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

Burgess & Allen

Project Specification

7 Whitehaven Street , Omaru, New Zealand
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1233 REFERENCED DOCUMENTS

1 GENERAL

1.1 REFERENCED DOCUMENTS

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

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

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

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

1.2 DOCUMENTS

Documents referred to in the GENERAL sections are:

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

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

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

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1234 DOCUMENTATION

1 GENERAL

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

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

Building Consent Authority documentation

1.1 BUILDING CONSENT

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

1.2 BUILDING CONSENT COMPLIANCE

It is an offence under the Building Act 2004

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

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

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

1.3 PROJECT PERSONNEL

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

Licensed Building Practitioner documentation

1.4 LICENSED BUILDING PRACTITIONERS

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

Include the following as applicable

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

Also provide names and contact details of the following

- Registered drainlayer

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- Registered plumber
- Registered gasfitter
- Registered electrician

1.5 RECORD OF WORK

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

Compliance information

1.6 DOCUMENTATION REQUIRED FOR CODE COMPLIANCE

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

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

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

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

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

1.7 PRODUCER STATEMENTS

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

Residential building contract

1.8 CHECKLIST

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

1.9 DISCLOSURE STATEMENT

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

1.10 BUILDING CONTRACT

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

1.11 DOCUMENTATION REQUIRED ON COMPLETION

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

Information and documentation relating to:

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

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

Substitutions

1.12 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

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

1.13 NO SUBSTITUTIONS

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

1.14 PROPOSED SUBSTITUTIONS

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

1.15 NOTIFICATION OF SUBSTITUTIONS

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

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

Plus an assessment of:

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

and if requested:

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

1.16 ACCEPTANCE OF SUBSTITUTIONS

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

Amendments to issued Building Consent

1.17 CONTRACTOR AMENDMENTS TO BUILDING CONSENT

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

The contractor must:

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

1.18 PRINCIPAL AMENDMENTS TO BUILDING CONSENT

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

The principal will:

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

Manufacturer's documents

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1.19 MANUFACTURER'S AND SUPPLIER'S INSTALLATION REQUIREMENTS

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

1.20 CONTRACTOR TO OBTAIN CURRENT DOCUMENTATION

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

1.21 DOCUMENTATION PROVIDED FOR BUILDING CONSENT

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

Branded work sections

1.22 BRANDED PRODUCTS / SYSTEMS

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

1.23 CROSS REFERENCED WORK SECTIONS

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

Care of construction documents

1.24 CONSTRUCTION ISSUE

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

1.25 REVISIONS TO CONSTRUCTION ISSUE

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

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

1.26 RETURN DOCUMENTS ISSUED FOR CONSTRUCTION

On completion of the contract works:

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

The Contract Administrator will advise whether such documents shall be:

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

Confidentiality of documents

1.27 CONFIDENTIALITY OF DOCUMENTS

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

2 SELECTIONS

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1250 TEMPORARY WORKS & SERVICES

1 GENERAL

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

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

Temporary works

1.1 COSTS RELATING TO TEMPORARY WORKS

Pay all rates/fees in respect of temporary works.

1.2 MAINTENANCE OF TEMPORARY WORKS

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

1.3 SAFEGUARD THE SITE, THE WORKS AND MATERIALS

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

1.4 CONSULTANTS TEMPORARY SITE OFFICE

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

1.5 SITE FENCING

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

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

1.6 SITE FENCING - NON-PUBLIC AREAS

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

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

1.7 PROVIDE SEDIMENT AND SILT RUN OFF PROTECTION

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

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

Provide sediment control by:

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

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

1.8 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

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

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Control run off from:

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

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

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

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

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

Spilt or surplus material:

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

Pump washwater away from drains, waterways and adjoining property.

1.9 EXCAVATION SAFETY

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

Scaffolding

1.10 SCAFFOLDING

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

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

Temporary services

1.11 WATER

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

1.12 ELECTRICITY

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

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

1.13 TELEPHONE

Provide on-site temporary telephone facilities.

1.14 COMPUTER FACILITIES

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

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1.15 PRINTER

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

1.16 IMAGING

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

Care and protection - Site

1.17 LOCATE AND PROTECT SURVEY MARKS

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

1.18 LOCATE EXISTING SERVICES

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

1.19 PROTECT EXISTING SERVICES

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

1.20 PROTECT EXISTING LANDSCAPE ELEMENTS

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

1.21 MAKE GOOD - SITE

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

Care and protection - miscellaneous

1.22 CONSTRUCTION KEYING AND SECURITY

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

1.23 TEMPORARY STORAGE

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

Rubbish removal

1.24 PERIODIC RUBBISH REMOVAL

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

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1270 CONSTRUCTION

1 GENERAL

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

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

Quality control and assurance

1.1 QUALITY ASSURANCE

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

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

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

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

1.2 PROVIDE QUALITY PLAN

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

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

1.3 REVIEW OF QUALITY PLAN

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

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

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

1.4 COMMENCEMENT OF WORK

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

1.5 NOTICE

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

1.6 NOTIFIABLE WORK

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

Noise and nuisance

1.7 LIMIT CONSTRUCTION NOISE

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

1.8 ACCEPTABLE NOISE LEVELS

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

1.9 PROVIDE INFORMATION TO NEIGHBOURS

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

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

1.10 INCONVENIENCE TO OTHERS

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

1.11 ROADWAY AND FOOTPATH

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

1.12 VEHICLE CROSSING

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

1.13 DIRT AND DROPPINGS

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

1.14 DAMAGE AND NUISANCE

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

1.15 SMOKE FREE REQUIREMENTS

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

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1.16 RESTRICTIONS

Do not:

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

Set-out and tolerances

1.17 SURVEY INFORMATION

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

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

1.18 DATUM

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

1.19 SET-OUT

Set out the work to conform with the drawings.

1.20 SET-OUT BY LICENSED CADASTRAL SURVEYOR

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

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

1.21 CONFIRM HEIGHT IN RELATION TO BOUNDARY

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

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

1.22 USE OF SET-OUT INSTRUMENTS

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

1.23 CHECK DIMENSIONS

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

1.24 TOLERANCES

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

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

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

Refer to work sections for tolerance requirements for finishes.

Execution

1.25 EXAMINE PREVIOUS WORK

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

1.26 REPORT DEFECTIVE PREVIOUS WORK

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

1.27 EXECUTION GENERALLY

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

1.28 EXECUTION - NO DETAIL IS PROVIDED

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

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

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

1.29 EXECUTION - ACCEPTABLE SOLUTION IS REFERRED TO

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

1.30 MINIMISE DELAYS DUE TO WEATHER

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

Qualifications

1.31 QUALIFICATIONS GENERALLY

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

1.32 QUALIFICATIONS WORKERS – RESTRICTED BUILDING WORK

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

1.33 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

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

1.34 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

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

1.35 QUALIFICATIONS – PRODUCER STATEMENTS

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

1.36 REPLACEMENT OF PERSON

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

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

Products

1.37 NEW PRODUCTS

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

1.38 COMPATIBILITY OF PRODUCTS

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

1.39 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

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

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

Refer to individual work sections for any special requirements.

1.40 SUBSTRATE CONDITIONS

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

1.41 INSTALLING PRODUCTS

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

1.42 COMPLY WITH STANDARDS

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

1.43 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.44 INCOMPATIBLE PRODUCTS

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

Samples

1.45 SAMPLES FOR REVIEW

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

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

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

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

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

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

Refer to SAMPLES clauses in work sections for further detail.

1.46 CONTROL SAMPLES

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

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

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

1.47 OTHER SAMPLE REQUIREMENTS

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

Prototypes

1.48 PROTOTYPES - TESTING

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

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

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

1.49 PROTOTYPES - REVIEW

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

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

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

1.50 PROTOTYPES - GENERAL

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

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

Spares & maintenance products

1.51 SPARES & MAINTENANCE PRODUCTS

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

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

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

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

Cleaning during the works

1.52 PERIODIC SITE CLEANING

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

1.53 TRADE CLEANING

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

Remove protection

1.54 REMOVE PROTECTION

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

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

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

Refer to individual work sections for any special removal requirements.

Completion

1.55 REMOVE CONSTRUCTION WASTE

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

1.56 COMPLETE ALL SERVICES

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

1.57 CLEANING BY CONTRACTOR

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

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

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works.

Commissioning

1.58 MOVING PARTS

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

1.59 INSTRUCTION AND DEMONSTRATION

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

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

1.60 SECURITY AT COMPLETION

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

Practical completion submission

1.61 ADDITIONAL PRACTICAL COMPLETION INFORMATION

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

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

1.62 ADDITIONAL PRACTICAL COMPLETION REQUIREMENTS

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

In addition to the requirements in the contract, the following conditions also apply:

- ~

Defects period submissions

1.63 DEFECTS REMEDIATION - SUBMISSIONS

Provide the following at periods required by the contract administrator, where no period is stated, provide this information monthly:

- A copy of the contractor's check list identifying remaining defects and omissions to be completed recording progress made in completing and correcting the items.
- A copy of lists issued by the principal/employer identifying omissions and defects recording progress made in completing and correcting the items.
- A copy of lists issued by the contract administrator identifying omissions and minor defects recording progress made in completing and correcting the items.

Completion submissions

1.64 FINAL COMPLETION - SUBMISSIONS

In addition to requirements in the contract and contained elsewhere in the specification provide:

- Contractors advice that all defects have been corrected and omissions and deferred work completed.
- All documents which the contractor has obtained on behalf of the owner/occupier.

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2210 PREPARATION & GROUNDWORK

1 GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:

- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
WorkSafe	Good Practice Guidelines - Excavation Safety

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

Manufacturer/supplier contact details;

Company:	~
Web:	~
Email:	~
Telephone:	~

1.3 SITE SAFETY

Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

1.4 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

2 PRODUCTS

2.1 EXCAVATED CLEAN FILL

Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

2.2 VOLCANIC TUFF FILL

Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL

Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL

Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.5 HARD FILL

Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL

Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE

Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE

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Scoria or crushed gravel graded 50 to 14 clean.

3 EXECUTION

3.1 WASHOUT BAY FOR TRUCK

Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY

Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe, Good Practice Guidelines - Excavation Safety.

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained.

3.5 EROSION CONTROL

Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.6 SURFACE PREPARATION

Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.7 STOCKPILE TOPSOIL

Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.8 GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.9 ROCK EXCAVATION

If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.10 FOUNDATION EXCAVATION

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.11 INADEQUATE BEARING

If localised bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows:

- Below slabs on grade: Hardfill compacted in 150mm layers
- Below footings: 10 MPa concrete

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.
Confirm any changes with the territorial authority.
For inadequate bearing or over excavation of service trenches, use hardfill compacted in 150mm layers.

3.12 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.13 GRANULAR BASE FOR SLABS

To conform to NZS 3604, section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.14 GENERAL BACKFILLING

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Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.15 RETAINING WALLS

Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.16 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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2310 FOUNDATIONS

1 GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3605	Timber piles and poles for use in buildings

Performance

2 PRODUCTS

2.1 CONCRETE PILES IN SITU

To NZS 3604 for concrete, reinforcement, footing and type.

2.2 CONCRETE PILES PRE-CAST

200mm square parallel-sided to NZS 3604 for footing and type.

2.3 SQUARE TIMBER PILES

Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross-section, length, straightness, strength and branding. All to NZS 3604 for footing and type.

2.4 TIMBER SUB-FLOOR FRAMING

Species, grade, moisture content in service and level of treatment as set out in NZS 3602. Grading to NZS 3603 and treated to NZS 3602, table 1C.

2.5 NAILS

Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.

2.6 BOLTS

Steel, stainless steel, and galvanized steel to NZS 3604.
Refer to SELECTIONS.

2.7 NAIL PLATES

Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

2.8 CORROSION RISKS

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3 EXECUTION

3.1 FOUNDATIONS GENERALLY

Comply with NZS 3109, 3602 and NZS 3604 except as varied by this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

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3.2 EXCAVATIONS

Refer to 2210 PREPARATION AND GROUNDWORK.

3.3 INSTALL CONCRETE PILES IN SITU

Box for, reinforce and pour in 17.5 MPa concrete the footings and piles in the various types to NZS 3604.

3.4 INSTALL CONCRETE PILES PRECAST

Pour 17.5 MPa concrete footing and set in pre-cast concrete piles in the various types to NZS 3604.

3.5 INSTALL ROUND TIMBER PILES

Prepare for and drive timber piles to NZS 3604, section 6.6, **Driven timber piles**. Protect pile heads with a suitable cushion.

3.6 INSTALL SQUARE TIMBER PILES

Prepare for, place and secure as detailed on the drawings.

3.7 SUB-FLOOR FRAMING

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6, **Foundation and subfloor framing**.

4 SELECTIONS

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3101 CONCRETE WORK - BASIC

1 GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

1.1 ABBREVIATIONS AND DEFINITIONS

The following definitions apply specifically to this section:

ACRS	Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS web site - www.steelcertification.com

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

2 PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5 to 50 MPa grade, (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

2.2 SITE CONCRETE

Concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, table 3.1, Prescribed mixes (P).

2.3 REINFORCEMENT

Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh Class E to AS/NZS 4671, and 500E mesh to AS/NZS 4671.

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2.4 MESH FOR SLABS TO NZS 3604 OR NZS 4229

For slabs on ground mesh to be welded reinforcing mesh to AS/NZS 4671, Class E, minimum to B1/AS1 - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction).

2.5 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.6 SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

Accessories

2.7 WATERPROOFING FOR EXTERIOR OPENINGS

Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings to CCANZ CP 01. Refer to SELECTIONS.
Do not use bituminous coatings.

3 EXECUTION

3.1 HANDLE AND STORE

Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 FALSEWORK AND FORMWORK

Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 CUT AND BEND REINFORCEMENT

Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3109, table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.4 ADJUSTMENTS

Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

3.5 TOLERANCES, BENDING

To NZS 3109, 3.9, Tolerances for reinforcement.

3.6 SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

3.7 LAPPED SPLICES

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Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked.
Wire mesh laps to NZS 3101.1, lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.8 MESH LAPS FOR SLABS TO NZS 3604 OR NZS 4229

For slabs on ground the welded reinforcing mesh to be lapped such that the outermost wires overlap by the greater of:

- the spacing of the cross wires plus 50mm
- 150mm or
- manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

3.9 REINFORCEMENT COVER TO NZS 3101.1

Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101.1, table 3.6, **Minimum required cover for a specified intended life of 50 years**. Sub-soil cover to NZS 3101.1, to suit soil and groundwater conditions. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.10 REINFORCEMENT COVER TO NZS 3604 OR NZS 4229

For in-situ concrete, foundations and interior slabs on ground, to NZS 3604 or NZS 4229, the reinforcement and welded mesh cover to be:

Location, cover to	**NZS 3604**	**NZS 4229**
Footing, to earth	75mm	75mm
Footing, to DPM	75mm	50mm
Foundation, to edge	75mm	75mm
Slab, to slab top	30mm	30mm
Slab, to slab edge	50mm to 75mm	50mm to 75mm

3.11 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Location and form of conduits to be approved in writing by the Contract Administrator. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

3.12 CONSTRUCTION JOINTS

Locate and construct as shown on the drawings or in accordance with NZS 3109, 5.6, Type B.

3.13 PRE-PLACEMENT INSPECTION

Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.

3.14 SURFACE FINISHES

To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.15 CONCRETE SURFACE TOLERANCES

To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.16 PUMPING CONCRETE

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Set up and supervise pump operation, placing and compaction of the mix to NZS 3109, 7.4, Handling and placing and NZS 3109, 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.17 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.18 FLOOR SLABS TO NZS 3604

Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 3604, 4.5 **Concrete and concrete masonry** and NZS 3604, 7.5, **Concrete slab-on-ground floors in timber buildings** as modified by NZBC B1/AS1, 3.0 **Timber**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 24m centres to NZBC B1/AS1, 3.1.13 **NZS 3604 New clause**.

3.19 FLOOR SLABS TO NZS 4229

Generally for slabs on ground to NZS 4229 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 4229, 6, **Footings** and NZS 4229, 7, **Foundation walls and concrete slab-on-ground** as modified by NZBC B1/AS1, 2.0 **Masonry**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 18m centres to NZS 4229, 7.8.5.3 **Free joints**.

3.20 SAW CUTS TO NZS 3604 OR NZS 4229

Cut slabs where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab after it has hardened (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 ºC, and 48 hours for average ambient temperatures below 20ºC).

3.21 SAW CUTS

Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring.

3.22 SPACING OF SAW CUTS

Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m
Carpet on underlay flooring	6m

3.23 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

3.24 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.25 STRIKE FORMWORK

Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.26 WATERPROOFING EXTERIOR OPENINGS

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Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.
Provide temporary protection from direct sunlight.

3.27 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.28 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

4 SELECTIONS

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3811M MITEK (GANG-NAIL) PREFABRICATED TIMBER TRUSSES

1 GENERAL

This section relates to the manufacture, supply and erection, of prefabricated:

- MiTek® timber roof trusses (GANG-NAIL® roof trusses)
- MiTek® bolted style timber roof trusses - (GANG-NAIL®) XPOTRUSS roof trusses
- MiTek® floor trusses (Posi-STRUT® truss systems)
- MiTek® rafter and purlin trusses (Posi-STRUT® truss systems)

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

FTMA	Frame and Truss Manufacturers Association of New Zealand Inc.
SED	Specific Engineering Design

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/VM1	Structure
NZBC B2/AS1	Durability
AS/NZS 1170.0	Structural Design Actions - General principles
AS/NZS 1170.2:2011	Structural Design Actions - Wind actions
NZS 1170.5	Structural Design Actions - Earthquake actions - New Zealand
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
MiTek® (GANG-NAIL®) Roof Truss System Manual
MiTek® (GANG-NAIL®) Roof Truss Installation manual
MiTek® (GANG-NAIL®) XPOTRUSS Roof Truss System brochure
MiTek® (GANG-NAIL®) Posi-STRUT® Truss System Manual
MiTek® Structural Fixings On site guide for Building Code Compliance (2012)
For the latest version of the documents refer to the manufacturer's web site.

Manufacturer/supplier contact details

Company:	**MiTek New Zealand Limited**
Web:	www.miteknz.co.nz
Email:	design@miteknz.co.nz
Telephone:	09 274 7109 or 03 348 8691

Requirements

1.4 QUALIFICATIONS

Fabricators to be experienced competent workers, familiar with the materials and the techniques specified.
Fabrication companies to be MiTek® accredited fabricators.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.6 DESIGN CRITERIA NON-SPECIFIC DESIGN

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Individual timber framing members used separately, but in association with the trusses, to NZS 3604.

1.7 DESIGN CRITERIA SED

Frames and trusses to, Alternative Solution MiTek® 20/20 and MiTek Sapphire® Design Programme, NZBC B1/VM1, AS/NZS 1170.0, AS/NZS 1170.2, NZS 1170.5 and NZS 3603.

Documentation for Building Consent/Code Compliance Certificate

1.8 DOCUMENTATION - FABRICATOR / MANUFACTURER

To NZS 3604, 10.2.2.3 **Drawings and Specifications** and the provisions/requirements of the following related clauses.

1.9 PROVISION OF STATEMENTS

Provide the following documentation. The statements shall include the name and position within the company of the person providing the statement.
Fabricator Design and Manufacturing Statements shall be noted as being:

- Issued by a named company, accredited as a fabricator by the nail plate manufacturer
- Issued to the named Owner and available for use by a BCA to assist in determining compliance with the NZBC.

1.10 SHOP DRAWINGS

Provide drawings showing the trusses and their layout;

- one prior to fabrication (buildable truss layout) for consent purposes.
- one post fabrication As Built (as fabricated layout) for construction and code compliance purposes.

The drawing shall be identified as 'Buildable' or 'As Built' (as fabricated) and shall include the following:

- The name and contact details of the accredited fabricator
- The job/design reference name or number
- The site address/location

Site specific structural and loading information including

- Pitch
- Cladding type
- Wind and snow loading values
- Date drawn
- A truss layout with truss labels and dimensions to locate the trusses on the supporting structure
- Identification of all load bearing walls/beams used to support trusses
- Specification and location of truss to truss and truss to top plate fixings or notification that such items are specified by others
- Identification of the location of any resulting loads where the design of the supporting member will be outside the scope of NZS 3604 (point loaded lintels and point loads on internal walls where the downward and upward loads are higher than 16kN) and where appropriate, any slab thickening required
- Reference to the Fabricator Design Statement

1.11 AS BUILT DOCUMENTS

Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:
~

- Provide final post fabrication as built information for construction and code compliance purposes. .

1.12 DESIGN STATEMENT - BUILDABLE TRUSS LAYOUT SERVICE

Roof truss layouts, a truss design statement and a producer statement (design) produced by MiTek Buildable Truss Layout (BTL) service have been included as a part of building consent documentation.

1.13 DESIGN STATEMENT - FABRICATOR

Provide a Design Statement issued by the fabricator listing the job specific inputs used in the design process.

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The Design Statement shall identify:

- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- Software date/version
- Reference to the Producer Statement - Design
- Supporting compliance documents including standards for material grades and sizes
- The job/design reference name or number
- The site address/location

Job specific information:

- Loads allowed for in the specific design including dead loads (cladding and ceiling) and live loads (wind and snow)
- Roof pitch
- Nominal overhang length
- Importance Level

Design working life:

- A list of the designed trusses, spans and maximum spacing
- Date of design

1.14 PRODUCER STATEMENT - DESIGN

Provide a Producer Statement - Design issued by the software provider, supporting the software and the engineering principles being applied by the software.

The Producer Statement shall:

- Have a level of detail consistent with that of an IPENZ Producer Statement PS1
- State the means of compliance with NZBC
- Reference the truss layout and Fabricator Design Statements
- Identify the job/design reference name or number
- Identify the software date/version
- Be signed by a Chartered Professional Engineer

1.15 MANUFACTURING STATEMENT

Provide a statement to support the manufacture of the roof trusses in accordance with the principles of the design statement and truss layouts. This statement is to be issued by a fabricator after manufacture has occurred and identifying:

- The job/design reference name or number
- The site address/location
- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- That the trusses were manufactured in accordance with the Design Statement
- The name and position within the company of the person providing the statement

Truss identification

1.16 IDENTIFICATION OF TRUSSES ON SITE

A selection of trusses in a job lot manufactured by a fabricator shall carry identification labels or markings fitted during manufacture, to NZS 3604, 10.2.2.5, **Truss identification**.

Identification shall be evident on the bottom chords of main rafter or girder trusses on a minimum of 6 trusses in a job lot, or on every truss where there are less than 6 trusses in the job lot.

Identification text shall be a minimum of 10mm high and shall include:

- The fabricator name
- The nail-plate manufacturer name
- The job/design reference name or number

2 PRODUCTS

Materials

2.1 MITEK TRUSSES - TIMBER

Structural grade timber to NZS 3602, NZBC B2/AS1, gauged, maximum moisture content of 20%, treated to NZS 3640, NZBC B2/AS1, hazard class H1.2 and identified with its unique identifier.

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2.2 MITEK ROOF TRUSSES - TOOTHED PLATE

MiTek® (GANG-NAIL®) timber roof trusses with toothed plate connectors. Design and layout to be determined by a MiTek® accredited fabricator, refer SELECTIONS.

Accessories

2.3 STEEL TOOTHED CONNECTOR PLATES

GANG-NAIL® 1.0mm to 2.0mm thick steel sheet, Z275 galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** and punched to form a toothed connector. For (roof) spaces designated closed environments to NZS 3604.

2.4 STAINLESS STEEL TOOTHED CONNECTOR PLATES

GANG-NAIL® 1.2mm to 2.0mm thick 316 grade, GS12 stainless steel sheet, punched to form a toothed connector.

2.5 BOWMAC GALVANIZED STRUCTURAL BRACKETS

MiTek® BOWMAC® >3mm thick steel plate brackets, hot-dip galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** with hot-dip galvanised bolts/screws and washers.

2.6 BOWMAC STAINLESS STEEL STRUCTURAL BRACKETS

MiTek® BOWMAC® >3mm thick, 304 stainless steel plate brackets with stainless steel bolts/screws and washers.

2.7 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3 EXECUTION

Conditions

3.1 COMPLY

Comply with current standards, code requirements and the FTMA CoP in the design and fabrication of trusses and frames.

3.2 DELIVER, HANDLE AND STORE TRUSSES AND FRAMES

Deliver, handle and store frames and trusses so no structural damage occurs, corners and edges are not damaged, or surfaces marked or stained. Follow manufacturer's requirements. Handle all frames and trusses with nylon strops or similar to prevent damage. Store under cover and clear of the ground, to keep dry prior to installation.

Fabrication

3.3 DIMENSIONS, NOT EXPOSED ELEMENTS

Each member calculated length ±3mm. Width and thickness to gauging tolerances. Each overall joint within ±3mm of correct outside profile (including camber allowance).

3.4 FABRICATION

Factory fabricate to the GANG-NAIL® Manufacturing System. Build camber into all elements to accommodate normal deflection under load. Lay up members accurately with all joints tight fitting. Mechanically press plates to manufacturer's tolerances, fully and flat over their whole area into the members forming the joint.

Site installation

3.5 MITEK (GANG-NAIL) ROOF TRUSS ERECTION

To MiTek® (GANG-NAIL®) Roof Truss Installation manual.

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Lift, place and fix trusses without overstressing or deformation. Use temporary supports as needed without causing damage. Fit trusses to wall plates and beams to MiTek® (GANG-NAIL®) requirements, but no less than NZS 3604, section 10, **Roof framing** and in particular section 10.2.2, **Roof trusses**. Fit and fix bracing as detailed and to NZS 3604: section 10.2.2, **Roof trusses** and section 10.3, **Systems to resist horizontal loads**. Ensure all trusses are correctly located, plumb and true to line and face.

3.6 MITEK (GANG-NAIL) ROOF TRUSS CONNECTION AND FIXING

To MiTek® (GANG-NAIL®) Roof Truss Installation manual.
Fit connectors and fixings to obtain full bearing over all contact surfaces and ensure the required loading capacity for the truss and frame roof is maintained. Fix each roof framing member in accordance with MiTek® (GANG-NAIL®) requirements and NZS 3604, Section 10, **Roof framing.** Ensure the size, number and location of nails to be used in roof framing comply with requirements of Table 10.8, **Nailing schedule for hand-driven and power-driven nails**, or to engineering specific design. Ensure all elements are correctly located, plumb and true to line and face.

3.7 ROOF BRACING

Refer to 3821M MITEK TIMBER FRAMING for roof bracing of trussed roofs.

3.8 WALL BRACING

Refer to 3821M MITEK TIMBER FRAMING for wall bracing.

3.9 DPC TO TIMBER

Lay DPC between all timber frames and concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. For LOSP treated timber use only a DPC specifically suitable with LOSP treatment.

3.10 TIGHTEN BOLTS

Check and tighten any related fixing bolts after erection is completed.

Completion

3.11 REPLACE

Replace or repair damaged elements.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

3.13 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

For further details on selections go to www.miteknz.co.nz.

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3813F FUTUREBUILD® NZ - LVL STRUCTURAL FRAMING

1 GENERAL

This section relates to the supply and installation of Futurebuild LVL engineered wood products including:

- hyONE®
- hySPAN®
- hyCHORD®
- hy90®
- hyJOIST®

1.1 RELATED WORK

Refer to 3811 PREFABRICATED STRUCTURAL TIMBER FRAMING for supply of trusses and frames.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1	Structure
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed buildings
AS/NZS 4357.0	Structural laminated veneer lumber - Specifications

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER DOCUMENTS

Futurebuild LVL documents relating to work in this section are:

- Futurebuild LVL Residential Design Guide
- Futurebuild LVL Specific Engineering Design Guide
- hyJOIST Design and Installation Guide:2.1
- hyJOIST HJ240 45 and HJ300 45 Brochure
- Product Technical Statement - Futurebuild LVL Products specified for Residential Applications through software and literature
- Product Technical Statement - Futurebuild LVL Products: General/Specific Design
- Product Technical Statement - Futurebuild LVL Products: Specified through designIT for commercial floors
- Product Technical Statement - Futurebuild® LVL Products: Specified through computeIT® Software Solutions
- designIT Software which includes installation details, Design Certificate and Producer Statement

Copies of the above literature and software are available from Futurebuild LVL.

Web:	www.futurebuild.co.nz
Email:	info@futurebuild.co.nz
Telephone:	0800 808 131 (Customer Services), 0800 585 244 (Technical)

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Futurebuild LVL engineered wood products or associated components or accessories. The structural properties of other manufactures LVL products may not be comparable.

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 CO-ORDINATION

Refer to all drawings to ensure details and fixings required are provided for in the structural LVL work.

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2 PRODUCTS

Materials - Laminated Veneer Lumber (LVL)

2.1 HYONE LINTELS & BEAMS

High stiffness structural LVL lintels and beams manufactured to AS/NZS 4357.0

2.2 HYSPAN

Structural radiata pine LVL bearers, lintels, rafters, floor joists, floor and roof beams, to AS/NZS 4357.0.

2.3 HYJOIST

Structural composite "I" beam floor joists and rafters comprised of a cross banded plywood web with LVL flanges in-grade tested to meet published Characteristic Values.

2.4 HYCHORD

Structural LVL truss chords for high load applications and wall studs to AS/NZS 4357.0

2.5 HY90 LINTEL

Structural LVL lintels and beams manufactured to the requirements of AS/NZS 4357.0

Components

2.6 JOIST HANGERS

Top mount hangers, full depth face mount hangers and partial depth face mount hangers with nails and/or screws to Futurebuild LVL technical literature requirements.

2.7 WEB STIFFENERS

Futurebuild LVL web stiffeners used to resist web buckling or installed in conjunction with partial height joist hangers, and/or to accommodate uplift forces. Fixed to Futurebuild LVL technical literature requirements.

2.8 STEEL STRAPS

Mild steel galvanized straps, to suit tie down applications for rafters, 27mm x 0.6mm, 25mm x 0.8mm and 25mm x 1.0mm.

3 EXECUTION

Conditions

3.1 ERECTION GENERALLY

Carry out the erection of LVL and associated support framing for houses and similar structures to the requirements of NZS 3604 and/or Futurebuild LVL literature and software as detailed. Comply with NZBC B1/VM1, 6.0 Timber. Refer to Futurebuild LVL guidelines for the installation of LVL structural framing. Prop long length beams and lintels at the mid span until the moisture content has reached a suitable level for the application of internal linings.

Application - hySPAN & hyCHORD

3.2 ERECTION

Lift, place and fix hySPAN or hyCHORD without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hySPAN or hyCHORD to NZS 3604 and/or to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.3 HOLES AND NOTCHES IN SOLID FUTUREBUILD LVL FLOOR JOISTS

Holes and notches in Futurebuild LVL floor joists to NZS 3604 and/or Futurebuild LVL requirements.

Application - hyJOIST

3.4 ERECTION

Lift, place and fix hyJOIST without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hyJOIST to Futurebuild LVL requirements. Ensure all hyJOIST is correctly located, plumb and true to line and face.

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3.5 WEB HOLE LOCATIONS IN HYJOIST

Circular holes, square holes and rectangular holes to be located in hyJOIST floor joists as per limitations in the hyJOIST Design and Installation Guide, designIT sITe APP or designIT Software. Do cut web area as specified. Do not cut, notch or bore through flanges.

3.6 HYJOIST RAFTERS AND OVERHANGS

To Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software, for details of rafter tie down, restraint at supports, lateral restraint for hyJOIST rafters, ridge support detail, fascia connection detail and overhang details. For sloping soffit with hyJOIST rafters birdsmouthed at supports, cut notch to provide 45mm minimum bearing. Flange must not overhang support. Do not cut beyond flange.

3.7 HYJOIST BEARING AND SUPPORT DETAILS

To hyJOIST Design and Installation Guide, or designIT Software, for details of bearing and support, nailing down to supports, installation of joist hangers, web stiffeners, web stiffeners for double joists, for joists oblique to bearer, concentrated loads from jamb studs or posts and limited notching at end supports.

3.8 JOIST HANGERS FOR HYJOIST JOISTS

To Joist Hanger Specification in Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software.

Application - hy90 & hyONE

3.9 ERECTION GENERALLY

Lift, place and fix hy90 or hyONE without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hy90 or hyONE to NZS 3604 and to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.10 LINTEL END CONNECTIONS

To hy90 and hyONE Lintels for residential construction - Information for design and installation for lintel end connections and cantilevered lintel connections construction details and to NZS 3604 and/or designIT for houses software for trimming stud connections and tie down where required for uplift.

Completion & Commissioning

3.11 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

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3820 CARPENTRY

1 GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber and engineered wood.

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 DIMENSIONS

All timber sizes except for battens are actual minimum dried sizes.

2 PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Structural grade (SG) to NZS 3604, NZS 3622 with properties to NZS 3603.

2.2 LAMINATED TIMBER

Radiata pine laminations to AS/NZS 1328.1; treated as required by NZS 3602, NZBC B2/AS1, to the requirements of NZBC B2/AS1, AS/NZS 1604.1, NZS 3640, with special attention to Appendix B "Specification advisory notes". Supply weather resistant sealed.

2.3 ENGINEERED WOOD

LVL members to AS/NZS 4357.0, to required sizes and lengths and the manufacturer design properties.
Treatment to NZS 3640 and AS/NZS 1604.1.

2.4 TIMBER TRUSSES

To FTMA CoP. Moisture content 16% at supply.

2.5 WALL DWANGS, NOGS AND BLOCKING

If dwangs, nogs or blocking is required for exterior insulated walls, ensure they are not full depth of framing. Install flush with face of wall required, leaving a minimum 20mm or 45mm preferable gap to the other face to NZS 3604, 8.8. Dwangs and nogs if required to be at 1350mm centres maximum to NZS 3604, 8.8.

2.6 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL

Extruded polypropylene battens, size approximately 45mm wide x 18mm thickness. Temporary fix battens before being fixed into the framing with the cladding fixings. To the scope limitations of NZBC E2/AS1, and NZS 3604 Building Wind Zones up to, and including "Extra High".

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Components

2.7 NAILS

Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.8 BOLTS AND COACH SCREWS

Bolts and coach screws complete with washers, to the requirements of NZS 3604, clause 2.4.5 Bolts and Coach Screws, and section 4, **Durability**, and of the type, number and form required for each particular junction to NZS 3604, sections 6 - 10.

2.9 NAIL PLATES

Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6 - 10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.10 CONNECTORS

Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.11 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

2.12 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3 EXECUTION

3.1 EXECUTION GENERALLY

To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION

Separate all timber framing timbers from concrete, masonry and brick by: -

- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum

3.5 SET-OUT

Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings. When necessary provide framing to suit any required cladding/lining control joints and sheet joints.

3.6 FRAMING SUB-FLOOR

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6.10, **Framed subfloor walls**.

3.7 FRAMING FLOORS

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Framed and fastened to NZS 3604, section 7, **Floors**.

3.8 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

3.9 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and 10, **Roof framing**.

3.10 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**. Trim for openings in ceilings and hatches to NZS 3604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.

3.11 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.12 FIT CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to NZS 3604. Fit and fix related flashings. Make allowance for cladding control joints where required. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.13 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.14 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

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4161MI MARSHALL WEATHERIZATION SYSTEM

1 GENERAL

This section relates to the application of the **Marshall Weatherization System** which consists of:

- **Tekton® Building Wrap** (also called **Tekton HouseWrap)**
- **HYDRA wall underlay**
- **HYDRA roof underlay**
- **SUPER-STICK Building Tape®**
- **Tekton® Seam Tape**
- **One-Piece Sill Tape**
- **TRADE-SEAL** (penetration seal)
- **Protecto Wrap Detail Tape**
- **Protecto Wrap Sill Tape**
- **Protecto Tak** (spray primer/adhesive)

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.
Roof underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic roof underlays

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
NZS/AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Specification for **Marshall Weatherization System**
Specification for **Tekton® Building Wrap**
Brochure for **Tekton® HouseWrap**
Specification for **SUPER-STICK Building Tape®**
Brochure for **SUPER-STICK Building Tape®**Specification for **TRADE-SEAL**
Brochure for **TRADE-SEAL**
BRANZ Appraisal 444 - Protecto Sill Window Sealing System
BRANZ Appraisal 548 - Tekton® Building Wrap
BRANZ Appraisal 591 - One Piece Sill Tape
BRANZ Appraisal 621 - The Marshall Weatherization System
BRANZ Appraisal 719 - Trade-Seal Pipe and Penetration Seal
BRANZ Appraisal 846 - SUPER-STICK Flexible Flashing Tape
BRANZ Appraisal 1071 - HYDRA Roof Underlay
BRANZ Appraisal 1072 - HYDRA Wall Underlay

Manufacturer/supplier contact details

Company:	**Marshall Innovations Limited**
Web:	www.mwnz.com
Email:	headoffice@mwnz.com
Telephone:	0800 776 9727

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

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15 years:Provide a material manufacturer/supplier warranty:
15 years: For **Tekton® Building Wrap**
15 years: For **HYDRA wall underlay**
15 years: For **HYDRA roof underlay**
15 years: For **SUPER-STICK Building Tape®**
15 years: For **Tekton® Seam Tape**
15 years: For **One-Piece Sill Tape**
15 years: For **TRADE-SEAL**
15 years: For **Protecto Sill Window System**

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS - WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS

Work to be carried out by competent, experienced tradespeople, who are familiar with the **Marshall Innovations Limited** materials and techniques specified, by or under the supervision of a Licensed Building Practitioner (LBP) with the relevant Licence Class.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified **Marshall Innovations Limited** systems, components and associated products listed in this section.

Performance - general

1.7 SURFACE FIRE PROPERTIES FOR LININGS

Flammability index ≤ 5, to NZS/AS 1530.2. Refer to SELECTIONS.

Quality control and assurance

2 PRODUCTS

Materials

2.1 TEKTON BUILDING WRAP

Tekton® Building Wrap, a synthetic breather-type wall underlay, as a coated spun-bonded polypropylene product approximately 0.6mm thick. Supplied in rolls 2740mm x 37m and 1370mm x 37m.

2.2 HYDRA WALL UNDERLAY

HYDRA Wall Underlay, a synthetic wall underlay, as a plain non-woven scrim and a woven bottom scrim with a polymeric laminated face. Supplied in rolls 1370mm x 36.5m and 2740mm x 37m.

2.3 SUPER-STICK BUILDING TAPE

SUPER-STICK Building Tape®, a multi-layered silver polyester-faced, copolymer, self-adhesive tape. Utilizes a high tack pressure sensitive adhesive (PSA) combined with a high-performance toughened film. Tape is supplied in 75mm, 150mm and 200mm wide x 22.86m long rolls.

2.4 TEKTON SEAM TAPE

Tekton® Seam Tape, a white polypropylene film coated with a cold weather acrylic adhesive. Tape is supplied in rolls 48mm wide x 50m long.

2.5 ONE-PIECE SILL TAPE

One-Piece Sill Tape, a polythene-faced SBS modified rubberised asphalt self-adhesive membrane. Tape is supplied in rolls 150mm wide x 1.0mm thick x 20m long.

2.6 TRADE-SEAL

TRADE-SEAL, a one piece self-adhesive EPDM collar bonded to a polyethylene carrier, for pipes and conduits that penetrate the cladding/wrap/underlay. Provides secondary protection air and moisture seal, and is available in ten size options to suit penetration diameters from 8mm to 220mm.

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2.7 PROTECTO WRAP DETAIL TAPE

Protecto Wrap Detail Tape, a black, self-adhering, un-reinforced, conformable, modified SBS rubberised asphalt membrane tape. Supplied in rolls 150mm wide x 1.0mm thick x 15m long.

2.8 PROTECTO WRAP SILL TAPE

Protecto Wrap Sill Tape, a polyethylene-backed, modified SBS rubberised asphalt adhesive membrane tape. Supplied in rolls 150mm wide x 0.5mm thick x 30m long.

2.9 PROTECTO TAK SPRAY PRIMER

Protecto Tak Spray Primer, a solvent-based spray-on adhesive primer, coloured blue. Primer is supplied in a 369g can.

Accessories

2.10 FIXINGS

Staples, clouts, screws, proprietary wrap fixings or other temporary fixings to attach the wall or roof underlay to the framing.

2.11 BUILDING WRAP/WALL UNDERLAY RESTRAINTS

Polypropylene tape or galvanized wire or 75mm galvanized mesh, to NZBC E2/AS1, clause 9.1.8.5, **Wall framing behind cavities**, for intermediate restraining of the building wrap/wall underlay from bulging into the drained cavity where stud spacings are greater than 450mm. Wire or tape to be run horizontally at 300mm centres.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To NZBC E2/AS1 Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

3.2 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.
Store all products under clean dry conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture. Rolls of **Tekton® Building Wrap** to be to be stored on end.

3.3 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.4 PRE-INSTALLATION REQUIREMENTS

Before starting work, check that the framing will allow work of the required standard. The framing must be free from any sharp protrusions that may damage the wrap/underlay. Carry out remedial work identified before the installation of the **Marshall Weatherization System**.

Installation/application - generally

3.5 STANDARDS AND TOLERANCES

To NZBC B2/AS1 and NZBC E2/AS1. Refer to the general section 1270 CONSTRUCTION for general requirements.

Installation - Tekton® Building Wrap

3.6 WRAP/UNDERLAY GENERALLY

To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 548 - Tekton® Building Wrap.

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Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

3.7 FIXINGS

Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.8 POSITION ROLL

Position roll against the framing with a short length of wrap/underlay free of the roll. Align the guide marks printed on the **Tekton® Building Wrap** with visible studs and nail/staple to the framing.

3.9 FIX TO FRAMING

Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - HYDRA Wall Underlay

3.10 WRAP/UNDERLAY GENERALLY

To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 1072 - HYDRA Wall Underlay.

Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

3.11 FIXINGS

Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.12 POSITION ROLL

Position roll against the framing with a short length of wrap/underlay free of the roll. Align the **HYDRA Wall Underlay** with visible studs and nail/staple to the framing.

3.13 FIX TO FRAMING

Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - penetrations and joints

3.14 APPLY SEAM TAPE

Apply **Tekton® Seam Tape** to all horizontal and vertical building wrap/underlay joints. Lap joint to sit halfway under the tape width. Press all tape firmly into position to enhance adhesion. Use **Tekton® Seam Tape** to repair small rips, punctures or tears in the building wrap/underlay and tape into place. Ensure overlapping material extends at least 150mm beyond the damaged area.

3.15 INSTALL PENETRATION SEAL

For pipe and conduit penetrations of the cladding/wrap/underlay use the appropriate sized **TRADE-SEAL**, to ensure a tight fit around the pipe. Any paired cable or multiple air conditioning pipes must pass through a conduit. Conduits must be sealed to prevent entry of any wind driven moisture. Conduits can be sealed with either an expanding foam or sealant. Install the **TRADE-SEAL** to Marshall Innovations Limited requirements. Push back the collar to fit the cavity width. Ensure the **TRADE-SEAL** exposure to weather and UV does not exceed 90 days. Trade-Seals should never be forced over pipes or conduit, they can be trimmed to get appropriate fit.

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Installation - openings

3.16 WRAP/UNDERLAY OVER OPENINGS

Run wrap/underlay over any openings and leave covered until windows and doors are ready to be installed.

3.17 FORM OPENINGS

Form openings by cutting wrap/underlay at a 45°diagonal in from each corner. Fold and staple wrap/underlay to the inside of the framed opening.

Installation - SUPER-STICK Building Tape

3.18 SUPER-STICK BUILDING TAPE

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 846 - SUPER-STICK Building Tape®.

3.19 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.20 SILL AREA – OVER BUILDING WRAP

Cut 4 strips of SUPER-STICK at 150mm x 75mm, Apply 2 strips at a 45 degree angle to the two bottom corners overlapping the corner by 3mm to create a seal at the corner junction. Measure and mark 150mm (for 90mm framing) / 200mm (for 140mm framing) up the jamb from the bottom corners of opening. Measure sill length. Measure and cut a length of **SUPER-STICK** 300mm (for 90mm framing) / 400mm (for 140mm framing) longer than sill length. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of the opening. Apply tape down frame and tight into corner.

When the sill jamb junction is reached ensure tape is pressed firmly into corner. Continue removing backing paper and adhering SUPER-STICK across the length of the sill and up the other jamb. Keep tape flush with inside edge of opening and the overhang to the outside of the framing.

At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The remainder of the split release film can now be removed. Fold the overhang onto the face of the framing and smooth firmly into place over the building wrap and corner butterflies. Press the tape down firmly to ensure proper adhesion.

Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill or alternatively apply a 150 mm by 150 mm square of Super Stick on top of the original flashing tape on the sill, where a nail will penetrate, to provide a fixing seal as per BRANZ Appraisal.

3.21 TOP CORNERS - OVER BUILDING WRAP

Cut two 300mm (for 90mm framing) / 400mm (for 140mm framing) lengths of **SUPER-STICK**. Mark 150mm (for 90mm framing) / 200mm (for 140mm framing) down from the underside of the lintel. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of opening. Apply tape up the frame and tight into the corner. Press tape firmly into the corner junction, then continue across the underside of the opening. At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The rest of the split liner / release film can now be removed.

Fold the overhang onto the face of the framing and smooth firmly into place.

Take the 75mm x 150mm strips of **SUPER-STICK**, remove the backing paper. Adhere diagonally across each corner, overlapping the corner by 3mm to create a seal at the corner junction. Press the overlap tightly into the corner to form a tight bond between the tapes. Smooth all tape firmly into place to maximize adhesion.

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3.22 SILL AREA – OVER RIGID AIR BARRIER (RAB)

Install tape over Rigid Air Barrier in accordance with Marshall Innovations Limited **SUPER-STICK** specifications and the Rigid Air Barrier manufacturer's specifications.

3.23 HEAD FLASHING

Install tape to head flashings using **SUPER-STICK** 75mm in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

3.24 RIGID AIR BARRIER - JOINT SEALING

Cut a length of **SUPER-STICK 75** and apply evenly over RAB joint. Smooth all tape firmly into place to enhance adhesion. Only to be used on vertical joints and in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

Installation - One Piece Sill Tape

3.25 ONE PIECE SILL TAPE

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 591 - **One Piece Sill Tape Flexible Flashing**.

3.26 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -5ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.27 APPLY PROTECTO TAK ADHESIVE PRIMER

Apply Protecto Tak adhesive primer to all surfaces that are to receive One Piece Sill Tape. The primed surface should be tacky when touched and have a light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.28 SILL AREA – OVER BUILDING WRAP

To dress the bottom of the opening, cut One Piece Sill Tape to the opening plus sufficient length to return up either side of the opening 150mm. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

3.29 TOP CORNERS - OVER BUILDING WRAP

For the top corners of the opening, install a 300mm length of One Piece Sill Tape, 150mm down the jamb and 150mm across the lintel. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

Installation - Protecto Sill Window Sealing System

3.30 PROTECTO SILL WINDOW SEALING SYSTEM

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 444 - **Protecto Sill Window Sealing System**.

3.31 PROTECTO WRAP DETAIL AND SILL TAPES GENERALLY

To avoid wastage, the tape can be lapped 100mm minimum onto itself without reducing the performance of the Proteto Sill System.

3.32 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

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3.33 APPLY PROTECTO TAK ADHESIVE PRIMER

Spray Protecto Tak adhesive primer to all surfaces prior to the application of Protecto Wrap Detail Tape and Protecto Sill Tape. The primed surface should be tacky when touched and have light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.34 APPLY PROTECTO WRAP DETAIL TAPE

Install a 300mm length of Protecto Wrap Detail Tape around all four corners of the opening, keeping the tape flush with the interior face of the opening and ensuring the exposed timber framing is covered. After removing the protective film, mould the tape that overhangs the front of the opening onto the face of the building wrap to create an airtight seal at the framing junction.

3.35 APPLY PROTECTO WRAP SILL TAPE - SILL AREA

Cut individual lengths of Protecto Wrap Sill Tape to suit the sill opening. Install tape flush with the interior face of the opening, and apply along the entire length of the sill. Fold the overhanging tape onto the face of the building underlay.

3.36 APPLY PROTECTO WRAP SILL TAPE - JAMBS

Cut two 300mm lengths of Protecto Wrap Sill Tape for the jambs. Install the tape flush with the interior face of the opening and tight into the sill/jamb junction. Fold the overhanging tape onto the face of the building underlay.

Completion

3.37 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.38 COMPLETION - TESTS & CERTIFICATION

Refer to 1270 CONSTRUCTION for general test and certification requirements at completion.

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4 SELECTIONS

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4161T KINGSPAN THERMAKRAFT UNDERLAYS, FOILS, DPC, DPM, & TAPES

1 GENERAL

This section relates to the application of Kingspan Insulation NZ Ltd, DPC, DPM, Wall & Roof Underlays, Foils, Flashing Tapes, and accessories.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called wall wraps, building wraps or building papers.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
AS 3566.2	Self-drilling screws for the building and construction industries - Corrosion resistance requirements
NZS 3604	Timber-framed buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:
Thermakraft product manual and technical data sheets.
BRANZ Appraisal 943 - Thermakraft Covertek 401™ Roof Underlay
Code Mark Certificate 30069 - Thermakraft Covertek 403™ Absorbent Breathable Roof Underlay
Code Mark Certificate 30030 - Thermakraft Covertek 405™ Absorbent Breathable Roof Underlay
Code Mark Certificate 30028 - Thermakraft Covertek 407™ Absorbent Breathable Roof Underlay

Manufacturer/supplier contact details

Company:	Kingspan Insulation Ltd
Web:	www.thermakraft.co.nz
Email:	technical@kingspaminsulation.co.nz
Telephone:	0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For Kingspan Thermakraft product range.

- Provide this warranty on the manufacturer/supplier standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- . Commences the warranty from the date of practical completion of the contract

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Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified materials, or associated products, components or accessories.

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

2 PRODUCTS

Roof underlays

2.1 THERMAKRAFT 215™ BITUMINOUS ROOF UNDERLAY

Thermakraft 215™, bituminous self-supporting roof underlay to NZS 2295.

Accessories

2.2 AUSNET™ HEXAGONAL WIRE UNDERLAY SUPPORT NETTING

Thermakraft Ausnet™ 50mm and 75mm galvanized hexagonal wire netting to AS/NZS 4534. Refer to BRANZ Appraisal 1029

2.3 PREMIUM JOINING TAPE™

Thermakraft Premium Joining Tape™, an acrylic, reinforced tape with superior adhesion and tear resistance used to join laps of wall and roof underlays, plywood rigid underlay, OSB board, fibre cement and insulation panels, DPM and vapour control products such as foil underlays. Maximum exposure 180 days, install from -10°C. Compatibility of the substrate with Premium Joining Tape must be checked by the designer or the installer prior to use.

BRANZ Appraised and approved for use with the James Hardie™ RAB™ Board system, refer t BRANZ Appraisal 611. Not to be used as a flashing tape.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

Design application and installation of Thermakraft Building products to NZBC E2/AS1, BRANZ Appraisals, Thermakraft Technical Literature and Industry Codes of Practice.

Application - roof underlay

3.2 HEXAGONAL WIRE MESH

Run Thermakraft Ausnet ™ hexagonal wire mesh continuously across roof rafters, top truss chords or purlins and fix in place with 25mm long stainless steel staples, galvanized flathead clouts or fencing batten staples into timber framing, and class 4 (to AS 3566.2) stainless steel self-tapping screws into steel framing, with 10mm minimum penetration. The installation direction of Ausnet hexagonal wire mesh must be the same as the underlay direction.

3.3 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixings. Lay underlay to avoid excessive dishing between purlins. When used vertically, limit individual runs to 10 metres for bituminous underlays. Do not lay vertically on roof pitches under 10° without wire mesh support. Horizontally lay across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations and avoid prolonged exposure by installing the roof immediately. UV exposure is a maximum of 7 days.

Application - Drainage mat

3.4 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

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4 SELECTIONS

For further details on selections go to www.thermakraft.co.nz.

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4231HL JAMES HARDIE® LINEA™ WEATHERBOARD CLADDING

1 GENERAL

This section relates to the supply and fixing of Linea™ Weatherboard cladding

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC E2/VM1	External moisture
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings

CodeMark™GM-CM30018 James Hardie® Linea™ Weatherboard Direct fixed and Cavity Cladding

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie® documents relating to this part of the work:
Linea™ Weatherboard Technical Specification
James Hardie® Technical Supplement - James Hardie® Claddings Installation to Steel Framing
Fire and Acoustic Design Manual by James Hardie®
Bracing Design Manual by James Hardie®
James Hardie® Installation Checklist
BRANZ Appraisal 446 - Linea™ Weatherboard Direct Fixed Cladding
BRANZ Appraisal 447 - Linea™ Weatherboard Cavity Cladding

Manufacturer/supplier contact details

Company:	James Hardie New Zealand Limited
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

25 years:	For Linea™ Weatherboard product (refer to James Hardie® product warranty)
15 year:	For accessories supplied by James Hardie® (refer to James Hardie® product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.6 SAFE WORKING

To James Hardie® requirements for safe working practices with James Hardie® products, particularly with regards to cutting and drilling.

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1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following general operation and maintenance information as electronic PDF format documents:
Linea™ Weatherboard Care and Maintenance guide

Provide this information prior to practical completion.

1.8 CODEMARK CERTIFICATE

James Hardie® Linea™ Weatherboard meets the requirements of the NZBC when used within the Conditions and Limitations of its Certificate of conformity GM-CM30018

Performance - wind

1.9 PERFORMANCE, WIND

The design wind zones are to NZS 3604, up to and including Extra High Wind Zone. James Hardie® Technical Specifications are suitable for these conditions.

2 PRODUCTS

2.1 SPECIFIC DESIGN, WIND

The design wind pressures are to AS/NZS 1170.2, for specific design wind pressures up to 3.2kPa, as per James Hardie® design details included in the Technical Specification.

Materials

2.2 LINEA™ WEATHERBOARDS

Linea™ Weatherboards, bevel back, 16mm thick, pre-primed, manufactured toAS/NZS 2908.2 from a reduced density cellulose fibre cement formulation and cured by high pressure autoclaving.
Tested to the requirements of NZBC E2/VM1 for weathertightness and complying with the NZBC.

2.3 RIGID AIR BARRIERS

Refer to section 4171HR JAMES HARDIE® RIGID AIR BARRIERS.

2.4 WALL UNDERLAY

For flexible wall underlays and rigid wall underlays, refer to the appropriate separate section(s).

2.5 THERMAL BREAK BATTEN

For thermal break battens, refer to the appropriate separate steel framing sections(s).

2.6 TIMBER CAVITY BATTENS

Radiata pine battens, minimum 45mm wide x 18mm thick, H3.1 treated, height to match timber framing studs. To NZS 3602, Table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

Components

2.7 SOAKERS

External metal corner soaker. Refer to SELECTIONS.

2.8 EXTERNAL SLIMLINE BOX CORNER MOULD

Etched primed aluminium extrusion with box section.

2.9 BOX CORNER "Z" FLASHING

uPVC profiled 'Z' flashing.

2.10 INTERNAL "W" MOULD 90

Etched primed aluminium extrusion.

2.11 INTERNAL "W" MOULD 135

Etched primed aluminium extrusion.

2.12 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Perforated PVC, with upstands.

2.13 HARDIE™ CORNER UNDER FLASHING

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50 x 50mm PVC moulding.

2.14 HARDIE™ AXENT™ TRIM

19mm thick pre-primed fibre cement trim.

2.15 CANT STRIP

Cant strip, uPVC profiled strip.

2.16 FILL

ADOS CRC Builders fill, two part exterior grade fill to finish over jolt head nails.

2.17 ADHESIVE SEALANT

Sikaflex 11FC for jointing weatherboards at external mitred corners only.

2.18 FLEXIBLE SEALANT

Bostik Seal N Flex-1 or Sikaflex AT Facade or Sikaflex MS sealant for tongue and groove joint at ends of Linea™ Weatherboards.

2.19 FASTENER TYPE

Fasteners to minimum durability requirements of the NZBC. Refer to NZS 3604, section 4, **Durability**, for requirements for fixing's material to be used in relation to the exposure conditions.

Refer to NZBC E2/AS1, Table 20, Material selection, and NZBC E2/AS1, Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Zone	**Fixings Material**
Zone D, Zone E / Microclimates (incl. Geothermal)	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized
Bracing - All zones	Grade 316 Stainless

Check against SED (specific engineering design) requirements for microclimate conditions. For fastener type refer to following clause(s).

2.20 STAINLESS STEEL CONCEALED NAILING OVER FLEXIBLE UNDERLAY

Grade 316 stainless, 40 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over flexible underlay into timber stud.

2.21 GALVANIZED STEEL CONCEALED NAILING OVER FLEXIBLE UNDERLAY

Hot-dipped galvanized, 40 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over flexible underlay into timber stud.

2.22 STAINLESS STEEL FACE NAILING OVER FLEXIBLE UNDERLAY

Grade 316 stainless, 60 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over flexible underlay into timber stud.

2.23 GALVANIZED STEEL FACE NAILING OVER FLEXIBLE UNDERLAY

Hot-dipped galvanized, 60 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over flexible underlay into timber stud.

2.24 STAINLESS STEEL CONCEALED NAILING OVER RIGID AIR BARRIER

Grade 316 stainless, 50 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over rigid air barrier into timber stud.

2.25 GALVANIZED STEEL CONCEALED NAILING OVER RIGID AIR BARRIER

Hot-dipped galvanized, 50 x 2.8mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over rigid air barrier into timber stud.

2.26 STAINLESS STEEL FACE NAILING OVER RIGID AIR BARRIER

Grade 316 stainless, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over rigid air barrier into timber stud.

2.27 GALVANIZED STEEL FACE NAILING OVER RIGID AIR BARRIER

Hot-dipped galvanized, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over rigid air barrier into timber stud.

2.28 STAINLESS STEEL CONCEALED NAILING OVER BATTENS & FLEXIBLE UNDERLAY

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Grade 316 stainless, 60 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over flexible underlay into timber stud.

2.29 GALV STEEL CONCEALED NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Hot-dipped galvanized, 60 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over flexible underlay into timber stud.

2.30 STAINLESS STEEL FACE NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Grade 316 stainless, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over flexible underlay into timber stud.

2.31 GALV STEEL FACE NAILING OVER BATTENS & FLEXIBLE UNDERLAY

Hot-dipped galvanized, 75 x 3.15mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over flexible underlay into timber stud.

2.32 STAINLESS STEEL CONCEALED NAILING OVER BATTENS & RIGID AIR BARRIER

Grade 316 stainless, 75 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over rigid air barrier into timber stud.

2.33 GALVANIZED STEEL CONCEALED NAILING OVER BATTENS & RIGID AIR BARRIER

Hot-dipped galvanized, 75 x 3.15mm Hardie™ Flex nails for Linea™ Weatherboard concealed nailing over cavity battens over rigid air barrier into timber stud.

2.34 STAINLESS STEEL FACE NAILING OVER BATTENS & RIGID AIR BARRIER

Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.35 GALVANIZED STEEL FACE NAILING OVER BATTENS & RIGID AIR BARRIER

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.36 STAINLESS STEEL FACE NAILING - EH WIND ZONE

Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.37 GALVANIZED STEEL FACE NAILING - EH WIND ZONE

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.38 STAINLESS STEEL FACE NAILING - SED PROJECTS

Grade 316 stainless, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.39 GALVANIZED STEEL FACE NAILING - SED PROJECTS

Hot-dipped galvanized, 90 x 3.55mm jolt head nails for Linea™ Weatherboard face nailing (with pre-drilling) over cavity battens over rigid air barrier into timber stud.

2.40 NAILING FOR HARDIE™ AXENT™ TRIM OVER DIRECT FIX LINEA™ WEATHERBOAR

75 x 3.15mm jolt head nails at 400mm centres staggered nailing (with pre-drilling).

2.41 NAILING FOR HARDIE™ AXENT™ TRIM OVER CAVITY FIX LINEA™ WEATHERBOAR

90 x 3.55mm jolt head nails at 400mm centres staggered nailing (with pre-drilling).

2.42 FASTENER TYPE TO STEEL FRAME

Fasteners to minimum durability requirements of the NZBC.

Refer to NZBC E2/AS1, Table 20, Material selection, and NZBC E2/AS1, Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Zone	Coating Required
Zone D and Sea Spray Zone or Geothermal Areas	Class-4
Zone B, Zone C	Class-3

Check against SED (specific engineering design) requirements for microclimate conditions. For fastener type refer to following clause(s).

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2.43 CLASS-4 CONCEALED SCREW FIXING - DIRECT FIX

8-10g x 40mm self embedding steel wingtek screw (class-4) for concealed fixing of Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.44 CLASS-3 CONCEALED SCREW FIXING - DIRECT FIX

8-10g x 40mm self embedding steel wingtek screw (class-3) for concealed fixing of Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.45 CLASS-3 FACE SCREW FIXING - DIRECT FIX

8-10g x 60mm self embedding steel wingtek screw (class-3) for fixing Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.46 CLASS-4 FACE SCREW FIXING - DIRECT FIX

8-10g x 60mm self embedding steel wingtek screw (class-4) for face fixing Linea™ Weatherboard over flexible underlay and 10mm thick thermal break battens into steel framing.

2.47 CLASS-3 CAVITY BATTEN SCREW FIXING TO STEEL STUD

45 - 50mm x 8 - 10g wingtek screw (class-3) for 19mm thick timber cavity batten fixing over flexible underlay and 10mm thick thermal break battens into steel framing.

2.48 CLASS-4 CONCEALED SCREW FIXING - CAVITY FIX

8-10g x 60mm self embedding steel wingtek screw (class-4) for concealed fixing of Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.49 CLASS-3 CONCEALED SCREW FIXING - CAVITY FIX

8-10g x 60mm self embedding steel wingtek screw (class-3) for concealed fixing of Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.50 CLASS-4 FACE SCREW FIXING - CAVITY FIX

8-10g x 75mm self embedding steel wingtek screw (class-4) for face fixing Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

2.51 CLASS-3 FACE SCREW FIXING - CAVITY FIX

8-10g x 75mm self embedding steel wingtek screw (class-3) for face fixing Linea™ Weatherboard over 19mm thick timber cavity battens, flexible underlay and 10mm thick thermal break battens into steel framing.

Accessories

2.52 SEALANT

Silaflex AT-Facade sealant.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 SUBSTRATE - TIMBER FRAMING

Do not commence work until the substrate is of the standard required by James Hardie® for the specified finish; plumb, level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after weatherboards are fixed.

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Application - particular installations

3.4 FIRE RESISTANCE RATING

Refer to project drawings for FRR system construction details and Fire and Acoustic Design Manual by James Hardie® for further information.

Application - generally

3.5 INSTALL CAVITY BATTENS

Install 18mm minimum thick cavity battens to NZBC E2/AS1: 9.0 **Wall claddings**, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs under the wall underlay. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Do not use horizontal cavity battens. Use cavity spacers where fixing is required between cavity battens.

3.6 PENETRATIONS AND FLASHINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- Wall underlay appropriately incorporated with penetration and junction flashings.
- Materials lapped in a way that water tracks down to the exterior face of the wall underlay.
- Wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations.
- Required holes in cladding accurately formed and cut to James Hardie® requirements, ensure (if required) services penetration grommets/sleeves/seals/tapes are in place prior to cladding installation.
- Claddings neatly finished off to all sides of openings
- Installation of flashings (those required to be installed prior to installation of penetrating elements).

3.7 INSTALL LINEA™ WEATHERBOARDS

Cut weatherboards to required lengths and fit joints off-stud using tongue and groove ends. Prime site cut ends that are exposed prior to installation. Fit internal corners and fix weatherboards as per Linea™ Weatherboard technical specifications. Fit and fix external corners and flexible sealant to tongue and groove joints as required.

Completion & Commissioning

3.8 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz.

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4231HO JAMES HARDIE® OBLIQUE™ WEATHERBOARD CLADDING

1 GENERAL

This section relates to the supply and fixing of Oblique™ Weatherboard cladding.

1.1 RELATED WORK

Refer to ~ for ~
Refer to painting section(s) for the protective coating required to meet the NZBC durability requirements.

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

FRR	Fire resistance rating

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC E2/VM1	External moisture
AS/NZS 1170.2:2011	Structural design actions - Wind loads
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings

CodeMark™ GM-CM30147 James Hardie® Oblique™ Weatherboard Cavity Claddin

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents relating to this part of the work:
Oblique™ Weatherboard Horizontal Installation Technical Specification
Oblique™ Weatherboard Vertical Installation Technical Specification
Oblique™ Weatherboard Vertical Installation to Hardie™ 40mm Structural Horizontal Cavity Batte Technical Specification
Fire and Acoustic Design Manual by James Hardie®
James Hardie® Installation Checklist
BRANZ Appraisal 1231 - Oblique™ Weatherboard (Horizontal) Cavity Cladding
BRANZ Appraisal 1232 - Oblique™ Weatherboard (Vertical) Cavity Cladding

Manufacturer/supplier contact details

Company:	James Hardie New Zealand Limited
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	0800 808 868

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

25 years	For Oblique™ Weatherboard products (refer to James Hardie® product warranty)
15 years	For accessories supplied by James Hardie® (refer to James Hardie® product warranty)

- Provide this warranty on the manufacturer/supplier standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of purchase (check with the manufacturer/supplier).

Refer to the general section 1237 WARRANTIES for additional requirements.

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Requirements

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.8 SAFE WORKING

To James Hardie® requirements for safe working practices with James Hardie® products, particularly with regards to cutting and drilling.

1.9 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following general operation and maintenance information as electronic PDF format documents:
Oblique™ Weatherboard Care and Maintenance guide.

Provide this information prior to practical completion.

1.10 OBLIQUE™ WEATHERBOARD INSTALLATION CHECKLIST

Installer to complete, sign and provide a James Hardie® Installation Checklist.

Compliance information

1.11 CODEMARK CERTIFICATE

James Hardie® Oblique™ Weatherboard meets the requirements of the NZBC when used within the Conditions and Limitations of its Certificate of conformity GM-CM30147

Performance - wind

1.12 PERFORMANCE, WIND

The design wind zones are to NZS 3604, up to and including Extra High Wind Zone. James Hardie® Technical Specifications are suitable for these conditions.

Performance - fire

1.13 EXTERNAL FIRE SPREAD - CLADDING MATERIALS

James Hardie® Oblique™ Weatherboard cladding tested toAS/NZS 3837 and to specific requirements of C/AS1 or C/AS2 achieving Type A classification (peak heat release rate ≤ 100 kW/m², total heat release rate ≤ 25 MJ/m²).

2 PRODUCTS

Materials

2.1 OBLIQUE™ WEATHERBOARDS

Oblique™ Weatherboards, rusticated profile, 14mm thick, pre-primed, manufactured toAS/NZS 2908.2 from a reduced density cellulose fibre cement formulation and cured by high pressure autoclaving. Tested to the requirements of NZBC E2/VM1 for weathertightness and complying with the NZBC.

2.2 RIGID AIR BARRIERS

Refer to section 4171HR JAMES HARDIE® RIGID AIR BARRIERS.

2.3 WALL UNDERLAY

For flexible wall underlays and rigid wall underlays, refer to the appropriate separate section(s).

2.4 TIMBER CAVITY BATTENS

Radiata pine battens, minimum 45mm wide x 18mm thick, H3.1 treated, height to match timber framing studs. To NZS 3602, Table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.5 HARDIE™ 20MM HORIZONTAL CAVITY BATTEN

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Proprietary profiled radiata pine battens, minimum 45mm wide x 20mm thick, H3.1 treated to NZS 3602, Table 1, reference 1D.10. Bevelled top edge with offset grooved rebates at the front and back faces to allow for drainage and ventillation. Requirements for wood-based building components to achieve a 50-year durability performance.

2.6 20MM VENT STRIP/VERMIN-PROOFING

Perforated uPVC, with upstands.

2.7 HARDIE™ 14MM ALUMINIUM JAMB FLASHING

Aluminium moulding used beside window opening to end butt the Oblique™ Weatherboard.

2.8 HARDIE™ 14MM ALUMINIUM TRIMLINE JOINT FLASHING

Aluminium flashing extrusion used behind cladding joints.

2.9 TRIMLINE JOINTERS

Aluminium jointers to joint Oblique™ Trimline Joint Flashings at flashing ends, external corners and internal corners.

2.10 FASTENER TYPE

Fasteners to minimum durability requirements of the NZBC. Refer to NZS 3604, section 4, **Durability**, for requirements for fixing's material to be used in relation to the exposure conditions.

Refer to NZBC E2/AS1, Table 20, Material selection, and NZBC E2/AS1, Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Zone	**Fixings Material**
Zone D, Zone E / Microclimates (incl. Geothermal)	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized

Check against SED requirements for microclimate conditions. For fastener type refer to following clause(s).

2.11 CAVITY BATTEN NAILS

40 x 2.8mm Hardie™ Flex nails for fixing timber cavity battens and aluminium flashings.

2.12 HOT DIPPED GALVANIZED NAILS

Hot-dipped galvanized, 65 x 2.87mm D head or 65 x 2.87mm RounDrive ring shank nails for fixing Oblique™ Weatherboards over cavity battens over flexible underlay.

2.13 GRADE 316 STAINLESS STEEL NAILS

Grade 316 stainless, 65 x 2.87mm D head or 65 x 2.87mm RounDrive steel ring shank nails for fixing Oblique™ Weatherboards over cavity battens over flexible underlay.

2.14 HOT DIPPED GALVANIZED NAILS

Hot-dipped galvanized, 75 x 3.06mm D head or 75 x 3.15mm RounDrive ring shank nails for fixing Oblique™ Weatherboards over battens over rigid air barrier.

2.15 GRADE 316 STAINLESS STEEL NAILS

Grade 316 stainless, 75 x 3.06mm D head or 75 x 3.15mm RounDrive ring shank nails for fixing Oblique™ Weatherboards over battens over rigid air barrier.

2.16 FLEXIBLE SEALANT

Bostik® Seal N Flex-1™ or Sikaflex® AT Facade or Sikaflex® MS sealants.

2.17 PRIMER

Refer to SELECTIONS.

2.18 EXTERIOR GRADE FILLER

CRC® ADOS® Builders Fill, two part filler to fill over nail holes.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work. Do not commence work until the substrate is of the standard required by James Hardie® for the specified finish; plumb, level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after weatherboards are fixed.

Application - particular installations

3.4 FIRE RESISTANCE RATING

Refer to project drawings for FRR system construction details and Fire and Acoustic Design Manual by James Hardie® for further information.

Application - generally

3.5 INSTALL CAVITY BATTENS - OBLIQUE™ HORIZONTAL WEATHERBOARDS

Install 20mm minimum thick cavity battens to NZBC E2/AS1: 9.0 **Wall claddings**, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs under the wall underlay. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Do not use horizontal cavity battens. Use cavity spacers where fixing is required between cavity battens.

3.6 INSTALL CAVITY BATTENS - OBLIQUE™ VERTICAL WEATHERBOARDS

Install 20mm thick Hardie™ Horizontal Cavity Battens. Fix horizontal cavity battens to wall framing nogs, fix vertically to studs at corners and openings. The battens are fixed by the cladding fixings which will penetrate the wall framing nogs and studs under the wall underlay. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc).

3.7 PENETRATIONS AND FLASHINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- Wall underlay appropriately incorporated with penetration and junction flashings.
- Materials lapped in a way that water tracks down to the exterior face of the wall underlay.
- Wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations.
- Required holes in cladding accurately formed and cut to James Hardie® requirements, ensure (if required) services penetration grommets/sleeves/seals/tapes are in place prior to cladding installation.
- Claddings neatly finished off to all sides of openings
- Installation of flashings (those required to be installed prior to installation of penetrating elements).

3.8 INSTALL OBLIQUE™ WEATHERBOARDS - HORIZONTAL INSTALLATION

Cut weatherboards to required lengths for vertical jointing. Prime site cut ends that are exposed prior to installation. Fit vertical jointers, internal and external corners and fix weatherboards as per Oblique™ Weatherboard Horizontal technical specifications.

3.9 INSTALL OBLIQUE™ WEATHERBOARDS - VERTICAL INSTALLATION

Cut weatherboards to required lengths. Prime site cut ends that are exposed prior to installation. Fit joint flashing, internal corners and external corners and fix weatherboards as per Oblique™ Weatherboard Vertical technical specifications.

Completion & Commissioning

3.10 COMPLETION MATTERS

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Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go towww.jameshardie.co.nz.

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4311M METALCRAFT PROFILED ROOFING

1 GENERAL

This section relates to the supply and fixing of **Metalcraft Roofing** profiled roofing complete with accessories.
It includes:

- Trough section roofing profiles
- Asymmetrical rib roofing profiles
- Corrugated roofing profile
- Translucent roofing

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 ABBREVIATIONS AND DEFINITIONS

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
MS	Modified silicone
LBP	Licensed Building Practitioner

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1	Protection from fire
NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
NZBC G12/AS1	Water supplies
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
ISO 9223	Corrosion of metals and alloys - Corrosivity of atmosphere - Classification determination and estimation
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Metalcraft Roofing Metdek500 product literature
Metalcraft Roofing Metdek855 product literature
Metalcraft Roofing Metrib760 product literature
Metalcraft Roofing MC770 product literature
Metalcraft Roofing MC760 product literature
Metalcraft Roofing T-Rib product literature
Metalcraft Roofing MC1000 product literature
Metalcraft Roofing Metcom7 product literature
Metalcraft Roofing Metcom930 product literature
Metalcraft Roofing Metcom965 product literature
Metalcraft Roofing Kahu® product literature
Metalcraft Roofing Corrugate product literature
Metalcraft Roofing Alsynite Topglass® product literature
Eco Choice Aotearoa Ecolabel certificates

Manufacturer/supplier contact details

Company:	**Metalcraft Roofing**
Web:	www.metalcraftgroup.co.nz
Email:	technical@metalcraftroofing.co.nz

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Telephone: 09 274 0408

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
~ years for failure of coating adhesion
~ years for weatherproofing by material penetration
For Warranty requirements in excess of this contact Metalcraft Roofing.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
5years for workmanship

- Provide this warranty on the material manufacturers standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include a copy of the Metalcraft Roofing maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.8 QUALIFICATIONS

Roof Installers shall be experienced, competent roofers familiar with Metalcraft products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.
Carry out work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance - Wind (design by contractor)

1.9 DESIGN PARAMETERS WIND - DESIGN BY CONTRACTOR

Design the installation to the manufacturer requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.
Refer to Metacraft for "Wind Load Span Design Graphs" for load parameters.

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters and NZMRM CoP NZ. Refer to Metalcraft profiled roofing product literature for profile details. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Fixing pattern to also take into account fixing method and purlin spacings.

Performance - General

1.11 PERFORMANCE

Install roofing materials in accordance with the NZMRM CoP, and Metalcraft profiled roofing product literature, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.12 DRINKING WATER

Roofing for collecting potable water to NZBC G12/AS1.

1.13 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

2 PRODUCTS

Materials

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2.1 PRE-FINISHED HOT-DIPPED ALUMINIUM/ZINC COATED STEEL

Formability steel sheet, G550 for roll forming or G300 for flashings, coated to AS 1397.

