. EXPOL 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 quality of work;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by EXPOL 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 EXPOL Limited or any third party.

For BRANZ



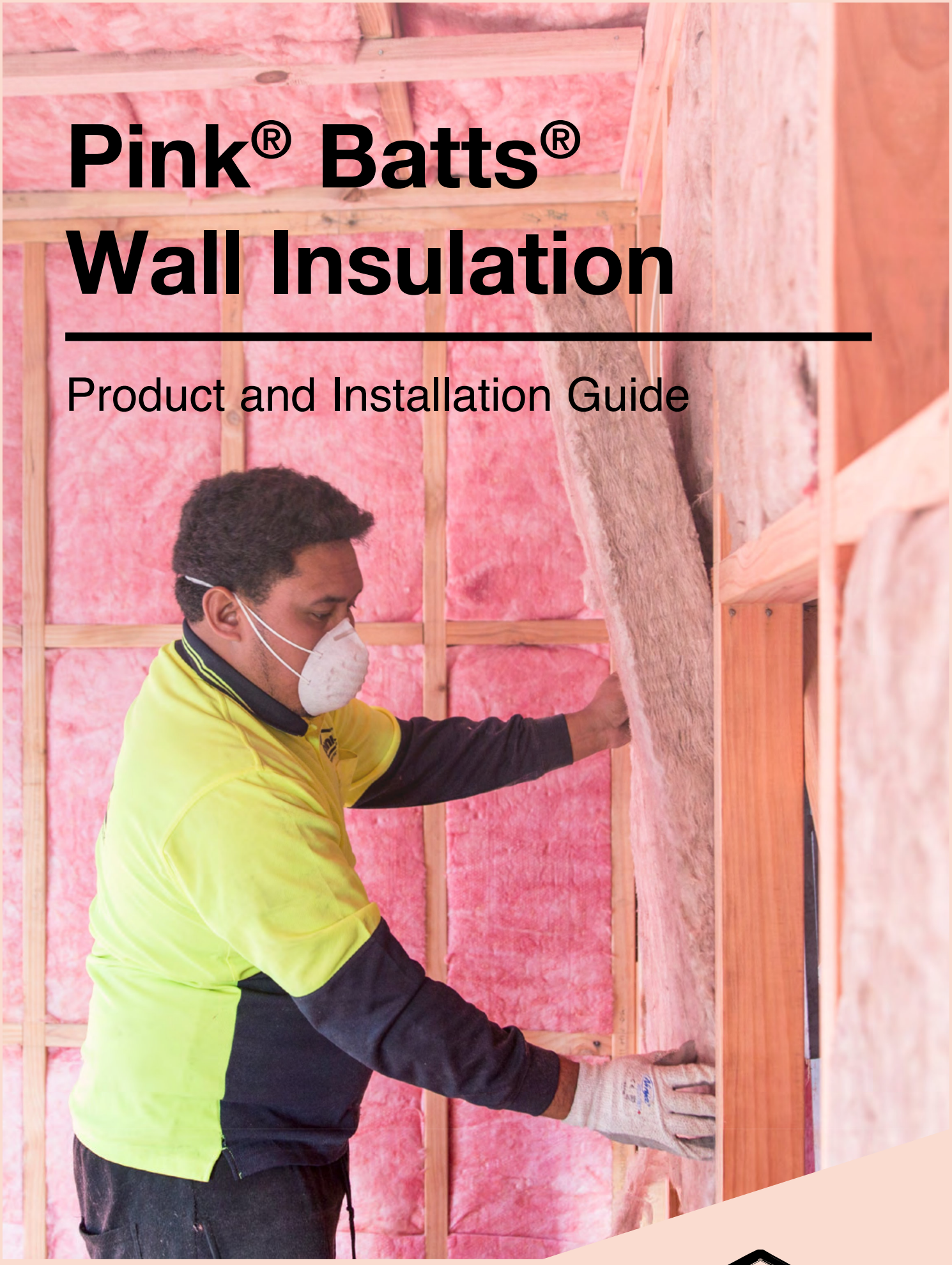
Claire Falck
Chief Executive

Date of Issue:
13 January 2026

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Pink® Batts® Wall Insulation

Product and Installation Guide



pink® batts®

BROUGHT TO YOU BY COMFORTECH®

Pink® Batts® Wall Insulation

Product and Installation Guide

Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
WALL – ACOUSTIC INSULATION									
Pink® Batts® Silencer® 100mm	7317001	1140 x 560	100	12.8	14.9	20	-	✓	x
Pink® Batts® Silencer® 75mm	7317003	1140 x 560	75	16.6	19.5	26	-	✓	x
WALL – THERMAL INSULATION									
INTERIOR SECONDARY INSULATION LAYER - 530mm WIDTH									
R1.0 Pink® Batts® Ultra® Interior Wall	7160271	1220 x 530	35	16.8	18.9	26	✓	✓	238
R1.3 Pink® Batts® Ultra® Interior Wall	7160272	1220 x 530	45	12.9	14.5	20	✓	✓	238
MASONRY WALL - 580mm WIDTH									
R1.0 Pink® Batts® Masonry Wall	7160110	1220 x 580	40	21.2	-	30	✓	✓	238
R1.2 Pink® Batts® Masonry Wall	7160134	1220 x 580	50	17.0	-	24	✓	✓	238
70mm WALL RANGE - 560mm WIDTH									
R2.2 Pink® Batts® 70mm Wall	7160248	1140 x 560	70	6.4	7.5	10	✓	✓	238
STEEL WALL - 610mm WIDTH									
R2.2 Pink® Batts® Steel Wall	7160214	1220 x 610	90	15.6	15.6	21	✓	✓	238
R2.6 Pink® Batts® Ultra® Steel Wall	7160215	1220 x 610	90	9.7	9.7	13	✓	✓	238
R2.8 Pink® Batts® Ultra® Steel Wall	7160267	1220 x 610	90	6.7	6.7	9	✓	✓	238
90mm WALL RANGE - STANDARD 560mm WIDTH									
R1.8 Pink® Batts® Wall	7127118	1140 x 560	90	16.6	19.6	26	✓	✓	238
R2.2 Pink® Batts® Wall	7127122	1140 x 560	90	13.4	15.8	21	✓	✓	238
R2.4 Pink® Batts® Wall	7127124	1140 x 560	90	10.2	12.1	16	✓	✓	238
R2.6 Pink® Batts® Ultra® Wall	7127126	1140 x 560	90	9.6	11.3	15	✓	✓	238
R2.6 Pink® Batts® Ultra® Wall (OC)	718226	1140 x 560	90	9.6	11.3	15			238
R2.8 Pink® Batts® Ultra® Wall	7127128	1140 x 560	90	6.4	7.5	10	✓	✓	238
R2.8 Pink® Batts® Ultra® Wall (OC)	718228	1140 x 560	90	6.4	7.5	10			238

* Square metre coverage per bale are estimates and actual coverage may differ

Pink® Batts® Wall Insulation
Product and Installation Guide

Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisal Number
90mm WALL RANGE - NARROW WALL 360mm WIDTH									
R2.2 Pink® Batts® Narrow Wall	7160243	1140 x 360	90	9.0	11.2	22	✓	✓	238
R2.6 Pink® Batts® Ultra® Narrow Wall	7160244	1140 x 360	90	7.4	9.2	18	✓	✓	238
R2.8 Pink® Batts® Ultra® Narrow Wall	7160247	1140 x 360	90	4.5	5.6	11	✓	✓	238
140mm WALL RANGE - STANDARD 560mm WIDTH									
R3.2 Pink® Batts® Ultra® 140mm Wall	7127132	1140 x 560	140	9.6	11.3	15	✓	✓	238
R3.6 Pink® Batts® Ultra® 140mm Wall	7127136	1140 x 560	140	7.0	8.3	11	✓	✓	238
R4.0 Pink® Batts® Ultra® 140mm Wall	7127140	1140 x 560	140	5.1	6	8	✓	✓	238
R4.3 Pink® Batts® Ultra® 140mm Wall	7127143	1140 x 560	140	3.2	3.8	5	✓	✓	238
140mm WALL RANGE - NARROW WALL 360mm WIDTH									
R3.2 Pink® Batts® Ultra® 140mm Narrow Wall	7160245	1140 x 360	140	7.0	8.6	17	✓	✓	238
R3.6 Pink® Batts® Ultra® 140mm Narrow Wall	7160273	1140 x 360	140	5.7	7.1	14	✓	✓	238
R4.0 Pink® Batts® Ultra® 140mm Narrow Wall	7160246	1140 x 360	140	4.1	5	10	✓	✓	238
R4.3 Pink® Batts® Ultra® 140mm Narrow Wall	7160262	1140 x 360	140	2.9	3.6	7	✓	✓	238

* Square metre coverage per bale are estimates and actual coverage may differ.

Pink® Batts® Wall Insulation
Product and Installation Guide

Application

Pink® Batts® wall insulation is a lightweight flexible glass wool insulation product designed to:

- Thermally insulate timber and steel framed walls
- Fit easily into standard wall constructions, or be easily cut to fit in non-standard constructions
- Meet the requirements of the New Zealand Building Code (NZBC) for different designs and environments

Features and Benefits

- High R-values – R-values up to R4.3 to assist in keeping homes above 18°C as per the World Health Organization's recommendation for a healthy and comfortable home
- Easy to install – lightweight, flexible and simple design makes the installation fast and easy
- Internationally certified for Indoor Air Quality – gives assurance that products meet strict chemical emissions limits
- Non-combustible – will not easily burn in the event of a fire
- Made from recycled glass making sustainable use of waste



Pink® Batts® Wall Insulation
Product and Installation Guide

Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using recycled glass, making sustainable use of waste
- Energy used during the manufacture of Pink® Batts® products is offset by the energy saved by a home fully insulated with Pink® Batts® products within 3-15 months[1]

Green Star NZ Credits

Green Star is a comprehensive environmental rating system for buildings; materials with certain attributes can receive points that contribute to the overall score of a rated home.

New Zealand Green Building Council (NZGBC) does not test or certify products; they rely on the work done by third party certification bodies and eco labels like Eco Choice Aotearoa. Further information is available at **nzgbc.org.nz**.

Eco Choice Aotearoa

All NZ-made Pink® Batts® Wall insulation products have Eco Choice Aotearoa Accreditation (refer to the Product Specifications)

Independently assessed for:

- **Waste Minimisation:** Recycled content, and recycling of process waste
- **Energy Management:** Effective energy management policies and procedures
- **Manufacturing Process:** Not manufactured using blowing agents with a Global Warming Potential (GWP) or Ozone Depleting Potential (ODP)
- **Product Characteristics:** Durability and performance

Eco Choice Aotearoa
Licence No 2504017

While only BRANZ appraised products are eligible for Eco Choice Aotearoa, all Pink® Batts® thermal insulation products are manufactured in the same environmentally considerate way.

1 (Beca Carter Hollings & Ferner Ltd, Energy Economics of Fibreglass Insulation, 2005)

Pink® Batts® Wall Insulation
Product and Installation Guide

Health and Safety

Product Safety

Pink® Batts® insulation is a non-hazardous, safe product.

- IARC (International Agency for Research on Cancer) classifies the glass wool formulation used to manufacture Pink® Batts® products as Group 3: 'Not classifiable as to its carcinogenicity to humans'. This is the same classification as caffeine, tea, hair colouring, chlorinated drinking water and saccharin
- Pink® Batts® insulation is bio-soluble. In the unlikely event any fibres are inhaled into the lungs they will dissolve in the body fluids and be cleared from the body

Indoor Air Quality

- Pink® Batts® insulation is certified under the GREENGUARD Certification Program. Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and formaldehyde), to help create healthier indoor environments

General Health

- Pink® Batts® insulation will assist in meeting the World Health Organisation recommendation for houses to be maintained at a minimum temperature of 18ºC to provide a healthy and comfortable home
- A Wellington School of Medicine study found insulated houses resulted in families with fewer sick days and the economic benefit was double the initial cost of the insulation[2]

2 Howden-Chapman, P. et al. "Effect of insulating existing houses on health inequality: cluster randomised study in the community" British Medical Journal, 2007, p334:460

Technical Data

Properties	Result		Test/Method/Standard	Test Results
Combustibility	Non-Combustible	✓	AS/NZS 1530.1:1994	Group Number 1S
Early Fire Hazards		✓	AS/NZS 1530.3:1993 - Ignitability (Range 0-20) - Spread of Flame Index (Range 0-10) - Heat Evolved Index (Range 0-10) - Smoke Developed Index (Range 0-10)	 = 0 = 0 = 0 = 0-1
R-value	Various*	✓	AS/NZS 4859.1:2018	
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Vermin Resistance	No Food Source	✓	AS/NZS 4859.1:2018-Glass wool exempt	

* Stated thicknesses are values at which stated R-values are achieved and are likely to be minimum values. See table on Page 1.

Pink® Batts® Wall Insulation
Product and Installation Guide

New Zealand Building Code (NZBC) and Limitations

Pink® Batts® wall insulation when used, installed and maintained in accordance with the requirements outlined in this datasheet, will meet or contribute to meeting the following provisions of the NZBC:

NZBC Clause B2: Durability

Meets the requirement NZBC B2.3.1 a) 50 years and NZBC B2.3.1 b) 15 years

NZBC Clause E3: Internal Moisture

Contributes to meeting these requirements

NZBC Clause F2: Hazardous Building Materials

Meets this requirement and will not present a health hazard to people

NZBC Clause H1: Energy Efficiency

Contributes to meeting this requirement

Limitations

To meet the provisions of the NZBC as outlined in this datasheet, Pink® Batts® wall insulation MUST be:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2016: Energy Efficiency-Installing bulk thermal Insulation in Residential Buildings

Pink® Batts® wall insulation should NOT be crushed, folded or compressed.

Acoustic Properties

Pink® Batts® insulation will assist with noise control, however penetrations in walls will transmit sound readily.
Superior noise control can be achieved by using Pink® Batts® insulation products in conjunction with good acoustic design.

Pink® Batts® Wall Insulation
Product and Installation Guide

Installation Instructions

Correct installation with no compression, gaps or folds is critical to ensure Pink® Batts® wall insulation performance is not compromised.

Safety

Each installation is unique so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of other sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work

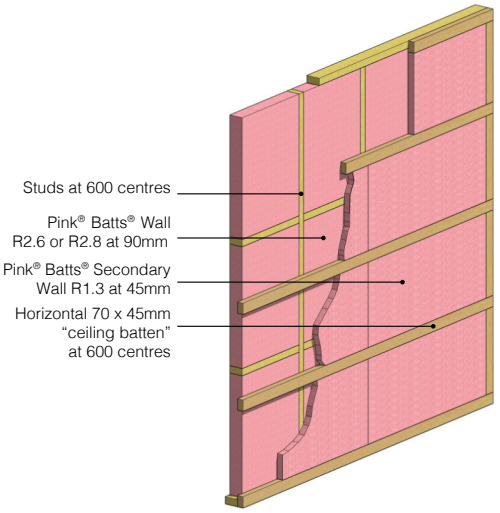
Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016

For your local PinkFit® installer call **0800 746 534** or visit **pinkbatts.co.nz/installing-pink-batts/**

Secondary Insulation Layer Wall Solution

With industry recognition of the issue of thermal bridging in walls, we have developed a cost-effective solution to significantly reduce heat loss while balancing cost. Our Interior Secondary Insulation Solution (ISIL) is installed to the interior of a 90mm frame between interior battens delivering around 20% more thermal performance as the same thickness of 140mm wall, while also being less expensive, and lighter and safer to transport and stand up on site. The ISIL solution utilizes standard 90mm Pink® Batts® in frame and a purpose manufactured 530mm wide x 45mm thickness R1.3 secondary internal layer, to fit between 70mm wide interior battens at 600 centres, to reduce the thermal bridges from more than 25% down to only around 5%. Better still, testing by GIB® demonstrates that their bracing systems will still perform when installed over the interior battens provided the end studs of each bracing element are also battened vertically; contact us for more details.





Pink® Batts® Wall Insulation
Product and Installation Guide

Installation:

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)

For an efficient installation, the following tools are recommended:

- Stable working platform
- Knife
- Tape measure

To ensure Pink® Batts® wall insulation performance isn't compromised, use only wall products for installing in wall applications.

- Ensure the product and all cavities are dry
- If cutting is required, cut oversize by 5 mm to ensure a good friction fit
- Ensure there are no gaps, folds or compression of the product to achieve optimal performance
- Fill gaps around windows and doors with off-cuts
- Follow the manufacturer's instructions for minimum clearances from hot inbuilt appliances. If they are unknown, refer to NZS 4246:2016
- Do not cover vents. Insulate around vents to allow unhindered ventilation
- Fit Pink® Batts® insulation tight and close around electrical cables and pipes. It's important to minimise compression, gaps and folds in the insulation. For electrical cables and small diameter pipes, partially cut insulation and place around the cables and pipes
- In new construction, it is recommended that Pink® Batts® insulation is installed once the cladding system is completely installed.

Tip: To verify Building Code Compliance, staple a product label and installer information at an easy to find location away from any hot items such as downlights or water cylinders. An alternative is to supply the information to the building owner or authorised person.

Refer to NZS 4246:2016 for further information related to the correct installation of insulation and clearances.

Retrofitting insulation in external walls without wall underlay/or underlay in poor condition

a) Direct Fixed Cladding

- A recent BRANZ study found that the most reliable mitigation measure for retrofitting insulation to an existing cavity is to include a drainage plane mesh, combined with a synthetic underlay, between the mesh and retrofitted insulation. The most effective way to protect the bottom plate was a strip of kraft paper tucked into the gap between the framing and the back of the cladding. Therefore, prior to installing the insulation, our recommendation is to fit an underlay with a water-repellent drainage plane mesh into the back of the cavity cut to the size of the opening and use the whole framing cavity. For further information please refer to Build 199 – 49 (Dec/Jan 2024).

Since some existing framing is only 95mm depth (or occasionally 90mm depth), the specific insulation product needs to be chosen to match the framing depth and the installation process. For example, with a 90mm frame depth a suitable product would need to have a thickness of 83mm or less to allow the lining to be correctly installed. Therefore, for a 90mm frame Pink® Batts® R2.2 70mm product should be used.

b) Drained Cavity

- The insulation can be the same thickness as the frame.
- The use of horizontal strapping is recommended or fit an underlay with a water-repellent drainage plane mesh (Dupont Tyvek Metal) into the back of the cavity cut to the size of the opening and use the whole framing cavity.

Unlined Walls in Roof Cavities

- Pink® Batts® Wall should be secured in place by using horizontal strapping (max spacing of 300mm).

Pink® Batts® Masonry Wall Insulation

- It is a requirement that an absorbent building paper or a waterproof membrane is placed between the insulation and the concrete. This is not intended to replace the DPC which must still be fixed between strapping and masonry.
- There is high likelihood of interstitial condensation occurring where a 90mm thickness (R2.2 and above) glasswool insulation is installed against a masonry or concrete wall. This is due to the lack of a ventilated external cavity to remove moisture. Therefore, in this situation, the recommended solution is Comfortech® Kooltherm Insulated Plasterboard.

CAUTION: Electrical cables and equipment may overheat and fail when partially or completely covered with bulk thermal insulation.

Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store undercover in clean, dry conditions.
The installed product should remain dry at all times. If the product becomes wet or damp, the source of dampness (e.g. leak in building) should be repaired and any wet or damp insulation should be removed and replaced with new insulation of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® insulation.
For further details download the relevant product data sheet from pinkbatts.co.nz

PREFERRED PINK® BATTS® INSTALLERS

BRANZ Appraised
Appraisal No. 238

Eco Choice Aotearoa
Licence No 2504017

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818

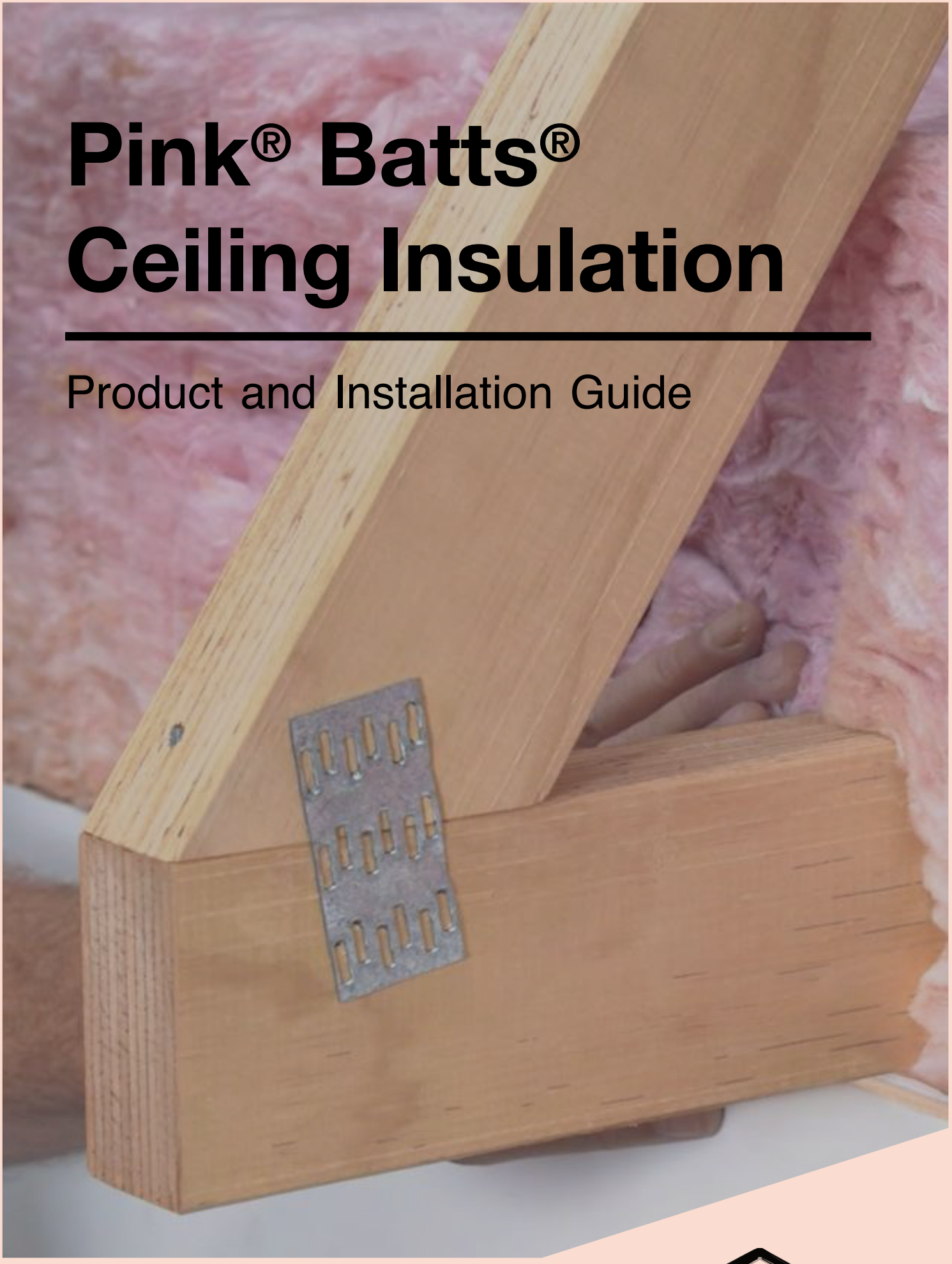
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pinkbatts.co.nz **0800 746 522**

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9-15 Holloway Place, Penrose, Auckland
January 2026

pink® batts®
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Pink® Batts® Ceiling Insulation

Product and Installation Guide

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Pink® Batts® Ceiling Insulation

Product and Installation Guide

Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisa l Number
ROOF – THERMAL INSULATION									
432mm WIDTH RANGE									
R1.8 Pink® Batts® Ceiling	7110118	1220 x 432	95	13.7	14.4	26	✓	✓	238
R2.2 Pink® Batts® Ceiling	7110122	1220 x 432	115	12.6	13.3	24	✓	✓	238
R2.6 Pink® Batts® Ceiling	7110126	1220 x 432	140	10.5	11.1	20	✓	✓	238
R3.2 Pink® Batts® Ceiling	7110132	1220 x 432	170	8.4	8.8	16	✓	✓	238
R3.6 Pink® Batts® Ceiling	7110136	1220 x 432	180	7.4	7.7	14	✓	✓	238
R4.0 Pink® Batts® Ceiling	7110140	1220 x 432	195	6.3	6.6	12	✓	✓	238
460mm WIDTH RANGE COVERING THE TRUSS CHORD									
R4.5 Pink® Superbatts® Ceiling	7113145	1220 x 460	210	5.6	5.5	10	✓	✓	238
R5.0 Pink® Superbatts® Ceiling	7113150	1220 x 460	225	4.5	4.4	8	✓	✓	238
R6.0 Pink® Superbatts® Ceiling	7113160	1220 x 460	245	3.9	3.8	7	✓	✓	238
R7.0 Pink® Superbatts® Ceiling	7114170	1220 x 460	275	3.9	3.8	7	✓	✓	238
ROOF – DOUBLE LAYER SOLUTION - FIRST LAYER THERMAL INSULATION									
R2.6 Pink® Batts® 110mm Ceiling	7160266	1220 x 432	110	9.5	10	18	✓	✓	238
R3.0 Pink® Batts® 160mm Ceiling	7160265	1220 x 432	160	8.4	8.9	16	✓	✓	238
ROOF – PERIMETER THERMAL INSULATION									
R2.7 Pink® Batts® Perimeter	7160274	1220 x 560	100	8.9	9.5	13	✓	✓	238
ROOF – SKILLION THERMAL INSULATION									
SKILLION 432mm WIDTH RANGE									
R3.2 Pink® Batts® Skillion Roof	7110232	1220 x 432	115	3.7	3.9	7	✓	✓	767
R3.6 Pink® Batts® Skillion Roof	7110236	1220 x 432	165	6.3	6.6	12	✓	✓	767
R4.5 Pink® Batts® Skillion Roof	7110245	1220 x 432	165	3.2	3.3	6	✓	✓	767
R5.0 Pink® Batts® Skillion Roof	7110250	1220 x 432	180	3.2	3.3	6	✓	✓	767
R6.0 Pink® Batts® Skillion Roof	7110260	1220 x 432	230	3.2	3.3	6	✓	✓	767
R7.4 Pink® Batts® Skillion Roof	7110274	1220 x 432	275	2.6	2.8	5	✓	✓	767

* Square metre coverage per bale are estimates and actual coverage may differ.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Product Specifications

PRODUCT GLASS WOOL RANGE	Product Code	Size (mm)	Nominal Stabilised Thickness (mm)	Nominal Total Area Per Bale (m^2)	Approx. Coverage Per Bale* (m^2)	Pieces Per Bale	Eco Choice Aotearoa (Environmental Choice)	Environmental Product Declaration	BRANZ Appraisa l Number
ROOF – SKILLION THERMAL INSULATION									
SKILLION 560mm WIDTH RANGE									
R5.0 Pink® Superbatts® Skillion Roof	7113250	1220 x 560	180	4.1	4.4	6	✓	✓	767
R6.0 Pink® Superbatts® Skillion Roof	7113260	1220 x 560	230	4.1	4.4	6	✓	✓	767
R7.4 Pink® Superbatts® Skillion Roof	7113274	1220 x 560	275	3.4	3.7	5	✓	✓	767
SKILLION 580mm WIDTH RANGE - SECONDARY INSULATION LAYER SOLUTION									
R1.0 Pink® Superbatts® Skillion Roof	7113210	1220 x 580	40	17.0	17.6	24	✓	✓	767

* Square metre coverage per bale are estimates and actual coverage may differ.

To find out more about our vision for better performing New Zealand homes, visit our H1 Hub at **www.pinkbatts.co.nz**

Our Pink® Superbatts® are at least 25mm wider than our standard Pink® Batts® ceiling range to ensure the truss chord is fully covered

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Application

Pink® Batts® ceiling insulation is a lightweight flexible glass wool insulation product designed to:

- Thermally insulate ceilings in new homes, be retrofitted into existing homes without insulation, or over existing insulation for better performance
- Fit easily into standard ceiling constructions, or be easily cut to fit in non-standard constructions
- Meet the requirements of the New Zealand Building Code (NZBC) for different designs and environments

Features and Benefits

- High R-values – R-values up to R7.0 to assist in keeping homes above 18°C as per the World Health Organisation's recommendation for a healthy and comfortable home
- Easy to install – lightweight, flexible and simple design makes the installation fast and easy
- Internationally certified for Indoor Air Quality – gives assurance that products meet strict chemical emissions limits
- Non-combustible – will not easily burn in the event of a fire
- Made from over 80% recycled glass – making sustainable use of waste
- Designed for New Zealand building conditions



Pink® Batts® Ceiling Insulation
Product and Installation Guide

Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% recycled glass, making sustainable use of waste
- Manufactured in New Zealand, reducing shipping distances
- Recyclable packaging

Green Star NZ Credits

Green Star is a comprehensive environmental rating system for buildings; materials with certain attributes can receive points that contribute to the overall score of a rated home.

New Zealand Green Building Council (NZGBC) does not test or certify products; they rely on the work done by third party certification bodies and eco labels like Eco Choice Aotearoa. Further information is available at **nzgbc.org.nz**.

Eco Choice Aotearoa

Pink® Batts® ceiling insulation products have Eco Choice Aotearoa Accreditation (refer to Product Specifications on page 1 for accredited products)

Independently assessed for:

- **Waste Minimisation:** Recycled content, and recycling of process waste
- **Energy Management:** Effective energy management policies and procedures
- **Manufacturing Process:** Not manufactured using blowing agents with a Global Warming Potential (GWP) or Ozone Depleting Potential (ODP)
- **Product Characteristics:** Durability and performance

Eco Choice Aotearoa
Licence No 2504017

While only BRANZ appraised products are eligible for Eco Choice Aotearoa, all Pink® Batts® thermal insulation products are manufactured in the same environmentally considerate way.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Health and Safety

Product Safety

Pink® Batts® insulation is a non-hazardous, safe product.

- IARC (International Agency for Research on Cancer) classifies the glass wool formulation used to manufacture Pink® Batts® products as Group 3: 'Not classifiable as to its carcinogenicity to humans'. This is the same classification as caffeine, tea, hair colouring, chlorinated drinking water and saccharin
- Pink® Batts® insulation is bio-soluble. In the unlikely event any fibres are inhaled into the lungs they will dissolve in the body fluids and be cleared from the body

Indoor Air Quality

- Pink® Batts® insulation is certified under the GREENGUARD Certification Program. Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and formaldehyde), to help create healthier indoor environments

General Health

- Pink® Batts® insulation will assist in meeting the World Health Organisation recommendation for houses to be maintained at a minimum temperature of 18ºC to provide a healthy and comfortable home

Technical Data

Properties	Result		Test/Method/Standard	Test Results
Combustibility	Non-Combustible	✓	AS/NZS 1530.1:1994	Group Number 1S
Early Fire Hazards		✓	AS/NZS 1530.3:1993 - Ignitability (Range 0-20) - Spread of Flame Index (Range 0-10) - Heat Evolved Index (Range 0-10) - Smoke Developed Index (Range 0-10)	 = 0 = 0 = 0 = 0-1
R-value	Various*	✓	AS/NZS 4859.1:2018	
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1:2018-Glass wool exempt	
Vermin Resistance	No Food Source	✓	AS/NZS 4859.1:2018-Glass wool exempt	

* Stated thicknesses are values at which stated R-values are achieved and are likely to be minimum values. See table on page 1.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Acoustic Properties

Pink® Batts® insulation will assist with noise control, however penetrations in ceilings and walls will transmit sound readily. Superior noise control can be achieved by using Pink® Batts® insulation products in conjunction with good acoustic design.

New Zealand Building Code (NZBC) and Limitations

Pink® Batts® ceiling insulation when used, installed and maintained in accordance with the requirements outlined in this datasheet, will meet or contribute to meeting the following provisions of the NZBC:

NZBC Clause B2: Durability

Meets the requirement NZBC B2.3.1 a) 50 years and NZBC B2.3.1 b) 15 years

NZBC Clause E3: Internal Moisture

Contributes to meeting these requirements

NZBC Clause F2: Hazardous Building Materials

Meets this requirement and will not present a health hazard to people

NZBC Clause H1: Energy Efficiency

Contributes to meeting this requirement

Limitations

To meet the provisions of the NZBC as outlined in this datasheet, Pink® Batts® ceiling insulation MUST be:

- Installed and maintained in a dry protected environment
- Installed in a building where the provisions of NZBC E2 and E3 are met
- Installed to the requirements of NZS 4246:2016: Energy Efficiency-Installing Bulk Thermal Insulation in Residential Buildings

Pink® Batts® ceiling insulation should NOT be crushed, folded or compressed#.

The exception to this being where edge compression is being utilised to maintain a ventilation pathway at the roof perimeter. Please refer to instructions on Pink® Superbatts® edge compression.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Installation Instructions

Correct installation with no compression#, gaps or folds is critical to ensure Pink® Batts® ceiling insulation performance is not compromised.

Safety

Each installation is unique so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work
- Avoid installing during the warmest part of the day. The roof cavity temperature can increase to uncomfortable levels
- Do not stand on ceiling lining or ceiling battens

Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016.

For your local PinkFit® installer call **0800 746 534**



The exception to this being where edge compression is being utilised to maintain a ventilation pathway at the roof perimeter. Please refer to instructions on Pink® Superbatts® edge compression.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Installation

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)
- Kneepads (for retrofitting)

For an efficient installation, the following tools are recommended:

- Stable working platform (for new build)
- Kneeling board or planks (for retrofitting)
- Knife
- Tape measure
- Install rod for tight spaces
- Head torch (for retrofitting)

For retrofitting, take into consideration:

- Using planks laid across joists to walk and work on
- Levelling and refitting any existing insulation if required with correct clearances
- Removing any damp insulation
- Starting installation at the point furthest away from the ceiling access hole

To ensure Pink® Batts® ceiling insulation performance isn't compromised, confirm the correct product and R-value is used in ceiling applications.

- Ensure the product is installed dry
- Friction fit product between framing, ensuring there are NO gaps, folds or compression[#] of the product to achieve optimal performance
- If cutting is required, cut oversize by 5-10mm to ensure a good friction fit
- Ensure that Pink® Batts® ceiling segments are firmly butted against each other
- For retrofitting, install over timber where insulation already exists or where appropriate. Any open-air pockets beside joist/truss cord ends at the roof perimeter to be blocked off with insulation off-cuts
- Fit Pink® Batts® insulation beneath electrical wiring and plumbing work. Minimise tucks
- Install to the outer edge of the top plate covering at least 50% of it while ensuring minimal overflow to the eaves
- Maintain a 25mm gap clearance between the Pink® Batts® insulation and any roofing material. If required to maintain 25mm clearance, utilise an insulation guard and edge compression or use a thinner product around the perimeter such as the new Pink® Batts® Perimeter product
- Insulate access hole cover and secure in place with strapping or glue. Remove excess material

Tip: To verify Building Code Compliance, staple a product label at an easy to find location away from any hot items such as down lights or water cylinders e.g. on truss/rafter above ceiling access hole and hot water cupboard.

Note: Pink® Batts® and Pink® Superbatts® ceiling insulation should not be installed in a roof space where foil has been installed as a roof underlay. Refer to NZS 4246:2016 for full details.

[#] The exception to this being where edge compression is being utilised to maintain a ventilation pathway at the roof perimeter. Please refer to instructions on Pink® Superbatts® edge compression.

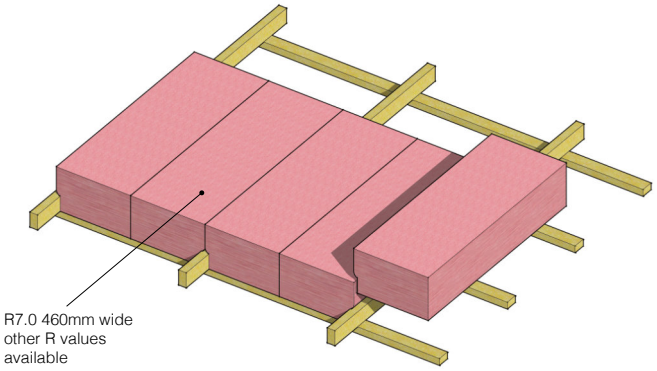
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Product and Installation Guide

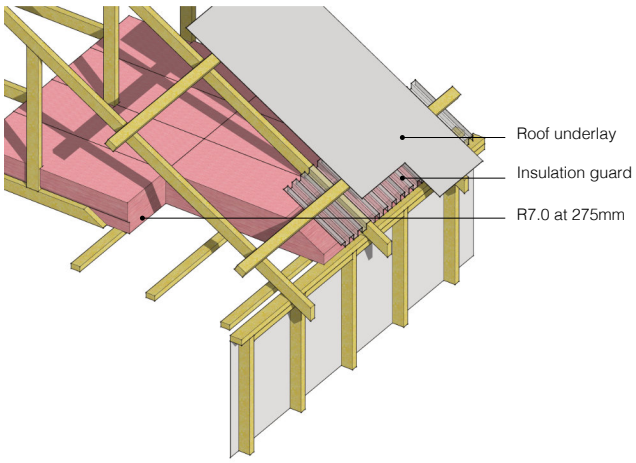
Single Layer Ceiling Solution

Comfortech® have developed a range of single layer Pink® Superbatts® solutions, at a width of 460mm. Segments can now also be ballooned to fit around and over the truss chord to seal the thermal bridge.

- Along with our R7.0 Pink® Superbatts®, as the calculation and modelling methods may determine a lower R-value is required, Comfortech® has a range of other R-values including Pink® Superbatts® R4.5, R5.0, R6.0 at 460mm wide
- Using an insulation barrier at the perimeter ensures contact between the insulation and roof underlay is avoided and a ventilation pathway is maintained. Using an insulation barrier provides a minimum 25mm air space to the roof underlay, using an insulation guard Pink® Superbatts® can be installed on a roof pitch of 18 degrees or above without requiring a raised heel

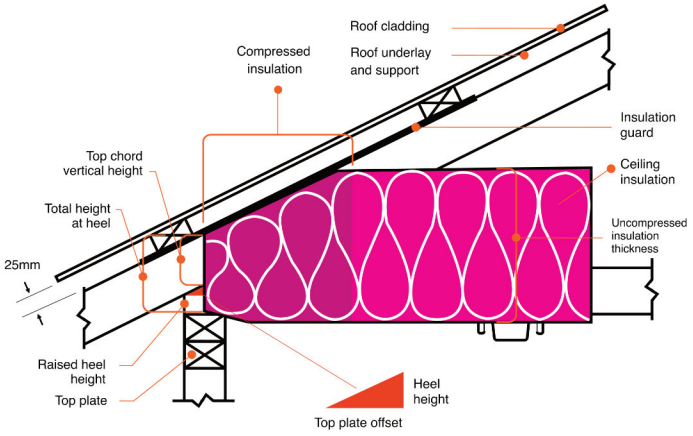
Note: *As an alternative to an insulation guard and edge compression, Comfortech® have developed a Pink® Batts® Perimeter solution that can be used under the H1 6th Edition.* *See more on page 10.*





Clearance at the Roof Perimeter

NZ 4246 requires that a 25mm clearance is maintained between the underside of the roof underlay and the top of the insulation



Double Layer Ceiling Solution

An alternative to our single layer solution, is our double layer solution where a secondary layer is installed between the timber or steel ceiling battens.

The Comfortech® double layer solution uses a:

- First layer of high-density Pink® Batts® insulation that is the combined height of the truss chord and the gap to the top of the ceiling batten. This layer is either 110mm for a 90mm truss chord, or 160mm for a 140mm truss chord
- Second layer of (460mm wide) Pink® Superbatts® insulation, installed at right angles to the first layer
- When the two layers are installed, the thermal bridge is completely closed, and the insulation performs as modelled

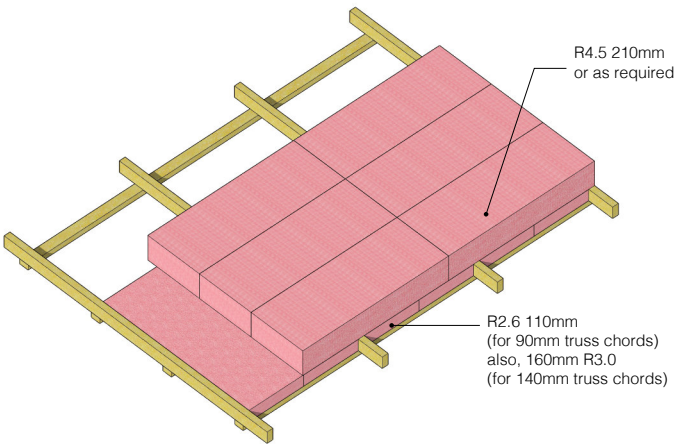
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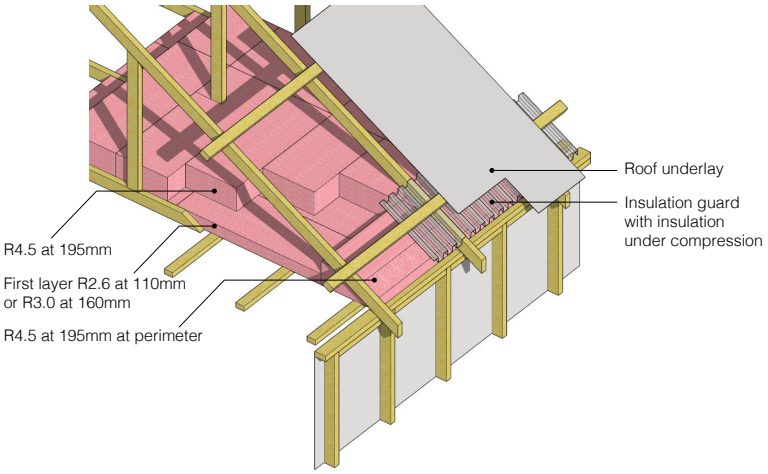
Double Layer Ceiling Installation

- With our two-layer solution, best practice is to install the top layer first, from below, across the truss chords
- The bottom layer is then pushed up under the top, to sit between the truss chords
- At the roof perimeter, the Pink® Superbatts® are designed to be compressed under the insulation guard, with installation to the middle of the top plate required
- Using an insulation guard at the perimeter ensures contact between the insulation and roof underlay is avoided and a ventilation pathway is maintained
- For the two-layer solution, at the perimeter, the bottom layer is stopped short so the last 460mm is the higher R value top layer only; typically R4.5 Pink® Superbatts®
- Pink® Superbatts® can be installed on a roof pitch of 18 degrees or above under perimeter compression over the last 460mm and still achieve the required perimeter R value, eliminating the need for a raised heel. When using Pink® Superbatts® R4.5, the roof pitch can go as low as 15 degrees whilst still achieving the required R value when under compression

Note: *As an alternative to an insulation guard and edge compression, Comfortech® have developed a Pink® Batts® Perimeter segment solution. See Pink® Batts® Perimeter below.*

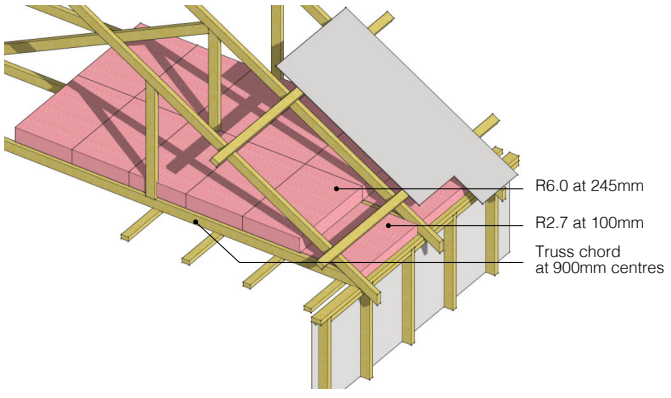
Double Layer Solution





Pink® Batts® Perimeter

With the reduction of the R value requirement for ceilings to a construction R value of R2.6 under the H1 6th Edition, we have released an R2.7 Pink® Batts® Perimeter product at 100mm thickness. Supplied at 560mm wide, our Pink® Batts® Perimeter is designed to cover over at least half of the top plate and extend up to 500mm into the ceiling space at the perimeter. Combined with the 460mm wide Superbatts® ceiling insulation solutions this ensures you can meet the requirements of the H1 6th Edition, while avoiding the need for a raise heel or an insulation guard.



Clearances for Electrical Equipment

Follow the clearances specified by the manufacturer, if they are not known then:

Recessed Luminaire

- CA rated recessed luminaires - None required, can close abut however, do not install insulation on top of the recessed luminaire
- IC rated recessed luminaires - None required, insulation can be installed over the top of the recessed luminaire
- Unmarked - Minimum 100mm

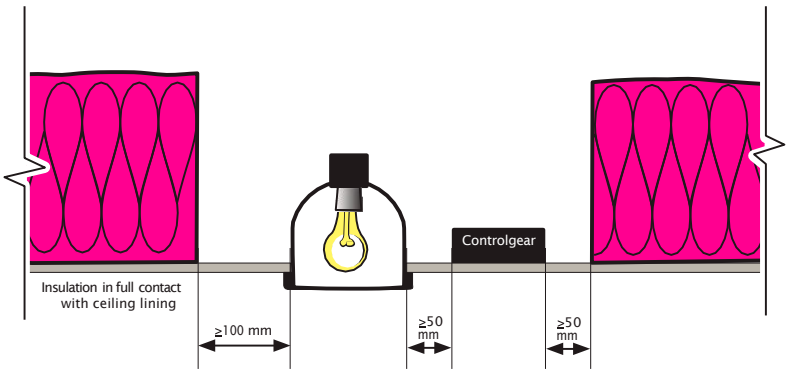
Surface Mounted Luminaire - Minimum clearance 200mm; however it does not apply if the insulation is permanently shielded.

Controlgear

- If possible place it on top of the insulation and leave a minimum clearance of 50mm between controlgear and luminaire
- If not possible to place it on top of the insulation and leave 50mm from the insulation to the controlgear

Controlgear **shall not sink** into the insulation

- Built in appliances - Minimum 50mm
- Enclosures containing electrical equipment - Minimum 50mm
- Fan/heat/light unit - Minimum 100mm
- Ventilation systems - Minimum 50mm
- Unducted mechanical fan units - Minimum 200mm
- Unducted passive vents that remain functional - Minimum 200mm
- Metal chimney and flues - Minimum 75mm
- Brick chimney - Minimum 50mm
- Roof underlay - Minimum 25mm



Unmarked luminaire and controlgear not placed on top of Pink® Batts® ceiling products.

Note: Pink® Batts® ceiling insulation can be installed from below when the ceiling is to be lined or replaced

Joist cover with insulation can be achieved either with two separate layers of insulation or cutting a single thick layer of insulation such that it spills over the top when tightly fitted.

***Caution:** Electrical cables and equipment partially or completely surrounded with bulk thermal insulation may overheat and fail.

For information on how to install Pink® Superbatts® ceiling insulation, please refer to the Pink® Superbatts® Installation Guide.

Pink® Batts® Ceiling Insulation
Product and Installation Guide

Storage and Maintenance

Pink® Batts® and Pink® Superbatts® insulation should be protected from damage and weather. Store undercover in clean, dry conditions. The installed product should remain dry at all times. If the product becomes wet or damp, the source of dampness (e.g. leak in building) should be repaired and any wet or damp insulation should be removed and replaced with new insulation of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® and Pink® Superbatts® insulation.

For further details download the relevant product data sheet from pinkbatts.co.nz

PREFERRED PINK® BATTS® INSTALLERS

BRANZ Appraised
Appraisal No. 238

Eco Choice Aotearoa
Licence No 2504017

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818

Comfortech Building Performance Solutions® Certified QMS
Telarc. Registered
Quality ISO 9001

pinkbatts.co.nz **0800 746 522**

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9-15 Holloway Place, Penrose, Auckland
March 2026

pink® batts®
BROUGHT TO YOU BY COMFORTECH®

BRANZ Appraised

Appraisal No. 238 [2023]

PINK® BATTS® INSULATION



Appraisal No. 238 (2023)

This Appraisal replaces BRANZ Appraisal No. 238 (2018)

Amended 23 February 2026

BRANZ Appraisals

Technical Assessments of products for building and construction.

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BUILDING PERFORMANCE SOLUTIONS

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WFTAO
WORLD FEDERATION OF TECHNICAL ASSESSMENT ORGANISATIONS

Product

1.1 Pink® Batts® Insulation is a range of resin-bonded, fibrous glasswool thermal insulating material for use in walls, ceilings and roofs of buildings. Pink® Batts® Insulation is pre-cut to suit a range of framing spacings.