Fixings

2.2 FASTENERS GENERALLY

Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code. Installation is to be in accordance with E2/AS1 and/or the NZMRM CoP and Metalcraft profiled roofing product literature.
For fixing patterns refer to Metalcraft product literature for roofing profile.

2.3 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK500

Galvanized steel (powdercoated) to suit the material and the roofing profile and location as required by Metacraft Roofing for roofing:

- For Metdek500 roofing, fixings for steel are 12 gauge galvanized Wafertek self-drilling screws and for timber 12 gauge galvanized screws or spiral shank nails. Minimum embedment 35mm.

2.4 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK855

Galvanized steel (powdercoated for aluminium) to suit the material and the roofing profile and location as required by Metacraft Roofing for roofing:

- For Metdek855 roofing, plastic lugs to be fixed directly to steel using 14 gauge hex head tek screws and for timber use 12 gauge hex screws. Minimum embedment 35mm.

2.5 FIXING SCREWS

To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by Metalcraft and with a Class 4 or 5 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm. Screw fasteners to be head stamped identifying the manufacturer and class. Refer to SELECTIONS.

2.6 RIVETS

Sealed aluminium, minimum diameter 4.0mm. Refer to Metalcraft for requirements..

2.7 FLASHINGS GENERALLY

To NZBC E2/AS1, 4.0, **Flashings**.
Formable grade 0.55 BMT for galvanized, aluminium/zinc, aluminium/zinc/magnesium - coated and pre-painted steel and 0.90 BMT for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

Components

2.8 FLASHINGS TO VERGE, RIDGE AND HIP

To NZBC E2/AS1, 4.0, Flashings.
Supplied by the roofing manufacturer to match or to suit the roofing.

2.9 BOOT FLASHINGS

Generally to E2/AS1, 8.4.17 **Roof penetrations** (note; E2/AS1, Figure.54 **Soaker flashing for pipe penetration**, has an error, use as guide only).
EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

Accessories

2.10 WIRE NETTING AND SAFETY MESH

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.11 UNDERLAY AND REFLECTIVE FOIL

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 SEALANT

Neutral curing silicone or polymer sealant as required by Metalcraft and used as directed.

2.13 CLOSURE STRIPS

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Polyurethane profiled closed cell foam strips to fit the sheet profile.
Brand: Ecofoam
Profile: To suit selected cladding profile

3 EXECUTION

Conditions

3.1 INSPECTION

Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2 FRAMING TIMBER MOISTURE

When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE

Upon delivery visually inspect sheets for damage and accept packs of undamaged roofing. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air circulation and drying between sheets.

3.4 HANDLING

Do not drag sheets across each other or other materials. Avoid distortion and contact with damaging substances, including cement. Long lengths of roofing should be lifted onto the roof using an approved load spreading beam. Protect edges and surface finishes from damage, keep under cover and remove as the product is being installed. Use soft, flat sole shoes when fixing and for all other work on the roof. Walk along the purlin line whenever possible.

3.5 SEPARATION

Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use lead sheet or copper in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.

Application

3.6 FIX INSULATION

Refer to thermal insulation sections.

3.7 SET-OUT

Carefully set out with consideration of the position of side laps to take account of the prevailing wind and line of sight. Ensure all sheets are square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.8 END LAPS

End laps are not recommended, except where specifically detailed.

3.9 THERMAL MOVEMENT

Fix for Thermal Movement to Metalcraft requirements for thermal movement.

3.10 FIXING GENERALLY

Install and fix in accordance with the NZMRM CoP recommendations, and to Metalcraft required fixing patterns and details for each area of the building roofing. Use only screws as required by Metalcraft. Paint colour matched fixings and accessories before installation.

3.11 MARKING AND CUTTING

Use ink pen, chalk line or coloured pencil for marking roof sheets prior to cutting. Do not use lead pencil for marking Zincalume® and Colorsteel®. Cut by shear only, using nibblers or hand snips. Remove all cutting and drilling debris from the roof.

3.12 FIX SHEETS - CONCEALED CLIP SYSTEM

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Fix sheets in place using the clip fixing system required by Metalcraft for roofing profile, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.13 STOP ENDS AND DOWNTURNS

Form stop-ends at the upper end of sheets. Form downturns at the gutter line where the roof pitch is less than 8 degrees. Form using the required tools.

3.14 INSTALL FLASHINGS

Flash roof to parapets, walls and penetrations to detail. Flashings to be installed on timber framing with moisture content of less than 20%. Where no detail is provided flash to NZMRM CoP recommendations and Metalcraft and NZBC E2/AS1 requirements. Cut accurately and fix using sealant and rivets to detail and to Metalcraft requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.15 USE OF SEALANTS

Select and use sealants only as recommended by Metalcraft. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.16 FLASHING PENETRATIONS

Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

Completion

3.17 REPLACE

Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.

3.18 LEAVE

Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.19 REMOVE

Remove all trade rubbish, swarf and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spouting, gutters and rainwater pipes on completion of the roof. Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.metalcraftgroup.co.nz.

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4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

This section relates to the fabrication, supply and installation of APL Window Solutions residential window and door systems manufactured by either Altherm, First or Vantage. It includes:

- APL Aluminium windows and doors
- APL Roof windows and overhead glazing
- APL Ventient trickle ventilators
- Hardware and furniture
- Flashings and sealants

1.1 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ
PQAS	Powder Coating Quality Assurance System

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC G4/AS1	Ventilation
NZBC H1/AS1-AS2	Energy efficiency
NZBC H1/VM1-VM2	Energy efficiency
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4303	Ventilation for acceptable indoor air quality
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
BS EN 673	Glass in building - Determination of thermal transmittance (U-value) - Calculation method
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - General
ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames
BRANZ BU 636	Protecting Glass From Damage

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Window & Glass Association NZ (WGANZ) documents:

Window Installation Guide	Guide to Window Installation as described in E2/AS1
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)

US Federal Specification:

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

CodeMark CMNZ10033 (V1)	APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors.

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Altherm Specifier's Guide
First Specifier's Guide
Vantage Specifier's Guide
APL Specifier Guide to Fluoroset FP - Selling, Fabricating, Handling, Care and Maintenance
APL Window Energy Efficiency Rating System (WEERS) Report Series
APL Metro Series ThermalHEART® with Centrafix™ System Guide V1, April 2023
BRANZ Appraisal 1188 [2023] - APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors
BRANZ Appraisal 1259 [2024] - APL ThermalHEART+® Window and Door Systems
Declare Label - Residential Series, Metro Series and APL Architectural Series APL Window Solutions - APL-0001
APL Window Solutions Environmental Product Declaration v1.1
Summary of Toitu Carbonreduce Certification for APL Window Solutions Limited’s Metro Thermal, Residential Thermal and Commercial Series

Manufacturer/supplier contact details

Company:	APL Window Solutions
Web:	www.altherm.co.nz www.firstwindows.co.nz www.vantage.co.nz www.aplnz.co.nz
Email:	specifiersguide@aplnz.co.nz
Telephone::	07 849 2113

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years:	For fabrication
2 years:	For hardware

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years:	For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

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Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified APL aluminium system, or associated components and products.

1.7 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

Compliance Information

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Manufacturer / supplier warranty
- Installer / applicator warranty
- Other information required by the BCA in the Building Consent Approval documents.

1.9 COMPLIANCE - CODEMARK CERTIFICATE

APL Metro Series ThermalHEART® with Centrafix™ meets the requirements of the NZBC when used within the Conditions and Limitations of its CodeMark Certificate of Conformity CMNZ10033 (V1).

1.10 COMPLIANCE

Windows and doors to be manufactured and installed to NZBC E2/AS1.

1.11 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

Performance

1.12 PERFORMANCE - WINDOWS AND DOORS

To NZS 4211, including:

- Deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.13 STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window fabricator.

Performance - Wind

1.14 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of NZS 3604, table 5.1.
Refer to SELECTIONS for wind zone.

2 PRODUCTS

Materials

2.1 ALUMINIUM EXTRUSIONS

Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.2 ALUMINIUM SHEET AND STRIP

Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.3 STAINLESS STEEL SHEET AND STRIP

Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

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2.4 GLASS

Refer to the glazing section for glass types and installation.

Flashings

2.5 FLASHINGS GENERALLY

To NZBC E2/AS1, 9.1.10 Windows and Doors. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components for installation - cavity systems

2.6 STANDARD CAVITY CLOSER

A device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with NZBC E2/AS1 to the spaces above the window or door.

2.7 SUPPORT BAR

WGANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2/AS1, and support bar location bracket, to provide continuous support to the window unit. Size to suit cladding type.

Components

2.8 GLAZING GASKETS

Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.9 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.10 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Section 2.0, Opening windows.

2.11 FIXING BRACKETS

Designed by manufacturer to specific design.

2.12 WEATHERING/INSTALLATION SEALANT

Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT-S-001543A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT-S-00230C.

Accessories

3 EXECUTION

Conditions - generally

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work.

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3.4 PROTECTIVE COVERINGS

Retain protective coverings and coatings to BRANZ BU 636 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.5 ADDITIONAL PROTECTION

Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Assembly

3.6 FABRICATION

Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.7 HARDWARE GENERALLY

Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.8 SAFETY STAYS

Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.9 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

3.10 EXPOSED FIXINGS AND FASTENINGS

Fixings and fastenings exposed to the weather to be aluminium, or Type 304 stainless steel.

3.11 PROTECTED FIXINGS AND FASTENINGS

Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.12 CORROSION PROTECTION

Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.13 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Wall underlays to wall openings.
- Full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).
- application of waterproof sealer to all door and window sills in concrete floor or concrete sill situations. To door sills only, apply a suitable membrane over the sealer
- all in accordance with the shop drawings, where applicable.

3.14 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.15 INSTALLATION CAVITY CONSTRUCTION

Install to WGANZ Window Installation Guide details and drawings including WGANZ sill support bars.

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For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, figure 62(d).

3.16 INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm plus any jamb scriber width at each end.

3.17 COMPLETE AIR SEAL

To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.18 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.19 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window and sealant manufacturer and to make the installation weathertight.. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.20 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.21 BACK UP

When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.22 SEALANT FINISH

Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

3.23 PROTECTIVE COVERINGS

Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades.
Anodised finishes should be protected from cement products and require immediate clean-up of cement splashes. Only use tapes that have passed WGANZ testing on powder coated products. Remove protection on completion.

3.24 IN-SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted to minor surface scratching. Otherwise replace all damaged material.

3.25 SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

4 SELECTIONS

For further details on selections go to www.aplnz.co.nz.

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4555 GARAGE DOORS

1 GENERAL

This section relates to the manufacture, supply and installation of garage door systems including required opening/operating systems.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1170	Structural design actions
AS/NZS 1170.2: 2011	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
NZS 3604	Timber-framed buildings
AS/NZS 4505	Garage doors and other large access doors

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 INFORMATION FOR OPERATION AND MAINTENANCE

Provide operating instructions for the garage doors and associated opening equipment. Provide a list of all components requiring regular maintenance.

Performance

1.3 DESIGN PARAMETERS WIND

Design the installation to the manufacturers requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.

1.4 LOADS - NON - SPECIFIC DESIGN - DOORS UP TO 3.0M HIGH

Garage doors complete with hinges, roller assemblies and fasteners to comply with wind performance requirements to NZS 3604.

1.5 RESPONSIBILITY FOR PERFORMANCE

Accept responsibility for the structural and weathertight performance of the completed garage door installation.

2 PRODUCTS

2.1 GARAGE DOOR

Manufacture to AS/NZS 4505 complete with a compliance label.

2.2 MOTORISED DOOR OPENER

~

3 EXECUTION

3.1 PREPARATION FOR INSTALLATION

Check that the trimmed and lined openings are formed and constructed to suit the required door units. Do not proceed until openings are properly formed.

3.2 MANUFACTURER'S REQUIREMENT FOR INSTALLATION

Install door, track and operating equipment complete with all specified and necessary accessories and hardware to the manufacturer's requirements.

3.3 START UP

Carry out start up procedures and verify proper performance of the doors.

3.4 ADJUSTMENT

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Lubricate bearings and sliding parts and adjust doors to operate easily, free of warp, twist or distortion with a weathertight fit round the entire perimeter.

3.5 DEMONSTRATION

Carry out start up procedures and verify proper performance of the door. Demonstrate the operation of the door to the principal/principal's representative. Set security features to principal's requirements. Reset security features at practical completion of the contract works.

Completion

3.6 ENSURE

Ensure all elements are free of marks or blemishes, with all moving parts working fully and freely.

3.7 REPLACE

Replace damaged, cracked or marked elements.

3.8 LEAVE

Leave work to the standard required by following procedures.

3.9 REMOVE

Remove all debris, unused materials and elements from the site.

4 SELECTIONS

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4610 GLAZING RESIDENTIAL

1 GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:

- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings
- balustrade systems, pool fences
- mirrors and mirror frames

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1-AS2	Energy Efficiency
NZBC H1/VM1-VM2	Energy Efficiency
AS/NZS 1170.2: 2011	Structural design actions - Wind actions
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Warrant glass under normal environmental and use conditions against failure of materials.

10 years:	for insulating glass units
10 years:	for laminated glass
10 years:	for toughened glass

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Performance

1.4 ENERGY EFFICIENCY

Provide glazing to comply with H1 Energy efficiency requirements of NZBC H1/AS1-AS2 and NZBC H1/VM1-VM2.

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2 PRODUCTS

Materials

2.1 LAMINATED GLASS

Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

2.2 TOUGHENED GLASS

Grade A Safety Glass to AS/NZS 2208.
Heat soaked toughened glass to NZS 4223.1, Appendix E required for critical areas.
Refer to SELECTIONS.

Materials, screens

2.3 GLASS SCREENS SHOWER & BATH

Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, timber glazing

2.4 PUTTY, TIMBER FRAME

Linseed oil base glazing putty. Not to be used with laminated or IGUs.

2.5 SPRIGS

Diamond metal pieces to retain glass in timber sashes and frames.

2.6 GLAZING TAPE

Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes for bead glazing. For internal use only.

2.7 GASKETS

PVC or Santoprene to window manufacturers' requirements.

2.8 SETTING BLOCKS

Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes. Use with bead glazing and for IGUs.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To NZS 4223.1, NZS 4223.3, NZS 4223.4. All external glazing to be wind and watertight on completion.

3.2 DELIVERY

Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 636.

3.3 GLASS CONDITION

All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS

If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1. For windows tested to NZS 4211, ensure glass meets the requirements of the window testing.
Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS

Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY

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Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS

Glazing of doors, side panels, low level and window seat glazing, bathrooms, stairwell landings and similar locations, to NZS 4223.3 for thickness and maximum areas of safety glass.

3.8 SAFETY GLAZING MATERIAL

Use only safety glazing materials defined in NZS 4223.3, that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, 2.8 Identification.

3.9 CONTAINMENT

Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS

All working of glass as required in NZS 4223.1.

3.11 EDGE WORK AND BEVELLING

Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.12 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS

To NZS 4223.3.

Application - timber glazing

3.15 PREPARE REBATES

Ensure all rebates and grooves are clean, dry and unobstructed at time of priming, sealing and glazing.

3.16 PREPARE TIMBER SURROUNDS

Ensure that all rebates have been primed with a primer suitable for this purpose and applied to the requirements of the painting section/s.

3.17 PREPARE TIMBER BEADS

Before fixing ensure that timber beads are sealed and painted to match the timber surround.

3.18 LOCATE BLOCKS

Centralise the glass in the rebate opening using setting, location and spacer blocks as required in NZS 4223.1, Section 4 Glazing, to prevent movement of glass in the rebate and cushion the effect of wind loading on the sealing system.

3.19 INSTALL PUTTY FRONTING

Back putty to give a bedding of not less than 1mm to 2mm between the glass and the back of the rebate when the glass has been pressed back. Strip off squeezed out putty at a positive angle. Fix glass to wooden surrounds with diamond points or sprigs at maximum 460mm centres. Fix glass to metal surrounds with spring clips or pins provided by the sash manufacturers. Apply putty to the face to form a triangular fillet stopping 1-2 mm below sight line. Finish putty smooth and true to line and face and with a light brushing.

Leave all windows and doors closed until putty has set sufficiently to prevent glass displacement.

Prime putty fronting once surface has skinned - normally within 10 - 15 days of completion of glazing, but this can be reduced with special XHP putty.

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3.20 BEAD GLAZING, PREFORMED STRIPS

Apply the preformed tape to the rebate upstand with securely formed (or sealed) butt joints at corners. Place setting blocks, offer the glass and press back against the tape centralised in the opening and apply the second tape. Press the beads against and compressing the tapes and fix true to line and face sufficiently rigid to prevent flexing or movement. Trim off excess strip.

If a capping bead is required clean and paint the timber surface and when dry apply sealant capping between bead and glass and tool to a smooth camber.

3.21 BEAD GLAZING, NON SETTING COMPOUNDS

Apply compound to the rebate. Push setting blocks into place with distance pieces against the rebate upstand before offering the glass to the surround on setting blocks, centralised in the opening and pushed back into the glazing compound. Fill all voids with compound and apply more compound before setting distance pieces in it opposite the distance pieces already in place. Bed the beads to the glass and rebate and fix true to line and face sufficiently rigid to prevent flexing or movement. Finish compound off at an angle both sides of the glass.

3.22 INSTALLING INSULATING GLASS UNITS

Refer to the glazing manufacturer's requirements and before glazing ensure that the materials forming the opening are strong enough to accept the weight, the rebates are the correct size and prepared to receive the units to AS/NZS 4666. Fit setting and location blocks and bead glaze units using a compatible sealant to NZS 4666 section 3 Glazing, and to the glazing manufacturer's requirements.

3.23 INSTALLING REFLECTIVE AND COATED GLASS

In addition to the type of glazing specified refer to the requirements of the glass manufacturer and ensure that the rebate dimensions, clearances and edge cover are sufficient to allow for the movement created by the particular solar glass being used. Check thermal stability for the particular location and ensure any sealant or compound is compatible with the coating.

Application miscellaneous

3.24 INSTALL GLASS SHOWER & BATH SCREENS

Install shower and bath screens and doors to manufacturer's requirements.

Finishing

3.25 SAFETY

Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

Completion

3.26 TRADE CLEAN

Clean off or remove safety indicators at completion of the building.

3.27 REPLACE

Replace damaged, cracked or marked glass.

3.28 LEAVE

Leave work to the standard required by following procedures.

3.29 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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4710P PINK® BATTS® THERMAL & ACOUSTIC INSULATION

1 GENERAL

This section relates to Comfortech Building Performance Solutions™ Pink® Batts® thermal and acoustic insulation materials for walls, floors, ceilings and roofs.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

IIC	Impact Insulation Class
STC	Sound Transmission Class

1.2 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting, wall underlays and roofing underlays

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC H1/AS1-AS2	Energy efficiency
NZBC G6/AS1	Airborne and impact sound
NZBC G6/VM1	Airborne and impact sound
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS/NZS 3000	Electrical installations (Known as the Australian/ New Zealand Wiring Rules)
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents related to this section are:
Comfortech H1. Done - Insulation Guide
Comfortech Pink® Batts® Insulation - Safety Data Sheet.
Comfortech Pink® Batts® Thermal Solutions - Product Guide
Comfortech Pink® Superbatts® Thermal Solutions - Installation Guide
Comfortech Pink® Batts® - Product Data Sheets
Comfortech Pink® Batts® - Installation Instructions
BRANZ Appraisal 238 - Pink® Batts® Insulation
BRANZ Appraisal 632 - Pink® Batts® SnugFloor® Insulation
BRANZ Appraisal 767 - Pink® Batts® Skillion Roof Insulation

Manufacturer/supplier contact details

Company:	Tasman Insulation NZ Ltd
Trading as:	Comfortech Building Performance Solutions™
Web:	www.pinkbatts.co.nz
Telephone:	0800 746 522

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

50 years	For Pink® Batts® thermal insulation products

- Provide this warranty on the manufacturer/ supplier standard form (if not available then use

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the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Compliance information

1.8 BRANZ APPRAISAL

Pink® Batts® Insulation meets the requirements of the NZBC when used in accordance with the conditions and limitations listed in the following Branz Appraisal:
BRANZ Appraisal 238 - Pink® Batts® Insulation
BRANZ Appraisal 632 - Pink® Batts® SnugFloor® Insulation
BRANZ Appraisal 767 - Pink® Batts® Skillion Roof Insulation

Performance - Fire

1.9 FIRE PROPERTIES - NON COMBUSTIBLE

Pink® Batts® insulation products, with the exception of Pink® Batts® R2.6 Wall Insulation and Pink® Batts® R2.8 Wall Insulation products, are classified as non-combustible when tested to NZS/AS 1530.1 and achieve a Group Number of 1-S.

2 PRODUCTS

2.1 FIRE HAZARD TESTING

Pink® Batts® insulation products withstand the 30s Needle Flame test in accordance with AS/NZS 60695.11.5, that is required for insulation abutting or covering recessed downlights intended to be in contact with IC, CA 80, CA 135 luminaires.

Materials - thermal insulation

2.2 PINK® BATTS® WALL INSULATION

Pink® Batts® Wall Insulation (Pink® Batts® Classic, Pink® Batts® Narrow, Pink® Batts® Ultra®, Pink® Batts® Ultra® 140mm Wall, Pink® Batts® Ultra® 140mm Narrow Wall) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

2.3 PINK® BATTS® CEILING INSULATION

Pink® Batts® Ceiling Insulation (Pink® Batts® Classic, Pink® Batts® Ultra® and Pink® Superbatts®) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

2.4 PINK® BATTS® SKILLION ROOF INSULATION

Pink® Batts® Skillion Roof Insulation (Pink® Batts® Skillion Roof and Pink® Superbatts®) rectangular bio-soluble fibrous glass wool slabs manufactured from up to 80% recycled window glass and bonded with thermosetting resin. Coloured Pink for identification. Available in different R-values, sizes and thicknesses. Refer to SELECTIONS.

Components

2.5 FASTENERS

Insulation anchors complete with retaining washer.

2.6 WIRE NETTING

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Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting used to support the insulation.

2.7 PLASTIC STRAPPING TAPES

Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall and ceiling locations.

2.8 ADHESIVE TAPE

Pressure sensitive adhesive tape.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work. Check that framing is free from moisture. Check cavities are not interconnected. Check required wire netting, roof/ underlays are in place and are dry, clean and homogeneous before installing insulation. Ensure main power is isolated and tagged prior to installation.

3.4 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Refer to Pink® Batts® Insulation - Safety Data Sheet.

Installation - general

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 INSTALL THERMAL INSULATION - GENERALLY

Install Pink® Batts® insulation in a dry protected environment. Lay, fit and fix insulation without gaps, tucks, folds and over compaction to NZBC H1/AS1-AS2 and Pink® Batts® installation requirements. For all housing and buildings up to 300m², install in accordance to NZS 4246 sections 5 Walls, 6 Ceilings & Roofs, 7 Underfloor - Suspended Framed Floors and 10 Concrete Slab-on-Ground Insulation, for residential light timber or steel framed buildings. Insulate around vents (not over them) to allow unhindered ventilation. Confirm with fireplace manufacturer for clearances; Pink® Batts® insulation is non-combustible and need not be separated except if used in conjunction with, or attached to other heat sensitive materials. Lift up electrical wires, lighting transformers/ controllers and lay the insulation underneath.

3.7 RECESSED LIGHT FITTINGS - RESIDENTIAL

Residential recessed light fittings to AS/NZS 3000, 4.5.2.3.5;

- Existing fittings or retrofit situations, fittings maybe unmarked
- New fittings can only be labelled - CA 80, CA 90, CA 135, IC, IC-F & IC-4

3.8 LAY WIRE NETTING - UNDER JOISTS / PURLINS

Lay at right angles across the rafters/ roof joists (under purlins). Pull tight and fix.

3.9 LAY WIRE NETTING - OVER PURLINS

Lay at right angles across the purlins with enough slack to allow insulation to retain its nominal thickness between. Tie edges of netting together with galvanized wire clips.

3.10 LAY PLASTIC STRAPPING TAPE

Lay at right angles across the framing at a minimum of 300mm centres, staple tape to each framing member with stainless steel staples.

3.11 PREPARATION

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Before installation, gently agitate the insulation by gentle shaking or bouncing to assist recovery to the nominal thickness stated on the product label. Ensure the product is installed dry.

Completion

3.12 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4 SELECTIONS

For further details on selections go to www.pinkbatts.co.nz.

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5113G GIB® PLASTERBOARD LININGS

1 GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- superior finish quality systems
- bracing systems
- fire rated garage boundary wall systems
- wet area systems
- GIBFix® Framing systems

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600:2005	Cold-formed steel structures
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)
NASH	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents which refer to work in this section:
GIB® Site Guide (September 2018)
GIB® Noise Control Systems (September 2017)
GIB® Fire Rated Systems (October 2018)
GIB® Wet Area Systems (April 2021)
GIB Toughline® Aqua (July 2018)
GIB Ezybrace® Systems (August 2016)
GIB Ezybrace® Bracing Design Software
GIB Ezybrace® Bracing Supplement Document (December 2016)
GIB Ezybrace® for Light Steel Frame Systems (March 2017)
GIBFix® Framing System (August 2016)
GIB Rondo® Metal Batten System (August 2012)
GIB-Cove®
GIB RocTape®
GIB® Goldline™ Platinum Tape-on Trims
GIB® UltraFlex high impact corner mould
GIB® Tough Systems (November 2014)
BRANZ Appraisal 289 GIB® Fire Rated Systems
BRANZ Appraisal 394 GIB® Noise Control Systems

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BRANZ Appraisal 427 GIB® Wet Area Systems
BRANZ Appraisal 928 GIB EzyBrace® Systems
BRANZ Appraisal 940 GIB® Intertenancy Barrier Systems for Terrace Homes

GreenTag Certification WWL:G102:2021:GR - GreenTag™ GreenRate Level A for:
GIB® Standard (10mm & 13mm)
GIB Fyreline® (10mm, 13mm, 16mm & 19mm)
GIB Braceline® (10mm & 13mm)
GIB Noiseline® (10mm & 13mm)
GIB Toughline® (13mm)
GIB Wideline® (10mm & 13mm)

GreenTag Certification WWL:G103:2021:GR - GreenTag™ GreenRate Level C for:
GIB Ultraline® (10mm & 13mm)

Manufacturer/supplier contact details

Company:	Winstone Wallboards
Web:	www.gib.co.nz
Telephone:	0800 100 442

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.5 INSTALLER WORK SKILLS AND QUALIFICATIONS

GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.6 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.7 BRACING REQUIREMENTS

Braced wall systems to NZS 3604 when tested to BRANZ Technical Paper P21, using:

- GIB Ezybrace® Systems (2016) and/or GIB Ezybrace® Bracing Design Software
- GIB Ezybrace® Bracing Supplement Document (December 2016)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software 2011 (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2 PRODUCTS

Materials

2.1 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Wideline® plasterboard
GIB Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Toughline® Aqua

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Components

2.2 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

2.3 SCREWS

GIB® Grabber® drywall type screws as follows:

Grabber® type	Used for fixing:
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber
Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.4 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.5 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.6 CONTROL JOINTS

GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims
GIB® plastic W-profile control joints.

Accessories

2.7 ADHESIVE

Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE

GIB® jointing tape.

2.10 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

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3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE

Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS** 2589.

3.4 SUBSTRATE

Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (September 2018).

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining: 18% or less for plasterboard linings. Refer to NZBC E2/AS1 and GIB® Site Guide (Sept 2018).

3.6 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide (Sept 2018).

Application

3.7 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.8 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide (September 2018). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.9 BOARD ORIENTATION

Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.10 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.11 FORM BRACING SYSTEMS

Form bracing systems to:

- GIB Ezybrace® Systems (2016)

3.12 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide (September 2018) requirements.

3.13 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.14 FINISHING GENERALLY

To GIB® Site Guide (September 2018) and AS/NZS 2589.

Completion & Commissioning

3.15 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

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4 SELECTIONS

4.1 GIB® BRACING SYSTEMS

Refer to:

- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Systems (2011)

For bracing element location refer to drawn documentation.

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5230 INTERIOR DOORS

1 GENERAL

This section relates to the supply and installation of interior doors.

1.1 RELATED SECTIONS

Refer to glazing section/s for glass type and thickness.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3602	Timber and wood-based products for use in building
NZS 3610	Specification form profiles of mouldings and joinery

2 PRODUCTS

2.1 TIMBER

To NZS 3602.

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES

Traditional profiles to NZS 3610. Proprietary profiles and special profiles as detailed. Pencil radius corners of profiled schedules for paint finish.

2.3 DOORS, TIMBER VENEER

Doors as scheduled complete with matching 6mm clashing strip to both sides and to the exposed edge of cavity slider doors.

2.4 DOORS, PAINTED

Doors as scheduled (without clashing strips).

2.5 CAVITY SLIDERS

Doors hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.6 FRAMED AND GLAZED DOORS

Solid timber framed doors, stop end jointed and bead glazed.

2.7 FRAMED AND PANELLED DOORS

Solid timber framed doors, stop end jointed and beaded as detailed.

2.8 FRAMED AND LOUVRED DOORS

Solid timber framed doors, stop end jointed and beaded as detailed.

2.9 DOOR HINGES

Size and gauge to carry door. 3 hinges per door.

2.10 SLIDING DOOR GEAR

To suit door/sash size and glazed weight and as detailed.

2.11 SLIDING-FOLDING DOOR GEAR

Bi-fold pattern to suit size and weight of doors and as detailed.

3 EXECUTION

3.1 SITE MEASURE

Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding or bi-fold door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

3.2 EXECUTION GENERALLY

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Manufacture to the methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 FACTORY FIT HARDWARE

Factory fit the following where specified: -

- Hinges

3.4 FACTORY FINISHING

Before delivery to site: -

- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

Internal doors

3.5 INTERNAL JOINERY FRAMES

Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish.

3.6 DOOR FRAMES, SOLID REBATED

Fabricate as detailed. Hang doors to operate freely on hinges, sliding, or bi-fold gear and to the door manufacturer's requirements. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.7 DOOR LINERS

Heads and jambs finished minimum 18mm, with 10mm planted door stops. Width to match width of lined walls. Hang doors on hinges, sliding, or sliding-folding gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.8 DOOR LINERS, EXTENDED

Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.9 CAVITY SLIDERS

Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion

3.10 CHECK

Check and adjust operation of all sashes, doors, hardware and furniture.

3.11 TEMPORARY PROTECTION

On completion remove any temporary protection and leave ready for following work.

4 SELECTIONS

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6411 VINYL SURFACING

1 GENERAL

This section relates to the supply and installation of vinyl surfacing including skirtings, nosings, trims and edges.
It includes:

- PVC sheet
- PVC tiles

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC D1/AS1	Access routes
NZS/AS 1884	Floor coverings - Resilient sheet and tiles - Installation practices

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

~ years:	For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 years:	For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Performance

1.6 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

2 PRODUCTS

Materials

2.1 VINYL SHEET

High vinyl content homogeneous monolayer flexible PVC sheet flooring.

2.2 VINYL TILES

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High vinyl content monolayer flexible PVC tiles.

2.3 COVINGS

Commercial applications:	Pencil cove with butterfly mitres to all external and internal corners. Fillet cove for safety flooring.
Domestic applications:	Pencil or fillet cove method.

2.4 VINYL SHEET WALL COVERING

High vinyl content homogenous flexible PVC sheet wall covering.

2.5 WALL AND FLOOR VINYL JOINING STRIP

White PVC floor to wall finishing strip.

2.6 TRIMS AND EDGING

PVC as supplied by the sheet manufacturer to complete the work.

Accessories

2.7 ADHESIVE

Standard acrylic adhesive to suit the material and substrate and to the vinyl manufacturer's requirements.

2.8 PRIMER AND SEALER

To the adhesive manufacturer's requirements for the particular substrate.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Maintain rolls of sheet, packages of tiles and accessories undamaged and dry. Store rolls upright with other material on level surfaces in non-traffic, non-work areas that are enclosed, clean and dry.

Avoid distortion, stretching, marking and damage to edges while shifting, unrolling and handling sheet, tiles and accessories.

3.2 BEFORE COMMENCING WORK

Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

3.3 LAYING GENERALLY

Carry out the whole of the work to NZS/AS 1884, and to the flooring manufacturer's requirements.

3.4 LAYOUT

Before beginning the installation confirm the proposed layout of material, location of seams and other visual considerations of the finished work.

Application - General / substrate preparation

3.5 PREPARATION NEW CONCRETE

Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind level, then vacuum to remove all dust.

3.6 PREPARATION, NEW PLYWOOD OR PARTICLEBOARD

Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind smooth, then vacuum to remove all dust.

3.7 PREPARATION FOR WALL LININGS

Prepare wall linings to requirements of wall lining manufacturer and vinyl manufacturer,for vinyl over.

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Application - laying

3.8 PREPARATION

Check that each colour supplied is from the same batch. Follow the vinyl manufacturer's requirements for conditioning of rolls and the working temperatures and conditions before, during and after laying. Protect work from solar heat gain and switch off under-floor heating during and for 48 hours either side, of the work period.

3.9 ADHESIVE APPLICATION

Apply approved adhesive as required by the vinyl manufacturer and without trowel marks after setting. Follow requirements for open time, taking note of substrate porosity, ambient temperature and relative humidity. Remove excess adhesive as the work proceeds using required techniques.

3.10 LAYING VINYL SHEET

Roll out, cut, leave to condition and install sheet vinyl to the vinyl manufacturer's requirements. Ensure there are no air bubbles or twisting, that the seams are kept clear of adhesive, and immediately the sheet is adhered roll with a 68 kg roller.

3.11 CROSS JOINS

Plan and allow cuts to avoid cross joins. Obtain written approval of the owner before proceeding if cross joins are unavoidable. Cross joins are not acceptable in wet areas.

3.12 COVE VINYL

Pencil cove flooring to the specified height and finish off as detailed.

3.13 MITRES

Perform butterfly method to internal and external mitres. Thermo-weld all mitres.

3.14 LAYING VINYL TILES

Set out from the centre of the area in two preparatory runs and modify to suit before laying tiles from the centre to the vinyl manufacturer's requirements. Ensure air is expelled and, as each section is completed, immediately roll with a 68 kg roller. Complete sections before scribing the perimeter tiles.

3.15 FIT VINYL SKIRTING

Fit skirting in accordance with the skirting manufacturer's requirements.

3.16 FIT VINYL EDGING

Fit tapered vinyl edging to all borders, except where abutting carpet.

3.17 WALL SURFACES

Clean off surface contamination, carry out minor repairs and bring to a smooth, even surface.

3.18 APPLY PRIMER OR SEALER FOR VINYL SHEET

Prime and/or seal porous plaster, concrete and timber substrates to the adhesive manufacturer's requirements.

3.19 FLOOR TO WALL FINISHING STRIP

Adhere to walls in a true, straight line using contact adhesive. Roll immediately using a seam-roller to ensure maximum bond strength is achieved.

3.20 APPLY VINYL WALL SHEET

Apply sheet to walls and heat weld seams under the technical direction of the wall sheet manufacturer's representative for each particular location.

Obtain written approval of the proposed joint layout approach from the owner, then adhesive fix either vertically or the T-method, ensuring all corners are wrapped and joints are no closer than 200mm to internal or external corners.

Cut vinyl neatly to recess on the floor/wall finishing strip and chemically weld this joint using Werner Mueller, type C welding compound.

3.21 THERMO-WELD VINYL WALL SHEET

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Hand groove and thermo-weld all seams, heating the sheet and weld rod to a sufficient temperature to melt and fuse them together into a single mass. Trim the weld to leave a smooth, flush surface with the sheet.

Cleaning

3.22 CLEAN VINYL

Leave vinyl flooring surfaces free of adhesive, dirt and debris. Clean and finish vinyl to manufacturer's requirements.

Completion

3.23 PROTECTION

Provide the following temporary protection of the finished work:
~

4 SELECTIONS

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6511 CARPETING

1 GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double bonded (double direct stuck).
It includes:

- carpet underlay
- woven sheet carpet

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2270	Plywood and blockboard for interior use
AS/NZS 2455.1	Textile floor coverings - Installation practice - General

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
1 year: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:
1 year: For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

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

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

2 PRODUCTS

Materials

2.1 UNDERLAY

To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

2.2 CARPET

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To AS/NZS 2455.1 Textile floor coverings.
Refer to SELECTIONS for product selection.

Components

2.3 BINDER BARS

Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS

Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER

Timber/plywood to AS/NZS 2270 with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

2.6 STAIR NOSING

Refer to SELECTIONS for type.

Accessories

2.7 ADHESIVE, UNDERLAY

To AS/NZS 2455.1, clause 1.5.3. and underlay manufacturer's requirements.

2.8 ADHESIVE, CARPET

To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.9 TAPE

To carpet manufacturer's requirements.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.2 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work. Ensure all fittings and fixtures around which the carpet is to be scribed are in place. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

Confirm moisture content of substrate in accordance with AS/NZS 2455.1. Appendix B Do not commence laying carpet until readings for the whole area are within acceptable levels as follows:

Moisture Content:	Timber substrate - 8 -12% for air conditioned buildings - 10 -14% for intermittently heated buildings - 12 -16% for unheated buildings
	Concrete substrate 75%RH

3.3 PROTECTION

Protect adjoining work surfaces and finishes during the carpet installation.

3.4 TAPE

Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.5 LAYOUT

Plan the general layout so that:

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- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

3.6 TEMPERATURE

Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

Application - general / substrate preparation

3.7 PREPARING NEW CONCRETE FLOOR

To be level, smooth, clean, cured and dry. Remove loose material and dust.

3.8 PREPARING NEW WOOD PRODUCT FLOOR

To be level, sanded smooth and dry with loose material and dust removed.

3.9 PREPARING EXISTING CONCRETE FLOOR

Remove existing coverings completely including adhesives, bituminous materials and paints. Patch cracks and depressions with compatible latex patching compound to the carpet manufacturer's requirements. Seal large areas of patching. Leave surface level, smooth and clean with loose material and dust removed. Seal powdery surfaces.

3.10 PREPARING EXISTING TIMBER OR WOOD PRODUCT FLOOR

Remove existing coverings completely including tacks, adhesives, bituminous materials, waxes and paints. Check for soundness, replace any substandard boards or panels and nail down loose boards. Sand smooth and remove loose material and dust.

3.11 SHEET UNDERLAYS FOR EXISTING TIMBER OR WOOD PRODUCT FLOORS

Refer to 6192 FLOORING SUBSTRATE PREPARATION for hard sheet underlays on existing floors.

Application - carpet laying

3.12 INSTALLATION, UNDERLAY

Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.13 INSTALLATION, CONVENTIONAL SYSTEM

Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.14 INSTALLATION, DIRECT STICK SYSTEM

Direct stick install to AS/NZS 2455.1, section 3. Apply adhesive evenly over the entire substrate surface to the carpet manufacturer's requirements. Lay carpet with all edges, selvages and joins tightly butted and completely bonded to the floor surface. Roll the carpet with a clean 25 kg roller and ensure complete contact with adhesive.

3.15 INSTALLATION, DOUBLE BOND SYSTEM

Double bond install to AS/NZS 2455.1, section 3. Apply adhesive on the underlay to the carpet manufacturer's requirements. Lay carpet with edges, selvages and joins tightly butted and completely bonded to the underlay surface.

3.16 LAYING TO STAIRS

Install on stairs in accordance with AS/NZS 2455.1.

3.17 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.18 PROTECTION

Provide the following temporary protection of the finished work:

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3.19 SPECIAL PROTECTION

Self Adhesive carpet protective film: ~

4 SELECTIONS

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6700 PAINTING GENERAL

1 GENERAL

This section relates to the general matters related to painting work

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312.1	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings - Paint Coatings
AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 9001	Quality management systems - requirements
SNZ TS 3404	Durability requirements for steel structures and components
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Health and Safety Programme

Health and Safety at Work Act 2015

Requirements

1.3 NO SUBSTITUTIONS

Substitutions are not permitted to any specified manufacturer's system, or associated components and products.

1.4 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

1.5 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Health and Safety Programme. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Refer to WorkSafe: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.6 MATERIAL SAFETY DATA SHEET

Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.

Warranties

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1.7 WARRANTY

Warrant this work under normal environmental and use conditions against failure.
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

Performance

1.8 MANUFACTURER'S INSPECTION

Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.

1.9 INSPECTION OF WORK

Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2 PRODUCTS

Materials

2.1 PAINT TYPES

Use the manufacturer's complete system and only the products specified.

2.2 MATERIALS GENERALLY

Use only the Manufacturer's products which are guaranteed for their consistency and performance under AS/NZS ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.

2.3 THINNERS AND ADDITIVES

Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

2.4 FILLERS

For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3 EXECUTION

Conditions

3.1 EXECUTION

To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, the MPNZA Specification manual, and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE

Prepare surfaces to the coating manufacturer's requirements.

3.3 COATED SURFACES

Ensure that substrate surfaces are able to achieve the specified finish.

3.4 PRE-PRIMED SURFACES

Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.5 BRUSH DOWN

Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY

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Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.7 TREATED SURFACES

Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 BACK PAINTING

Co-ordinate with cladding and/or lining installer as to who will do the work and timing.

Exterior
For exterior cladding and trim that require on site finishing, paint the back and exposed bottom edges at the base of the cladding (generally, bottom plate overhang and horizontal flashings) to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed.
Refer to appropriate exterior paint sections SELECTION clauses for claddings to be back painted.

Interior
For lining and trim that require on site finishing and/or back painting (usually wet areas), paint the back and exposed bottom edges at the base of the lining, to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed, or if no front finish seal to manufacturer's requirements.
Refer to appropriate interior paint sections SELECTION clauses for linings to be back painted.

3.9 ANCILLARY SURFACES

The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

3.10 HARDWARE

Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

3.11 PROTECTION

Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation - unpainted and pre-primed timber and wood based products

3.12 MOISTURE CONTENT

Ensure moisture content at the time of application is near to the equilibrium moisture content pertaining to the particular locality in which the timber is used, without any excessive moisture content gradient between core and surface.

3.13 PREPARING DRESSED TIMBER

Ensure dressed timber is smooth, free from raised or woolly grain, planing burrs or other machining defects. Slightly round or ease sharp edges to ensure they can be properly coated. Sand timber to bring up to a smooth finish along the direction of the grain. Sand timber back to new condition timber that has been weathered.

3.14 PREPARING ROUGH SAWN TIMBER

Thoroughly brush along the direction of the grain to remove dust and dirt.

3.15 PREPARING PRE-PRIMED TIMBER

Check pre-prime coat for damage, powdering, weathering or loss of adhesion. Where primer is sound, thoroughly brush along the direction of the grain to remove dust and dirt. If there is doubt, sand back and re-prime.

3.16 TIMBER SPECIES

Check that the preparation and paint system is suitable for the timber species.

3.17 PREPARING DAMAGE AND DEFECTS

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Scrape clean loose or soft material holes, depressions, resin or gum pockets, knot holes, surface splits, checks, or any localised decay. Apply primer and/or sealer specified and fill these areas with linseed oil putty or other appropriate filler.

3.18 FIXINGS

Take timber fixings below the painted or clear finished surface. Leave corrosion resistant timber fixings flush with clear finished surfaces.

3.19 CLEANING

Remove grease and oil by wiping down with solvent or water-based degreasing agent. Remove resin by wiping down with solvent or water-based degreasing agent or heating and scraping. Remove sanding dust. Bad staining may be untreatable and require replacement of timber, discuss with paint manufacturer and main contractor.

Preparation - gypsum plaster

3.20 PREPARING GYPSUM PLASTER

Fill and sand small crevices and cracks. Surface moisture content not to exceed 12% at time of coating.

Preparation - unpainted linings

3.21 PREPARING FIBROUS PLASTER

Check for and remove release agents and other contaminants by washing with clean water or solvent and allow to dry. Fill cracks and surface imperfections with patching plaster and lightly sand smooth. Remove dust.

3.22 PREPARING PLASTERBOARD

Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

Preparation - unpainted plastics

3.23 PREPARING POLYESTERS (GRP) AND PHENOL FORMALDEHYDES

Wipe surfaces with methyl ethyl ketone or other suitable solvent. Lightly abrade with sandpaper and dust off. Proceed immediately with priming.

3.24 PREPARING UNPLASTICISED POLYVINYL CHLORIDE (UPVC)

Wipe surfaces with mineral turpentine, methylated spirits or white spirit. Lightly abrade with sandpaper and dust off. Proceed immediately with topcoats applicable for walls or timber finishes.

Preparation - painted surfaces generally

3.25 SURFACE PREPARATION

Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

3.26 MOULD

Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water. Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

3.27 GAP FILLING

Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using putty. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

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Preparation - painted surfaces in good condition

3.28 PREPARING SURFACES

Wash down surfaces with either:

- a chlorine based solution; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water

Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:

- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.29 PREPARING PAINTED TIMBER

Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:

- burning off using a blowtorch to soften paint without charring, before scraping off with a broad knife
- using an electrically heated hot air stream to soften paint, before scraping off with a broad knife
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow WorkSafe guidelines for minimising the hazards of stripping.

3.30 PREPARING PAINTED GYPSUM PLASTER

Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.31 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER

Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

3.32 PREPARING PAINTED CEMENT PLASTER, CONCRETE AND MASONRY

Remove the fine white powder of efflorescence by brushing and then wiping with a clean cloth. Remove faulty mortar by wire-brushing. Make good with fresh mortar to match.

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Confirm that the cause of any dampness has been eliminated and that the substrate is dry before applying any coating.

Wire brush moss or lichen affected areas to remove loose, powdery growth. Treat the affected areas with a solution of 200 millilitres of formalin (40% solution) to 800 millilitres of water. Apply the solution and leave for 3 days, or until the moss and lichen turns brown. Scrub off with a hard bristle brush and hose down liberally with water. Swab the affected area using a solution of 1 volume of household bleach to 2 volumes of water. After 30 minutes wash down with clean water.

Remove grease by continued washing with a 1:40 solution of sugar soap and water until completely removed, wash with clean water and allow to dry.

Where necessary strip paint back to the original surface by water or abrasive blasting. Remove chalk dust and dirt when dry by stiff bristle brushing.

3.33 PREPARING PAINTED METALWORK

Remove corrosion in whatever form. Sand edges to form a smooth surface with surrounding areas unaffected by corrosion. Use a chemical pre-treatment to remove the last traces of and to inhibit future, corrosion. Clean down completely before spot priming to suit the coating system specified.

Application - before applying final coatings

3.34 OFF-SITE WORK

Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

3.35 PRIMING JOINERY

Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP. treated joinery has dried sufficiently to lose odour.

3.36 CONCEALED JOINERY SURFACES

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.37 CONCEALED METAL SURFACES

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.38 DOORS

Prime or seal and paint all six faces of doors before hanging.

3.39 BEAD GLAZING

Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.

3.40 PUTTY GLAZING

Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.

Application - generally

3.41 PAINTING GENERALLY

Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.42 MIXING

Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.43 ENVIRONMENT

Paint exterior surfaces only in favourable weather conditions:

- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively

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- as far as possible apply paint in the temperature range 15°C to 25°C
- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

3.44 SEQUENCE OF OPERATIONS

Painting work to generally follow the following sequences:

- back painting and pre-installation painting, then post-installation exposed-face painting
- complete surface preparation before commencing painting
- apply paint in the specified sequence using the specified paint
- allow full drying time between coats to the paint manufacturer's requirements
- do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
- finish broad areas before painting trim
- ensure batch numbers of tins are matched for whole areas
- internally, paint ceilings before walls and walls before joinery, trim and other items

3.45 PAINT APPLICATIONS

Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour.

3.46 DRYING TIME

Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

3.47 LIGHTLY SAND

Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.

3.48 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the paint system specified.

3.49 EACH COAT

Each coat of paint and the completed paint system to have the following qualities and properties:

- uniform finish, colour, texture, sheen and hiding power
- the specified number of coats applied
- no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
- proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application

Completion

3.50 CLEAN

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.

3.51 CLEAN EQUIPMENT

Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.

3.52 LEAVE

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.53 REMOVE

Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

3.54 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

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4 SELECTIONS

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7120 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G4/AS1	Ventilation
NZBC G11/AS1	Gas as an energy source
NZBC G12/AS1	Water supplies
NZBC G12/AS3	Water supplies
NZBC H1/AS1-AS2	Energy Efficiency
AS 1432	Copper tubes for plumbing, gas fittings and drainage applications
AS/NZS 1477	PVC pipes and fittings for pressure applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2345	Dezincification resistance of copper alloys
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.1	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) General
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2537.3	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) fitness for purpose of system
AS/NZS 2537.4	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) Guidance for the assessment of conformity.
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply and gas systems - metallic fittings and end connectors
AS/NZS 3879	Solvent cements and priming fluids for PVC (PVC-U and PVC-M and ABS and ASA pipes and fittings

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AS 4032.2	Water supply - Valves for the control of heated water supply temperatures - Tempering valves and end-of-line temperature actuated devices
AS/NZS 4129	Fittings for polyethylene (PE) pipes for pressure applications.
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4606.1	Storage water heaters. General requirements
NZS 4606.2	Storage water heaters. Specific requirements for water heaters with single shells
NZS 4606.3	Storage water heaters. Specific requirements for water heaters with composite shells.
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS 4809	Copper pipe and fittings. Installation and commissioning
AS 5200 part 053	Plumbing and drainage products, Stainless steel pipes and tubes for pressure applications.
AS/NZS 5601.1	Gas installations - general installations
AS/NZS 60335.2.35	Household and similar electrical appliances. Safety - Pat 2.35 Particular requirements for instantaneous water heaters

Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2019, Field testing of backflow prevention devices and verification of air gaps

Warranties

1.3 WARRANTY

Provide warranty for:

2 years:	For the supply and installation of the plumbing system and fixtures

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Requirements

1.4 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 INFORMATION FOR OPERATION AND MAINTENANCE

Provide the following general operation and maintenance information as electronic PDF format documents:
~

Provide this information prior to practical completion.

1.6 HOT WATER TEMPERATURES

To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60ºC.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:

- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 50ºC - for personal hygiene fixtures in all other buildings.

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For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

Performance

1.7 TESTING - TO NZBC G12/AS1

Test to NZBC G12/AS1, 7.6, Watertightness, for hot and cold water.

- Test to a pressure of1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.8 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.9 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.10 GAS APPLIANCE COMPLIANCE

Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS

Materials

2.1 WATER METER

To the requirements of the network utility operator.

2.2 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1.

2.3 TEMPERING VALVE

Tempering valve to NZS 4617 or AS 4032.2 to NZBC G12/AS1.

Materials - Hot water heating appliances

2.4 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

To NZS 4305 NZS 4606.1, NZS 4606.2 and NZS 4606.3, electric water storage cylinder, insulated and complete with required fittings.

2.5 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION

3.1 EXECUTION GENERALLY

Generally carry out the whole of this work and tests to NZBC G12/AS1 or AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3.

3.2 HANDLE AND STORE

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Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE

Flow rates to each outlet to be no less than those given in AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE

Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Pipework installation

3.10 WATER SUPPLY CONNECTION

Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.11 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.12 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 9 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and AS/NZS 3500.4 as modified by NZBC G12/AS3 or G12/AS1.

3.13 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES

If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

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3.14 IN-LINE FILTER

Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.15 HOT WATER CYLINDER INSTALLATION GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6. 11, Water heater installation or NZS 4607 for Valve-vented systems.

3.16 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS

Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11 or NZS 4607 for Valve-vented systems.

3.17 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to NZBC G12/AS1.

3.18 INSTALL TEMPERING VALVE

Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.19 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

3.20 INSTALLING BELOW GROUND ISOLATING VALVE

Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.21 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

Completion

3.22 LABEL

Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.23 CLEAN IN-LINE FILTER

Clean all in-line filters on completion of works.

3.24 REPLACE

Replace damaged or marked elements.

3.25 LEAVE

Leave work to the standard required by following procedures.

3.26 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Hot water systems

4.1 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

Brand: ~
Model size: ~

4.2 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Brand: ~
Model size: ~
Remote controller: ~

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Gas type: ~

4.3 TEMPERING VALVE

Location: ~
Brand/type: ~

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7411M METALCRAFT ROOFING RAINWATER SPOUTING SYSTEMS

1 GENERAL

This section relates to **Metalcraft Roofing** rainwater disposal systems including gutters fascias and downpipes.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
Gutter	In this section includes spouting

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Are available on the website or by contacting Metalcraft Roofing.

For technical assistance contact **Metalcraft Roofing**
Web: www.metalcraftroofing.co.nz

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against:

10 years:	Failure of coating adhesion (manufacturer's standard warranty)
10 years:	Weatherproofing failure caused by material penetration as a result of corrosion (manufacturer's standard warranty)
3 years:	Weatherproofing failure caused by substandard workmanship
From:	Date of completion of installation

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.6 QUALIFICATIONS

Installers to be experienced competent gutter installers, familiar with the **MetalcraftRoofing** materials and the techniques specified.

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Provide one copy of all relevant **Metalcraft Roofing** maintenance information on completion of the roofing work.

Performance

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1.8 TEST - NZBC E1/AS1

Test the completed rainwater disposal system with water to ensure gutters are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in gutters. Comply with NZBC E1/AS1.

2 PRODUCTS

Materials

2.1 GUTTERS

Complete with matching brackets with fixing screws to suit the gutter / fascia. Refer to SELECTIONS for type.

2.2 DOWNPIPES

To AS 1273 Unplasticised PVC (uPVC) downpipe and fittings for rainwater. Complete with stand-off brackets, galvanized screw fixed. Refer to SELECTIONS for type.

Components

2.3 DROPPERS

Steel or plastic droppers, sized to fit inside the downpipe.

2.4 DOMES

Wire mesh in round form with legs to clip inside the outlet opening to the downpipe.

2.5 GUTTER MESH

Flexible plastic mesh fitted into the gutter to the mesh manufacturer's requirements.

3 EXECUTION

Conditions

3.1 HANDLE AND STORE

Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE

Check that fascia, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT

Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 12 metres in length for steel gutter.

3.4 CORROSION

Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Check compatibility of metals used for rainwater goods, against the materials being used for roofing and flashings.

Application - metal

3.5 INSTALL METAL GUTTER AND FASCIA

Establish minimum falls necessary (minimum 1:500) to outlets to prevent ponding and screw fix brackets true-to-line at 900mm centres maximum. In areas where snow fall is possible and or high wind areas, the centres should be reduced to 600mm. Lap spouting joints in direction of flow, a minimum of 40mm to seal between and over the top of joint and seal with silicone sealant and fix with rivets. Ensure the joint is fixed over its full girth. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to **Metalcraft Roofing** details and NZMRM CoP recommendations.

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3.6 INSTALL PVC DOWNPIPES

Install downpipes complete with 115 degree angle bends as needed with all joints lapped and glued. Galvanize screw fix with PVC pipe clips to rigidly stand 40mm off the wall plumb and discharging into stormwater gully or inlet pipe. All installation to **Metalcraft Roofing** details and NZMRM CoP recommendations.

3.7 INSTALL RAINWATER HEADS

Install using rivets where required to detail as shown on drawings. Ensure colour matched blind aluminium rivets are used when joining metal surfaces.

3.8 INSTALL OVERFLOWS

Install as close as practical to downpipe locations, at a height allowing water to discharge to the outside and not into the building.

3.9 INSTALL PROTECTION

Fit wire mesh domes to downpipe outlets and plastic mesh to spouting to the spouting manufacturer's requirements.

Completion

3.10 REPLACE

Replace damaged or marked elements.

3.11 LEAVE

Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.metalcraftroofing.co.nz

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7411MA MARLEY RAINWATER DISPOSAL SYSTEMS

1 GENERAL

This section relates to **Marley** rainwater disposal systems.
It includes;

- uPVC spouting and downpipes
- Stratus Design Series® spouting and downpipes
- associated accessories necessary to complete the installation

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E2/AS1	External moisture
AS/NZS 3500.3	Plumbing and Drainage - Stormwater drainage
AS/NZS 4020	Testing of products for use in contact with drinking water

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Marley Rainwater Sales Brochures
Marley Product Catalogue
Marley - Spouting and Downpipe DIY Installation Guide
Marley Stratus Design Series® Sales brochure
Marley Stratus Design Series® - Design and installation guide

Manufacturer/supplier contact details

Company:	**Marley New Zealand Limited**
Web:	www.marley.co.nz
Email:	info@marley.co.nz
Telephone:	0800 MARLEY (0800 627 539)

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier Guarantee:

15 years:	Against defects in material and manufacture

- Commence the guarantee from the date of purchase
- Refer to Marley NZ Guarantee available at www.marley.co.nz

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

~ years:	For installation

- When installed to Marley's published installation instructions at time of installation.
- Provide this warranty on the installer/applicator standard form.
- Workmanship warranty to be issued separately by the installer
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

Installers to be experienced, competent workers familiar with the materials and techniques specified.

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1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified Marley systems, components and associated products listed in this section.

Performance

1.7 TEST

Test the completed Marley rainwater disposal system with water to ensure, spouting is laid to correct fall, that both spouting and downpipes are unobstructed and that no ponding occurs in spouting.

1.8 DESIGN - NZBC E1/AS1

Layout, falls and capacity of spouting to falls and the size and position of downpipes to comply with NZBC E1/AS1.

1.9 DRINKING WATER

All Marley spouting and downpipe systems are tested for the collection of rainwater and drinking purposes to AS/NZS 4020. Care should be taken to ensure water is not contaminated by other sources.

2 PRODUCTS

Materials

2.1 UPVC SPOUTING/DOWNPIPES

Marley uPVC spouting and downpipe systems in white and grey uPVC.

2.2 STRATUS DESIGN SERIES® SPOUTING/DOWNPIPES

Marley Stratus Design Series® spouting and downpipe systems in co-extruded colour outer layer with grey uPVC internal layer.

Products

2.3 MARLEY SPOUTING

Marley spouting system, complete with Marley fittings including jointers, brackets, expansion outlets, end caps and corners supplied by Marley. Refer to SELECTIONS for type.

2.4 MARLEY DOWNPIPES

Marley downpipe system, complete with Marley fittings including bends, clips, joiners and junctions supplied by Marley. Refer to SELECTIONS for type.

Components

2.5 MARLEY MCS SOLVENT WELDING CEMENT

Only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting and downpipe systems to manufacturer's instructions. Colour match to spouting or downpipes.

2.6 EXPANSION OUTLET/DROPPERS

Marley expansion outlet/droppers, compatible with spouting and downpipe profile.

2.7 SCREW FIXINGS - TIMBER FASCIA

Stainless steel, grade 304 finish, self tapping screws 6g x 20mm pan head or wafer head.

2.8 NAIL FIXINGS - TIMBER FASCIA

Marley galvanised nails (MCNAILS).

2.9 SCREW FIXINGS - METAL FASCIA

Self drilling tek screws 6g pan head or wafer head.

2.10 FABRICATION

Special items can be fabricated by Marley to specific dimensions on request including but not limited to angle flats, angle rakes, outlets and adaptors.

3 EXECUTION

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Conditions

3.1 HANDLING AND STORAGE

Handle and store Marley downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Store out of direct sunlight. Refer to Marley installation guides for further details.

3.2 SUBSTRATE

Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT

Make adequate provision in the jointing of the spouting for thermal movement in the length of the spouting by using Marley expansion joiners and/or expansion outlets. Refer to Marley expansion technical information.

3.4 ENVIRONMENTAL

Marley Spouting and Downpipe systems are suitable for most environmental conditions and will never rust, rot or corrode.

3.5 RECYCLING

All Marley manufactured spouting and downpipe systems are 100% recyclable and Marley operates recycling programs with industry suppliers where uPVC pipes can be returned from site for recycling at Marley.

Application

3.6 INSTALL MARLEY SPOUTING

Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting systems to manufacturer's instructions. From high points fix brackets true-to-line to give a fall of 5mm every 10 metres to outlets. Set spouting brackets at 500mm centres; reduce to 300mm spacing for high wind zones or areas subject to occasional snowfalls. Make adequate provision for thermal movement.

3.7 INSTALL MARLEY DOWNPIPES

Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure that all joints are sealed properly using Marley MCS® Solvent Welding Cement. Assemble downpipes, solvent cement jointed complete, fit to outlets, fix with pipe clips every 1.2 metres, fix pipe clips with 304 stainless steel screws, plumb and discharging into the stormwater gully or pipe inlet to the Marley required practice.

Painting Marley uPVC spouting/downpipes

3.8 PAINTING

After installation use a mineral based undercoat and two coats of 100% weatherable acrylic paint. Do not paint the inside of spouting or internal brackets.

Completion

3.9 REPLACE

Replace damaged or marked elements.

3.10 LEAVE

Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.11 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.marley.co.nz

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7420 SANITARY SYSTEMS

1 GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.
Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G1/AS1	Personal hygiene
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
Stainless steel pipe and associated fittings
PVC,PE polyethylene or polypropylene pipe including all associated fittings.

3 EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1

Carry out this work to NZBC G13/AS1 and NZBC G1/AS1 and complete all tests to G13/AS1, 7.1 Test Methods.

3.2 EXECUTION GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2, as modified by NZBC G13/AS3, and complete all tests to AS/NZS 3500.2, section15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.

3.3 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.4 INSTALL TRAPS, WASTE AND VENT PIPES - AS/NZS 3500.2

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2, as modified by NZBC G13/AS3, and jointing to PVC-U pipes to AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

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3.5 INSTALL ELECTRIC PAN VENTS

Install electric pan vents to manufacturers' requirements. Leave ready for electrical connection by electrician.

3.6 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.7 TEST

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations,as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.8 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4 SELECTIONS

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7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - sanitary plumbing
NZBC G13/AS2	Foul water - drainage
NZBC G13/AS3	Foul water - sanitary plumbing and drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
NZS 3111	Method of test for water and aggregate for concrete
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4402 (set)	Method of testing soils for civil engineering purposes
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls
NZTA F2	Specification for pipe subsoil drain construction

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

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Underground PVC-U pipe to be classified as follows:

Classification:	Use:
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES

Polyethylene pipes and fittings to AS/NZS 5065.

2.5 PERFORATED PIPE - SUBSOIL DRAINAGE

Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS - NZBC G13/AS2

To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 GULLY TRAPS - AS/NZS 3500.2

Gully traps complete with grating to AS/NZS 3500.2, 4.6 Gullies, as modified by NZBC G13/AS3.

2.8 SURFACE WATER SUMP GRATINGS

Cast iron frame with lift-up grating.

2.9 STRIP DRAIN CHANNEL

Proprietary, modular, variable invert, plastic, steel (various types), or polymer concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings.

2.10 INSPECTION COVERS

Cast iron frame with screw-down cover.

2.11 TRENCH BACKFILLING MATERIAL, FOUL WATER - NZBC G13/AS2

Bedding and backfilling material to NZBC G13/AS2, 2.0 Materials**,** for methods shown in NZBC G13/AS2, figure 7, Bedding and backfilling.

2.12 TRENCH BACKFILLING MATERIAL, FOUL WATER - AS/NZS 3500.2

Bedding and backfilling material to AS/NZS 3500.2, 5.4, Bedding of drains, and for concrete, if required, AS/NZS 3500.2, 5.3 Concrete Support.

2.13 DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Free draining crushed stone, 7 mm to 20 mm in size.

2.14 FILTER FABRIC

Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency. The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

3 EXECUTION

3.1 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.
Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, Proximity of Trench to Building, for stormwater and subsoil drains.
- AS/NZS 3500.3, 6.2.8, Installation near and under buildings, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, Proximity of Trench to Building, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 FOUL WATER DRAINAGE GENERALLY - NZBC G13/AS2

Carry out foul water drainage work to NZBC G13/AS2 and NZBC G1/AS1 and complete all tests to NZBC G13/AS1, 7.1 Test Methods.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

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3.4 FOUL WATER DRAINAGE GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2 and complete all tests to AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

3.5 LAY FOUL WATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

3.6 CONSTRUCT GULLY TRAPS - NZBC G13/AS2

Set in a minimum 75mm thick concrete with top surround 25mm above paving and 100mm above other surfaces, to NZBC G13/AS2, 3.3 Gully traps.

3.7 CONSTRUCT GULLY TRAPS - AS/NZS 3500.2

Set in a minimum 100mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to AS/NZS 3500.2, section 4.6, Gullies.

3.8 LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.

3.9 FILTER FABRIC TO DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.10 LAY PERFORATED PIPING - SUBSOIL DRAINAGE

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.11 LAY PERFORATED PIPING TO BASEMENT WALLS - SUBSOIL DRAINAGE

Ensure any required waterproofing and protection sheets are in place before starting work.
Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to 1:150 gradients with invert of the highest horizontal point 50 mm minimum below floor slab level, discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Fill with drainage material to full height of wall. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.12 LAY PERFORATED PIPING TO RETAINING WALLS - SUBSOIL DRAINAGE

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage metal comprising of filter material to the NZTA F2 specification. Pipe bedding not less than 75mm deep. Backfill not less than 300mm deep. The pipe must not excessively elongate during installation. Lay in straight runs to correct gradients , discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Place granular fill in layers not exceeding 150 mm thick loose depth, to full height of wall, with an allowance for the thickness of the surface finish. Compact to provide support of not less than that of the adjacent material. Where geocomposite drain is used, the backfill shall follow the manufacturer's recommendations. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.13 INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

3.14 INSTALL SURFACE WATER SUMP

To NZBC E1/AS1 or to AS/NZS 3500.3 section 7 as modified by NZBC E1/AS2, complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

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3.15 INSTALL STORMWATER INSPECTION CHAMBERS

Construct as detailed on a poured concrete footing to NZBC E1/AS1, 3.7, Access for maintenance, or to AS/NZS 3500.3, section 7 as modified by NZBC E1/AS2. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.16 INSTALL FOUL WATER INSPECTION CHAMBERS - NZBC G13/AS2

Construct as detailed on a poured concrete footing to NZBC G13/AS2, 5.7 Access points. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.17 INSTALL FOUL WATER INSPECTION CHAMBERS - AS/NZS 3500.2

Construct as detailed on a poured concrete footing to AS/NZS 3500.2, 4.7 Inspection openings and 4.8 Inspection chambers, as modified by NZBC G13/AS3. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.18 SOAKHOLES OR TRENCHES

Dispose of stormwater on site as shown on the drawings, by soakage, to suit local geology and soil structure; all as directed by the territorial authority.

3.19 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.20 TESTING - FOUL WATER

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations, as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.21 TRENCH BACKFILLING GENERALLY - FOUL WATER

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid. Up to 300mm above the pipe, compaction shall be by tamping by hand tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.22 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

4 SELECTIONS

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7701 ELECTRICAL BASIC

1 GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting
- electrical automation
- security system
- complete with componentry
- electrically-powered fittings
- fire rated sealers, liners and accessories

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.
The following abbreviations apply specifically to this section:

AFDD	Arc Fault Detection Device
ELV	Extra Low Voltage
GLS	general lighting service
IP	international (ingress) protection classification
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1:2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3:2005	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
NZS 4514	Interconnected smoke alarms for houses

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NZS 4246	Energy Efficiency - Installing bulking thermal insulation in residential buildings
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance.
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).
TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.3 WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year:	Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.4 COMPLY

Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2, and TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

Workers and supervisors to be appropriately qualified to applicable legislative requirements. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 QUALIFICATIONS - SECURITY SYSTEM

Installation by an installer licensed under the Private Investigators and Security Guards Act. Installation of all security equipment to comply with AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance.

1.7 SAFETY OF INSTALLATION - DESIGN BY ELECTRICAL ENGINEER

Before installation work commences obtain from the electrical engineer a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulation 58.

1.8 SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN

Before installation work commences provide a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulations 58. It must be signed by the designer of the installation.

1.9 ELECTRICAL CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations 2010, prior to connection.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect high risk electrical work as required by regulation 70.

1.10 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, Reg 74A, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

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2 PRODUCTS

2.1 MAINS SUPPLY

Tough plastic sheathed neutral screened cable to AS/NZS 5000.2 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to AS/NZS 3439.3, or AS/NZS 61439.3, and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units.
Label all switch units that control electrical equipment or special lighting circuits by proprietary engraved switch mechanisms where applicable.
Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.
Refer to SELECTIONS.

2.8 HOT WATER SYSTEM SWITCH

One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS

10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang as detailed.

2.10 FIRE & SMOKE ALARM SYSYEM

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Refer to SELECTIONS.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class ll surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class lll surge protection to switched socket outlets.

2.12 CEILING ROSES

White plastic mounting base with screwed cover, manufactured to AS/NZS 3113. Terminal type. Suspended fittings to have sheathed round flexible cord to AS/NZS 3008.1.2. Refer to SELECTIONS.

2.13 BATTEN HOLDERS

Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.14 DOOR BELL SYSTEM

Complete with transformer for mounting on distribution board.

2.15 LIGHT FITTINGS

Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise; integral/non-integral LEDs, reflectors, lenses, heatsinks and drivers - 3,000K to 4,000K, CRI >80, L70.

2.16 EMERGENCY LIGHT FITTINGS

Emergency escape lighting and exit signs for buildings to AS 2293.3. Exit, recessed, ceiling or wall mounted. Refer to SELECTIONS.

2.17 SPACE HEATERS

Fixed wired room heaters radiant or convector, and compliant with AS/NZS 60335.1. Flush or surface mount, fitted with safety cut-outs.

2.18 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 60335.1.

2.19 HEATED TOWEL RAILS

Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with AS/NZS 60335.1, scratch resistant powdercoated or chrome finish.

2.20 EXTERIOR SWITCHES AND SWITCHED SOCKET UNITS

Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches and sockets to IP56 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

Electrical automation system

2.21 ELECTRICAL AUTOMATION SYSTEM

Electrical automation system designed to enable if required:

- Lighting - automated control and dimming timer control.
- Heating including heated towel rails and ventilation systems.
- Security - programmable to simulate lights and other devices to give appearance home is occupied - ability to interface with security system and smoke detectors to activate lights.
- Energy efficiency - automatically switch circuits off when not required or on during low tariff times.
- Appliances.
- Spa pools.
- Irrigation systems.

Security system

2.22 CONTROL PANEL

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Control panel system with a minimum of one installer code, one master code, 6 zones minimum and 6 user codes. The installer to select codes to suit installation.

2.23 DETECTORS

There are two main types of detectors:

- Standard passive infrared sensors: Install in stable environments with no wind flow and no direct bright sunlight.
- Passive infrared/ microwave sensors: Install in area where environmental stability is an issue.

2.24 AUDIBLE DEVICES

Internal sirens can be either a 12V Piezo Siren or a Horn speaker with a sound pressure level of no less than 95dB.
External siren can be either a stainless steel design or have hardened plastic casing. Both designs to be fully weatherproof but not limited to IP66 Rating. The siren box to contain a strobe diffuser in either blue or red. The siren shall contain a horn speaker, 12v speaker or an electronic siren. The external siren box to have both a cover and rear wall tamper mechanism.

2.25 CABLING

Security alarm wiring to NZS/AS 1125 for cables.
Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm².

2.26 PERIPHERALS

Fit anti-tamper devices to detectors, control panels and equipment housings, programmed to give a tamper indication when the system is unset and a tamper alarm when the system is set.
Standard keypad manufactured of moulded hardened plastic with either a LED or LCD screen, to match the style of the wiring accessories in diameter, colour and aesthetics.

2.27 COMMUNICATIONS

Digital dialler to be built into the PCB of all control panels, with the options for both monitoring and remote dial in windows based software. Digital dialler to comply with all the industry standard communication formats including contact I.D and SIA, and NZ Telepermit certification.
Remote software able to upload / download programming changes and or history events and change status of the security alarm with the ability to be turned off if required.

3 EXECUTION

Fire rated sealers and liners

3.1 MAIN SUPPLY

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX

Fit to meter box manufacturer and Electricity Retailer requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD

Fit to AS/NZS 3000 and board manufacturer requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION

Install MCBs at distribution board to AS/NZS 3000 to protect each final sub circuit.

3.5 MAIN EARTH

Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.6 EARTH LEAKAGE PROTECTION

Install RCD protection to AS/NZS 3000.

3.7 RCD - RESIDENTIAL INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

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3.8 RCD - SPECIFIC INSTALLATIONS

Install fixed wired RCD protected outlets (SRCD) in the following higher risk areas:

- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.
- Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.9 SET-OUT

The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.10 CABLING

Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.11 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.12 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.13 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.14 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer requirements.

3.15 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer requirements and as close as practicable to the lamp. Ensure transformers/drivers and rear of light fittings are adequately ventilated and appropriately clear of any building elements, to AS/NZS 3000.

3.16 EMERGENCY LIGHTING

Emergency escape lighting and exit signs for buildings to AS 2293.1 and NZBC F6/AS1. Fit emergency light fittings to manufacturer specifications. Refer to plans for position of fittings.

3.17 ELECTRIC HOT WATER SYSTEM

For storage heaters, wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end. Hot water cylinders, thermostats and 3000 watt element supplied and fitted under the hot and cold water system section.

3.18 SPACE HEATERS

Install to the heater manufacturer requirements, and to AS/NZS 3000. Fit neatly and without damage to surrounding finishes. Ensure control switches and thermostats are fitted to appliance, or otherwise connect to a control switch located adjacent to the heater and a remote thermostat.

3.19 SURGE PROTECTION

Install surge protection devices to manufacturer requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class ll protection at the switchboard, protect the device by a dedicated MCB.

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3.20 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.21 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heated towel rails: Install to manufacturers requirements and installed in accordance with AS/NZS 3000
- Mirror demisters: Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.

3.22 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with AS/NZS 3000 and in accordance with the manufacturer recommendations:
Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems. Refer to drawings for connection points. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches and sockets to IP56. Install to manufacturer specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

3.23 ELECTRICAL AUTOMATION SYSTEM

Fit distribution cabinet in wall, cut-out to finish flush with the wall surface, or surface mounted. Configure installation to manufacturer instructions. Provide adequate user training and operating manual to the owner.

3.24 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Security system

3.25 SECURITY SYSTEM

Install to the system manufacturer requirements, control panel, detectors and associated equipment fitted neatly and without damage to surrounding finishes. Installation of security equipment to AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance. All 230v mains power connections to the security panel are to be in accordance with AS/NZS 3000. The 230V power is to be switched using a dedicated single gang Isolator switch or similar.

Fire rated sealers and liners

3.26 SEAL ALL PENETRATIONS

Seal all penetrations, including in and around conduits and sleeves, in accordance with manufacturer instructions. For fire and/or acoustic rated elements, maintain the rating with the seal systems.

3.27 PROVIDE CABLE SLEEVES

Provide PVC sleeves formed from pipe sections, unless fire and/or acoustic systems require sleeves for other building elements and/or different material for the sleeve.

Fire rated accessories

3.28 INSTALL WALL BOXES AND SWITCH UNITS - FIRE RATED

Install proprietary fire rated wall boxes and switch units in accordance with manufacturer instructions.