Scope

2.1 Pink® Batts® Insulation has been appraised as a thermal insulation material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Pink® Batts® Insulation, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years and B2.3.1 (b) 15 years. Pink® Batts® Insulation meets these requirements. See Paragraph 8.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.1. Pink® Batts® Insulation contributes to meeting this requirement. See Paragraphs 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Pink® Batts® Insulation meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. Pink® Batts® Insulation contributes to meeting these requirements. See Paragraphs 14.1 and 14.2.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Technical Specification

4.1 Pink® Batts® Insulation is a resin-bonded, fibrous, glasswool insulation, manufactured from recycled and/or virgin glass and cured urea extended phenolic resin.

4.2 Pink® Batts® Insulation is manufactured in a range of sizes to suit framing centres and cavity depths. Building Insulation Blanket (BIB) is supplied in rolls for commercial applications. Pink® Batts® Insulation is available as set out in Table 1.

Table 1: Pink® Batts® Insulation Product Table

R-value	Length (mm)	Width (mm)	Nominal Thickness (mm)	Density (kg/m³)
Roof - Ceiling Thermal Insulation				
1.8	1,220	432	95	8.3
2.2	1,220	432	115	8.2
2.6	1,220	432	140	7.0
2.6	1,220	432	110	10.5
3.0	1,220	432	160	8.2
3.2	1,220	432	170	6.9
3.6	1,220	432	180	7.2
4.0	1,220	432	195	8.1
4.5	1,220	460	210	8.5
5.0	1,220	460	225	8.9
6.0	1,220	460	245	11.1
7.0	1,220	460	275	11.8
Roof - Building Insulation Blanket (BIB)				
1.2	14,000 or 24,000	1,200	50	12.0
1.8	11,000 or 20,000	1,200	75	12.0
2.4	9,000 or 16,000	1,200	95	12.0
2.6	8,000 or 14,000	1,200	105	12.0
3.2	6,000 or 12,000	1,200	125	12.0
3.6	5,000 or 10,000	1,200	140	12.5
Roof - Perimeter Thermal Insulation				
2.7	1,220	560	100	15.8
Wall - Masonry Insulation				
1.0	1,220	580	40	14.0
1.2	1,220	580	50	12.8
Wall - Interior Secondary Insulation Layer[2]				
1.0[2]	1,220	530	35	22.0
1.3[2]	1,220	530	45	22.0
70 mm Wall Range - Thermal Insulation				
2.2	1,140	560	70	30.0
90 mm Wall Range - Thermal Insulation				
1.8	1,140	560	90	9.1
2.2	1,140	560	90	11.0
2.4	1,140	560	90	13.9
2.6	1,140	560	90	18.0

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

2.6[1]	1,140	560	90	18.0
2.8	1,140	560	90	25.2
2.8[1]	1,140	560	90	25.5
90 mm Narrow Wall Range - Thermal Insulation				
2.2	1,140	360	90	11.0
2.6	1,140	360	90	18.0
2.8	1,140	360	90	25.2
90 mm Steel Wall Range - Thermal Insulation				
2.2	1,220	610	90	11.0
2.6	1,220	610	90	18.0
2.8	1,220	610	90	25.2
140 mm Wall Range - Thermal Insulation				
3.2	1,140	560	140	9.6
3.6	1,140	560	140	12.4
4.0	1,140	560	140	17.6
4.3	1,140	560	140	28.0
140 mm Narrow Wall Range - Thermal Insulation				
3.2	1,140	360	140	9.6
3.6	1,140	360	140	12.4
4.0	1,140	360	140	17.6
4.3	1,140	360	140	28.0

[1] Pink® Batts® Wall range R2.6 and R2.8 are manufactured by Owens Corning Canada.

[2] Pink® Batts® R1.0 and R1.3 wall products have been assessed as thermal insulation material. The assessment of performance of these when used as a secondary insulation layer for walls specifically impacts on the bracing design of the wall as well as interstitial condensation, these have not been assessed by BRANZ and are outside the scope of this Appraisal.

Note: Customised widths additional to those listed above can be provided by Comfortech Building Performance Solutions. These must be to the same R-value, thickness and density requirements as the products above.

All Pink® Batts® Insulation products covered by this Appraisal and manufactured in New Zealand have the Eco Choice Aotearoa Licence.

4.3 Pink® Batts® Insulation is pink in colour and is baled in polythene bags with labelling in compliance with AS/NZS 4859.1.

4.4 Accessories used with Pink® Batts® Insulation, which are supplied by the insulation installer, are wire netting, plastic strapping and fixings.

Handling and Storage

5.1 Pink® Batts® Insulation must be stored under cover and in dry conditions. Heavy objects must not be stacked on the bales. The bales must be stored in an orientation that avoids excessive compression of the product.

5.2 In general, insulation products are sensitive to the length of time they are stored under compression packaging. Product that does not recover to its nominal thickness may not achieve the stated thermal resistance (R-value).

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Pink® Batts® Thermal Solutions: Product Guide, January 2026.
- Pink® Batts® Ceiling Insulation Installation Product and Installation Guide, January 2026.
- Pink® Batts® Wall Insulation Product and Installation Guide, January 2026.
- Pink® Superbatts® Thermal Solutions: Installation Guide, January 2025.
- Pink® Batts® Building Insulation Blanket (BIB) – Product and Installation Guide, January 2025.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Pink® Batts® Insulation is intended for use as thermal insulation to meet the requirements of the NZBC. Pink® Batts® Insulation can be used to meet the requirements of the NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Greater construction R-values can be achieved where specific design is used. For construction R-values, refer to the BRANZ House Insulation Guide. Product R-values and dimensions are given in Table 1.

7.2 The R-value of Pink® Batts® Insulation has been determined by testing to AS/NZS 4859.1.

7.3 Pink® Batts® Insulation is designed to be friction-fitted between wall, ceiling or roof framing. It can also be laid directly on a ceiling lining, over ceiling battens or over joists/truss chords. In other horizontal situations, the insulation must be adequately supported by galvanised wire netting or some other suitable durable material.

7.4 When insulation is installed in a double layer over new or existing insulation, the possibility of compression of the bottom layer must be avoided, or reduction of R-values for the bottom layer of the formed system must be taken into account.

7.5 For new and existing buildings, the R4.5, R5.0, R6.0 and R7.0 Pink® Superbatts® ceiling products are designed to be notched around timber framing and to form a uniform layer above the timber framing, between and on the top of the truss chords.

7.6 At the roof perimeter, Pink® Batts® Insulation is designed to be compressed rather than cut. To achieve the required construction R-value of R3.3 at the ceiling perimeter, a minimum product R-value of R3.5 and a minimum 115 mm height is required at the midpoint of the top plate to the underside of the insulation guard, to accommodate the compressed insulation. The Pink® Superbatts® range all exceed this product R-value requirement under compression with a 115 mm heel. If the roof slope is less than 20° and the height is less than 115 mm, a raised heel will be required.

7.7 Where the insulation is installed in exterior walls, the nominal thickness of the insulation material must be selected to provide a snug close fit which touches all sides of the insulation cavity between the wall underlay and the interior wall lining.

7.8 Where the insulation is retrofitted in external walls without a wall underlay, and with direct-fixed claddings, the insulation must be at least 20 mm thinner than the framing to allow a gap of at least 20 mm between the insulation and the wall cladding. Horizontal straps must be stapled into the sides of the wall studs at 300 mm centres maximum as support before the insulation is installed. Refer also to NZS 4246.

7.9 When the insulation is installed in a wall with a drained cavity, it is recommended that specific wall products with a controlled nominal thickness be used. Where the stud spacings are greater than 450 mm, an intermediate means of restraining the insulation from bulging into the cavity must be installed in accordance with NZBC Acceptable Solution E2/AS1.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

7.10 Building Insulation Blanket (BIB) products are designed specifically for commercial roof and commercial wall applications. In residential applications, installation must be completed in accordance with NZS 4246.

7.11 The building envelope must be constructed to ensure the insulation remains dry during installation and throughout the life of the building.

7.12 The clearance requirements for heating appliances and downlights must be met, and reference made to the manufacturer's instructions and NZS 4246.

Durability

Serviceable Life

8.1 Where the building is maintained so that the provisions of NZBC Clauses E2 and E3 are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance (e.g. moisture), Pink® Batts® Insulation can be expected to have a serviceable life of at least 50 years.

Maintenance

9.1 Insulation that has become damp must be removed and the cause of dampness repaired. Cavities must be clean and dry before fitting new insulation of an equivalent thermal rating. NZS 4246 gives guidance on thermal insulation maintenance due to water damage.

Prevention of Fire Occurring

10.1 Pink® Batts® Insulation is classified a non-combustible material and need not be separated from heat sources such as fireplaces, heating appliances and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated or protected from heat sources. NZBC Acceptable Solutions C/AS1 and C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Downlights

10.2 Insulation should maintain 100 mm clearance from all undefined recessed luminaires, treating them as a heat source. For insulation to abut or cover recessed luminaires, these must be clearly marked as being suitable for having insulation abutting and covering them, and have been installed in accordance with NZBC Acceptable Solution G9/AS1.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

11.1 Pink® Batts® Insulation products have been tested to AS 1530.1 and are classified as non-combustible. Pink® Batts® Insulation can be assigned a Group Number of 1-S. Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 to determine where Pink® Batts® Insulation may be used according to its Group Number.

11.2 Pink® Batts® Insulation may or may not need to be enclosed by an internal lining depending on the Risk Group. The NZBC Building Product Specifications provides specified performances (Group Number) for some generic substrate and coating combinations, including concrete, sheet metal, fibre cement, gypsum plasterboard and wood substrates.

External Moisture

12.1 The total building envelope must be weathertight and comply with the requirements of NZBC Clause E2 to ensure that the insulation remains dry in use.

12.2 The moisture content of the construction materials at the time of installing and enclosing the insulation must meet the requirements of NZBC Acceptable Solution E2/AS1 or a lower moisture content if required by the lining manufacturer.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Internal Moisture

13.1 Buildings must provide an adequate combination of thermal resistance, ventilation and space temperature to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate. This does not apply to Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings.

13.2 NZBC Acceptable Solution E3/AS1 provides an Acceptable Solution for compliance with internal moisture requirements and details on minimum ventilation and wall and ceiling insulation levels to meet these requirements.

Energy Efficiency

14.1 Pink® Batts® Insulation will contribute to meeting the requirements of NZBC Clause H1, Performance H1.3.1 (a) and H1.3.2 E, by compliance with NZBC Verification Methods H1/VM1, H1/VM2, NZBC Acceptable Solutions H1/AS1 or H1/AS2. Refer to Paragraphs 7.1-7.9.

14.2 Pink® Batts® Insulation R-values have been determined by testing to AS/NZS 4859.1 and are given in Table 1.

Installation Information

Installation Skill Level Requirement

15.1 All design and building work must be carried out in accordance with the Pink® Batts® Insulation Technical Literature and this Appraisal. All building work must be undertaken by competent and experienced tradespeople conversant with Pink® Batts® Insulation.

General

16.1 Installation of Pink® Batts® Insulation must be in accordance with the Technical Literature and this Appraisal. NZS 4246 should be used as a guide for installing insulation in residential buildings.

16.2 The product must be installed only when the building is enclosed and when the construction materials have achieved the required maximum moisture content or less.

16.3 Pink® Batts® Insulation must be released from the packaging and allowed to re-loft prior to installation. The time to loft will depend upon the length of time the product has been packaged and stored.

16.4 Pink® Batts® Insulation is supplied in segment and blanket form (see Table 1) to suit framing layouts. The product is able to be cut to suit wall cavities and when fitted between roof or ceiling framing. The insulation must be neatly friction-fitted between framing members so that the potential for gaps and convective heat loss is reduced. In wall cavities, the insulation must be neatly friction-fitted between framing members to prevent sagging. In ceiling or roofs, the insulation may be fitted between framing members or fitted over framing members and butted tightly. The insulation must extend to the external wall top plate. The insulation must not be folded or compressed. A close even fit provides the most efficient thermal performance. Whenever possible, the insulation should be fitted beneath wiring or plumbing.

16.5 The clearance requirements for heating appliances and downlights must be followed. Refer also to NZS 4246.

Inspections

16.6 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of Pink® Batts® Insulation installations.

Health and Safety

17.1 Refer to the Technical Literature and NZS 4246 for guidance on health and safety requirements such as personal protective clothing and installation hazard assessment.

Basis of Appraisal

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

The following is a summary of the technical investigations carried out:

Tests

18.1 Thermal resistance testing of Pink® Batts Insulation in accordance with AS/NZS 4859.1 has been completed. The results have been reviewed by BRANZ technical experts.

18.2 Tests have been carried out in accordance with AS 1530.1. Pink® Batts® Insulation is not deemed combustible according to the test criteria. The results have been reviewed by BRANZ technical experts.

Other Investigations

19.1 An assessment of the durability of Pink® Batts® Insulation has been made by BRANZ technical experts.

19.2 The manufacturer's Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

20.1 The manufacture of Pink® Batts® Insulation has been examined by BRANZ, including methods adopted for quality control. Details of the manufacturing processes, and quality and composition of the raw materials used were obtained and found to be satisfactory.

20.2 The range of Pink® Batts® Insulation products have been assessed for their environmental impact by The New Zealand Ecolabelling Trust and comply with the requirements of the Eco Choice Aotearoa Specification, Licence No. 2504017 - Building Insulants. The products that have the Eco Choice Aotearoa Licence are noted in Table 1.

20.3 Comfortech Building Performance Solutions are responsible for the quality of the product supplied.

20.4 Quality of installation of the product on-site is the responsibility of the installer.

20.5 Quality of maintenance of the building to ensure the insulation material remains dry is the responsibility of the building owner.

Sources of Information

- AS 1530.1:1994 Combustibility test for materials.
- AS/NZS 4859.1:2018 Thermal insulation materials for buildings.
- BRANZ House Insulation Guide [Sixth Edition].
- NZS 4246:2016 Energy efficiency - Installing bulk thermal insulation in residential buildings.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 12 August 2024

This Appraisal has been amended to update Table 1.

Amendment No. 2, dated 04 November 2024

This Appraisal has been amended to update product specifications in Table 1 for products R5.0 ceiling, R6.0 ceiling, R7.0 ceiling and R2.4 wall.

Amendment No. 3, dated 21 January 2026

This Appraisal has been amended to update the Product Range in Table 1, update the Technical Literature referenced and to reflect the changes made to the NZBC compliance documentation.

Amendment No. 4, dated 23 February 2026

This Appraisal has been amended to update the Product Range in Table 1 and to update the Technical Literature referenced.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ

In the opinion of BRANZ, Pink® Batts® Insulation is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions), and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions):
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and quality of work;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions).
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Tasman Insulation New Zealand Ltd (t/a Comfortech Building Performance Solutions) or any third party.

For BRANZ



Claire Falck
Chief Executive

Date of Issue:
30 October 2023

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ Appraised
Appraisal No. 1225 [2022]

STRIA™ CLADDING VERTICAL



Appraisal No. 1225 (2022)

Amended 1 April 2026

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Stria™ Cladding Vertical is a cavity-based fibre cement wall cladding. It is designed to be used as an external wall cladding for residential and light commercial type buildings where domestic construction techniques are used. Stria™ Cladding Vertical is available in two panel finish options: 'Smooth' and 'Fine Texture'.

Scope

Timber Framing

2.1 Stria™ Cladding Smooth and Stria™ Cladding Fine Texture have been appraised for use as an external wall cladding for timber-framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

Specific Design

2.2 Stria™ Cladding Smooth has also been appraised for weathertightness and structural wind loading when used as an external wall cladding for buildings within the following scope:

- with a building height not exceeding 25 m; 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 3.2 kPa where studs are at maximum 600 mm centres; and,
- with inter-storey deflections designed for and up to height/180 of horizontal in-plane movement during seismic serviceable limit state (SLS) events (based on a 3 m inter-storey height); and,
- when fixed over James Hardie RAB™ Board rigid air barrier for buildings over 10 m in height.

General

2.3 Stria™ Cladding Vertical must only be installed vertically on vertical, flat surfaces.

2.4 Stria™ Cladding Vertical must only be used with window and doors that comply with NZBE Acceptable Solution E2/AS1 or that are covered by a valid BRANZ Appraisal or NZ CodeMark certification.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Stria™ Cladding Vertical, 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. Stria™ Cladding Vertical meets the requirements for loads arising from self-weight, wind, impact and creep [i.e. B1.3.3 (a), (h), (j) and (q)]. See Paragraphs 9.1-9.5.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Stria™ Cladding Vertical meets these requirements. See Paragraphs 10.1-10.4.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Stria™ Cladding Vertical meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Stria™ Cladding Vertical meets this requirement.

Technical Specification

4.1 System components and accessories for Stria™ Cladding Vertical which are supplied by James Hardie New Zealand Limited, are:

Stria™ Cladding panels

- Stria™ Cladding panels are manufactured from a reduced density cellulose fibre cement formulation. The panels are formed, cut to length and then cured by high-pressure autoclaving. Stria™ Cladding panels are manufactured to meet the requirements of AS/NZS 2908.2 and are identified by the name 'Stria™ Cladding' printed on the back of the panels. The panels are 14 mm thick and are factory sealed on the front face and all edges with a manila white colour primer.
- Panels are available in the following options:
  - Stria™ Cladding Smooth: 325 or 405 mm wide x 4,200 mm long.
  - Stria™ Cladding Fine Texture: 325 mm wide x 3,000 or 4,200 mm long.

Accessories

- **Hardie™ 20 mm horizontal cavity battens** – 45 x 20 mm thick radiata pine battens treated to Hazard Class H3.1 and available in 2,700 mm lengths. The top edge is bevelled with an 18° slope. The back face is grooved with 22 mm wide x 5 mm deep rebates at 50 mm centres, and the front face is grooved with 6 mm wide x 6 mm deep rebates at 150 mm centres. The grooves are offset on each face.
- **Hardie™ 14 mm Trimline Joint Flashing** - an etch-primed aluminium extrusion used behind the cladding at vertical joints, available in 3,000 mm lengths.
- **Hardie™ 14 mm Internal Corner Flashing** – a 90° anodised aluminium extrusion available in 3,000 mm lengths.
- **Hardie™ 14 mm External Box Corner** - an anodised aluminium extrusion used to create external corners, available in 3,000 mm and 4,000 mm lengths.
- **uPVC vent strip** – a uPVC moulding used as vermin proofing, available in 3,000 mm lengths.
- **Trimline Horizontal Jointer** - an aluminium jointer used to cover the butt joint of Hardie™ 14 mm Trimline joint flashing, available in 100 mm lengths.
- **Trimline External Corner Jointer** - 55 x 55 mm aluminium extrusion which joins Trimline joint flashings at an external corner.
- **Trimline Internal Corner Jointer** - 60 x 60 mm aluminium extrusion which joins Trimline joint flashings at an internal corner.
- **HomeRAB™ Pre-Cladding** - 4.5 mm thick fibre cement rigid wall underlay, 1,200 mm wide and available in 2,450 or 2,750 mm lengths.
- **RAB™ Board** - 6 or 9 mm thick fibre cement rigid wall underlay, 1,200 mm wide and available in 2,450, 2,750 or 3,000 mm lengths.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

4.2 Accessories specific to Stria™ Cladding Vertical, which are supplied by the building contractor are:

- **Fixings for cavity battens and flashings** - 40 x 2.8 mm or longer Hardie™ Flex nail.
- **Fixings for Stria™ Cladding Smooth panels** - 65 x 2.87 or 75 x 3.15 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
- **Fixings for Stria™ Cladding Fine Texture panels over flexible underlay** - 60 x 3.15 mm Hardie™ Flex nails or 65 x 2.87 mm round head ring shank Paslode or Ecko gun nails.
- **Fixings for Stria™ Cladding Fine Texture panels over rigid underlay** - 75 x 3.15 mm Hardie™ Flex nails, 75 x 3.05 mm round head ring shank Paslode or Ecko gun nails and 70 x 3.15 mm jolt head nails.

[Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680].

4.3 Accessories used with Stria™ Cladding Vertical to a generic specification in accordance NZBC E2/AS1 or covered by a relevant and valid BRANZ Appraisal or NZ CodeMark Certification, which are supplied by the building contractor, are:

- Flexible wall underlay
- Flexible wall underlay support
- Rigid wall underlay
- Flexible sill, head and jamb flashing tape
- Joinery head flashings
- Window and door trim cavity air seal
- Flexible sealant

Paint System Specification

4.4 Paint systems are not supplied by James Hardie New Zealand Limited and have not been assessed, therefore they are outside the scope of this Appraisal.

4.5 All exposed faces, including top edges at sills and all bottom edges of Stria™ Cladding panels and accessories must be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730 within 90 days of installation.

Handling and Storage

5.1 Handling and storage of all materials supplied by James Hardie New Zealand Limited, whether on-site or off-site, is under the control of building contractor and shall be handled according to the requirements in the Technical Literature.

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 This Appraisal must be read in conjunction with:

- Stria™ Cladding Smooth Vertical Installation Technical Specification, dated April 2026.
- Stria™ Cladding Fine Texture Vertical Installation Technical Specification, dated April 2026.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber framing must be treated as required by NZBC Acceptable Solution B2/AS1.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of a building within the scope limitations of NZS 3604. Buildings or parts of a building outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Studs must be at maximum 600 mm centres. Nogs/dwangs must be fitted flush between the studs at maximum 800 mm centres (for studs at 600 mm centres).

7.3 The maximum moisture content of timber framing must be in accordance with NZBC Acceptable Solution E2/AS1.

General

8.1 When Stria™ Cladding Smooth is used for specifically designed buildings up to 3.2 kPa ULS wind pressure, only the weathertightness and structural aspects of the cladding are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal. *(Note: Stria™ Cladding Fine Texture is only for use in NZS 3604 Wind Zones up to, and including, Extra High.)*

8.2 Ground clearance to finished floor levels as set out in NZS 3604 must always be adhered to.

8.3 The horizontal separation between the wall cladding and the adjacent ground must be maintained in accordance with NZS 3604.

8.4 The bottom of cladding must have separations, clearances and overlaps in accordance with NZBC Acceptable Solution E2/AS1.

8.5 All external walls shall have barriers to airflow in accordance with NZBC Acceptable Solution E2/AS1 and for specifically designed buildings up to a 2.5 kPa design differential ULS wind pressure, a rigid underlay is required.

8.6 All external walls of buildings must have barriers to airflow in the form of 9 mm thick RAB™ Board when used on buildings between 10-25 m high or situated in specific design wind pressures over a maximum differential ULS of 1.5 kPa.

8.7 Penetrations through Stria™ Cladding Vertical shall be in accordance with NZBC Acceptable Solution E2/AS1 and the Technical Literature.

8.8 Inter-storey junctions in claddings are required in accordance with NZBC Acceptable Solution E2/AS1 and shall be detailed in accordance with the Technical Literature.

8.9 Where Stria™ Cladding Vertical abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. The Technical Literature provides guidance for using the Stria™ Cladding Vertical at junctions. Details not included with the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Structure

Mass

9.1 The mass of Stria™ Cladding Vertical is approximately 16 kg/m^2 and is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

9.2 Stria™ Cladding Vertical has good resistance to hard and soft body impacts 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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Wind Zones

9.3 Stria™ Cladding Smooth and Stria™ Cladding Fine Texture are suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1.

9.4 Stria™ Cladding Smooth is also suitable for use in buildings up to 25 m high, situated in specific design wind pressures up to maximum design differential ULS of 3.2 kPa where framing is specifically designed.

Inter-storey Deflections

9.5 Stria™ Cladding Vertical, installed in conjunction with RAB™ Board, is suitable to resist inter-storey deflections. When installed in accordance with the Technical Literature, Stria™ Cladding Vertical, in conjunction with RAB™ Board, is capable of withstanding SLS deflections up to height/180.

Durability

10.1 Stria™ Cladding Vertical meets the performance requirements of NZBC Clause B2.3.1 (b) 15 years for the Stria™ Cladding panels, flashings and cavity system.

Serviceable Life

10.2 Stria™ Cladding Vertical installations are expected to have a serviceable life of at least 50 years provided the paint coating system is maintained in accordance with this Appraisal to ensure the Stria™ Cladding panels and fixings remain dry in service. Stria™ Cladding Vertical must be painted within 90 days of fixing.

10.3 Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500 m from the sea including harbours, or 100 m from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604, Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life in Zone D, Stria™ Cladding Vertical must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot-dip galvanised steel.

10.4 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. The use of Stria™ Cladding Vertical in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604 and is outside the scope of this Appraisal.

Maintenance

11.1 Regular maintenance in accordance with the Technical Literature is essential for Stria™ Cladding Vertical installations to continue to meet the NZBC durability performance provision and to maximise its serviceable life.

11.2 Annual inspections must be made to ensure that all aspects of the cladding system, including the paint coating system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the sealant or paint coating manufacturer's instructions.

11.3 Regular cleaning (at least annually) of the paint coating surface is recommended to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Paint systems must be recoated at approximately 7-15 yearly intervals in accordance with the paint manufacturer's instructions.

11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *(Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Stria™ Cladding Vertical.)*

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Prevention of Fire Occurring

12.1 Stria™ Cladding panels are considered a non-combustible material and need not be separated from heat sources such as fireplaces, heating appliances and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from heat sources such as fireplaces, heating appliances and chimneys. NZBC Acceptable Solutions C/AS1 and C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

13.1 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2 for fire resistance rating, control of external fire spread and vertical fire spread requirements for external walls.

Horizontal Fire Spread

13.2 Where required by NZBC Acceptable Solution C/AS1 or C/AS2, the cladding system will need to be installed over a fire resistance rated (FRR) external wall with the required FRR.

Vertical Fire Spread - Buildings 10 m in height or less

13.3 When Stria™ Cladding Vertical is used in 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.

Vertical Fire Spread - Buildings greater than 10 m in height

13.4 Stria™ Cladding Vertical can form part of an external wall cladding system designed to meet Vertical Fire Spread requirements. This has not been assessed by this Appraisal and is outside its scope.

13.5 Specific Fire Engineering Design is required for each building over 10 m in height to ensure the External Cladding System will meet the requirements of NZBC Acceptable Solution C/AS2 or NZBC Verification Method C/VM2.

13.6 The specific engineering design for the building must include the specific detailing at each floor level as provided in the Stria™ Cladding Vertical Technical Specification and meet the requirements of NZBC Acceptable Solution C/AS2.

13.7 The following information is provided to support the Specific Engineering Design. The components listed in Table 1 form a part of the James Hardie External Cladding System and have been tested and achieved the listed classifications.

Table 1: Components of the Stria™ Cladding Vertical system

Component	Test Method	Result
Stria™ Cladding panels	AS/NZS 3837:1998	Pass - Type A
Joinery and joint flashings and mouldings	Aluminium as defined in C/AS2 definitions	Non-combustible
James Hardie Rigid Air Barrier (RAB™ Board)	AS/NZS 3837:1998	Pass - Type A
Flexible sill, head and jamb flashing tape	-	-
Timber cavity battens	Component of NFPA 285 test	Pass
Fixings	Steel as defined in C/AS2 definitions	Non-combustible
Air seals and sealants	-	-

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

External Moisture

14.1 Stria™ Cladding Vertical, when installed and maintained 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 drained cavity must be sealed off to restrict air movement between the drained cavity; and: floor, wall and roof framing, and attic roof space, and subfloor space as required by NZBC Acceptable Solution E2/AS1.

14.3 Construction moisture must be managed in accordance with NZBC Acceptable Solution E2/AS1 to ensure construction moisture is not permitted to damage building elements.

14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

Internal Moisture

Water Vapour

15.1 Stria™ Cladding Vertical is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal and the Technical Literature, will not create or increase the risk of moisture damage resulting from condensation.

15.2 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.

Installation Information

Installation Skill Level Requirement

16.1 All design and building work must be carried out in accordance with the Stria™ Cladding Vertical Technical Literature and this Appraisal by competent and experienced tradespeople, conversant with Stria™ Cladding Vertical. Where the work involves Restricted Building Work (RBW), this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

17.1 The selected wall underlay and flexible flashing tape must be installed in accordance with the underlay and tape manufacturer's instructions, prior to the installation of the cavity battens and Stria™ Cladding Vertical. 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 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 wall underlay and flexible flashing tapes around window and door openings and penetrations to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

17.2 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a flexible wall underlay restraint in accordance with the Appraisal Technical specification must be installed over the underlay to prevent the insulation from bulging the building underlay into the cavity.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

RAB™ Board

17.3 RAB™ Board must be installed in accordance with the Technical Literature and BRANZ Appraisal No. 611 James Hardie Rigid Air Barriers.

Hardie™ Horizontal Cavity Battens

17.4 Hardie™ horizontal cavity battens must be installed over the wall underlay to the wall framing (nogs/dwangs) at maximum 600 mm centres. The battens must be installed with the top edge sloping away from the wall underlay towards the back of the Stria™ Cladding. The cavity battens must be fixed by the cladding fixings through the timber battens to the timber framing.

Joinery Installation

17.5 Joinery must be installed in accordance with the appraised Technical Literature and any Technical Literature of the joinery manufacturer. The joinery must be installed plumb, level and fixed in accordance with NZBC Acceptable Solution E2/AS1 or the joinery manufacturers Technical Literature.

Stria™ Cladding Installation

17.6 Stria™ Cladding panels may be cut on-site by power saw. Holes and cut-outs may be formed by drilling a number of holes around the perimeter of the opening required and tapping out the centre with a hammer, or by using a hole saw.

17.7 Stria™ Cladding panels must be dry prior to installation. Before the panels are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement.

17.8 Before Stria™ Cladding panels are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner. The necessary flashings, including window flashings, must be installed before commencing panel fixing and the cavity vent strip must be installed continuously around the bottom of the cavity.

17.9 Stria™ Cladding panels must be installed starting at the corner of the wall being clad. The first panel must be installed plumb to assist with the installation of subsequent panels. The panels must overhang the bottom plate by a minimum of 50 mm. The panels should be installed with the lap facing away from the prevailing winds. Stria™ Cladding panel laps are pre-determined by the machined joint detail.

17.10 Fixings for Stria™ Cladding Vertical must be in accordance with the Technical Literature. The 'D' head nails must be punched a maximum of 2 mm below the surface of the panel and be no closer than 12 mm to the end of the panel.

Stria™ Cladding Fine Texture

17.11 Stria™ Cladding Fine Texture must be installed using the concealed fixing method in accordance with the Technical Literature.

Finishing

17.12 All punched fixings must be filled. The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. Stria™ Cladding Vertical must be clean and dry before commencing painting.

Inspections

17.13 The Technical Literature must be referred to during the inspection of Stria™ Cladding Vertical installations.

Health and Safety

18.1 Protective equipment must be worn and used as required by the Technical Literature and the manufacturer's instructions.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 Uniform wind face load tests to simulate wind pressures on Stria™ Cladding Vertical were carried out by a James Hardie Australia Pty Ltd NATA accredited laboratory. The testing determined design wind suction pressures, and by comparing these pressures with the NZS 3604 and AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber-framed walls. The test methods and results have been reviewed by BRANZ and found to be satisfactory.

19.2 Stria™ Cladding Vertical has been tested by a James Hardie Australia Pty Ltd NATA accredited laboratory in accordance with AS/NZS 2908.2 and ISO 8336. The testing covered: soak-dry, bending strength, warm water soaking, heat/rain, freeze/thaw and apparent density. The test methods and results have been reviewed by BRANZ and found to be satisfactory.

19.3 Cone calorimeter testing to determine the peak rate of heat release and total heat release of Stria™ Cladding Vertical was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.

19.4 BRANZ expert opinion on NZBC Clause C3 code compliance for Stria™ Cladding Vertical was based on NFPA 285 testing by Intertek Group plc on specimens assembled containing the James Hardie External Cladding System.

19.5 BRANZ expert opinion on NZBC Clause E2 code compliance for Stria™ Cladding Vertical was based on NZBC Verification Method E2/VM2 [BRANZ EM7] testing and evaluation of all details within the scope and as stated within this Appraisal.

Other Investigations

20.1 Structural and durability opinions have been provided by BRANZ technical experts.

20.2 A BRANZ expert opinion on NZBC Clause E2 code compliance for Stria™ Cladding Vertical including evaluation of all details within the scope of this Appraisal has been completed.

20.3 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.4 The Technical Literature for Stria™ Cladding Vertical has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of Stria™ Cladding Vertical 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 James Hardie New Zealand Limited is the responsibility of James Hardie New Zealand Limited.

21.3 Quality of installation on-site of components and accessories supplied by James Hardie New Zealand Limited 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 underlays, flashing tapes, air seals and cavity battens in accordance with the instructions of James Hardie New Zealand Limited.

21.5 Sub-trades are responsible for installation of penetrations, flashings etc. that are relevant to their trade in accordance with the Stria™ Cladding Vertical Technical Literature.

21.6 Building owners are responsible for the maintenance of Stria™ Cladding Vertical in accordance with the instructions of James Hardie New Zealand Limited.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Sources of Information

- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170:2002 Structural design actions.
- AS/NZS 2908.2:2000 Cellulose-cement products - Flat sheet.
- AS/NZS 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- AS/NZS 4534:1998 Zinc and zinc/aluminium-alloy coatings on steel wire.
- AS/NZS 4680:2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
- BRANZ Appraisal No. 611 James Hardie Rigid Air Barriers.
- BRANZ EM7 Performance of mid-rise cladding systems.
- ISO 5660.1:2002 Heat release rate (cone calorimeter method).
- ISO 8336:2009 Fibre-cement flat sheets - Product specification and test methods.
- NFPA 285:2012 Standard method of test for the evaluation of flammability characteristics of exterior non-loadbearing wall assemblies containing components using the intermediate scale, multi-storey test apparatus.
- NZS 3603:1993 Timber structures standard.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No.1, dated 13 May 2025

This Appraisal has been amended to correct a editorial error in Paragraph 17.1.

Amendment No. 2, dated 1 April 2026

This Appraisal has been amended to increase the stud spacing to 600 mm centres and the nog spacing to 800 mm centres and to incorporate the 'Fine Texture' panel.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ

In the opinion of BRANZ, Stria™ Cladding Vertical is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to James Hardie New Zealand Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. James Hardie New Zealand Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by James Hardie New Zealand Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to James Hardie New Zealand Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
31 August 2022

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

CodeMark

Certificate no: CMNZ30109
Version: F
Original issue date: 20/08/2019
Version date: 24/04/2026
Renewal Date: 01/09/2028

1. Certificate Holder Details

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Complaints: The complaints process for this certificate can be found here:
www.global-mark.co.nz/complaints

Global-Mark Managing Director

Herve Michoux

global-mark

Product Certificate

Stria™ Smooth and Stria™ Fine texture Claddings by James Hardie

3. Description of Building Method or Product

Stria™ Smooth and Stria™ Fine Texture Claddings are cavity-based fibre cement panel wall cladding systems. They consist of Stria™ Smooth or Stria™ Fine Texture Cladding Panels, which are 14mm profile fibre cement panel, fixed horizontally or vertically over battens to form a cavity. Proprietary ventilated timber battens are used in vertical applications. The cladding is finished with a latex paint system.

4. Intended use of Building Method or Product

The systems are designed to be used as part of an external cladding system on timber framed building

5. New Zealand Building Code Provisions

The Systems if designed, used, installed and maintained in accordance with the conditions of this Certificate will comply with or contribute to compliance with the following performance provisions of the NZ Building Code:

Clause B1 STRUCTURE:	Performance B1.3.1, B1.3.2 and B1.3.4, for the relevant physical conditions of B1.3.3 (a), (f), (h), (j) & (m)
Clause B2 DURABILITY:	Performance B2.3.1(b) 15 years and B2.3.2(a)
Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE:	Performance C3.5 (contributes to) and C3.7
Clause E2 EXTERNAL MOISTURE:	Performance E2.3.2 (contributes to), E2.3.5 (contributes to), E2.3.6 (contributes to) and E2.3.7
Clause F2 HAZARDOUS BUILDING MATERIALS:	Performance F2.3.1

6. Conditions and Limitations of Use

1. Both systems are certified as a cavity external wall claddings in:
    a. Buildings
        i. of importance Levels 1 to 4, and
        ii. within the scope of C/AS1, Subsection 1.1.1, or C/AS2, Subsection 1.1.1, and
        iii. located in all exposure zones (except microclimates) as defined in NZS 3604:2011 section 4.2, and

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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 advise 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. The revision of all Acceptable solutions, Verification methods or standards referenced in this certificate are the current at the time of issuance of the certificate unless identified otherwise

iv. located anywhere in relation to the relevant boundary, and;

b. Timber-framed buildings:
   i. within the scope limitations of the NZBC Acceptable Solution E2/AS1, subsection 1.1.1, and
   ii. with a risk score of up to 20, calculated in accordance with the NZBC Acceptable Solution E2/AS1, Table 3.1.3.1, and
   iii. situated in NZS 3604:2011 Wind Zones up to, and including Extra High, or

c. in addition, Stria™ Smooth Claddings, Timber-framed buildings specifically engineering designed (SED):
   i. up to 25m in height, and
   ii. with an inter-storey drift of span/180 maximum, and
   iii. the design ultimate limit state (ULS)differential wind pressure does not exceed 3.2 kPa, and
   iv. with the stud and batten spacing no more than 600mm centres, and

2. The systems shall be specified, installed, inspected and maintained in accordance with the following sets of documents to the extent that their scope covers that for is applicable to this Certificate:
   a. For the Horizontal applications with timber batten:
      i. Either
         1. Stria™ Cladding Smooth Horizontal Installation Technical Specification (April 2026), , or
         2. Stria™ Cladding Fine Texture Horizontal Installation Technical Specification (April 2026), as applicable and
      ii. James Hardie Fire & Acoustic Design Manual (May 2025) section 4:17 Control of External Fire Spread, figures No's. 2 to 11, 14 to 18 and 21 to 26, specifically details JHETGS30h and JHETGS60h.
   b. For the Vertical Application:
      i. Either
         1. Stria™ Cladding Smooth Vertical Installation Technical Specification (April 2026), or
         2. Stria™ Cladding Smooth Vertical Installation to Hardy™ 40mm Structural Horizontal Cavity Batten Technical Specification (April 2026), or
         3. Stria™ Cladding Fine Texture Vertical Installation Technical Specification (April 2026), as applicable and
      ii. James Hardie Fire & Acoustic Design Manual (May 2025) section 4:17 Control of External Fire Spread, figures No's. 2 to 11, 14 to 18 and 21 to 26, specifically details JHETGS30v, JHETGS60v and JHETSS60v.
   c. James Hardie Fire & Acoustic Design Manual (May 2025) section 4:17 "Control of External Fire Spread", Figure No's 2 to 11, 14 to 18 and 21 to 26, in particular the installation details JHETGS30h, JHETGS30v, JHETGS60h and JHETGS60v. These details have only been assessed and certified with respect to external fire spread via Stria™ Cladding. For walls located within 1.0 m of a relevant boundary, Stria™ Cladding may be used as an external façade/cladding attached to the exterior of fire rated

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wall systems as depicted within the Fire and Acoustic Design Manual (May 2025). Fire Resistance rating performance of the wall assembly falls outside the scope of this certificate.

3. In wind zones greater than Very High a rigid air barrier which complies with Table C.2.1.1 of E2/AS1 shall be used. In buildings exceeding 10 m in height RAB™ Board must be used including horizontal control joints in accordance with the requirements of the Codemark certificate (CMNZ30130) for RAB™ Board.
4. The system must be used:
    a. with the ancillary components as described in this certificate, and
    b. with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills which complies with the requirements of NZS 4211:2008 including amendment 1 for the relevant Wind Zone or wind pressure or have a current CodeMark.
5. Stria™ Cladding shall only be installed on vertical surfaces.
6. All exposed faces, including top edges at sills and all bottom edges of Stria™ Cladding panel and fibre cement ancillary components shall be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730.
7. E2.3.5 and E2.3.6 compliance is limited to cavities created between the internal surface of the panels and the underlay or RAB™ Boards.

7. Health and Safety Information

Standard industry safety practices and manufacturer safety requirements as detailed in the technical literature including the applicable SDS must be observed at all times. Please refer to James Hardie SDS Fibre Cement Products June 2022

8. Basis for Certification

The certification decision is based on independent technical review(s) of test report(s), engineering opinion(s) and other documented evidence(s), factory audit(s) and site review(s)

Code Objective Clause	Compliance pathway
B1 STRUCTURE	Informed by NZS3604:2011 and comparison with E2/AS1
B2 DURABILITY	Informed by expert judgement
C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE	Informed by expert judgement and testing to NFPA 285
E2 EXTERNAL MOISTURE	Informed by expert judgement and testing to AS/NZS4284

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CodeMark

Product Certificate

Stria™ Smooth and Stria™ Fine texture Claddings by James Hardie

global-mark

Certificate no: CMNZ30109
Version: F
Original issue date: 20/08/2019
Version date: 24/04/2026
Renewal Date: 01/09/2028

F2 HAZARDOUS BUILDING MATERIALS	Informed by expert judgement

9. Supporting Documentation for Certification

Nb	Author	Description	Date and/or Revision
001	GLOBAL-MARK	Codemark Certification (CMNZ30130)HomeRAB™ Pre-Cladding and RAB™ Board by JAMES HARDIE	Version B
002 *	BRANZ	Fire Assessment Report based Cone calorimeter test.	FH3182 21 November 2002
003 *	BRANZ	Fire Assessment Report based Cone calorimeter test.	FH 2976 15 May 2001
004 *	BRANZ	Fire Assessment Report based Cone calorimeter test (BRANZ Project No. FC10254-001).	FSR 4206 Issue2 7 November 2018
005*	BRANZ	Fire technical Opinion: Technical opinion based on NFPA 285 Compliance with NZBC C/AS2, clause 5.8.2 (b) and C/VM2 Part A (a).	FC12172-001 – 1 November 2019
006*	BRANZ	Fire Assessment Report Review of James Hardie Fire and Acoustic Manual	FAR 4620 – 04 November 2016
007*	BRANZ	Fire technical Opinion: Fire resistance of James Hardie Wall Systems with Service Penetrations	FC12040-004 -03 December2019
008*	BRANZ	Technical Assessment “Fire Resistance of External Wall and Soffit” _Various JH Products	FAR 2597- 5th October 2005
009*	BRANZ	E2 Weathertightness Opinion for the Appraisal of Linea Oblique Weatherboard (Vertical) Cavity Cladding	TP2355-02, dated 19 November 2015

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010*	Intertek B&C	JH cavity fix wall assembly fire test as per NFPA 285	J6706.01-121-24 - 20th August 2019
011*	Intertek B&C	JH cavity fix wall assembly fire test as per NFPA 285	J6707.01-121-24 - 21st August 2019
012*	Clarkson Consulting Services	JH NZ_RAB_Weathertightness Assessment_200626_R2.1	August 2022
013*	James Hardie Building Product	Weathertightness Testing of Residential Façade Fibre Cement Cladding System On Cavity Battens to the requirement of Verification Method E2/VM1	TS061-05, dated 15 February 2006
014*	James Hardie Building Product	TESTING OF A TITAN RESIDENTIAL FIBRE CEMENT CLAD FAÇADE FOR COMPLIANCE WITH THE REQUIREMENTS OF AS/NZS 4284:1985 "TESTING OF BUILDING FACADES"	TS010-06, dated 14 November 2006
015*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS003-13, dated 4 December 2013
016*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS022-13, dated 12 November 2013
017*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS033-13, dated 8 January 2014
018*	James Hardie Technical Support group	Weathertightness & Façade System (E2/VM1)	TS009-15, dated 14 October 2015
019*	James Hardie Technical Support group	Weathertightness & Façade System (E2/VM1)	TS052-11, dated 16 December 2011
020*	James Hardie New Zealand Limited	Report Number TS021/040-24	17 January 2025
021*	Façade Testing New Zealand Limited,	Testing of James Hardie NZ ExoTec Façade panel top hat rainscreen façade system in accordance with AS/NZS 4284:2008	FT-R1005, dated May 2017

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022*	Façade Lab Ltd	Testing of James Hardie Linea – Weatherboard on RAB Board in accordance with E2/VM2 (BRANZ – EM7)	20-15 dated 10/3/2021
023*	Façade Lab Ltd	Testing of James Hardie Linea Oblique vertical weatherboard on rigid wall underlay to E2/VM2 (BRANZ EM7) using tests from AS/NZS 4284:2008 'Testing of Building Facades'	20-16 dated 11/12/2020
024*	BRANZ	BRANZ Assessment – Face Load Strength of James Hardie Linea Weatherboard Clad Walls and Variations of Sheet thickness and Nail type (reviews STO483)	STO102/SM30/SJT dated 11 November 2002
025*	BRANZ	Durability Opinion on the Linea Weatherboard System	DA 0220 dated 24/09/2017
026*	BRANZ	Face Loading Testing of Low-Density Thick Weatherboard	Report ST483 dated 20 February 2001
027	David Beneke Consulting	Producer Statement – Structural Design Verification of Vertically Fixed, Stria Cladding, As proposed by James Hardie	2024-24-LO-24 dated 07 January 2025
028	David Beneke Consulting	Producer Statement – Structural Design Verification of Vertically Fixed, Stria Cladding, As proposed by James Hardie	2025-04-LO-49 dated 13 February 2026
029	David Beneke Consulting	Producer Statement – Structural Design Verification of Horizontally Fixed, Stria Cladding, As proposed by James Hardie	2024-24-LO-39 dated 16 December 2025
030	James Hardie New Zealand Limited	Stria™ Cladding Smooth Horizontal Installation Timber Cavity Batten Technical Specification	April 2026
031	James Hardie New Zealand Limited	Stria™ Cladding Fine Texture Horizontal Installation Technical Specification	April 2026
032	James Hardie New Zealand Limited	Stria™ Cladding Smooth Vertical Installation Technical Specification	April 2026
033	James Hardie New Zealand Limited	Stria™ Cladding Smooth Vertical Installation to Hardy™ 40mm Structural Horizontal Cavity Batten Technical Specification	April 2026
034	James Hardie New Zealand Limited	Stria™ Cladding Fine Texture Vertical Installation Technical Specification	April 2026

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035	James Hardie New Zealand Limited	James Hardie Fire & Acoustic Design Manual. Section 4:17 Control of External Fire Spread, figures No's to 11, 14 to 18 and 21 to 26, specifically details JHETGS30h, JHETGS30v, JHETGS60h, JHETGS60v, JHETSS60h and JHETSS60vJHETGL30, JHETGL60 and JHETLL60	May 2025
036	James Hardie New Zealand Limited	LQA8N – Safety data sheet – James Hardie Fibre Cement Sheet Products	Version No.: 2.0 ISSUED Date: 22/06/2022

* These documents were provided commercial in confidence and are not publicly available

10. Supporting Information About Description (Optional)

The Stria™ Cladding panels are pre-primed with an acrylic primer on the front face and edges. The Stria™ Cladding panels are 14 mm thick and are available 325 mm or 405 mm wide by 3000mm or 4200 mm long.

They are manufactured from a reduced density cellulose fibre cement formulation. The panels are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a profile is machined on the top edge of the front face, and a rebated lap is machined on the bottom of the back face of the panel. The front edge at the bottom of the board and the board ends are finished square. The Stria™ Cladding panels are manufactured to meet the requirements of AS/NZS 2908.2.