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Completion & Commissioning

3.29 COMPLETION MATTERS

Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.30 FIRE RATED SEALERS AND LINERS

Sealants, collars, wraps, expanding foam, mortars and liners, used to seal around pipe, conduit and sleeve penetrations through fire and acoustic walls and floors. Refer to SELECTIONS for type.

Fire rated accessories

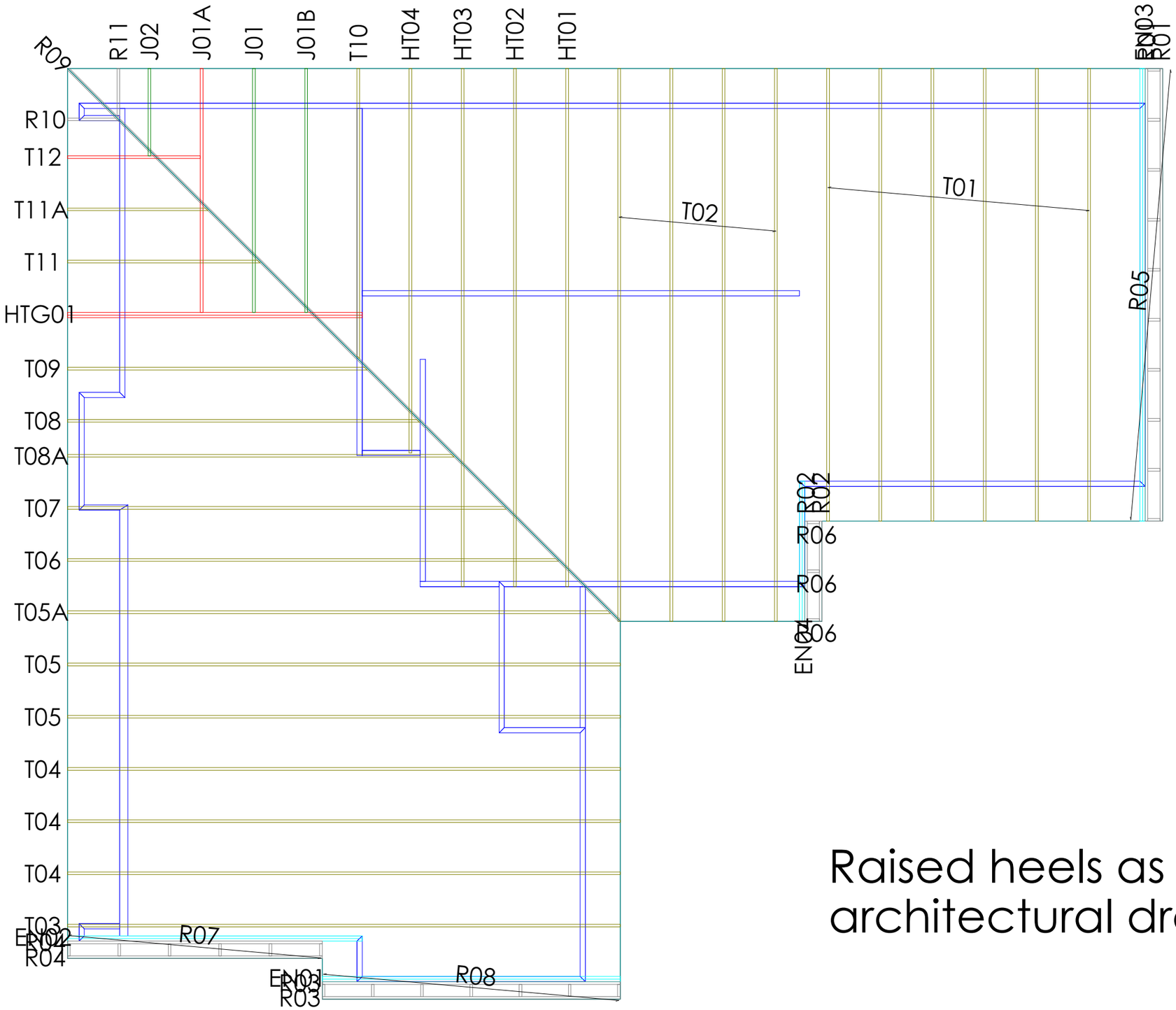
3.31 WALL BOXES AND SWITCH UNITS - FIRE RATED

Proprietary intumescent pad for plastic electrical sockets installed in plasterboard lined fire rated partitions providing an acoustic barrier and fire protection. Refer to SELECTIONS for type.

4 SELECTIONS

Materials

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Raised heels as per architectural drawings

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PlaceMakers
34 Carncross Street
Mosgiel
Ph 03 484 7280

Site Address :
A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Sheet Title :
For Building Consent
Buildable Truss Layout

Date : 7 Jun,2024 | Drawn : Craig Murphy
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 5.00deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron .55mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on clips	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.630kPa	Overhang	: 600mm

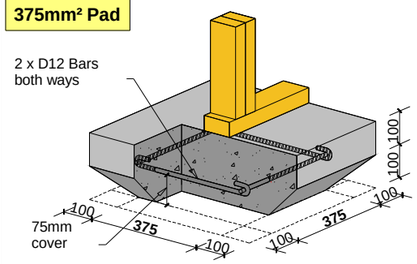
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Job Title : 252947P
Sheet : 1
Revision Number :

SLAB THICKENING & STUD REQUIREMENTS

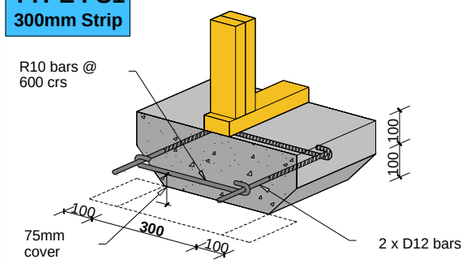
TYPE FP1
375mm² Pad

2 | 3



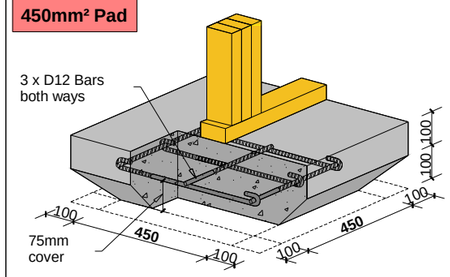
TYPE FS1
300mm Strip

2 | 3



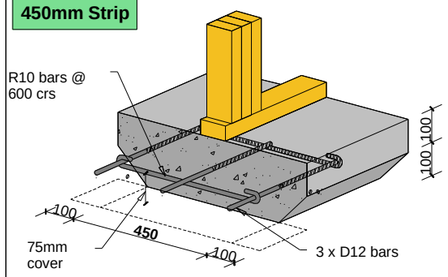
TYPE FP2
450mm² Pad

3 | 4



TYPE FS2
450mm Strip

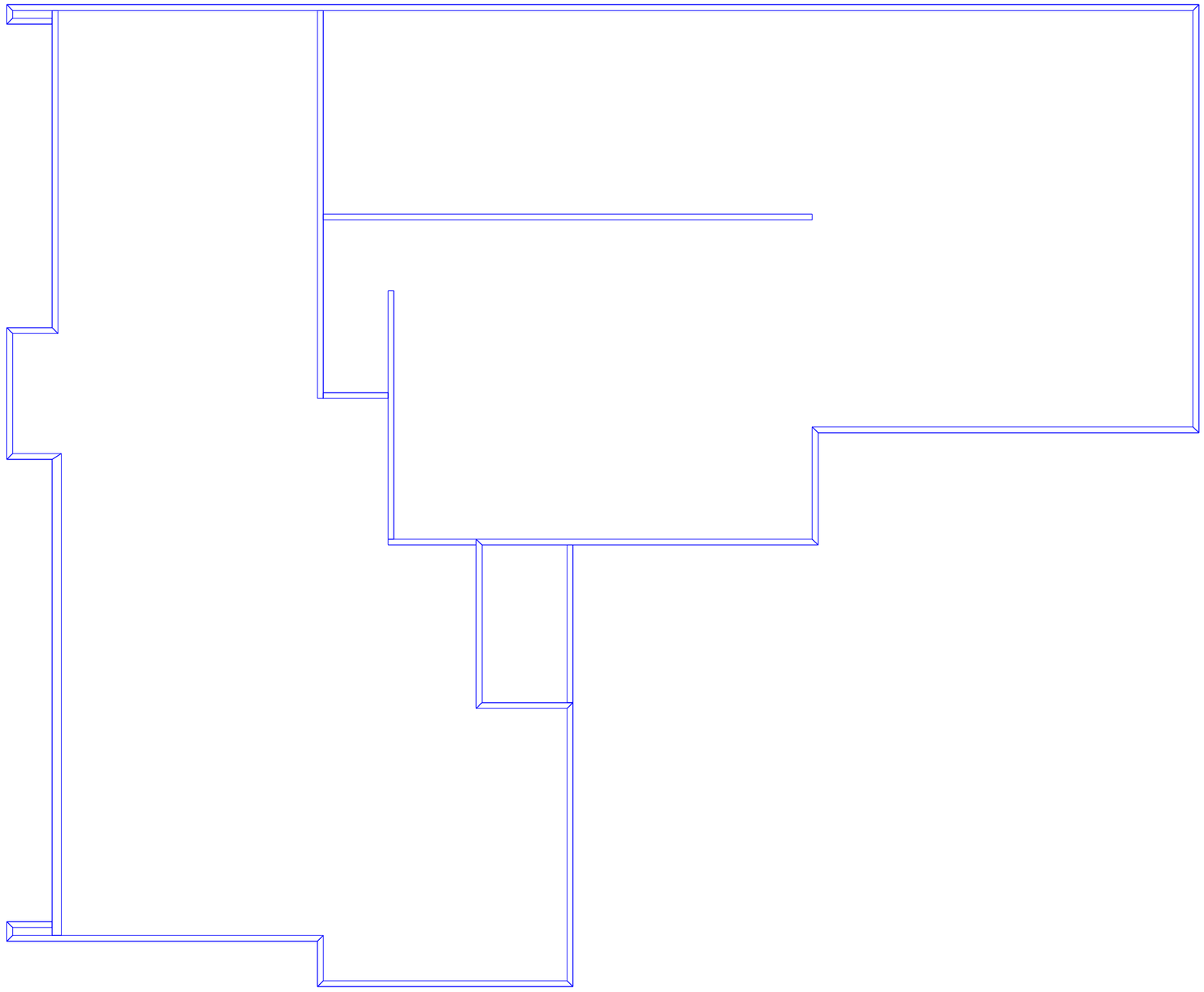
3 | 4



Notes:
- The numbers found in the hatched areas are the numbers of studs required below each truss
- Standard 100mm reinforcing concrete slab, as per NZS3604:2011

Refer to:
MiTek Internal Load Bearing on Concrete Floor Slabs 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance

Concrete Slab Thickening Guide



NO SLAB THICKENING REQUIRED

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PlaceMakers®
34 Carncross Street
Mosgiel
Ph 03 484 7280

Site Address :
A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Sheet Title :
For Building Consent
Slab Thickening

Date : 7 Jun,2024
Drawn : Craig Murphy
Scale : 1: 100
System : MiTek 20/20

Job Details:

Roof Pitch	: 5.00deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron .55mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on clips	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.630kPa	Overhang	: 600mm

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MiTek™

Job Title : 252947P
Sheet : 2
Revision Number :

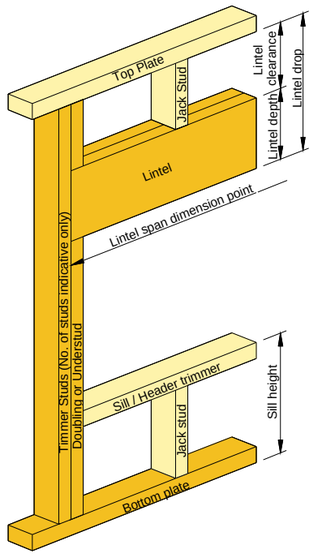
LUMBERLOK®
LINTEL FIXING OPTIONS

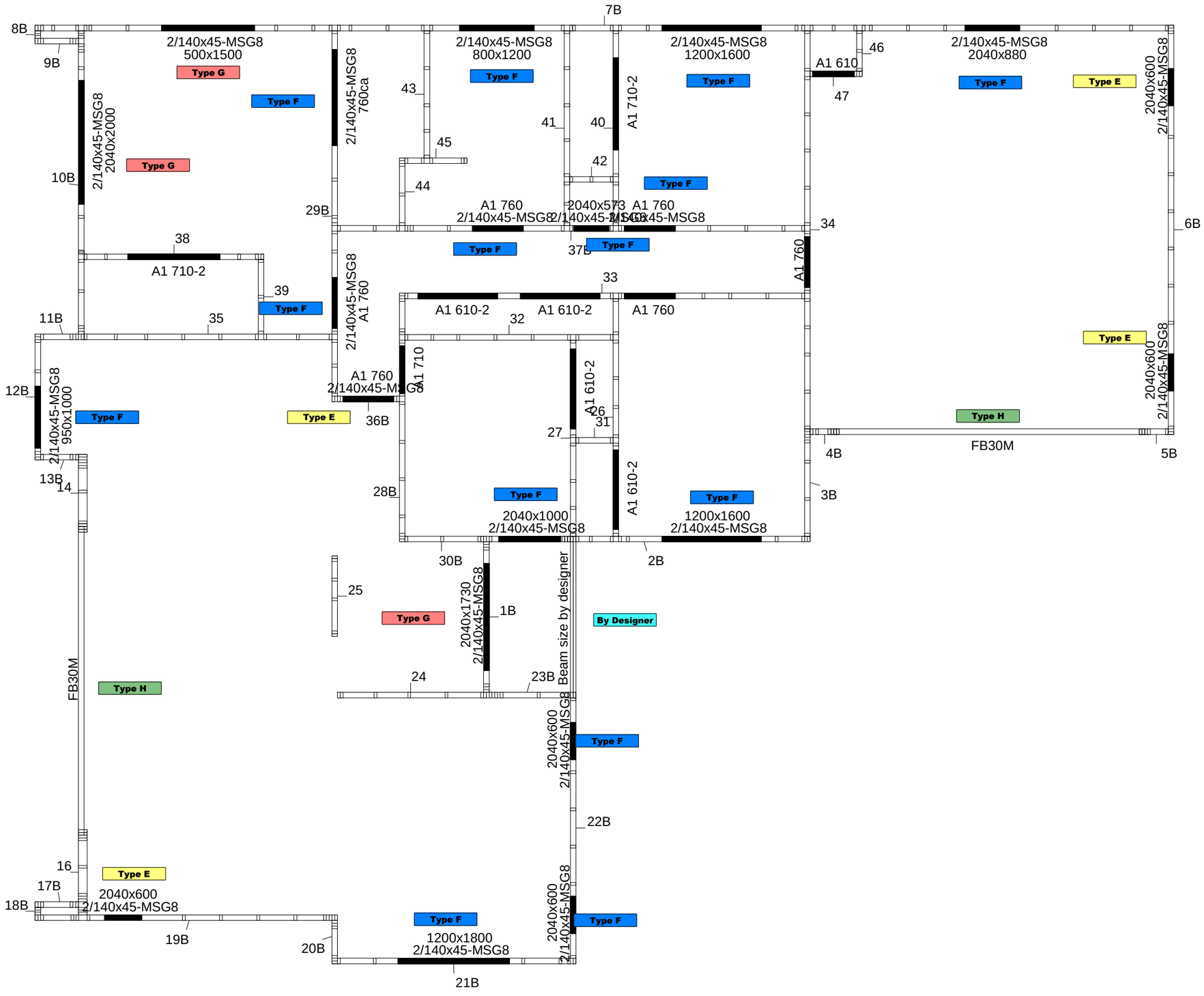
TYPE E
1.4 kN

TYPE F
4.0 kN

TYPE G
7.5 kN

TYPE H
13.5 kN





Refer to:
LUMBERLOK Lintel Fixing Schedule 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance
(Alternative to Table 8.14 & Figure 8.12 NZS 3604:2011)

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PlaceMakers®
34 Carncross Street
Mosgiel
Ph 03 484 7280

Site Address :
A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Sheet Title :
For Building Consent
Lintel Fixing

Date : 7 Jun,2024
Drawn : Craig Murphy
Scale : 1: 100
System : MiTek 20/20

Job Details:

Roof Pitch	: 5.00deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron .55mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on clips	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.630kPa	Overhang	: 600mm

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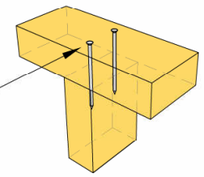
Job Title :
252947P
Sheet :
3
Revision Number :

BOWMAC®
STUD-LOK
STUD TO TOP PLATE FIXING OPTIONS

TYPE A - 0.7 kN

*Images are indicitive only. Timber sizes may vary.

Non-Load Bearing Walls

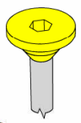


2 x 90mm x 3.15 Ø plain steel wire nails driven vertically through single Top Plate into stud

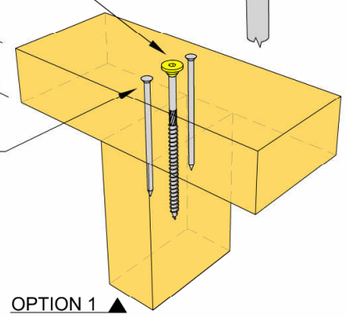
TYPE B - 4.7 kN

Load Bearing Walls

STUD-LOK SL125
- Yellow Head
- 125mm long



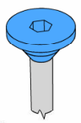
1 x STUD-LOK **SL125** screwed vertically through single Top Plate into stud.



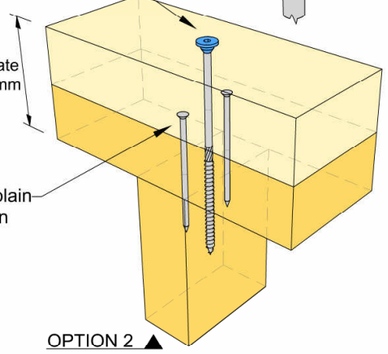
2 x 90mm x 3.15 Ø plain steel wire nails driven vertically into stud.

OPTION 1

STUD-LOK SL170
- Blue Head
- 170mm long



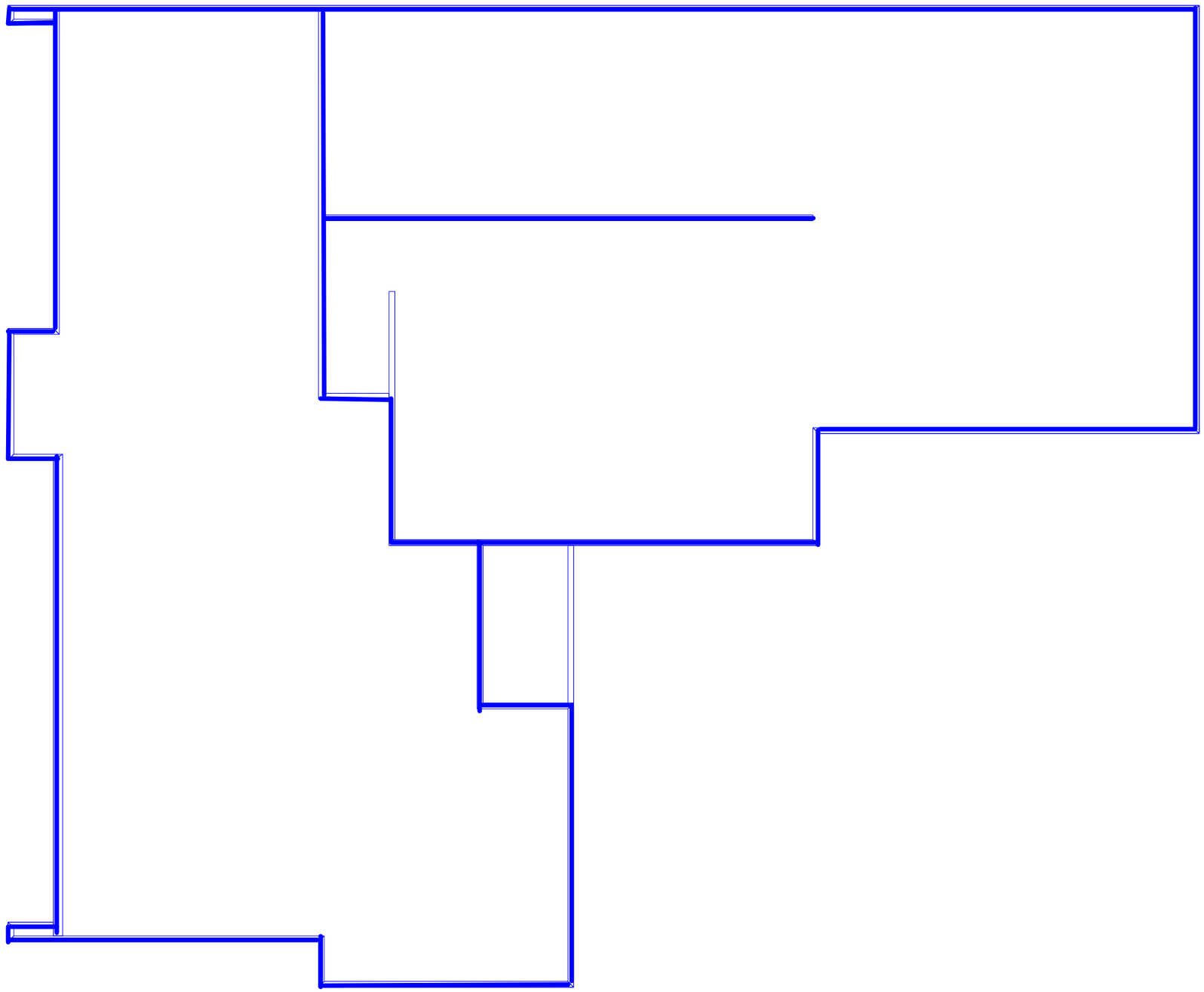
1 x STUD-LOK **SL170** screwed vertically through single or double Top Plate into stud.



2 x 90mm x 3.15 Ø plain steel wire nails driven vertically into stud.

OPTION 2

(Alternative to NZS 3604:2011 Section 8)



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PlaceMakers®
34 Carncross Street
Mosgiel
Ph 03 484 7280

Site Address :
A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Sheet Title :
For Building Consent
Stud To Top Plate Fixing

Date : 7 Jun,2024
Drawn : Craig Murphy
Scale : 1: 100
System : MiTek 20/20

Job Details:

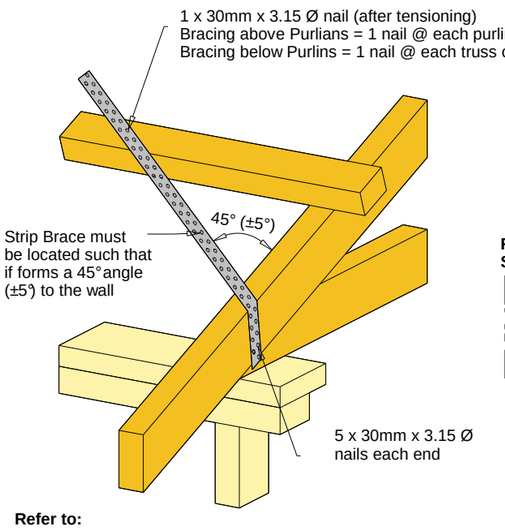
Roof Pitch	: 5.00deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron .55mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on clips	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.630kPa	Overhang	: 600mm

PrimeCad v4.7.346

MiTek™

Job Title : 252947P
Sheet : 4
Revision Number :

LUMBERLOK® ROOF BRACING



Roof Bracing Specifications

Refer to:
LUMBERLOK Roof Bracing Specifications 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance
(As per NZS 3604:2011)

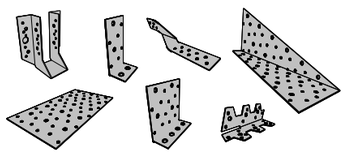
LUMBERLOK® TRUSS FIXINGS

D - Pair of Wire Dogs and 2 x 90mm 3.15mm skew nails
X - LUMBERLOK JH47x90 Joist Hanger
Z - LUMBERLOK JH47x120 Joist Hanger
P - LUMBERLOK JH47x190 Joist Hanger
E - LUMBERLOK JH95x165 Joist Hanger
T - LUMBERLOK CT200 Ceiling Tie
O - Pair of LUMBERLOK CT200 Ceiling Ties
H - LUMBERLOK CT400 Cyclone Tie
B - LUMBERLOK CT600 Cyclone Tie
4 - LUMBERLOK Multi Grip
M - Pair of LUMBERLOK Multi Grips
NP - LUMBERLOK Nailon Plate
N - LUMBERLOK N21 Diagonal Cleat
V - LUMBERLOK CPC40 Cleat
W - Pair of LUMBERLOK CPC40 Cleats
K - LUMBERLOK TTP 16kN Truss to Top Plate set
G - LUMBERLOK TTP 9kN Truss to Top Plate set

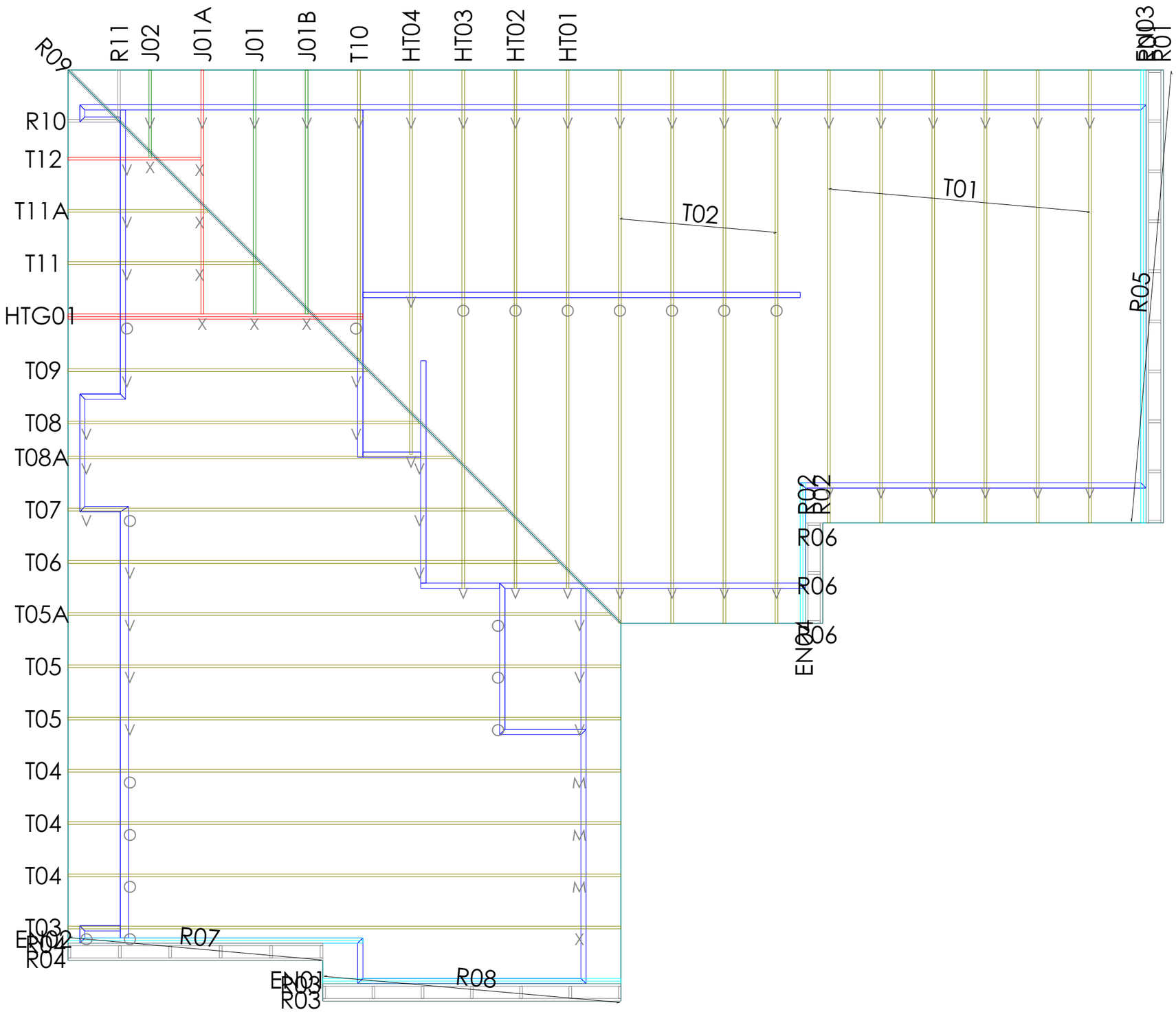
Joist Hanger Installation

CT200 Truss to Top Plate Fixing Installation

16kN & 9kN Truss to Top Plate Fixing Installation



Notes:
All other areas must have the minimum 2 x 90mm 3.15mm skew nails and 2 x wire dogs for truss to top plate connections
Refer to:
LUMBERLOK Timber Connectors Characteristic Loadings Data Brochure 08/2014



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PrimeCad v4.7.346

PlaceMakers®
34 Carncross Street
Mosgiel
Ph 03 484 7280

Site Address :
A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Sheet Title :
For Building Consent
Truss Fixings & Roof Bracing

Date :	7 Jun,2024	Drawn :	Craig Murphy
Scale :	1: 100	System :	MiTek 20/20

Job Details:

Roof Pitch	: 5.00deg	Truss Centres	: 900mm
Roof Material	: Longrun Iron .55mm	Roof Live Load	: 0.250kPa
Ceiling Material	: Rondo on clips	Floor Live Load	:
Wind Zone	: High	Wind Speed	: 44m/s
Roof Snow Load	: 0.630kPa	Overhang	: 600mm

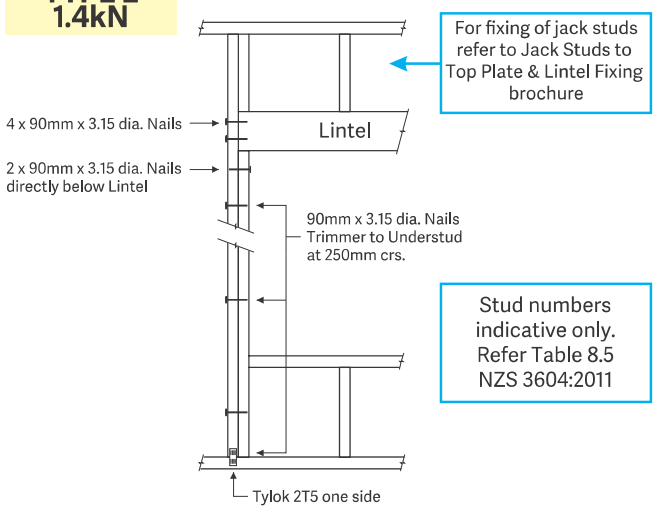
MiTek™

Job Title : 252947P
Sheet : 5
Revision Number :

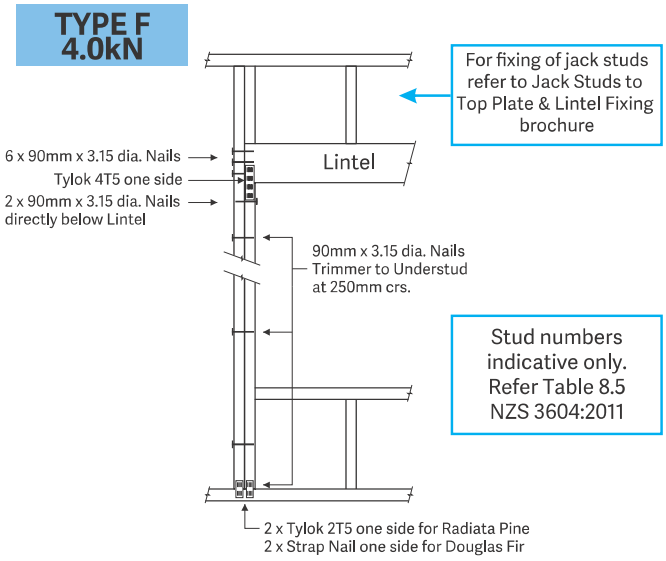
LINTEL FIXING OPTIONS

(Characteristic Uplift)

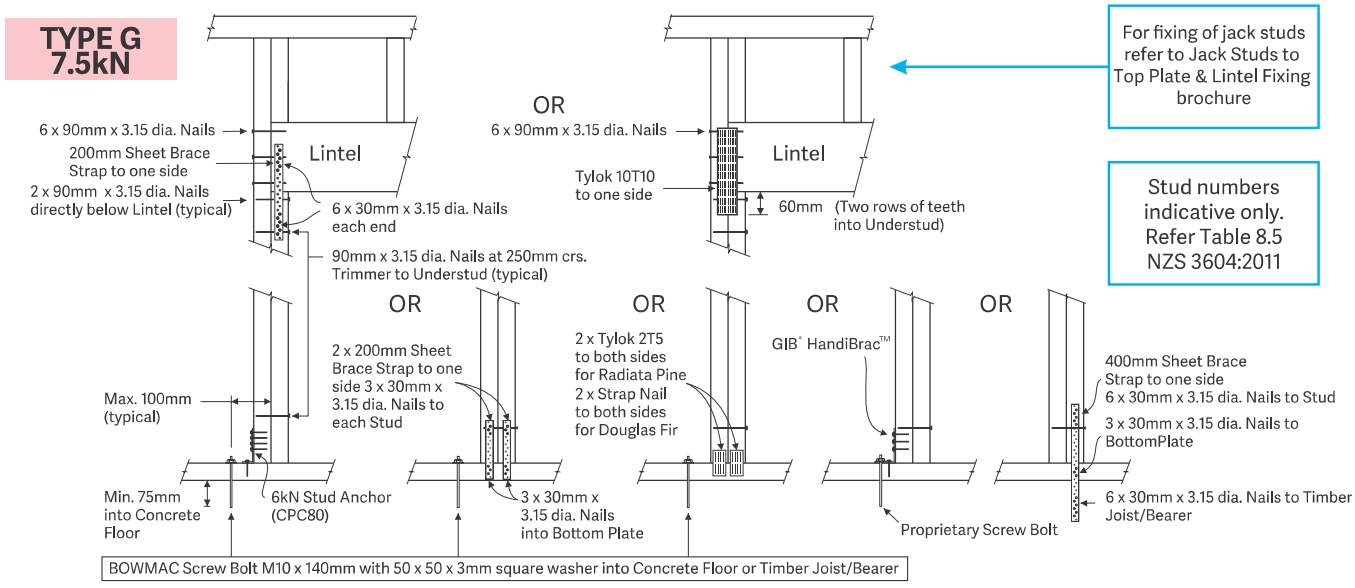
TYPE E 1.4kN



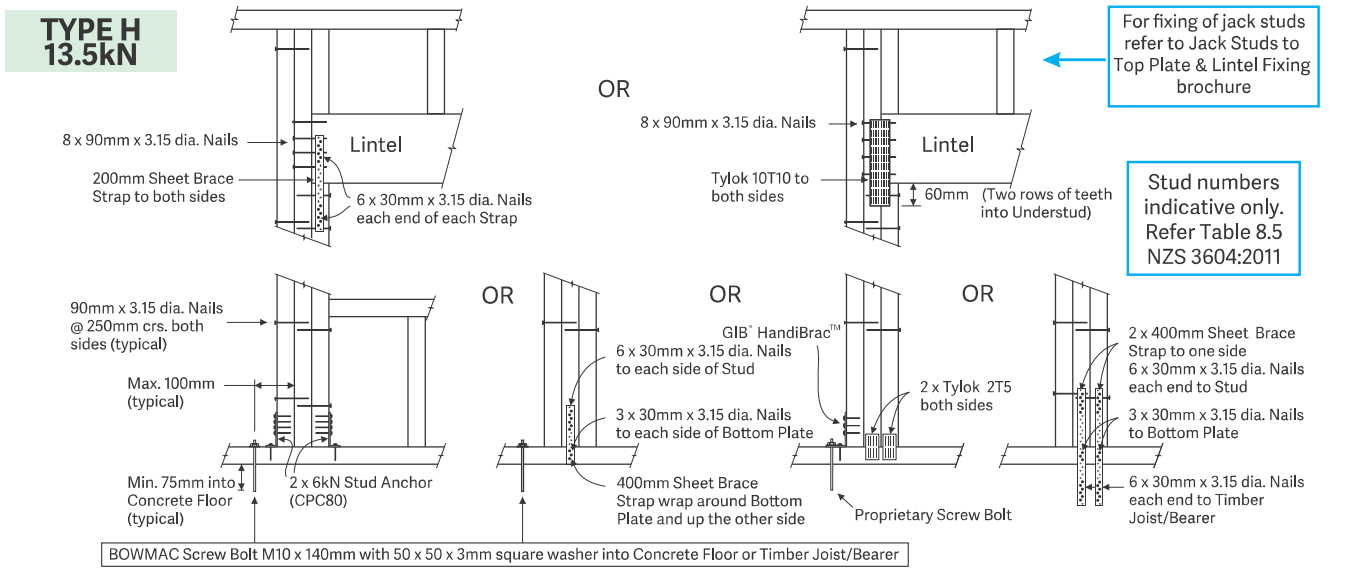
TYPE F 4.0kN



TYPE G 7.5kN



TYPE H 13.5kN

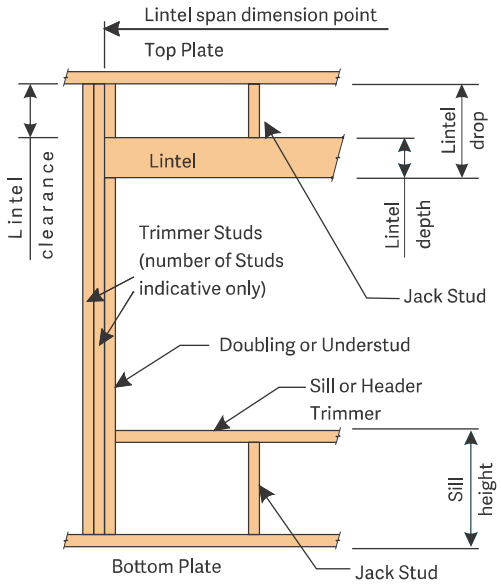


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STUD-LOK LINTEL FIXING OPTIONS FOR ON-SITE

ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12 NZS 3604:2011

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



LINTEL SUPPORTING GIRDER TRUSSES

	Light Roof			Heavy Roof		
	Wind Zone			Wind Zone		
Roof Tributary Area	Low, Medium, High	Very High	Extra High	Low, Medium, High	Very High	Extra High
8.6m²	G	G	H	G	G	H
11.6m²	G	H	H	G	G	H
12.1m²	G	H	H	G	H	H
15.3m²	H	H	-	G	H	H
19.1m²	H	-	-	G	H	-
20.9m²	H	-	-	H	H	-
21.8m²	H	-	-	H	-	-
34.3m²	-	-	-	H	-	-

NOTES:

1. Roof Tributary Area = approx. 1/2 x (total roof area on girder and rafter trusses supported by lintel)

2. Assumed girder truss is at mid-span or middle third span of lintel

3. Use similar fixings for both ends of lintel

4. All other cases require specific engineering design

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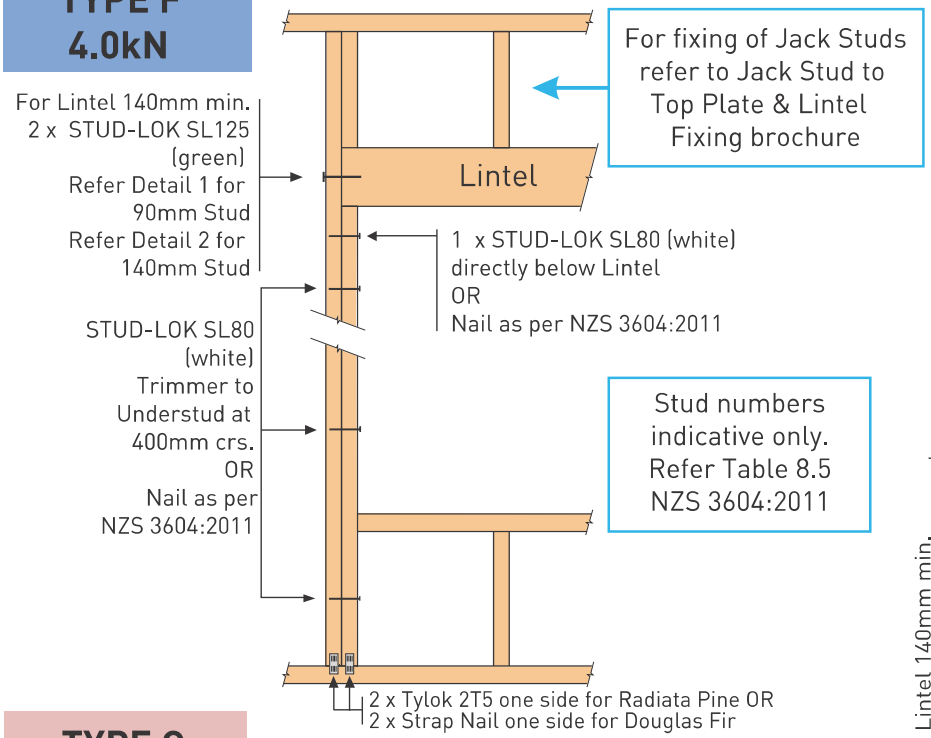
SELECTION CHART FOR LINTEL FIXING

Lintel Span (m)	Loaded Dimension (m)	Light Roof					Heavy Roof				
		Wind Zone					Wind Zone				
		Low	Medium	High	Very High	Extra High	Low	Medium	High	Very High	Extra High
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
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	6.0	G	H	-	-	-	E	G	H	-	-

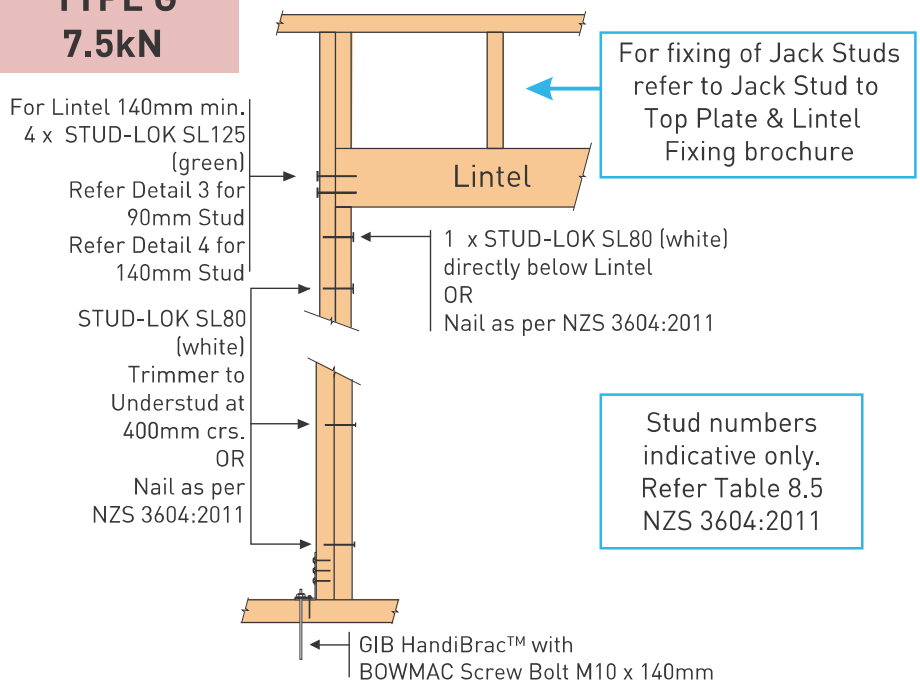
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STUD-LOK LINTEL FIXING OPTIONS FOR ON-SITE

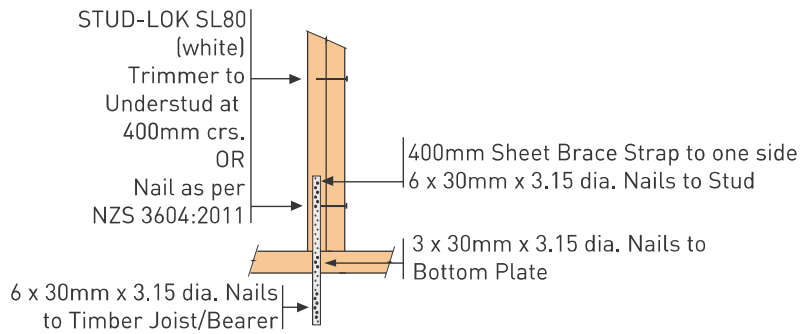
TYPE F 4.0kN



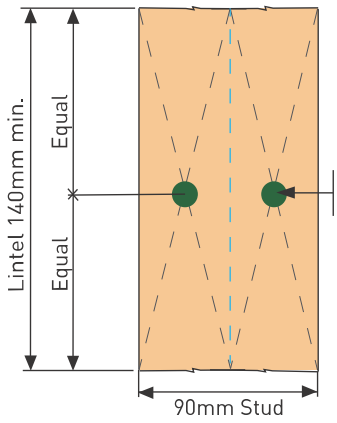
TYPE G 7.5kN



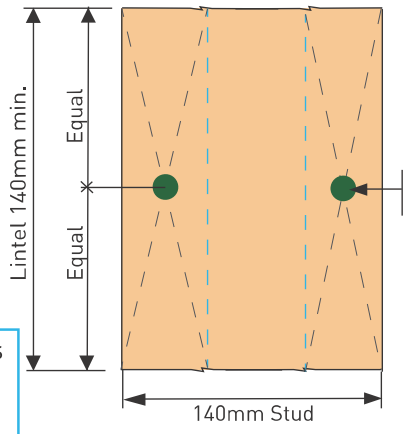
OR



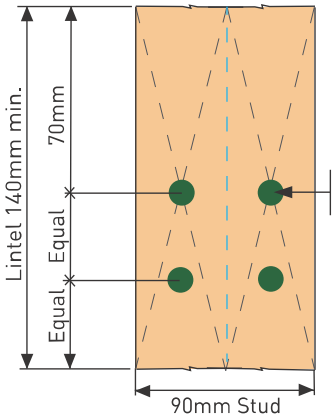
Detail 1



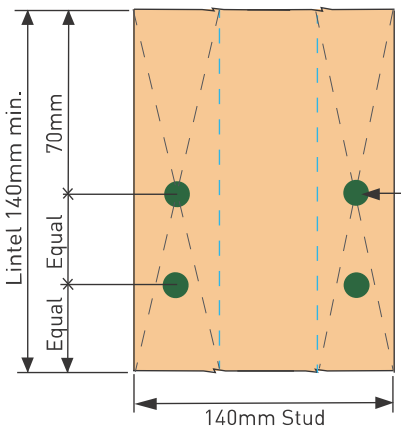
Detail 2



Detail 3



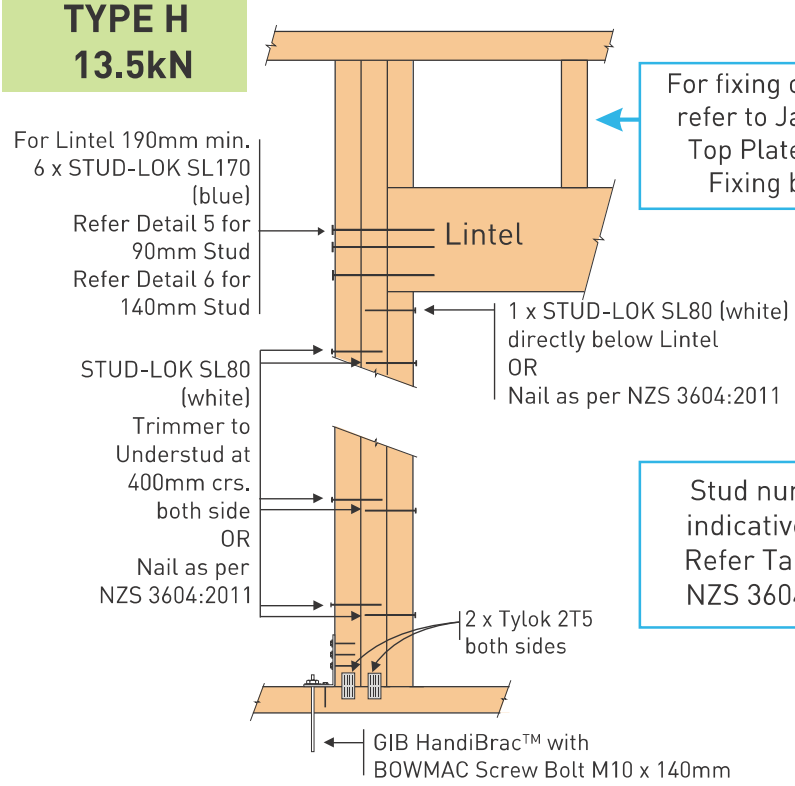
Detail 4

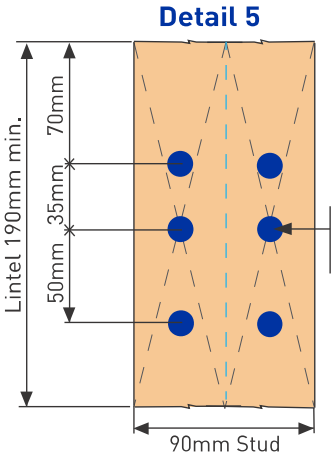


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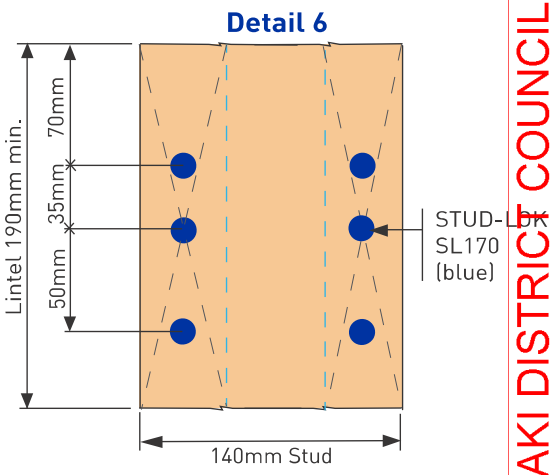
STUD-LOK LINTEL FIXING OPTIONS FOR ON-SITE

TYPE H
13.5kN

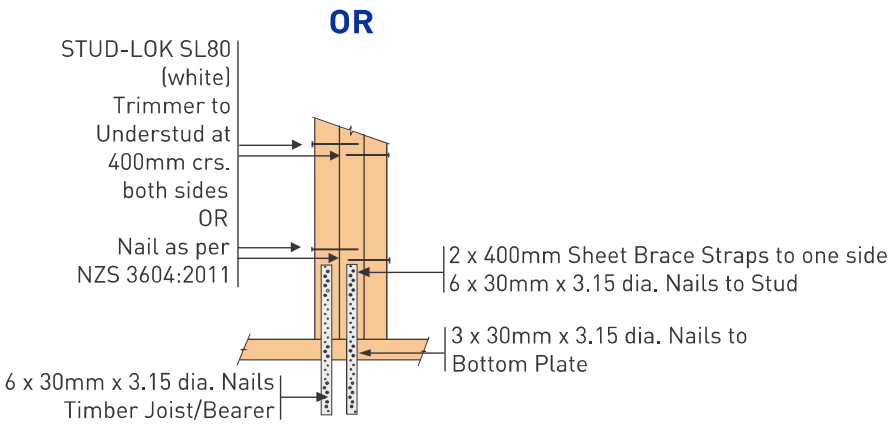




Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011



OR



NOTE: STUD-LOK TYPE F 4.0kN fixing can be used for TYPE E 1.4kN fixing

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MiTek New Zealand Limited

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

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

www.miteknz.co.nz

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

ISSUED BY: **MiTek New Zealand Limited**

TO: **PlaceMakers - Frame & Trusses**

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

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **252947P** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

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

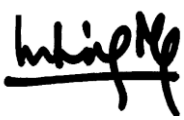
On behalf of MiTek New Zealand Limited, and subject to:

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

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

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

On behalf of MiTek New Zealand Limited, **Date: Friday, 7 June 2024**



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

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Job: 252947P
Client: A1 Homes Otago Southland
Phone:
Site: A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru
Description:
Building Consent No.:
Phone:

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **PlaceMakers - Frame & Trusses**, being licensed to use the MiTek 20/20® software, to the client listed above and may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

MiTek 20/20® TRUSS DESIGN DATA

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

Job Details

Importance Level : 2

Design Working Life : 50 years

Roof Truss

Timber Group:	DFTNZOH1.2	Pitch:	5.000 deg	Nominal Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Longrun Iron .55mm	Material:	Rondo on clips	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	1800 mm centres	**Snow**	
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN	Location:	Oamaru (N4) at 100 m
				Open Ground Load:	0.900 kPa
				Basic Roof Load:	0.630 kPa

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

MiTek® Truss List

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

Roof Truss

Treatment: Top Chords - H1.2 Bottom Chords - H1.2 Webs - H1.2

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
EN01	1D	3850	5.000	900	*R01	2	7800	5.000	255	T03	1	8640	5.000	900
EN02	1D	4880	5.000	900	*R02	2	1730	5.000	255	T04	3	7940	5.000	900
EN03	1D	6600	5.000	900	*R03	2	5140	5.000	255	T05	2	6630	5.000	900
EN04	1D	1820	5.000	900	*R04	2	4390	5.000	255	T05A	1	6630	5.000	900
HT01	1	8330	5.000	900	*R05	10	210	0.000	862	T06	1	5270	5.000	900
HT02	1	8330	5.000	900	*R06	3	210	0.000	843	T07	1	5970	5.000	900
HT03	1	8330	5.000	900	*R07	6	210	0.000	869	T08	1	4880	5.000	900
HT04	1	6025	5.000	900	*R08	7	210	0.000	849	T08A	1	5970	5.000	900
HTG01	1D	4180	5.000	900	*R09	1	13433	3.540	900	T09	1	4180	5.000	900
J01	1	3605	5.000	900	*R10	1	871	5.000	900	T10	1	3605	5.000	900
J01A	1	3605	5.000	900	*R11	1	820	5.000	900	T11	1	1390	5.000	900
J01B	1	3605	5.000	900	T01	6	6600	5.000	900	T11A	1	1390	5.000	900
J02	1	905	5.000	900	T02	4	8330	5.000	900	T12	1	1390	5.000	900

Roof Truss quantity : 76

Total quantity : 76

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The computer design input has been carried out by:

Signed: ... .

Date: ...Friday, 7 June 2024....

Name of Detailer: Craig Murphy

Qualifications and Title:

On behalf of: PlaceMakers - Frame & Trusses

PlaceMakers®
Know how. Can do.

Job: 252947P
Client: A1 Homes Otago Southland
Phone:
Site: A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru
Phone:
Description:
Building Consent No.:
MiTek 20/20 Engineering 4.7.346.0
MiTek New Zealand Limited
Printed: 07:13:06 07 Jun 2024

TRUSS FIXING SELECTION REPORT - Characteristic Loads

Fixings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data)

MiTek® Truss List
Legend: * = detail only, ? = input only, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
EN01	1D	3850	N	3.609	2.727	Wide		No fixing selected
			X	3.203	2.609	Wide		No fixing selected
			W	1.910	1.087	Wide		No fixing selected
			V	0.668	0.424	Wide		No fixing selected
			U	0.638	0.422	Wide		No fixing selected
			T	0.628	0.408	Wide		No fixing selected
			S	0.633	0.415	Wide		No fixing selected
			R	0.630	0.406	Wide		No fixing selected
			Q	0.637	0.432	Wide		No fixing selected
			P	0.660	0.342	Wide		No fixing selected
			O	1.977	3.394	Wide		No fixing selected
EN02	1D	4880	AA	0.545	0.195	Wide		No fixing selected
			O	0.865	0.360	Wide		No fixing selected
			Z	0.679	0.341	Wide		No fixing selected
			Y	0.623	0.424	Wide		No fixing selected
			X	0.633	0.413	Wide		No fixing selected
			W	0.631	0.412	Wide		No fixing selected
			V	0.632	0.413	Wide		No fixing selected
			U	0.632	0.412	Wide		No fixing selected
			T	0.632	0.413	Wide		No fixing selected
			S	0.631	0.407	Wide		No fixing selected
			R	0.633	0.433	Wide		No fixing selected
			Q	0.628	0.326	Wide		No fixing selected
			P	0.797	0.702	Wide		No fixing selected
EN03	1D	6600	AL	2.747	1.737	Wide		No fixing selected
			U	4.266	2.297	Wide		No fixing selected
			AC	0.632	0.412	Wide		No fixing selected
			AK	1.001	0.639	Wide		No fixing selected
			AJ	0.661	0.414	Wide		No fixing selected
			AI	0.634	0.419	Wide		No fixing selected
			AH	0.630	0.409	Wide		No fixing selected
			AG	0.632	0.413	Wide		No fixing selected
			AF	0.631	0.412	Wide		No fixing selected
			AE	0.632	0.412	Wide		No fixing selected
			AD	0.632	0.412	Wide		No fixing selected
			AB	0.632	0.412	Wide		No fixing selected
			AA	0.632	0.412	Wide		No fixing selected
			Z	0.631	0.413	Wide		No fixing selected
			Y	0.636	0.410	Wide		No fixing selected
			X	0.614	0.421	Wide		No fixing selected
			W	0.879	0.380	Wide		No fixing selected
			V	1.419	2.493	Wide		No fixing selected
EN04	1D	1820	H	3.695	1.708	Wide		No fixing selected
			M	2.988	2.676	Wide		No fixing selected
			L	2.226	0.879	Wide		No fixing selected
			K	0.694	0.543	Wide		No fixing selected
			J	0.631	0.369	Wide		No fixing selected
			I	2.037	3.744	Wide		No fixing selected
HT01	1	8330	I	2.978	1.274	Cross	1	Single CPC40
			O	3.895	2.126	Cross	1	Single CPC40
			L	7.538	4.928	Cross	1	CT200 pair
HT02	1	8330	J	2.816	1.166	Cross	1	Single CPC40
			Q	3.762	2.073	Cross	1	Single CPC40
			M	7.805	5.105	Cross	1	CT200 pair
HT03	1	8330	K	2.828	1.174	Cross	1	Single CPC40
			S	3.741	2.096	Cross	1	Single CPC40
			N	7.785	5.093	Cross	1	CT200 pair
HT04	1	6025	H	3.092	1.345	Cross	1	Single CPC40
			N	1.784	0.860	Cross	1	Single CPC40
			K	5.813	3.818	Cross	1	Single CPC40
J01	1	3605	E	3.717	1.842	Cross	1	Single CPC40
			H	1.734	1.415	Butt	1	JH 47x90
J01B	1	3605	F	3.834	1.773	Cross	1	Single CPC40
			J	2.621	1.554	Butt	1	JH 47x90
J02	1	905	E	2.401	1.295	Cross	1	Single CPC40
			H	0.851	0.402	Butt	1	JH 47x90
*R01	2	7800						Refer NZS3604:2011 Tables 15.6
*R02	2	1730						Refer NZS3604:2011 Tables 15.6
*R03	2	5140						Refer NZS3604:2011 Tables 15.6
*R04	2	4390						Refer NZS3604:2011 Tables 15.6
*R05	10	210						Refer NZS3604:2011 Tables 15.6
*R06	3	210						Refer NZS3604:2011 Tables 15.6
*R07	6	210						Refer NZS3604:2011 Tables 15.6
*R08	7	210						Refer NZS3604:2011 Tables 15.6
*R09	1	13433						Refer NZS3604:2011 Tables 15.6
*R10	1	871						Refer NZS3604:2011 Tables 15.6

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PlaceMakers - Frame & Trusses

Job: 252947P
Description:
Building Consent No.:
MiTek 20/20 Engineering 4.7.346.0

Client: A1 Homes Otago Southland
Phone:

MiTek New Zealand Limited

Site: A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Phone:

Printed: 07:13:06 07 Jun 2024

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
*R11	1	820						Refer NZS3604:2011 Tables 15.6
T01	6	6600	J	6.162	3.376	Cross	6	Single CPC40
			P	6.253	3.259	Cross	6	Single CPC40
T02	4	8330	J	2.894	1.219	Cross	4	Single CPC40
			P	4.673	2.140	Cross	4	Single CPC40
			M	7.633	5.011	Cross	4	CT200 pair
T03	1	8640	K	3.014	4.134	Cross	1	CT200 pair
			R	6.992	3.585	Butt	1	JH 47x90
			L	12.431	8.089	Cross	1	CT200 pair
T04	3	7940	K	7.630	4.091	Cross	3	CT200 pair
			R	7.445	3.921	Butt	3	Pair of MultiGrips
T05	2	6630	K	6.603	3.368	Cross	2	Single CPC40
			Q	6.424	4.088	Cross	2	CT200 pair
			I	2.184	1.642	Cross	2	Single CPC40
T05A	1	6630	K	6.599	3.368	Cross	1	Single CPC40
			Q	6.523	4.097	Cross	1	CT200 pair
			I	1.903	1.234	Cross	1	Single CPC40
T06	1	5270	K	5.544	2.668	Cross	1	Single CPC40
			O	5.222	3.187	Cross	1	Single CPC40
			H	0.772	0.777	None		No fixing selected. Specific engineering design required for down and uplift loads.
			I	2.042	1.256	None		No fixing selected. Specific engineering design required for down and uplift loads.
T07	1	5970	J	0.831	1.484	Cross	1	Single CPC40
			N	4.827	3.062	Cross	1	Single CPC40
			K	6.717	4.337	Cross	1	CT200 pair
			H	2.209	1.433	None		No fixing selected. Specific engineering design required for down and uplift loads.
T08	1	4880	I	4.243	2.411	Cross	1	Single CPC40
			M	5.004	3.060	Cross	1	Single CPC40
			H	0.362	0.296	None		No fixing selected. Specific engineering design required for down and uplift loads.
T08A	1	5970	J	5.128	3.015	Cross	1	Single CPC40
			O	5.621	2.946	Cross	1	Single CPC40
T09	1	4180	G	4.765	2.178	Cross	1	Single CPC40
			J	3.399	2.086	Cross	1	Single CPC40
T10	1	3605	G	2.505	1.393	Cross	1	Single CPC40
			F	0.300	0.230	None		No fixing selected. Specific engineering design required for down and uplift loads.
			J	2.116	1.112	Wide		No fixing selected
			I	2.363	1.454	Wide		No fixing selected
			H	2.446	1.194	Wide		No fixing selected
T11	1	1390	F	2.751	1.940	Cross	1	Single CPC40
			H	1.748	1.279	Butt	1	JH 47x90
			E	0.489	0.392	None		No fixing selected. Specific engineering design required for down and uplift loads.
T11A	1	1390	F	2.790	2.023	Cross	1	Single CPC40
			H	0.997	0.567	Butt	1	JH 47x90
T12	1	1390	E	2.716	1.901	Cross	1	Single CPC40
			G	0.749	0.488	Butt	1	JH 47x90
J01A	1	3605	F	3.949	2.075	Cross	1	Single CPC40
			I	2.631	1.817	Butt	1	JH 47x90
HTG01	1D	4180	G	7.681	4.335	Cross	1	CT200 pair
			K	6.956	4.567	Cross	1	CT200 pair

Fixing List

Qty	Selected Fixing
53	Single CPC40
18	CT200 pair
8	JH 47x90
3	Pair of MultiGrips
57	No fixing selected

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Note:
1) Fixings have been selected based on loading only. Please check that selected fixings are practical for each situation and that appropriate nailing can be applied on site.
2) Fixings are selected from the LUMBERLOK Brochure 08/2014 (Timber Connectors Characteristic Loadings Data) with down and uplift characteristic loads of at least the values shown for each joint.

PlaceMakers - Frame & Trusses

Job: 252947P
Description:
Building Consent No.:

Client: A1 Homes Otago Southland
Phone:

Site: A1 Homes
Burgess & Allen
7 Whitehaven St
Oamaru

Phone:

MiTek 20/20 Engineering 4.7.346.0 | MiTek New Zealand Limited | Printed: 07:13:46 07 Jun 2024

TRUSS BEARINGS EXCEEDING 10KN REPORT - Ultimate Limit State Loads

MiTek® Truss List

Legend: ? = input only, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully

Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN) Down	Uplift

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Note:

1) Select appropriate Slab Thickening Detail from the MiTek 'Internal Load Bearing On Concrete Floor Slabs' brochure.

Placemakers

Job No: 252947P
Job Name: Burgess & Allen

Client: A1 Homes Otago & Southland
Building Consent No:

Site: 7 Whitehaven St Oamaru

PRODUCER STATEMENT
MiTek Beam Program v1.07 April 2012

Certification of MiTek Beam Program v1.07 April 2012

The MiTek Beam Program v1.07 April 2012 has been developed by MiTek New Zealand Ltd for the design of these beams: Timber, Glulam, GANGLAM and GANG-NAIL FLITCH BEAMS. The beam designs calculated by this program are prepared using sound and widely accepted engineering principles, and in accordance with Compliance Documents of the New Zealand Building Code and Verification Method B1/VM1 to satisfy the requirements of Clause B1 of the Building Code. We believe on reasonable grounds that these beams for the proposed building, if constructed in accordance with the drawings, specifications and other documents provided will comply with the relevant provisions of the NZ Building Code. This is subject to all proprietary products meeting their performance specification requirements; the provision of adequate bracing and fixings; and the correct input of design data carried out by suitably trained personnel.

Summary of MiTek Beam Program v1.07 February 2009 Data and Output

Roof
Weight: light + ceiling
Dead Load: 0.45 kPa
Live Load: 0.25 kPa

Wind
Area/Speed: high (44.0 m/s)

Snow
Area: 0.63 kPa

Wall
Type: Low weight - 0.57kPa

Floor
Live Load: NA

Beam List

Opening Label	Beam Material	Beam Size	Beam Length	Design Status	Opening Label	Beam Material	Beam Size	Beam Length	Design Status
entry Beam	MSG8/VSG8	2/140x45	2430	OKAY					
D01	MSG8/VSG8	2/140x45	1730	OKAY					
w01,w02	MSG8/VSG8	2/140x45	600	OKAY					
w03	MSG8/VSG8	2/140x45	1800	OKAY					
w04	MSG8/VSG8	2/140x45	600	OKAY					
d02	GN Flitch Beam	FB30M	4800	OKAY					
w05	MSG8/VSG8	2/140x45	1000	OKAY					
d03	MSG8/VSG8	2/140x45	2000	OKAY					
w06	MSG8/VSG8	2/140x45	1500	OKAY					
w07	MSG8/VSG8	2/140x45	1200	OKAY					
w08	MSG8/VSG8	2/140x45	1600	OKAY					
d04	MSG8/VSG8	2/140x45	880	OKAY					
w09,w10	MSG8/VSG8	2/140x45	600	OKAY					
d05	GN Flitch Beam	FB30M	4840	OKAY					
w11	MSG8/VSG8	2/140x45	1600	OKAY					
w12	MSG8/VSG8	2/140x45	1000	OKAY					
hall 760	MSG8/VSG8	2/140x45	840	OKAY					
master 760	MSG8/VSG8	2/140x45	840	OKAY					
ensui	MSG8/VSG8	2/140x45	1500	OKAY					
bath 760	MSG8/VSG8	2/140x45	840	OKAY					
store 510	MSG8/VSG8	2/140x45	590	OKAY					
bed 2 760	MSG8/VSG8	2/140x45	840	OKAY					

GANGLAM plating details indicated with RD (regular duty plating), HD (heavy duty plating) and SHD (super heavy duty plating)

The design input has been carried out by:

Signed:..... .....

Date: 7/06/2024

Name of Computer Operator: Craig Murphy

Qualifications and Title: Detailer

Company: Placemakers

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MiTek Beam v1.07 February 2009

Date: Friday, 7 June 2024
Job Number 252947P
Job Name Burgess & Allen
Client A1 Homes Otago & Southland
Calculated By Craig Murphy

Roof Weight light + ceiling
Wind Zone high (44.0 m/s)
Snow Load 0.63 kPa

Beam Details

Beam Label	entry Beam	D01	w01,w02	w03	w04	d02	w05	d03	w06	w07
Beam Span (mm)	2430	1730	600	1800	600	4800	1000	2000	1500	1200
Roof Span "S" (mm)	1400	7940	7940	900	900	7940	5970	1390	3605	3230
Overhang (mm)	600		600	300	300	900	200	900	600	600
Wall Type	NA	NA	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa
Wall Height (mm)			1095	1095	400	300	300	400	400	400
Floor Live load	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Floor Span "F" (mm)										

MiTek Bearing Reactions

Not in use in this version

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)										
)										
;										

Point Load 1										
Girder Span (mm)								1390	3605	
Setback (mm)								905	1390	
Location (mm)								45	1405	
Point Load 2										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 3										
Girder Span (mm)										
Setback (mm)										
Location (mm)										

Beam Status	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY
Beam Material	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	GN Flitch Beam	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8
Beam Size	2/140x45	2/140x45	2/140x45	2/140x45	2/140x45	FB30M	2/140x45	2/140x45	2/140x45	2/140x45
Beam Deflection	3.85mm	3.02mm	0.08mm	2.95mm	0.02mm	5.54mm	0.33mm	3.46mm	1.54mm	0.55mm
Beam Length	2430	1730	600	1800	600	4800	1000	2000	1500	1200

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MiTek Beam v1.07 February 2009

Date: Friday, 7 June 2024
Job Number 252947P
Job Name Burgess & Allen
Client A1 Homes Otago & Southlanc
Calculated By Craig Murphy

Roof Weight light + ceiling
Wind Zone high (44.0 m/s)
Snow Load 0.63 kPa

Beam Details

Beam Label	w08	d04	w09,w10	d05	w11	w12	hall 760	master 760	ensuite 760 cs	bath 760
Beam Span (mm)	1600	880	600	4840	1600	1000	840	840	1500	840
Roof Span "S" (mm)	3230	6600	900	6600	5010	5010	2840	4180	900	8330
Overhang (mm)	600	600	300	600	600					
Wall Type	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	Medium weight - 1.05kPa	NA	NA	NA	NA	NA	NA
Wall Height (mm)	400	400	900	900						
Floor Live load	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Floor Span "F" (mm)										

MiTek Bearing Reactions

Not in use in this version

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r										
:										
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)										
)										
;										

Point Load 1										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 2										
Girder Span (mm)										
Setback (mm)										
Location (mm)										
Point Load 3										
Girder Span (mm)										
Setback (mm)										
Location (mm)										

Beam Status	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY	OKAY
Beam Material	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	GN Flitch Beam	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8	MSG8/VSG8
Beam Size	2/140x45	2/140x45	2/140x45	FB30M	2/140x45	2/140x45	2/140x45	2/140x45	2/140x45	2/140x45
Beam Deflection	1.75mm	0.25mm	0.03mm	6.17mm	1.73mm	0.21mm	0.06mm	0.09mm	0.19mm	0.18mm
Beam Length	1600	880	600	4840	1600	1000	840	840	1500	840

BC - 24009002 - APPROVED - WAITAKI DISTRICT COUNCIL - PAGE 148 OF 400

MiTek Beam v1.07 February 2009

Date: Friday, 7 June 2024
Job Number 252947P
Job Name Burgess & Allen
Client A1 Homes Otago & Southlanc
Calculated By Craig Murphy

Roof Weight light + ceiling
Wind Zone high (44.0 m/s)
Snow Load 0.63 kPa

Beam Details

Beam Label	store 510	bed 2 760
Beam Span (mm)	590	840
Roof Span "S" (mm)	8330	8330
Overhang (mm)		
Wall Type	NA	NA
Wall Height (mm)		
Floor Live load	NA	NA
Floor Span "F" (mm)		

MiTek Bearing Reactions

Not in use in this version

Point Load 1

Girder Span (mm)		
Setback (mm)		
Location (mm)		

Point Load 2

Girder Span (mm)		
Setback (mm)		
Location (mm)		

Point Load 3

Girder Span (mm)		
Setback (mm)		
Location (mm)		

Beam Status	OKAY	OKAY
Beam Material	MSG8/VSG8	MSG8/VSG8
Beam Size	2/140x45	2/140x45
Beam Deflection	0.04mm	0.18mm
Beam Length	590	840

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DESIGN RIGHT

Bracing for monopitch roofs



BY ALIDE ELKINK,
FREELANCE TECHNICAL WRITER, WELLINGTON

JUDGING BY THE NUMBER OF CALLS TO THE BRANZ HELPLINE, THERE'S SOME CONFUSION AROUND BRACING REQUIREMENTS FOR MONOPITCH ROOFS. HERE, WE SORT OUT THE ISSUE.

THE BRACING REQUIREMENT for monopitch roofs is addressed in NZS 3604:2011 *Timber-framed buildings* paragraph 10.3.4.

Simply stated, it requires that bracing for monopitch roofs must comply with paragraphs 10.3.2 (for light roofs) or 10.3.3 (for heavy roofs), but it also includes an exemption.

Raked wall frames

Paragraph 10.3.4 does *not* require roof plane diagonal bracing if:

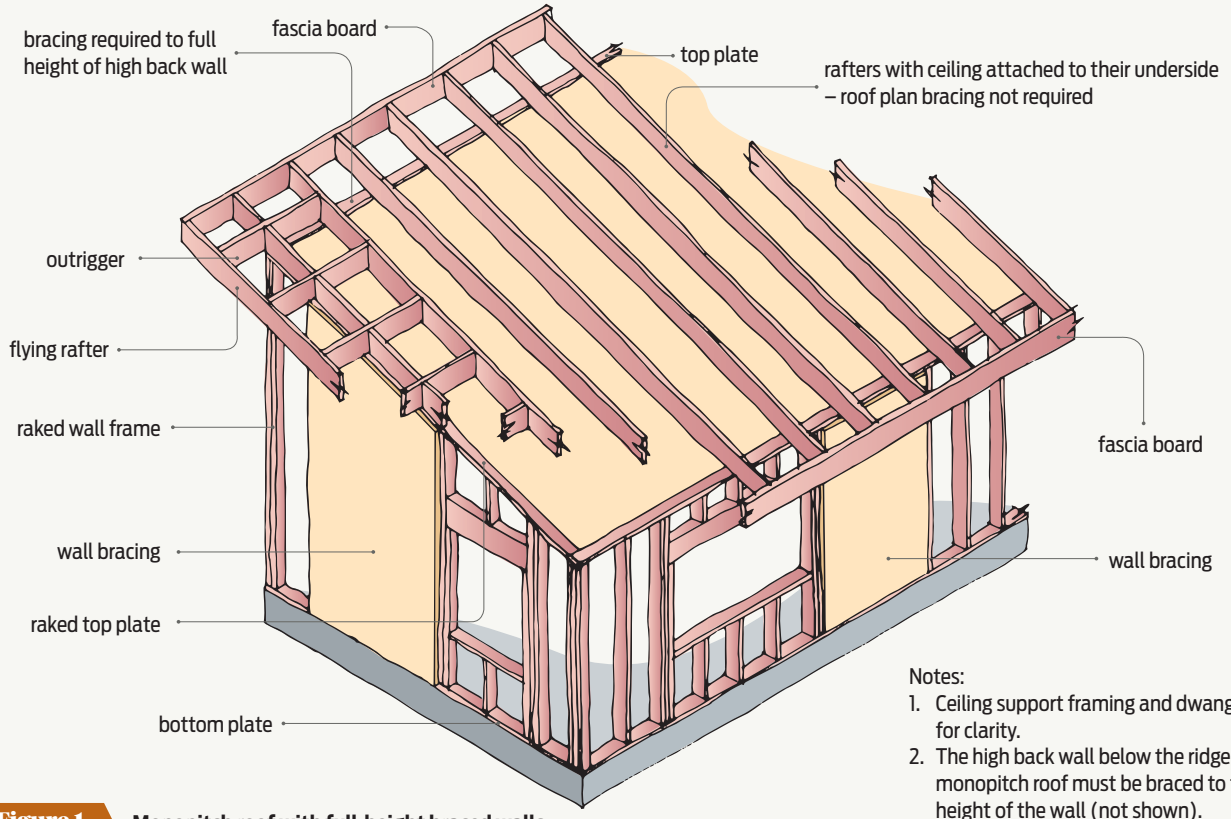
- the wall frames extend and are braced up to the underside of the rafters, and
- the ceiling lining is attached directly to the underside of the rafters.