James Hardie supplies the following ancillary components:

- For the horizontal, vertical applications with 20 mm cavity and vertical applications with 40 mm cavity
  - Rigid wall underlay – HomeRAB™ Pre-Cladding and RAB™ Board
  - Hardie™ 14 mm Trimline Joint Flashing The joint flashings are available in extruded aluminium in 3000 mm lengths.
  - Trimline Horizontal Jointer - A jointer to cover the butt joint of HardieTM 14 mm Trimline Joint Flashing in 100 mm
  - Hardie™ 14 mm External Corner jointer - Joins Hardie™ 14 mm Trimline Joint Flashing at an external corner
  - Hardie™ Internal Corner jointer - Joins Hardie™ 14 mm Trimline Joint Flashing at an internal corner
  - Hardie™ 14 mm Internal Corner Flashing - Anodised aluminium extrusion used to create internal corners in 3000 mm lengths
  - Hardie™ 14 mm External Box Corner - Anodised aluminium extrusion used to create external corners in 3000 and 4000 mm lengths.
- For the horizontal applications
  - Hardie™ Vertical Joint Flashing. The joint flashings are available in extruded aluminium in 3000 mm lengths.
  - Hardie™ 14 mm Aluminium Window Jamb Flashing - Aluminium moulding used beside window opening to end butt the Stria Cladding in 3000 mm lengths

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  - Cavity vent strip – Hardie™ 28 mm aluminium cavity closure
  - Cavity vent strip – Hardie™ uPVC vent strip, available in 3000 mm lengths
- For the vertical applications with 20 mm cavity
  - Hardie™ 20 mm horizontal cavity battens – 45 x 20 mm thick Radiata pine batten treated to Hazard Class H3.1. The top edge is bevelled with an 18° slope. The back face is grooved with 22 mm wide x 5 mm deep rebates at 50 mm centres, and the front face is grooved with 6 mm wide x 6 mm deep rebates at 150 mm centres. The grooves are offset on each face.
  - Hardie™ 9mm Panel Aluminium External Box Corner- A box corner moulded to form the external joints. 9mm etch primed available in 2700, 3000 and 4000 mm
  - Cavity vent strip – Hardie™ uPVC vent strip, available in 3000 mm lengths
- For the vertical applications with 40 mm cavity
  - Hardie™ 40 mm Structural Horizontal Cavity battens – 45 x 20 mm thick Radiata pine batten treated to Hazard Class H3.1. The top edge is bevelled with an 18° slope. The back face is grooved with 22 mm wide x 5 mm deep rebates at 50 mm centres, and the front face is grooved with 6 mm wide x 6 mm deep rebates at 150 mm centres. The grooves are offset on each face.
  - Hardie™ 9mm Panel Aluminium External Box Corner- A box corner moulded to form the external joints. 9mm etch primed available in 2700, 3000 and 4000 mm

Other components not supplied by James Hardie but meet the following requirements

- For the horizontal, vertical applications with 20 mm cavity and vertical applications with 40 mm cavity
  - Flexible sill, head and jamb flashing tape - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Subsection 4.2.12 for use around window and door joinery openings.
  - Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1 for use as a weather sealing sealant for exterior use.
  - Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, Subsection 9.1.5for use around window, door and other wall penetration openings.
  - Exterior Grade filler – CRC® ADOS® builders Fill or similar two part filler to fill over nail holes
  - Penetration seals
  - Joinery head flashings - extruded or folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table C.1.1.1A for durability requirements.
- For the horizontal and vertical applications with 20 mm cavity
  - Flexible wall underlay – building underlay complying with NZBC Acceptable Solution E2/AS1, Table C.2.1.1, or breather-type membranes for use as wall underlays

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- 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.)
- Cavity batten fixings - 40 x 2.8 mm or longer flat head hot-dip galvanised nails.
- Stria™ Cladding fixings (with flexible wall underlays) - 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless-steel ring shank nails.
- Stria™ Cladding fixings (with rigid wall underlays up to 10 mm thick) – 75 x 3.15 mm Hardie™ Flex hot-dip galvanised or stainless-steel nails

- For horizontal applications
  - Cavity battens - nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to Hazard Class H3.1.
  - Timber trim and moulding for use around windows and door. Timber trim and moulding must be finished in accordance with their manufacturer specifications to achieve the required durability
  - Planted sill and scribers - timber treated to Hazard Class H3.1, pre-primed before installation. Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, Subsection 9.1.5, or self-expanding, moisture cure polyurethane foam air seals suitable for use around window, door and other wall penetration openings.
- For vertical applications with 40 mm cavity
  - Cavity batten fixings – 80 mm x 10g screw
  - Cavity batten fixings – 75 x 3.06 mm RounDrive ring shank Galvenized Stainless Steel Nails
  - Stria™ Cladding fixings - 50 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless-steel ring shank nails.

  Cavity vent strip – 40 mm Vent Strip

Note: Stainless steel fixings must be Grade 304/316 and hot-dip galvanising must comply with AS/NZS 4680.

11. Supporting Information About Intended Use (Optional)

While Stria™ Smooth Cladding Panels can be nail fixed through the face, for aesthetic reasons, the fixing of Stria™ Fine Texture Cladding Panels is limited to concealed nails options,

12. Supporting Information About Conditions and Limitations of Use (Optional)

Stria™ Cladding can be used to provide fire resistance rated construction, but this aspect has not been assessed and is outside the scope of this certificate.
Provisions within the referenced documents related to the use of the system with steel-frame construction are outside the scope of this certification

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All CodeMark certificates that are current must be registered with MBIE. MBIE maintains a register of valid product certificates. Please find the register here.

If the certificate is not listed on this register or it appears as (SUSPENDED), it is not a valid CodeMark certificate and does not have to be accepted by a building consent authority as establishing compliance with the New Zealand Building Code.

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Rinnai



Enviroflo
Hot Water Heat Pump

GR Series

Enviroflo GR Series
Hot Water Heat Pump

The Rinnai Enviroflo GR Series Electric Integrated Hot Water Heat Pump systems are your reliable choice for efficient hot water. Designed to meet a variety of installation needs across New Zealand, the GR Series offers capacities of 215L, 265L and 280L, making it suitable for diverse site requirements.

Featuring as standard a single element boost, you can enjoy hot water comfort, anytime. The GR Series is Solar PV compatible*, allowing for integration with solar energy systems to enhance efficiency.

Built to withstand New Zealand's unique climate, these systems operate effectively under water pressures up to 1000kPa, ensuring durability and dependable performance. Plus, they utilise R290, an environmentally friendly refrigerant, making them a sustainable choice for your hot water needs.

Available in 215L, 265L and 280L capacities

Designed to operate quietly

Built in Wi-Fi for convenient control

Can be networked with solar PV*



* When used with third-party interface.

GR Series Features and Benefits

Choice
Available in capacities of 215L, 265L and 280L to suit your hot water needs.

Quiet Operation
Operates quietly at a low 46dB(A), quieter than the average noise level of a household dishwasher.

Built in Wi-Fi
The built in Wi-Fi module allows for convenient control from anywhere.

Solar PV Compatible*
Can be networked with grid tied Solar PV for enhanced efficiency and savings.

Energy Efficient
With a high Coefficent of Performance (COP) of 4.0**, it delivers reliable and cost-effective hot water heating by maximising energy efficiency when compared to standard electric cylinders.

Environmentally Focused
High efficiency R290 refrigerant with a low Global Warming Potential of just 3.

Versatile
Multiple operating modes (Standard/ECO/Hybrid/ Electric/Vacation).

Adaptable for All Climates
Operates in ambient air conditions ranging from -7°C to 45°C.

Renowned Quality
Designed and built with a high level of product quality, backed by over 50 years of Rinnai's excellence in hot water.

Defrost Control
Built in anti-frost function to protect the evaporator in colder climates.

Reliable
Inbuilt electric element to ensure you always have a reliable supply of hot water.

Auto Disinfection
Auto disinfection preventing the potential growth of legionella.

Automated
Auto restart function - in the event of a power outage it will automatically restart once the power is re-instated.

Off-Peak Compatible
Option to run only at off-peak times, when the electricity cost is lower.

* When used with third-party interface.

** Performance estimated according to AS/NZS 5125:2014. Coefficient of Performance was measured at the following conditions: Inlet water temperature 19°C, Outlet Water temperature 55°C, Dry Bulb Temperature 19°C.

How Our Enviroflo GR Series Hot Water Heat Pumps Work

Using advanced refrigeration technology, the Rinnai Enviroflo GR Series Electric Hot Water Heat Pump naturally moves thermal heat energy and transfers it to the stored water. The higher the ambient air temperature, the higher the system efficiency, this is also known as Coefficient of Performance – COP.

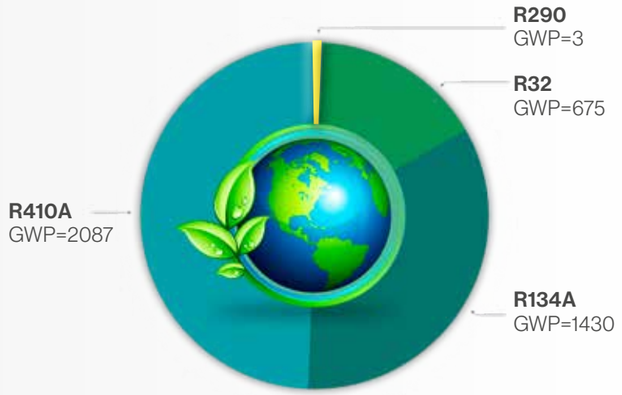
1. Compressor
The compressor is the central hub of the heating cycle which distributes the refrigerant between two heat exchange coils to facilitate efficient heat transfer.

2. Dual Protection Heat Exchanger
The highly efficient design of the heat exchanger safely transfers thermal heat from the refrigerant to the stored hot water.

3. Intelligent Controller
This clever controller continually monitors and adjusts system parameters ensuring optimum performance and system reliability.

4. Integrated DC Fan and Evaporator
40% more efficient and smaller than conventional AC fans when coupled with the evaporator means reduced materials during construct and a lighter assembled weight.

5. R290 Refrigerant
This sustainable and non-toxic refrigerant has a zero Ozone Depletion Potential (ODP) and a Global Warming Potential (GWP) of just 3. As such, it easily outperforms other hot water heat pumps that typically use refrigerants with high GWP values.



Warranty

		Cylinder*	Refrigeration Components (1)	Other Components (2)
Domestic Use	Parts	7 Years	3 Years	1 Year
	Labour	3 Years		
Commercial Use	Parts	1 Year	1 Year	
	Labour			

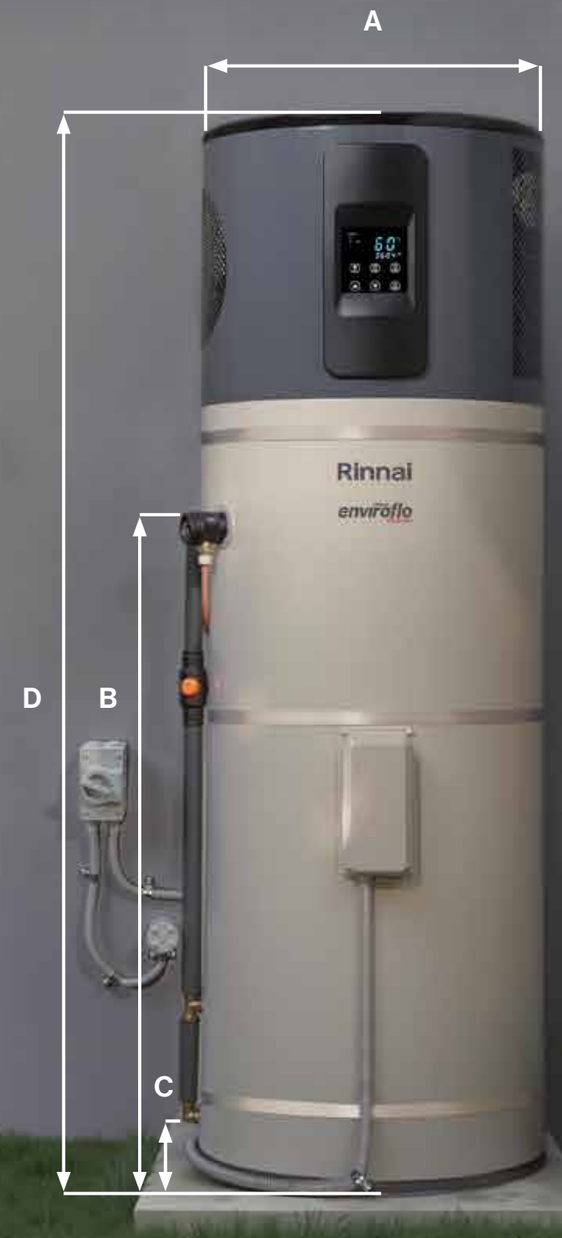
(1) Refrigeration components include but are not limited to: compressor, condenser, expansion valve, heat exchanger, evaporator and associated pipe work.
(2) Other components include but are not limited to: sensors, thermostats, valves, electric heating elements, anodes.

GR Series Technical Information

Model	Description	A Diameter (mm)	B Hot Outlet (mm)	C Cold Inlet (mm)	D Height (mm)	Empty Weight (Kgs)	Sizing Guide
EHPG215VM	215L Enviroflo GR Series Hot Water Heat Pump	640	1227	129	1875	109	2-4 Person Household
EHP265VM10	265L Enviroflo GR Series Hot Water Heat Pump	640	1210	112	1933	118	2-5 Person Household
EHPG280VM	280L Enviroflo GR Series Hot Water Heat Pump	640	1252	112	1975	120	2-5 Person Household

Technical Information	EHPG215VM	EHPG265VM10	EHPG280VM
Net Weight/Filled Weight (kg)	109/324	118/383	120/400
Tank Volume (L)	215	265	280
Sound Level	46 dB(A)		
Ambient Temperature Limits (for heat pump operation - element will operate beyond these limits) (°C)	-7°C to 45°C		
Ingress Protection	IP24		
Storage Cylinder - Hot Outlet and Cold Inlet Connections	ISO 7.1¾" RP		
Storage Cylinder - TPR valve connection	ISO 7.1½" RP		
Pressure and Temperature Relief (TPR) supplied valve settings/ratings	1000 kPa / 10kW		
Pressure limiting valve	500 kPa approx.		
Cold water pressure expansion valve	700 kPa approx		
Refrigerant Type / Mass	R290/355g	R290/395g	
Rated Input Electric Element (Factory Wired)	2.4kW	1.0kW	2.4kW
Rated Input Refrigeration Module (Factory Wired)	1.1kW		
Total Rated Input (To be wired by installer)	3.3kW	2.1kW	3.3kW
Maximum Energy Output (Use to size PTR)	7.0kW	5.6kW	7.0kW
Power Supply	220-240V AC/50 Hz		
Rated Current	13.5 Amp (15 Amp plug fitted)	9.2 Amp (10 Amp plug fitted)	13.5 Amp (15 Amp plug fitted)
Refrigerant Circuit Maximum Pressure	3091 kPa		
Coefficient Of Performance (COP)** (19°C ambient 19 °C inlet water 55 °C outlet water temp)	4.0	4.1	
Heat Output (19°C ambient 19 °C inlet water 55 °C outlet water temp)	2.00 kW	2.40 kW	2.75 kW
Package Size	725x725x2055	725x725x2113	725x725x2155

Note: Enviroflo GR Series Heat Pump is supplied with a 10 or 15 amp plug, or can be hard wired.
** Performance when tested to AS/NZS 5125:2014.



ZFLYENVIROGR26

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 **rinnai.co.nz**

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Rondo® Metal Batten Systems

Specification and Installation Manual

CBI 5113

SEPTEMBER 2024

NATIONAL SUPPORT

POST: PO Box 12 256, Penrose,
Auckland 1642, New Zealand
EMAIL: info@gib.co.nz
WEB: gib.co.nz

GIB® HELPLINE

0800 100 442

GIB® RONDO® METAL BATTEN SYSTEMS PROVIDE A STABLE SUBSTRATE FOR PLASTERBOARD CEILING LININGS.

Regular users of metal batten systems consistently have fewer call-backs for movement related ceiling defects such as peaking or cracked joints and popped fasteners.

GIB® Rondo® Metal Batten systems offer framing options to enable the construction of resilient and high performing, smooth surfaces. They form an essential part in many GIB® Fire Rated and GIB Noise Control® Systems and allow for the installation of services in the created cavity.

Some of the wall and ceiling systems are suitable to use as an integral part of airtight and thermal designs for 'high performance' homes.

WHY USE GIB® RONDO® METAL BATTEN SYSTEMS

- Consistent performance
  - Less influence from moisture or environmental factors than timber. Unlike timber battens which can vary in grade, species and with temperature and humidity
- Lighter weight
  - Lower transport costs and easier to handle on site
- Require less storage space
  - Storage space is often at a premium on building sites and a house-lot of GIB® Rondo® componentry will occupy substantially less space on site than timber battens
- Easy to achieve a flat, stable substrate
  - This results in a trouble-free ceiling and reduces the risk of costly call-backs
- Noise Control
  - Clip fix systems can noticeably improve inter-storey noise control
- Technical back up, our well established and highly rated technical team are available to quickly and efficiently handle any enquiries, call us on **0800 100 442** or email **helpline@gib.co.nz**

WHAT'S NEW OR CHANGED IN THIS BOOK?

- Introduction of GIB® Rondo® Metal Batten ceiling and wall systems for easier specification and installation using system specification ID codes
- System selectors for
  - Direct fix systems
  - Clip fix systems
  - Fully suspended systems
- Suspended ceiling specification and installation
- Full component list with parts dimensioned and SKU numbers
- Updated fastener requirements
- Links to installation videos on the GIB® Website

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SCOPE OF USE

The GIB® Rondo® Metal Batten systems covered in this literature are suitable for applications within the following scope of use:

- For buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144m^2, not exceeding 12 metres in any direction
- For use in dry internal environments
- Supporting a single layer 10mm or 13mm GIB® plasterboard ceiling lining

GIB NOISE CONTROL® AND GIB® FIRE RATED SYSTEMS

Fire rated and noise control systems have specific requirements to ensure their performance. Please refer to the relevant GIB® literature* for details about the use and installation of those GIB® systems especially regarding requirements for multiple layers of GIB® plasterboard and perimeter detailing.

*GIB® Fire Rated Systems and GIB Noise Control® Systems manual

GIB EZYBRACE® SYSTEMS

Specific design is required to use GIB® Rondo® Metal Battens in a GIB EzyBrace® wall bracing element.

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements that transfer loads to walls on bracing lines. Full details can be found in the GIB® EzyBrace® System specification and installation manual or the GIB® Site Guide.

COMPLIANCE AND STANDARDS

When used within the scope of application and the details in this literature, compliance is achieved with the following NZBC Clauses:

- B1 Structure
- B2 Durability
- F2 Hazardous Building Material

Relevant standards:

- AS/NZS 1170 Structural design actions
- AS/NZS 4600:2018 Cold-formed steel structures
- NZS 3404 Parts 1 and 2:1997 Steel structures standard
- AS 1397:2021 Continuous hot-dip metallic coated steel sheet
- AS 3566:2002 Self drilling screws
- AS/NZS 2589:2017 Gypsum linings

ELECTRICITY

Earthing is not required when electrical fixtures such as light fittings are installed between metal battens or fixed to timber blocking between battens.

Do not run electrical cabling inside metal battens.

For any other scenarios, consult an electrical contractor for any earthing requirements that may need to be incorporated.

CEILING LOADS

To limit sag, loads on GIB® plasterboard ceilings must not exceed an insulation weight of 4.2kg/m^2, and a fixture weight of 1kg or more unless they are independently supported. The placement of ceiling fixtures such as light fittings are to be limited to one fixture per m^2 unless independently supported.

BOTTOM CHORD RESTRAINT AND LATERAL SUPPORT OF TOP PLATES

Directly fixed GIB® Rondo® Metal Battens will provide bottom chord restraint for roof trusses and lateral support for top plates for buildings compliant with NZS 3604:2011 or NASH Standard for Residential and Low-Rise Steel Framing. Clip or full suspended systems provide minimal or no restraint or lateral support.

RAKING AND COVED CEILINGS AND SKILLION ROOFS

Due to the higher and fluctuating air moisture content, temperatures, and low air movement that can occur in raking ceilings, it is strongly recommended that clip fixed GIB® Rondo® Metal Batten systems are used. Unlike the various species and grades of timber battens which are variously affected by temperature and humidity, the performance of GIB® Rondo® Metal Battens is consistent throughout New Zealand.

Roof space ventilation, ceiling control joints or perimeter relief, and back-blocking will help reduce the risk of cracking in large expansive plasterboard ceilings.

Specific Engineering Design (SED) is required when designing raking suspended ceilings. See the Suspended Ceiling section in this manual for further details (p.16-19).

WALL LOADS

Metal battens on walls are not suitable for mounting heavy items such as shelving, cupboards, or vanity units.

TILING WALLS ON BATTEN SYSTEMS

To support tiles, reduce batten spacing to 450mm centres maximum and batten spans to 800mm centres maximum. Use 13mm GIB Aqualine® when tiling on metal battens.

BACK-BLOCKING

Back-blocking is the practice of laminating an offcut of plasterboard to the back of a joint using GIB-Cove® Bond. The back-blocking process is described in detail in the GIB® Site Guide.

Back-blocking is required as outlined below:

- Timber battens
  - When there are 3 or more tapered edge joints in a ceiling area
- Metal battens
  - When there are 6 or more tapered edge joints in a ceiling area
- To achieve a Level 5 Finish (all joints)

When using clip fixed metal battens or suspended ceiling, back-blocking tapered edge joints is not required when a Level 4 Finish is specified.

We strongly recommend back-blocking in the following situations:

- Sheet end joints not formed over battens
- All sheet joints in garages
- All sheet joints in ceiling application for superior performance

CONTROL JOINTS

Control joints are recommended to provide relief from stresses associated with changes in temperature, humidity, and the performance of junctions between dissimilar construction materials. Control joints must be positioned at maximum 12.0m centres in either direction. For general requirements refer to the GIB® Site Guide or for more significant structural movements consult the building designer.

Control joints in the GIB® Rondo® Metal Batten system can be achieved as shown in the details section of this manual (p.22).

Refer to the GIB® Fire Rated and GIB Noise Control® Systems literature for control joints in those systems.

HEALTH AND SAFETY

Use appropriate PPE such as eye protection and gloves. PPE must be used when handling or cutting GIB® Rondo® Metal Batten system components. Avoid breathing the dust while cleaning metal battens, and avoid any sharp edges when cutting.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded.

Before using this publication check whether this is the current publication; simply call the GIB® Helpline on 0800 100 442 or visit gib.co.nz

GIB® WARRANTY STATEMENT AND SUBSTITUTION

Product and System Warranty

The Winstone Wallboards warranty covers GIB® products and/or systems for a minimum of 10 years from the date of purchase. Winstone Wallboards warrants that GIB® products will be free from defects caused by factory workmanship or materials and, subject to compliance with the conditions in the Winstone Wallboards warranty statement, that the product or system will perform to the extent set out in relevant Winstone Wallboards published literature current at the time of installation. Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

We are 100% Behind our Products and Systems

If any of our products or systems fail to perform as claimed or an issue associated with any GIB® product or system does occur, Winstone Wallboards will work with the relevant parties to help resolve the issue.

System and Product Components

A system is a group of related product components that interact to perform a task. Ensure the full GIB® building system, including the appropriate GIB® branded products, are specified and installed. This will ensure performance is not compromised and that any failure that is attributable to GIB® products and/or systems will be supported. Winstone Wallboards will not support system performance where substitute products are used.

SUSTAINABILITY

- Winstone Wallboards Ltd is committed to protecting the environment. Environmental planning is integrated into all our business activities:
  - Our operations strive to exceed all environmental regulatory requirements at all times
  - Protection of the environment is a day-to-day responsibility that we must all accept
  - We allocate management time and resources to address relevant environmental issues and continuously improve our activities in that area
  - We will achieve our standards through positive action, employee involvement and constant communication with our neighbours, local authorities and customers
- Recycled steel content in Rondo® product is maximised, without being detrimental to the quality of the product
- The Rondo® EPD provides the Life Cycle Assessment (LCA) data

Rondo® is constantly reviewing its processes to minimise Rondo® Australia and New Zealand's consumption of energy from fossil fuels and reducing waste to landfill. Rondo® is constantly reviewing advancements in technology that could be introduced to benefit Rondo® by reducing annual energy consumption and the waste sent to landfill annually. Rondo® also recognises its responsibility in making a genuine commitment to the environment, aiming to achieve and maintain a high standard of environmental care within all areas of its operations.

GIB® sustainability

Rondo® sustainability

HANDLING AND STORAGE

- Metal components must be protected from the weather prior to installation and stored dry and flat on suitable dunnage
- Do not make service holes in metal battens or accessory components
- Metal battens can be cut using tin snips, a hacksaw or grinder disk. Wear appropriate PPE and take care when using a grinder not to damage the surface of the battens.
- Follow normal safe practices to protect yourself and others

INSTALLATION

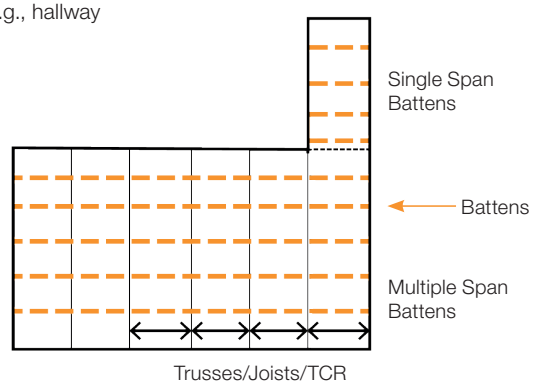
- Install GIB® Rondo® Metal Batten system after the roof is on. This is important with heavyweight roofs to reduce any unevenness and stress in the ceiling plane as the roof settles. Truss bottom chords usually have a pre-camber which changes under the roof load and will also affect the 'flatness' of the finished ceiling and create stress points especially near wall framing
- Do not line the ceiling until the moisture content of the timber framing supporting the battens is less than 18%. It is recommended that a moisture content of 8-12% is achieved if the building is to be air-conditioned and/or centrally heated
- To minimise the risk of plasterboard surface defects, ensure all ceiling battens run in the same direction. Consider control joints at a change in direction

Scan to view GIB® installation videos

BATTEN SPACING AND SPAN

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

- A multiple span batten is continuous across more than 2 supports
- A single span batten spans between 2 supports only e.g., hallway



DROP HEIGHT

For ceiling applications, the following drop heights can be achieved depending on batten type, Direct Fix (DF), Clip Fix (CF) and Suspended Ceiling (SC). The drop height is measured from the underside of the floor framing or slab to the top of the plasterboard ceiling lining.

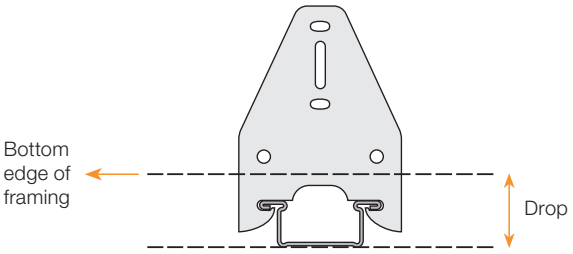


Table 1

Batten	Fixing	Type	Drop Range (mm)	Page
GIB® Rondo® 310	Direct Fix	N/A	35	12
	Clip Fix	311D Clip	40-65	13
		313 Long Clip	40-165	
		A311 GIB® Quiet Clip	40-65	
Rondo® 308	Clip Fix	226 Clip	20-45	14
		394 Long Clip	20-145	
		STWC Acoustic Clip	30-40	
		Betagrip Clip	35 / 40	
		A239 Clip 100mm Bolt	55-130	
		A239 Clip 180mm Bolt	55-210	
	Suspended Ceiling	Grid	150-1000	18
		Grid + STSU Clip	165-1000	
Rondo® 129	Clip Fix	226 Clip	30-55	15
		394 Long Clip	30-155	
		STWC Acoustic Clip	40-50	
		Betagrip Clip	30-50	
		A239 Clip 100mm Bolt	70-140	
		A239 Clip 180mm Bolt	70-220	
	Suspended Ceiling	Grid	165-1000	18
		Grid + STSU Clip	180-1000	

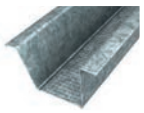


GIB® Rondo® Metal Batten Selector - Direct Fix (DF) and Clip Fix (CF) Options

GIB® RONDO® 310 SYSTEM
DF AND CF

310 BATTEN
12639 3.6m
12640 4.8m
12641 6.0m

35mm (h) x 40mm (face)



311D CLIP
12711

92mm (h) x 90mm (w)
Adjustment range 2-30mm



313 LONG CLIP
14907

190mm (h) x 90mm (w)
Adjustment range 2-130mm



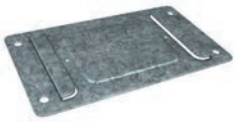
A311 GIB QUIET CLIP®
14209

92mm (h) x 90mm (w)
Adjustment range 2-30mm



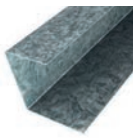
312 JOINTER
12643

55mm (l) x 21mm (w)



340 PERIMETER CHANNEL
12642 3.0m

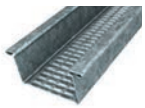
35mm (h) x 24mm x 36mm
(uneven leg)



GIB® RONDO® 308 SYSTEM
CF ONLY

308 BATTEN
14918 3.6m
14919 4.8m
14920 6.0m

16mm (h) x 38mm (face)



394 LONG CLIP
14909

190mm (h) x 66mm (w)
Adjustment range 2-130mm



STWC ACOUSTIC CLIP
14984

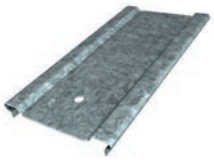
Resilient mount. Direct fix to wall or ceiling. Adjustment up to 5mm possible.

Also referred to as ST001.



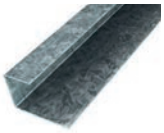
138 JOINTER
14924

91mm (l) x 51mm (w)



142 PERIMETER CHANNEL
14937

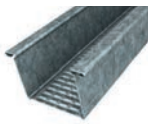
16mm (h) x 13mm x 28mm
(uneven leg)



GIB® RONDO® 129 SYSTEM
CF ONLY

129 BATTEN
14915 3.6m
14916 4.8m
14917 6.0m

28mm (h) x 38mm (face)



226 CLIP
14903

90mm (h) x 66mm (w)
Adjustment range 2-30mm



A239 CLIP
14911

100mm Rod & Clip

A239 CLIP
14913

180mm Rod & Clip



For direct fixing to concrete walls or ceilings.

Accepts 129 or 308 Batten.

BETAGRIP CLIP
14914

For direct fixing to concrete walls or ceilings. Approx. before 25mm adjustment for height in 5mm increments.

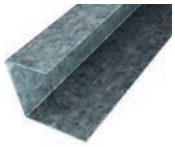
Accepts 129 batten in all slots and 308 batten in upper 2 slots.

Previously known as BETAFIX CLIP.



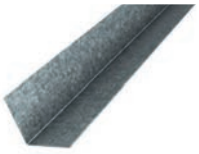
140 PERIMETER CHANNEL
14936

28mm (h) x 20mm x 30mm
(uneven leg)



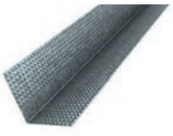
NZ18 PERIMETER ANGLE
12645 3.0m
Can also be used for internal corners in tiled shower situations (see GIB® Site Guide).

32mm (h) x 32mm (w)



GIBFIX® ANGLE
15662 2.4m
15663 2.7m

45mm (h) x 45mm (w)



*NZ18 & GIBFix® angle are compatible with all ceiling battens types.

Scan to view GIB® Rondo® range

SPECIFICATION EXAMPLE

Fixing
Direct Fix (DF)
Clip Fix (CF)

GIB® Rondo®



Clip Options

Batten	Clip
310	311D
	313LC
	A311
308/129	226
	394LC
	STWC
	BGC
	A239100
	A239180

Batten
310
308
129

INTRODUCTION

This section describes Direct Fix (DF) and Clip Fix (CF) ceiling applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options are the GIB® Rondo® 310 Batten with a depth of 35mm, the Rondo® 308 Batten with a depth of 16mm, and the Rondo® 129 Batten with a depth of 28mm.

GIB® Rondo® 310 System

- Only the GIB® Rondo® 310 Batten can be direct fixed
- For clip fixing to framing, the 311D and 313 Long Clip are used with the GIB® Rondo® 310 Batten
- To reduce noise attenuation between floor levels the GIB Quiet Clip® can be used with the GIB® Rondo® 310 Batten

GIB® Rondo® 308/129 System

- The Rondo® 308 and 129 Battens require clip fixing
- For clip fixing to framing, the 226 and 394 Long Clip are used with Rondo® 308 and 129 Batten
- To reduce noise attenuation between floor levels the STWC Acoustic Clip can be used with the Rondo® 308 or 129 Batten
- The Betagrip Clip and A239 Clips are used with Rondo® 308 or 129 Battens

Specification Reference

A specification reference can be assigned by combining the batten type, fixing method, and clip type as follows:

GR308/129 Systems	GR310 Systems
GR308 or GR129-CF-226	GR310-DF
GR308 or GR129-CF-394LC	GR310-CF-311D
GR308 or GR129-CF-STWC	GR310-CF-313LC
GR308 or GR129-CF-BGC	GR310-CF-A311
GR308 or GR129-CF-A239100	
GR308 or GR129-CF-A239180	

INSTALLATION

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.

JOINTING BATTENS

When direct fixing using GIB® Rondo® 310 Battens, batten joints can be made over a supporting framing member. When batten joints fall between framing or when clip fixing is used, the GIB® Rondo® 310 Battens can be joined using the 312 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Stagger joints between adjacent battens.

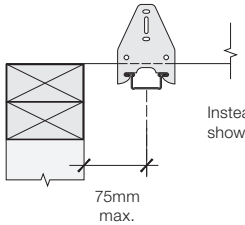
PERIMETER FIXING

There are several options to fix the ceiling perimeter.

When direct fixing using GIB® Rondo® 310 Battens. The ceiling perimeter can be fixed to a nominally 140 x 35mm oversize top plate. The batten dimensions match the nominal top plate thickness. When clip fixing, or with a conventional plate arrangement, use the 340 Perimeter channel or a NZ18 or GIBFix® Angle.

When clip fixing Rondo® 308 or 129 Battens, the ceiling perimeter is fixed to a 142 or 140 Perimeter channel respectively, or a NZ18 or GIBFix® Angle.

When a batten runs parallel and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements. Raking or skillion roofs may have specific perimeter requirements for folded metal angles.

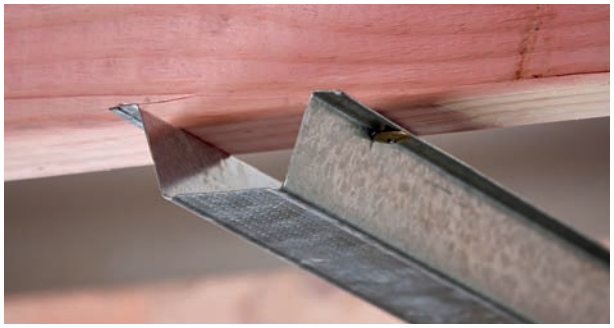


Instead of a metal angle a batten can be positioned as shown (not suitable for fire-rated applications)

GIB® RONDO® 310 DIRECT FIX (DF) SYSTEM

This fixing method applies to the GIB® Rondo® 310 Metal Batten only. For specification purposes the following string can be used.

GR310-DF



FASTENERS

Fix directly by fastening with pairs of 32mm x 8g GIB® Grabber® Wafer Head or 32mm x 7g GIB® Grabber® Dual Thread Screws.

- Alternatively, pairs of min. 45mm x 2.8mm flat or 'D' head nails can be used
- For fixing to steel framing a drill tip screw is recommended
- Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle
- To fix the batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets

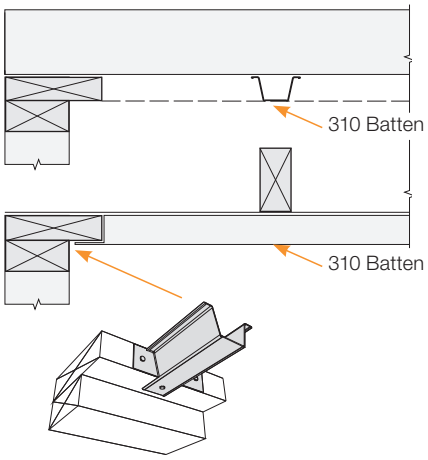
PERIMETER

GIB® Rondo® NZ18 angle, 340 Perimeter channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

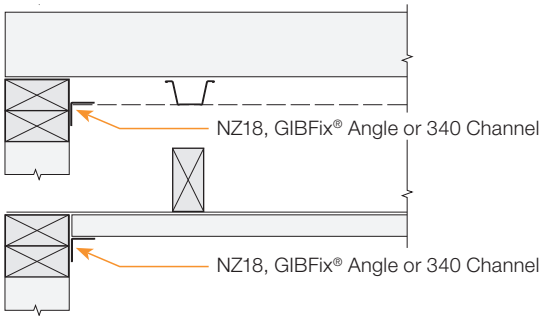
INSTALLATION

1. Establish ceiling height
2. Fix any perimeter channels or angles at required level
3. Set out batten centres
4. Cut the battens 10mm short to leave a 5mm gap at each end
5. Set the battens in the correct position and fasten to the framing taking care not to distort the batten

PERIMETER OPTIONS



PREFERRED OPTION



GIB® RONDO® 310 CLIP FIX (CF) SYSTEM

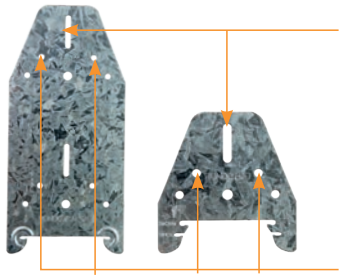
This fixing method applies to the GIB® Rondo® 310 Metal Batten and matching clip options selected, depending on the desired drop height or acoustic requirements.

Clips available for use with the GIB® Rondo® 310 Batten are the 311D Clip, the 313 Long Clip, and the A311 GIB Quiet Clip®.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR310-CF-311D
GR310-CF-313LC
GR310-CF-A311

FASTENING THE SHORT AND LONG CLIP

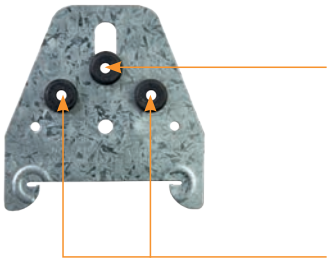


Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection

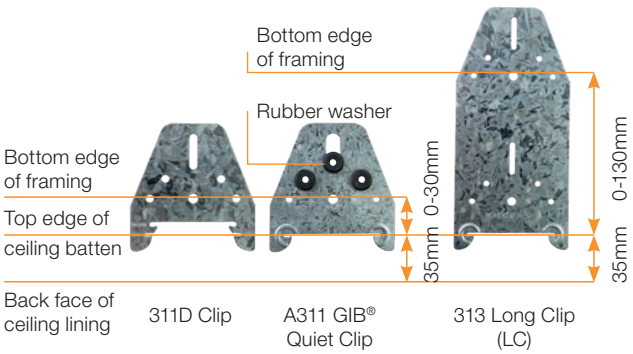
FASTENING THE A311 GIB QUIET CLIP®

Insert the first screw into the middle rubber grommet, tighten enough to hold the A311 GIB® Quiet Clip® in place, adjust the clip to the correct position insert the remaining two screws and tighten. Do not overtighten the screws to the point where the grommet is crushed. The screws should be tightened enough to allow the flexibility to remain in the connection.



Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection



PERIMETER

GIB® Rondo® NZ18 Angle, 340 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

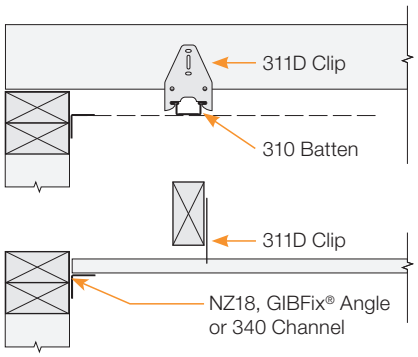
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles at the level required
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk. Cut the battens 10mm short to leave a 5mm gap at each end
7. Insert the batten into the channel at each end and fit into the clips
8. Install remainder of clips ensuring that the batten is straight and flat

GIB® RONDO® 310 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



GIB® RONDO® 308 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 308 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 308 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100mm or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR308-CF-226	GR308-CF-BGC
GR308-CF-394LC	GR308-CF-A239100
GR308-CF-STWC	GR308-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

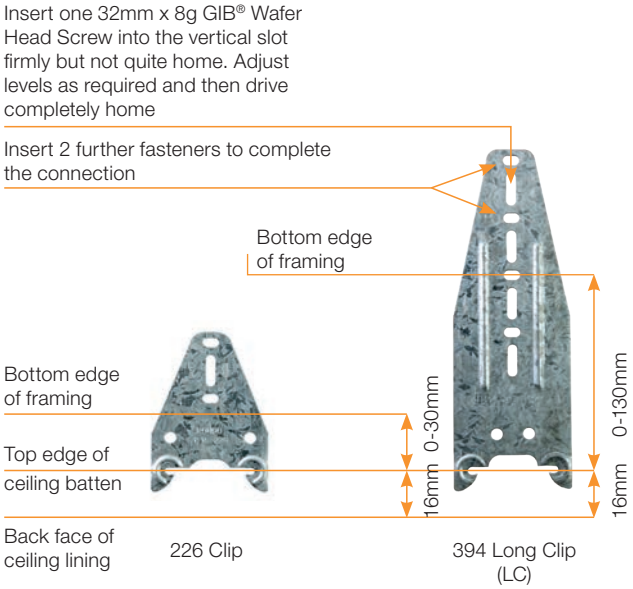


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 142 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

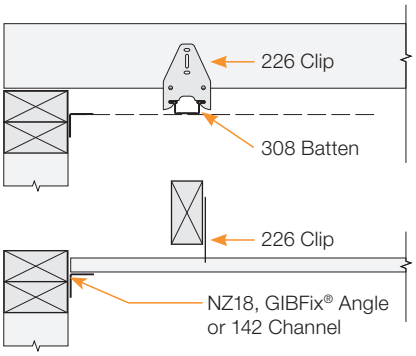
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 308 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



GIB® RONDO® 129 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 129 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 129 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100 or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR129-CF-226	GR129-CF-BGC
GR129-CF-394LC	GR129-CF-A239100
GR129-CF-STWC	GR129-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

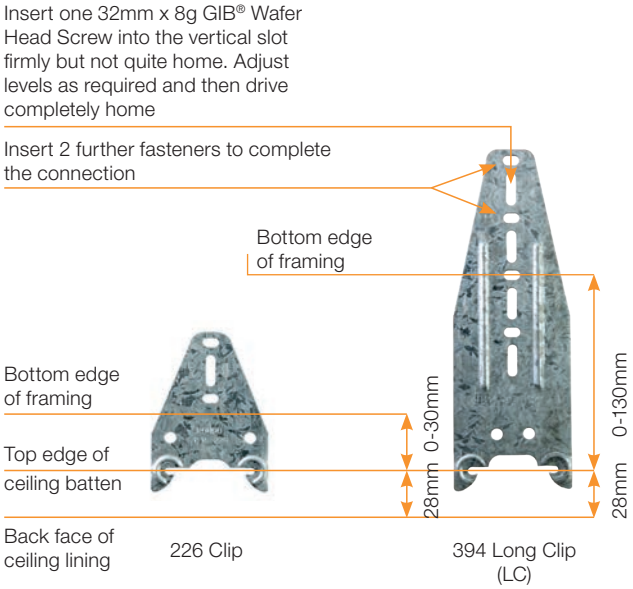


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 140 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

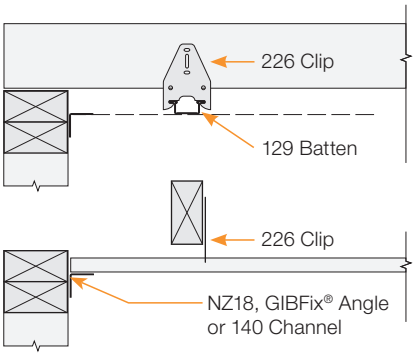
To fix batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

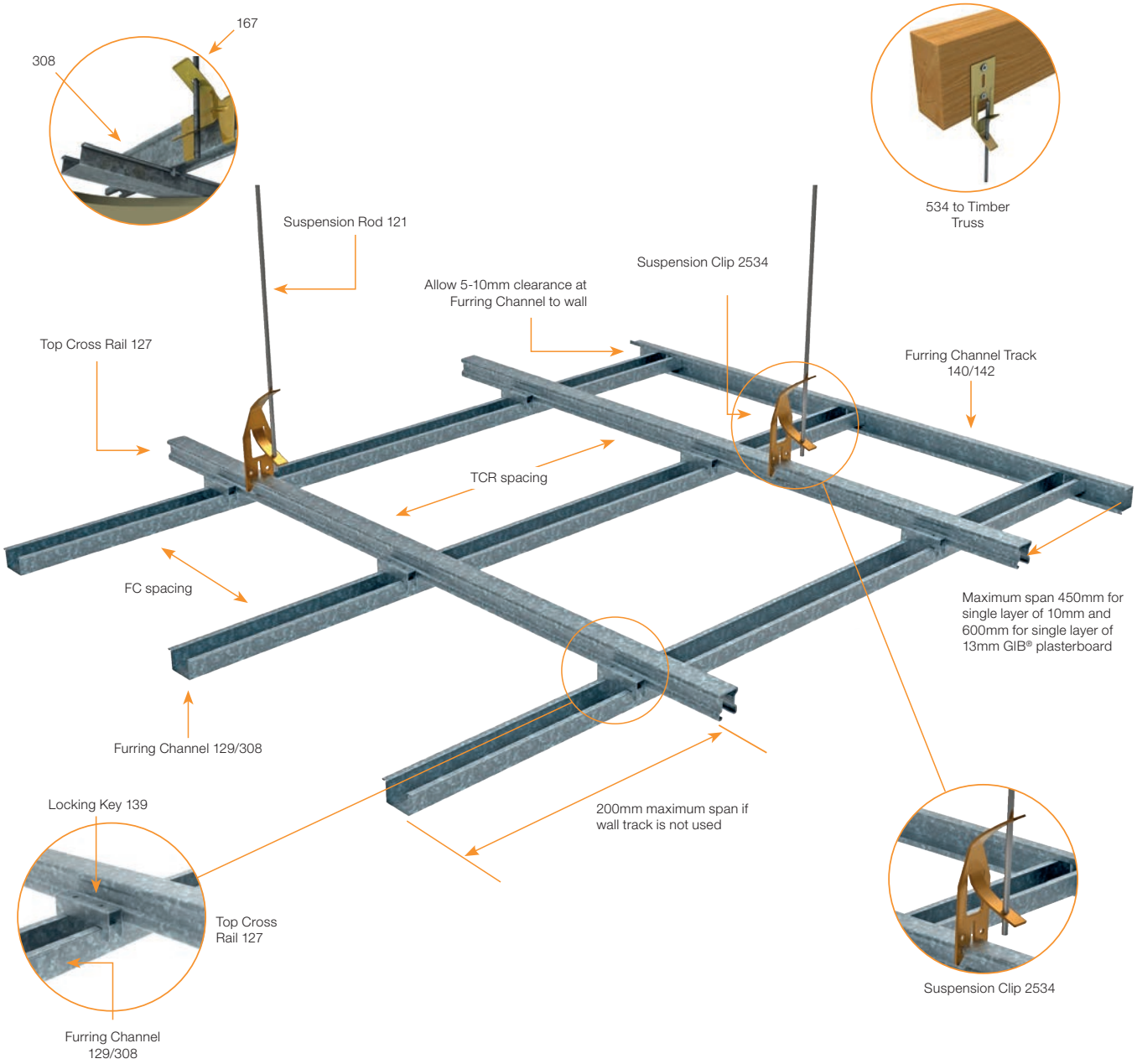
1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 129 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



Suspended ceiling metal battens (SC) on rod **Fully suspended (150–1000mm drop)**



CEILING ACCESSORIES (COMPATIBLE WITH THE 308 & 129 BATTENS)

547 CLIP

14935

Fix vertically.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 547 clip. Easily adjustable for height.



STSU CLIP

14983

Ceiling resilient mount.

Fits 127 or 128 TCR.

Accepts either 129 or 308 Battens.



534 CLIP

14934

Fix horizontally.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 534 clip. Easily adjustable for height.



167 CLIP

14929

Side mount clip - low profile alternative for 2534 clip.

Connects 127 TCR to 5mm rod.

Provides height adjustment.

Only suitable for single layer systems.



121 ROD

14931 3.6m

5mm galv. rod for use with 547, 534, 2534, 8167 clips.



2534 CLIP

14930

Friction fitted to 121 rod.

Connects to TCR 127 & 128



127 TCR – 25mm

14921 3.6m
14922 4.8m

25mm (h) x 21mm (w)

Top Cross Rail. (TCR)
Also called strongback, works with 2534 clip.



128 TCR – 38mm

14923 4.8m

Top Cross Rail (TCR). Also called a strongback. Works with 2534 clip.

38mm (h) x 21mm (w)



139 CLIP

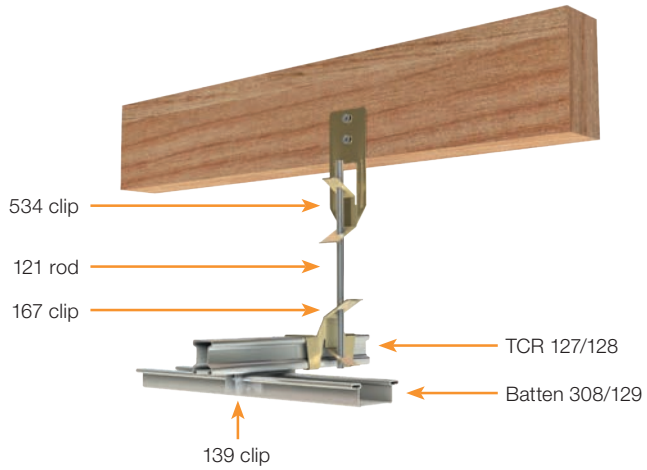
14925

Clicks into TCR at spacings to suit the ceiling lining, i.e. 450mm for 10mm plasterboard and 600mm for 13mm plasterboard.