This will only apply where the wall frames are raked (see Figure 1).

Level top plates and trusses

Where the wall frames have level top plates and the roof framing consists of trusses or a strutted roof, either roof plane or roof space bracing is required in accordance with paragraphs 10.3.2 and 10.3.3 for light and heavy roofs (see Figure 2).

In this case, the highest end of the trusses is considered the ridge line and requires at least two braces over its length. Figure 2 shows both roof plane bracing and roof space bracing as alternatives.



Notes:
1. Ceiling support framing and dwangs omitted for clarity.
2. The high back wall below the ridge of the monopitch roof must be braced to the full height of the wall (not shown).

Figure 1 **Monopitch roof with full-height braced walls.**

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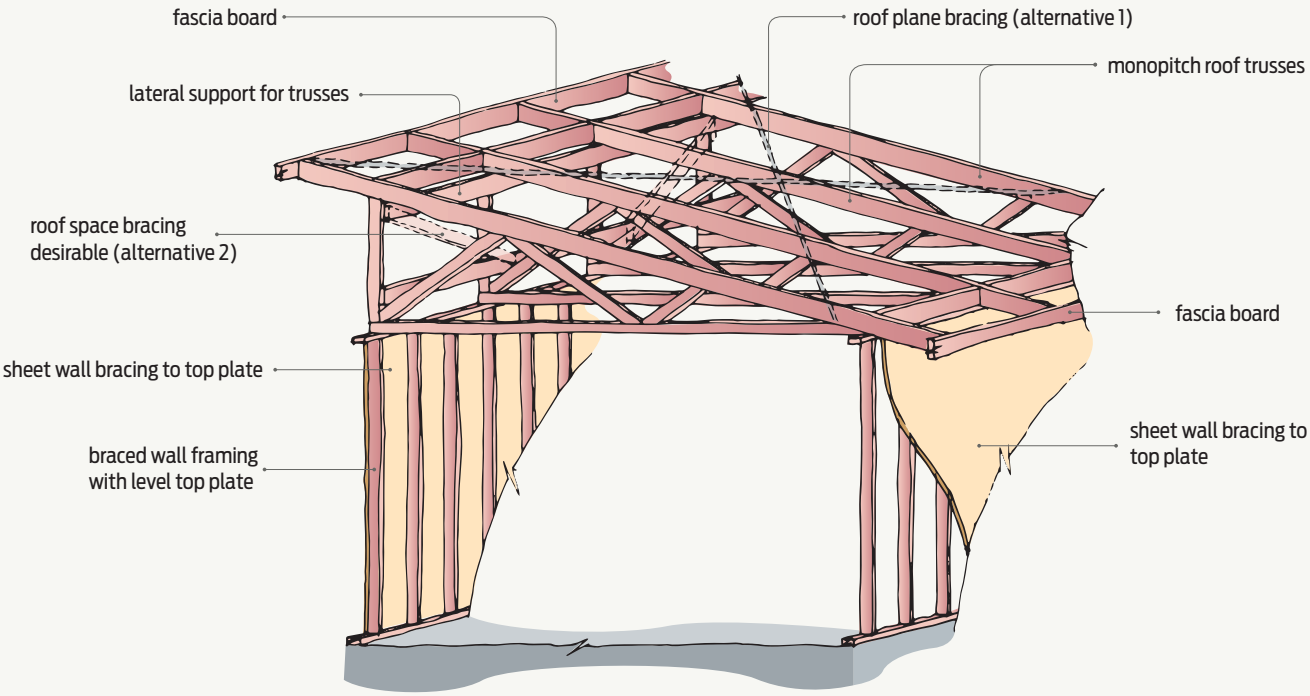


Figure 2 **Monopitch truss roof with level top plate.**

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MiTek®

GABLE END RAKING VERGE

OVERHANG OPTIONS

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★ Covers raking verge using standard purlin overhang options.
★ Covers up to 750mm overhang using standard verge outriggers.
★ Covers up to 1200mm overhang using verge outrigger/purlin combination.

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OVERHANG OPTIONS

- **All gable end loading parameters are based on the design considerations used in NZS 3604:2011 and cover heavy roof weight, extra high wind load and snow load Sg of up to 1.0kPa.**
- **All live load considerations as per AS/NZS 1170.**
- **All timber to be minimum grade SG8 as defined in NZS 3604:2011.**

CANTILEVER PURLIN OPTION

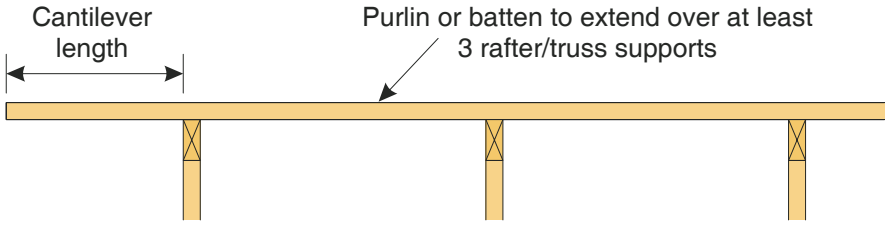


TABLE 1

PURLIN SIZE & ORIENTATION	MAX. CANTILEVER LENGTH (mm)	PURLIN CENTRES (mm)
45x45 ⊠	200	400
70x45 ⊠	300	900
90x45 ⊠	450	900

CANTILEVER OUTRIGGER OPTION

(Note: Maximum sidewall overhang of 750mm)
(See details on next pages)

TABLE 2

MAX. CANTILEVER LENGTH 750mm	OUTRIGGER SIZE & ORIENTATION	MAX. CANTILEVER LENGTH (mm)	OUTRIGGER CENTRES (mm)
	70x45 ⊠	750	600
		600	900
	90x45 ⊠	750	900
		600	1200
	90x45 ⊠	750	400
		600	600

CANTILEVER OUTRIGGER/PURLIN COMBINATION OPTION

(Note: Maximum sidewall overhang of 1200mm)
(See details on next pages)

TABLE 3

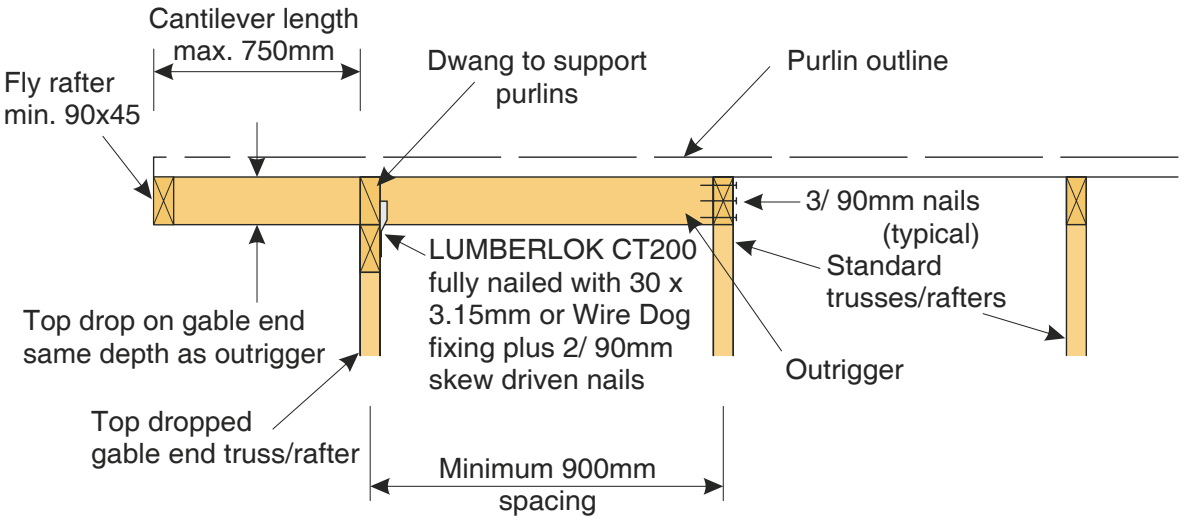
MAX. CANTILEVER LENGTH 1200mm	OUTRIGGER SIZE & ORIENTATION	MAX. CANTILEVER LENGTH (mm)	OUTRIGGER CENTRES (mm)
	45x45 Purlin 90x45 Outrigger ⊠	1200	450
	70x45 Purlin 90x45 Outrigger ⊠	1200	700
	90x45 Purlin 90x45 Outrigger ⊠	1200	900

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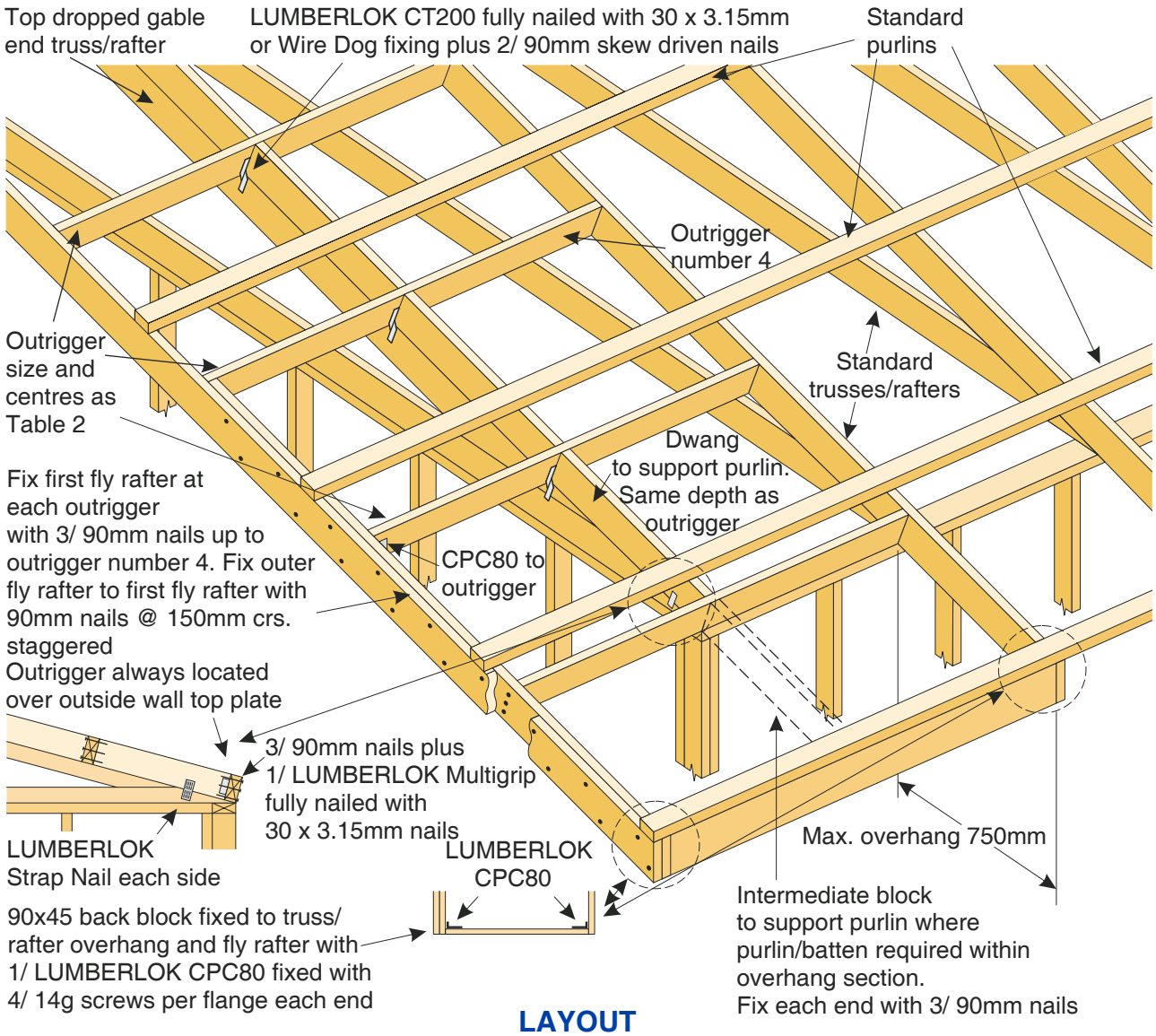
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CONSTRUCTION DETAILS FOR CANTILEVER OUTRIGGER OPTION

(SPANS & CENTRES AS PER TABLE 2)



CROSS SECTION



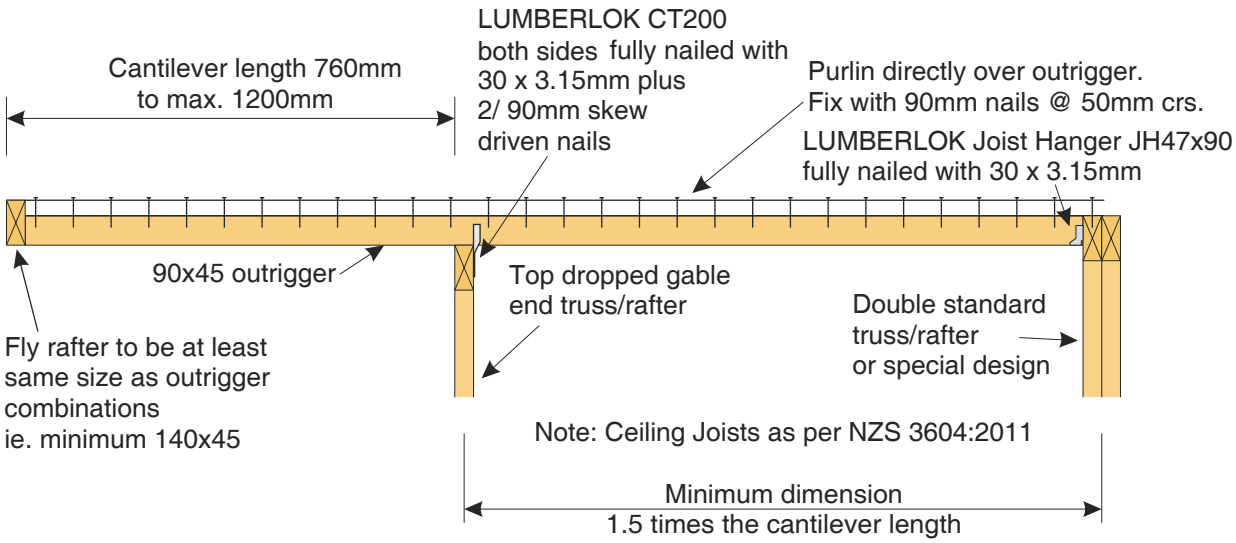
LAYOUT

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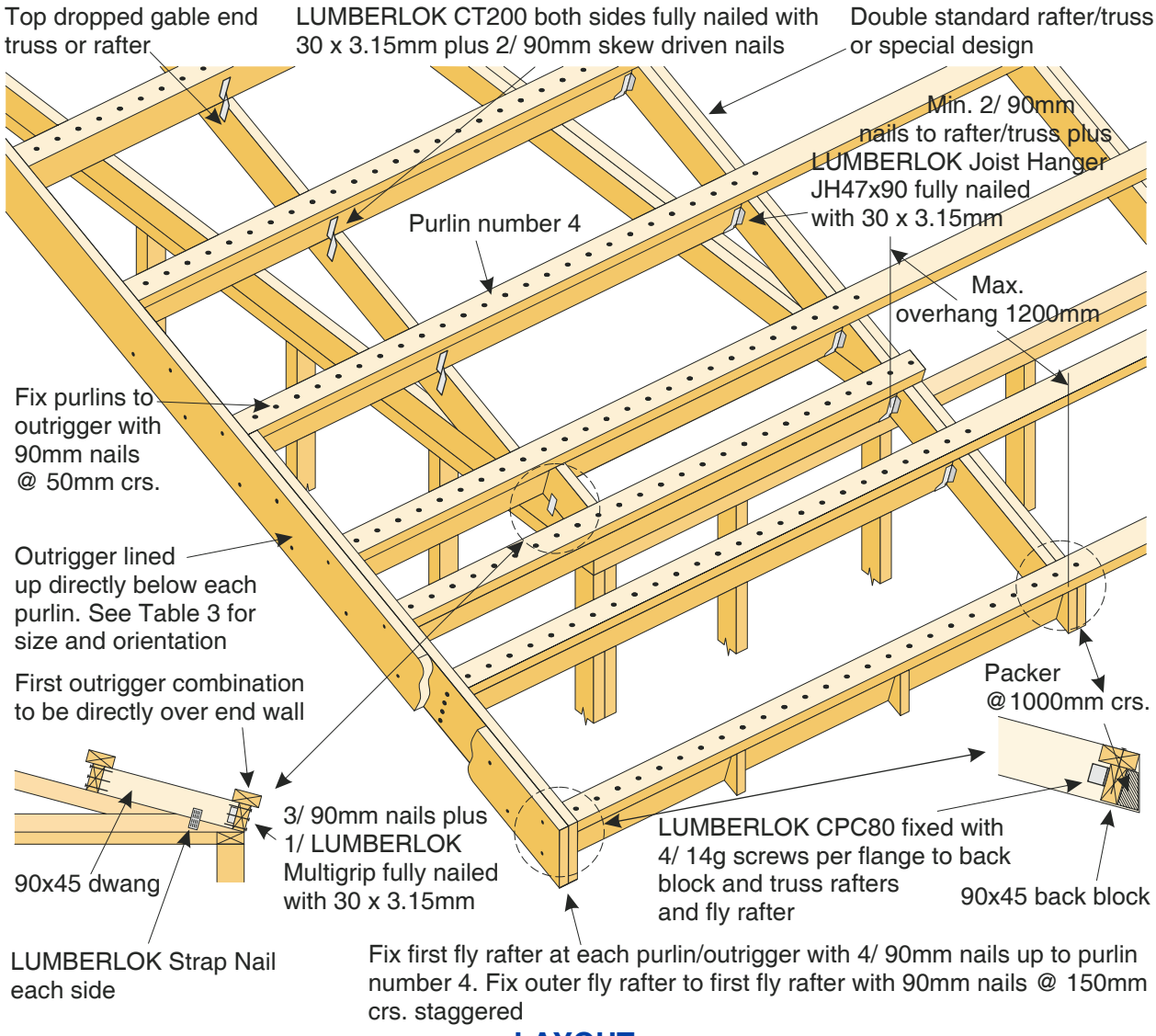
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CONSTRUCTION DETAILS FOR OUTRIGGER/PURLIN COMBINATION

(SPANS & CENTRES AS PER TABLE 3)



CROSS SECTION



LAYOUT

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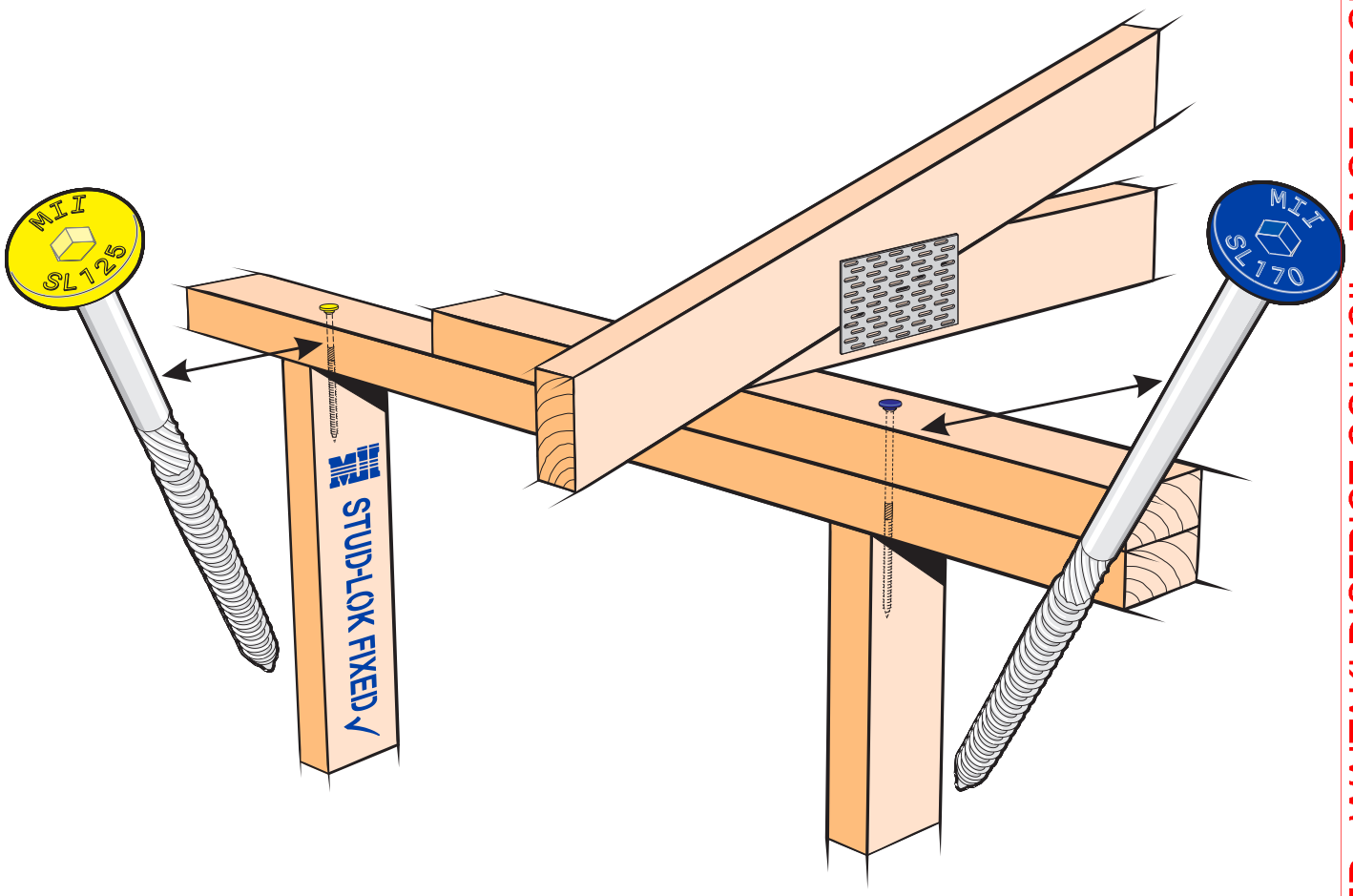
MITEK® LUMBERLOK® BOWMAC®

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BOWMAC®

STUD-LOK

Provides a solution for top plate to stud fixings for residential timber frame buildings



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

Code: **SL125-500**
Packed: **500 per Carton**

Code: **SL170-200**
Packed: **200 per Carton**

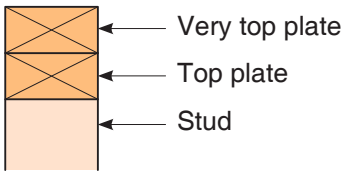
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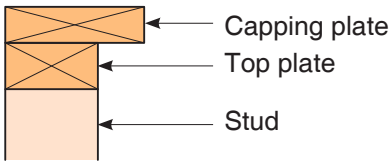
MiTek®

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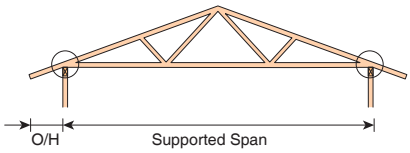
NOTE:
- ★ The STUD-LOK fixing is designed to resist vertical loads only.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist lateral loads.
- ★ The STUD-LOK connections assume that the correct choice of rafter/truss fixings have been made.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011 and include LVL8 timber grades.

DOUBLE TOP PLATES DEFINITION



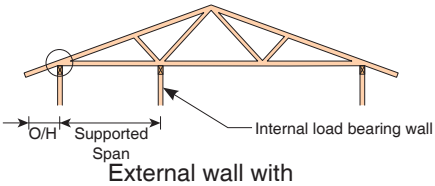


LOAD DIMENSION DEFINITION

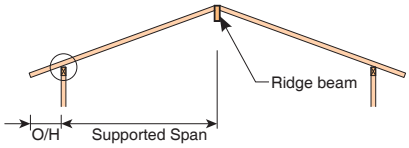


External wall with Standard truss

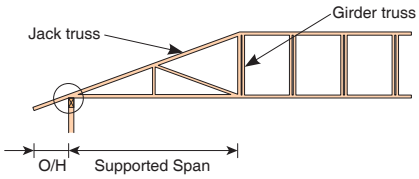
EXTERNAL WALL
LOADED DIMENSION =
SUPPORTED SPAN / 2 + O/H



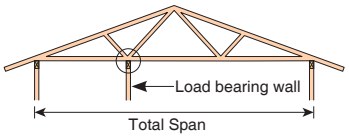
External wall with Internal load bearing wall



External wall with Rafter roof

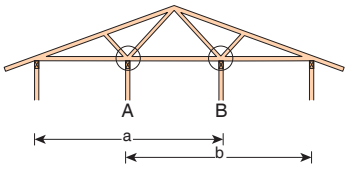


External wall with Jack truss



Internal load bearing wall
(overhang dimension does not apply)

INTERNAL LOAD BEARING WALL
LOADED DIMENSION =
TOTAL SPAN / 2



Multiple internal load bearing walls
(overhang dimension does not apply)

MULTIPLE INTERNAL LOAD BEARING WALLS
LOADED DIMENSION FOR
WALL A = a/2
WALL B = b/2

FIXING SELECTION CHART

(Suitable for walls supporting roof members at 600, 900 or 1200mm crs.)

Wind Zones L, M, H, VH, EH as per NZS 3604:2011

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

2N = 2/ 90mm x 3.15 dia. nails

SL = Single STUD-LOK plus 2/ 90mm x 3.15 dia. nails

NOTE:
To calculate the number of STUD-LOK fixings required, divide the wall length by the stud centres, add 1 to this figure and locate this number of fixings as evenly as possible along the wall length. This figure includes the start and end studs in each wall length.

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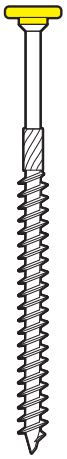
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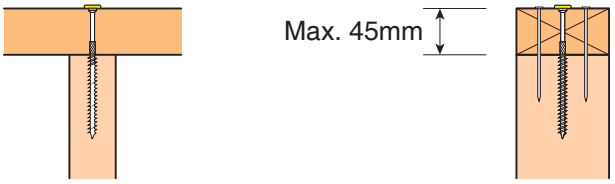
TOP PLATE TO STUD FIXING OPTIONS

STUD-LOK SL125 - Yellow Head

Fix through single top plate

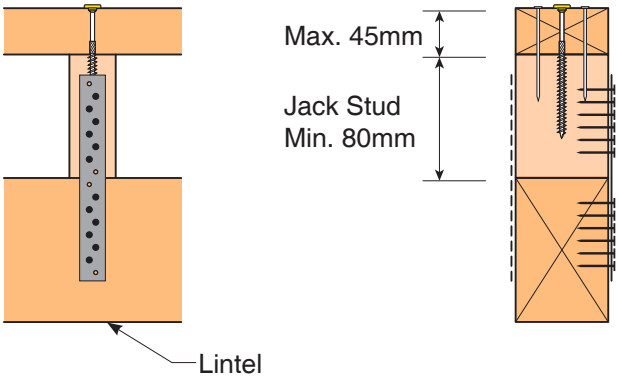
1. Full length stud option





Single SL125
plus 2/ 90mm x 3.15 dia. nails

2. Jack stud option



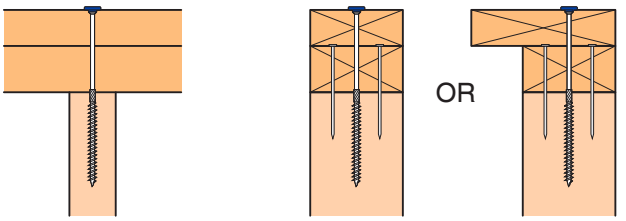
Note: Connect jack stud to lintel with LUMBERLOK® Sheet Brace Strap 200mm on one side with 6 x LUMBERLOK® Product Nails 30mm x 3.15 dia. each end,
OR a pair of Tylok 6T5 (one each side)

STUD-LOK SL170 - Blue Head

Fix through very top plate or capping plate

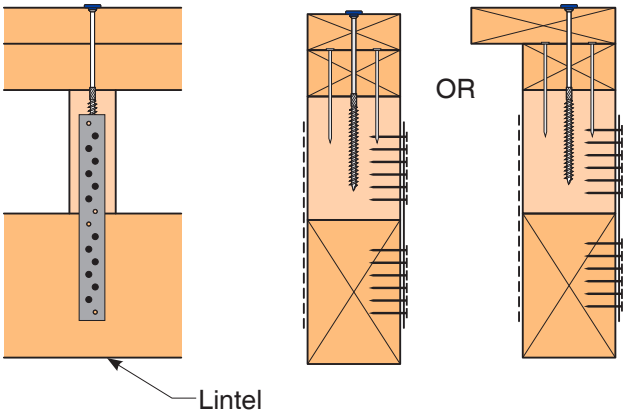
1. Full length stud option





Single SL170
plus 2/ 90mm x 3.15 dia. nails

2. Jack stud option



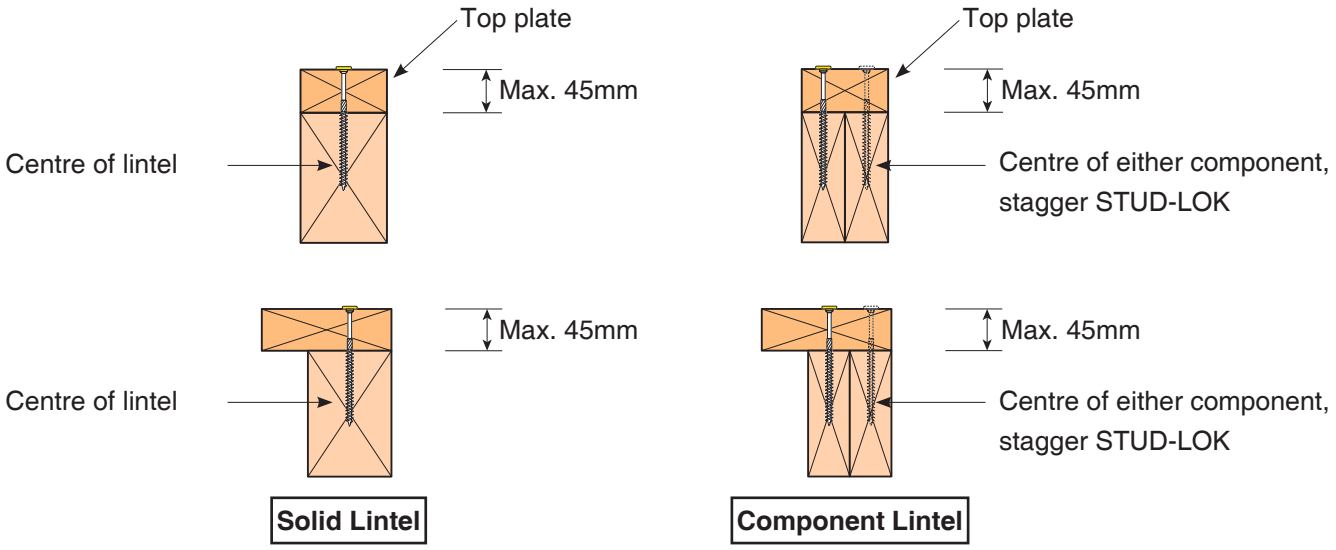
Note: Connect jack stud to lintel with LUMBERLOK® Sheet Brace Strap 200mm on one side with 6 x LUMBERLOK® Product Nails 30mm x 3.15 dia. each end,
OR a pair of Tylok 6T5 (one each side)

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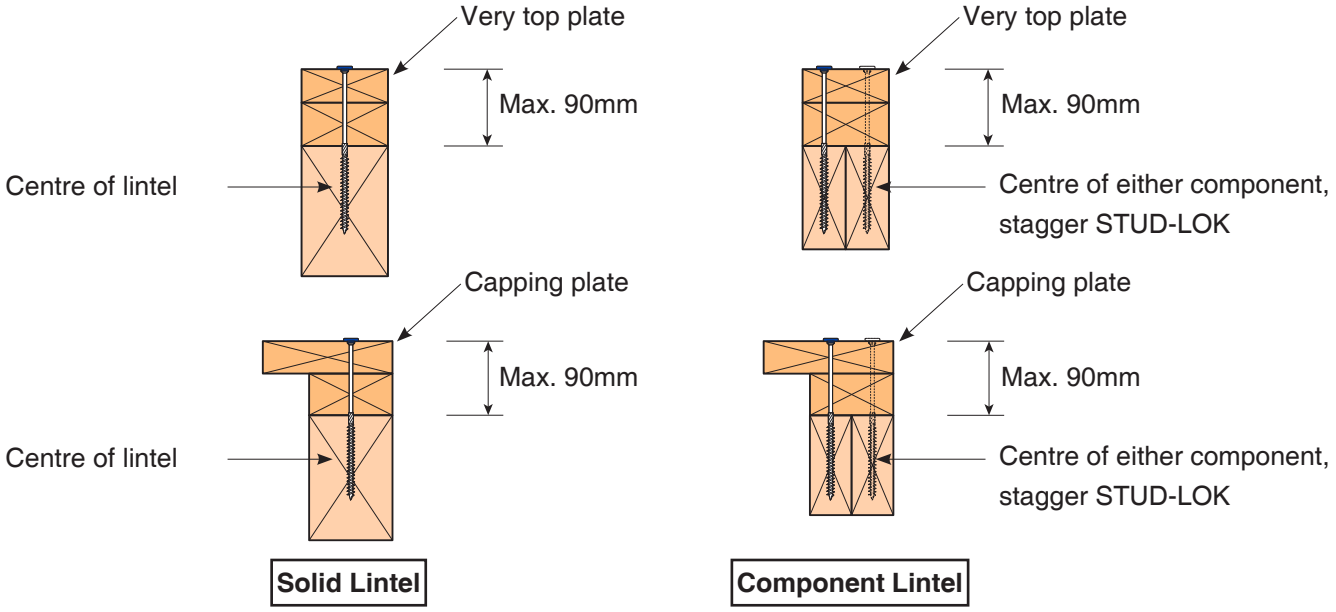
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TOP PLATE DIRECT TO LINTEL FIXING OPTIONS

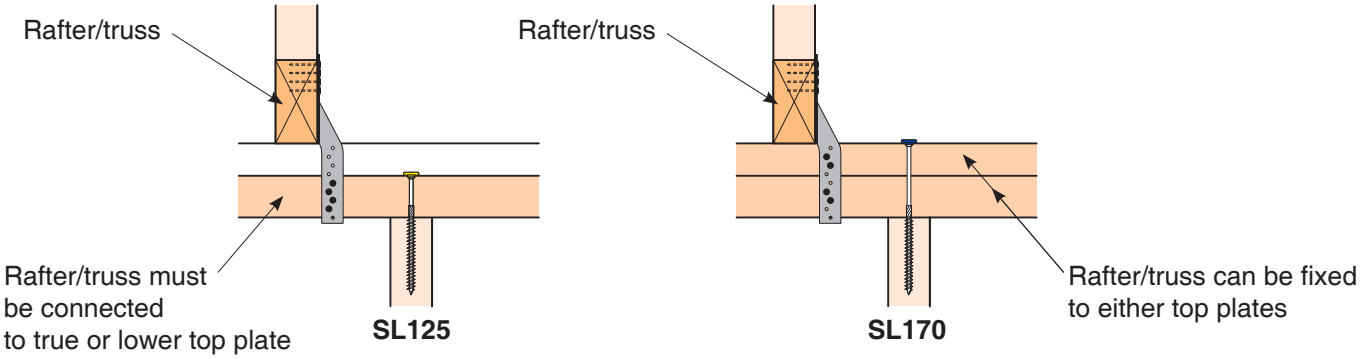
Fix through single top plate using STUD-LOK SL125 (@ stud crs.)



Fix through very top plate or capping plate using STUD-LOK SL170 (@ stud crs.)



RAFTER/TRUSS TO TOP PLATE CONNECTIONS



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GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

Name:	OS1150
Street and Number:	7 Whitehaven Street, Oamaru
Lot and DP Number:	Lot 4 DP 585523
City/Town/District:	Waitaki District Council
Designer:	AK
Company:	Idesign Architecture ltd.
Date:	Wednesday, 5 June 2024

Building Specification

Number of Storeys	1
Floor Loading	2 kPa
Foundation Type	Slab
	Single
Cladding Weight	Light
Roof Weight	Light
Room in Roof Space	No
Roof Pitch (degrees)	5
Roof Height above Eaves (m)	1.075
Building Height to Apex (m)	3.95
Ground to Lower Floor (m)	0.25
Average Stud Height (m)	2.42
Building Length (m)	18.38
Building Width (m)	15.14
Building Plan Area (m²)	187.38

Building Location

Wind Zone = High

Earthquake Zone 1

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

Bracing Units required for Wind

	Along	Across
Single Level	**625**	**633**

Bracing Units required for Earthquake

	Along & Across
Single Level	**474**

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GIB EzyBrace® Bracing Software

Single Level Along Resistance Sheet

Job Name: OS1150

									Wind	EQ
									Demand	
									625	474
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1684 269%	1507 318%
A	1	1.25		2.42	GS1-N	GIB®	86	74		
	2	1.25		2.42	GS1-N	GIB®	86	74		
	3	0.70		2.42	GS1-N	GIB®	41	41		
	4	0.70		2.42	GS1-N	GIB®	41	41		
	5	1.20		2.42	GS1-N	GIB®	82	71		
	External Length = 18.38								335 OK	302 OK
B	1	4.70		2.42	GS1-N	GIB®	322	280		
	2	2.10		2.42	GS1-N	GIB®	144	125		
									465 OK	405 OK
C	1	0.75		2.42	GS1-N	GIB®	45	44		
	2	1.52		2.42	GS1-N	GIB®	104	90		
	3	0.70		2.42	GS1-N	GIB®	41	41		
	4	0.70		2.42	GS1-N	GIB®	41	41		
	5	0.52		2.42	GS1-N	GIB®	29	30		
	6	0.47		2.42	GS1-N	GIB®	25	27		
	External Length = 11.05								284 OK	273 OK
D	1	3.76		2.42	GS1-N	GIB®	257	224		
	External Length = 1.4								257 OK	224 OK
E	1	3.16		2.42	GS1-N	GIB®	216	188		
	2	0.98		2.42	GS1-N	GIB®	63	58		
	3	0.98		2.42	GS1-N	GIB®	63	58		
	External Length = 8.73								342 OK	304 OK

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GIB EzyBrace® Bracing Software

Single Level Across Resistance Sheet

Job Name: OS1150

									Wind	EQ
									Demand	
									633	474
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1582 250%	1420 299%
M	1	0.80		2.42	GS1-N	GIB®	48	47		
	2	1.20		2.42	GS1-N	GIB®	82	71		
	3	0.75		2.42	GS1-N	GIB®	45	44		
	4	1.16		2.42	GS1-N	GIB®	78	69		
	5	1.38		2.42	GS1-N	GIB®	94	82		
	External Length = 14.44								348 OK	313 OK
N	1	2.02		2.42	GS1-N	GIB®	138	120		
	2	1.00		2.42	GS1-N	GIB®	64	59		
	3	0.70		2.42	GS1-N	GIB®	41	41		
	External Length = 0.7								244 OK	220 OK
O	1	2.35		2.42	GS1-N	GIB®	161	140		
	2	1.57		2.42	GS1-N	GIB®	107	93		
	3	0.40		2.42	GS1-N	GIB®	21	23		
	4	2.20		2.42	GS1-N	GIB®	151	131		
	5	0.40		2.42	GS1-N	GIB®	21	23		
	External Length = 6.81								461 OK	410 OK
P	1	1.20		2.42	GS1-N	GIB®	82	71		
	2	3.83		2.42	GS1-N	GIB®	262	228		
	External Length = 1.73								344 OK	299 OK
Q	1	0.61		2.42	GS1-N	GIB®	35	35		
	2	0.60		2.42	GS1-N	GIB®	34	35		
	3	1.20		2.42	GS1-N	GIB®	82	71		
	4	0.61		2.42	GS1-N	GIB®	35	35		
	External Length = 6.6								185 OK	177 OK

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Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
CHH	EP1_0.4	0.4	80	95
CHH	EP1_0.6	0.6	95	105
CHH	EP1_1.2	1.2	120	135
CHH	EPG_0.4	0.4	100	115
CHH	EPG_1.2	1.2	150	150
Engineer designed	Portal	4.84	150	150

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DESIGN CERTIFICATE

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

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

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

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

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

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

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

Version date: 13 May, 2024

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

Specifier details:

Specifier:	Candice
Business name:	IDesign Architecture
Email:	candice@idesignarchitecture.co.nz

Project and site details:

Project:	OS1150
Site address:	
Design wind zone	High
Snow loading	Design snow zone: N5, Altitude: 80 m (sub-alpine), Ground snow load, $S_g^{1,2}$ = 0.9 kPa

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

MEMBER DESIGN DETAILS

Member 1

1) Member code and description	JS1 - Jamb studs - In single or upper storey load bearing walls
2) Date prepared	19 June 2024

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

4) Design inputs

Opening width	4840 mm
Stud height	2420 mm
Roof type and mass	Light roof and ceiling - 40 kg/m²
Roof load width 'RLW'	3.9 m
Roof snow load	0.6 kPa (μ_i=0.7 , C_e=1.0)

5) Member specification

Size, stress grade/product	Use 2/90 x 45 hyCHORD
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Wind load - W_s*	16.1 mm	10.7 mm	1.5

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

7) Reactions

		Limit States Design Reaction[2,3]	
Load case	k_1[1]	End kN[4]	Horizontal kN
1.35G	0.60	-5.7	
1.2G + 1.5Q	0.80	-9.1	
1.2G + S_u + Ψ_cQ	0.80	-12.0	
1.2G + W_u + Ψ_cQ	1.00	-14.9	2.4
0.9G + W_u	1.00	2.4	1.9

8) Installation requirements

- Jamb studs to be nogged at maximum 1350 mm
- Notching of the jamb studs not permitted
- Nail Laminate studs in accordance with NZS 3604 Clause 2.4.4.7
- Provide 1 full length stud plus 1 secondary Jamb Stud to Detail H19

Member 2

1) Member code and description JS2 - Jamb studs - In single or upper storey load bearing walls

2) Date prepared 19 June 2024

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

4) Design inputs

Opening width	4840 mm
Stud height	2420 mm
Roof type and mass	Light roof and ceiling - 40 kg/m²
Roof load width 'RLW'	5.0 m
Roof snow load	0.6 kPa (μ_i=0.7 , C_e=1.0)

5) Member specification

Size, stress grade/product	Use 2/140 x 45 hyCHORD

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Material type — Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Wind load - W_s*	16.1 mm	2.8 mm	5.7

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

7) Reactions

		Limit States Design Reaction[2,3]	
Load case	k_1[1]	End kN[4]	Horizontal kN
1.35G	0.60	-7.3	
1.2G + 1.5Q	0.80	-11.6	
1.2G + S_u + Ψ_cQ	0.80	-15.3	
1.2G + W_u + Ψ_cQ	1.00	-19.0	2.4
0.9G + W_u	1.00	3.1	1.9

8) Installation requirements

- Jamb studs to be nogged at maximum 1350 mm
- Notching of the jamb studs not permitted
- Nail Laminate studs in accordance with NZS 3604 Clause 2.4.4.7
- Provide 1 full length stud plus 1 secondary Jamb Stud to Detail H19

Member 3

1) Member code and description — VB1 - Verandah beams

2) Date prepared — 19 June 2024

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

4) Design inputs

Span	2.4 m - single span
Roof mass	30 kg/m²
Roof load width 'RLW'	1.4 m
Roof snow load	0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7 , C_e=1.0, k=0.5)

5) Member specification

Size, stress grade/product	Use 2/190 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m²

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G + Ψ_LQ*	6.0 mm	1.4 mm (long term)	4.3
Live load - Ψ_sQ	9.6 mm	0.4 mm	22.0
Wind load - W_s	12.0 mm	1.9 mm	6.3
Snow load - S_s	6.0 mm	0.9 mm	6.4

*Critical serviceability load case

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See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit States Design Reaction[2,3] End kN[4]
1.35G	0.60	-1.1
1.2G + 1.5Q	0.80	-1.7
1.2G + S_u + Ψ_cQ	0.80	-2.4
1.2G + W_u + Ψ_cQ	1.00	-3.3
0.9G + W_u	1.00	2.8

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer AS 1684

Notes for interpretation of serviceability data

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

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

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

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

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

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

Notes for interpretation of reaction data

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

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Design Navigator H1 Compliance Report

Project Summary

H1 Report created by:	i design architecture
Project Name:	OS1150
Client:	Burgess & Allen
Lot No:	Lot 4
Comment:	
Project Id:	184444
Report Date:	05/06/2024

Compliance Result

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

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

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

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

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

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prepared for Burgess & Allen

H1 Compliance Details

H1 AS1 Edition 5 - Calculation Method Compliance

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

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

HeatLoss:

Maximum permitted Heat Loss	Proposed Building Heat Loss	
250 W/°C	249 W/°C	✓

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

Element	Reference Building Area	Reference Building R-value	Proposed Building Area
Roof	148.6 m²	6.6	148.6 m²
Wall	103.1 m²	2.0	114.5 m²
Slab Floor	148.6 m²	1.7	148.6 m²
Other Floor	0.0 m²	3.0	0.0 m²
Window and Door	44.2 m²	0.50	32.8 m²
Skylight	0.0 m²	-	0.0 m²

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

Element Type	Minimum permitted R-value	Minimum proposed R-value	
Roof	3.3	4.2	✓
Wall	1.0	2.3	✓
Slab Floor	0.9	1.5	✓
other Floor	1.5		✓

Lighting Power Density Compliance

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

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Compliance with Clause E3

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

Building Element	Minimum permitted R-value	Minimum project R-value	
Light timber frame wall or other framed wall constructions with cavities	1.5	2.3	✓
Single skin normal weight masonry based wall construction without a cavity	0.6		
Solid timber wall systems no less than 60 mm thick	0.6		
Roof or ceilings of any construction	1.5	4.2	✓

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Design Details

Climate		
Location	Waitaki District (true left of the Otekaieke river)	
Climate Zone	6	
Building Dimensions		
Total Floor Area	148.6	m²
Slab Floor Area	148.6	m²
Other Floor Area	0.0	m²
Gross Wall Area	147.3	m²
Net Wall Area	114.5	m²
North Wall Area	33.4	m²
East, South and West Wall Area	81.1	m²
Window Area	32.8	m²
North Window Area	3.6	m²
East, South and West Window Area	29.2	m²
Opaque Door Area	0.0	m²
Gross Roof Area	148.6	m²
Net Roof Area	148.6	m²
Skylight Area	0.0	m²
Glazing Areas		
Total Window Percentage	22.3	%
Total Windows over 30%	no	
Total Windows over 40%	no	
East, South and West Window Percentage	26.5	%
East, South and West Windows over 30%	no	
Skylight Area over 1.5m²	no	
Skylight Percentage	0.0	%
Skylight Area over 1.5%	no	
Opaque Door Area over 6m²	no	
Opaque Door Percentage	0.0	%
Opaque Door Area over 6%	no	

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prepared for Burgess & Allen

Heat Loss Details

ID	Name	Orient.	Width	Height	Gross Area	Net Area	R	Heat Loss	Type	Heated	Construction
Floors											
F1					148.6	148.6	1.52	97.8	slab		Floortype 1
Walls											
W1		N	13.91	2.42	33.7	30.0	2.32	12.9			Linea Weatherboard (90mm wall)
Wi1-1			1.50	0.50		0.8	0.50	1.5			Windows
Wi1-2			1.20	0.80		1.0	0.50	1.9			Windows
Wi1-3			1.60	1.20		1.9	0.50	3.8			Windows
W2		N	1.40	2.42	3.4	3.4	2.33	1.5			Vertical Oblique (90mm wall)
W3		E	6.60	2.42	16.0	14.5	2.27	6.4			Garage wall
Wi3-1			0.76	2.00		1.5	0.34	4.5			Garage door
W4		E	8.54	2.42	20.7	14.8	2.33	6.4			Vertical Oblique (90mm wall)
Wi4-1			1.73	2.00		3.5	0.50	6.9			Windows
Wi4-2			0.60	2.00		1.2	0.50	2.4			Windows
Wi4-3			0.60	2.00		1.2	0.50	2.4			Windows
W5		S	10.13	2.42	24.5	21.2	2.32	9.1			Linea Weatherboard (90mm wall)
Wi5-1			0.60	2.00		1.2	0.50	2.4			Windows
Wi5-2			1.80	1.20		2.2	0.50	4.3			Windows
W6		S	5.18	2.42	12.5	8.6	2.33	3.7			Vertical Oblique (90mm wall)
Wi6-1			1.00	2.00		2.0	0.50	4.0			Windows
Wi6-2			1.60	1.20		1.9	0.50	3.8			Windows
W7		W	8.01	2.42	19.4	14.4	2.32	6.2			Linea Weatherboard (90mm wall)
Wi7-1			2.00	2.00		4.0	0.50	8.0			Windows
Wi7-2			1.00	0.95		0.9	0.50	1.9			Windows
W8		W	7.13	2.42	17.3	7.7	2.85	2.7			Linea Weatherboard (140mm wall)
Wi8-1			4.80	2.00		9.6	0.50	19.2			Windows
Roofs											
R1					148.6	148.6	4.23	35.1	perimeter		Rooftype 1
Total Heat Loss								248.9			

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

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Floor Construction Details

Name: Floortype 1 Slab Floor ☒ heated ☐ 1.52 m²°C/W



Type: Floor: Slab Floor - H1/AS1 Edition 5 and H1/AS2 Edition 1

Table F Slab Insulation (H1 Edition 5)
- H1 Acceptable Solutions and Verification Methods

Slab floor area [m²]: 148.64

Area Perimeter Ratio: 2.44

Underslab insulation: Full Insulation : 1.32

Perimeter:

	*Length**	*Masonry Veneer Wall*	*External Wall Thickness**	*Edge Insulation*
-	60.90 m	☐	90 mm	☐

+

* required data. If empty the perimeter type will be ignored.

Wall Construction Details

Name: Linea Weatherboard (90mm wall) heated ☐ 2.32 m²°C/W



Type: Wall: Timber Frame with vented Cavity

external surface 0.03

Cladding : James Hardie Linea weatherboard
R-value: 0.08

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

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

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 0.75*	Pink(c)Batts(c) Ultra R2.8 90mm Wall 2.8
	still Airgap: none *R-value: 0.00*

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

internal surface 0.09

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Name: Linea Weatherboard (140mm wall) heated ☐ 2.85 m²°C/W



Type: Wall: Timber Frame with vented Cavity

external surface 0.03

Cladding : James Hardie Linea weatherboard
R-value: 0.08

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

Timber Frame & Cavity : 140mm, studs @ 600mm, dwangs @ 800mm

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 1.17*	Pink(c)Batts(c) Ultra R3.2 140mm Wall 3.2
	still Airgap: none *R-value: 0.00*

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

internal surface 0.09

Name: Vertical Oblique (90mm wall) heated ☐ 2.33 m²°C/W



Type: Wall: Timber Frame with vented Cavity

external surface 0.03

Cladding : James Hardie Oblique weatherboard
R-value: 0.11

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

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

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 0.75*	Pink(c)Batts(c) Ultra R2.8 90mm Wall 2.8
	still Airgap: none *R-value: 0.00*

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

internal surface 0.09

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Name: Garage wall heated ☐ 2.27 m²°C/W



Type: Wall: Timber Frame (direct fixed Cladding)

external surface 0.03

Cladding : generic - Gypsum plasterboard 10mm into still air (garage, etc.)

R-value: 0.10

Air Barrier : generic - none

R-value: 0.00

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

Wall Frame Area: 14.4%

Framing : *R-value: 0.75*

Cavity Area: 85.6%

Insulation : 2.8

still Airgap: none

R-value: 0.00

Wall Lining : generic - gypsum Plasterboard 10mm

R-value: 0.04

internal surface 0.09

Roof Construction Details

Name: Rooftype 1 Ceiling Perimeter ☒ heated ☐ 4.23 m²°C/W



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

external surface 0.03

Roofing : generic - Metal corrugate Iron with building paper

R-value: 0.01

Insulation :

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

Roof Frame Area: 5.0%

Roof space (still air) 0.11

Framing : *R-value: 0.75*

Cavity Area: 95.0%

Roof space (still air) 0.11

Pink(c)Batts(c) Ultra R4.0 Ceiling 4

notched to cover bottom chord ☒

Roof Lining : generic - gypsum Plasterboard 13mm

R-value: 0.06

internal surface 0.09

Non-IC-rated recessed downlights

Ceiling Area [m²]: 148.64 Number of downlights: Clearance from lamp holder side [m]:

Glazing Details

Name: Windows Opaque Door ☐ 0.50 m²°C/W



Type: Thermally Broken Aluminium Frame

Glass Type : Double Pane: Low E4/Clear - Argon - Thermally improved Spacer (Ug 1.10)

R-value: 0.50

Solar Heat Gain Coefficient (SHGC): 0.84

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Name: Garage door Opaque Door ☐ 0.34 m²°C/W



Type: Doors

Door Type : Internal Hollow Core (i.e. to the garage)

R-value: 0.34
Solar Heat Gain Coefficient (SHGC): 0.00

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COUNCIL COMPLIANCE

Specification Data Sheet

AUGUST 2016

COLORSTEEL® MAXX®

DESCRIPTION
Prepainted ZINCALUME® steel

STANDARD
Substrate manufactured to AS1397:2011

SUBSTRATE COATING CLASS
AZ200

TYPICAL APPLICATIONS
Very severe environments, industrial roofing, wall cladding

STANDARD COLOURS
20 colours

STRIPPABLE FILM
Available on request

BACKING COAT
Perpetual Grey®

MAXX® PHYSICAL PROPERTIES

Pencil hardness
F minimum

Reverse impact resistance (10 joules)
Pass

T-bend test
No tape off
4T minimum

Top coat specular gloss (60° head)

Nominal Range	Tolerance
0-15	± 3
16-80	± 10
80+	Nominal -10

Chalk rating (AS1580: 481.1.11, 1998)
≤4 (10 years exposure)

Colour retention (CIE Lab units, Delta E)
8 units (maximum) – 10 years exposure
10 units (maximum) – 15 years exposure

COLORSTEEL® ENDURA®

DESCRIPTION
Prepainted ZINCALUME® steel

STANDARD
Substrate manufactured to AS1397:2011

SUBSTRATE COATING CLASS
AZ150

TYPICAL APPLICATIONS
Roofing, cladding, rainwater goods, garage doors, fence panels

STANDARD COLOURS
20 colours

STRIPPABLE FILM
Available on request

BACKING COAT
Perpetual Grey®

ENDURA® PHYSICAL PROPERTIES

Pencil hardness
F minimum

Reverse impact resistance (10 joules)
Pass

T-bend test
No tape off
4T minimum

Top coat specular gloss (60° head)

Nominal Range	Tolerance
0-15	± 3
16-80	± 10
80+	Nominal -10

Chalk rating (AS1580: 481.1.11, 1998)
≤4 (10 years exposure)

Colour retention (CIE Lab units, Delta E)
8 units (maximum) – 10 years exposure
10 units (maximum) – 15 years exposure

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Zincalume®

Description
Steel base hot dip coated with a 45% zinc, 55% aluminium alloy coating

Standard
Manufactured to AS1397:2011

Typical applications
Roofing, cladding rainwater goods, air conditioning, garage doors

ZINCALUME® AVAILABILITY

Grades
G300, G550

Thickness (BMT)
0.33 – 1.15mm

Width
70 – 1230mm

ZINCALUME® COATING

Coating type
AZ (naturally small spangle)

Coating mass – standard (g/m²)
150

GALVSTEEL®

Description
Steel base hot dip coated with a zinc coating

Standard
Manufactured to AS1397:2011

Typical applications
Roofing, cladding, drums and tubes, purlins, air conditioning, culverts, sheet metal work, concrete form work

GALVSTEEL® AVAILABILITY

Grades
G1, G250, G300, G450, G500, G550

Thickness (BMT)
G1, G250: 0.30 – 2.00mm
G300, G550: 0.30 – 1.00mm
G500: 1.01 – 1.49mm
G450: 1.50 – 2.00mm

Width
70 – 1230mm

GALVSTEEL® COATING

Coating type
Z (regular spangle)

Coating mass – standard (g/m²)
100, 200, 275, 450, 600

FABRICATION PERFORMANCE FOR ZINCALUME® AND GALVSTEEL®

PROCESS	GRADE G1/G250/G300	GRADE G450/G500/G550
Bending	Excellent	Limited
Drawing	Fair	Not recommended
Pressing	Limited	Not recommended
Roll-Forming	Excellent	Excellent
Painting	Excellent	Excellent

NOTE: Not all combinations of grade, thickness and width are readily available. Please discuss your specific requirements with your steel supplier or New Zealand Steel.

For more information about NEW ZEALAND STEEL products call **0800 100 523** or visit **nzsteel.co.nz**

NEW ZEALAND MADE

NEW ZEALAND STEEL

NOTE: Buyers and users of New Zealand Steel products and services must make their own assessment of the products for their own conditions. All queries regarding product specification, purpose or application should be directed to New Zealand Steel, phone 0800 100 523. New Zealand Steel reserves the right to modify products, techniques, equipment and statements to reflect improvements in the manufacture and application of its products. The information contained in this brochure is supplied without prejudice to New Zealand Steel's standard terms and conditions of sale. In the event of conflict between this information and the standard terms and conditions, the standard terms and conditions prevail. COLORSTEEL® and GALVSTEEL® are registered trademarks of New Zealand Steel Limited. ZINCALUME® is a registered trademark of BlueScope Steel Limited.

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BRANZ Appraised

Appraisal No. 943 [2021]

THERMAKRAFT COVERTEK 401 ROOF UNDERLAY



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Appraisal No. 943 (2021)

This Appraisal replaces BRANZ Appraisal No. 943 [2016]

Amended 09 January 2023

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Thermakraft Covertek 401 Roof Underlay is a non-fire-retardant, synthetic, self-supporting building underlay for use under roof claddings.

Scope

2.1 Thermakraft Covertek 401 Roof Underlay has been appraised for use as a roof underlay on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 for timber-framed buildings; or,
- the scope limitations of NASH Building Envelope Solutions, Paragraph 1.1 for steel-framed buildings; and,
- with masonry tile roof cladding; and,
- with metal tile roof cladding; and,
- with profiled metal roof cladding; and,
- situated in NZS 3604 and NASH Standard Part 2 Wind Zones up to, and including, Extra High.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Thermakraft Covertek 401 Roof Underlay, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2. Thermakraft Covertek 401 Roof Underlay meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the roof cladding system, Thermakraft Covertek 401 Roof Underlay contributes to meeting this requirement. See Paragraphs 12.1 and 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Thermakraft Covertek 401 Roof Underlay meets 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 Thermakraft Covertek 401 Roof Underlay is a synthetic building underlay for use under roof claddings. The product consists of a micro-porous, water-resistant film, ultrasonically bonded to two layers of non-woven spun-bonded polyolefin. Thermakraft Covertek 401 Roof Underlay is coloured white or light grey.

4.2 The product is supplied in rolls 1.35 m wide x 18.6, 37 and 55 m long, and 2.7 m wide x 33.4 m long. The product is printed with the Thermakraft Covertek 401 logo repeated along the length of the roll. The rolls are wrapped in clear polythene film.

Accessories

4.3 Accessories used with Thermakraft Covertek 401 Roof Underlay which are supplied by the installer are:

- **Fixings** - stainless steel staples, clouts, screws or proprietary underlay fixings, or other temporary fixings to attach the roof underlay to the framing.

Handling and Storage

5.1 Handling and storage of the product, whether on-site or off-site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Installation Guide, Thermakraft™ Covertek 401, Issue 3.0, dated September 2022.
- Product Data Sheet, Thermakraft™ Covertek 401, Issue 7.0, dated September 2022.

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

Timber and Steel Framing

7.1 Timber and steel roof framing must be provided in accordance with the requirements of the NZBC and the roof cladding manufacturer.

General

7.2 Thermakraft Covertek 401 Roof Underlay is intended for use as an alternative to conventional kraft paper roof underlays, which are fixed over timber or steel-framed roofs in order to limit the entry of wind into the roof cavity, and to assist in the moisture management of the roof cladding system.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the roof weathertight and some wetting of the underlying structure is always possible before the roof cladding is installed. Hence, the entire building must be closed-in and made weatherproof before moisture sensitive materials such as ceiling linings and insulation materials are installed.

7.4 Thermakraft Covertek 401 Roof Underlay must not be exposed to the weather or ultraviolet (UV) light for a total of more than 7 days before being covered by the roof cladding.

7.5 Thermakraft Covertek 401 Roof Underlay is suitable for use under roof claddings on buildings as a roof underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23 for timber-framed buildings or NASH Building Envelope Solutions, Table 23 for steel-framed buildings. Refer to Table 1.

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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.

Table 1: Material Requirements

NZS 2295 Property	Property Performance Requirement	Results
Absorbency	≥ 150 g/m^2	Pass
Vapour Resistance	≤ 7 MN s/g	Pass
Water Resistance	≥ 100 mm	Pass
pH of Extract	≥ 5.5 and ≤ 8	Pass
Shrinkage	≤ 0.5%	Pass

7.6 Thermakraft Covertek 401 Roof Underlay is suitable for use at roof pitches 3° and above. When used at pitches less than 10°, Thermakraft Covertek 401 Roof Underlay can be installed horizontally when spanning no greater than 1,200 mm in one direction, or it can be installed vertically when fully supported by a corrosion resistant material.

7.7 At pitches 10° and greater, Thermakraft Covertek 401 Roof Underlay can be installed vertically or horizontally and must span no greater that 1,200 mm in one direction.

7.8 At roof pitches less than 10° (minimum 3°), Thermakraft Covertek 401 Roof Underlay may be run horizontally, or vertically if installed over a roof underlay support.

7.9 Refer to Table 2 for a summary of the roof underlay support requirements.

Table 2: Roof Underlay Support Requirements

Roof Pitch	Span	Roof Underlay Support Required?	
		Horizontally Installed	Vertically Installed
10° or more	Greater than 1,200 mm	Yes	Yes
	1,200 mm or less	No	No
Less than 10° (minimum 3°)	Greater than 1,200 mm	Yes	Yes
	1,200 mm or less	No	Yes

Structure

8.1 Thermakraft Covertek 401 Roof Underlay is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High or NASH Standard Part 2 Wind Zones up to, and including, Extra High.

Durability

9.1 Thermakraft Covertek 401 Roof Underlay meets code compliance with NZBC Clause B2.3.1 (a) not less than 50 years for roof underlays used where the roof cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry roof tile cladding, and code compliance with NZBC Clause B2.3.1 (b) 15 years for roof underlays used where the roof cladding durability requirement is 15 years.

Serviceable Life

9.2 Provided it is not exposed to the weather or UV light for a total of more than 7 days, and provided the roof cladding is maintained in accordance with the cladding manufacturer's instructions and the roof cladding remains weather resistant, Thermakraft Covertek 401 Roof Underlay is expected to have a serviceable life equal to that of the roof cladding.

Control of Internal Fire and Smoke Spread

10.1 Thermakraft Covertek 401 Roof Underlay has an AS 1530 Part 2 flammability index of greater than 5. For Risk Groups other than SH, Thermakraft Covertek 401 Roof Underlay must be enclosed by a suitable internal lining in occupied spaces (not exposed to view).

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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

11.1 Separation or protection must be provided to Thermakraft Covertek 401 Roof Underlay from heat sources such as fireplaces, heating appliances, flues 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.

External Moisture

12.1 Thermakraft Covertek 401 Roof Underlay must only be used under roof claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, or roof claddings covered by a valid BRANZ Appraisal.

12.2 Thermakraft Covertek 401 Roof Underlay, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.

Installation Information

Installation Skill Level Requirement

13.1 All design and building work must be carried out in accordance with the Thermakraft Covertek 401 Roof Underlay Technical Literature and this Appraisal by competent and experienced tradespersons conversant with Thermakraft Covertek 401 Roof Underlay. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License class.

Underlay Installation

14.1 Thermakraft Covertek 401 Roof Underlay must be fixed at maximum 300 mm centres to all framing members with large-head clouts 20 mm long, 6-8 mm stainless steel staples, self-drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.

14.2 Thermakraft Covertek 401 Roof Underlay may be installed horizontally or vertically at roof pitches 3° and above (refer to Paragraph 7.1 for further guidance). It must extend from the ridge and overhang the fascia board by 20-25 mm. Vertical laps must be no less than 150 mm wide. Horizontal laps must also be no less than 150 mm, with the direction of the lap ensuring that water is shed to the outer face of the underlay. End laps must be made over framing and be no less than 150 mm wide. To assist with achieving the correct lap dimension, Thermakraft Covertek 401 Roof Underlay has a 150 mm lap line printed continuously along the top face.

14.3 When fixing the product in windy conditions, care must be taken due to the large sail area created.

14.4 Any damaged areas of Thermakraft Covertek 401 Roof Underlay, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

14.5 The Technical Literature must be referred to during the inspection of Thermakraft Covertek 401 Roof Underlay installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

15.1 The following tests have been carried out on Thermakraft Covertek 401 Roof Underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23 and NASH Building Envelope Solutions: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6 and pH of extract in accordance with AS/NZS 1301.421s. A range of these tests were completed before and after the underlays were exposed to UV light.

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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

16.1 A durability opinion has been given by BRANZ technical experts.

16.2 An evaluation of the expected performance of Thermakraft Covertek 401 Roof Underlay in direct contact with metal roof cladding has been completed by BRANZ.

16.3 The practicability of installation of Thermakraft Covertek 401 Roof Underlay has been assessed by BRANZ and found to be satisfactory.

16.4 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.

Quality

17.1 The manufacture of Thermakraft Covertek 401 Roof Underlay 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.

17.2 The quality of supply to the market is the responsibility of Kingspan Insulation NZ Limited.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the roof underlay into their design in accordance with the instructions of Kingspan Insulation NZ Limited.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Kingspan Insulation NZ Limited.

Sources of Information

- AS/NZS 1301.421s:1998 Determination of the pH value of aqueous extracts of paper, board and pulp - cold extraction method.
- AS/NZS 4200.1:1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.3:1994 Pliable building membranes and underlays - Methods of test – Shrinkage.
- AS/NZS 4201.4:1994 Pliable building membranes and underlays - Methods of test – Resistance to water penetration.
- AS/NZS 4201.6:1994 Pliable building membranes and underlays - Methods of test – Surface water absorbency.
- NASH Building Envelope Solutions:2019 Light steel-framed buildings.
- NASH Standard Part Two:2019 Light steel-framed buildings.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 09 January 2023.

This Appraisal has been amended to update the product name, company name, and technical literature.

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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, Thermakraft Covertek 401 Roof Underlay 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 Kingspan Insulation NZ 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. Kingspan Insulation NZ 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 Kingspan Insulation NZ 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 Kingspan Insulation NZ Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
01 December 2021

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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.

1.0 - Product Overview

EXPOL ThermaSlab (Expanded Polystyrene / EPS) provides excellent compressive strength, moisture resistance, and thermal protection.

Ideally suited for residential applications**, EXPOL ThermaSlab** is a cost effective, easy to install insulation solution that achieves R-values above building regulations.

EXPOL ThermaSlab is available in grades S, M, H, VH and SL, and can be used in:

- Retaining Walls (S Grade)
- Skillion Roof Insulation (S, M H Grades)
- Concrete Floor Insulation (S, H, VH Grades
- Wall Insulation (SL Grade)
- Cladding Insulation (S and H Grades)





2.0 - Installation

2.1 There are no special requirements for PPE when handling or installing EPS. It is an inert, non-toxic material.

2.2 When transporting, storing or installing, ensure the EPS 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 EPS.

2.4 EPS is compatible with all common construction products.

3.0 - Maintenance

3.1 No maintenance required

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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 20-year warranty on our EPS Foam Insulation Products – for full warranty details visit www.expol.co.nz/expol-eps-warranty/

5.0 - Compliance with the New Zealand Building Code

EPS, 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 E3 Internal moisture performance E3.3.1

5.3 Clause F2 Hazardous building materials performance F2.3.1(a)

EXPOL EPS 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)

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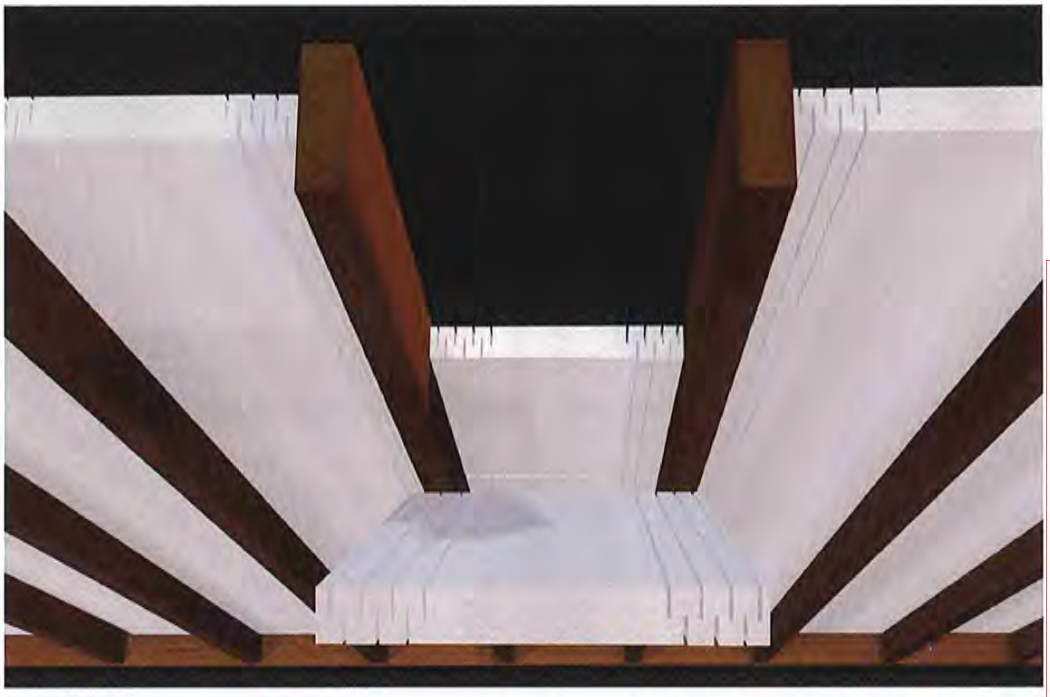
7.0 - Technical Data

Properties	Test / Method / Standard	Test Results
Material	Expanded Polystyrene	
Density	16 kg / m3	
Sheet Size	2400 mm x 1200 mm	
Thickness / R Value	10mm	-
	20mm	R 0.53
	25mm	R 0.66
	30mm	R 0.79
	35mm	R 0.92
	40mm	R 1.05
	45mm	R 1.18
	50mm	R 1.32
	55mm	R 1.45
	60mm	R 1.58
	65mm	R 1.71
	70mm	R 1.84
	75mm	R 1.97
	80mm	R 2.11
	85mm	R 2.24
	90mm	R 2.37
	95mm	R 2.50
	100mm	R 2.63
	110mm	R 2.89
	120mm	R 3.16
Thermal Conductivity	ATSM 168	K – Value 0.038
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	34 KPA 59 KPA 74 KPA 84 KPA
Youngs Modulus	-	3.8 MPA
Cross breaking strength KPA	AS 2498.4	165 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	5%	
Recyclability	EPS is 100% recyclable	
Environmental Statement	EPS is inert and non-toxic. There are no chemicals or gases harmful to the environment emitted from EPS either during manufacture or within use.	
Ozone Depleting Potential	EPS does not contain ozone-depleting CFC or HCFC gases, nor use them in its manufacture. As a result, EPS has zero ozone depletion potential.	
Vermin Resistance	EPS does not offer any nutritive value.	

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BRANZ Appraised
Appraisal No. 256 [2020]

EXPOL UNDERFLOOR INSULATION



Appraisal No. 256 (2020)

This Appraisal replaces Appraisal No. 256 (2014).

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BRANZ Appraisals

Technical Assessments of products for building and construction.

Product

1.1 EXPOL Underfloor Insulation is an Expanded Polystyrene (EPS) foam board for use as a thermal insulation for timber frame 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 exposed subfloors and subfloors with wind exposure 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 will meet these requirements. See Paragraphs 8.1 and 8.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. EXPOL Underfloor Insulation meets this requirement and will not present a health hazard to people.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. EXPOL Underfloor Insulation will contribute to meeting these requirements. See Paragraph 13.1.

EXPOL

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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

Description

4.1 EXPOL Underfloor Insulation is Expanded Polystyrene (EPS) foam boards with pre-cut concertina cuts to both edges. 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)	Pieces per Bag
R1.4	60	360	1200	12
R1.4	60	410	1200	11
R1.4	60	470	1200	10
R1.4	60	560	1200	9

4.2 EXPOL Underfloor Insulation is white in colour and is supplied in colour coded packaging to identify the different widths.

4.3 EXPOL Underfloor Insulation is manufactured from flame retardant bead to meet the manufacturing requirements of AS 1366.3.

4.4 Accessories used with EXPOL Underfloor Insulation, which are supplied by the insulation installer, are nylon brackets and stainless steel nails as an optional method of fixings.

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 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for EXPOL Underfloor Insulation. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 EXPOL Underfloor Insulation is intended for use as thermal insulation to meet the requirements of the NZBC. EXPOL Underfloor insulation has an R-value of 1.4 m²°C/W and are designed to meet the minimum schedule method R-values of NZBC Verification Method H1/VM1 or NZBC Acceptable Solution H1/AS1. For construction R-values, refer to BRANZ House Insulation Guide.