Connects to 308 or 129 batten.



EXAMPLE



SUSPENDED CEILINGS

This section describes suspended ceiling (SC) applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options, also referred to as furring channels, are the Rondo® 308 and 129 Battens.

The Rondo® 308 or 129 Batten is clipped to a top cross rail (TCR) using 139 Clips. The 127 or 128 TCR is connected via 2524 Clips or 167 Side Mounted Clips to 5mm galvanised suspension 121 Rods. Rods are fixed to the supporting structure using 547 Clips for mounting to a horizontal surface, or 534 Clips for side mounting to a vertical face.

The suspended ceiling option permits a drop from 150 to 1000mm.

A specification reference can be assigned for the selected system by combining the batten type, and fixing method. For example:

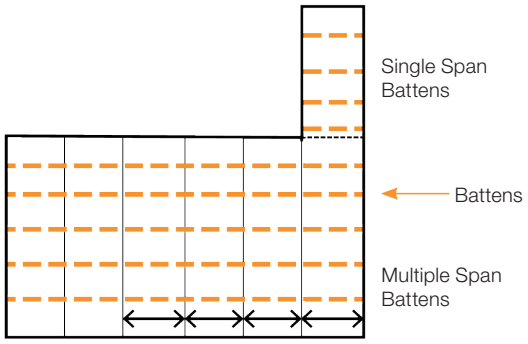
GR308-SC
GR129-SC

SUPPORTING FRAMING AND BATTEN LAYOUT

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.



JOINTING BATTENS

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

JOINTING TOP CROSS RAIL

To join TCRs, use a 200mm long piece of the 127 TCR and clip it over the top of the rail (see Control Joint Details p.22).

PERIMETER FIXING

The Rondo® 308 and 129 Battens can be terminated at the ceiling perimeter into a 142 or 140 Perimeter Channel respectively or can be fixed to a NZ18 or GIBFix® Angle.

When a batten runs parallel, and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements.

FASTENERS

1. 534 Top mount fixed to timber framing by fastening with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
2. 547 Top mount fixed to underside of the timber with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
3. Perimeter Channel to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix the perimeter channels or angles. There must be a nog/dwang behind the channel or angle
3. Cut the suspension rod (121) to length using a hacksaw
4. Attach top mount clip (534) to one end of the rod and TCR clip (167) to the other end
5. Fix the rod assembly to floor or roof structure above to support the TCR along its length at maximum 1200mm centres and space the TCRs at 1200mm centres maximum to form a 1200mm grid. The first hanger to be a maximum of 400mm from the wall perimeter channel
6. Adjust all hangers to correct drop using a string line or laser
7. Attach TCR (127) to suspension clips (TCR clip 167)
8. Click the 139 locking key batten clips into the TCR at 600mm centres
9. Cut the battens to length using tin snips, a hacksaw or grinder disk
10. Insert the batten into the channel at each end and fit into the batten clips. Stagger any batten joints and use the 138 batten jointer. Ensure the battens are straight and flat

SPECIFIC ENGINEERING DESIGN

The suspended ceiling systems in this technical literature can be specified without the need for Specific Engineering Design (SED), provided they are intended for installation within the following scope of use:

- Buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144 m^2, not exceeding 12 metres in any direction
- Supporting a single layer of 10mm or 13mm GIB® plasterboard ceiling lining
- Suspension drop not exceeding 1000 mm measured from the supporting structure above to the back of the ceiling lining
- GIB® plasterboard installed to the suspension grid in accordance with the current GIB® Site Guide
- The ceiling is level, with no height variations along the ceiling plane

This scope assumes buildings of limited height and a ceiling perimeter which is fixed to bounding walls by means of plasterboard fixings to the perimeter channel or angle, and a coved or square stopped junction detail between the ceiling and wall linings.

For application outside this scope, Specific Engineering Design SED is required. Options include full fixing of plasterboard ceiling linings to perimeter walls capable of transferring the associated seismic forces, designing the grid suspension system to transfer these forces to structural walls, or bracing the suspension system so that forces are directly transferred to the floor above.

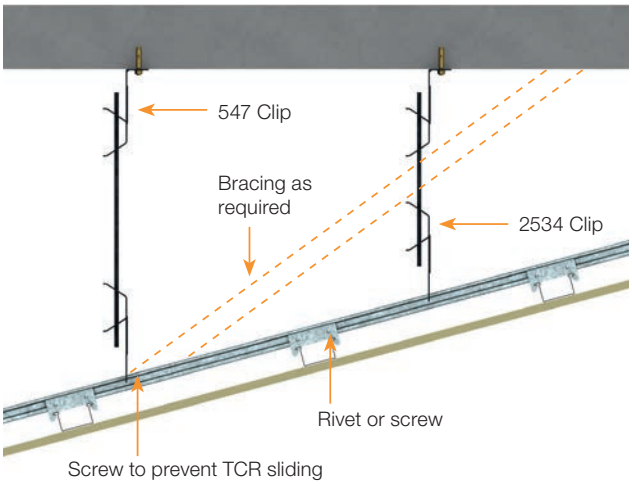
AS/NZS 2785:2020 Suspended Ceilings - Design and Installation provides one way of designing the suspended ceiling systems. When using this Standard care must be taken not to confuse the performance of a plasterboard lined ceiling with a two-way grid system which accommodates proprietary ceiling tiles.

When other areas of performance are required, such as fire-resistance or noise-control, the design must carefully consider compliance with all relevant NZBC clauses.

RAKING CEILINGS

Specific Engineering Design (SED) is recommended when designing raking suspended ceilings. Due to the slope of the ceiling, lateral forces will develop. If these forces are not directly transferred to the perimeter walls by the ceiling linings, they will be imposed on the grid and hangers in which case a separate bracing system is required.

Raking or skillion roofs may also have specific perimeter requirements for folded metal angles (see Raking Ceilings p.23).



BATTEN FIXING TO WALLS

This section describes batten fixing to walls. Only the GIB® Rondo® 310 Batten can be direct fixed. The GIB® Rondo® 310 Batten as well as the Rondo® 308 and 129 Battens can be clip fixed. Note that the Rondo® 308 and 129 Battens use a different clip design.

- Do not fix metal battens direct to masonry walls
- Metal batten to wall fixing is not suitable for wall bracing elements without specific design
- Refer to GIB® Fire Rated Systems and GIB Noise Control® Systems for use in those applications
- Specific thermal design is required when installing metal battens over an internal vapour control membrane as part of an air tightness design
- Battens must be spaced no further than 600mm apart and be supported at 1200mm maximum

LININGS

When linings and battens run in the same direction with longitudinal sheet joints formed over battens, there is no need for nogs/dwangs between the battens unless to support sheet end butt joints.

When linings run perpendicular to the battens, there is no need for nogs/dwangs behind the tapered sheet joints.

Sheet end or cut edge joints must be supported by framing.

PERIMETER

Use an NZ18 or GIBFix® Angle behind wall-to-ceiling and wall-to-wall joints and fix to battens either side using 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screws.

GIB® RONDO® 310 SET OUT AND DIRECT FIXING (DF)

Install battens perpendicular to studs or nogs/dwangs and fix at no more than 1200mm centres with pairs of 32mm x 8g GIB® Grabber® Wafer Head Screws through each flange.

When fixing horizontally, place the lowest batten about 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Batten end joints can be formed over framing or use the 312 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Pack where necessary to provide a flat substrate and fasten taking care not to distort the batten
- Form internal and external corners using the NZ18 or GIBFix® Angle

BATTEN SET OUT AND CLIP FIXING (CF)

The GIB® Rondo® 310 and Rondo® 308 and 129 Battens can all be clip fixed to walls. Note that the Rondo® 308 and 129 Battens use a different clip design, but otherwise separation achieved with the standard and long clips are the same.

The A311 GIB Quiet Clip® can only be used with the GIB® Rondo® 310 Batten and the STWC Acoustic Clip only accepts Rondo® 308 and 129 Battens.

For standard clip fixing to walls, simply use the ceiling specification turned 90 degrees, except that batten spacing for walls can be 600mm for both 10mm and 13mm GIB® plasterboard linings.

Alternatively, the A239 Clip and threaded rod, the STWC Acoustic Clip, or Betagrip Clip can be used with the Rondo® 308 and 129 Battens for face fixing to flat surfaces, including concrete masonry.

Place clips at no more than 1200mm centres along the battens. Space battens at no more than 600mm. When fixing battens horizontally, set out to locate the lowest batten 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Rondo® 308 and 129 Batten joints are formed using the 138 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Using a laser or string lines, install the clips at the required centres, creating a level surface
- Fit the battens into the clips
- Form internal and external corners using the NZ18 or GIBFix® Angle

FASTENERS

- Betagrip Clip - 38mm x 8g GIB® Grabber® Wafer Head Screws to timber or 6.0mm diameter screw bolt with minimum 50mm embedment for masonry
- STWC Acoustic Clip - 63mm x 8g GIB® Grabber® Self Tapping Drywall Screws to framing
- A239 Threaded Rod (100 or 180mm) and Clip - supplied 6.5mm masonry anchor

STWC Acoustic Clip



Betagrip Clip



A239 Clip and Threaded Rod



FIXING TO MASONRY

If installation is required to concrete or masonry, it is recommended that GIB® Rondo® 308 battens are clipped to GIB® Rondo® A239 clips as shown. A239 clips should be spaced at 1200mm centres (maximum) vertically and 600mm centres (maximum) horizontally

Anchor Bolt



Polystyrene



A239 Clip



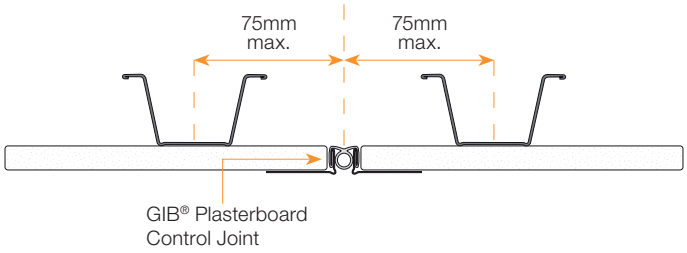
308 Batten

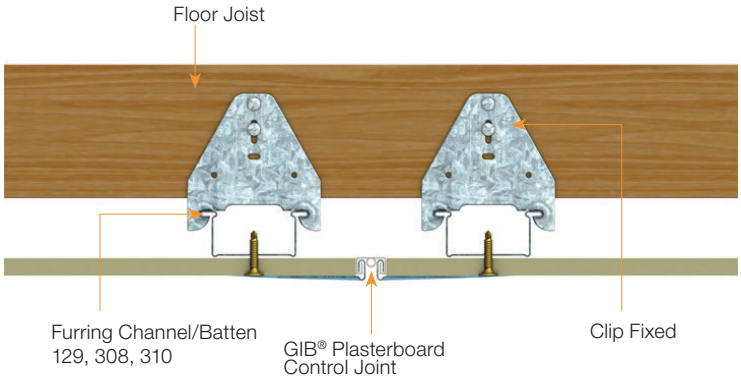


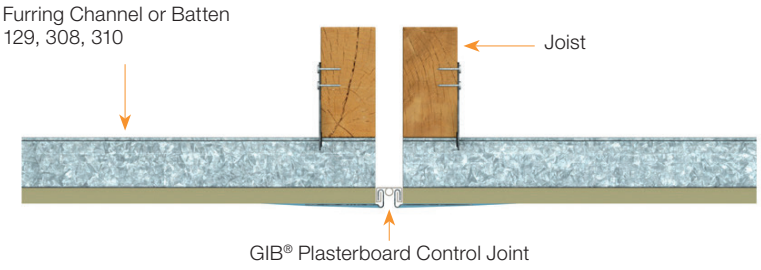
GIB® Plasterboard Overlay



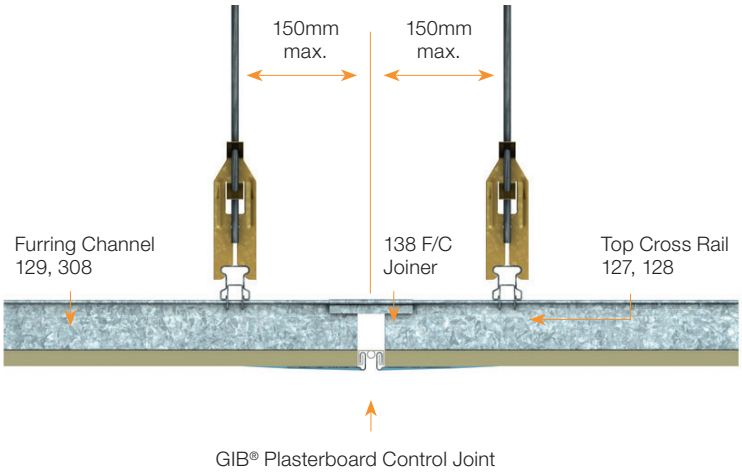
CONTROL JOINT: DIRECT AND CLIP FIXED







CONTROL JOINT: SUSPENDED CEILING



RAKING CEILINGS AND SKILLION ROOFS

Due to the higher temperatures and low air movement that can occur in raking ceilings it is strongly recommended that clip fixed GIB® Rondo® metal battens are used (these are considered to be ceiling suspension systems).

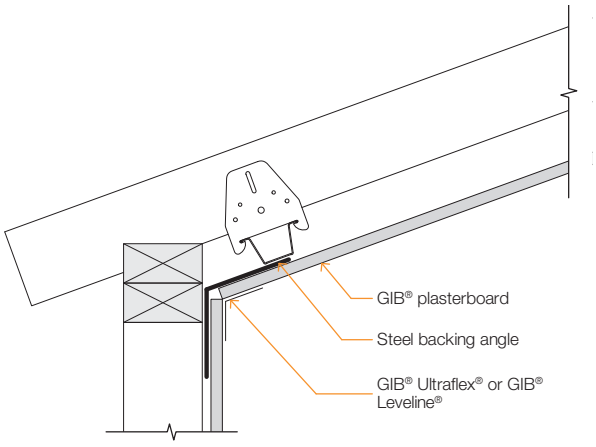
Because of the heat that can be generated in roof spaces, timber battens can be subjected to conditions that contribute to joint failure and popped fasteners.

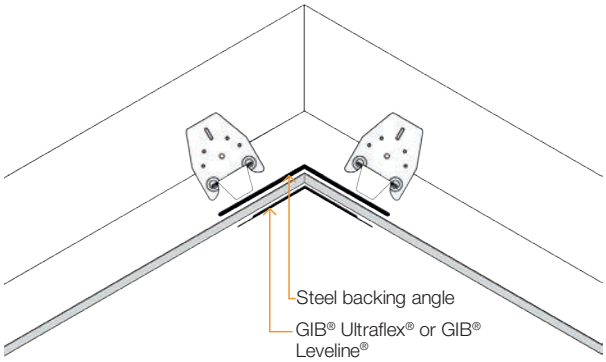
The use of control joints or perimeter relief will help reduce the risk of cracking in large, expansive ceilings.

These may not be suitable for use in Fire Rated Systems or Noise Control Systems.

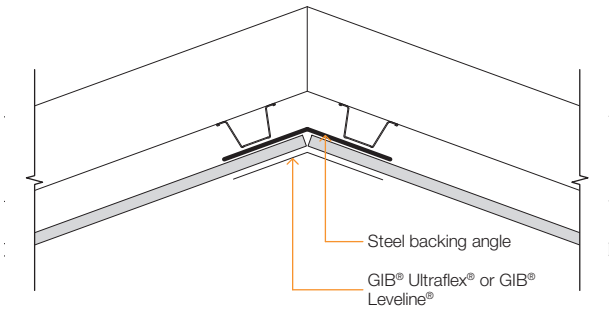
Back-blocking of all ceiling joints is highly recommended as it can reduce the likelihood of cracking.

FIXED — STEEL BACKING ANGLE



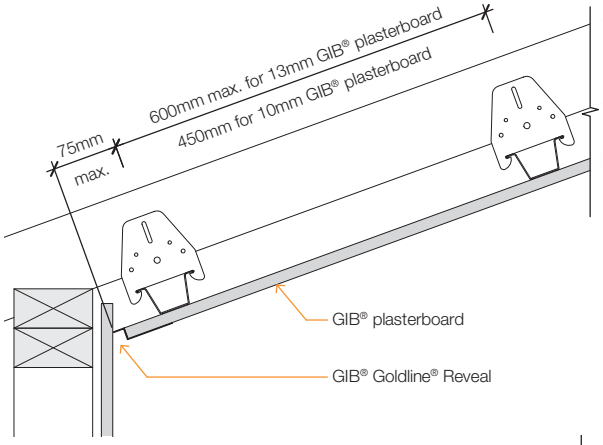


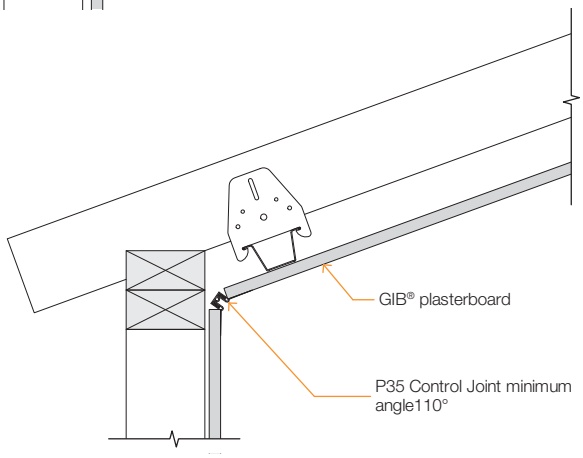
NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

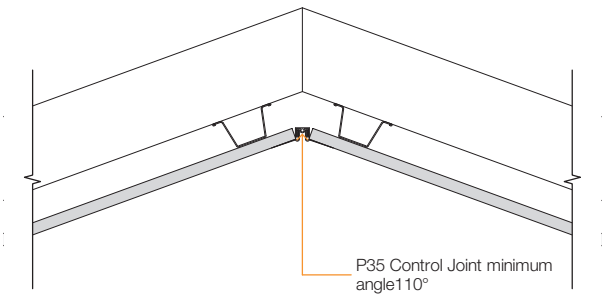


NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

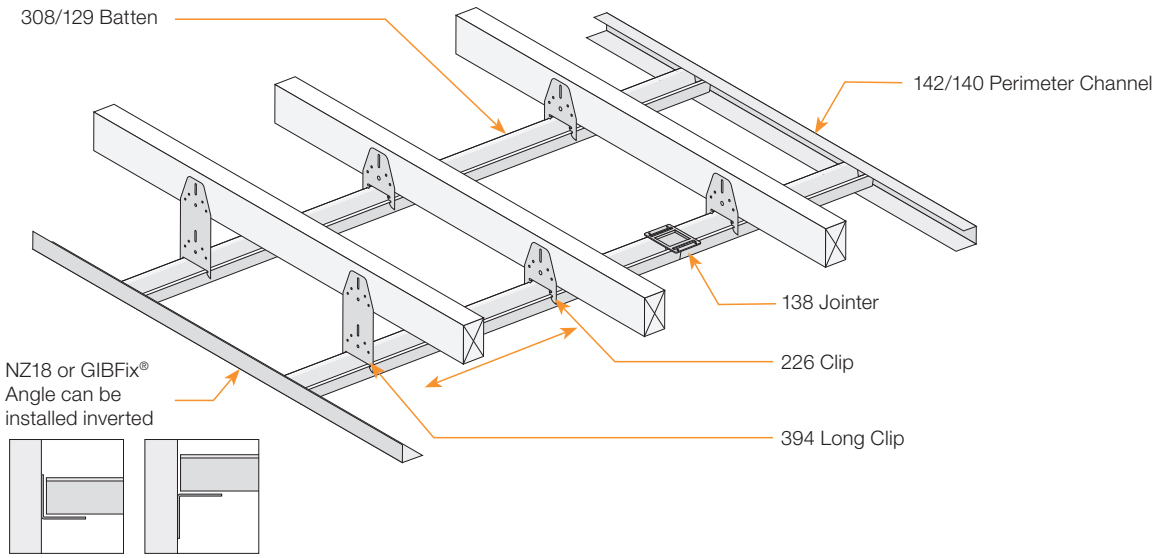
FLEXIBLE — PERIMETER RELIEF



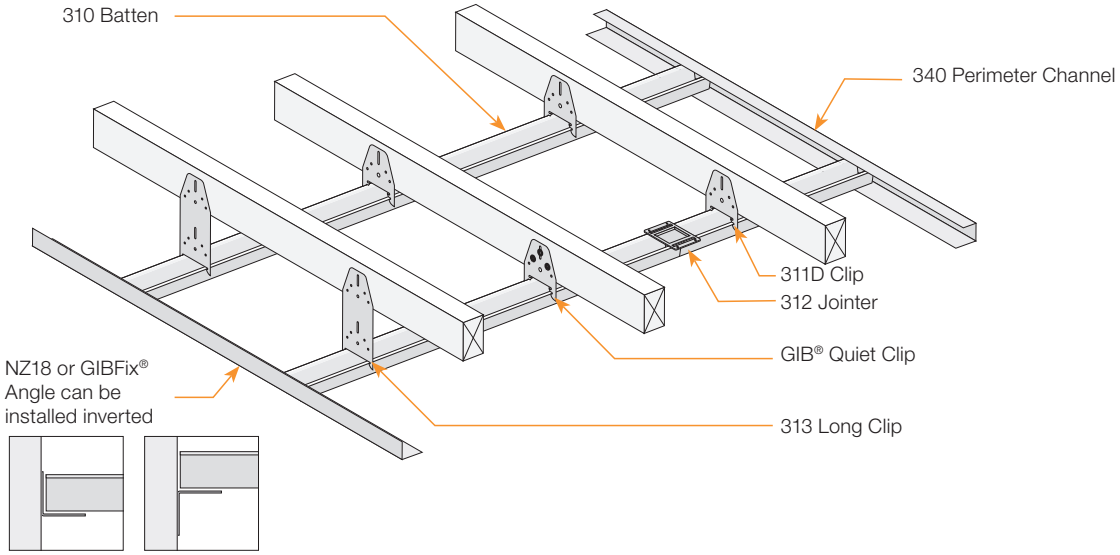




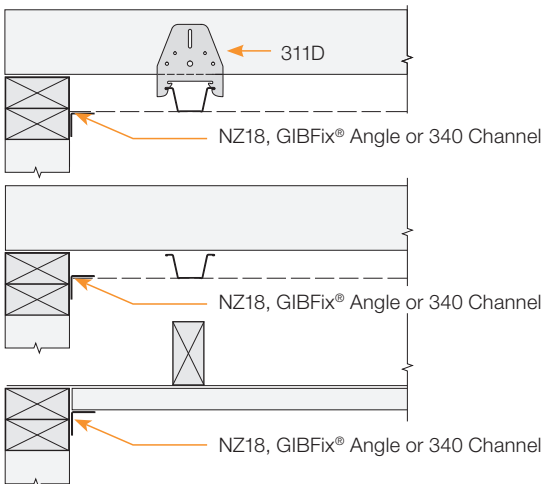
GIB® RONDO® 308/129 SYSTEM



GIB® RONDO® 310 SYSTEM



Recommended Best Practice Details



Notes

Notes

GIB® Rondo® Metal Batten Systems, September 2024

LIMITATIONS

Winstone Wallboards Ltd accepts no liability if the GIB® Rondo® Metal Batten systems and junction details are not installed in strict accordance with instructions contained within this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. You should check the GIB® website to ensure you are using the current publication. If you are unsure whether this is the current publication, simply call the GIB® Helpline on 0800 100 442.