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 bracket. 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 exposed underfloors without a lining. Clips must be used in wind exposed situations.

7.5 The building envelope must be constructed to ensure the insulation remains dry throughout the life of the building.

7.6 The clearance requirements for heating appliances and downlights must be met and reference made to the manufacturers instructions and NZS 4246.

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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.

Electrical Cables

7.7 PVC cables must be prevented from direct contact with EXPOL Underfloor Insulation. Refer to Paragraph 15.5.

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 nylon brackets must be used to achieve a 50 year serviceable life.

8.4 Nylon support brackets are required to support EXPOL Underfloor Insulation for underfloors that are subjected to wind exposure.

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 fire places, heating appliances, flues, chimneys and recessed luminaries (except classed IC - F). Refer to Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM1.

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 and 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 Paragraph 10.2(a), 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.

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 Method H1/VM1 or NZBC Acceptable Solution H1/AS1. Refer to Paragraph 7.1.

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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.

Installation Information

Installation Skill Level Requirements

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.

17.1 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.

17.2 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.

17.3 EXPOL nylon brackets must be used, in line with the Technical Literature, in exposed floors and wind exposed situations.

17.4 EXPOL Underfloor Insulation must be separated from all sources of heat.

17.5 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

17.6 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of EXPOL Underfloor Insulation installations.

Health and Safety

18.1 Refer to the Technical Literature and NZS 4246 for guidance on heath and safety requirements such as personal protective clothing and installation hazard assessment.

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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 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

20.1 An assessment of the durability of EXPOL Underfloor Insulation has been made by BRANZ technical experts.

20.2 The Technical Literature including Installation Instruction have been reviewed by BRANZ and found to be satisfactory.

20.3 Site inspections have been undertaken by BRANZ to assess the practicability of installation and to examine completed installations.

Quality

21.1 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.

21.2 Expol Limited is responsible for the quality of the product supplied.

21.3 Quality of installation of the product on site is the responsibility of the installer.

21.4 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: 2006 Materials for the thermal insulation of buildings.
- BRANZ House Insulation Guide, Fifth Edition 2014.
- 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 for Compliance Documents and Handbooks.
- The New Zealand Building Regulations 1992.

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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 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 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

Chelydra Percy
Chief Executive
Date of Issue:
28 February 2020

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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. 621 [2020]

THE MARSHALL WEATHERIZATION SYSTEM

Appraisal No. 621 (2020)

This Appraisal replaces BRANZ Appraisal No. 621 (2014)


HYDRA
HYDRA
HYDRA

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Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, The Marshall Weatherization System 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, B2.3.1 (b) 15 years and B2.3.2. The Marshall Weatherization System meets this requirement. See Paragraphs 10.1 - 10.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Marshall Weatherization System contributes to exterior walls and roof cladding systems meeting this requirement. See Paragraphs 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Marshall Weatherization System meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 System components supplied by Marshall Innovations Limited are as follows:

- **Flexible wall underlay** - Tekton® Building Wrap is a synthetic breather-type building membrane available in rolls 2740 mm wide and 37 m long or 1370 mm wide and 37 m long. The product is manufactured from coated spun bonded polypropylene.
- **Flexible wall underlay** - HYDRA Wall Underlay is a synthetic building underlay for use under wall claddings. The product consists of a plain non-woven top scrim and a woven bottom scrim with a polymeric laminated facer supplied in rolls 1.37 m wide x 36.5 m long or 2.74 m wide x 37.0 m long.
- **Flexible Roof Underlay** - HYDRA Roof Underlay is a heavy duty, spun-bonded, non-woven fabric laminated breathable coating, coloured blue and is supplied in rolls 1.25 m wide x 20 m or 40 m long.
- **Flexible flashing tape** (1) - Super Stick is a multi-layered, silver, polyester-faced, copolymer self-adhesive tape. The tape is supplied in rolls of 75 mm x 22.86 m, 150 mm x 22.86 m and 200 mm x 22.86 m.
- **Flexible flashing tape** (2) - Protecto Sill System comprises Protecto Wrap Detail Tape, Protecto Wrap Sill Tape and Protecto Tak spray on primer. Both the tapes are based on modified SBS rubberised asphalt and Protecto Tak is a solvent based spray-on adhesive primer. Protecto Wrap Detail Tape is supplied as a 150 mm wide, 15 m long and 1.0 mm thick roll, Protecto Wrap Sill Tape is supplied as a 75, 150 and 200 mm wide, 30 m long and 0.5 mm thick roll and Protecto Tak is supplied in a 369 g can.
- **Pipe and Services Penetration Seal** - TRADE-SEAL is an EPDM sleeve bonded to a carrier material of spun-bonded high density polyethylene film 150 micron thick. The carrier material is backed with a self-adhesive layer. TRADE-SEAL is available with various diameter EPDM sleeve sizes to accommodate different size wall penetrations.
- **Adhesive tape** - Tekton® Seam Tape is a thin polypropylene joining adhesive tape, available in rolls 48 mm wide and 50 m long.

Handling and Storage

5.1 All products must be kept clean and dry at all times prior to use by storing under cover so that they are protected from the weather and damage. Rolls of Tekton® Building Wrap, HYDRA Wall Underlay and HYDRA Roof Underlay must be stored on end.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for The Marshall Weatherization System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

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.

Design Information

Timber and Steel Framing

7.1 Studs must be provided at maximum 600 mm centres. Dwangs must be fitted flush between studs at maximum 1200 mm centres.

7.2 Timber and steel roof framing must be provided in accordance with the requirements of the NZBC and the roof cladding manufacturer.

General

8.1 The Marshall Weatherization System is intended for use behind wall cladding systems and at joinery openings as a secondary defence against water penetration into framing cavities and is intended for use as an alternative to conventional wall underlays.

8.2 HYDRA Roof Underlay is intended for use as an alternative to conventional kraft paper roof underlays, which are fixed over timber or steel framed roofs in order to limit the entry of wind into the roof cavity, and to assist in the moisture management of the roof cladding system.

8.3 The system will provide a degree of temporary weather protection during construction. However, it will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed-in. The building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

8.4 The Marshall Weatherization System is suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 (c). Refer to Table 1.

8.5 HYDRA Roof Underlay is suitable for use under roof claddings on buildings as a roof underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23 or NASH Building Envelope Solutions Table 23. Refer to Table 2 for the material properties of HYDRA Roof Underlay.

8.6 TRADE-SEAL when used with Tekton® Building Wrap or HYDRA Wall Underlay, provides an alternative solution to the pipes and services penetrations specified in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.3 and Figure 68, or NASH Building Envelope Solutions Paragraph 9.1.10.3 and Figure 63.

Table 1: Material Properties

NZS 2295 Property	Property Performance Requirement	Actual Property - Tekton Building Wrap	Actual Property - HYDRA Wall Underlay
Absorbency	≥ 100 g/m²	Classified as non-absorbent	Pass
Vapour Resistance	≤ 7 MN s/g	1.15 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass	Pass
pH of Extract	≥ 6 and ≤ 9	9.78 (Note 1)	Pass
Shrinkage	≤ 0.5%	0.10%	Pass
Mechanical	Edge tear and tensile strength	Edge tear: Machine direction = 228 N Cross direction = 186 N Tensile strength: Machine direction = 4.4 kN/m Cross direction = 3.9kN/m	Edge tear: Machine direction = 191.3 N Cross direction = 145.6 N Tensile strength: Machine direction = 4.53 kN/m Cross direction = 3.32kN/m
Air Barrier	Air resistance: ≥0.1 MN s/m³	Pass	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlays performance, or the performance of other materials.

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Table 2: Material Properties

NZS 2295 Property	Property Performance Requirement	Results
Absorbency	≥ 150 g/m²	Pass
Vapour Resistance	≤ 0.5 MN s/g	Pass
Water Resistance	≥ 100 mm	Pass
pH of Extract	≥ 5.5 and ≤ 9	Pass
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	Edge tear [Average] Machine Direction > 166 N Cross Direction > 117 N Tensile Strength [Average] Machine Direction > 6.1kN/m Cross Direction> 4.3kN/m

8.7 The Marshall Weatherization System is suitable for use under wall cladding as a wall underlay system in accordance with NZBC Acceptable Solution E2/AS1, Table 23 on timber framed buildings, except that it cannot be used with non-absorbent wall claddings in direct fixed installations. The Marshall Weatherization System is also suitable for use under wall cladding as a wall underlay system as called up in NASH building envelope solutions, Table 23 on steel framed buildings, except that it cannot be used with non-absorbent wall claddings in direct fixed installations.

8.8 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens. This is to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5 or NASH Building Envelope Solutions, Paragraph 9.1.9.5.

8.9 When The Marshall Weatherization System is used in conjunction with LOSP (light organic solvent preservative) treated timber, the solvent from the timber treatment must be allowed to evaporate (generally at least one week) prior to the installation of the system.

Structure

9.1 The Marshall Weatherization System is suitable for use in all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including Extra High when used as an overlay for rigid building underlays.

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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

10.1 The Marshall Weatherization System meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years where the cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry veneer, and code compliance with NZBC Clause B2.3.1 (b), 15 years where the cladding durability requirement is 15 years. This is provided the system is not exposed to the weather for a total time of more than 60 days. The products also must not be exposed to the weather or ultra-violet (UV) light at any time in service.

10.2 Provided it is not exposed to the weather or UV light for a total of more than 14 days, and provided the roof cladding is maintained in accordance with the cladding manufacturer's instructions and the roof cladding remains weather resistant, HYDRA Roof Underlay is expected to have a serviceable life equal to that of the roof cladding.

10.3 The exterior cladding must be maintained weathertight at all times for The Marshall Weatherization System to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

11.1 The Marshall Weatherization System has an AS 1530 Part 2 flammability index of 0 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 (b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

12.1 Separation or protection must be provided to The Marshall Weatherization System from heat sources such as fire places, 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.

External Moisture

13.1 The system is used to assist the control of moisture behind wall claddings by ensuring moisture which may occasionally penetrate the wall cladding is directed back to the exterior of the building.

13.2 The system is suitable for use with wall claddings complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal, and where exposed up to, and including Extra High winds as defined by NZS 3604.

Installation Information

Installation Skill Level Requirements

14.1 All design and building work must be carried out in accordance with The Marshall Weatherization System Technical Literature and this Appraisal by competent and experienced tradespersons conversant with wall underlays and weatherization system installation. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License class.

System Installation

15.1 The system must be installed in accordance with NZBC Acceptable Solution E2/AS1, or when used with BRANZ Appraised wall claddings, in accordance with any instructions given in the Appraisal, along with the instructions given in the Technical Literature.

15.2 Tekton® Building Wrap and the Hydra Wall Underlay must be fixed first to the external face of the timber or steel wall framing over all openings in the framing, then cut and dressed into all sides of the openings.

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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.

15.3 Openings are dressed with lengths of Super Stick or Protecto Sill System Tapes where required and adhered to the Tekton® Building Wrap or HYDRA Wall Underlay. The tape is 'fanned' around the corners onto the face of the Tekton® Building Wrap or HYDRA Wall Underlay and folded over the outside edge of the opening framing. All surfaces must be clean and dry prior to the installation. *(Note: Super Stick requires two layers on the sill.)*

15.4 HYDRA Roof Underlay must be fixed at maximum 300 mm centres to all framing members with large-head clouts 20 mm long, 6-8 mm stainless steel staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.

15.5 HYDRA Roof Underlay may be run horizontally or vertically. The roof underlay must extend from the ridge and overhang the fascia board by 20-25 mm.

15.6 Vertical laps must be no less than 150 mm wide. Horizontal laps must also be no less than 150 mm, with the direction of the lap ensuring that water is shed to the outer face of the underlay. End laps must be made over framing and be no less than 150 mm wide.

15.7 Any other components of the cladding system or joinery installation, such as sill trays, other flashings or seals should be installed as instructed by the cladding or joinery manufacturer. Note that these components, including cladding systems and joinery have not been assessed and are outside the scope of this Appraisal.

Inspections

15.8 The Technical Literature must be referred to during the inspection of The Marshall Weatherization System installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

16.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.

16.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421.

16.3 Tests have been carried out on Protecto Wrap Detail Tape, Super Stick and Protecto Wrap Sill Tapes in accordance with ICC Evaluation Service Criteria for Flashing Materials, AC148 (2001). The results have been reviewed by BRANZ experts and found to be satisfactory.

16.4 Peel adhesion testing of Protecto Wrap Detail Tape, Super Stick and Protecto Wrap Sill Tapes, Tekton Seam Tape and TRADE-SEAL on the Tekton® Building Wrap has been completed by BRANZ.

16.5 The following tests have been carried out on HYDRA Roof Underlay and Wall Underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6 and pH of extract in accordance with AS/NZS 1301.421s. A range of these tests were completed before and after HYDRA Roof Underlay and Wall Underlay was exposed to ultra-violet light.

16.6 The Flammability Index of HYDRA Roof Underlay and Wall Underlay has been evaluated in accordance with AS 1530.2.

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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

Other Investigations

17.1 Durability opinions have been given by BRANZ technical experts.

17.2 Practicability of installation has been assessed by BRANZ and found to be satisfactory.

17.3 The Technical Literature from Marshall Innovations Ltd has been examined by BRANZ and found to be satisfactory.

Quality

18.1 The manufacture of products covered by this Appraisal has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certifications covering quality aspects associated with these products.

18.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.

18.3 Building designers are responsible for the design of the building, and for the incorporation of The Marshall Weatherization System into their design in accordance with the instructions of Marshall Innovations Limited.

18.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AC 148 [2001] Acceptance criteria for flashing materials ICBO Evaluation Service Inc. July 2001
- AS 1530.2: 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp - cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays - Methods of test - Shrinkage.
- BS 6538-3: 1987 Method for determination of air permeance using the Garley apparatus.
- NASH Building Envelope Solutions: 2019 Light steel framed buildings.
- NASH Standard Part Two: 2019 Light Steel Framed Buildings.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- 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.

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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, The Marshall Weatherization System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Marshall Innovations 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. Marshall Innovations 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 Marshall Innovations 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 Marshall Innovations Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
15 May 2020

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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.

TEKTON SPECIFICATION

PRODUCT DESCRIPTION

Tekton Wall Underlay is a synthetic breather-type Wall Underlay for use as a wall underlay and air barrier under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is a coated spun-bonded polypropylene, and is approximately 0.6mm thick. Tekton Wall Underlay is supplied in rolls 2740mm x 37m and 1370mm x 37m.

FEATURES /BENEFITS

- Tekton Wall Underlay can be used in all wind zones up to and including very high and extra high with RAB Systems.
- Tekton Wall Underlay is fire retardant with a zero flammability index and can be used without restriction on all buildings, however must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the NZ Building Code.
- Tekton Wall Underlay can be installed as an air barrier to walls that are not lined, such as gable ends.
- Tekton Wall Underlay has superior water hold out - keeping framing drier while permanent cladding is installed.
- Tekton Wall Underlay has 50 year durability.
- Tekton Wall Underlay can be left exposed for up 60 days.
- Tekton Wall Underlay has optimal surfactant resistance (will not lose integrity if exposed to most soaps, detergents and cleaning chemicals).
- Tekton Wall Underlay is Branz appraised # 548 (2013)
- Tekton Wall Underlay can be used as a non-rigid backing material for stucco plaster and as a slip layer over rigid backing for stucco plaster.
- Tekton Wall Underlay is compatible with metal cavity battens.

APPLICATION RANGE

TIMBER FRAMED BUILDINGS

- With absorbent wall claddings directly fixed to the framing.
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

STEEL FRAMED BUILDINGS

- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

Tekton Wall Underlay can also be used on buildings subject to specific weathertightness design.

STORAGE

Tekton Wall Underlay must be stored on its end in a clean and dry environment. It is the responsibility of the installer to protect the roll from damage and weather.

SURFACE PREPARATION

Studs must be provided at a maximum of 600mm centres. Nogs must be fitted flush between the studs at a maximum of 1200mm centres. The framing must be free from any sharp protrusions that may damage the wall underlay.

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TEKTON specification

INSTALLATION

PLACEMENT

- The branded side of the wall underlay must face away from the framing.
- The wall underlay must run horizontally.
- The wall underlay must extend from the upper side of the top plate to the underside of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.
- Horizontal laps must be no less than 75mm with the direction of the lap ensuring that water is shed to the outside.
- End laps must be made over framing and be no less than 150mm wide.

It is preferable to tape all joins.

APPLICATION

- Position the roll of Tekton Wall Underlay against the framing with a short length of wall underlay free of the roll.
- Align the guide marks printed on the Tekton Wall Underlay with visible studs and nail /staple to the framing

Fix the wall underlay into place using 6-8mm zinc/ stainless plated staples, hot dip galvanised large head clouts or proprietary wall underlay fixings.

- Unroll the wall underlay across the framing and fix to all framing members at a maximum of 300mm centres.
- Keep the wall underlay straight and taut over the framing.
- The wall underlay should be run over any openings and these should be left covered until the windows and doors are ready to be installed. To form the openings cut the wall underlay at a 45 degree diagonal in from each corner. Fold and staple the wall underlay to the inside of the framed opening. Excess wall underlay can be trimmed.
- All openings must be detailed using a Branz appraised flexible flashing system like Super-Stick, Protecto One Piece Sill Tape or the Protecto Sill System.
- Where cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when insulation is installed.
- Tekton Wall Underlay can be added as a second layer over head flashings as per E2/AS1 or the headflashing can be sealed to the wall underlay using Protecto Head Flashing Tape.
- Any damaged areas of the wall underlay must be repaired by overlapping with new material and taping, or by taping small tears .

When fixing wall underlay in windy conditions, care must be taken due to the large sail area created by the roll widths.

WARRANTY

Tekton Wall Underlay meets the durability requirements of NZBC B2.3.1(a), 50 years and B2.3.1(b), 15 years. Tekton Wall Underlay is warranted to be free of defect in manufacture. This warranty is limited to replacement of the Tekton Wall Underlay material. Marshall Innovations NZ/AUS Ltd (the distributor) is not liable for incorrect installation or any accidental or wilful damage to the product.

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TEKTON Specification







PRODUCT DATA SHEET

Roof | PINK® BATTS® CEILING INSULATION

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

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Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% 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]
- Manufactured in New Zealand and Australia, reducing shipping distances
- Recycleable 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 Environmental Choice. Further information is available at **nzgbc.org.nz.**

Environmental Choice

All Pink® Batts® ceiling insulation products have Environmental Choice New Zealand Accreditation (refer to Product Specifications on page 5 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

Licence No 2504017.
Thermal Building Insulants

While only BRANZ appraised products are eligible for Environmental Choice, all Pink® Batts® thermal insulation products are manufactured in the same environmentally considerate way.

Note that Pink® Batts® R3.6 and Pink® Batts® R3.2 ceiling insulation is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made product only.

[1] (Beca Carter Hollings & Ferner Ltd, Energy Economics of Fibreglass Insulation, 2005)

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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 4859.1:2002	
Corrosion	Non-Corrosive	N/A	AS/NZS 4859.1:2002-Glass wool exempt	
Moisture Absorption	Non-Hygroscopic	N/A	AS/NZS 4859.1:2002-Glass wool exempt	
Vermin Resistance	No Food Source	✓	AS/NZS 4859.1:2002-Glass wool exempt	

* Stated thicknesses are values at which stated R-values are achieved and are likely to be minimum values. See table on Page 5.

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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.

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Roof | PINK® BATTS® CEILING INSULATION

Product Specifications

ROOF - Thermal Insulation		PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m^2)	APPROX. COVERAGE PER BALE* (m^2)	ENVIRONMENTAL CHOICE
R1.8	Pink® Batts® Classic R1.8 Ceiling	7110118	1220 x 432	95	13.7	14.4	✓
R2.2	Pink® Batts® Classic R2.2 Ceiling	7110122	1220 x 432	115	12.6	13.3	✓
R2.6	Pink® Batts® Classic R2.6 Ceiling	7110126	1220 x 432	140	10.5	11.1	✓
R3.2	Pink® Batts® Classic R3.2 Ceiling‡	7110132	1220 x 432	170	8.4	8.8	✓‡
R3.2	Pink® Batts® Skillion Roof R3.2	7110232	1220 x 432	115 max	3.7	3.9	✓
R3.6	Pink® Batts® Classic R3.6 Ceiling‡	7110136	1220 x 432	180	7.4	7.7	✓‡
R3.6	Pink® Batts® Skillion Roof R3.6	7110236	1220 x 432	165 max	6.3	6.6	✓
R4.0	Pink® Batts® Ultra® R4.0 Ceiling	7110140	1220 x 432	195	6.3	6.6	✓
R5.0	Pink® Batts® Ultra® R5.0 Ceiling	7110150	1220 x 432	220	4.2	4.4	✓
R6.0	Pink® Batts® Ultra® R6.0 Ceiling	7110160	1220 x 432	235	3.7	3.9	✓
R6.3	Pink® Batts® Ultra® R6.3 Ceiling	7110163	1220 x 432	250	3.2	3.3	✓
R7.0	Pink® Batts® Ultra® R7.0 Ceiling	7110170	1220 x 432	260	2.6	2.8	✓
ROOF - Thermal Retrofit Insulation							
R2.9	Pink® Batts® R2.9 Retrofit Ceiling	7110129	1220 x 432	150	9.5	10.0	✓
R3.3	Pink® Batts® R3.3 Retrofit Ceiling	7110133	1220 x 432	175	8.4	8.8	✓
ROOF and WALL - Thermal Insulation							
R2.4	Pink® Batts® HandyPack R2.4^	7200158	7000 x 580	90	4.06	-	

* Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.
‡ This product is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made product only.
# For full details of the Pink® Batts® Lifetime Warranty visit pinkbatts.co.nz/lifetime-warranty.
^ Product does not have the Pink® Batts® Lifetime Warranty or BRANZ Appraised Accreditation.

Accreditations/Appraisals/Certifications

BRANZ Appraised
Appraisal No. 238 [2012]
Appraisal No. 632 [2012]
Appraisal No. 767 [2012]

Licence No 2504017.
Thermal Building Insulants

Tasman Insulation New Zealand Ltd
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Quality ISO 9001

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pink batts Lifetime WARRANTY #

TASMAN INSULATION NEW ZEALAND

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PRODUCT DATA SHEET

Wall

PINK® BATTS® WALL INSULATION

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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 over 80% recycled glass making sustainable use of waste
- Made in New Zealand - designed for New Zealand building conditions and reduces emissions associated with the importing of overseas manufactured product

Environment

Pink® Batts® insulation is a sustainable and energy efficient product.

- Manufactured using over 80% 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]
- Manufactured in Auckland, minimising shipping distances compared to imported products

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 Environmental Choice. Further information is available at **nzgbc.org.nz.**

Environmental Choice

All Pink® Batts® Wall insulation products have Environmental Choice New Zealand Accreditation (refer to the Product Specifications)

Building Insulants
Licence No. 2504017

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

While only BRANZ appraised products are eligible for Environmental Choice, 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)

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Health and Safety

Product Safety

Pink® Batts® insulation is a non-hazardous, safe product.

- IARC (International Agency for Research on Cancer) classifies 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, 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 Organization recommendation for houses to be maintained at a minimum temperature of 18°C 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 levels. See table on page 5.

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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 or folded

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.

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Wall | PINK® BATTS® WALL INSULATION

Product Specifications

WALL - Thermal Insulation	PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m^2)	APPROX. COVERAGE PER BALE* (m^2)	ENVIRONMENTAL CHOICE
Masonry						
R1.0 Pink® Batts® Masonry R1.0	7160110	1220 x 580	40	21.2	-	✓
R1.2 Pink® Batts® Masonry R1.2	7160134	1220 x 580	50	17.0	-	✓
70mm Wall Range						
R2.2 Pink® Batts® Classic R2.2 70mm Wall	7160248	1140 x 560	70	6.4	7.5	✓
90mm Wall Range						
R1.8 Pink® Batts® Classic R1.8 Wall	7127118	1140 x 560	90	16.6	19.6	✓
R2.2 Pink® Batts® Classic R2.2 Wall	7127122	1140 x 560	90	13.4	15.8	✓
R2.2 Pink® Batts® Steel R2.2 Wall	7160214	1220 x 610	90	15.6	15.6	✓
R2.2 Pink® Batts® R2.2 Narrow Wall	7160243	1140 x 360	90	9.0	11.2	✓
R2.4 Pink® Batts® Classic R2.4 Wall	7127124	1140 x 560	90	10.2	12.1	✓
R2.6 Pink® Batts® Ultra® R2.6 Wall	7127126	1140 x 560	90	9.6	11.3	✓
R2.6 Pink® Batts® Ultra® Steel R2.6 Wall	7160215	1220 x 610	90	9.7	9.7	✓
R2.6 Pink® Batts® Ultra® R2.6 Narrow Wall	7160244	1140 x 360	90	7.4	9.2	✓
R2.8 Pink® Batts® Ultra® R2.8 Wall	7127128	1140 x 560	90	6.4	7.5	✓
R2.8 Pink® Batts® Ultra® R2.8 Narrow Wall	7160247	1140 x 360	90	4.5	5.6	✓
140mm Wall Range						
R3.2 Pink® Batts® Ultra® R3.2 140mm Wall	7127132	1140 x 560	140	9.6	11.3	✓
R3.2 Pink® Batts® Ultra® R3.2 140mm Narrow Wall	7160245	1140 x 360	140	7.0	8.6	✓
R3.6 Pink® Batts® Ultra® R3.6 140mm Wall	7127136	1140 x 560	140	7.0	8.3	✓
R4.0 Pink® Batts® Ultra® R4.0 140mm Wall	7127140	1140 x 560	140	5.1	6.0	✓
R4.0 Pink® Batts® Ultra® R4.0 140mm Narrow Wall	7160246	1140 x 360	140	4.1	5.0	✓
R4.3 Pink® Batts® Ultra® R4.3 140mm Wall	7127143	1140 x 560	140	3.2	3.8	✓
R4.3 Pink® Batts® Ultra® R4.3 140mm Narrow Wall	7160262	1140 x 360	140	2.9	3.6	✓

* Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.
\# For full details of the Pink® Batts® Lifetime Warranty visit pinkbatts.co.nz/lifetime-warranty.

Accreditations/Appraisals/Certifications

BRANZ Appraised
Appraisal No. 238 [2018]

Environmental Choice New Zealand
Building Insulants
Licence No. 2504017

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GIB® EzyBrace® Systems

Specification and installation manual



CBI 5113

AUGUST 2016

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

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners[1]
- Encourages more even bracing distribution throughout the building.

[1] Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

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

NEW — GIBFIX® FRAMING SYSTEM

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

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BRANZ Appraised
Appraisal No.928 [2016]

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Sustainability and the Environment **31**

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GIB EzyBrace® Systems — August 2016

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

USE ONLY THE CURRENT SPECIFICATION

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

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

PATENTS

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

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 *The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.*

Note 2 *The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.*

Note 3 *Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.*

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Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

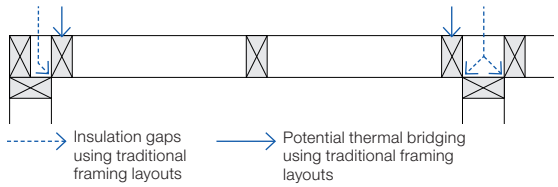
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

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

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

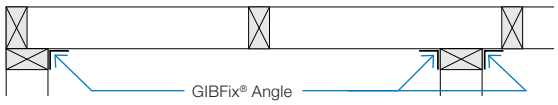
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFIX® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners[1].
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

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Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

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

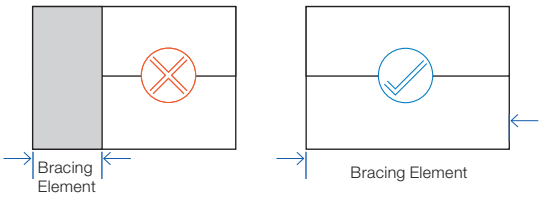
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Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

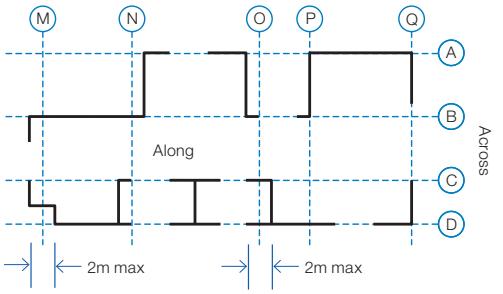
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 ‘rules’ are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- ‘N’ stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)

Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.

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Bracing demand

GIB EZYBRACE® CALCULATOR

The GIB EzyBrace® calculator is a software tool to determine the wind and earthquake bracing demand and to design the bracing resistance for light timber-framed buildings constructed in accordance with NZS 3604:2011.

The updated GIB EzyBrace® calculator combines an up-to-date user-friendly interface with the latest knowledge relating to the performance of GIB® plasterboard in light timber-framed structures when subjected to high winds or earthquakes. The calculator can be down-loaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

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

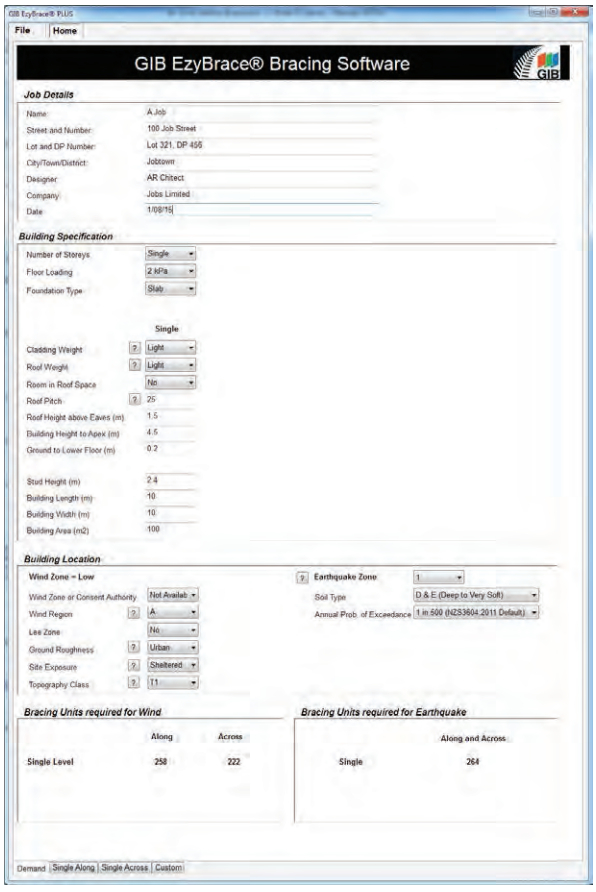
Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

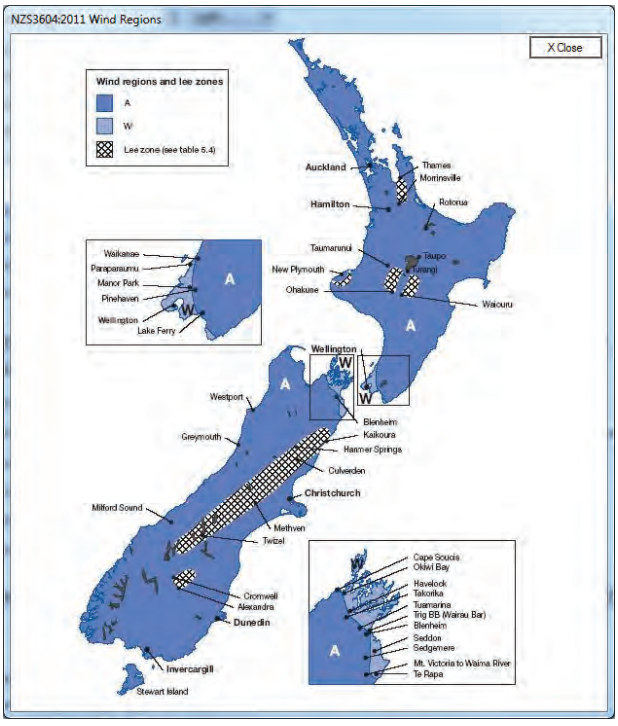
The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design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

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

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

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





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

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Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check. Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

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

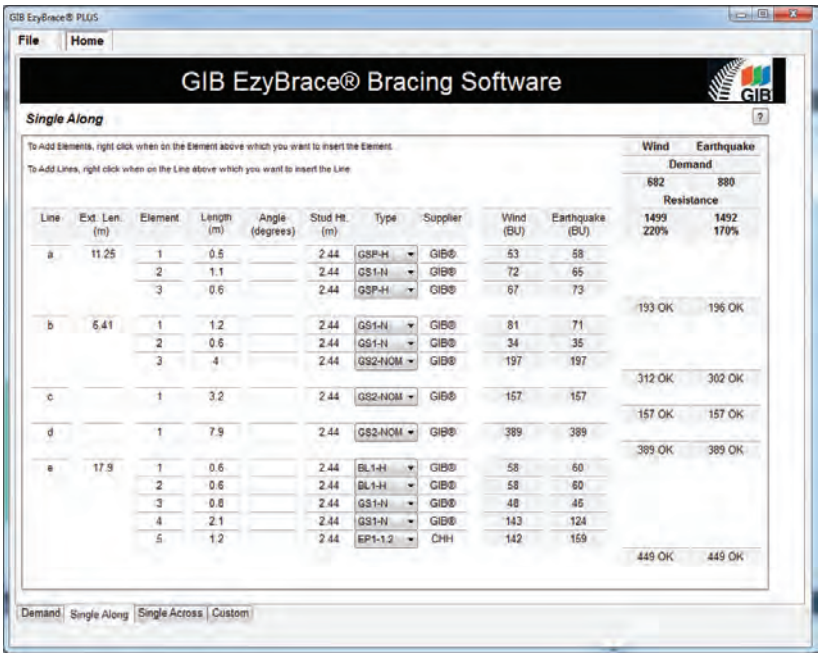
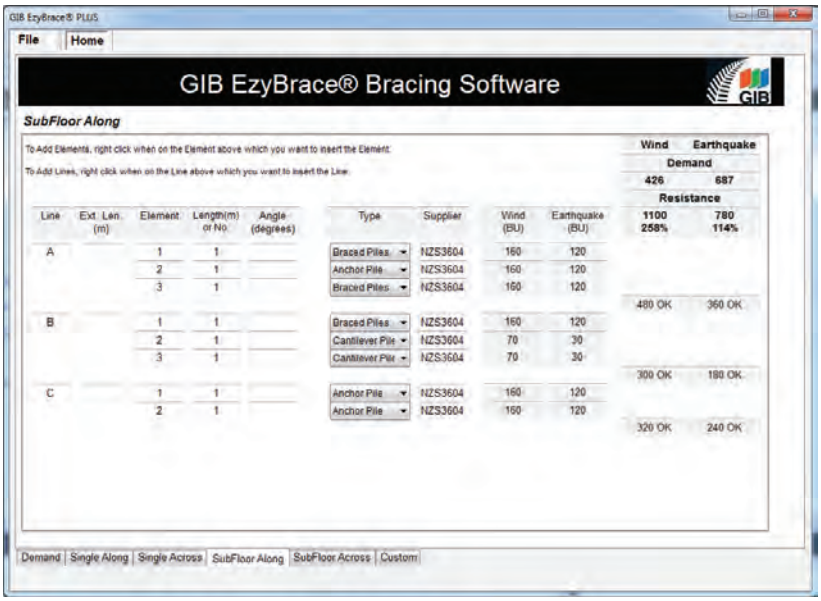


FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET



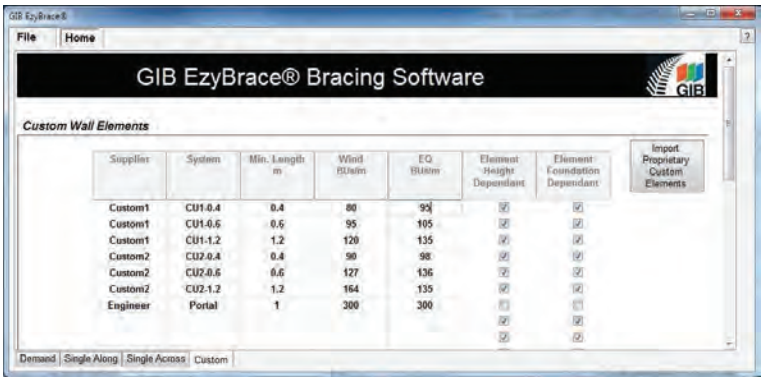
Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET



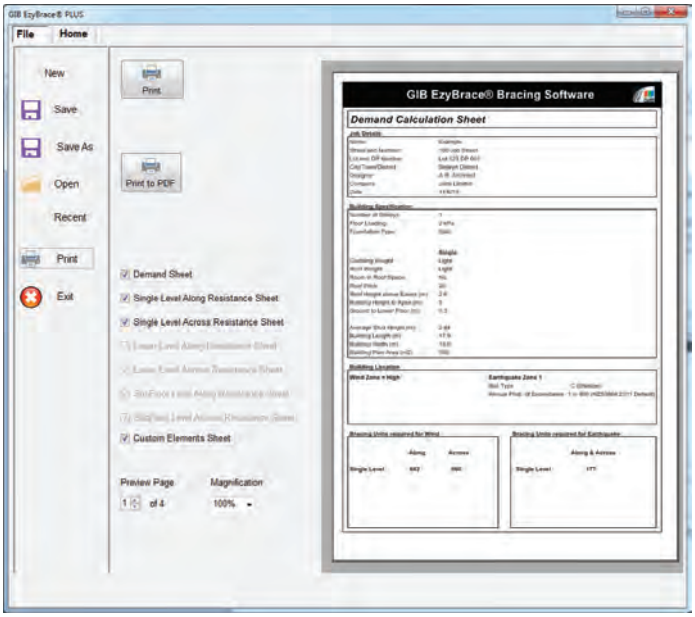
Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.
- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW



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

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GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For futher design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

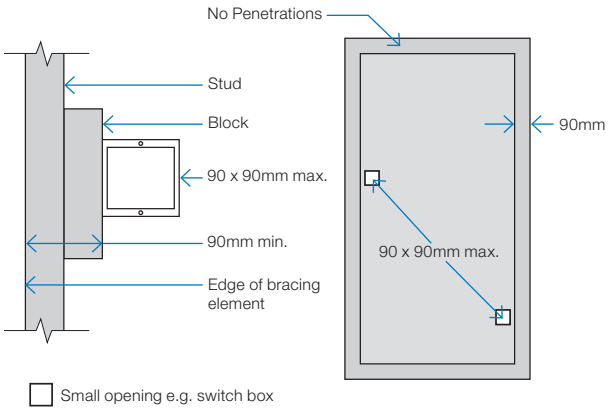
SMALL OPENINGS

Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

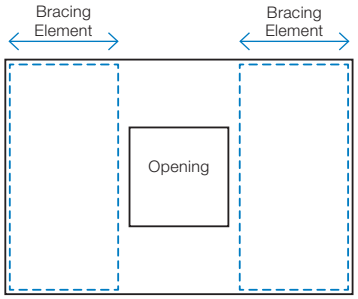
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



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Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

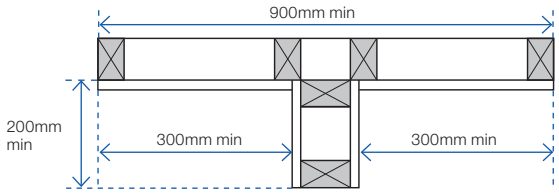
Guidelines for intersection walls

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. The bracing element length must be no less than 900mm.

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

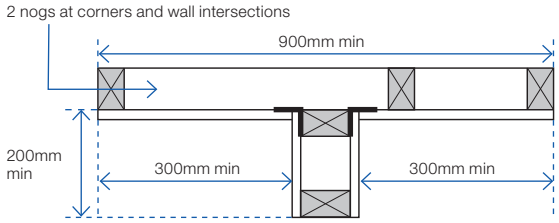
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



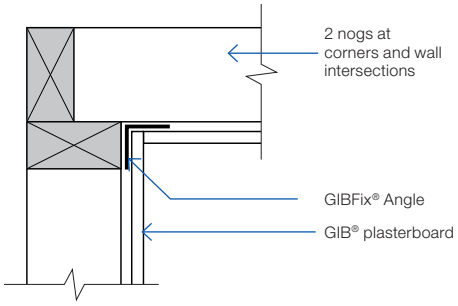
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



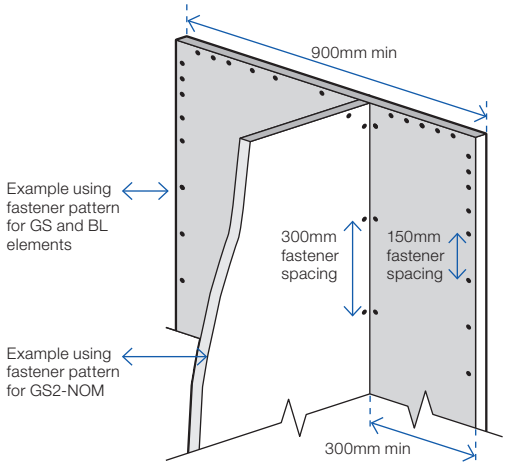
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFIX® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.

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Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR — EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR — INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

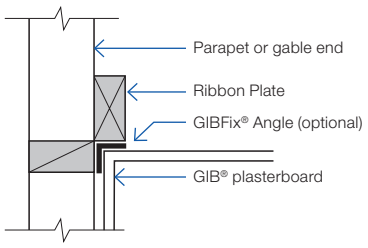
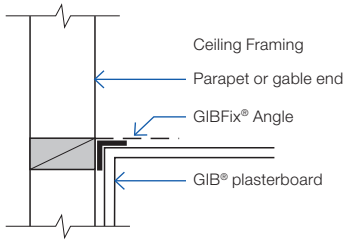


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

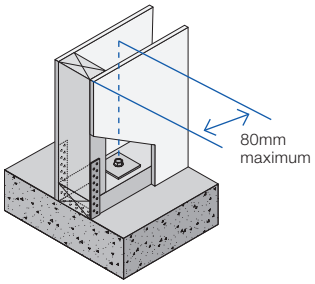
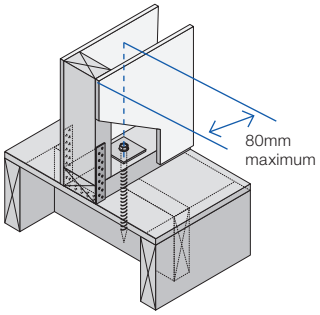
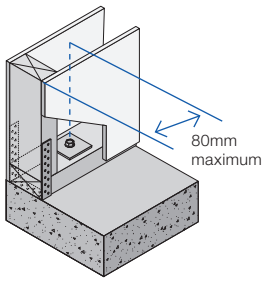
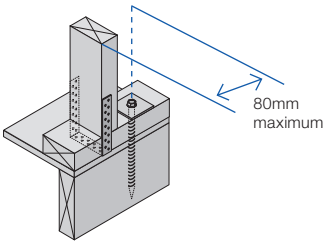
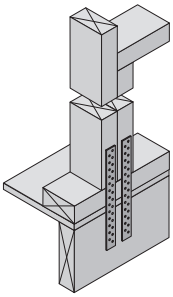
BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	

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Bracing strap installation

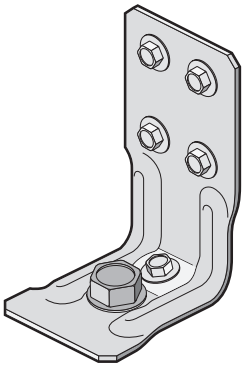
Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor	Timber floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.	
Internal wall	
 GEB004	 GEB005
External wall	
 GEB006	 GEB007
Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.	2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.
	 GEB008

Hold-down fastener requirements	
Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.	12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element

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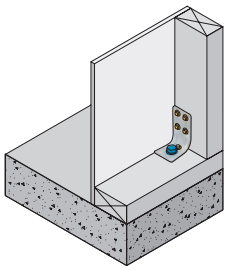
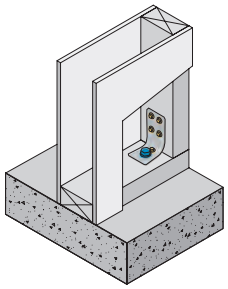
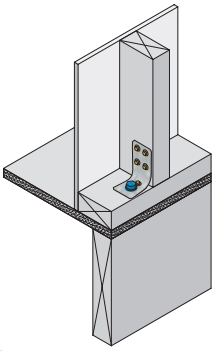
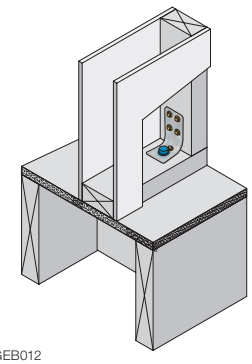
GIB HandiBrac® installation



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

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

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

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

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

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

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

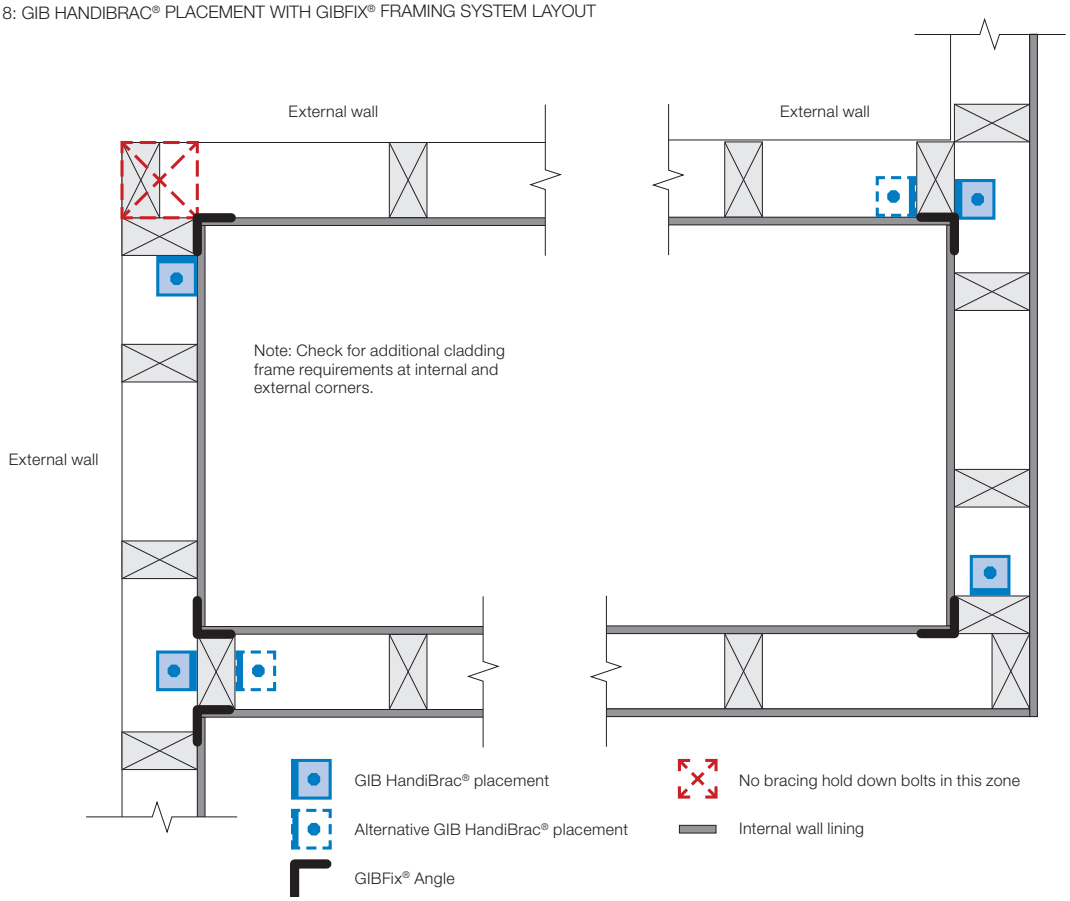
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

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

TIMBER FLOORS

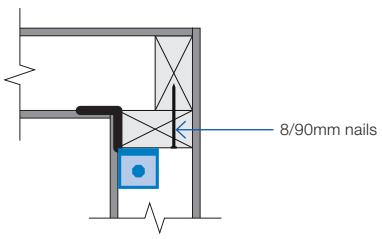
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

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



GEB013

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



GEB014

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Ceiling diaphragms

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

Limitations for GIB® plasterboard ceiling diaphragms

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

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

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

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

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

FIGURE 20: PROTRUSIONS AND CUTOUTS

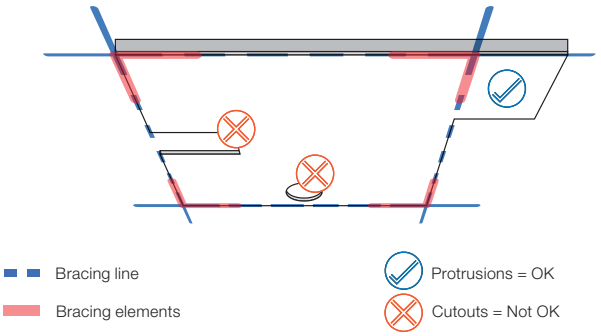


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

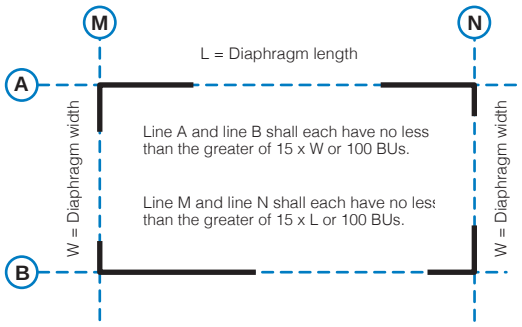
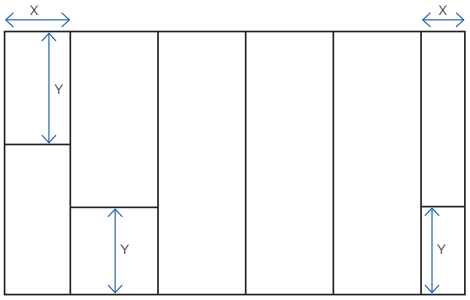
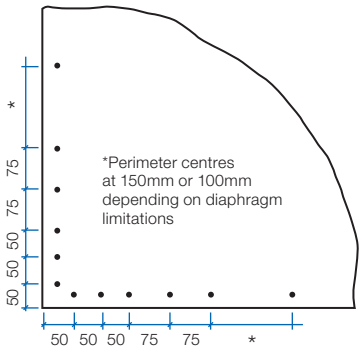


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



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

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015

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Ceiling battens in ceiling diaphragms

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

Battens shall be spaced at a maximum of:
- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

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

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

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

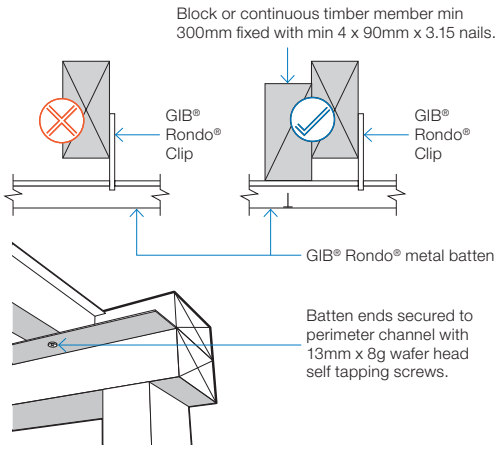
GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

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

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

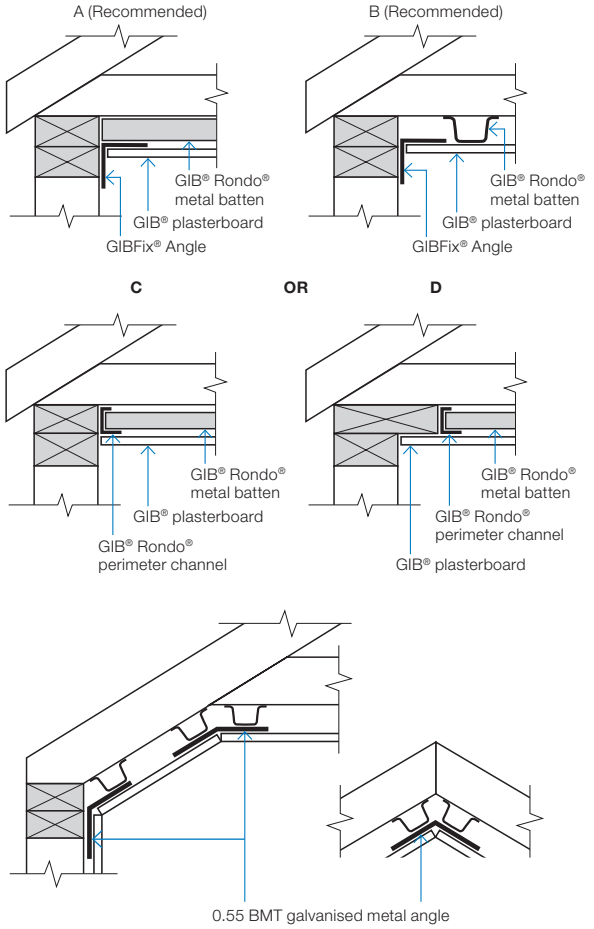
Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



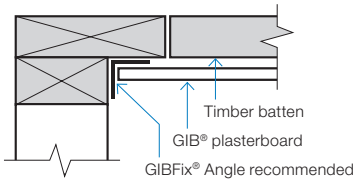
GEB016

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



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

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Openings in ceiling diaphragms

SMALL OPENINGS

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

LARGE OPENINGS

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

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

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

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

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

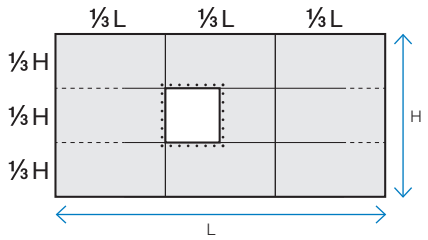
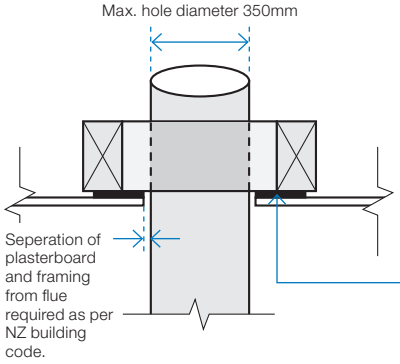
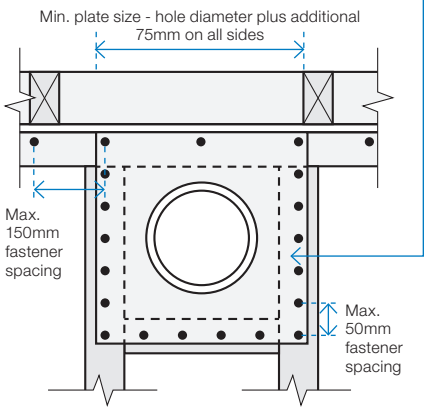


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



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

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

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

Plasterboard ceiling not shown in plan view

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Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

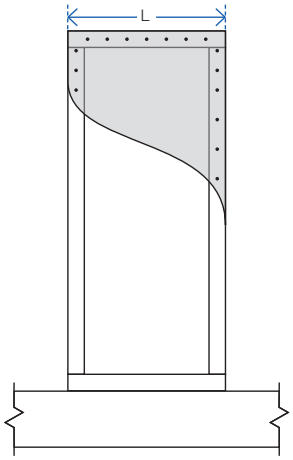
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

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

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

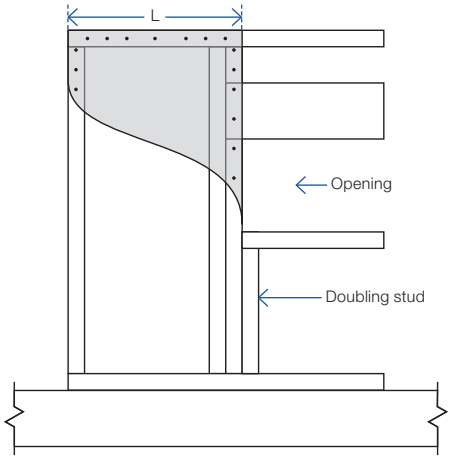
Fastener spacings and diagram scales shown in Figures 29–32 are indicative only. Refer to p.23–30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



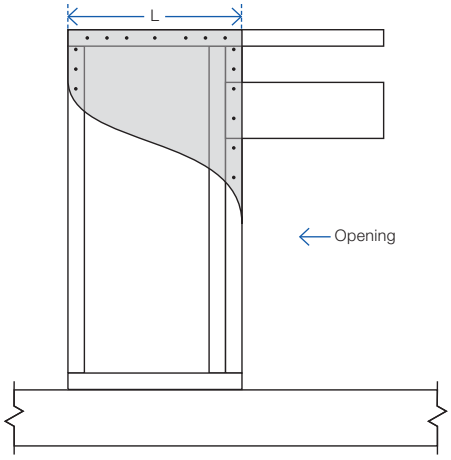
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



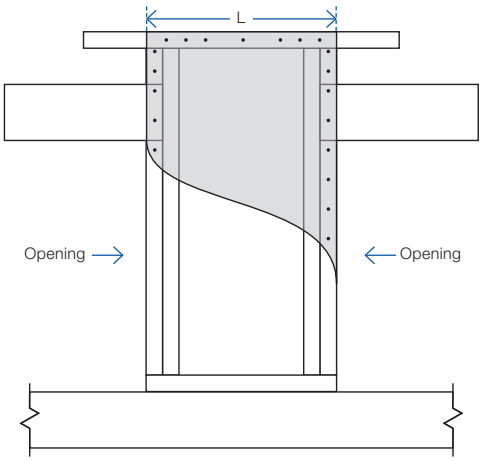
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



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

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



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

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Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

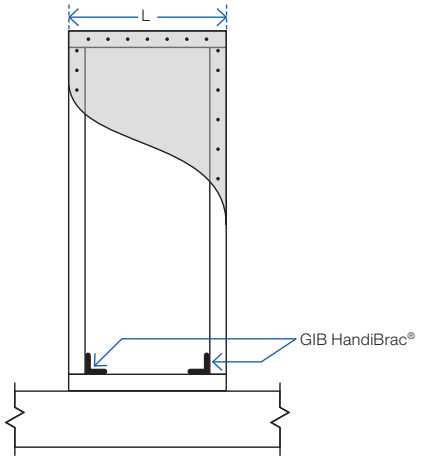
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34-36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB HandiBrac® bolt.

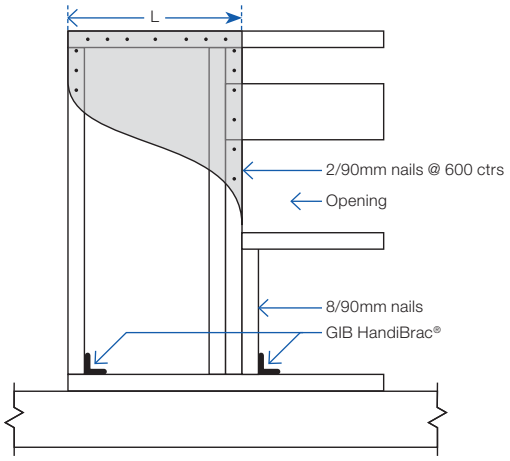
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



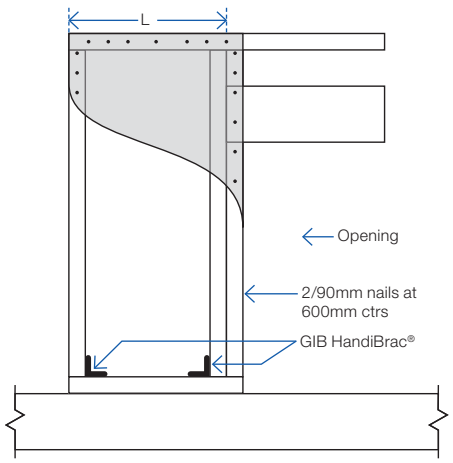
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



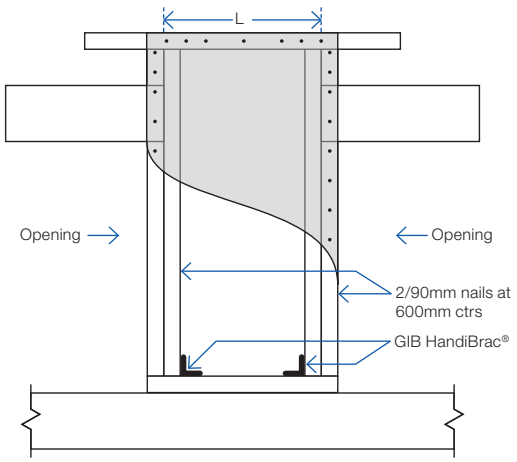
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



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

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



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

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GIB EzyBrace® Systems specification GS1-N

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

Concrete floor

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

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

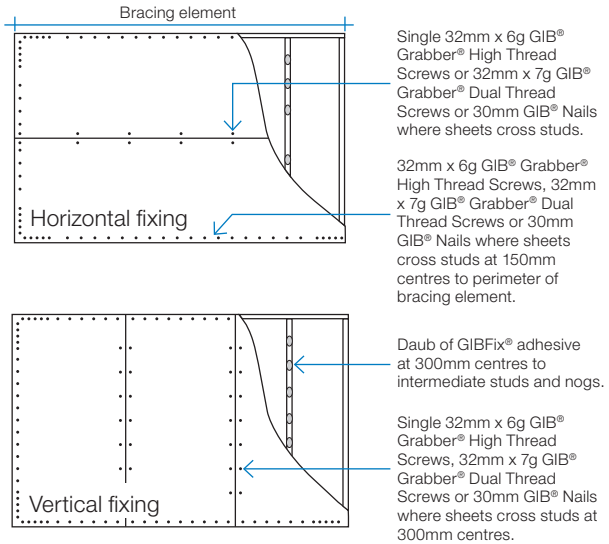
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

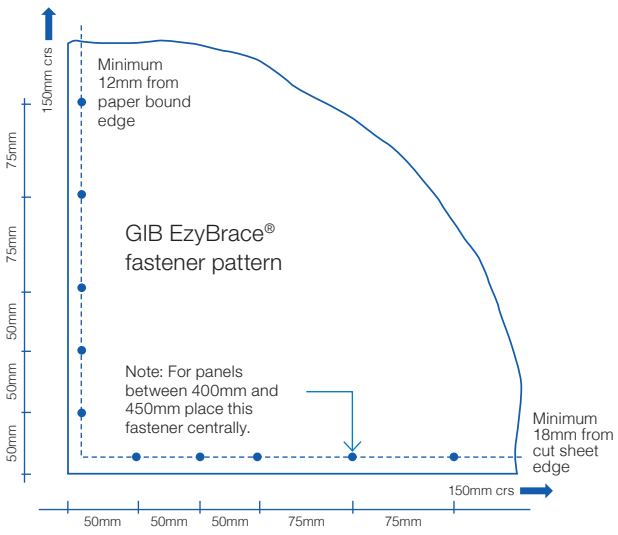
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GIB EzyBrace® Systems specification GS2-NOM

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

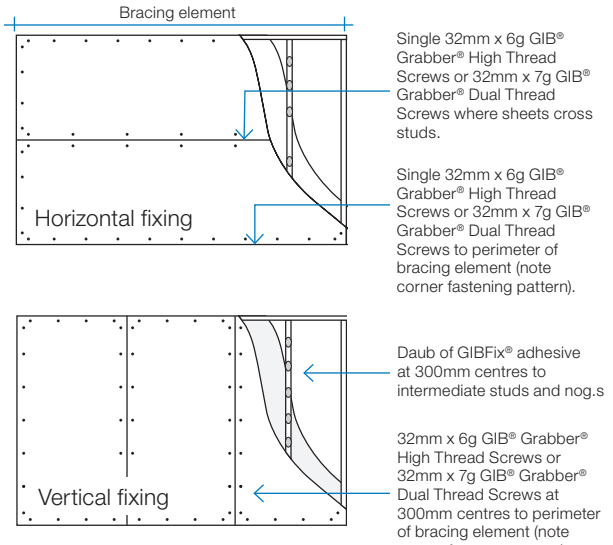
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

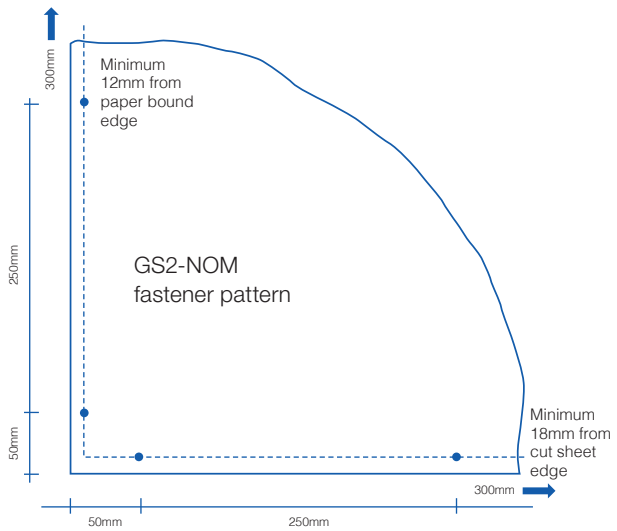
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

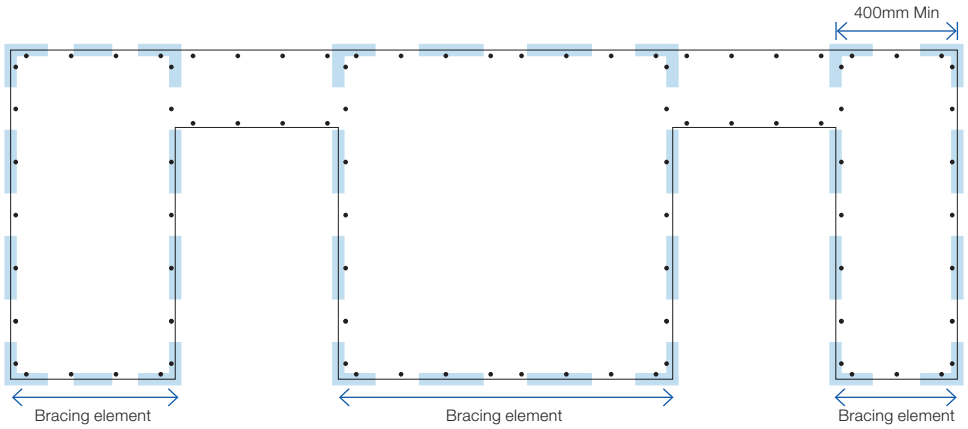
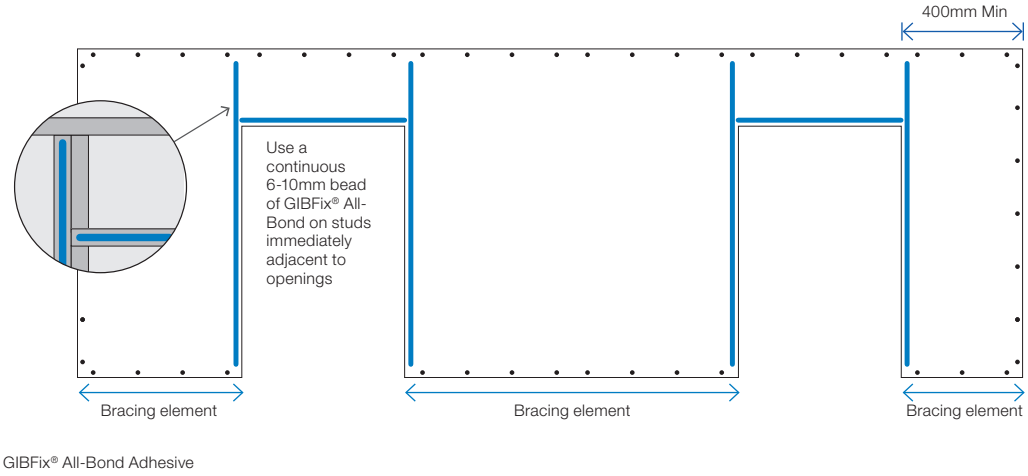
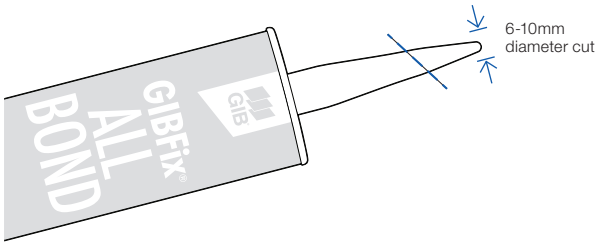


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE



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GIB EzyBrace® Systems specification GS2-N

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber Floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

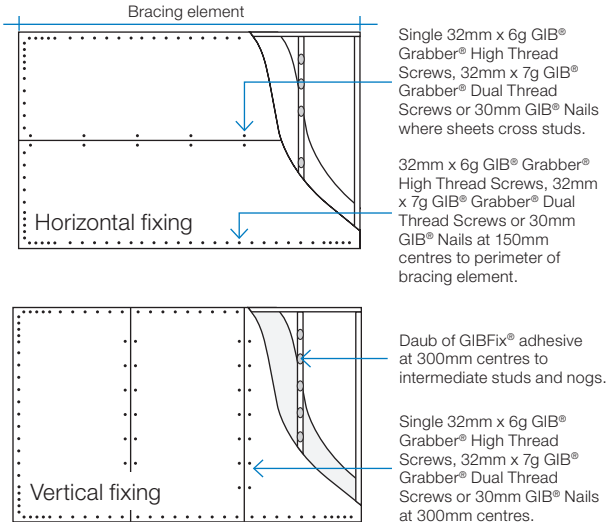
32mm x 6g GIB® Grabber® High Thread Screws,32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

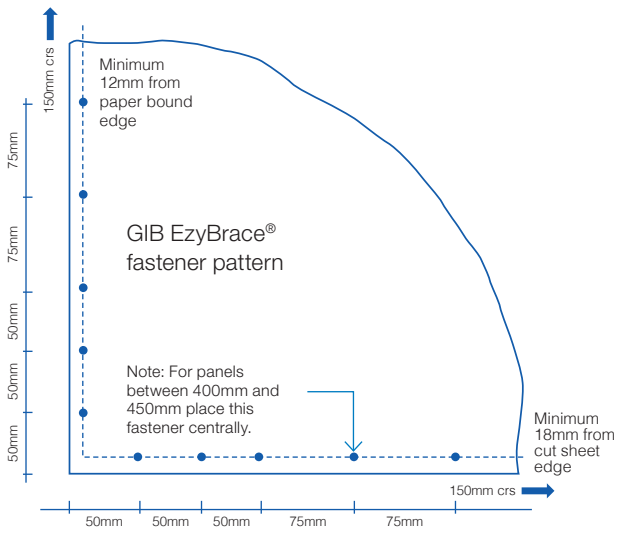
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GIB EzyBrace® Systems specification GSP-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

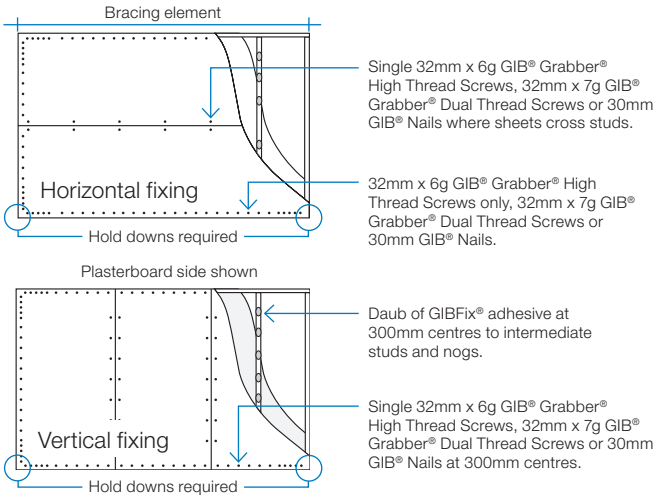
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

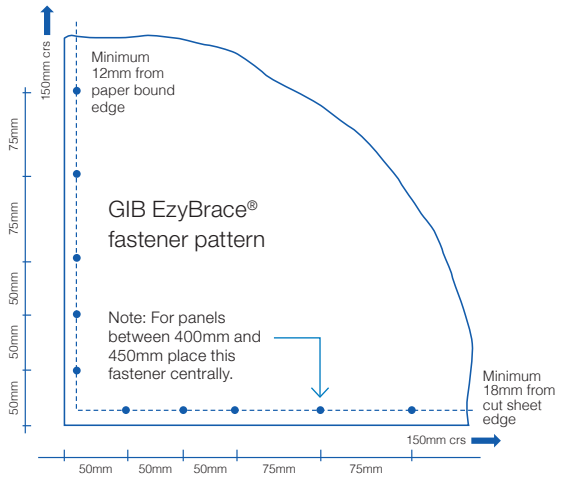
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

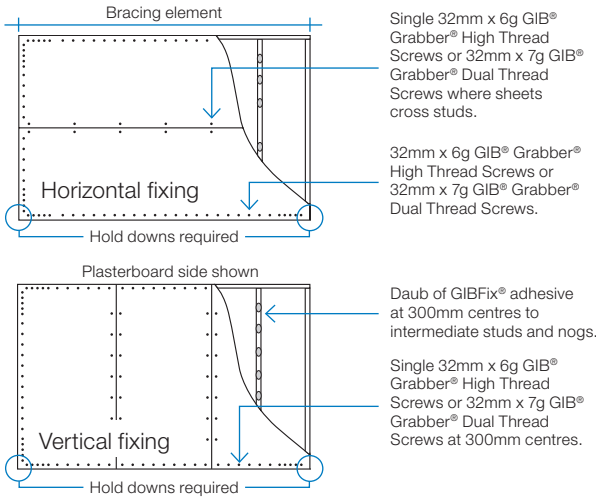
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

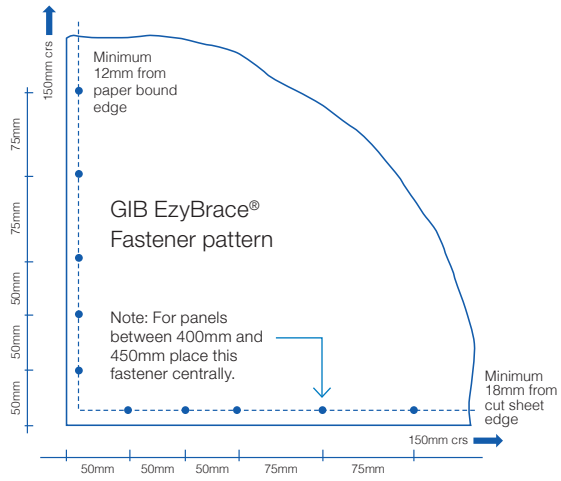
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GIB EzyBrace® Systems specification BLG-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

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

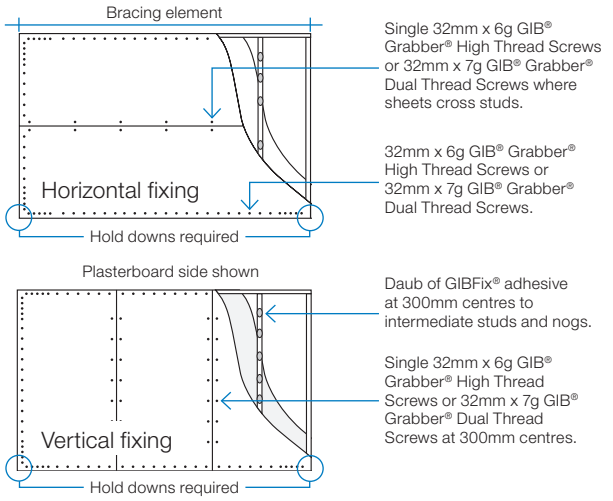
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

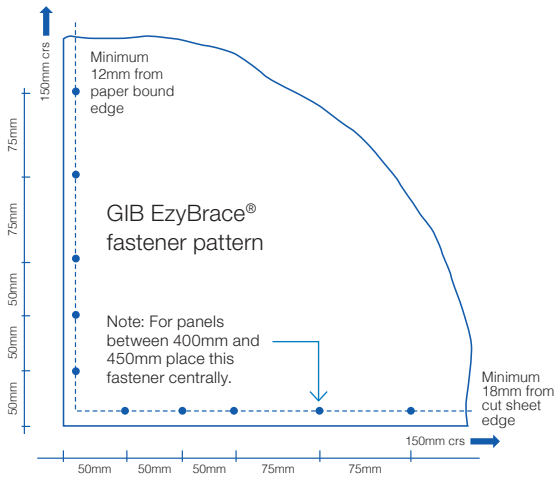
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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GIB EzyBrace® Systems specification BLP-H

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

WALL FRAMING

Wall framing to comply with;

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

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

BOTTOM PLATE FIXING

Timber floor

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

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

Concrete floor

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

WALL LINING

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

PERMITTED ALTERNATIVES

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

FASTENING THE LINING

Fasteners

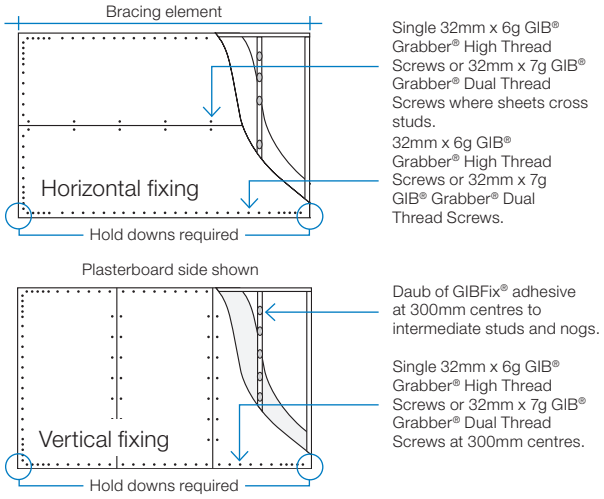
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread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

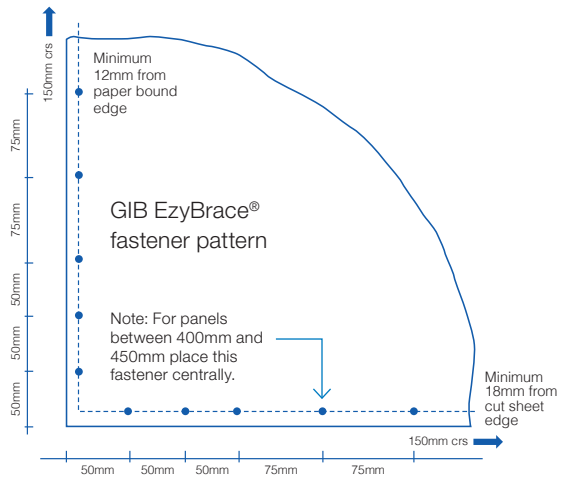
Fastener centres

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

JOINTING

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





Unless stated all fastener spacings are maximums.

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

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Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERTTM}

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

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

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

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

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

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

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

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

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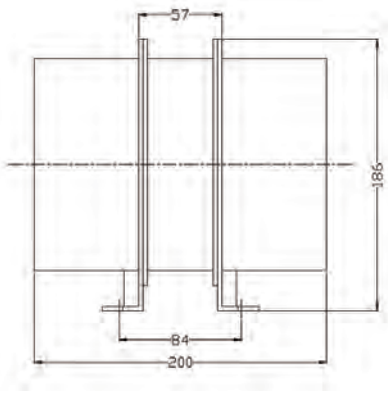
FOR MORE INFORMATION VISIT

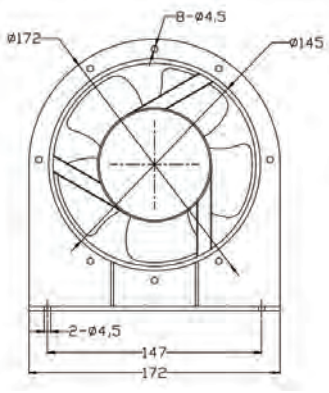
gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

Specification Sheet - VA150





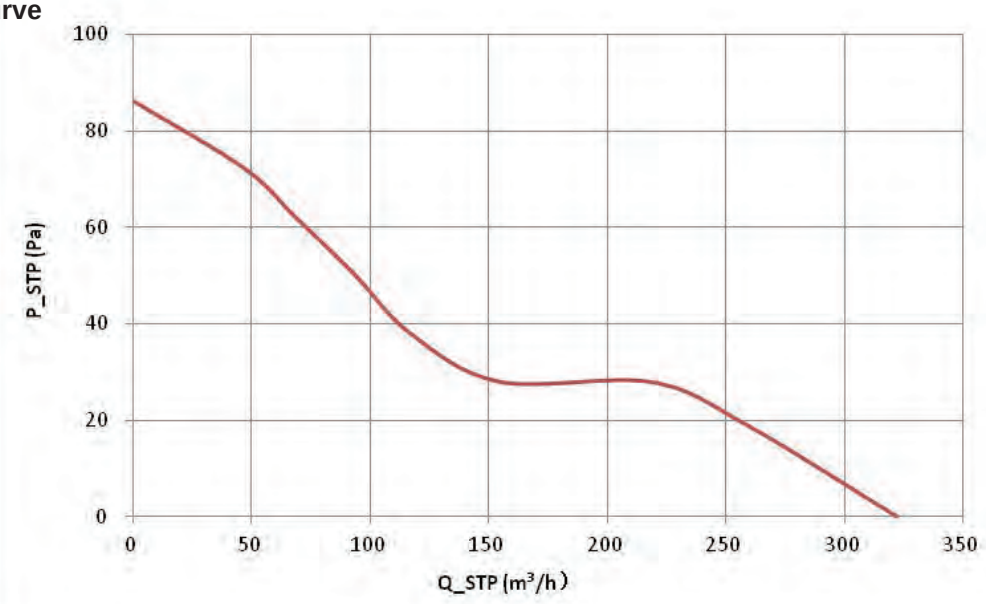


Inline Fan Axial Fan

Designed for use in bathroom and laundry extraction and general air movment applications.

Motor Type	Shaded Pole
Net Weight	1300g
Rotation Direction	CW
Rated Voltage	220-240V 50Hz
Rated Current	0.26A
Rated Input Power	36W
Maximum Speed	2500R/min
Maximum Air Flow	323m³/h
Maximum Static Air Pressure	86Pa
Operating Temperature	-20 to +70°C
Environment Humidity	10%(RH)45℃ for 24 hours & 98% (RH) 45℃
MTBF	30000H
Temperature Protection	Yes
Lock Rotor Protection	Manual Reset
Ingress Protection	IPX2
Climate Class	T
Soft Start	Yes
Dielectric Strength	500VAC/60Hz 1min ≥5mA
Sound Level @ 3m	45dB

Fan Pressure Curve



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316581G
May 2018

INSTALLATION INSTRUCTIONS
&
OWNERS GUIDE

RHEEM MAINS PRESSURE ELECTRIC HOT WATER HEATERS

Congratulations for choosing a Rheem Water Heater

It is important that you take a few minutes
to read this booklet as it may save you
time and trouble later.
If you require any further information or your
water heater needs to be serviced, please contact the
Rheem Service Department on 0800 657 335,
or the nearest service centre
(look in the Yellow Pages under “Plumbers”)
Or visit www.rheem.co.nz

Important to the Installer

Do not leave this booklet inside the element cover
after installation
Please leave the booklet with the water heater’s owner

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IMPORTANT INFORMATION

GENERAL

- The information contained in this manual, and all other information or advice given at any time by Rheem New Zealand Limited in connection with the purchase, installation or use of a Rheem water heater, is given in good faith. Subject to any rights the owner may have under the “Consumer Guarantees Act 1993”, Rheem New Zealand Limited will not be liable to any person for any inaccuracy or omission in the information or advice arising through the fault or negligence of Rheem New Zealand Limited or any other person or through any other cause whatsoever.
- This water heater is not intended to be operated, adjusted or tampered with by young children or infirm persons. Young children should be supervised to ensure they do not play with the water heater.

ABOUT YOUR WATER HEATER

Q. DOES THE WATER QUALITY AFFECT THE WATER HEATER?

A. Your water heater is suitable for most public water supplies, however, some water qualities may have a detrimental effect on it. **If you are in a known harsh water area please refer to page 6**.

Q. HOW HOT SHOULD THE WATER BE?

A. All models (temperature range 60 - 70°C) require an authorised person to make any temperature adjustments. For reasons of safety and economy, we advise the thermostat is adjusted to the lowest setting that meets your needs.

The New Zealand Building Code requires a stored temperature setting of not less than 60°C. A tempering valve set at a maximum of 55°C must be used on domestic wet areas.

Q. HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

A. Refer to the installation requirements on page 4.

Q. HOW LONG WILL THE WATER HEATER LAST?

A. There are a number of factors that affect the life of the water heater. These include; the water quality, water pressure, water temperature and the usage pattern, however, your Rheem water heater is supported by a comprehensive warranty (refer to page 7).

The life of the water heater may be extended by arranging for an authorised person to inspect the anode and replace it, if required.

The suggested time after installation when the anode should be inspected is:

Vitreous Enamel 8 years
Optima 10 years

For softened water supplies or in areas of poor water quality, it is recommended the anode be inspected 3 years earlier than shown (refer to "Water Quality" on page 6).

HOW THE WATER HEATER WORKS

SINGLE AND TWIN ELEMENT MODELS

Water stored within the water heater is heated by the electric heating element. The thermostat controls the electricity supply to the heating element so that a constant water temperature is maintained. As the cold water is heated it expands approximately 1/50 of its volume and, as a result, a small amount of water is discharged from the cold water expansion valve.

NON-SIMULTANEOUS ELEMENT MODELS

The two heating elements are wired for non-simultaneous operation, so that only one heating unit can operate at a time. The bottom heating unit is usually connected to an off-peak (overnight) supply and the top heating unit to a continuous supply. **The red link wire must be removed from the terminal block during installation if two separate power supplies are to be used**. Leaving the link in place ensures both elements operate correctly with a single power supply.

The basic operation is as follows: when the water temperature at the top of the water heater has reached the set temperature, the thermostat switches the top element off. This creates a circuit to the bottom heating element by switching the neutral.

SAFETY

On all models, a Temperature and Pressure Relief valve is supplied with each water heater. It can be found inside the front cover and must be mounted on top of the water heater.

Also fitted to the water heater is a thermostat, which incorporates an over-temperature thermal cut-out device.

⚠ ***Warning:*** *The operation of the thermal cut-out indicates a possible dangerous situation. The thermostat and thermal cut-out is to only be adjusted or reset by an authorised service person.*

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These safety devices must not be tampered with, or removed, and under no circumstances operate the water heater unless both devices are fitted.

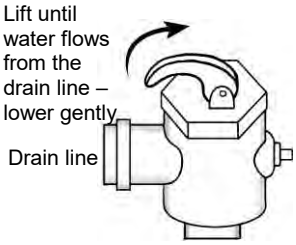
REGULAR CARE

MANUALLY OPERATING THE TEMPERATURE AND PRESSURE RELIEF (TPR) VALVE:

The easing lever (see diagram. 1) on the TPR valve should be operated regularly to remove lime deposits and verify that it is not blocked. **It is very important that you raise and lower the lever gently.**

⚠ ***Warning:*** *To ensure the relief valve is working correctly, operate the relief valve easing lever at least every six months. Failure to do this may result in the water heater over-pressurising.*

DIAGRAM 1



Water Heater

If water does not flow freely from the drain line or the valve fails to completely close and water continues to be discharged, contact the Rheem Service Department, phone **0800 657 335,** or the nearest Rheem Service Centre (look in the Yellow Pages under "Plumbers).

GOING ON HOLIDAYS:

If you plan to be away from home for one or two nights, we suggest that you leave the water heater switched on. However, if you plan to stay away more than a few nights, conserve energy by switching the water heater off at the isolating switch, or at the main switchboard. In locations where freezing could occur, you should leave the water heater turned on.

SAVE A SERVICE CALL

CHECK THE ITEMS BELOW BEFORE MAKING A SERVICE CALL. YOU MAY BE CHARGED FOR SERVICE IF THE FAULT IS NOT RELATED TO THE WATER HEATER MANUFACTURE OR PARTS SUPPLIED WITH THE WATER HEATER BY RHEEM.

WATER DISCHARGING FROM EXPANSION CONTROL VALVES

It is normal for the cold water expansion valve and the temperature and pressure relief valve to discharge a small quantity of water during the heating cycle. If either of these valves discharge more than a bucket full of water in 24 hours, one of the following may be the cause.

- **Continuous dribble**
  Try gently raising the easing lever on the relief valve for a few seconds. This may dislodge small particles of foreign matter and clear the fault.
- **Heavy flow of hot water until the water is cold – then stops while the water reheats**
  Immediately turn off the electricity supply to the water heater. Call the Rheem Service Department or look in the Yellow Pages under "Plumbers" for your nearest Rheem Service Centre or www.rheem.co.nz to arrange an inspection.
- **A steady flow of water (often at night)**
  This may indicate that your cold water pressure sometimes rises above the design pressure of the water heater. A Pressure Limiting valve should be installed, or if one is installed, it may need replacing.

NOT ENOUGH HOT WATER (or no hot water)

- **Is the electricity turned on?**
  Check the switch marked 'water heater' at the switchboard and the water heater isolating switch.
  Check the fuse or circuit breaker marked 'water heater'.

WHERE THE WATER HEATER IS CONNECTED TO AN OFF PEAK (NIGHT RATE) ELECTRICAL TARIFF, THE SUPPLY MAY NOT BE AVAILABLE AT CERTAIN TIMES OF THE DAY.

- **Do you have the correct size heater for your requirements?**
  Refer to the sizing guide in the Rheem sales literature or the Rheem website.
- **Is one outlet (especially the shower) using more hot water than you think?**
  Carefully review the family's hot water usage and if necessary, check the shower flow rate.
  For maximum efficiency we recommend the flow rate through the shower is between 8 to 10 litres per minute (mixed hot and cold). This can be achieved by installing a flow control valve if provision is not made to fit a flow restrictor in the shower rose.
- **Ensure the thermostat setting is appropriate. Note, some models require an authorised person to make electrical thermostat adjustments.**

HIGH ELECTRICITY BILLS

- **Consider recent changes to your hot water usage pattern and check if there has been an increase in tariffs since your previous account.**
- **Is either of the expansion valves discharging too much water?**

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- **Is one outlet (especially the shower) using more hot water than you think?**
- **Is there a leaking hot water pipe, dripping hot water tap, etc?**
  Even a small leak will waste a surprisingly large quantity of hot water and energy. Replace faulty tap washers, and have your plumber rectify any leaking pipe-work.

INSTALLATION

Please take careful notice of the advice given as Rheem New Zealand Limited will not be liable for any loss or damage suffered as a result of the incorrect installation of the water heater, or any failure to check the capability of the electrical supply wiring to the water heater.
The water heater must be installed by a certified person or registered plumber and the installation must comply with the New Zealand Building Code, Rheem Installation Instructions, AS/NZS 3000 electrical installations and all local codes and regulatory authority requirements. Note that no warranty costs will be payable where the water heater is located in a position that does not comply with the Rheem water heater installation instructions or relevant statutory requirements, where the unit is installed in a position that does not allow safe or ready access, the cost of that access shall not be payable (refer to "Rheem Warranty" on page 7).

- **WATER HEATER LOCATION**
  Water heaters with a galvanised outer casing are only suitable for indoor installations, whereas water heaters with a painted casing are suitable for both indoor and outdoor installations.
  Clearance must be allowed for servicing and removal of the water heater and it must be accessible without the use of a ladder or scaffold. (Typical clearances are: TPR valve removal 135 mm, Element Cover and Element Removal 400 mm). Also, you must be able to read the information on the rating plate and if possible, leave headroom of one water heater length so the anode can be inspected or replaced.
- **CONNECTION SIZES**
  - Hot and Cold water connections: RP *¾ / 20.*
  - Relief valve connection: RP ½ / 15.
- **INLET/OUTLET CONNECTIONS**
  A union must always be provided at the cold water inlet and hot water outlet for disconnection reasons. All connection sockets on the water heater are parallel threaded and therefore tapered brass nipples must be used to ensure watertight connections. Both connections are fitted with plastic liners and it is important that they remain in situ for the water heater to function properly. These liners will be pushed into the correct position as the fitting is being screwed in.
- **NON RETURN VALVE**
  A non return valve must be installed on the cold water line to the water heater.
- **PIPE SIZES**
  The cold water line to the water heater should be the same size or bigger than the hot water line from the water heater. For best results, choose the most suitable pipe size for each individual application.
- **COLD WATER EXPANSION VALVE**
  A cold water expansion valve must be fitted to the cold water line to the water heater.
- **TEMPERATURE AND PRESSURE RELIEF VALVE**
  When fitting the temperature and pressure relief valve, ensure the probe has not been bent. Seal the thread with PTFE tape, or similar, as recommended by the valve manufacturer and screw the valve into the off-centre socket. Do not use a wrench on the valve body – use the spanner flats provided. Drain the TPR valve with a pipe the same size as the valve outlet. The drain must run downwards to a visible point outside the house, preferably over a gully trap.
  In some setups or circumstances, such as if freezing could occur, an air break must be provided in the drain within 300 mm of the TPR valve, refer to the New Zealand Building Code - Clause G12 for requirements and acceptable solutions for the running of hot water drain line(s).

  Warning: The drain line from the TPR valve must be in copper. *A Rheem mains pressure water heater must **not** be installed and operated without a suitable (valve that complies with AS 1357.1) temperature and pressure relief valve. Under no circumstances block the outlet of this valve or its drain pipe.*
- **WATER SUPPLY PRESSURE**
  Maximum permitted mains water pressure - refer product label and Table 5.2 AS/NZS 3500.4. Note inlet pressure control valve is required where maximum permitted mains pressure is likely to be exceeded.
  Minimum inlet pressure: 60 kPa
- **PRESSURE LIMITING/REDUCING VALVE**
  If the water supply pressure exceeds the requirements of Table 5.2 AS/NZS 3500.4, a pressure limiting valve with a maximum setting of 500 kPa is to be fitted in the installation.
- **SAFE TRAY AND SEISMIC RESTRAINTS**
  The water heater must be installed with a properly drained safe tray where there is the possibility of water damage to furniture, carpets or building. All water heaters must be restrained to protect against seismic forces. (Refer to the Zealand Building Code for acceptable solutions.)

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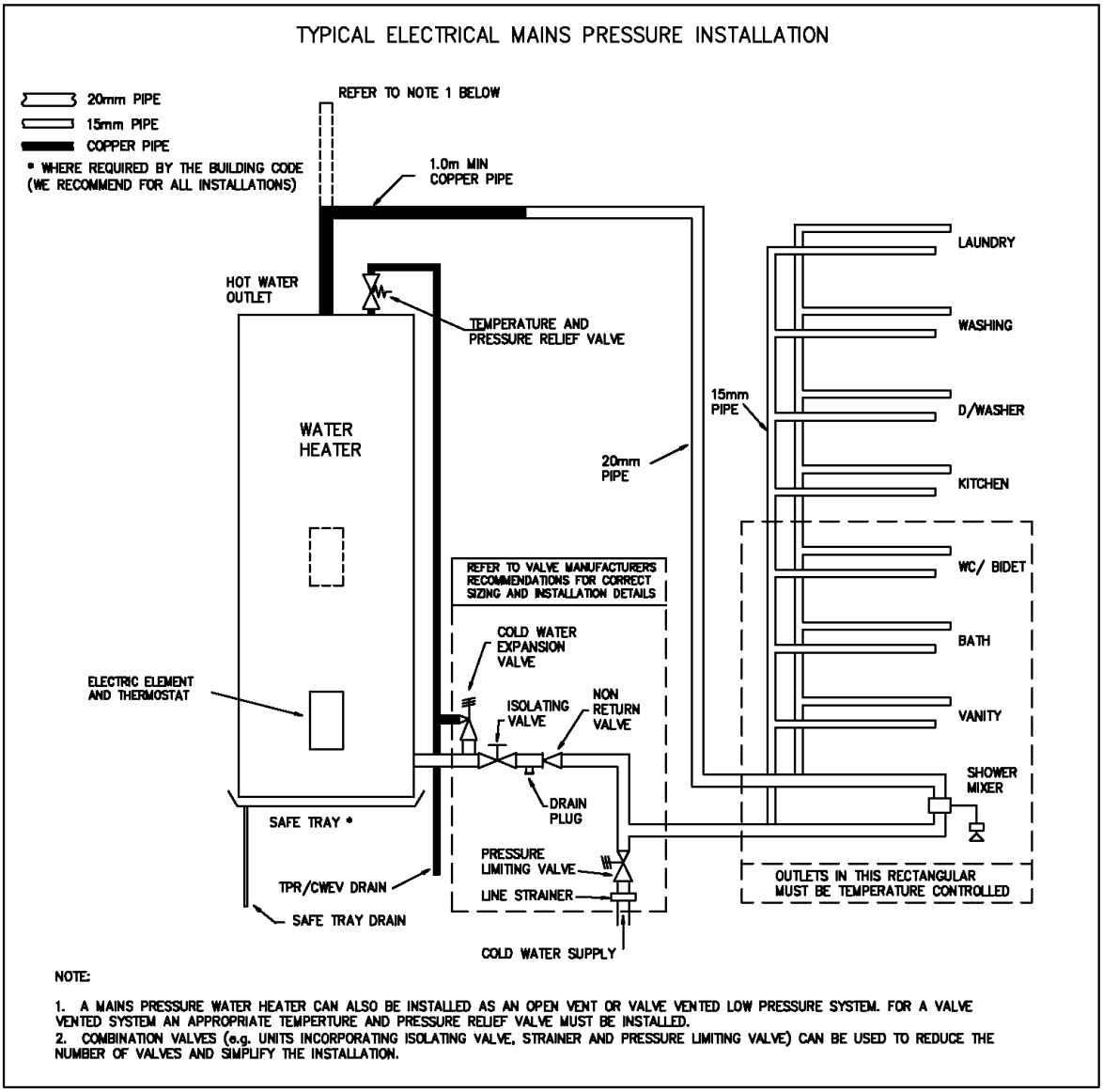


DIAGRAM 2:

CONNECTIONS - ELECTRICAL

The electrical installation must be completed in accordance with AS/NZS 3000. All water heaters are designed for 230 VAC, 50 Hz mains operation and a means of disconnection from the power supply must be incorporated in the fixed wiring during installation.

A flexible 20 mm conduit is required for the electrical cable to the water heater. The conduit is to be connected to the unit with a 20 mm plain to screw adaptor. Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover. For details, refer to the wiring diagram on the inside of the element cover. **A separate heating element earth wire is not required because the element earths by the thread of the element boss or the flange being in contact with the element socket.**

COMMISSIONING

TO FILL AND TURN ON THE WATER HEATER

⚠ ***Warning:*** *The power supply to the water heater must not be switched on until the water heater is filled with water and an "earth continuity test", as outlined in Annex A of AS/NZS 60335.1 has been carried out. Failure to do so will damage the element and shorten its life and may create a dangerous situation.*

- Open all of the hot water taps in the house (don't forget the shower). Open the cold water isolation valve fully to the water heater to force the air out of the taps. As water flows freely from each tap, close it. Check the pipe-work for leaks.
- Switch on the electrical supply at the isolating switch to the water heater.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then;

- Switch off the electrical supply at the isolating switch to the water heater.
- Close the cold water isolation valve at the inlet to the water heater.

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DRAINING THE WATER HEATER

- Switch off the electrical supply at the isolation switch to the water heater.
- Close the cold water isolation valve.
- Operate the relief valve easing lever to release the pressure in the water heater.
- Drain the water heater through the drain valve or plug.
- Undo the top outlet union or operate the relief valve easing lever again to let air into the water heater and allow the water to drain

WHAT YOU SHOULD KNOW ABOUT WATER QUALITY

WATER SUPPLY CHEMISTRY

Water quality can have a detrimental effect on water heater operation, components and life expectancy and may affect the warranty.

⚠ ***Warning****: This water heater must be installed in accordance with advice given to be covered by the Rheem warranty.*

Your Rheem water heater is manufactured to suit the water condition of most local authority water supplies. However, some water supplies can have a detrimental effect on the water heater and its operation and/or life expectancy. This water heater must only be connected to a water supply which complies with these specifications for the Rheem warranty to apply. If you are unsure of your water chemistry you may be able to obtain information from your local water supply authority or you can contact Rheem and we will provide you with contact details of a suitable agency capable of testing your water for compliance with Rheem standards. Water quality tests must be carried out at the owner's cost.

HARSH WATER AREAS

Rheem water heaters are designed for use in areas where the Total Dissolved Solids (TDS) content of the water supply is less than 2500 mg/L.

In areas where the TDS exceeds 600 mg/L it is possible the standard magnesium anode fitted to the water heater, may be excessively active. To alleviate this, the magnesium anode should be replaced with an aluminium anode. Where the TDS of the water is less than 40 mg/L, such as when the water has been deionised or is from an alpine supply, a high potential anode should be used. The changing of anodes must be carried out by a plumber or qualified service person.

CAUTION

If your water supply has a TDS greater than 600 mg/L and the anode has not been changed, there is a possibility of hydrogen gas accumulating in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (e.g. automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flames near the tap whilst it is turned on. Any hydrogen gas will be dissipated as indicated by an unusual spurting of the water from the tap. Once the water runs freely again any hydrogen in the system will have been released.

SATURATION INDEX

The saturation index is used as a measure of the water's corrosive or scaling properties. In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. When scaling water has a saturation index greater than +0.40 an expansion control valve must be fitted on the cold water line after the non-return valve.

Where the saturation index exceeds +0.80, low watts density elements should be used. Where the saturation index is less than -1.0, a corrosive resistant heating unit should be used (contact your local Rheem Service Department or an authorised service person).

Scaling water is water that containing levels of calcium carbonate (total hardness in excess of 200 mg/litre at any time when the water heater is operating) Scaling water can block and prevent the pressure & temperature relief valve from operating, resulting in damage to the water heater storage cylinder and water components. A cold water expansion control valve must be fitted where in all areas with scaling water to assist in preventing blockage of the pressure and temperature relief valve.

⚠ ***Warning:*** *Failure to install an expansion control valve where scaling water conditions occur may result in the water storage cylinder failing or under certain circumstances over pressurising.*

To avoid damage to the storage cylinder and components Rheem strongly recommends scaling water be treated before entering the water heater by fitting appropriate water filters, conditioners, etc – refer to your local water authority for information on water in your area. A build up of white sediment on the hot taps or shower rose can be indicative of scaling water. Contact Rheem if this condition is observed.

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Warning: *Damage caused by scaling water can affect the Rheem warranty.*

The Rheem warranty of this water heater will not cover resultant faults on components, including storage tank, due to the effects of sludge and/or sediment as a result of connection to a water supply from silted or untreated sources, i.e. springs, dams, bores, rivers or town supplied from a bore.

WATER HEATERS NOT INSTALLED IN ACCORDANCE WITH THE ABOVE ADVICE WILL NOT BE COVERED BY THE RHEEM WARRANTY.

RHEEM WARRANTY

Mains Pressure Electric Water Heater Product Warranty New Zealand Only

In addition to your legal right, in New Zealand Rheem New Zealand Limited makes the following promise to the owner. We will repair or, if necessary, replace a defective unit or part of it, which has failed due to faulty manufacture on the following terms and conditions:

1. THE RHEEM WARRANTY – GENERAL

1.1 This warranty is given in respect of sales in New Zealand by Rheem New Zealand Limited of 475 Rosebank Road.

1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the unit subject to the terms of the Rheem warranty in New Zealand – contact your Rheem Service Centre on 0800 657 335.

1.3 For details about this warranty, you can contact your Rheem Service Centre in New Zealand on 0800 657 335.

1.4 The terms of this warranty are set out in section 2 and apply to units manufactured after 1st July 2016.

1.5 If a subsequent version of this warranty is published, the terms of that warranty will apply to units manufactured after the date specified in the subsequent version.

2. TERMS OF THE RHEEM WARRANTY AND EXCLUSIONS TO IT

2.1 The decision of whether to repair or replace a faulty component is at Rheem New Zealand Limited's sole discretion.

2.2 Where a failed component or unit is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Rheem warranty.

2.3 Where the unit is installed outside the boundaries of a metropolitan area, defined by Rheem as further than 25 km from a Rheem service centre, the cost of transport, insurance and travelling between the Rheem service centre and the installed site shall be the owner's responsibility.

2.4 Where the unit is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors, walls, roofs or trap doors and the cost of any special equipment to bring the unit to floor or ground level or to a serviceable position is not covered by this warranty.

2.5 This warranty only applies to the original and genuine Rheem unit in its original installed location and any genuine Rheem replacement parts. It does not cover any plumbing, gas fitting or electrical parts supplied by the installer, that are not an integral part of the unit, e.g. pipe-work, pressure limiting valve, stop valves, non-return valves, electrical switches, pumps and fuses.

2.6 The Rheem warranty does not cover faults that are a result of:

a) Accidental damage to the unit or any component, for example Acts of God such as floods, storms, fires, lightning strikes and the like and Third party acts or omissions.

b) Misuse or abnormal use of the unit.

c) Installation or use not in accordance with the Owner's Guide and Installation Instructions, New Zealand Building Code requirements or with relevant statutory and local requirements including failure to install a properly drained safe tray where required by the owners guide and installations.

d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions, or poor water quality outside the limits specified in the owners guide and installation instructions.

e) Repairs, attempts to repair or modifications to the unit by a person other than Rheem Service or a Rheem Accredited Service Technician.

f) Faulty plumbing or faulty power supply.

g) Failure to maintain the unit in accordance with the Owner's Guide and Installation Instructions.

h) Transport damage.

i) Fair wear and tear from adverse conditions (for example, corrosion).

j) Cosmetic defects.

2.7 If you require a call out and we find that the fault is not covered by the Rheem warranty, you are responsible for Rheem Service Centre call out costs. If you wish to have the relevant component repaired or replaced by Rheem that service will be at your cost.

2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims however arising including under contract or tort for damage to furniture, carpet, walls, foundations or any other consequential loss or incidental expenses either directly or indirectly due to leakage from Rheem unit, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.

2.9 This warranty excludes to the extent permissible all implied warranties set out in the sale of goods act 1908 (New Zealand) and all guarantees set out in the consumers guarantees act 1933 (New Zealand) to the extent that the goods are acquired for the purpose of resupply in trade consumption in the course of a process of production or manufacture or repairing or treating in trade other goods or fixtures on land.

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3. WHAT IS COVERED BY THE RHEEM WARRANTY FOR THE UNITS DETAILED IN THIS DOCUMENT

3.1 The following Warranty terms apply for all Rheem Water Heaters manufactured after 1st June 2018. Rheem will repair or replace a faulty component of your unit if it fails to operate in accordance with its specifications as follows:

Warranty Cover	**The period from date of installation, in which the fault must appear, in order to be covered**		*Domestic use is defined as; when the appliance is installed in a single family domestic dwelling.
What components are covered	**Domestic use***	**Non-domestic use***	**What coverage you receive**
Low & Mains Pressure	**Years**		**(Excludes Optima)
All components	1	1	Repair or replacement of failed component, or if necessary, replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	5	1	Repair or replacement of the complete water heater, free of charge, including labour.
Cylinder only - Vitreous Enamel (Thermostat setting must be below 70°C)	10	3	Repair or replacement of the complete water heater, free of charge. Installation and labour cost are the responsibility of the owner.
Optima	**Years**		
All components	3	1	Repair or replacement of failed component, or if necessary, replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	5	1	Repair or replacement of the complete water heater, free of charge, including labour.
Cylinder only (Thermostat setting must be below 70°C)	12	5	Repair or replacement of the complete water heater, free of charge. Installation and labour cost are the responsibility of the owner.

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

4.1 To be entitled to make a claim under this warranty you need to:

a) Be the owner of the unit or have consent of the owner to act on their behalf.

b) Contact Rheem New Zealand Limited Service Department without undue delay after detection of the defect and, in any event, within the applicable warranty period.

c) Return the faulty component or unit as directed by the Rheem New Zealand Limited Service Department.

4.2 You are **not** entitled to make a claim under this warranty if your unit:

a) Does not have its original serial numbers or rating labels.

b) Is not installed in New Zealand.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

5.1 If you wish to make a claim under this warranty, you need to:

a) Contact Rheem New Zealand on 0800 657 335 and provide owner's details, address of the unit, a contact number and date of installation of the unit or if that's unavailable, the date of manufacture and serial number (from the rating label on the unit).

b) A Rheem service centre will arrange for the unit to be tested and assessed on-site.

c) If Rheem determines that you have a valid warranty claim, Rheem will repair or replace the unit in accordance with this warranty.

5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

RHEEM SERVICE DEPARTMENT
475 Rosebank Road, Avondale, Auckland

www.rheem.co.nz

FOR SERVICE TELEPHONE
Phone: 0800 657 335
Fax: 09 829 0222
or refer to your local Yellow Pages under "Plumbers"
for your nearest Rheem Service Centre

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PRODUCT CERTIFICATE

Linea™ Weatherboard by James Hardie
Direct Fixed and Cavity Cladding systems

KEY INFORMATION

CERTIFICATE: **GM-CM30018 RevM**

1 SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT

Linea™ Weatherboard is a 16 mm thick bevelback fibre cement weatherboard, which is designed to be used as part of an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.
Linea™ Weatherboard Direct Fixed Cladding system consists of Linea™ Weatherboards applied direct to the external wall framing over a flexible underlay.
Linea™ Weatherboard Cavity Cladding system consists of Linea™ Weatherboards fixed over timber battens to form the cavity.
Both cladding methods (referenced as the system) incorporate secondary protection behind all internal and external corners, flashings for window, door and meter box penetrations as well as air seals to all wall penetrations.

2 SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT

The system is designed to be used as part of an external cladding system on timber framed building.

3 BUILDING CODE PROVISIONS

The systems if designed, used, installed and maintained in accordance with this certificate will meet the following provisions of the NZBC:

Clause B1 STRUCTURE:	Performance B1.3.1, B1.3.2, B1.3.4 for the relevant physical conditions of B1.3.3 (a), (f), (h), (j) and (q).
Clause B2 DURABILITY:	Performance B2.3.1(b) 15 years and B2.3.2.
Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE:	Performance C3.5, C3.7
Clause E2 EXTERNAL MOISTURE:	Performance E2.3.2, E2.3.5, E2.3.6 and E2.3.7
Clause F2 HAZARDOUS BUILDING MATERIALS:	Performance F2.3.1.

4 CERTIFICATE HOLDER DETAILS

James Hardie New Zealand Limited
Trading as James Hardie
1 O'Rorke Road, Penrose , Auckland 1061, New Zealand,
TechnicalTeam@jameshardie.co.nz
Tel: 0800 808 868,
www.jameshardie.co.nz

ISSUED	LAST UPDATE	RECERTIFICATION
26/05/2020	21/09/2022	03/07/2025

5 SIGNATURE

Herve Michoux, Global Mark Managing Director

6 PRODUCT CERTIFICATION BODY

Global-Mark Pty Ltd
57 Willis Street, Wellington, 6011
customer.service@global-mark.co.nz
+64 9 889 0622
www.global-mark.co.nz

The complaints process for this certificate can be found here:
https://www.global-mark.com.au/?s=complaint

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CERTIFICATE V1.5

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PRODUCT CERTIFICATE

Linea™ Weatherboard by James Hardie
Direct Fixed and Cavity Cladding systems

7	CONDITIONS AND LIMITATIONS OF USE

1. The systems (respectively) are certified:
   a. as a direct fixed external wall cladding for buildings:
      i. within the scope limitations of the New Zealand Building Code (NZBC) Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Paragraph 1.1, and
      ii. with a risk score of 0-12, calculated in accordance with the NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 2, and
      iii. situated in NZS 3604:2011 Wind Zones up to, and including Very High, and
   b. as a cavity fixed external wall cladding for buildings:
      i. within the scope limitations of the NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Paragraph 1.1,
      ii. with a risk score of up to 20, calculated in accordance with the NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 2,
      iii. situated in in NZS 3604:2011 Wind Zones up to, and including Extra High, and
   c. as a cavity fixed external wall cladding for 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 spacing no more than 600mm centres
   d. located:
      i. in all exposure zones (except microclimates) as defined in NZS 3604:2011 section 4.2, and
      ii. located anywhere in relation to the relevant boundary for building within the scope of:
         - C/AS1, amendment 5, 5 November 2020 or
         - C/AS2, amendment 2, 5 November 2020
2. The system shall be specified, installed, inspected and maintained in accordance with the following sets of documents collectively referenced as the Applicable Technical Specification to the extent that their scope covers that for this Certificate:
   a. For direct fixed external wall cladding application
      i. James Hardie Linea™ Weatherboard Direct Fix Technical Specification (May 2020)
      ii. James Hardie Fire & Acoustic Design Manual (November 2020) section 4:16 Control of External Fire Spread, figures No's. 1 to 8 and 12 to 20, specifically details JHETGL30 and JHETGL60. These details have only been assessed and certified with respect to external fire spread via Linea™ Weatherboard. For walls located within 1.0m of a relevant boundary, Linea™ Weatherboard may be used as an external façade/cladding attached to the exterior of fire rated wall systems as depicted within the Fire and Acoustic Design Manual (November 2020). Fire Resistance rating performance of the wall assembly falls outside the scope of this certificate
      iii. BRANZ Appraisal No 446 (2020) Linea™ Weatherboard Direct Fixed Cladding

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b. For cavity fixed external wall cladding applications:
   i. James Hardie Linea™ Weatherboard Cavity Fix Technical Specification (May 2020)
   ii. James Hardie Fire & Acoustic Design Manual (November 2020) section 4:16 Control of External Fire Spread, figures No's. 1 to 8 and 12 to 20, specifically details JHETGL30 and JHETGL60. These details have only been assessed and certified with respect to external fire spread via Linea™ Weatherboard. For walls located within 1.0m of a relevant boundary, Linea™ Weatherboard may be used as an external façade/cladding attached to the exterior of fire rated wall systems as depicted within the Fire and Acoustic Design Manual (November 2020). Fire Resistance rating performance of the wall assembly falls outside the scope of this certificate
   iii. BRANZ Appraisal No 447 (2020) Linea™ Weatherboard Cavity Cladding

(Note: Provisions within the documents above related to the use of the systems with steel-frame construction are outside the scope of this certification).

3. In wind zones greater than Very High a rigid air barrier which complies with Table 23 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 for RAB™ Board. (Refer to GM-CM30130)
4. The system is certified for use:
   a. with the ancillary components as described in this certificate,
   b. with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. Only joinery compliant with the requirements of NZS 4211:2008 including amendment 1 for the relevant Wind Zone or wind pressure shall be used or have a current CodeMark
5. The weatherboards must only be installed horizontally on vertical surfaces. .
6. All exposed faces, including top edges at sills and all bottom edges of Linea™ Weatherboard and fibre cement ancillary components must 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.

8 HEALTH AND SAFETY INFORMATION

Standard industry safety practices and manufacturer safety requirement as detailed in the technical literature including the applicable SDS must be observed at all time. Please refer to James Hardie SDS Fibre Cement Products June 2020

9 SUPPORTING INFORMATION ABOUT DESCRIPTION

Linea™ Weatherboard cladding is finished with a latex paint system
Linea™ Weatherboards are bevel-back profile weatherboards with tongue and grove at each end for jointing. The weatherboards are pre-primed with an acrylic primer on the front face and edges.
Linea™ Weatherboards are 16 mm thick and are available 150mm and 180 mm wide. The boards are supplied 4200 mm long.
Linea™ Weatherboards are manufactured from a reduced density cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a revel profile is machined on the back face of the weatherboard, the bottom of the board is chamfered and the tongue and grove are machined on the ends. Linea™ Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

James Hardie supplies the following ancillary components:

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PRODUCT CERTIFICATE

Linea™ Weatherboard by James Hardie
Direct Fixed and Cavity Cladding systems

- Hardie™ Axent™ Trim - a 19mm thick fibre cement trim manufactured from a reduced density cellulose fibre cement formulation. Hardie™ Axent™ Trim is pre-primed with an acrylic primer on the front face and both edges, and is available in sizes of 70 mm and 89mm wide by 3000 mm long.
- External and internal corner mouldings - chromate treated aluminium external box corner, 90° internal corner 'W' mould and 135° internal corner 'W' mould. The mouldings are available in 2,700 mm and 4,000 mm lengths.
- Corner soakers - 90° soakers are available for 150 mm and 180 mm Linea™ Weatherboards. The soakers are available in chromate treated aluminium, copper and stainless steel.
- Cavity vent strip - uPVC, available in 3,000 mm lengths.
- Rigid wall underlay – HomeRAB™ Pre-Cladding, RAB™ Board or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.

Other components not supplied by James Hardie must meet the following requirements

- Flexible wall underlay – building paper complying with NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 23, or breather-type membranes covered by a valid CodeMark certificate for use as wall underlays.
- Flexible building underlay support – polypropylene strap at 300 mm centres fixed horizontally and drawn taut, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible building underlay in place and preventing bulging of the bulk insulation into the drainage cavity. (Note: Mesh and wire galvanising must comply with AS/NZS 4534. Additional vertical battens may also be installed to provide support.)
- Flexible sill, head and jamb flashing tape - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- Cavity battens - nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to Hazard Class H3.1.
- Cavity batten fixings - 40 x 2.8 mm flathead hot-dip galvanised nails.
- Joinery sill and head flashings - folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 20 for durability requirements.
- Planted sill and scribers - timber treated to Hazard Class H3.1, pre-primed before installation.
- Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Paragraph 9.1.6, or self-expanding, moisture-cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
- Linea™ Weatherboard fixings
    - Direct fix cladding method:- 40 x 2.8 mm flathead hot-dip galvanised Hardie™ Flex nails or stainless steel ring shank Hardie™ Flex nails (for concealed nailing), and 60 x 3.15 mm jolthead hot-dip galvanised nails or stainless steel ring shank nails (for face nailing).
    - Cavity cladding method - 60 x 3.15 mm flathead hot-dip galvanised Hardie™ Flex nails or stainless steel ring shank Hardie™ Flex nails (for concealed nailing in NZS 3604 Wind Zones up to, and including, Very High), 75 x 3.15 mm jolthead hot-dip galvanised nails or stainless steel ring shank nails (for face nailing in NZS 3604 Wind Zones up to, and including, Very

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High), and 90 x 3.55 mm jolthead hot-dip galvanised nails or stainless steel ring shank nails (for face nailing in the NZS 3604 Extra High Wind Zone and specific design wind pressures up to a maximum design differential ULS of 3.2 kPa).

- Hardie™ Axent™ Trim fixings - 60 x 3.15 mm or 75 x 3.15 mm hot-dip galvanised jolthead nails and stainless steel ring shank jolthead nails.

(Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680).

- Flashings - balustrade and parapet cap flashings and inter-storey joint flashings. Refer to NZS 3604 Section 4, and NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 20 for durability requirements.
- Aluminium joinery head flashing - as supplied by the joinery manufacturer or the contractor

10 SUPPORTING INFORMATION ABOUT INTENDED USE

Nil

11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

Linea™ Weatherboard Cavity 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.

12 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 Clause	Compliance pathway	Evidence
B1 STRUCTURE	Alternative solution -Expert judgement	001, 002, 003, 021 and 022
B2 DURABILITY	Alternative solution -Expert judgement	001, 002, 003, 021 and 022
C3 FIRE AFFECTING AREAS BEYOND THE SOURCE	Alternative solution -Expert judgement	001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 021, 022 and 023
E2 EXTERNAL MOISTURE	Alternative solution -Expert judgement	001, 002, 003, 013, 014, 015, 016, 017, 018, 019, 020, 021 and 022
F2 HAZARDOUS BUILDING MATERIALS	Alternative solution -Expert judgement	001, 002, 003, 021, 022 and 024

13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

Ref	Author	Title	Date and/or revision
001	BRANZ	LINEA™ - WEATHERBOARD CAVITY CLADDING - Appraisal No. 447 [2020]	02 September 2020
002	BRANZ	LINEA™ - WEATHERBOARD DIRECT FIXED CLADDING - Appraisal No. 446 [2020]	02 September 2020
003*	BRANZ	BRANZ Appraisals Means of Compliance - Basis of Appraisal - LINEA™ WEATHERBOARD DIRECT FIXED AND CAVITY CLADDING - Appraisal No 446 and 447 (2020)	TV10686-001 21/08/2020
004*	BRANZ	Fire Assessment Report based Cone calorimeter test.	FH3182 21 November 2002

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Linea™ Weatherboard by James Hardie
Direct Fixed and Cavity Cladding systems

005*	BRANZ	Fire Assessment Report based Cone calorimeter test.	FH 2976 15 May 2001
006*	BRANZ	Fire Assessment Report based Cone calorimeter test (BRANZ Project No. FC10254-001).	FSR 4206 Issue2 7 November 2018
007*	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
008*	BRANZ	Fire Assessment Report Review of James Hardie Fire and Acoustic Manual	FAR 4620 – 04 November 2016
009*	BRANZ	Fire technical Opinion: Fire resistance of James Hardie Wall Systems with Service Penetrations	FC12040-004 -03 december2019
010*	BRANZ	Technical Assessment "Fire Resistance of External Wall and Soffit" _Various JH Products	FAR 2597- 5th October 2005
011*	Intertek B&C	JH cavity fix wall assembly fire test as per NFPA 285	J6706.01-121-24 - 20th August 2019
012*	Intertek B&C	JH cavity fix wall assembly fire test as per NFPA 285	J6707.01-121-24 - 21st August 2019
013*	Clarkson Consulting Services	JH NZ_RAB_Weathertightness Assessment_200626_R1.5	26 June 2020
014*	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
015*	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
016*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS003-13, dated 4 December 2013
017*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS022-13, dated 12 November 2013
018*	James Hardie Technical Support group	Weathertightness (E2/VM1)	TS033-13, dated 8 January 2014
019*	James Hardie Technical Support group	Weathertightness & Façade System (E2/VM1)	TS009-15, dated 14 October 2015
020*	James Hardie Technical Support group	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
021	James Hardie New Zealand Limited	James Hardie Linea™ Weatherboard Direct Fix Technical Specification (May 2020)	May 2020
022	James Hardie New Zealand Limited	James Hardie Linea™ Weatherboard Cavity Fix Technical Specification (May 2020)	May 2020
023	James Hardie New Zealand Limited	James Hardie Fire & Acoustic Design Manual. Section 4:16 Control of External Fire Spread, figures No's. 1 to 8 and 12 to 20, specifically details JHETGL30, JHETGL60 and JHETLL60	November 2020

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PRODUCT CERTIFICATE

Linea™ Weatherboard by James Hardie
Direct Fixed and Cavity Cladding systems

024	James Hardie New Zealand Limited	LQA8N - SAFETY DATA SHEET- JAMES HARDIE FIBRE CEMENT SHEETS PRODUCTS	Version No.: 1.0 ISSUED Date : 18/06/2020

* These documents were provided commercial in confidence and are not publicly available

14 CONDITIONS RELATING TO NOTIFICATION

(a) the certificate holder notifies the product certification body in writing of any intended change to any of the following particulars:
(i) the name, address, or contact details of the certificate holder:
(ii) any address of a location where a certified product is produced or manufactured:

(b) the certificate holder notifies the product certification body in writing of any intended change, modification, or alteration to any of the following:
(i) the certified building method or product:
(ii) the method of its production or manufacture:
(iii) the product quality plan prepared in respect of the certified building method or product:
(iv) the application or installation instructions for the certified building method or product:
(v) any documentation relating to the use and maintenance of the certified building method or product:

(c) if the certificate holder has any reason to suspect that the certified building method or product does not comply with the Building Code, the certificate holder notifies the product certification body in writing of the reason for that suspicion:

(d) if the certificate holder or the product certification body finds that a certified building method or product that has been released on the market does not comply with the Building Code, the certificate holder discloses that fact in disclosure statements published in a form that is acceptable to the product certification body and to the chief executive:

(e) if the certificate is suspended or revoked, the certificate holder—
(i) notifies all customers to whom the building method or product is regularly supplied; and
(ii) immediately ceases using the certificate, the mark of conformity, and any reference to the number of the certificate.

End of the document

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Linea™ WEATHERBOARD

jameshardie.co.nz

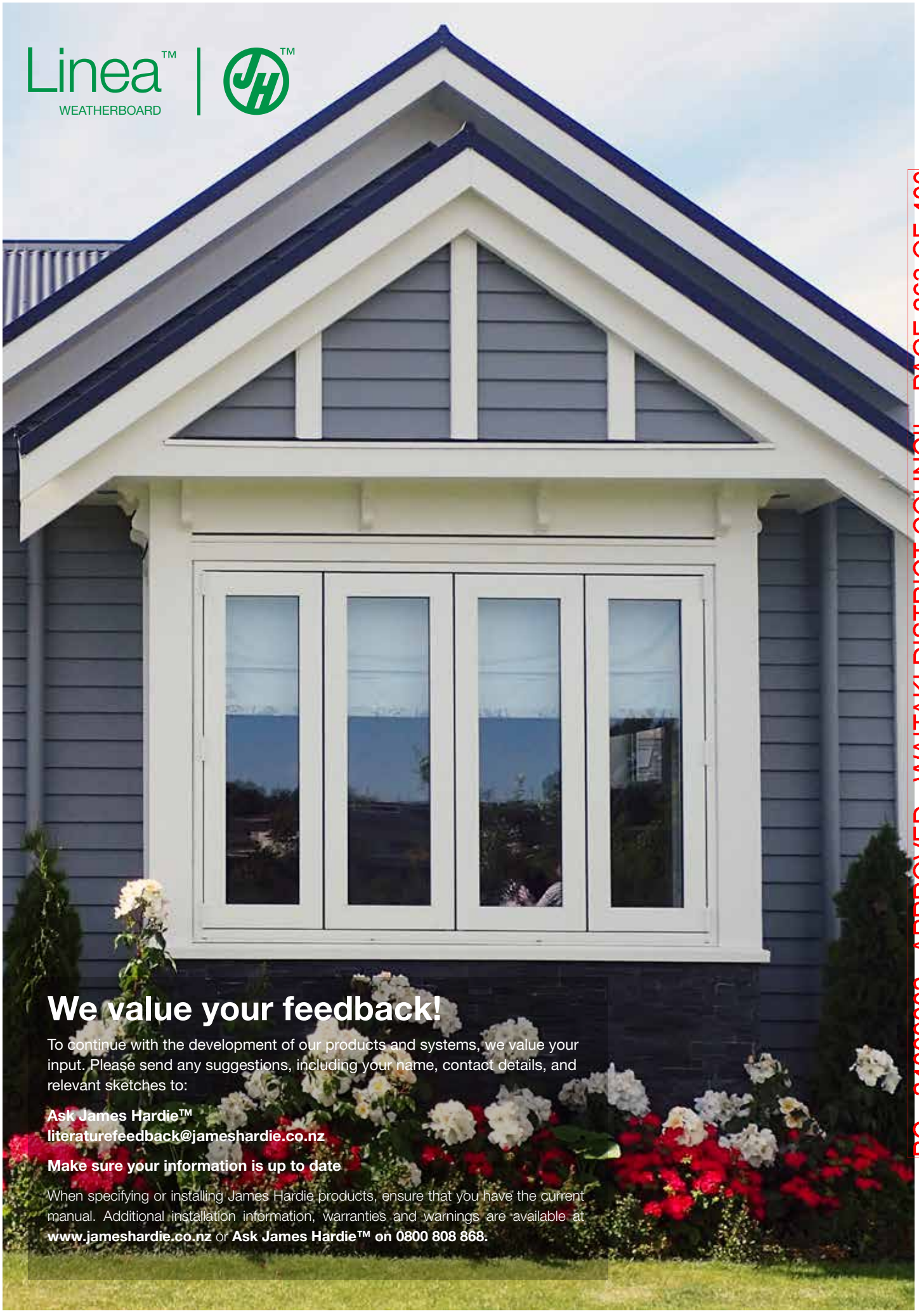
Cavity Fix

Technical Specification

May 2020 New Zealand



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1 Product Overview

1.1 Product Information

Linea™ Weatherboard is an external cladding.

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

James Hardie also has available:

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

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

Table 1

Linea Weatherboard and Axent Trim sizes									
							Coverage Information		
Product	**Code**	**Length (mm)**	**Width (mm)**	**Thickness (mm)**	**End details**	**Effective cover (mm)**	**No. of planks/ metre height (approx.)**	**Mass kg/ lineal m (approx. at EMC)**	**Mass kg/m² (approx. at EMC)**
Linea Weatherboard 135	401844	4200	135	16	T & G	105	9.5	2.62	25.70
Linea Weatherboard 150	402533	4200	150	16	T & G	120	8.3	3.1	24.93
Linea Weatherboard 180	401847	4200	180	16	T & G	150	6.7	3.57	23.92
Axent Trim 84mm	401943	2600	84	16	Square	N/A	N/A	1.6	N/A
Axent Trim 100mm	401930	2600	100	16	Square	N/A	N/A	1.9	N/A

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

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

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

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1.2 Manufacturing and Classification

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

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

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

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

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

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

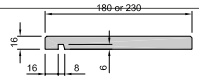
1.3 Components and Accessories

Table 2

Accessories/tools supplied by James Hardie			
Accessories	**Description**	**Size (mm)**	**Code**
	**External corner soaker 90º for Linea Weatherboards 180mm** • Aluminium • Copper • Stainless Steel	200 long	**301186** **301188** **301197**
	**External corner soaker 135º for Linea Weatherboards 180mm** • Aluminium	200 long	**301178**
	**External corner soaker 90º for Linea Weatherboards 150mm** • Aluminium • Stainless Steel	170 long	**302820** **302821**
	**External corner soaker 90º for Linea Weatherboards 135mm** • Aluminium • Stainless Steel	155 long	**301185** **301196**
	**External Slimline Box Corner Mould** Etched primed aluminium extrusion used to create external corner	2700 long 4000 long	**301195** **305809**
	**Linea 35mm Cavity Closer**	3000 long	**306035**
	**Internal 'W' Mould 90º** Etched primed aluminium extrustion used to create 900 internal corner	2700 long 4000 long	**301184** **305807**
	**Internal 'W' Mould 135º** Etched primed aluminium extrustion used to create 135º internal corner	2700 long	**301183**
Accessories/tools supplied by James Hardie			

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Table 2 contd.

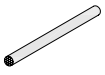
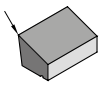
Accessories	Description	Size (mm)	Code
	**JH Corner Under Flashing 50 x 50mm** PVC moulding used as under fashing for internal and external corners	3000 long	**303745**
	**Axent Trim 84mm**	84 x 2600 long	**401943**
	**Axent Trim 100mm**	100 x 2600 long	**401930**
	**Axent Fascia** - 180mm - 230mm	4200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

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Table 3

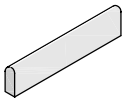
Accessories not supplied by James Hardie

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

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

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Table 3 contd.

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

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2 Application and Scope

2.1 Application

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

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

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

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

2.2 Scope

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

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

2.3 Limitations

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

2.4 Details

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

All dimensions shown are in millimetres unless noted otherwise.

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3 Compliance

3.1 NZBC Compliance

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

CODEMARK™
30018

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

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

BRANZ Appraised
Appraisal No.447 [2010]

4 Design

4.1 Responsibility

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

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

Specifier

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

Installer

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

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets their aesthetic expectations before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation. James Hardie will only offer a replacement product if Linea Weatherboard or Axent Trim supplied are found to be out of its manufacturing specification.

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4.2 Clearances

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

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

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

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

4.3 Structure

4.3.1 Timber Framing

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

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

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

4.3.2 Durability

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

4.4 Structural Bracing

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

4.5 Energy Efficiency

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

4.6 Fire Rated Walls

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

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

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4.7 Control of External Fire Spread

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

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

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

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

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

4.8 Alpine regions

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

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

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5 Safe Working Practices

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

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

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

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

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

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

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica and when cleaning up
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

Avoid breathing in crystalline silica dust

Safe working practices

✕ NEVER use a power saw indoors or in a poorly ventilated area

✕ NEVER dry sweep

✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up

✕ NEVER use grinders

✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance – connected to an M Class or higher vacuum

- ✓ Before cutting warn others in the area to avoid dust
- ✓ ALWAYS follow tool manufacturers' safety recommendations
- ✓ ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- ✓ ALWAYS wear a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

When cutting

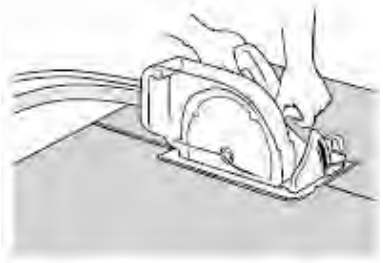
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a HardieBlade Saw Blade (or equivalent) and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

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

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Working Instructions

HardieBlade™ Saw Blade



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

Hole-Forming



For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a 'pilot' hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

5.1 Storage and delivery

Keeping products and people safe

Off loading

✓ James Hardie products should be off-loaded carefully by hand or by forklift

✓ James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

James Hardie products should be stored:

✓ In their original packaging

✓ Under cover where possible or otherwise protected with a waterproof covering to keep products dry

✓ Off the ground – either on a pallet or adequately supported on timber or other spacers

✓ Flat so as to minimise bending

James Hardie products must not be stored:

✗ Directly on the ground

✗ In the open air exposed to the elements

James Hardie is not responsible for damage due to improper storage and handling.

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5.2 Tips for safe and easy handling of weatherboard products

Weatherboard products

✗ Do not lift planked products flat and in the middle

✓ Carry the products on the edge

✓ If only one person is carrying the product, hold it in the middle and spread arms apart to better support the product

✓ If two people are carrying the plank, hold it near each end and on edge

✓ Exercise care when handling weatherboard products to avoid damaging the edges/corners

6 Installation

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

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

6.1 Fastener

6.1.1 Fastener – Size and Method

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

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

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Table 4

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

Table 5

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

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

6.1.2 Gun Nailing

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

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

6.1.3 Fastener Durability

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

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Table 6

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

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

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

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

6.2 Framing

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

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

6.2.1 Specific Engineering Design (SED)

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

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

6.2.2 Gable Ends

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

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6.2.3 Tolerances

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

6.3 Flexible Underlay or HomeRAB™ Pre-Cladding

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

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

6.4 Intermediate Support

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

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

No intermediate supports are required:

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

6.5 Rigid Air Barrier

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

For buildings more than 10m, RAB™ Board must be used. To achieve the temporary weathertightness using HomeRAB™ Pre-Cladding and RAB™ Board, windows/doors need to be installed with required flashing tapes and seals etc. Refer to HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual for information regarding its installation and to achieve temporary weathertightness.

6.6 Vent Strip

Linea 35mm cavity closer vent strip (uPVC) must be installed at the bottom of all walls constructed using the drained and ventilated for cavity construction method. James Hardie Linea 35mm cavity closer vent strip has an opening area of 1000mm^2/m length. It is important that the openings in the vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. Alternate cavity closer can be used ensuring compliance of E2 and may need to be used with a cant strip.

6.7 Cavity Battens

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

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

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Cavity battens must comply with E2/AS1 and:

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

6.8 Joints

6.8.1 Jointing

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

6.8.2 Drainage Joint

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

6.8.3 External Corner Joint

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

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

Refer to figures in section 9 of this manual.

6.8.4 Internal Corner Joint

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

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

Refer to figures in section 9 of this manual.

6.9 Junctions and Penetrations

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

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7 Finishes

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

7.1 Preparation and Priming

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

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

7.2 Sealants

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

7.3 Painting

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

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

For best aesthetic results a low sheen paint is recommended.

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

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

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

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8 Care and Maintenance

The extent and nature of maintenance will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to comply with the NZBC Acceptable Solution B2/AS1. As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months* using low pressure water and a brush, and every 3-4 months in extreme coastal conditions or sea spray zones
- Re-coating exterior protective finishes. Always refer to your paint manufacturer for re-coating requirements
- Maintaining the exterior envelope and connections including junctions, penetrations, flashings and sealants
- Cleaning out gutters, blocked pipes and overflow pipes as required
- Pruning back vegetation close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained especially where gardens are concerned
- The clearances between the bottom edge of Linea Weatherboard and the finished/unfinished ground must always be maintained
- Stainless steel soakers used in extreme coastal conditions or in sea spray zones may show some signs of 'tea staining'. It is an aesthetic issue and to minimise staining soaker must be washed/polished frequently

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

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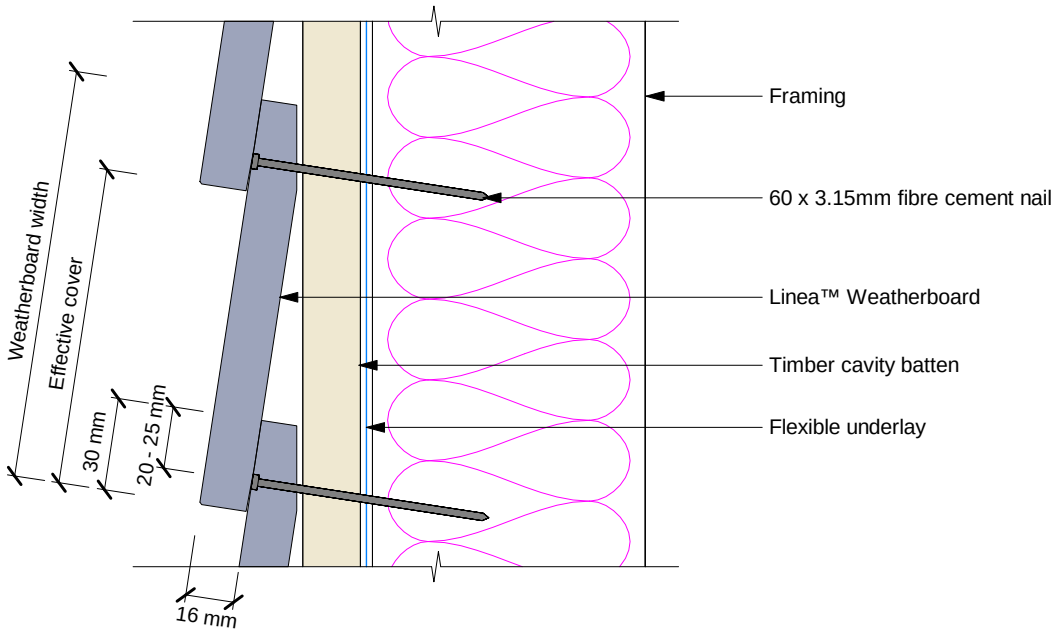
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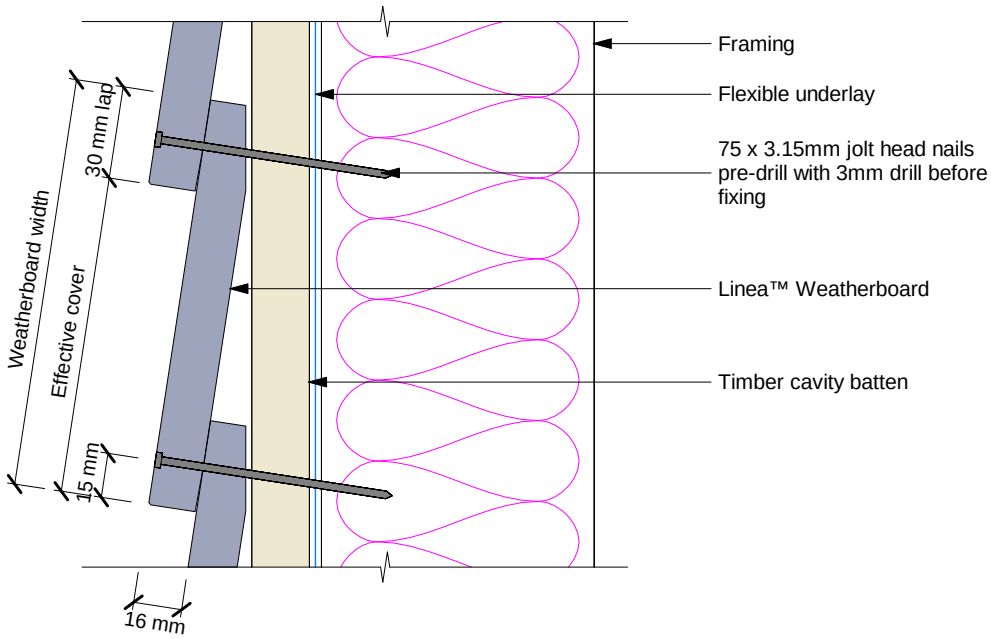
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Figure 1: Weatherboard fixing



Concealed Nailing

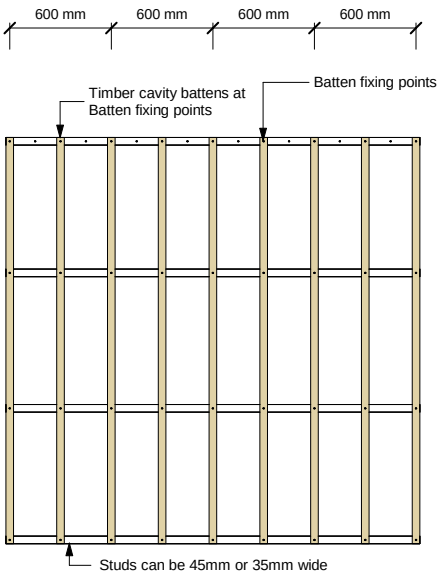
Linea™ Weatherboards to be face fixed at corners and down window and door openings using jolt head nails at 90° to face, punch 2mm below surface and fill. Refer to fixing table 4



Exposed Nailing

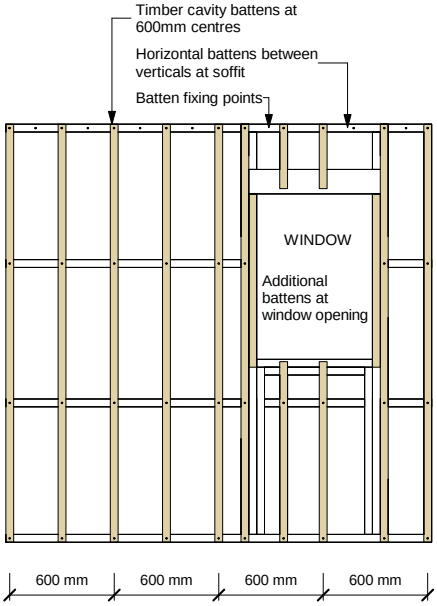
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Figure 2: Batten fixing



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

Figure 3: Batten layout at window opening

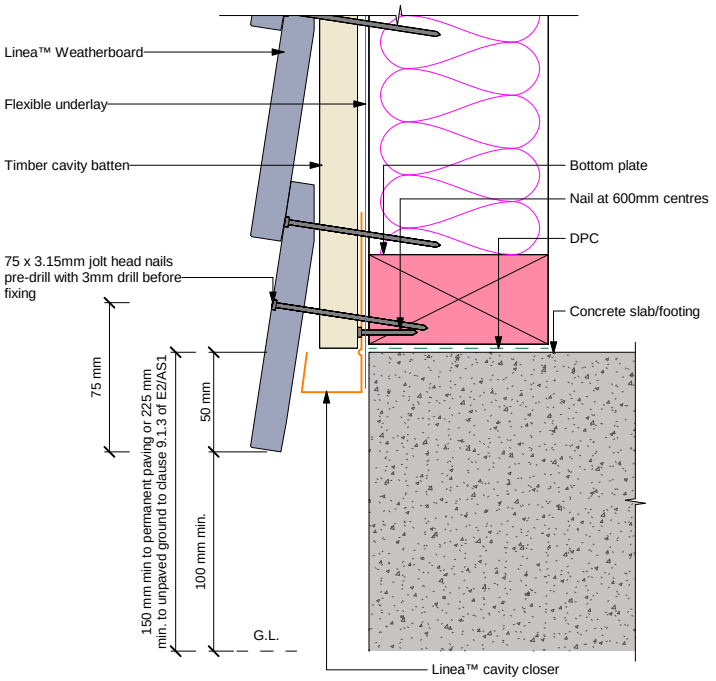


- Studs can be 45mm or 35mm wide

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

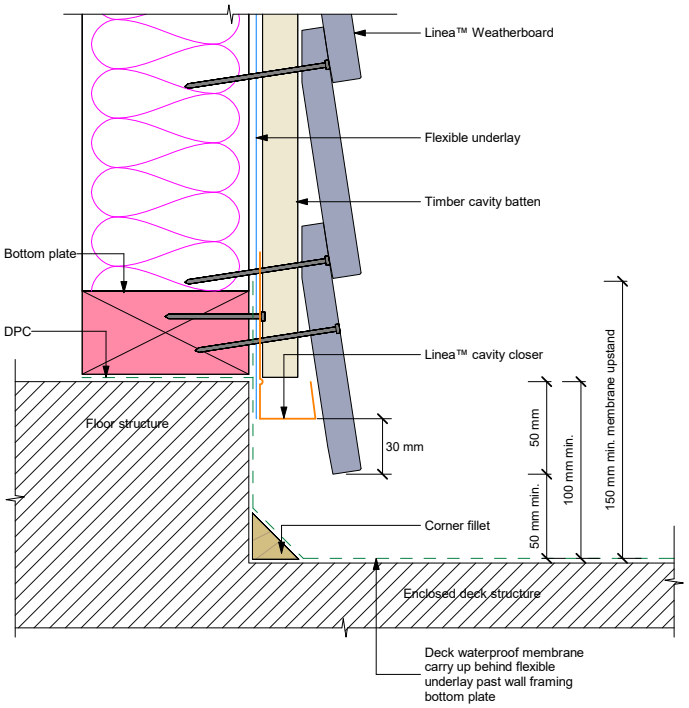
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Figure 4: Foundation detail



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

Figure 5: Enclosed Deck



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Figure 6: Jointing off stud

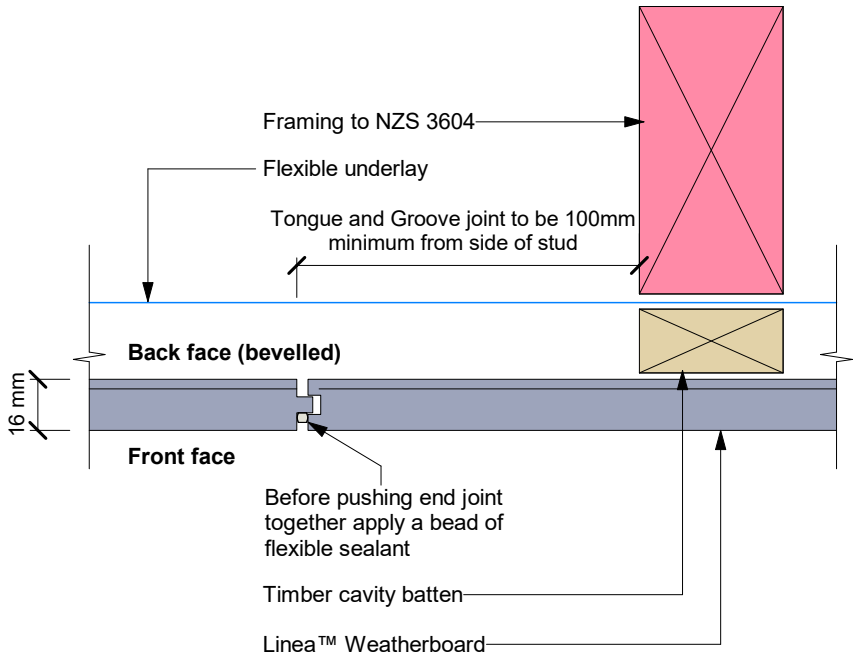
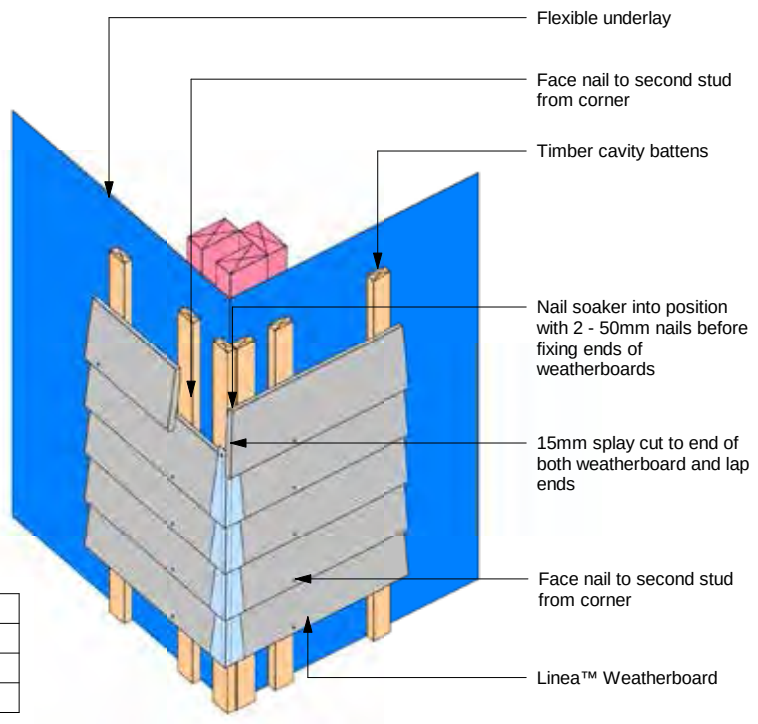