SUBSTITUTION

GIB® Rondo® Metal Batten systems have been specifically designed and tested to achieve the stated performance levels. To maintain the GIB® product and system warranty, all system components detailed in this publication must be used when specifying and installing GIB® Rondo® Metal Batten systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Toughline®, GIB Braceline® GIB Noiseline®, GIB Aqualine®, GIB Weatherline®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB® Quiet Stud®, GIB Rail®, GIB Barrierline®, GIB X-Block®, GIB Fire Soundseal®, GIB Clip®, the colour mauve for GIB Toughline®, the colour blue for GIB Braceline® GIB Noiseline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour purple for GIB Weatherline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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GIB®

FOR MORE INFORMATION VISIT

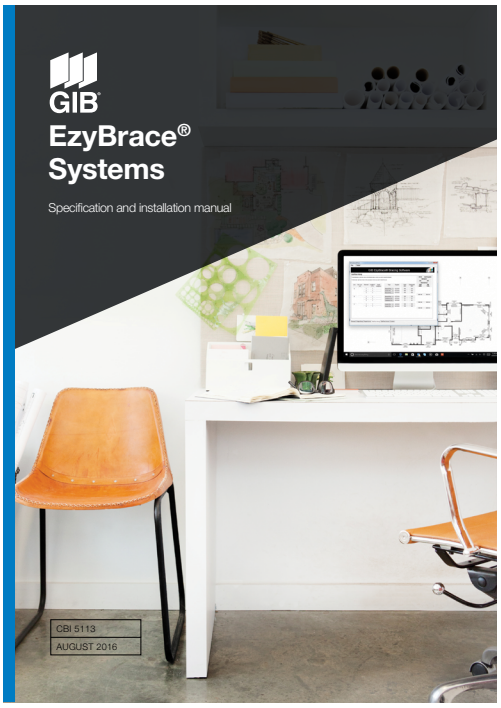
gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

BRANZ Appraised
Appraisal No. 928 [2021]

GIB EZYBRACE® SYSTEMS



Appraisal No. 928 (2021)

This Appraisal replaces BRANZ Appraisal No. 928 [2016]

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 GIB EzyBrace® Systems are a range of wall and ceiling bracing systems based on the use of GIB® Standard, GIB Braceline® and other GIB® plasterboards. GIB EzyBrace® Systems are used to resist earthquake and wind loads on timber-framed buildings designed and constructed in accordance with NZS 3604 and the GIBFix® Framing System. The GIB EzyBrace® Bracing Software provides an electronic means of calculating bracing demand and resistance.

Scope

2.1 GIB EzyBrace® Systems and the GIB EzyBrace® Bracing Software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, GIB EzyBrace® Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB EzyBrace® Systems meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 (a), (f), (h) and (j)]. See Paragraphs 8.1-8.10.

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years. GIB EzyBrace® Systems meet this requirement. See Paragraphs 9.1-9.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB EzyBrace® Systems meet this requirement.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB EzyBrace® Systems, and supplied or specified by Winstone Wallboards Ltd are as follows:

GIB® plasterboards

- **GIB® Standard** - GIB® Standard plasterboard is a paper-bound, fibreglass reinforced gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1,200 mm and 1,350 mm (GIB® Wideline). The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2,400 mm to 6,000 mm. The nominal sheet weight is 6.5 kg/m² for 10 mm thick sheets and 8.5 kg/m² for 13 mm thick sheets. GIB® Standard plasterboard face paper is a light buff colour.
- **GIB Braceline®** - GIB Braceline® is a high-density fibreglass reinforced, paper-bound gypsum-plaster core sheet lining material. GIB Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1,200 mm and 1,350 mm, and is available in lengths of 2,400 mm, 2,700 mm, 3,000 mm, 3,600 mm and 4,800 mm. The nominal sheet weight is 9 kg/m² for 10 mm thick sheets and 12.5 kg/m² for 13 mm thick sheets. GIB Braceline® face paper is light blue in colour.
- **Alternative GIB® plasterboards** - in certain situations, as specified in the Technical Literature, substitution is permitted with GIB Aqualine®, GIB Fyreline®, GIB Toughline® and GIB Ultraline®.

Components and Accessories

- **GIB® Accessories and GIB® Jointing Compounds** - as specified in the GIB® Site Guide Technical Literature.
- Fasteners
  - **GIB Grabber® High Thread Screws for fixing directly to timber** – 32 mm x 6 g.
  - **GIB Nail** – 30 x 2.8 mm.
  - **GIB Grabber® screws for fixing to light gauge steel battens** – 32 mm x 6 g.
- Adhesive and Sealants
  - **GIBFix® One** – an off-white acrylic adhesive supplied in 375 ml cartridges and 600 ml sausages.
  - **GIBFix® All-Bond** – a green solvent-based adhesive supplied in 375 ml cartridges and 600 ml sausages.
- GIBFix® Framing Components
  - **GIBFix® Angle** – 45 x 45 x 0.55 mm galvanised steel angle with a knurled surface. Supplied in lengths of 2.4 m and 2.7 m.
  - **GIB Grabber® Dual Thread Screws for fixing to timber through GIBFix® Angle** – 32 mm x 7 g needle-point screw with coarse thread lower section and fine thread upper section.
- Fasteners, Anchors and Connections
  - **GIB® HandiBrac®** – a one-piece, 2 mm thick, galvanised steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with five Type 17 screws, 14 g x 35 mm.
  - **BOWMAC® screw bolt** – M10 x 140 mm screw anchor, with a blue painted hex head.
  - **Coach screws** – 12 mm x 150 mm and 50 x 50 x 3 mm washer, hot-dip galvanised for fixing to timber floors.
  - **Cast-in bolts** – M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors.
  - **Shot-fired fasteners** – minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1-N, GS2-N and GS2-NOM internal line bracing elements to concrete slabs.
  - **Galvanised or stainless steel strap** – 25 x 0.9 mm top and bottom plate connections.
  - **Strap fixings** – 30 x 2.5 mm hot-dip galvanised or stainless steel flat head nails. *(Note: For corrosion protection requirements, refer to NZS 3604, Section 4.)*

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

- **Ceiling Diaphragms** - ceiling diaphragms are constructed using timber ceiling battens, or GIB® Rondo® or similar metal ceiling batten systems.
- Plywood
  - **Plywood** – minimum of 7 mm thick complying with AS/NZS 2269 D-D Structural Grade.
  - **Plywood fixings** – 50 x 2.5 mm hot-dip galvanised or stainless steel annular-grooved, flathead nails.

Handling and Storage

5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.

5.2 All accessories must be kept dry.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB EzyBrace® Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 NZS 3604 provides methods to distribute the bracing elements in walls to resist forces. The use of ceiling diaphragms is defined in the Technical Literature.

7.2 GIB EzyBrace® Systems are for use in dry, internal situations only.

7.3 GIB EzyBrace® Systems must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

GIB EzyBrace® Bracing Software

7.4 The GIB EzyBrace® Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5–5.10 for 2 kPa floor loads or less, or Tables 14.1–14.3 for 3 kPa floor loads.

7.5 The bracing demand calculations contained in the GIB EzyBrace® Bracing Software are based on first principles engineering and calculate wind and earthquake demand, based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The GIB EzyBrace® Bracing Software has been assessed as part of this Appraisal.

7.6 The bracing ratings for GIB EzyBrace® Systems are embedded in the GIB EzyBrace® Bracing Software.

GIBFix® Framing System

7.7 The GIBFix® Framing System utilises GIBFix® Angles fixed at internal corners and at wall/ceiling junctions to reduce the potential for fastener 'popping' and joint cracking due to timber framing movement. The GIBFix® Framing System also offers an alternative arrangement of studs at corners and at intersecting walls to improve insulation and to reduce thermal bridging compared to traditional wall framing layouts. Refer to the Technical Literature for full details.

7.8 Where walls intersect, noggings are required at maximum 900 mm centres to enable fixing of the end stud of the intersecting wall to the main wall framing.

7.9 The GIBFix® Framing System permits the use of a single panel hold-down [e.g. GIB® HandiBrac®] at wall corners and T-intersections for both the across and along bracing directions.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Framing

7.10 GIB EzyBrace® Systems can be installed using conventional timber framing layouts or by using the layouts provided in the GIBFix® Framing System. The bracing ratings embedded in the GIB EzyBrace® Bracing Software are equally applicable to both framing options.

7.11 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.

7.12 Winstone Wallboards Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 mm x 45 mm for external walls and 75 mm x 45 mm for internal walls.

7.13 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 mm x 0.9 mm hot-dip galvanised mild steel strap, three nails each side of joint for 3 kN and six nails each side of joint for 6 kN.

Bracing System GS2-NOM

7.14 Most GIB EzyBrace® Systems require additional fasteners at the corners to achieve the published bracing ratings. The GS2-NOM system only requires fixings at 300 mm centres around the sheet perimeter.

7.15 Where internal doors penetrate a GS2-NOM bracing element and recessed door jambs are used, the sheets may be adhesive fixed around the door opening with GIBFix® All-Bond, instead of screw fixing. This is designed to reduce fastener 'popping' around internal doors when using grooved door frames. Screw fixing should be used where door frames are to be finished with architraves and the architrave will cover the screws. The adhesive fix option around door openings must not be used with any other GIB EzyBrace® Systems.

Alternative GIB® plasterboards

7.16 GIB Ezybrace® Systems have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® plasterboard product. Table 1 provides acceptable alternative options.

Table 1: Permitted Alternatives in GIB EzyBrace® Systems

Specified	Permitted alternative GIB® plasterboard products								
GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10 mm	13 mm	16 mm	19 mm
GIB® Standard	N/A	✓	✓	✓	✓	✓ *Note 1*	✓ *Notes 1 and 3*		
GIB Braceline®	X	X	N/A	✓ *Note 2*	✓	X	✓ *Notes 1, 2 and 3*		

- ***Note 1:*** *The fastener type and length and must be as required for the relevant Fire Resistance Rating (FRR) system but the fixing pattern must be as required for bracing elements.*
- ***Note 2:*** *The bracing element must be 900 mm or longer. Fasteners must be at maximum 100 mm centres to the perimeter of the bracing element. The bracing corner fastening pattern applies to all four corners of the element.*
- ***Note 3:*** *Specify traditional wall framing layout where a FRR is required. See Paragraph 11.4.*

BOWMAC Screw Bolts

7.17 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Structure

Bracing

8.1 The bracing unit (BU) ratings are embedded in the GIB EzyBrace® Bracing Software and vary with the wall length.

8.2 The Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using anchor screws and cast-in bolts (concrete), coach screws (timber), GIB® HandiBrac® or nailed stud-to-plate straps.

8.3 Bracing units derived from the BRANZ P21 test method are based on a wall height of 2.4 m. The GIB EzyBrace® Bracing Software calculates bracing ratings for higher wall heights by multiplying the appropriate bracing rating by 2.4 m and dividing by the actual wall height in metres. For walls less than 2.4 m in height, the GIB EzyBrace® Bracing Software calculates bracing ratings as if they were 2.4 m high.

8.4 NZS 3604 limits wall bracing elements to a maximum of 120 BU/m for timber-framed floors and 150 BU/m for concrete floors.

Ceiling Diaphragms

8.5 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be square or rectangular and the length must not exceed twice the width.

8.6 For ceiling diaphragms not steeper than 15° and not exceeding 7.5 m in length, any GIB® plasterboard may be used provided the perimeter fixing are at 150 mm centres.

8.7 For ceiling diaphragms not steeper than 45° and not exceeding 7.5 m in length, and for diaphragms not steeper than 25° and not exceeding 12 m in length, any GIB® plasterboard may be used provided the perimeter fixings are at 100 mm centres.

Openings in Bracing Elements

8.8 Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

Shower Areas

8.9 GIB EzyBrace® Systems must not be located in shower cubicles or behind baths and the like. GIB EzyBrace® Systems may be used in water-splash areas provided they are protected as required by NZBC Clause E3 Internal Moisture. Refer to BRANZ Appraisal No. 427 GIB® Wet Area Systems.

Impact Resistance

8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon history of use in domestic and light commercial applications.

Durability

9.1 GIB EzyBrace® Systems, including linings and their fixings, have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

9.2 The building must be maintained weatherproof and GIB® plasterboards must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.

9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.

9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to the GIB EzyBrace® Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

11.1 For internal surface finish properties and fire resistance ratings, refer to BRANZ Appraisal No. 289 GIB® Fire Rated Systems.

Internal Moisture

12.1 GIB® plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

Installation Information

Installation Skill Level Requirement

13.1 Installation of GIB EzyBrace® Systems must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

14.1 GIB EzyBrace® Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

14.2 To achieve an acceptable decorative finish, the GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommends a moisture content of 12% or less where buildings are to be air conditioned, centrally heated or have heat pumps installed.

14.3 Where the GIBFix® Framing System is used, GIBFix® Angles are tacked to the framing with flat head clouts prior to installation of the GIB® plasterboard.

Cutting

14.4 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Hold-downs

14.5 GIB EzyBrace® Systems which require hold-downs must either have a GIB® HandiBrac® fitted to each end of the bracing element or alternatively a metal stud-to-plate strap and hold-down anchor may be used. Refer to the Technical Literature for full installation details. Where a metal stud-to-plate strap is used, the hold-down anchor must be placed no more than 80 mm from the end of the bracing element.

14.6 Where the GIBFix® Framing System is used, a single hold-down located at a wall intersection may be used to provide the hold-down in both the across and along bracing directions.

Plasterboard Sheet Fixing

14.7 Corner fixings must be 50 mm away from the sheet corner. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

14.8 Wall bracing plasterboards (except for those used with the GS2-NOM system) are fixed at 150 mm centres around the perimeter framing of the bracing element *(Note: There is a variation for GIB Aqualine® and GIB Fyreline®, see Table 1)*. At the corners of the wall bracing elements, a special fastening pattern is required with fasteners spaced at 50 mm, 100 mm, 150 mm, 225 mm and 300 mm from the corner and thereafter at 150 mm centres. Fixing to other framing is either mechanical or by using GIBFix® adhesives.

14.9 When installing GS2-NOM bracing elements, the GIB® plasterboard is fixed to framing around the bracing element perimeter and at sheet joints with fasteners at maximum 300 mm centres. Where recessed door jambs are used on internal door frames, the GIB® plasterboard may be fixed to the framing around the door opening with GIBFix® All-Bond, see Paragraph 7.15.

14.10 Where GIB Aqualine® or GIB Fyreline® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres and the corner pattern described in Paragraph 14.8 used.

14.11 Full sheets must be used wherever possible.

Fire Resistance Rated Bracing Elements

14.12 Where a bracing element is also used as a fire-rated element, the method of fixing (including the length of the fixing specified) for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres and fixings at corners of the bracing element must be fixed as described in Paragraph 14.8. In two-layer systems, the inner layer must be used for bracing.

Plywood Fixing

14.13 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

Ceiling Diaphragms

14.14 All GIB EzyBrace® System ceiling diaphragms require fixings around the perimeter at 100 mm or 150 mm centres, depending on the ceiling pitch and length. See Paragraphs 8.4-8.6 and refer to the Technical Literature.

14.15 The perimeter of the ceiling diaphragm is fixed to GIBFix® Angles, GIB® Rondo® perimeter channels, or alternatively, to an additional ex 150 x 40 mm timber plate fixed to the top plate.

Jointing and Finishing

14.16 All bracing element joints must be reinforced with GIB® tape and finished in accordance with the GIB® Site Guide.

Health and Safety

15.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

16.1 Bracing tests were carried out by Winstone Wallboards Ltd in accordance with BRANZ Technical Paper P21 to determine the performance of GIB EzyBrace® Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. Winstone Wallboards Ltd's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Other Investigations

17.1 The GIB EzyBrace® Bracing Software has been assessed by BRANZ and found to be satisfactory.

17.2 The GIB EzyBrace® Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

17.3 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.

17.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.

17.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, and hard and soft body impact tests.

Quality

18.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.

18.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.

18.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.

18.4 The quality of the application and finish on-site is the responsibility of the installation and stopping contractors.

18.5 Designers are responsible for the design of buildings.

18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 2269.0:2012 Plywood - Structural - Specifications.
- AS/NZS 2588:2018 Gypsum plasterboard.
- BRANZ Technical Paper P21:2010 A wall bracing test and evaluation procedure.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ

In the opinion of BRANZ, GIB EzyBrace® Systems are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Winstone Wallboards Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Winstone Wallboards Ltd:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Winstone Wallboards Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Winstone Wallboards Ltd or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
01 December 2021

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

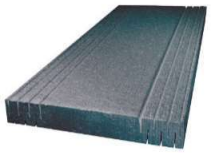
EXPOL R3.1 BLACK UNDERFLOOR INSULATION – TECHNICAL DATA SHEET

1.0 - Product Overview

Trusted by Kiwis for more than 25 years, EXPOL UnderFloor Insulation (UnderFloor) is easy-to-install and is available in 4 convenient joist widths 360, 410, 470, 560 (mm). It is the DIY solution that will keep your home warm, dry and healthy.

Suitable for use in both new and existing homes, EXPOL UnderFloor Insulation comes with a 50-year product warranty and requires no maintenance.

EXPOL provides EXPOL R1.4 White, EXPOL R1.8 Black, R2.5 and R3.1 Black UnderFloor Insulation for insulating between the joists under timber floors. EXPOL UnderFloor is specifically designed for both new and existing fl





2.0 - Installation

2.1 There are no special requirements for UnderFloor when handling or installing UnderFloor. It is an inert, non-toxic material.

2.2 When transporting, storing or installing, ensure the UnderFloor is not exposed to:

- Petroleum based solvents, or
- Fire, or
- Sustained direct sunlight.

2.3 PVC sheathed electrical cables should not be allowed direct contact with UnderFloor.

2.4 UnderFloor is compatible with all common construction products.

3.0 - Maintenance

3.1 No maintenance required

4.0 - Warranty

We believe we manufacture and supply the highest quality UnderFloor, EPS and XPS Foam Insulation products and that is why we stand behind them with some of the best warranties in the industry.

4.1 We provide a 50-year warranty on our UnderFloor Foam Insulation Products – for full warranty details visit www.expol.co.nz/expol-underfloor-warranty/

5.0 - Compliance with the New Zealand Building Code

UnderFloor, when installed and maintained in accordance with the requirements outlined in this technical data sheet, will meet or contribute to meeting the following provisions of the New Zealand Building Code:

5.1 Clause B2 Durability, performance B2.3.1 (a), B2.3.1(b)

5.2 Clause F2 Hazardous building materials performance F2.3.1(a)

5.3 Clause H1 Energy Efficiency, Performance H1.3.1 (a) and H1.3.2 E.

EXPOL UnderFloor is not subject to a warning or ban under the Building Act 2004.

6.0 - Quality Assurance

6.1 BRANZ, H1 Energy efficiency performance H1.3.1(a), H1.3.2(e)

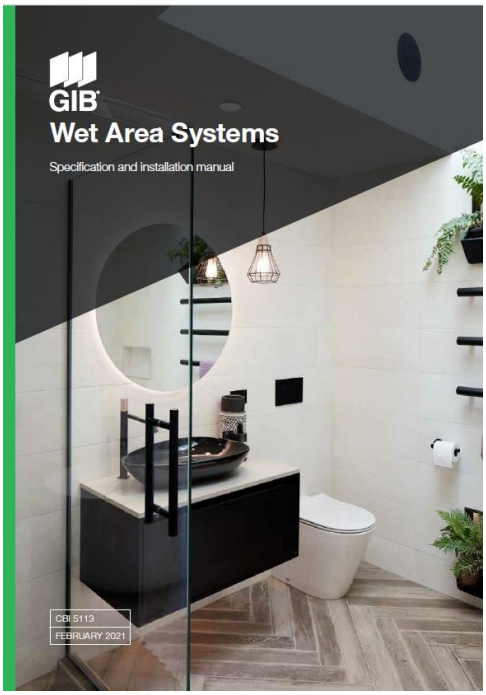
EXPOL R3.1 BLACK UNDERFLOOR INSULATION – TECHNICAL DATA SHEET

7.0 - Technical Data

Properties	Test / Method / Standard	Test Results
Material	Expanded Polystyrene with Graphite	
Density	18 kg / m3	
Sheet Size	1200 mm x 100 mm x 360 mm | 1200 mm x 100 mm x 410 mm 1200 mm x 100 mm x 470 mm | 1200 mm x 100 mm x 560 mm	
Thickness / R Value	100mm	R 3.1
Thermal Conductivity	ATSM 168	K – Value 0.032
Rate of water vapour transmission (max) measured parallel to rise at 23 deg C	AS 2498.5	520 mg/m2s
Permeability m/s	-	
Compressive Resistance KPA at 1% Compressive Resistance KPA at 2% Compressive Resistance KPA at 5% Compressive Resistance KPA at 10%	AS 2498.3	- KPA - KPA - KPA 105 KPA
Youngs Modulus	-	- MPA
Cross breaking strength KPA	AS 2498.4	135 KPA
Dimensional stability of length, width & thickness (max) at 70 deg C for 7 days	AS2498.6	1%
Long term water absorption by immersion	ASTM C72	- %v / v
Determination of flame propagation surface ignition Medium flame duration (max) Eighth vale	AS2122.1-1993	2 sec 3 sec
Fire behavior Spread of flame index (0 – 10) Smoke developed index (0 – 10)	AS/NZS 1530.3:1999	 0 5
Recycled Content	0%	
Recyclability	UnderFloor is 100% recyclable	
Environmental Statement	UnderFloor is inert and non-toxic. There are no chemicals or gases harmful to the environment emitted from UnderFloor either during manufacture or within use.	
Ozone Depleting Potential	UnderFloor does not contain ozone-depleting CFC or HCFC gases, nor use them in its manufacture. As a result, UnderFloor has zero ozone depletion potential.	
Vermin Resistance	UnderFloor does not offer any nutritive value.	

BRANZ Appraised
Appraisal No. 427 [2021]

GIB® WET AREA SYSTEMS



Appraisal No. 427 (2021)

This Appraisal replaces BRANZ Appraisal No. 427 (2007)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Wet Areas

7.4 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. There are two general categories of wet areas as follows:

- Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
- Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.

7.5 Both the above wet area categories must be finished with surfaces and joints that are impervious and easily cleaned. In addition, shower areas must be waterproofed. This can be achieved using proprietary rigid shower lining systems, flexible vinyl shower wall finishes, or tiling. Tiled shower areas must include a wet area waterproofing membrane system under the tiles.

Intertenancy Walls – Wet Areas

7.6 Intertenancy construction that incorporates fire resistance and noise control must be protected from water splash. In shower areas, GIB® Wet Area plasterboards must not be substituted for other GIB® plasterboards but must be an extra lining layer. Refer to the Technical Literature.

Tiling

7.7 GIB® Wet Area Systems are suitable as a substrate for tiling up to the following weights:

- 10 mm GIB Aqualine® and GIB Weatherline® - up to 26 kg/m^2.
- 13 mm GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® - up to 40 kg/m^2.

[Note: Most ceramic and porcelain wall tiles weigh less than 20 kg/m^2. 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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

Durability

Serviceable Life

9.1 GIB® Wet Area Systems have a serviceable life of at least 15 years as a fully protected shower or water splash lining. As a general wall and ceiling lining, GIB® Wet Area Systems will have a serviceable life in excess of 50 years. The ability of GIB® plasterboards to remain durable is dependent on being protected and remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

9.2 The building must be maintained weathertight and all lining systems protected from internal and external moisture.

9.3 Finishes to water splash and shower areas, including tiles, grout, waterproof membranes, sealants and flexible sheet vinyl must be checked to ensure the integrity of the system is maintained. They must be repaired or replaced if necessary. When repairing or replacing finishes, the GIB® plasterboard substrate must be checked for defects and repaired or replaced, as required.

9.4 For flexible sheet vinyl, particular attention must be paid to joints, especially at corners. Checks should be made to ensure the vinyl has not been punctured. Where damage has occurred, repairs must be made immediately.

9.5 Impact damage to GIB® plasterboard, resulting in small holes and cracks, may be patched, stopped and finished. For larger areas of damage, expert advice on repair must be sought from Winstone Wallboards Ltd.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to the GIB® Wet Area Systems from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

11.1 The gypsum plasterboard used in GIB® Wet Area Systems without an applied paint or wallpaper finish has been tested in accordance with ISO 5660 and achieved a Material Group Number of 1-S.

11.2 The gypsum plasterboard used in GIB® Wet Area Systems with an untested applied finish of a waterborne or solvent borne paint coating ≤ 0.4mm thick achieves a Material Group Number of G2-S in accordance with Table A1 of NZBC Verification Method C/VM2.

11.3 A lower Material Group Number may be achieved when used with a tested finishing system. The Material Group Number for the complete lining system must be obtained from the supplier of the finish product or system.

Fire Resistance Ratings (FRRs)

11.4 GIB® Wet Area plasterboards, when used as part of GIB® Fire Rated Systems, can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2. Refer to BRANZ Appraisal No. 289 (2018) and relevant technical literature.

Internal Moisture

12.1 When installed in accordance with this Appraisal, GIB® Wet Area Systems will provide wall surfaces adjacent to sanitary fixtures and sanitary appliances that are impervious and easily cleaned.

12.2 The construction methods in the Technical Literature meet with the internal moisture requirements of the NZBC Acceptable Solution E3/AS1.

12.3 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

BRANZ

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

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.