Figure 7: External corner soaker

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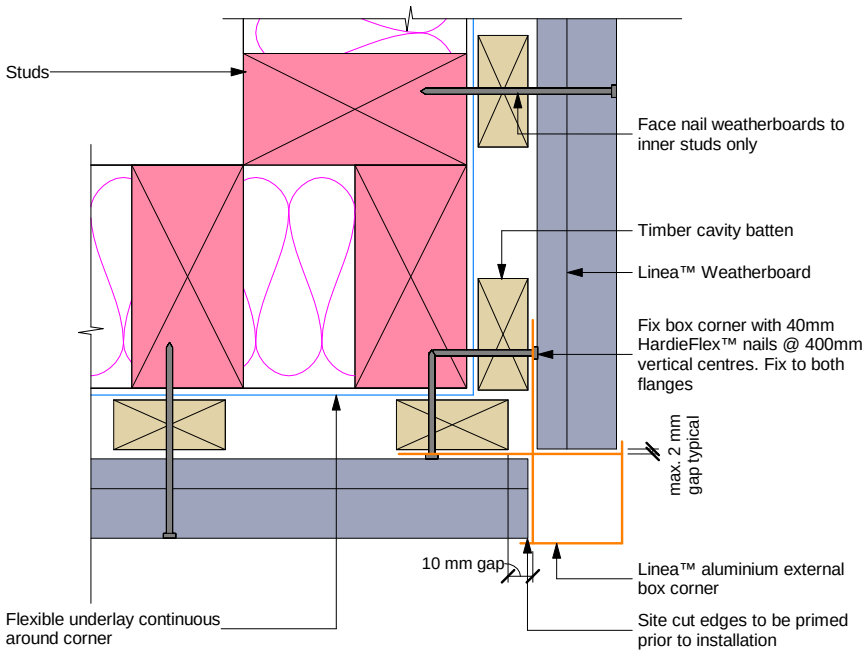
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Soaker material	Nail material
Copper	Copper or phosphor bronze
Aluminium	Hot dip galvanised
Stainless steel	Stainless steel

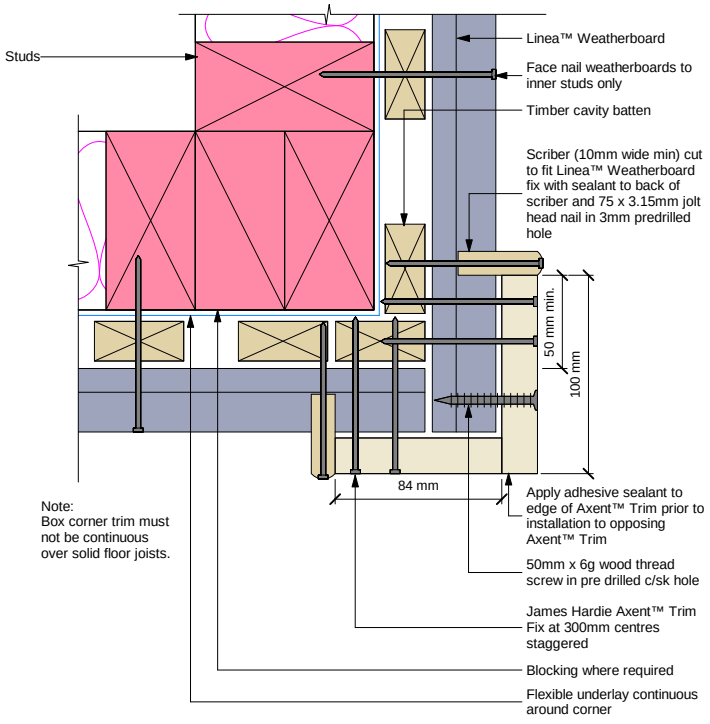
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Figure 8: Aluminium box corner



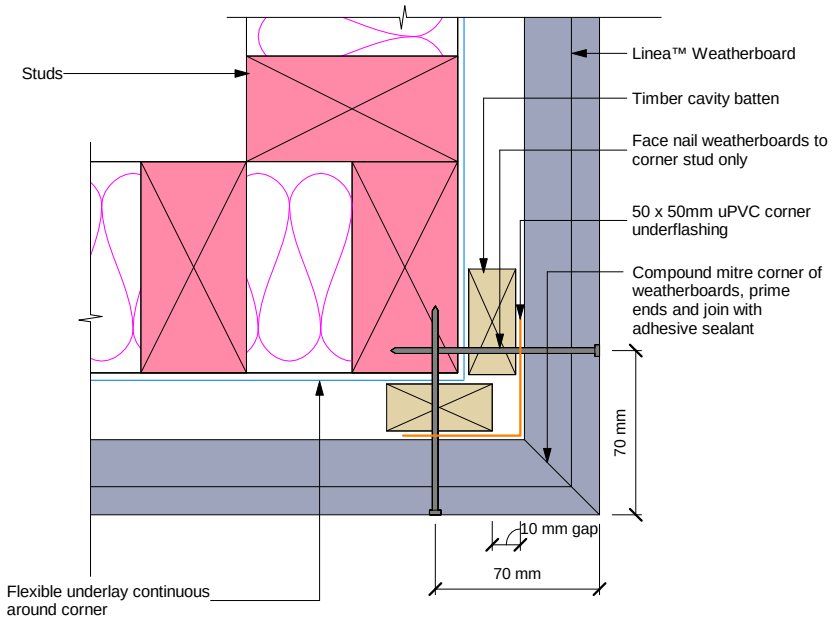
Note: Site cut edges to be primed

Figure 9: Boxed corner



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Figure 10: Mitre corner



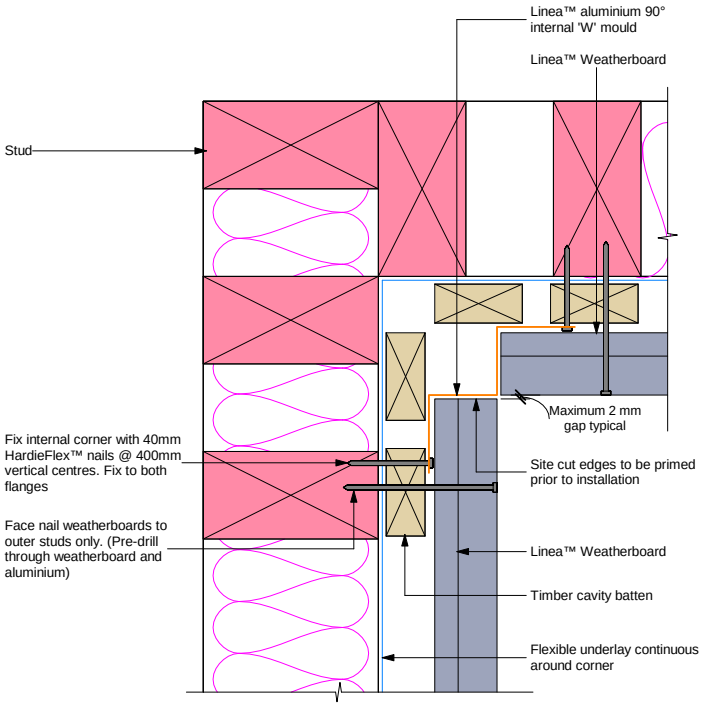
Note: Adhesive sealant must be used on the full end face of both weatherboards. Push lightly together

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

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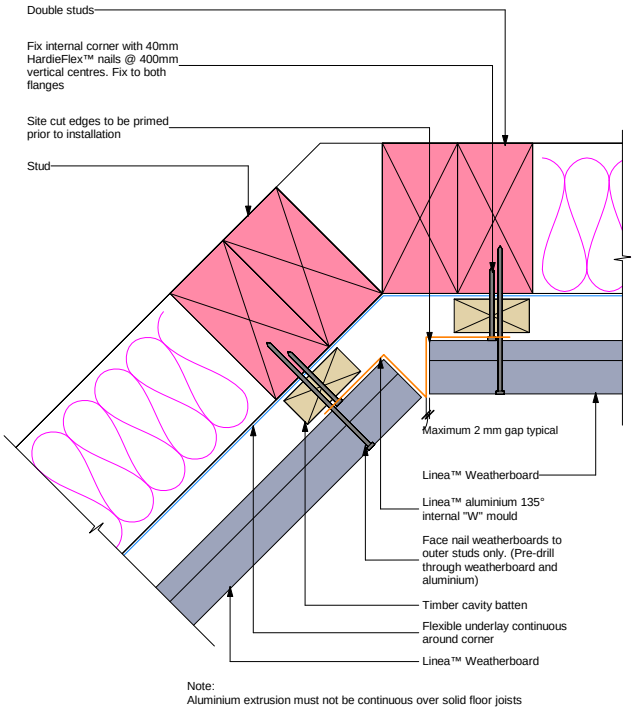
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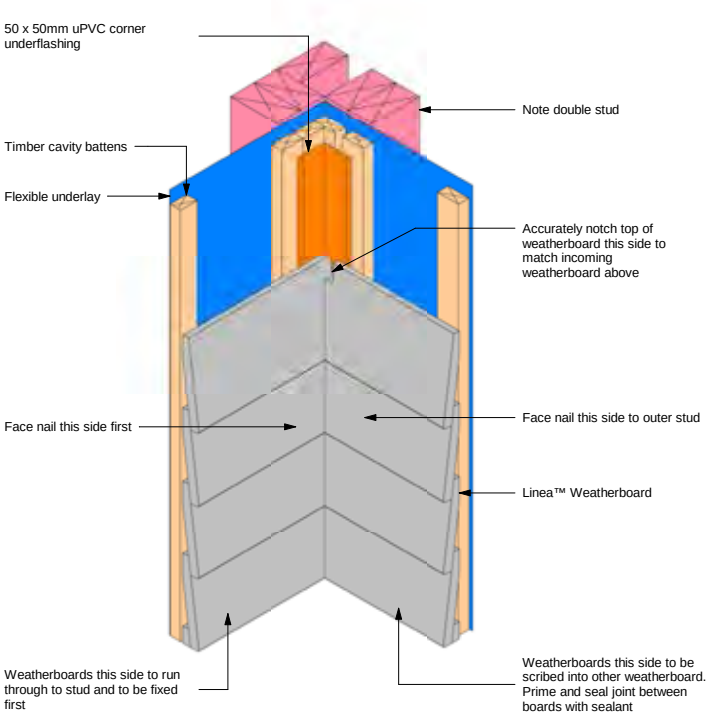
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Figure 12: Internal 135 ° aluminium ‘W’ mould corner



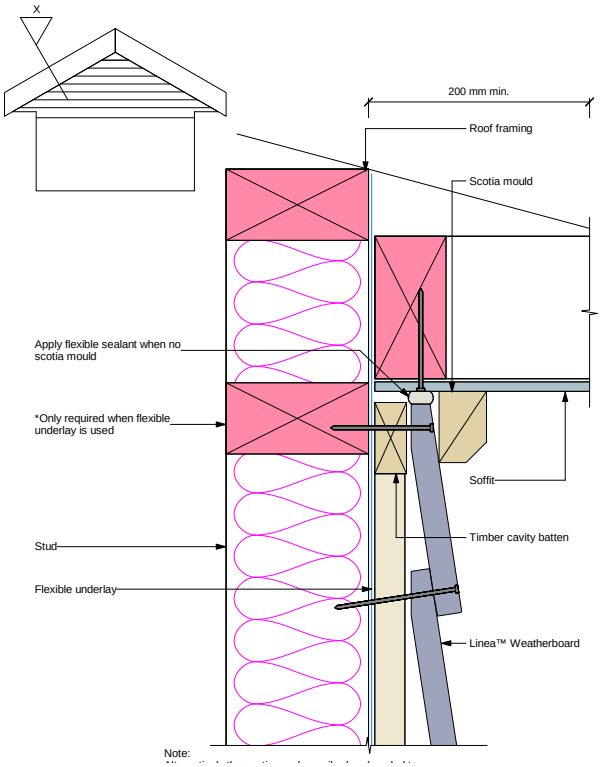
Note:
Aluminium extrusion must not be continuous over solid floor joists

Figure 13: Internal corner joint flashing



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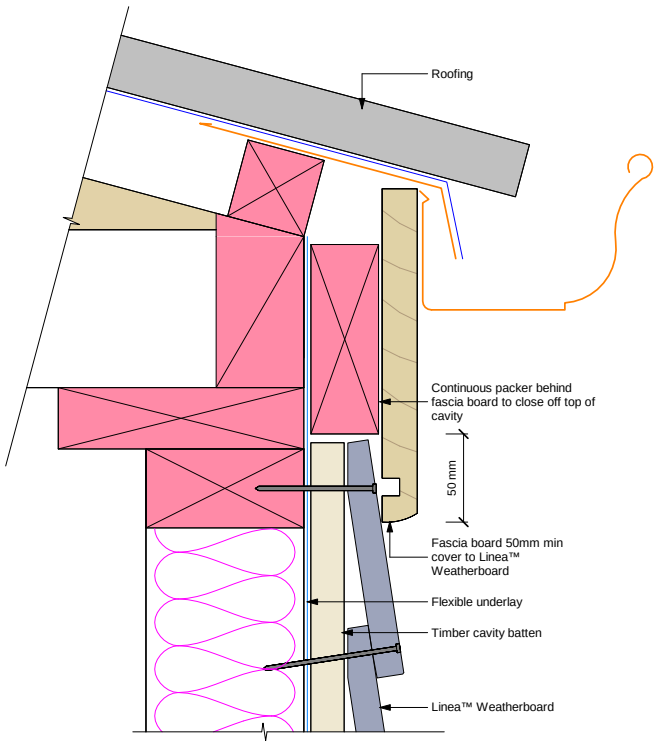
Figure 14: Wall to soffit junction 'X'



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

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

Figure 15: Nil soffit detail



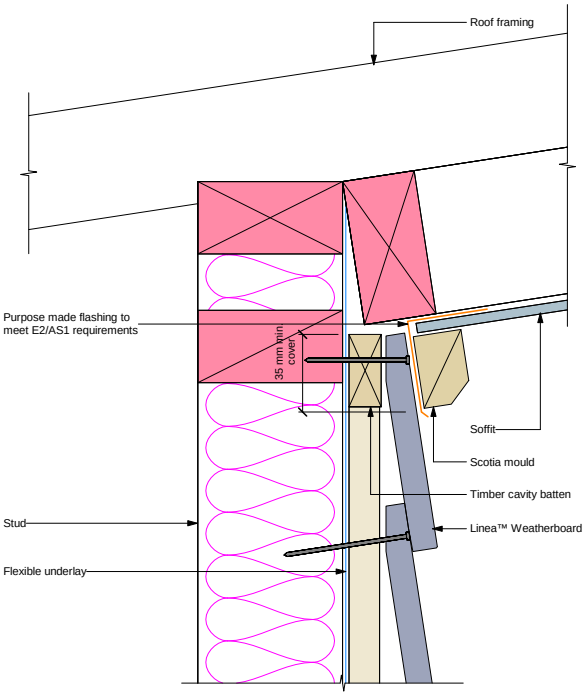
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Figure 16: Sloping soffit and wall junction

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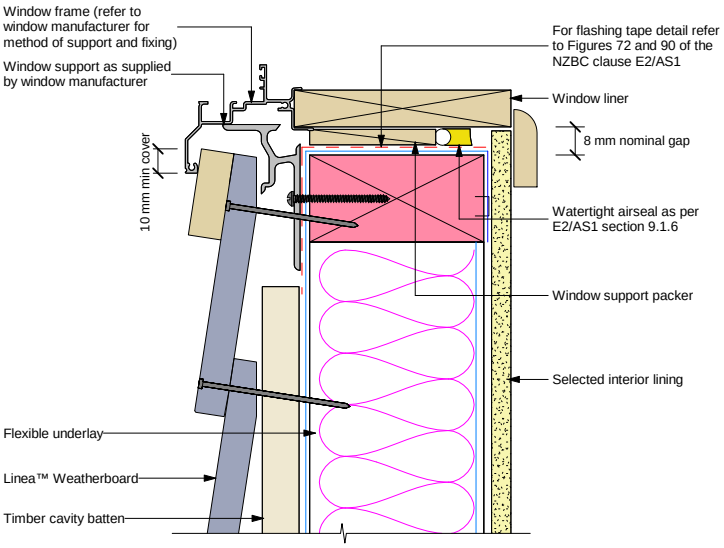
Note: Site cut edges to be primed

Figure 17: Window and door sill

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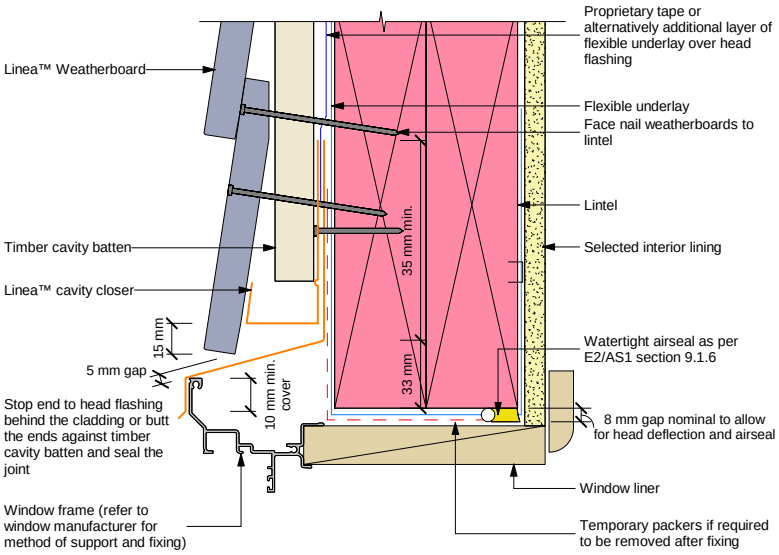
General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1
2. Flexible underlay must comply with acceptable solution E2/AS1
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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

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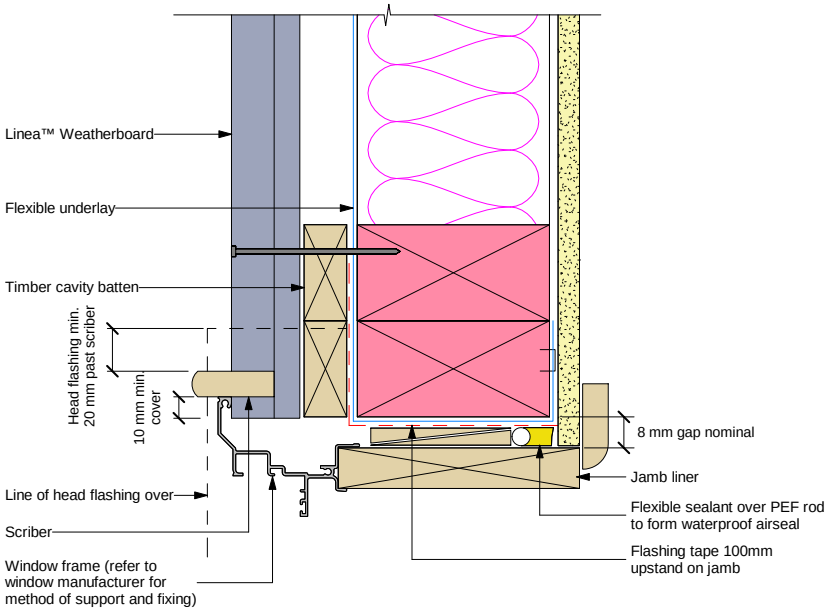
Figure 18: Window head



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

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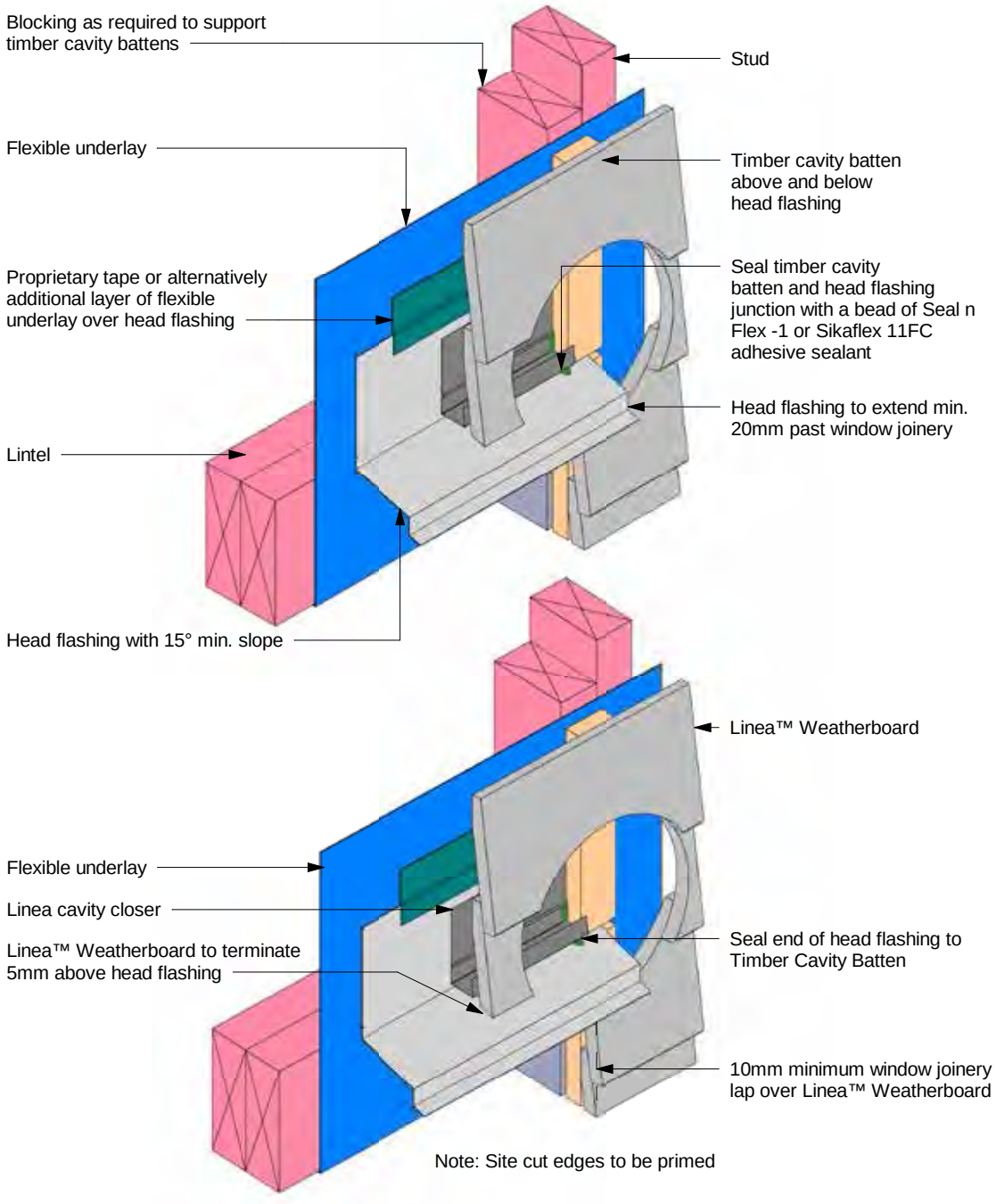
Figure 19: Window jamb



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Figure 20: Window head stop end



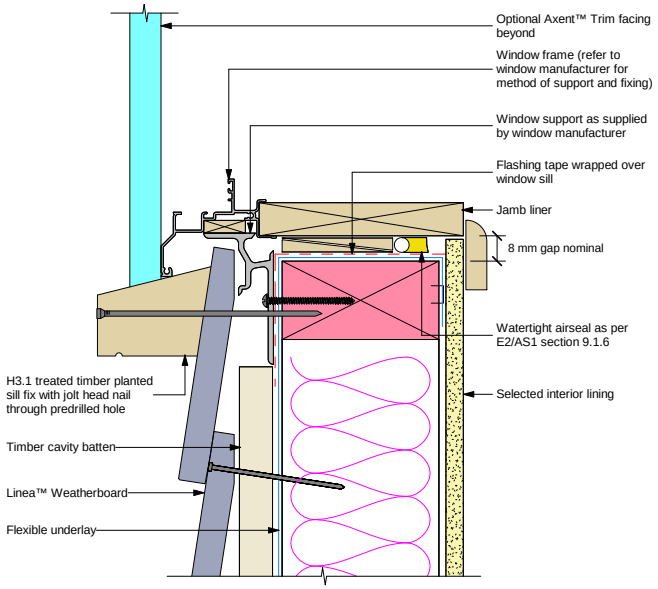
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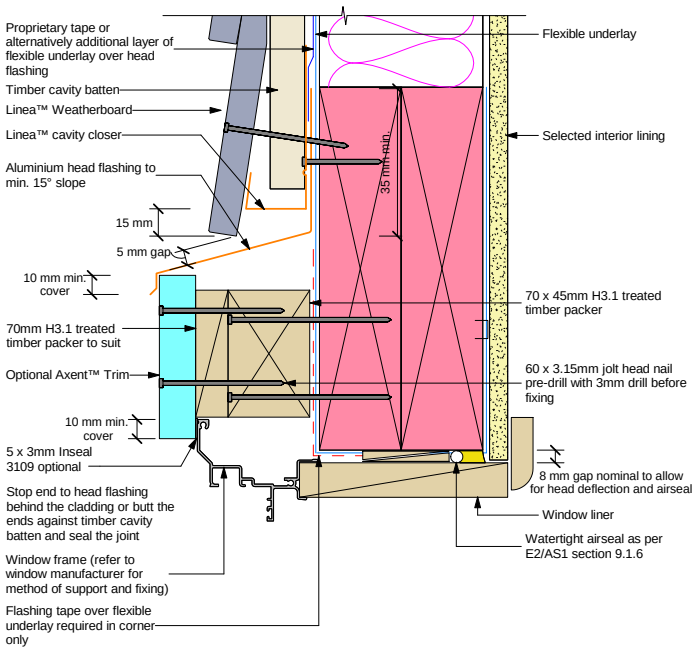
Figure 21: Window sill with facing



General notes for materials selection
1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1
2. Flexible underlay must comply with acceptable solution E2/AS1
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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

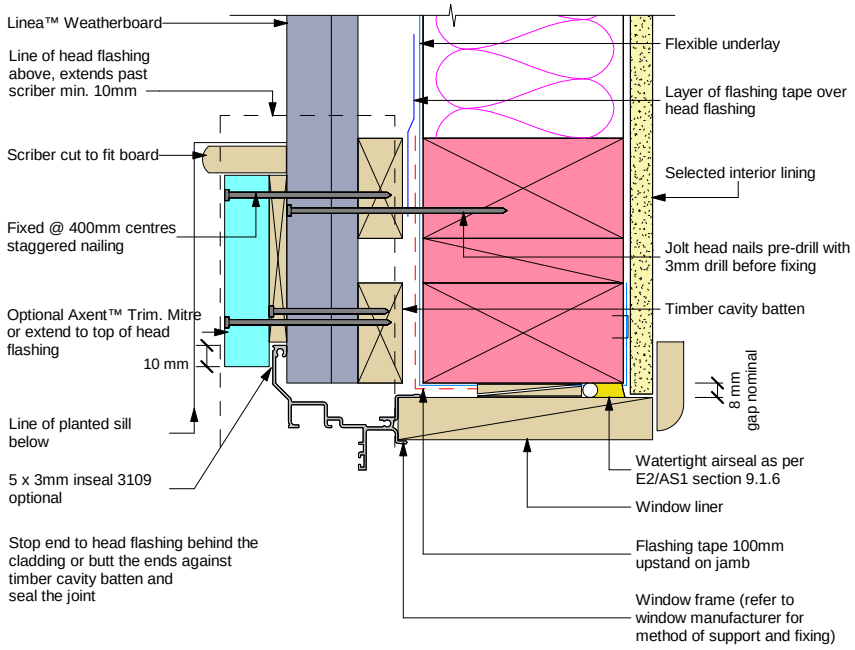
Figure 22: Window head with facings



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

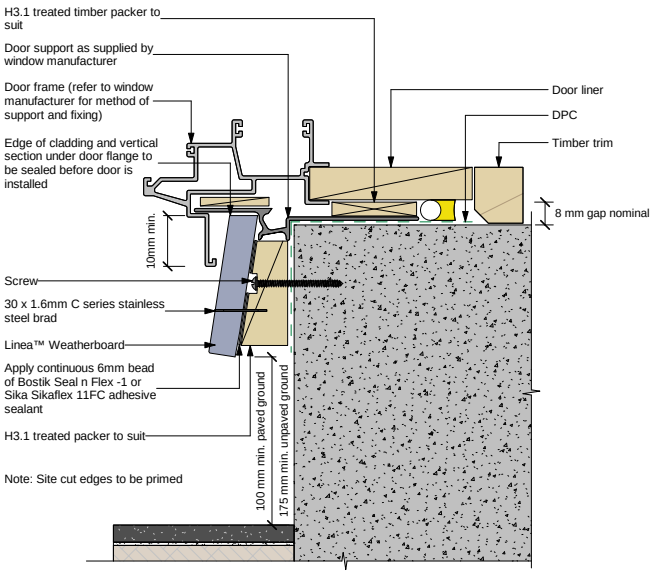
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Figure 23: Window jamb with facings



Note:
- Site cut edges to be primed

Figure 24: Door sill support detail

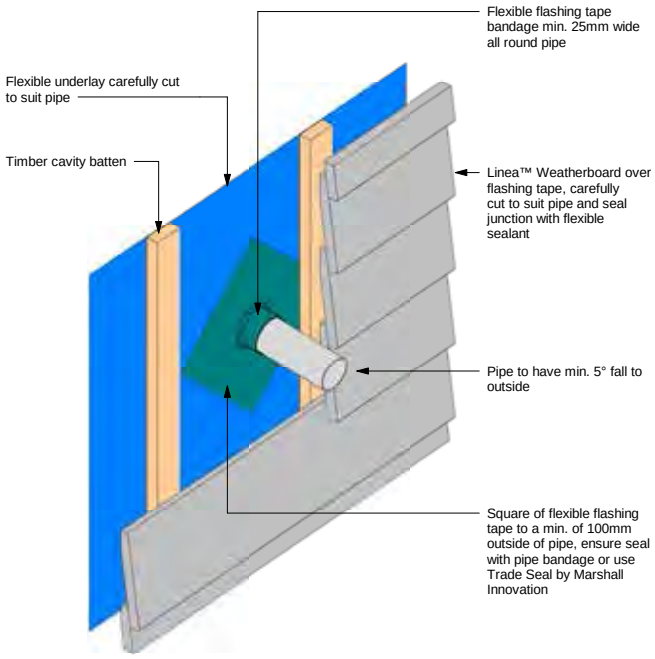


Refer to the manufacturer or supplier for technical information for these materials

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

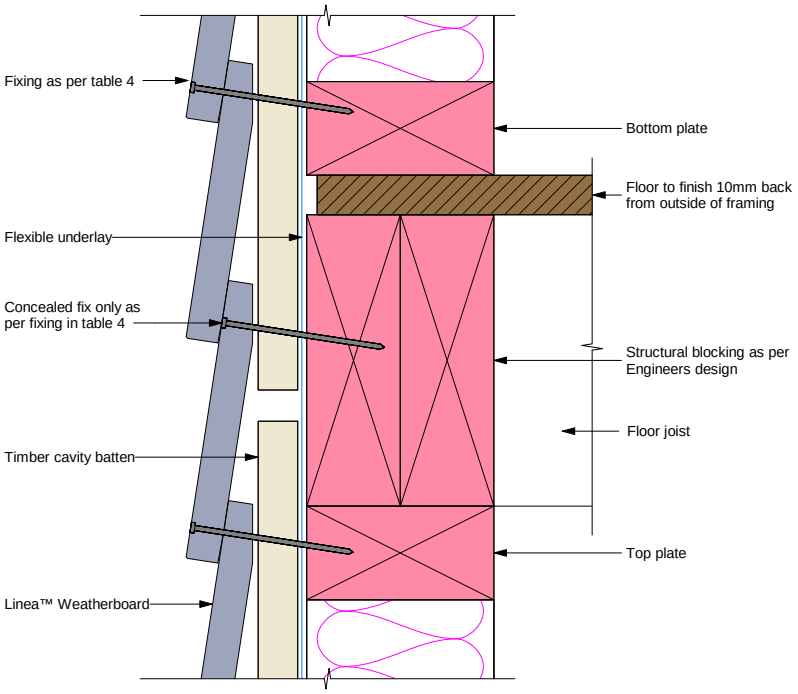
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Figure 25: Pipe penetration



Note: Site cut edges to be primed

Figure 26: Continous cladding over joist



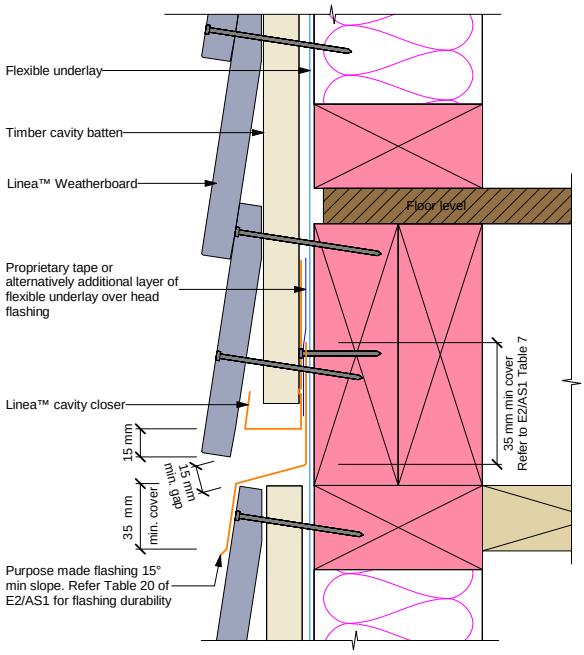
interactive assembly instructions available

http://wksp.nz/jh-lin-flj

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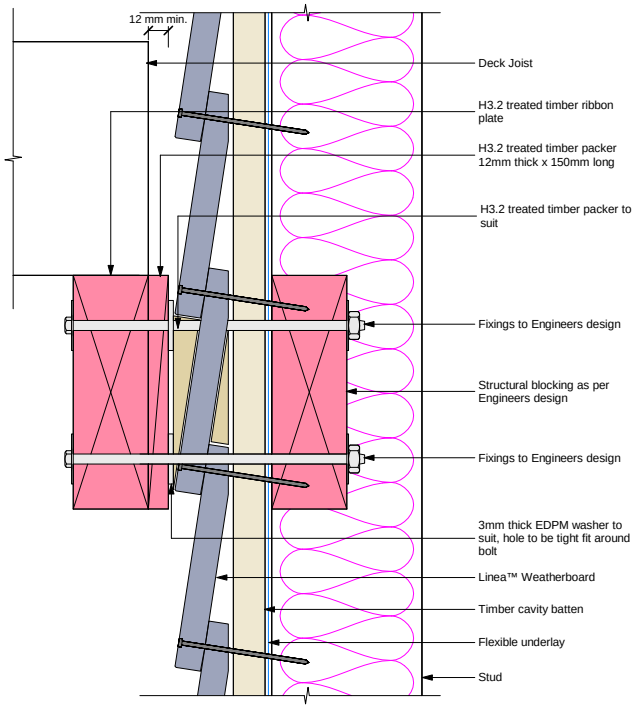
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Figure 27: Drained flashing joint at floor level



Note:
This detail is required to limit cavities to a maximum of 2 stories or 7 metres. Refer E2/AS1 clause 9.1.9.4.

Figure 28: Timber deck junction



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Figure 29: One piece apron flashing joint

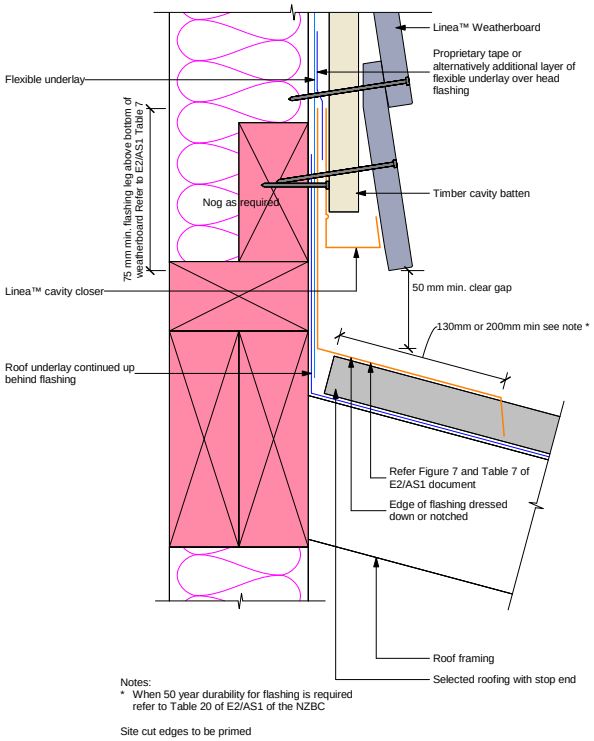
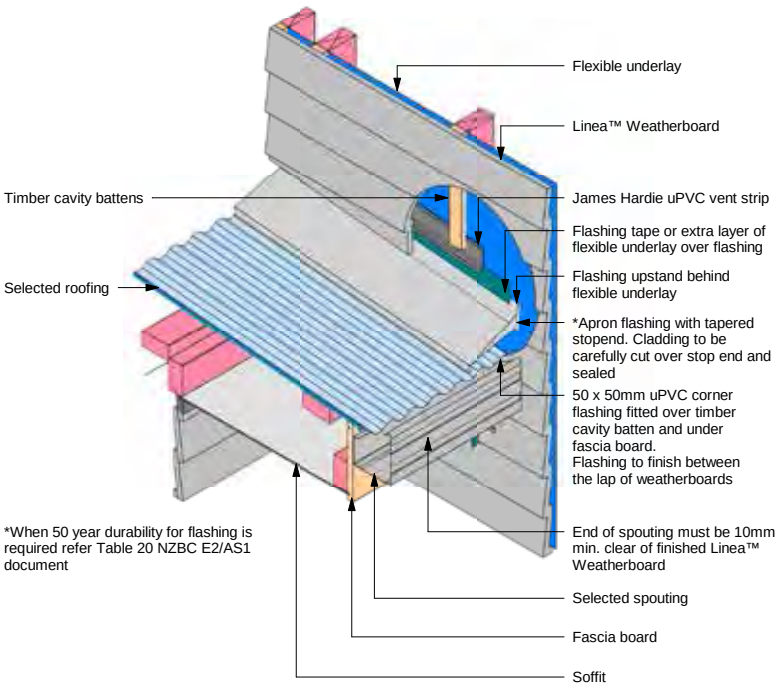


Figure 30: Roof to wall junction detail

Interactive assembly instructions available

http://wksp.nz/jh-lin-rfw

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Note: Site cut edges to be primed

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Figure 31: Parapet flashing

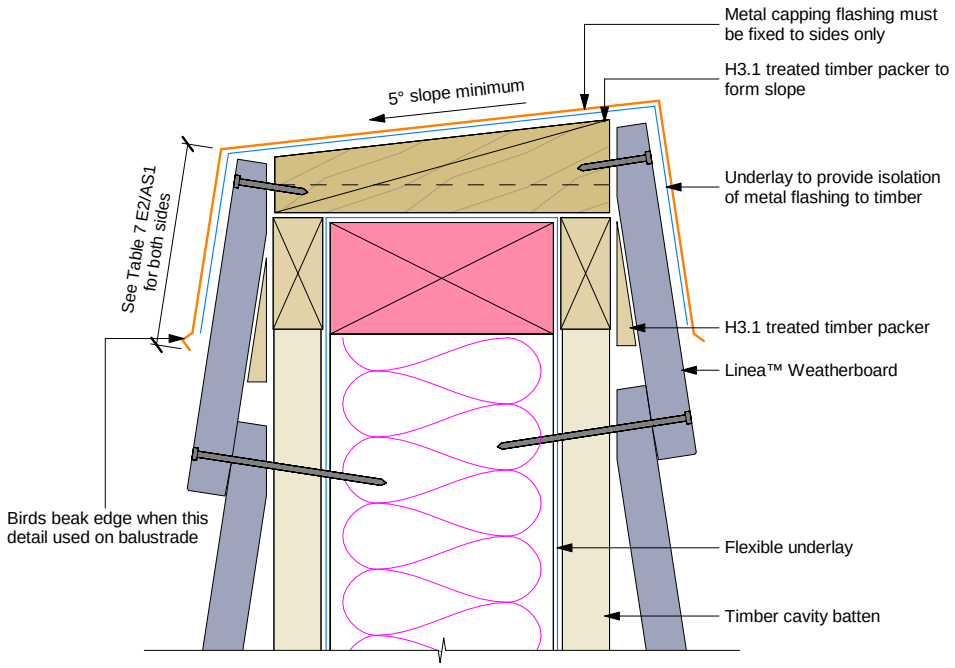
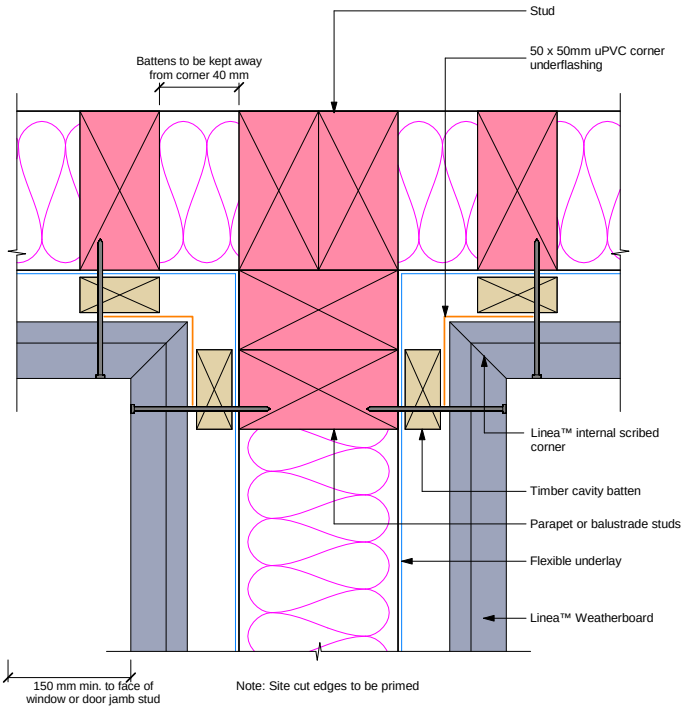
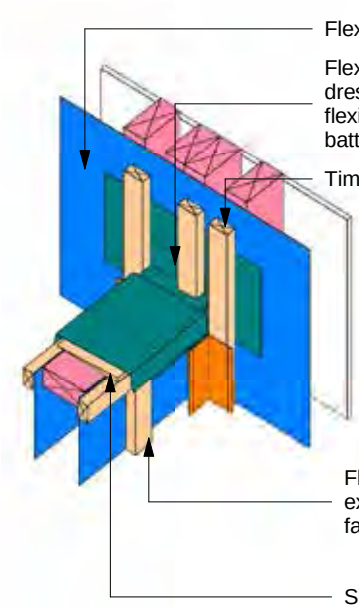


Figure 32: Enclosed deck balustrade to wall

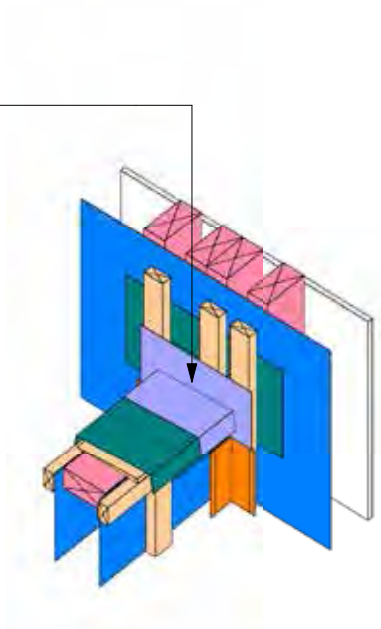


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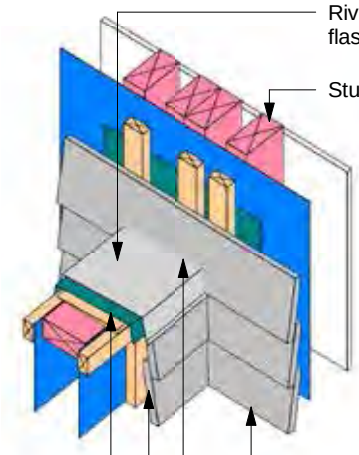
Figure 33: Enclosed balustrade to wall



Batten and Flashing Tape Application Prior to Metal Flashing Fixing

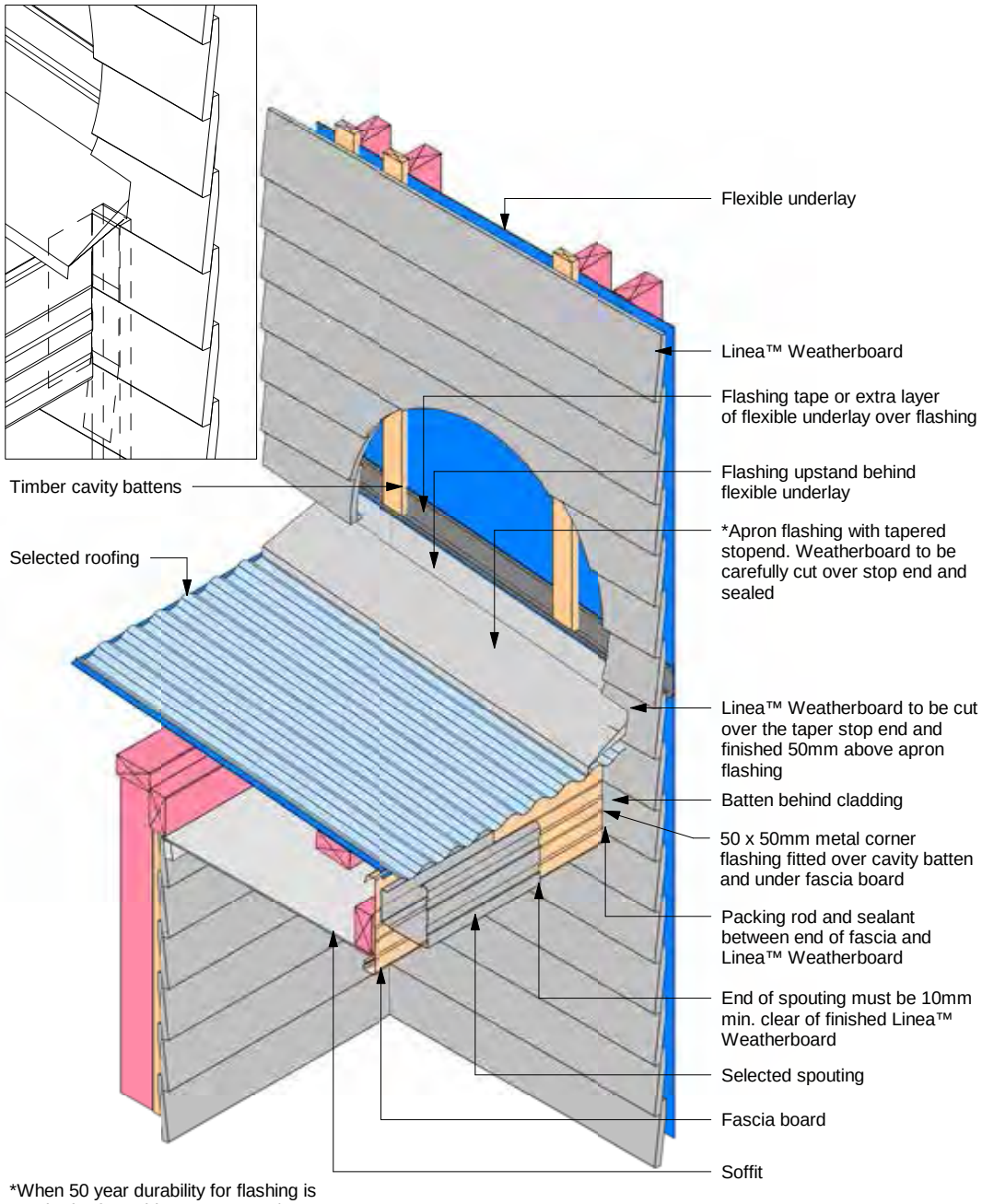


Saddle Flashing Application Prior to Cladding and Cap Flashing Fixing



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Figure 34: Junction Linea™ Weatherboard and fascia board

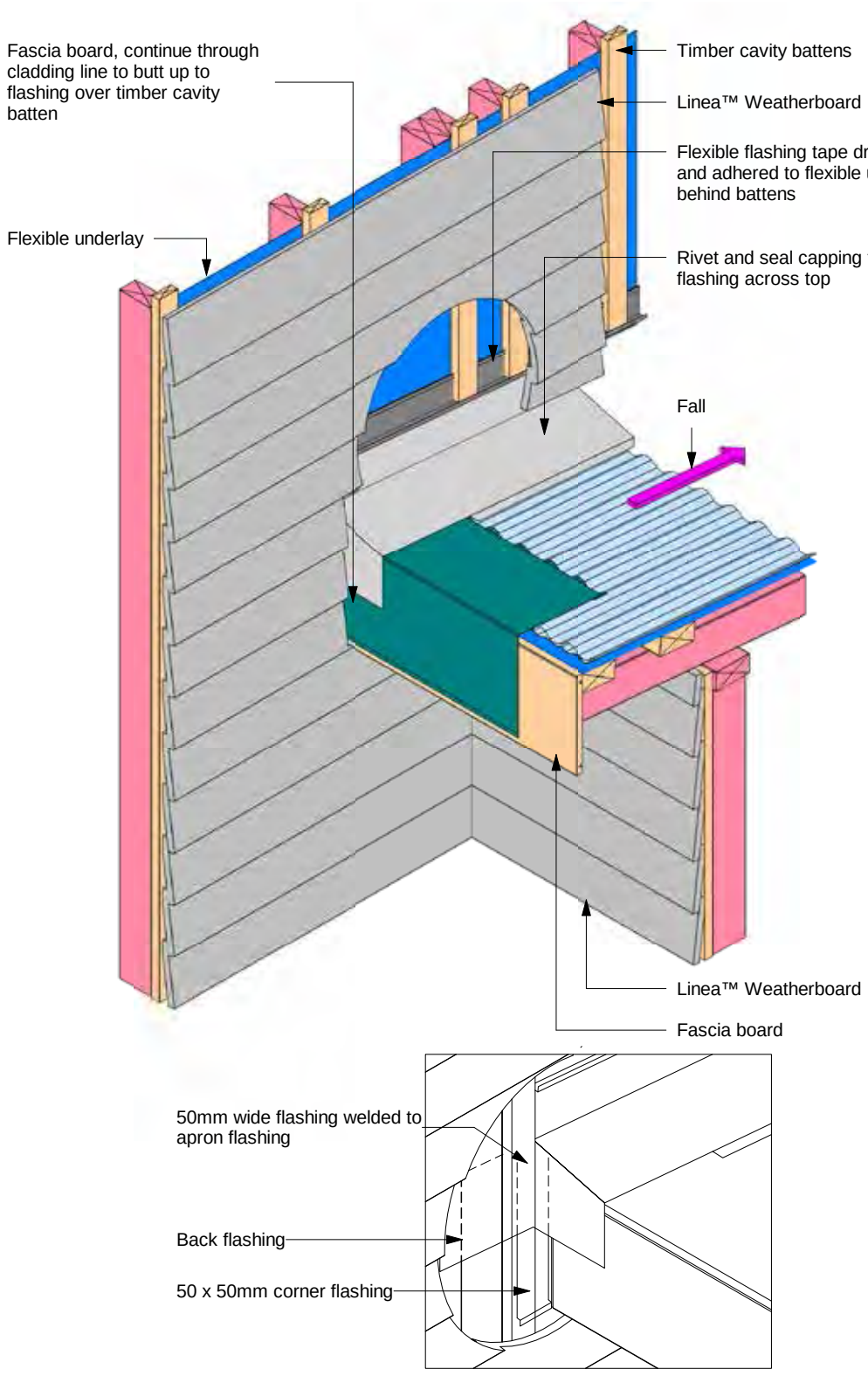


*When 50 year durability for flashing is required refer Table 20 NZBC E2/AS1 document

Note: Site cut edges to be primed

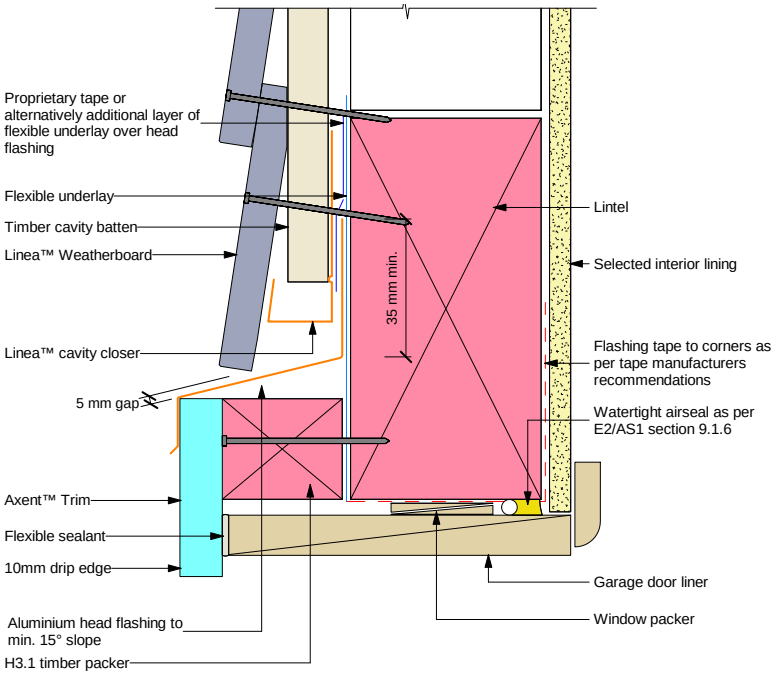
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Figure 35: Enclosed roof to wall intersection



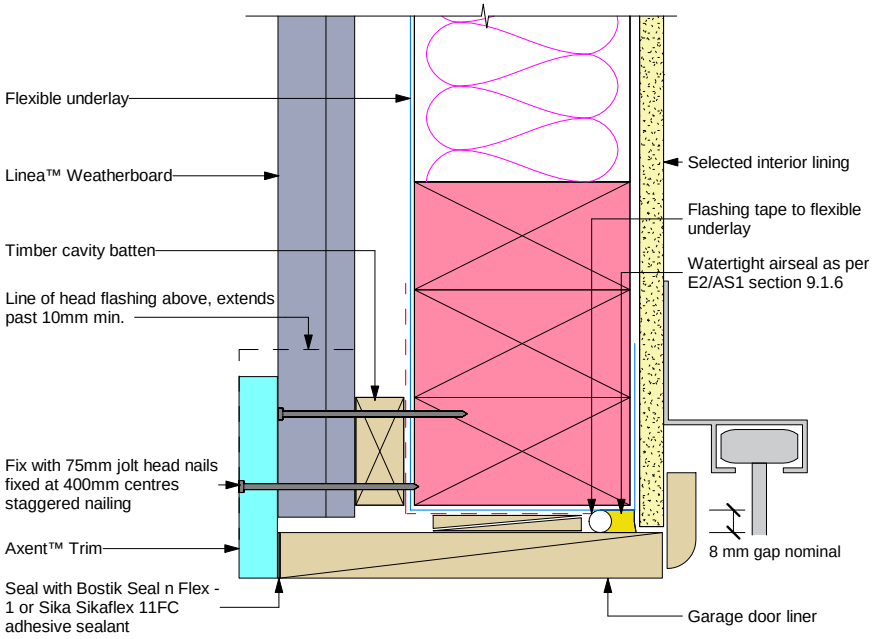
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Figure 36: Garage door head



Note:
- Sealant must be applied between head flashing and liner in VH and EH wind zones and SED wind pressures
- Site cut edges to be primed

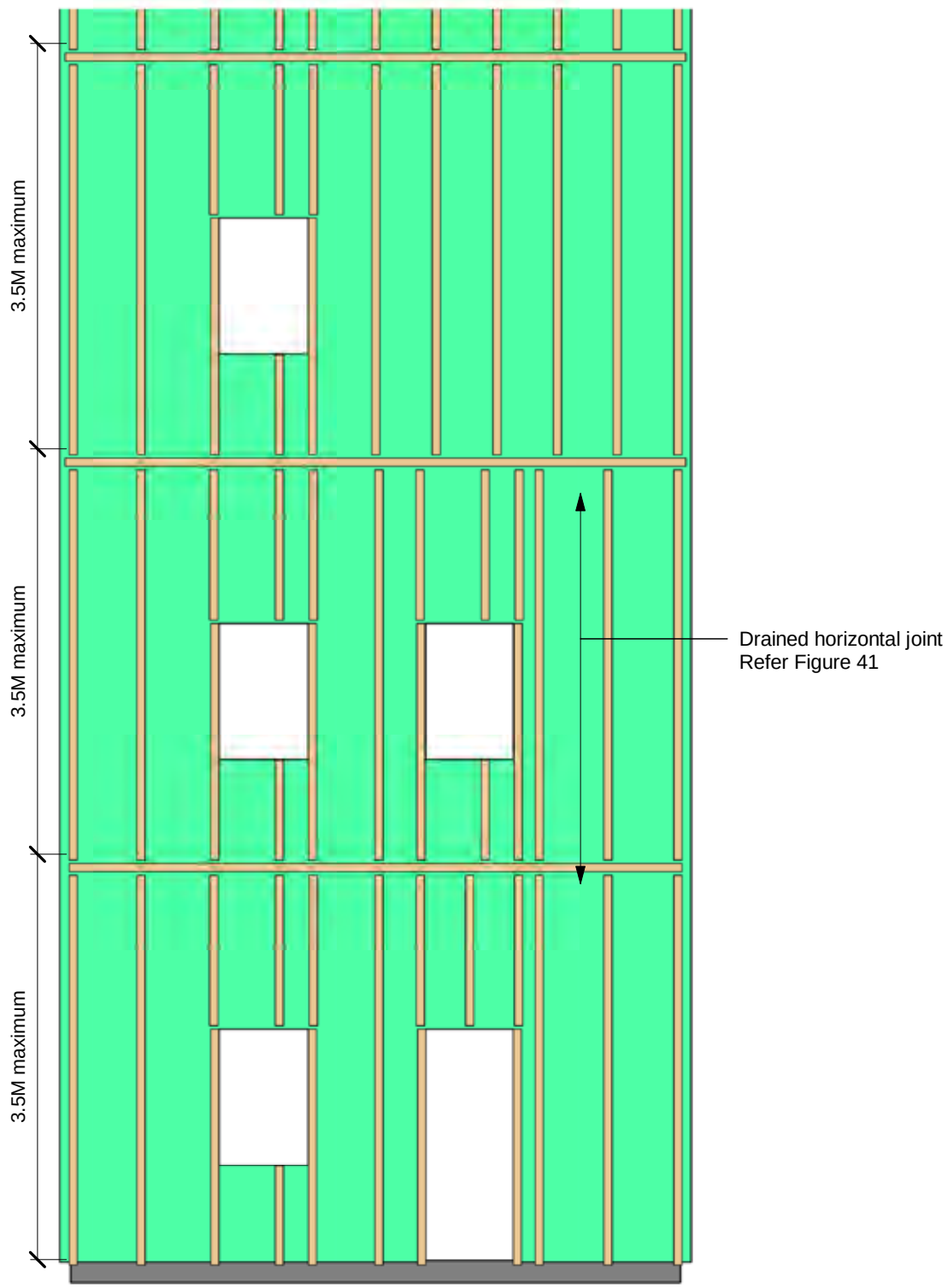
Figure 37: Garage door jamb



Note: Site cut edges to be primed

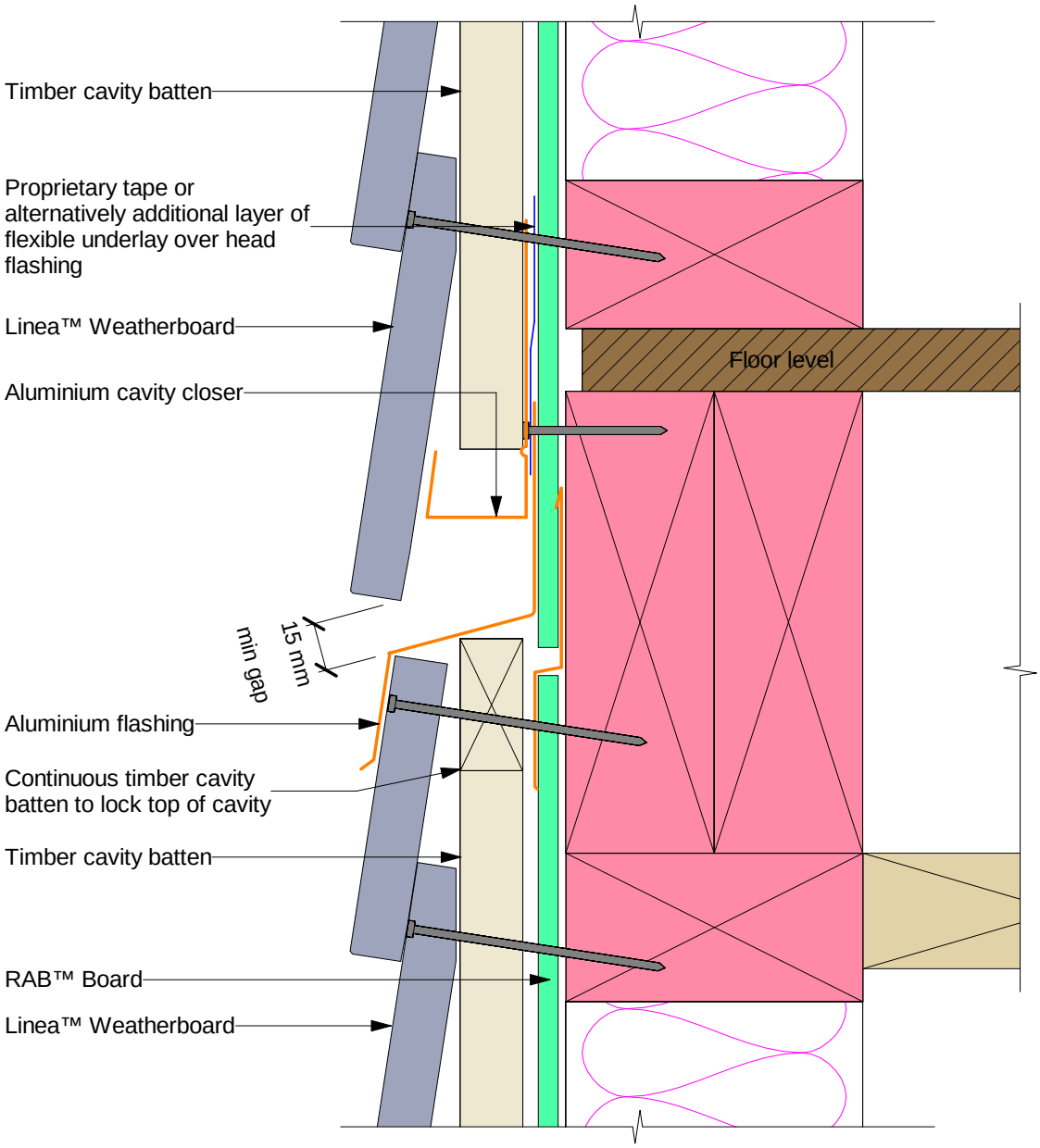
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Figure 38: Framing setout building height over 10m



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Figure 39: Intertenancy vertical fire separation



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Linea™ WEATHERBOARD

Product Warranty

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

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

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.

b) This warranty is not transferable.

c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice.

d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("The NZBC"), regulations and standards.

e) The claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).

g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.

h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

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

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BRANZ Appraised
Appraisal No. 1232 [2022]

OBLIQUE™ WEATHERBOARD (VERTICAL) CAVITY CLADDING



Appraisal No. 1232 (2022)

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BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Oblique™ Weatherboard (Vertical) Cavity Cladding is a cavity-based fibre cement weatherboard wall cladding. It is designed to be used as an external cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 Oblique™ Weatherboard (Vertical) Cavity Cladding consists of Oblique™ rusticated profile fibre cement weatherboards fixed vertically over ventilated timber battens to form the cavity. The cladding is finished with a latex paint system.

Scope

2.1 Oblique™ Weatherboard (Vertical) Cavity Cladding installed over 40 mm structural cavity battens has been appraised as an external wall cladding for buildings between 0 and 10 m high within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Oblique™ Weatherboard (Vertical) Cavity Cladding installed over 20 mm timber cavity battens has also been appraised for weathertightness and structural wind loading when used as an external vertically fixed wall cladding for buildings between 0 and 25 m high within the following scope:

- buildings with a building height not exceeding 25 m; and,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 3.2 kPa where studs are at maximum 400 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,
- constructed with timber framing subject to specific engineering design; and,
- when fixed over RAB™ Board by James Hardie New Zealand Limited.

2.3 Oblique™ Weatherboard (Vertical) Cavity Cladding must only be installed vertically on vertical, flat surfaces.

2.4 Oblique™ Weatherboard (Vertical) Cavity Cladding has been appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(Note: The Appraisal of Oblique™ Weatherboard (Vertical) Cavity Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.)*

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, Oblique™ Weatherboard [Vertical] Cavity Cladding, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Oblique™ Weatherboard [Vertical] Cavity Cladding 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 9.1-9.3.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years, B2.3.1 (c) 5 years and B2.3.2. Oblique™ Weatherboard [Vertical] Cavity Cladding meets these requirements. See Paragraphs 10.1-10.4.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Oblique™ Weatherboard [Vertical] Cavity Cladding meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Oblique™ Weatherboard [Vertical] Cavity Cladding meets this requirement.

Technical Specification

Oblique™ Weatherboards

4.1 Oblique™ Weatherboards are 14 mm thick rusticated profile weatherboards, available 200 or 300 mm wide and 2,750 or 4,200 mm long. They are factory sealed on all sides and pre-primed with a manila white acrylic primer on the front face.

4.2 Oblique™ Weatherboards are manufactured from a reduced density cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a rusticated 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 weatherboard. The front edge at the bottom of the board and the board ends are finished square. Oblique™ Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

Accessories

4.3 Accessories used with Oblique™ Weatherboard [Vertical] Cavity Cladding, which are supplied by James Hardie New Zealand Limited are:

- **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™ 40 mm structural horizontal cavity battens** - 45 x 40 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™ Axent™ Trim** - a 19 mm thick fibre cement trim pre-primed with an acrylic primer, available 70 and 89 mm wide and in 3,000 mm lengths.
- **Hardie™ 14 mm Trimline joint flashing** - an etch-primed aluminium extrusion used behind the cladding at vertical joints, available in 3,000 mm lengths.
- **Weatherboard Internal 'W' Corner** - an aluminium extrusion used to create internal corners, available in 2,700 and 4,000 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 2,700 and 4,000 mm lengths.
- **uPVC vent strip** – a uPVC moulding used as vermin proofing, available in 3,000 mm lengths.

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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.

- **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.
- **Oblique™ 14 mm Plug** - a PVC plug to fill the recess in the Oblique™ Weatherboards, available in bags of 200.
- **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.

4.4 Accessories used with Oblique™ Weatherboard (Vertical) Cavity Cladding, which are supplied by the building contractor are:

- **Fixings for 20 mm timber cavity battens to timber frame** - 40 x 2.8 mm or longer Hardie™ Flex nail.
- **Fixings for Oblique™ Weatherboard to 20 mm cavity battens over flexible wall underlay** - 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
- **Fixings for Oblique™ Weatherboard to 20 mm cavity battens over rigid wall underlay** - 75 x 3.06 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
- **Fixings for Hardie™ 40 mm structural horizontal cavity battens to timber frame** - 75 x 3.06 mm 'D' round head stainless steel or hot-dip galvanised nail or 80 mm x 10 g wood screws.
- **Fixings for Oblique™ Weatherboard to Hardie™ 40 mm structural horizontal cavity battens** - 50 x 2.87 mm 'D' head or RounDrive ring shank stainless steel or hot-dip galvanised nails.

(Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680).

- **40 mm vent strip** - uPVC moulding used as vermin proofing.
- **Flexible wall underlay** – building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible wall underlay support** – polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *(Note: Mesh and wire galvanising must comply with AS/NZS 4534.)*
- **Rigid wall underlay** – plywood or fibre cement panel complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal or CodeMark for use as a rigid air barrier system.
- **RAB™ Board vertical joint sealing tape** - Thermakraft™ Premium Joining Tape, Thermaflash® Self-Adhesive Window Flashing Tape, Super-Stick Building Tape® or 3M™ All Weather Flashing Tape 8067.
- **Flexible sill, head and jamb flashing tape** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **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 20 for durability requirements.
- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

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Paint System Specification

4.5 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.

4.6 All exposed faces, including top edges at sills and all bottom edges of Oblique™ Weatherboard 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 or the building contractor, whether on-site or off-site, is under the control of the building contractor. Oblique™ Weatherboards must be stacked flat, off the ground and supported on a level platform. They must be kept dry at all times either by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to edges, ends and surfaces. Weatherboards must always be carried on edge.

5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Oblique™ Weatherboard 14 mm Vertical Installation Technical Specification, October 2022.
- Oblique™ Weatherboard 14 mm Vertical Installation to Hardie™ 40 mm structural cavity batten Technical Specification, October 2022.

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 wall framing behind Oblique™ Weatherboard [Vertical] Cavity Cladding must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of a building within the scope limitations of NZS 3604. Buildings or parts of a building outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604.

7.3 Studs must be at maximum 600 mm centres. Nogs/dwangs must be in a continuous line and be fitted flush between the studs. When 200 mm wide Oblique™ Weatherboards are installed over 20 mm timber cavity battens, nogs/dwangs must be spaced at maximum 600 mm centres in NZS 3604 Wind Zones up to, and including, Extra High. When 300 mm wide Oblique™ Weatherboards are installed over 20 mm timber cavity battens, nogs/dwangs must be at 400 mm centres, or double fixings must be used if nogs/dwangs are at 600 mm centres, in areas subject to wind pressures above 1.5 kPa. When Oblique™ Weatherboards are installed over 40 mm structural cavity battens, nogs/dwangs must be spaced at maximum 400 mm centres when installed in areas subject to wind pressures over 1.5 kPa.

7.4 The moisture content of the timber framing must not exceed 24% at the time of the cladding installation. *[Note: If Oblique™ Weatherboard [Vertical] Cavity Cladding is fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]*

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General

8.1 When Oblique™ Weatherboard [Vertical] Cavity Cladding 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.

8.2 Punchings in the cavity vent strip and rebates in the cavity batten provide a minimum ventilation opening area of 1,000 mm^2 per lineal metre of wall. *[Note: Hardie™ horizontal cavity battens do not provide vermin proofing to the bottom of the cavity and an additional cavity vent strip must be used.]*

8.3 At ground level the bottom edge of Oblique™ weatherboards must be kept clear of paved surfaces, such as footpaths, by a minimum of 100 mm and unpaved surfaces by 175 mm in accordance with NZBC Acceptable Solution E2/AS1, Table 18. The ground clearances to finished floor levels as set out in NZS 3604 must be adhered to.

8.4 At balcony, deck or low pitch roof/wall junctions, the bottom edge of Oblique™ weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 50 mm.

8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to, and including, Very High, and rigid underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 3.2 kPa design differential ULS wind pressure.

8.6 All external walls of buildings must have barriers to airflow in the form of 9 mm thick RAB™ Board when between 10-25 m high or situated in specific design wind pressures over a maximum design differential ULS of 1.5 kPa.

8.7 Unlined gables and walls must incorporate RAB™ Board, a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.

8.8 Where Oblique™ Weatherboard [Vertical] Cavity Cladding abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Inter-storey Junctions

8.9 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b). For buildings more than 10 m high, a drained horizontal joint must be provided at each floor to accommodated the inter-storey deflections.

Structure

Mass

9.1 The mass of the 200 mm wide Oblique™ Weatherboard when installed on the wall is 20.6 kg/m^2 at equilibrium moisture content [EMC] and the mass of the 300 mm wide board is 19.7 kg/m^2 at EMC. Oblique™ Weatherboard [Vertical] Cavity Cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

9.2 Oblique™ Weatherboard [Vertical] Cavity Cladding will resist impacts likely to be encountered in normal residential use. The likelihood of impact damage to the cladding when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers provided for vulnerable areas.

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Wind Zones

9.3 Oblique™ Weatherboard [Vertical] Cavity Cladding, when installed over 40 mm structural cavity battens, is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa ULS wind pressure where buildings are specifically designed.

9.4 Oblique™ Weatherboard [Vertical] Cavity Cladding, when installed over 20 mm timber cavity battens, is suitable for use in buildings up to 25 m high, situated in specific design wind pressures up to a maximum design differential ULS of 3.2 kPa, where studs are at maximum 400 mm centres. The spacing of nogs/dwangs must be in accordance with Paragraph 7.3.

Inter-storey Deflections

9.5 Oblique™ Weatherboard [Vertical] Cavity Cladding, installed in conjunction with RAB™ Board, is suitable to resist inter-storey deflections. When installed in accordance with the Technical Literature, Oblique™ Weatherboard [Vertical] Cavity Cladding, in conjunction with RAB™ Board, is capable of withstanding SLS deflections up to height/180.

Durability

10.1 Oblique™ Weatherboard [Vertical] Cavity Cladding meets the performance requirements of NZBC Clause B2.3.1 [b] 15 years for the Oblique™ Weatherboards, flashings and cavity system, and the performance requirements of NZBC Clause B2.3.1 [c] 5 years for the exterior paint system.

Serviceable Life

10.2 Oblique™ Weatherboard [Vertical] Cavity Cladding installations are expected to have a serviceable life of at least 50 years provided the paint coating system is maintained in accordance with this Appraisal to ensure the Oblique™ Weatherboards and fixings remain dry in service. Oblique™ Weatherboards 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, Oblique™ Weatherboard [Vertical] Cavity Cladding 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 atmospheres into aggressive environments for fasteners. The fixing of Oblique™ Weatherboard [Vertical] Cavity Cladding in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

11.1 Regular maintenance is essential for Oblique™ Weatherboard [Vertical] Cavity Cladding installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.

11.2 Annual inspections must be made to ensure that all aspects of the cladding system, including the paint coating system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the sealant or paint coating manufacturer's instructions.

11.3 Regular cleaning [at least annually] of the paint coating surface is recommended to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Paint systems must be recoated at approximately 7-15 yearly intervals in accordance with the paint manufacturer's instructions.

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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 Oblique™ Weatherboard [Vertical] Cavity Cladding.]*

Prevention of Fire Occurring

12.1 Oblique™ Weatherboards 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 fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and 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

Vertical Fire Spread - Buildings 10 m in height or less

13.1 When the system 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

13.2 Oblique™ Weatherboard [Vertical] Cavity Cladding 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. Specific Fire Engineering Design is required for each building over 10 m in height to ensure the Oblique™ Weatherboard [Vertical] Cavity Cladding and the External Wall Cladding System will meet the requirements of NZBC Acceptable Solution C/AS2, Section 5.8 or NZBC Verification Method C/VM2, Section 4.6. The following information is provided to support the Specific Engineering Design.

13.3 Oblique™ Weatherboard [Vertical] Cavity Cladding, as part of the James Hardie External Cladding System, has been tested to NFPA 285 and has passed the test criteria.

13.4 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 Oblique™ Weatherboard [Vertical] Cavity Cladding system

Component	Test Method	Result
Oblique™ Weatherboards	AS/NZS 3837:1998	Pass Type A
Hardie™ Axent™ Trim	AS/NZS 3837:1998	Pass Type A
Joinery and joint flashings and mouldings	Aluminium as defined in C/AS2 definitions	Non-combustible
Cavity vent strip	-	-
Oblique™ Plug	-	-
Flexible wall underlay	-	-
James Hardie Rigid Air Barrier [RAB™ Board]	AS/NZS 3837:1998	Pass Type A
Flexible sill, head and jamb flashing tape	-	-
Cavity batten	Component of NFPA 285 test	Pass
Cavity batten and Oblique™ fixings	Steel as defined in C/AS2 definitions	Non-combustible
Air seals and sealant	-	-

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Horizontal Fire Spread

13.5 Oblique™ weatherboards have a peak heat release rate of less than 100 kw/m^2 and a total heat released of less than 25 MJ/m^2. Testing was carried out as per Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of NZBC Acceptable Solution C/AS2, achieving a Type A performance.

External Moisture

14.1 Oblique™ Weatherboard [Vertical] Cavity Cladding, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and subfloor space to meet code compliance with NZBC Clause E2.3.5.

14.3 Oblique™ Weatherboard [Vertical] Cavity Cladding allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.

14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

14.5 The use of Oblique™ Weatherboard [Vertical] Cavity Cladding where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for junctions, penetrations, etc. to remain weather-resistant.

Internal Moisture

15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

15.2 Oblique™ Weatherboard [Vertical] Cavity Cladding is not a barrier to the passage of water vapour, and when installed in accordance with the Technical Literature and this Appraisal will not create or increase the risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirement

16.1 All design and building work must be carried out in accordance with the Oblique™ Weatherboard [Vertical] Cavity Cladding Technical Literature and this Appraisal by competent and experienced tradespersons conversant with Oblique™ Weatherboard [Vertical] Cavity Cladding. 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.

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System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

17.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Oblique™ Weatherboard [Vertical] Cavity Cladding system. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Rigid wall underlays must be installed in accordance with the instructions of the manufacturer and the Technical Literature. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

17.2 Where studs are at greater than 400 mm centres and a flexible wall underlay is being used, a building underlay support must be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

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 Oblique™ Weatherboards. The 20 mm cavity battens must be fixed by the cladding fixings through the timber battens to the timber framing. Oblique™ Weatherboards must be fixed vertically to Hardie™ 40 mm structural horizontal cavity battens using fixings as specified in the Technical Literature.

Oblique™ Weatherboard Installation

17.5 Oblique™ Weatherboards may be cut on-site by power saw. Holes and cut-outs may be formed by drilling a number of holes around the perimeter of the opening required and tapping out the centre with a hammer, or by using a hole saw.

17.6 Oblique™ Weatherboards must be dry prior to installation. Before the weatherboards are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement.

17.7 Before the weatherboards 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 weatherboard fixing and the cavity vent strip must be installed continuously around the bottom of the cavity.

17.8 Oblique™ Weatherboards must be installed starting at the corner of the wall being clad. The first weatherboard must be installed plumb to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50 mm. The weatherboards should be installed with the lap facing away from the prevailing winds.

17.9 Oblique™ Weatherboard laps are pre-determined by the machined joint detail.

17.10 Fixings for Oblique™ Weatherboard [Vertical] Cavity Cladding must be in accordance with Paragraph 10.3 and 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.

Aluminium Joinery Installation

17.11 Aluminium joinery and associated head and sill flashings must be installed by the building contractor in accordance with the Technical Literature. An 8 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

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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. Oblique™ Weatherboards and trim must be clean and dry before commencing painting.

Inspections

17.13 The Technical Literature must be referred to during the inspection of Oblique™ Weatherboard [Vertical] Cavity Cladding installations.

Health and Safety

18.1 Cutting of Oblique™ Weatherboards must be carried out in well ventilated areas, and a dust mask and eye protection must be worn.

18.2 When power tools are used for cutting, grinding or forming holes, health and safety measures as set out in the Technical Literature must be observed to minimise the amount of dust generated.

18.3 Safe use and handling procedures for Oblique™ Weatherboards and the components that make up the cladding system are provided in the relevant manufacturer's Technical Literature.

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 Oblique™ Weatherboards 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 Oblique™ Weatherboards have 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 Oblique™ Weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.

19.4 BRANZ expert opinion on NZBC C3 code compliance for Oblique™ Weatherboard [Vertical] Cavity Cladding was based on NFPA 285 testing by Intertek Group plc on specimens assembled comprising the James Hardie External Cladding System.

19.5 BRANZ expert opinion on NZBC E2 code compliance for Oblique™ Weatherboard [Vertical] Cavity Cladding was based on NZBC E2/VM2 [BRANZ EM7] testing and evaluation of all details within the scope and as stated within this Appraisal.

Other Investigations

20.1 Weathertightness, structural, fire and durability opinions have been provided by BRANZ technical experts.

20.2 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

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Quality

21.1 The manufacture of Oblique™ Weatherboard has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of CodeMark Certificate GM-CM30059 RevE covering quality aspects with the cladding.

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 on-site is the responsibility of the installer.

21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the Oblique™ Weatherboard (Vertical) Cavity Cladding in accordance with the instructions of James Hardie New Zealand Limited.

21.5 Building owners are responsible for the maintenance of Oblique™ Weatherboard (Vertical) Cavity Cladding in accordance with the instructions of James Hardie New Zealand Limited.

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.

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BRANZ

In the opinion of BRANZ, Oblique™ Weatherboard (Vertical) Cavity Cladding is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to James Hardie New Zealand Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. James Hardie New Zealand Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by James Hardie New Zealand Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to James Hardie New Zealand Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
26 October 2022

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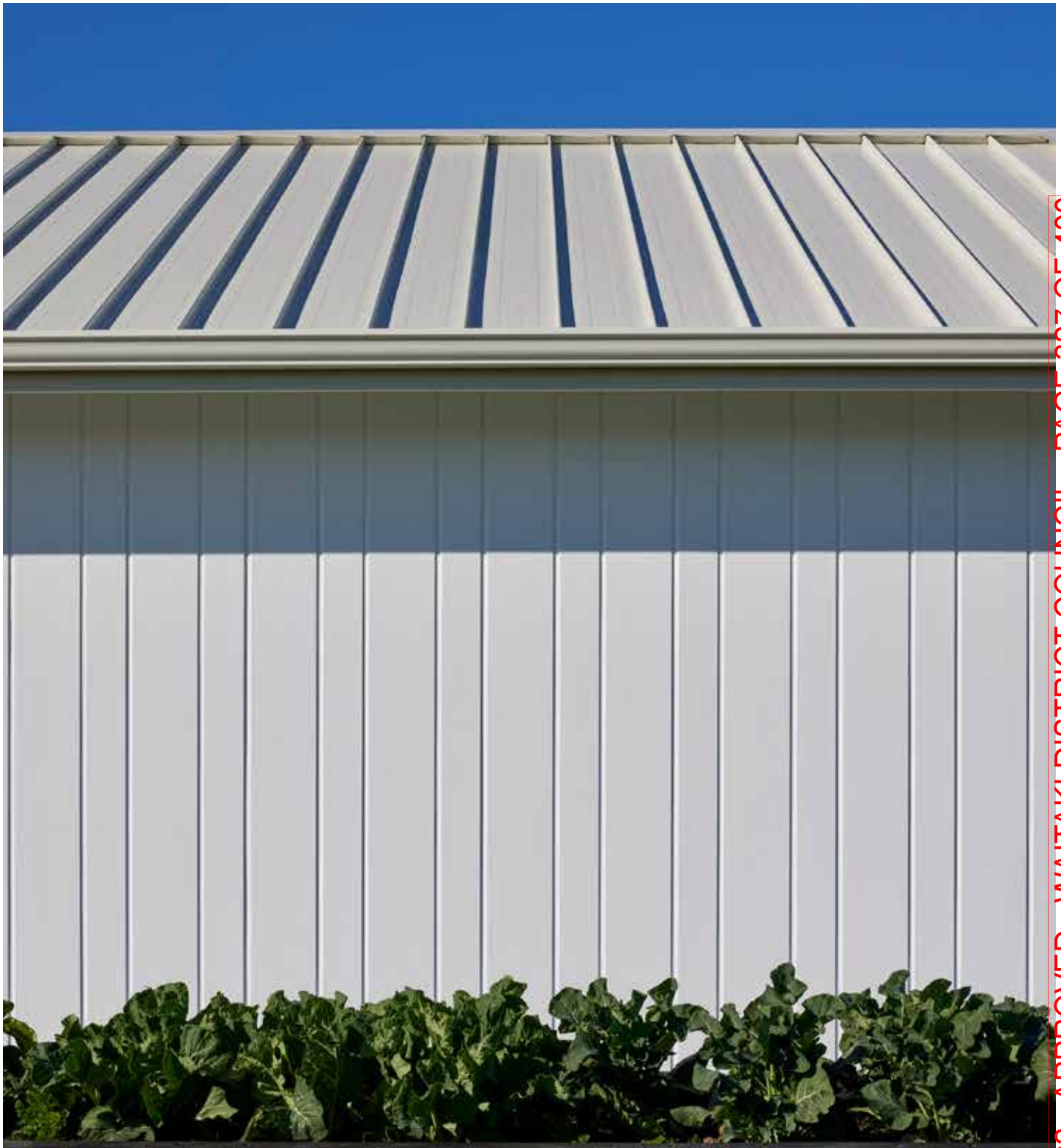
Oblique™ Weatherboard 14mm Vertical Installation

Technical Specification

October 2022 New Zealand



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We value your feedback!

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

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

Make sure your information is up to date

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

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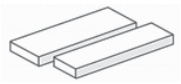
1 Product Overview

1.1 Production Information

Oblique™ Weatherboard installed as per this specification gives a vertical rusticated profile weatherboard appearance. Oblique™ Weatherboard can be fixed to timber-framed external walls.

A wide range of colours can be used varying from light to dark. Oblique™ Weatherboard is available in 200mm or 300mm wide x 4200mm or 2750mm lengths and is 14mm thick.

Table 1

Oblique™ Weatherboard information					
Product	**Description**	**Size (mm)**			**Code**
		Thickness	**Length**	**Width**	
	**Oblique™ Weatherboard** A 14mm profiled weatherboard for residential cladding. Factory sealed on all six sides. Each weatherboard has a manila white colour primer applied on its face, which accepts a wide range of paint finishes.	14	2750 4200	200 300 200 300	**405322** **405323** **405320** **405321**
	**Hardie™ Axent™ Trim** Hardie™ Axent™ Trim is a 19mm thick, pre-primed fibre cement product available in two widths. For use as decorative trims around openings and external corners.	19	3000	70 89	**405257** **405258**

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

Oblique™ Weatherboard is manufactured in 14mm thickness and has a mass of 16kg/m . Oblique™ Weatherboard is defined as a Light Weight Wall Cladding (not exceeding 30kg/m^2) as per NZS 3604.

1.2 Manufacturing and Classification

Oblique™ Weatherboard is an advanced lightweight cement composite cladding, manufactured using James Hardie formulation. Basic composition is Portland cement, ground sand, cellulose fibre and water. The product is easily identified by the name 'Oblique™ Weatherboard'.

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

Oblique™ Weatherboard and Hardie™ Axent™ Trim products are manufactured in Australia to Australian/New Zealand Standard AS/NZS 2908.2 ‘Cellulose-Cement Products’ (ISO 8336 ‘Fibre-Cement Flat Sheet’).

Oblique™ Weatherboard is classified Type A, Category 2 in accordance with AS/NZS 2908.2 “Cellulose-Cement Products”.

For Safety Data Sheets (SDS) visit **www.jameshardie.co.nz** or **Ask James Hardie™** on **0800 808 868**.

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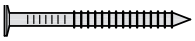
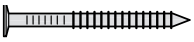
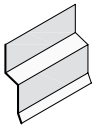
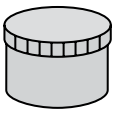
1.3 Components and Accessories

Table 2

Accessories/tools supplied by James Hardie			
Accessories	**Description**	**Size**	**Code**
	**Hardie™ Horizontal Cavity Batten 20mm** H3.1 Timber treated batten the cladding is fixed over	2700mm long	**305862**
	**Hardie™ 14mm Aluminium Trimline Joint Flashing** Aluminium extrusion used behind cladding at horizontal joints.	3000mm long	**305827**
	**Weatherboard Internal 'W' Corner** Anodised aluminium extrusion used to create internal corners.	2700mm long 4000mm long	**300386** **306180**
	**Hardie™ 14mm Aluminium Internal Corner** Anodised aluminium extrusion used to create internal corners.	3000mm long	**304871**
	**Hardie™ 14mm Aluminium Weatherboard External Box Corner** Anodised aluminium extrusion used to create external corners.	2750mm long 4000mm long	**306160** **305823**
	**uPVC Vent Strip** PVC moulding used as vermin proofing.	3000mm long	**302490**
	**Trimline Horizontal Jointer** A jointer to cover the butt joint of Oblique™ Trimline Joint Flashing	100mm long	**305871**
	**Trimline External Corner Jointer** Joins Trimline Joint Flashing at an external corner		**305870**
	**Trimline Internal Corner Jointer** Joins Trimline Joint Flashing at an internal corner		**305872**
	**Oblique™ 14mm Plug** To fill recess in Oblique™ Weatherboard 14mm		**306154**
Tools			
	**Hardie™ Blade Saw Blade** Diamond tip fibre cement circular saw blade. Spacers not included.	184mm 254mm	**300660** **303375**

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Table 3

Accessories/tools not supplied by James Hardie	
James Hardie recommends the following products for use in conjunction with Oblique™ Weatherboard and HomeRAB™ Pre-Cladding/RAB™ Board. James Hardie does not supply these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.	
Product	**Description**
	**Flexible underlay** Must comply with Table 23 of E2/AS1.
	**Flexible window opening flashing tape** A flexible self-adhesive tape used in preparation of a window. Refer to the window installation section in this manual for more information. e.g. Protecto® or Super-Stick Building Tape® by Marshall Innovations or 3M™ All Weather Flashing Tape 8067 by 3M™ Marshall Innovations: 0800 776 9727 3M™: 0800 474 787
	**Rigid air barrier vertical joint sealing tape** The tape to be used to seal HomeRAB™ Pre-Cladding/RAB™ Board vertical joints. Thermakraft™ Premium Joining Tape, Thermaflash® Self Adhesive Window Flashing tape by Thermakraft™ Ltd or Super-Stick Building Tape® by Marshall Innovations or 3M™ All Weather Flashing Tape 8067 by 3M™ Marshall Innovations: 0800 776 9727 3M™: 0800 474 787 Thermakraft™ Ltd 0800 806 595
	**Flexible Sealant** Bostik® Seal N Flex-1™, Sikaflex® AT Facade, Sikaflex® MS or similar.
	**65 x 2.87mm 'D' head nail or 65 x 2.87 RounDrive nail** (ring shank hot dipped galvanised/stainless steel) For fixing Oblique™ Weatherboard.
	**75 x 3.06mm 'D' head nail or 75 x 3.15 RounDrive nail** (hot dipped galvanised or ring shank stainless steel) For fixing Oblique™ Weatherboard.
	**40 x 2.8mm or longer Hardie™ Flex nail.** For fixing timber cavity battens and aluminium flashings.
	**Meter box** Refer electrical suppliers.
	**Head flashing** Required over window heads to be supplied by window installer. Material must comply with Table 20 and 21 of E2/AS1.
	**Exterior grade filler** CRC® ADOS® Builders Fill or similar two part filler to fill over nail holes

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2 Application and Scope

2.1 Application

Oblique™ Weatherboard can be installed vertically to timber frame or steel frame.

For fixing to steel frame, Ask James Hardie™ on 0800 808 868 for specific requirements. You can also refer to Steel Frame Technical Supplement by James Hardie for more information.

Specifiers

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

Installers

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

2.2 Scope

This specification covers the installation of Oblique™ Weatherboard within the following scope:

- The Oblique™ Weatherboard must be installed vertically.
- An external wall structure that complies with the NZBC for an existing building or new building where the designer and/or installer has established that the external wall frame is suitable for the cladding installation.
- In all wind zones up to a design wind pressure of 3.2kPa (ULS) up to 25m of building height. In wind zones greater than Very High (VH), a rigid air barrier must be used.

Refer to Oblique™ Weatherboard Horizontal Installation technical specification when installing horizontally.

2.3 Details

Various typical Oblique™ Weatherboard vertical construction details are provided in the Details section of this document. These details are available in dwg, dxf, jpg and pdf file format and can be downloaded from our website at www.jameshardie.co.nz.

All dimensions shown are in millimetres unless noted otherwise.

2.4 Specific Design

For use of Oblique™ Weatherboard in a specific engineering design (SED) project that is outside the scope of this literature, the designer, architect or engineer must ensure that applicable clauses of the NZBC have been considered and a specific design has been undertaken.

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3 Compliance

3.1 Compliance

Oblique™ Weatherboard installed in accordance with this specification has been tested to demonstrate compliance with clauses E2, B1, B2 and F2 of the NZBC.

When installed in accordance with the conditions of CodeMark number GM-CM30147 Oblique™ Weatherboard complies with all relevant requirements of the NZBC. Please refer to www.building.govt.nz or www.jameshardie.co.nz for a copy of the certificate.

CODEMARK
CMNZ30147

Oblique™ Weatherboard Vertical Installation has a BRANZ Appraisal number 1232 (2022) to demonstrate compliance with the requirements of the NZBC. Please refer to our website www.jameshardie.co.nz for a copy of the BRANZ appraisal.

4 Design

4.1 Responsibility

The specifier or other party responsible for the project must ensure that the information and details in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this technical specification. For applications outside the scope of this literature and details, which are not provided herein, the architect, designer or engineer must undertake specific design and it should be ensured that the intent of their design meets the requirements of the NZBC.

All New Zealand Standards referenced in this document are current editions and must be complied with.

Make sure your information is up to date

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

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

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4.2 Site and Foundation

The site on which the building is situated must comply with the NZBC Acceptable Solution E1/AS1 'Surface Water'. Foundation design must comply with the requirements of NZS 3604 'Timber-framed Buildings' or be as per specific engineering design. The grade of adjacent finished ground must slope away from the building to avoid any possibility of water accumulation in accordance with the NZBC requirements.

4.3 Clearances

The clearance between the bottom edge of the cladding and paved/unpaved ground must comply with section 9.1.3 of E2/AS1. The finished floor level must also comply with these requirements. These clearances must be maintained throughout the life of the building.

Oblique™ Weatherboard must overhang the bottom plate by a minimum of 50mm, as required by E2/AS1.

Oblique™ Weatherboard must maintain a minimum clearance of 100mm from paved ground, and 175mm from unpaved ground.

On roofs and decks, the minimum clearance must be 50mm.

Do not install external cladding such that it may remain in contact with water or ground, refer to Figures 6 and 7.

4.4 Moisture Management

It is the responsibility of the specifier to identify moisture related risks associated with any particular building design.

Wall construction design must effectively manage moisture, considering both interior and exterior environments of the building, particularly in buildings that have a higher risk of wind driven rain penetration. The building should also be ventilated sufficiently to control moisture accumulation due to condensation, especially in artificially cooled/heated buildings.

Walls must include those provisions as required by the NZBC Acceptable Solution Clause E2/AS1. In addition, all wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate appropriate flashings for waterproofing. The other materials, components and installation methods used to manage moisture in external walls, must comply with the requirements of relevant standards and the NZBC. For further guidance on designing for weathertightness, refer to BRANZ Ltd. and the Ministry of Business Innovation and Employment (MBIE) updates on the following websites respectively, www.branz.co.nz and www.building.govt.nz.

In addition, the following issues must also be considered:

- Sealant must be installed where detailed in this literature
- Where the walls are higher than two storeys, it is necessary to provide a horizontal flashing at the second floor level to drain the cavity
- The installation of smoke chimneys, pipe penetrations and other fixtures etc. must not track moisture into the wall or restrict the drainage of moisture to the exterior

4.5 Structure

4.5.1 Timber Framing

Timber-framed buildings must either be in accordance with NZS 3604 (Timber-framed Buildings) or designed as per specific engineering design (SED).

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

4.5.2 Dimensions

A 90 x 45mm minimum framing size is required.

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4.5.3 Structural Grade

Timber grade used must be in accordance with timber grades specified in NZS 3604.

4.5.4 Durability

The external framing timber must be treated to a minimum H1.2 treatment. Higher treatment levels may be used, but check for the compatibility of treatment chemicals with other materials. Refer to the NZBC Acceptable Solution B2/AS1 Durability for further information about the durability requirements.

For timber treatment and allowable moisture content information refer to NZS 3602 (Timber and Wood-Based Products for use in Buildings) and NZS 3640 (Chemical Preservation of Round Sawn Timber) for minimum timber treatment selection and treatment requirements.

Also refer to the framing manufacturer's literature for further guidance on timber selection. Framing must be protected from moisture at the site in accordance with the framing manufacturer's recommendations.

4.6 Wind Pressures

Oblique™ Weatherboard is suitable for use in wind zones up to and including EH as defined in NZS 3604.

Oblique™ Weatherboard is also suitable for use in specific design projects up to wind pressures of 3.2kPa (ULS).

4.7 Structural Bracing

Oblique™ Weatherboard installed as per this specification cannot be used to achieve structural bracing. However, bracing can be achieved by using a HomeRAB™ Pre-Cladding/RAB™ Board installed direct to framing instead of a flexible underlay or by using the Villaboard™ Lining bracing system on the internal face of the wall. Refer to the Bracing Design Manual by James Hardie for further information.

4.8 Energy Efficiency

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

4.9 Fire Rated Walls

Oblique™ Weatherboard when fixed over timber cavity battens to external walls can achieve fire ratings up to 60/60/60 to comply with Clause C/AS1 and C/AS2 of the NZBC, when the walls are constructed in accordance with the current Fire and Acoustic Design Manual by James Hardie.

Oblique™ Weatherboard is classified as a 'non-combustible' material suitable for use on walls close to a boundary.

4.10 Control of External Fire Spread

Oblique™ Weatherboard material is classified as 'Type-A' as per Table C1.3 when tested to the requirements of Appendix C7.1.1 (b) of C/AS2 of NZBC and is suitable for use where 'Non Combustible Material' or ' Limited Combustibility Material' is required for for use in buildings located anywhere in relation to the relevant boundary for building within the scope of C/AS1 or C/AS2.

- At intervals of no greater than 3.5m vertical height where the upper floors contain sleeping uses or other property, a horizontal flashed joint must be provided to block the top of lower cavity. Refer to Figure 39.
- On buildings greater than 10m in height a RAB™ Board must be used.

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4.11 Durability

Oblique™ Weatherboard and HomeRAB™ Pre-Cladding/RAB™ Board installed and maintained as per this technical specification will meet the durability requirement for cladding as per the NZBC clause B2 Durability.

Oblique™ Weatherboard is resistant to permanent moisture induced deterioration (rotting) and meets the requirements of 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)

4.12 Alpine Regions

In regions subject to freeze/thaw conditions, Oblique™ Weatherboard and HomeRAB™ Pre-Cladding/RAB™ Board must not be in direct contact with snow or ice build up for extended periods, e.g. external walls in alpine regions must be protected where snowdrifts over winter are expected.

These products meet the requirements of the AS/NZS 2908.2 Clause 8.2.3.

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5 Safe Working Practices

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

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

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

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

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

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

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica and when cleaning up
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

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Avoid breathing in crystalline silica dust

Safe working practices

- ✗ NEVER use a power saw indoors or in a poorly ventilated area
- ✗ NEVER dry sweep
- ✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up
- ✗ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the Hardie™ Blade name or one with at least equivalent performance – connected to an M Class or higher vacuum
- ✓ Before cutting warn others in the area to avoid dust
- ✓ ALWAYS follow tool manufacturers' safety recommendations
- ✓ ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- ✓ ALWAYS wear a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

When cutting

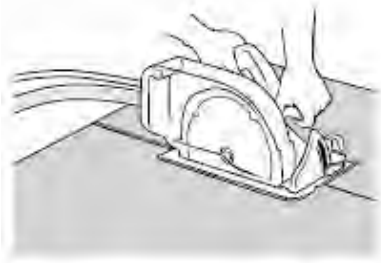
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a Hardie™ Blade Saw Blade (or equivalent)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

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

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Working Instructions

Hardie™ Blade Saw Blade



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

Hole-Forming



For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a 'pilot' hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

5.1 Storage and delivery

Keeping products and people safe

Off loading

✓ Hardie™ fibre cement products should be off-loaded carefully by hand or by forklift

✓ Hardie™ fibre cement products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

Hardie™ fibre cement products should be stored:

✓ In their original packaging

✓ Under cover where possible or otherwise protected with a waterproof covering to keep products dry

✓ Off the ground – either on a pallet or adequately supported on timber or other spacers

✓ Flat so as to minimise bending

Hardie™ fibre cement products must not be stored:

✕ Directly on the ground

✕ In the open air exposed to the elements

James Hardie is not responsible for damage due to improper storage and handling.

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5.2 Tips for Safe and Easy Handling of Oblique™ Weatherboard

✕ Do not lift planked products flat and in the middle

✓ Carry the products on the edge

✓ If only one person is carrying the product, hold it in the middle and spread arms apart to better support the product

✓ If two people are carrying the plank, hold it near each end and on edge

✓ Exercise care when handling weatherboard products to avoid damaging the edges/corners

6 Installation

Oblique™ Weatherboard must be installed vertically using the cavity construction method as per the details and information published in this manual.

The two widths of Oblique™ Weatherboard can be mixed to create the desired look.

Oblique™ Weatherboard must be kept under cover whilst in storage or at sites and they must be dry at the time of their installation. All site-cut board edges must be sealed with Dulux® Acraprime® 501/1, Dulux® 1 Step, Resene® Quick Dry or a similar sealer compatible with the finish coat before installation.

Oblique™ Weatherboard must be fully supported and fixed through Hardie™ horizontal cavity battens. Ensure that cladding is hard against the battens to avoid drumminess.

This technical specification only covers the vertical installation of Oblique™ Weatherboard. Refer to the Oblique™ Weatherboard horizontal installation technical specification for horizontal installation.

6.1 Fastener

6.1.1 Fastener – Size and Layout

Oblique™ Weatherboard must be fixed vertically to framing using fixings as specified in Tables 4 and 5 on the next page and follow the edge distance required for nails as shown in the details.

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Table 4

Oblique™ Weatherboard 200mm			
Cavity Construction	**Wind Zone**	**Fixing**	**Fastener Type**
Over flexible underlay	Up to and including VH wind zone	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 4	65 x 2.87mm D head or 65 x 2.87mm RounDrive ring shank nails or 75 x 3.15mm Hardie™ Flex nails
Over HomeRAB™ Pre-Cladding	Up to and including VH wind zone	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 4	75 x 3.06mm D head or 75 x 3.15mm RounDrive ring shank nails or 75 x 3.15mm Hardie™ Flex nails
Over RAB™ Board	Up to and including EH wind zone and SED projects	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 4	75 x 3.06mm D head nails or 75 x 3.15mm RounDrive ring shank nails

- The loose 75 x 3.15mm Hardie™ Flex nail is only suitable for use up to VH wind zone

Table 5

Oblique™ Weatherboard 300mm			
Cavity Construction	**Wind Zone**	**Fixing**	**Fastener Type**
Over flexible underlay	Up to and including VH wind zone	Fix one nail 150mm from bottom edge of board per nog/plate. Refer to Figure 4	65 x 2.87mm D head or 65 x 2.87mm RounDrive ring shank nails
Over HomeRAB™ Pre-Cladding	Up to and including VH wind zone	Fix one nail 150mm from bottom edge of board per nog/plate. Refer to Figure 4	75 x 3.06mm D head or 75 x 3.15mm RounDrive ring shank nails
Over RAB™ Board	Up to and including EH wind zone and SED projects with nogs at 400mm centres maximum	Fix one nail 150mm from bottom edge of board per nog/plate. Refer to Figure 4	75 x 3.06mm D head nails or 75 x 3.15mm RounDrive ring shank nails
Over RAB™ Board	Up to and including EH wind zone and SED projects with nogs at 600mm centres maximum	Fix two nails 80mm from bottom and top edge of board per nog/plate. Refer to Figure 5	75 x 3.06mm D head nails or 75 x 3.15mm RounDrive ring shank nails

For other fixing options Ask James Hardie™ on 0800 808 868.

- When fixing the weatherboards using nail guns, refer to the nail gun manufacturer for information about nails and the type of nail gun to be used
- D head nails - finish nails 2mm below weatherboard surface
- RounDrive nails - finish nails flush with weatherboard surface
- Hardie™ Flex nails - finish nails flush with weatherboard surface

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6.1.2 Fastener Durability

Fasteners must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing materials to be used in relation to exposure conditions and are summarised in Table 6.

Fasteners must be fully compatible with the other materials that they are to be in contact with, to ensure the durability of the complete assembly.

Table 6

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

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

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

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

6.2 Framing

Oblique™ Weatherboard can be fixed either to a timber-frame or steel-frame.

For fixing to a steel frame Ask James Hardie™ on 0800 808 868 for specific requirements.

6.2.1 Special Framing Requirements

The following are special framing requirements for both timber and steel framing:

- Double studs are required at internal corners, refer to Figures 10 and 11
- Extra packers may be required at external corners

6.2.2 Tolerances

In order to achieve the required performance and an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with Table 2.1 of NZS 3604 and the manufacturer's specifications. All framing shall be made flush. Also refer to MBIE guidance to tolerances, materials and workmanships etc.

6.2.3 Frame Construction

Use of timber framing must be in accordance with NZS 3604 and the framing manufacturer's specifications. The framing must be rigid and must not rely on the cladding for stability. Timber framing sizes and its set-out must comply with NZS 3604 and as specified in this technical specification.

The following framing is required for Oblique™ vertical Installation:

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 600mm centres maximum
- An extra stud is required in internal corners
- For specific design projects exposed to wind speeds higher than 55m/sec, the stud size and spacing must be as per the project specific engineering design requirements
- The nog spacing must be closed to 400mm centres for EH and SED wind zones.

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

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6.3 Flexible Underlay/HomeRAB™ Pre-Cladding

Flexible underlay/HomeRAB™ Pre-Cladding must be provided as per the requirements of External Moisture Clause E2 of the NZBC. The flexible underlay selected for use must comply with Table 23 of E2/AS1.

The flexible underlay must be fixed in accordance with section 9.1.7 of E2/AS1 and the underlay manufacturer's recommendations.

Walls which are not lined on the inside face (e.g. garage walls or gable ends), must include a rigid sheathing or an air barrier behind the cladding which complies with Table 23 of E2/AS1. For attached garages, flexible underlays must be selected in accordance with the NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. HomeRAB™ Pre-Cladding by James Hardie complies with these requirements and is suitable for use in this situation. It must be installed in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual.

6.4 Intermediate Support

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

- 75mm galvanised mesh; or
- Polypropylene tape at 300mm centres fixed horizontally and drawn taut

No intermediate supports are required:

- When studs are spaced at 400mm centres; or
- When rigid air barriers are used

6.5 Rigid Air Barrier

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

For buildings more than 10m, RAB™ Board must be used. To achieve the temporary weathertightness using HomeRAB™ Pre-Cladding and RAB™ Board, windows/doors need to be installed with required flashing tapes and seals etc. Refer to HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual for information regarding its installation and to achieve temporary weathertightness.

6.6 Flashings

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to Oblique™ Weatherboard installation. Refer to moisture management requirements in Clause 2.5. The flexible underlay/rigid air barrier must be appropriately incorporated with penetration and junction flashings using flashing tapes. Materials must be lapped in such a way that water tracks down to the exterior on the face of the flexible underlay or rigid air barrier board.

The selected flashing materials must comply with the durability requirements of the NZBC. For information refer to Table 20 of E2/AS1.

When using HomeRAB™ Pre-Cladding/RAB™ Board the entire framing around openings must be protected with a flashing tape. The tape must be finished over the face of the rigid air barrier. Ensure to check the compatibility of flashing tapes and sealants with their manufacturers. Refer to the HomeRAB™ Pre-Cladding/RAB™ Board Installation Manual by James Hardie for further information.

6.7 Cavity Closure/Vent Strip

The Hardie™ uPVC cavity vent strip must be installed at the bottom of all walls and above all openings constructed using the drained and ventilated cavity construction method. It is important that the openings in the cavity closure/vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. Hardie™ cavity closure/vent strip has an opening area of 1000mm^2/m length.

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6.8 Cavity Battens

Oblique™ Weatherboard must be installed on a cavity. The battens provide ventilation and drainage between the frame and the weatherboard and are considered a “packer” only in this specification.

The Hardie™ horizontal cavity battens are H3.1 treated in accordance with NZS 3640 (Chemical preservation of rough and sawn timber) to comply with the durability requirements of B2/AS1.

Hardie™ horizontal cavity battens meet the requirements of E2/AS1 and:

- Are minimum 20mm thick and 45mm wide
- Fixed horizontally to nogs
- Fixed vertically to studs at corners and openings
- Must be fixed by the cladding fixings to the main framing over the flexible underlay. Therefore until claddings are fixed the battens only need to be tacked to framing by 40 x 2.8mm or longer nails at 800mm centres
- Permit air circulation and water drainage

6.9 Joints

6.9.1 Vertical Joint

Oblique™ Weatherboard vertical joints shall be formed using the ship lap edge of the Oblique™ Weatherboard. Ensure that the Oblique™ Weatherboards are securely interlocked before nailing, refer to Figures 3 to 5.

6.9.2 Horizontal Joint

Oblique™ Weatherboard can run continuously over floor joists without a flashed horizontal joint when LVL timber floor joists or engineered joist are used, refer to Figure 26.

When using a solid timber joist, a horizontal joint or a movement joint must be formed at floor joist, refer to Figure 25.

6.9.3 Drainage Joint

After every two floors a horizontal drainage joint flashing is required, refer to Figure 27.

For buildings higher than 3 storey, from a vertical fire spread safety perspective, a horizontal drainage joint is required at each floor.

6.9.4 External Corner

An external box corner flashing is used to fix the external corners, refer to Figure 8. Alternatively an Hardie™ Axent™ Trim external boxed corner can also be formed, refer to Figure 9.

6.9.5 Internal Corner

An internal corner flashing is to be used to form an internal corner joint, refer to Figures 10 and 11.

An extra stud is required in internal corners.

Note: All joint mouldings to be fixed at 400mm centres both sides.

6.10 Junctions and Penetrations

Refer to Clause 2.5 of this specification for moisture management requirements. All windows and doors must be detailed as per the requirements of this specification. For an example of window details for Oblique™ Weatherboard which meet the performance requirements of E2 External Moisture, an approved document of the NZBC, refer to Figures 16 to 23.

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7 Finishes

7.1 Preparation

The D head nail must be finished 2mm below the weatherboard surface. The nail holes must be filled with an exterior grade two part builders fill, ie. CRC® ADOS® Builders Fill or similar two part external grade filler. The RounDrive nail heads must finish flush with weatherboard surface.

7.2 Painting

Oblique™ Weatherboard is pre-primed and is suitable for site applied acrylic paints.

In order to seal cut edges or sanded patches, Dulux® 1 Step, Acraprime® 501/1, Resene® Quick Dry, Taubmans® Underproof Acrylic Primer Undercoat or a similar product should be applied. The primer should be compatible with the paint to be used.

Painting of Oblique™ Weatherboard is mandatory to meet the durability requirements of the NZBC and the 25 year James Hardie product warranty. Oblique™ Weatherboard must be dry and free of any dust or grime before painting. The weatherboards must be painted within 90 days of their installation. There is no restriction on the LRV of paint to be applied on the Oblique™ Weatherboard.

James Hardie recommends a minimum of two coats of exterior grade acrylic paint. Follow the paint manufacturer's recommendations to prepare the surface and to adequately cover and conceal the weatherboard fixings.

For best aesthetic results a low sheen paint is recommended.

7.3 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.

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8 Care and Maintenance

It is the responsibility of the specifier to determine normal maintenance requirements to maintain the effectiveness of the cladding. The extent and nature of maintenance required will depend on the geographical location and exposure of the building.

As a guide, it is recommended that the basic normal maintenance tasks shall include, but not be limited to:

- Washing down exterior surfaces every 6 - 12 months using low pressure water and a brush, and every 3-4 months in extreme coastal conditions or sea spray zones. Do not use a water blaster to wash down the cladding. Refer to your paint manufacturer for washing down requirements.
- Re-coating exterior protective finishes. Always refer to your paint manufacturer for re-coating requirements.
- Regular inspection and repair if necessary of the cladding joints, sealants, nail head fillers
- Cleaning out gutters, down pipes and overflow pipes as required
- Pruning back vegetation which is close to or touching the Oblique™ Weatherboard as well as ensuring the NZBC ground clearance requirements are maintained, especially where gardens are concerned
- The clearance between the bottom edge of the Oblique™ Weatherboard and the finished/unfinished ground must always be maintained

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9 Details

The following generic details have been provided in this document for cavity construction methods.

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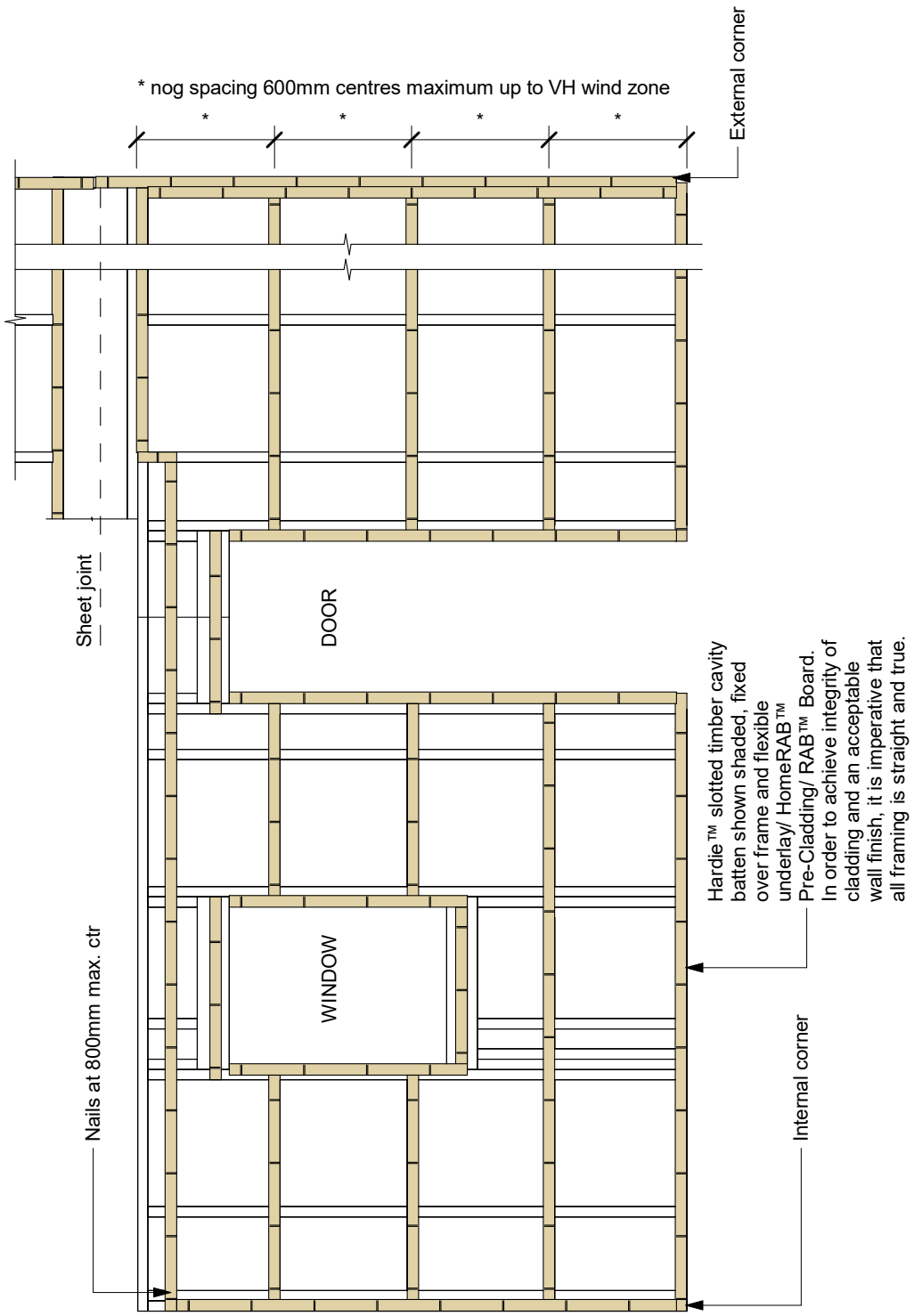
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Figure 1: Cladding installed



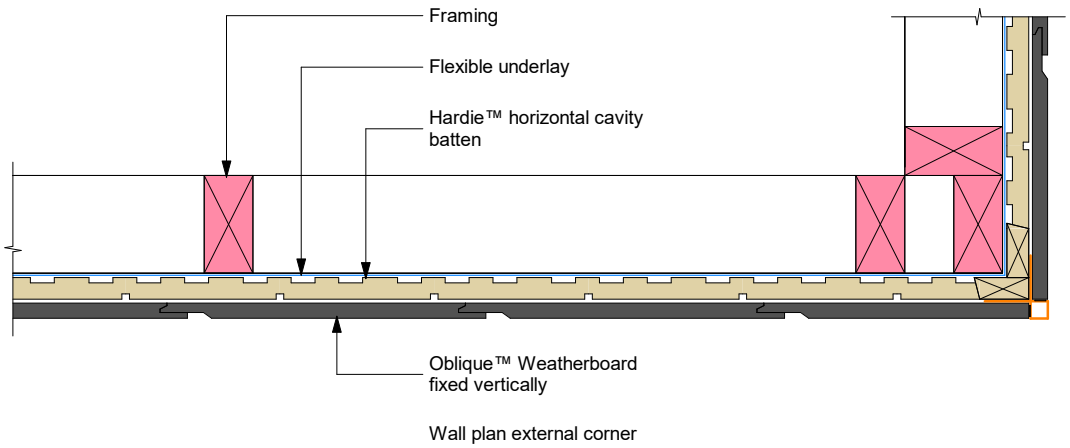
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Figure 2: Framing setout

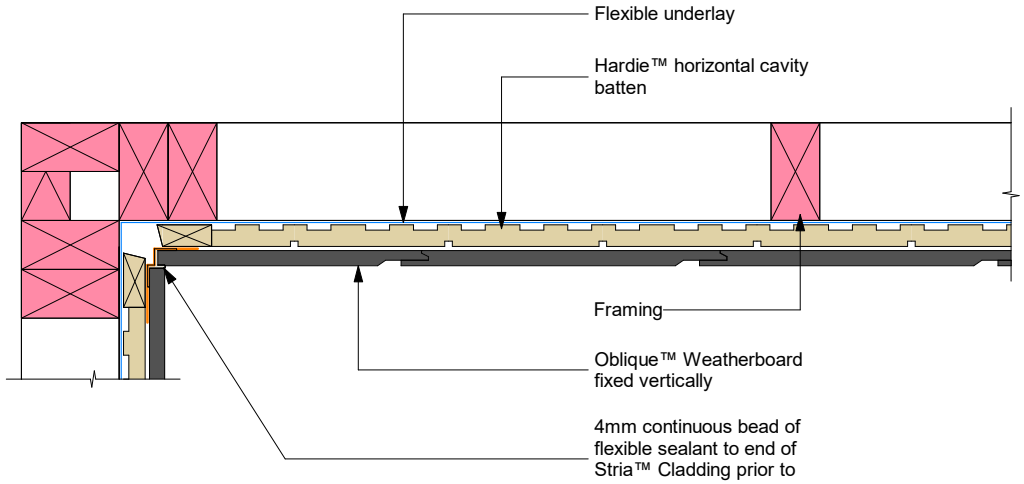


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Figure 3: Cladding & Hardie™ horizontal cavity batten



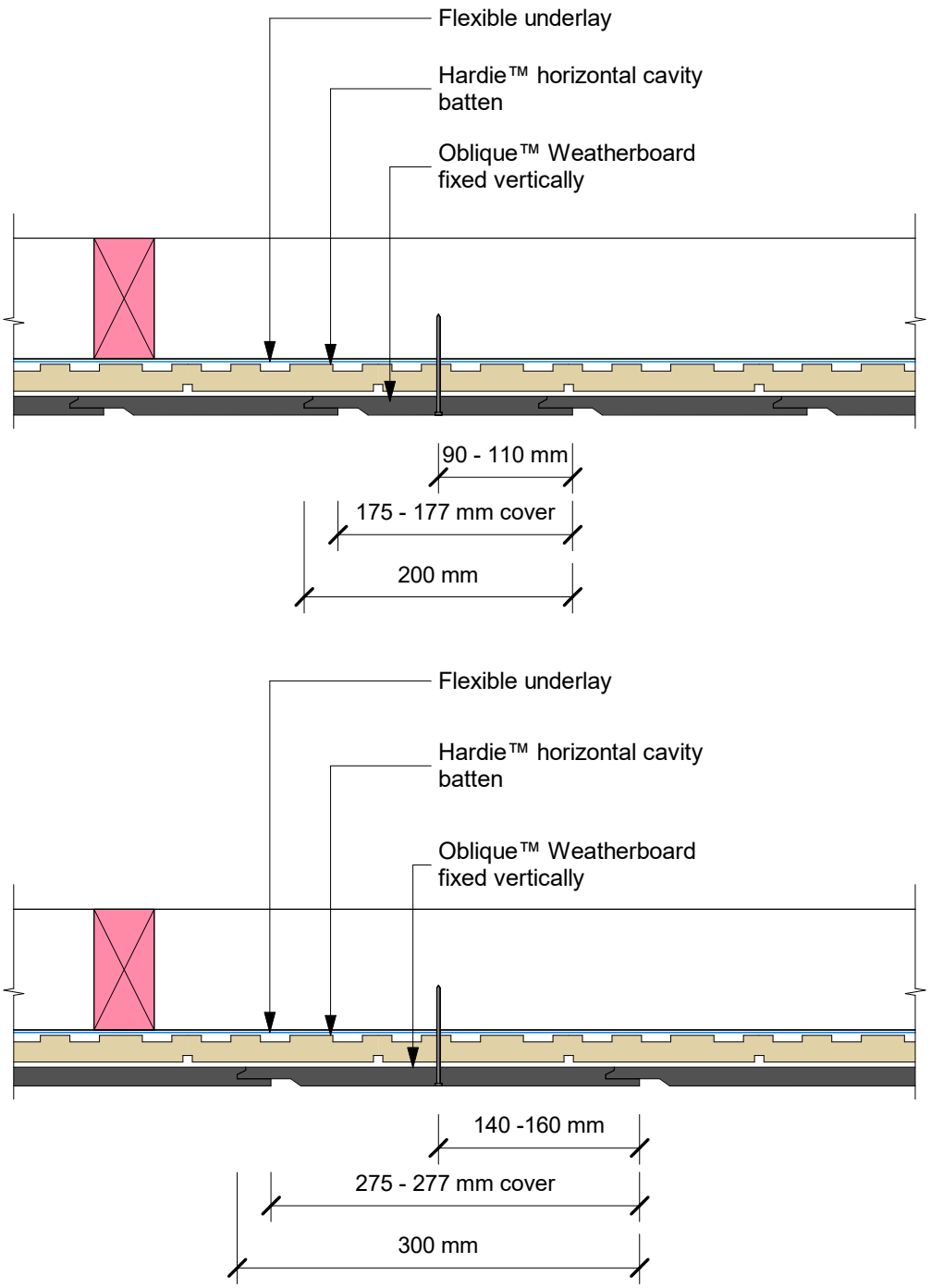
Wall plan external corner



Wall plan internal corner

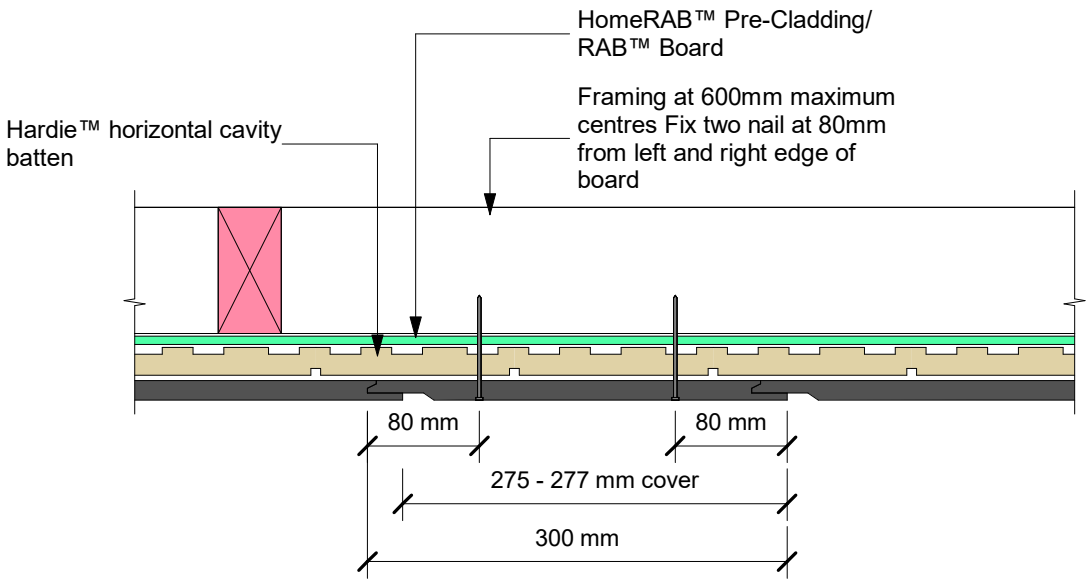
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Figure 4: Fixing up to VH wind zone



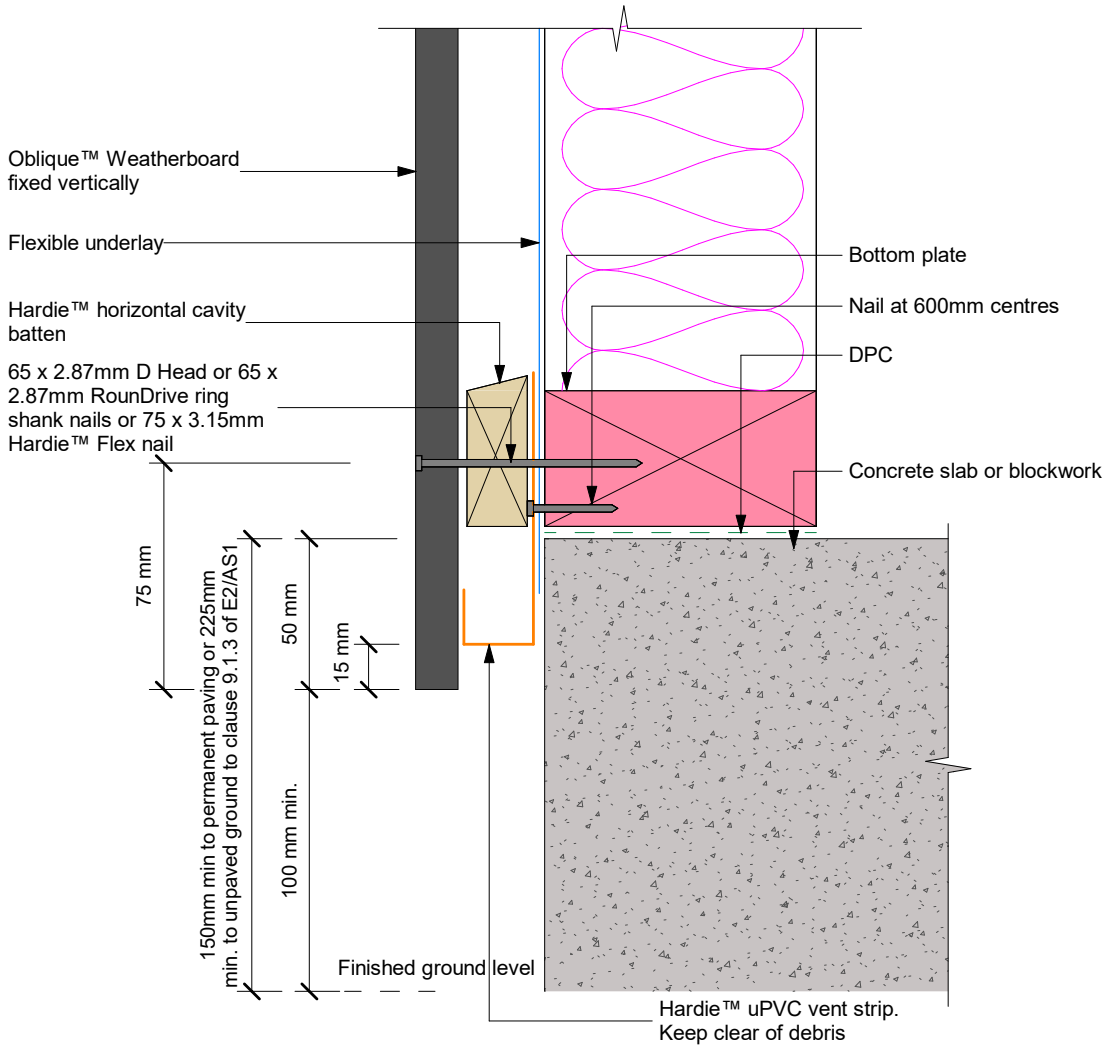
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Figure 5: Fixing in EH or SED wind zone



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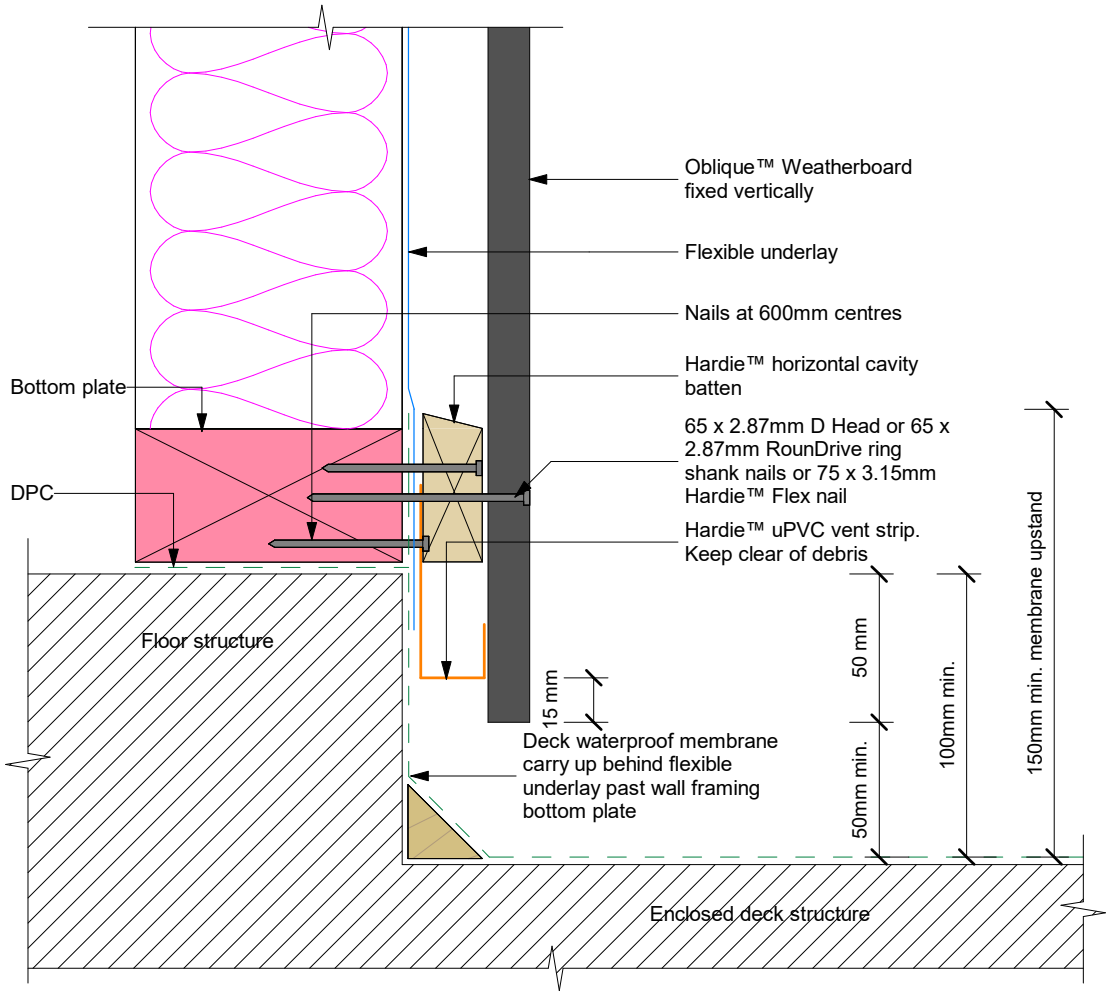
Figure 6: Foundation detail



Note: Site cut edges to be primed

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Figure 7: Enclosed deck



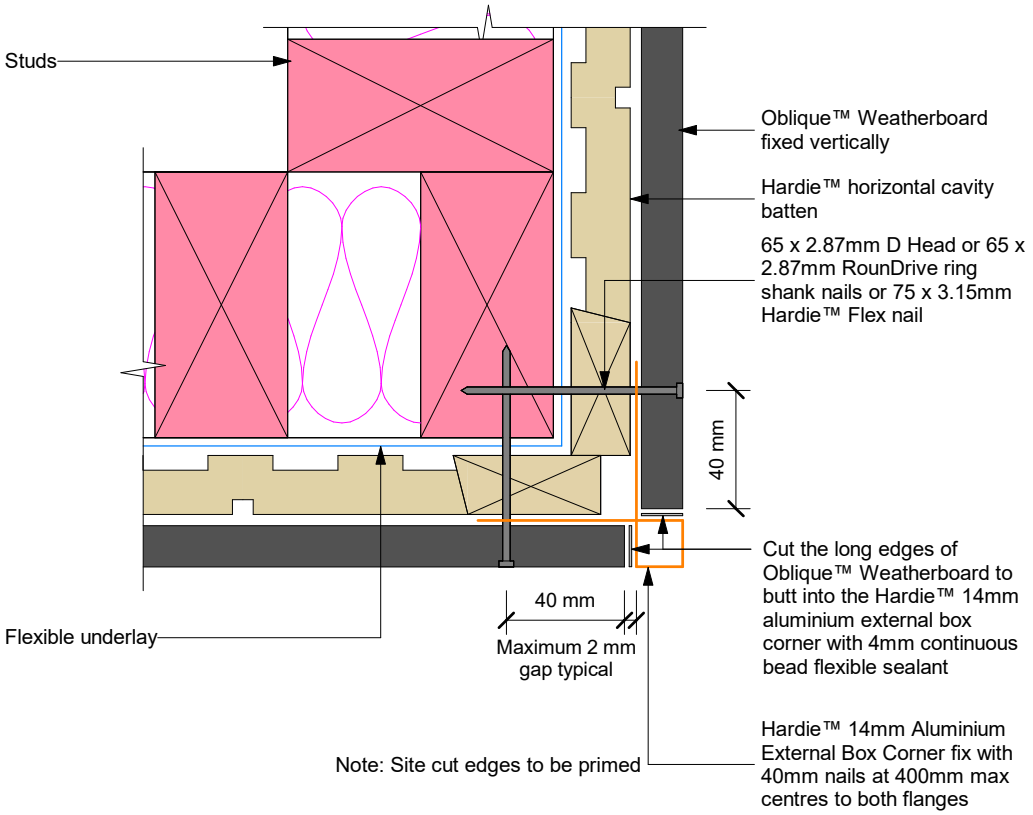
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Figure 8: External aluminium box corner

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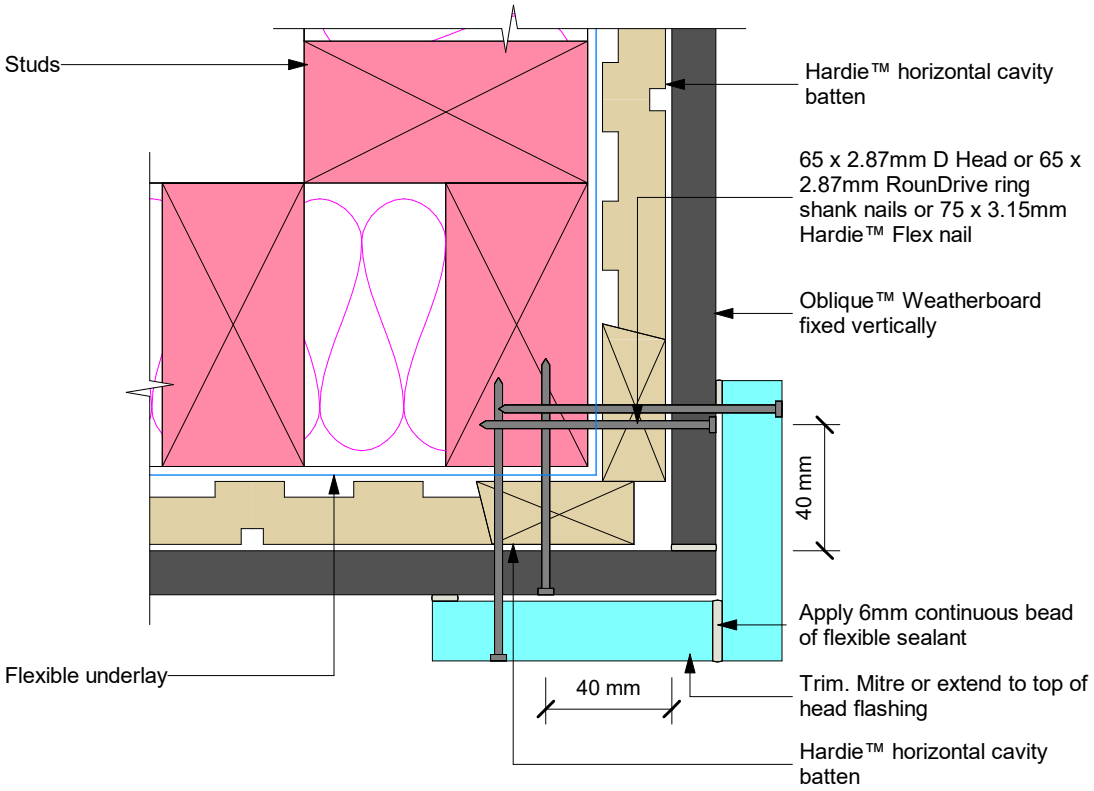
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Figure 9: External aluminium box corner negative detail



Note: Site cut edges to be primed

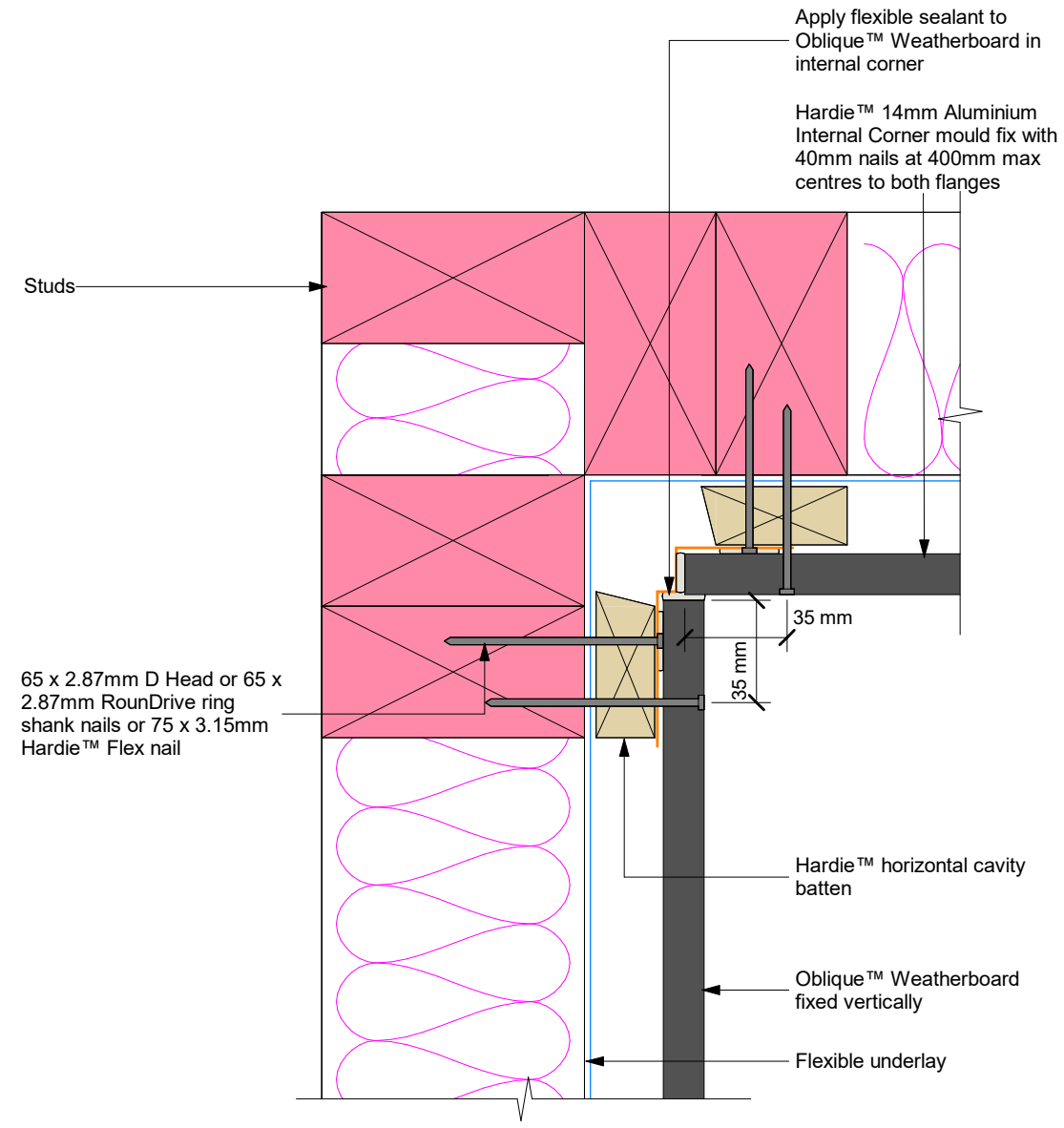
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Figure 10: Internal aluminium corner - Option A

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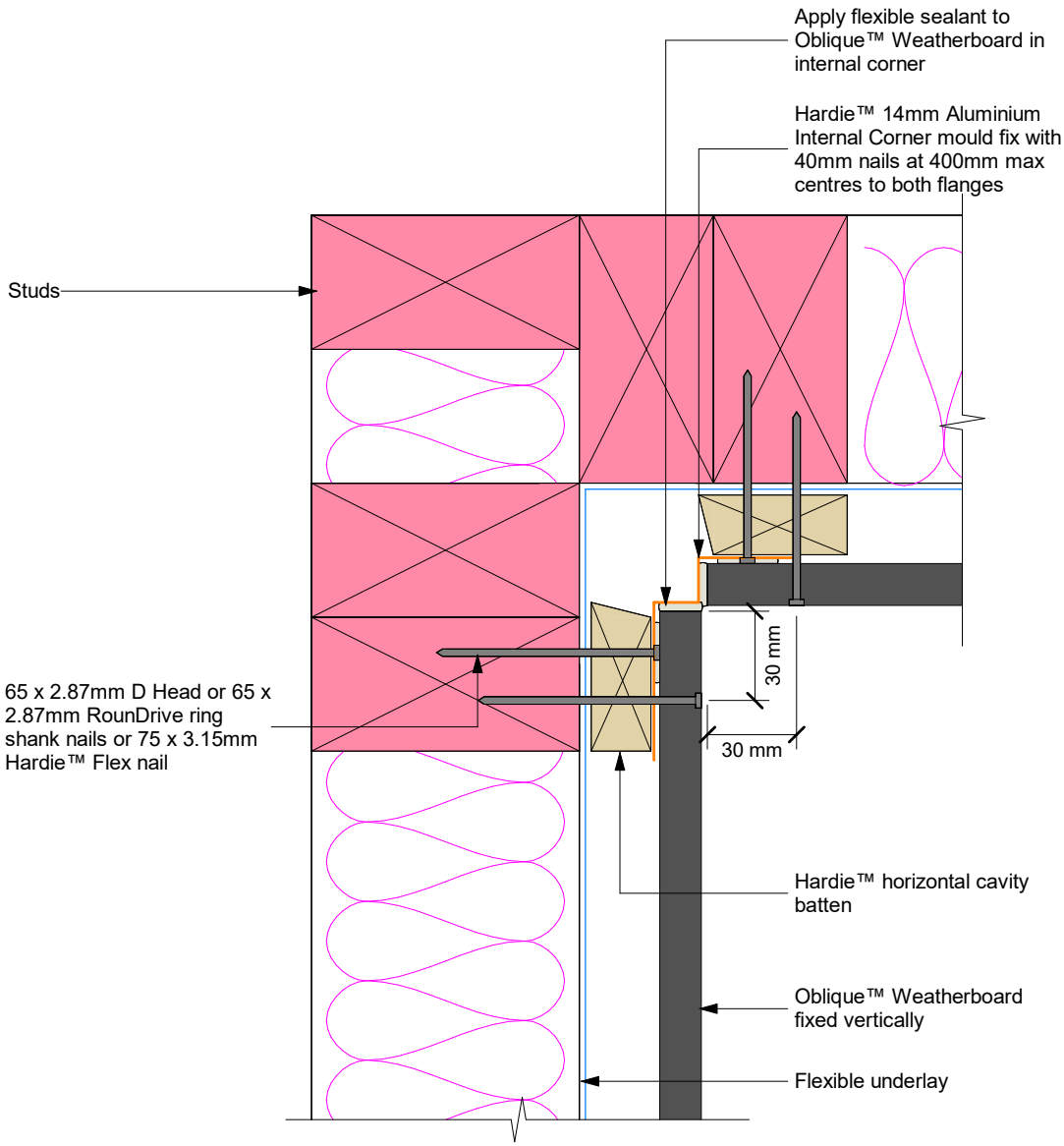
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Note: Site cut edges to be primed

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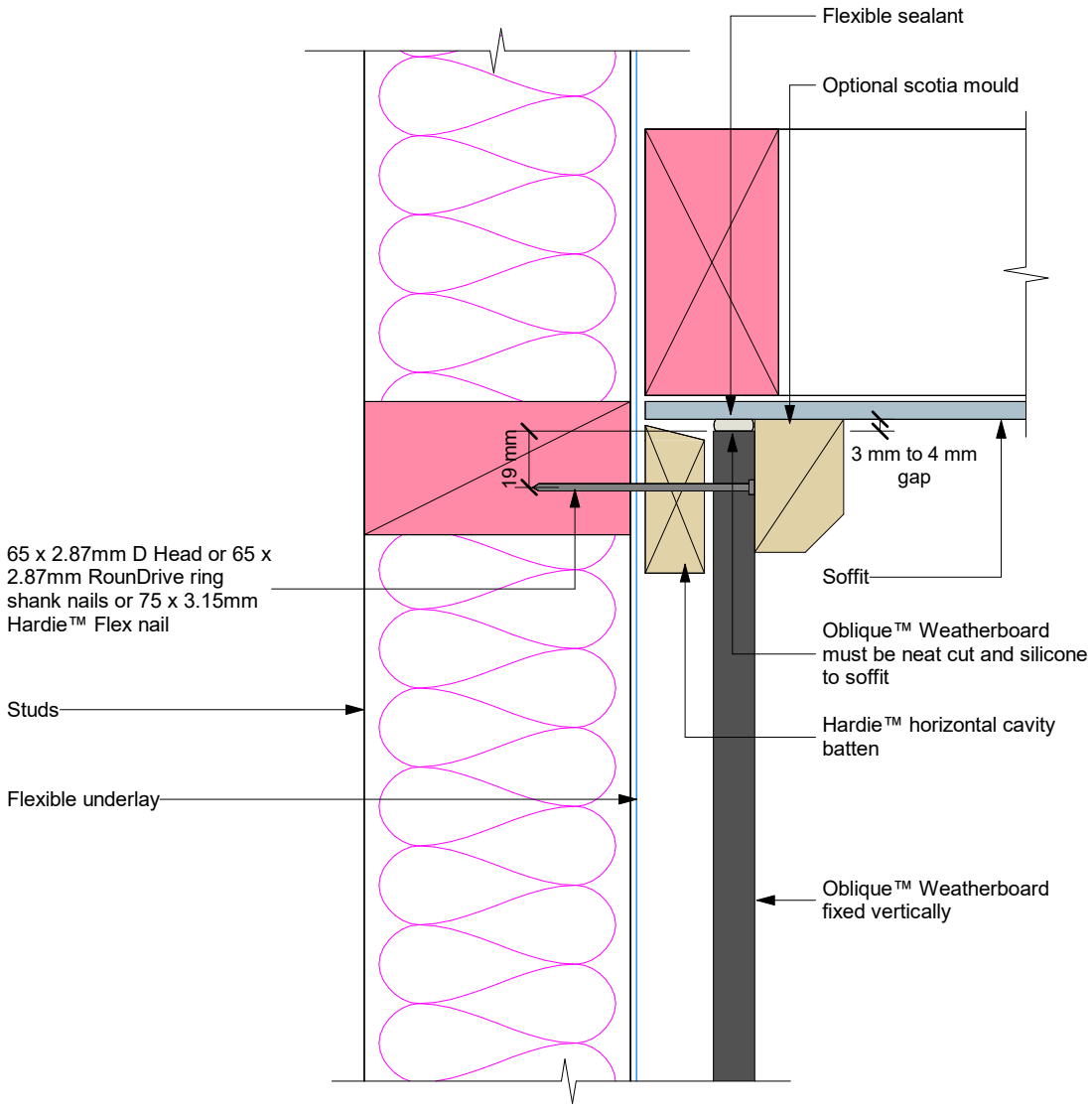
Figure 11: Internal aluminium corner - Option B



Note: Site cut edges to be primed

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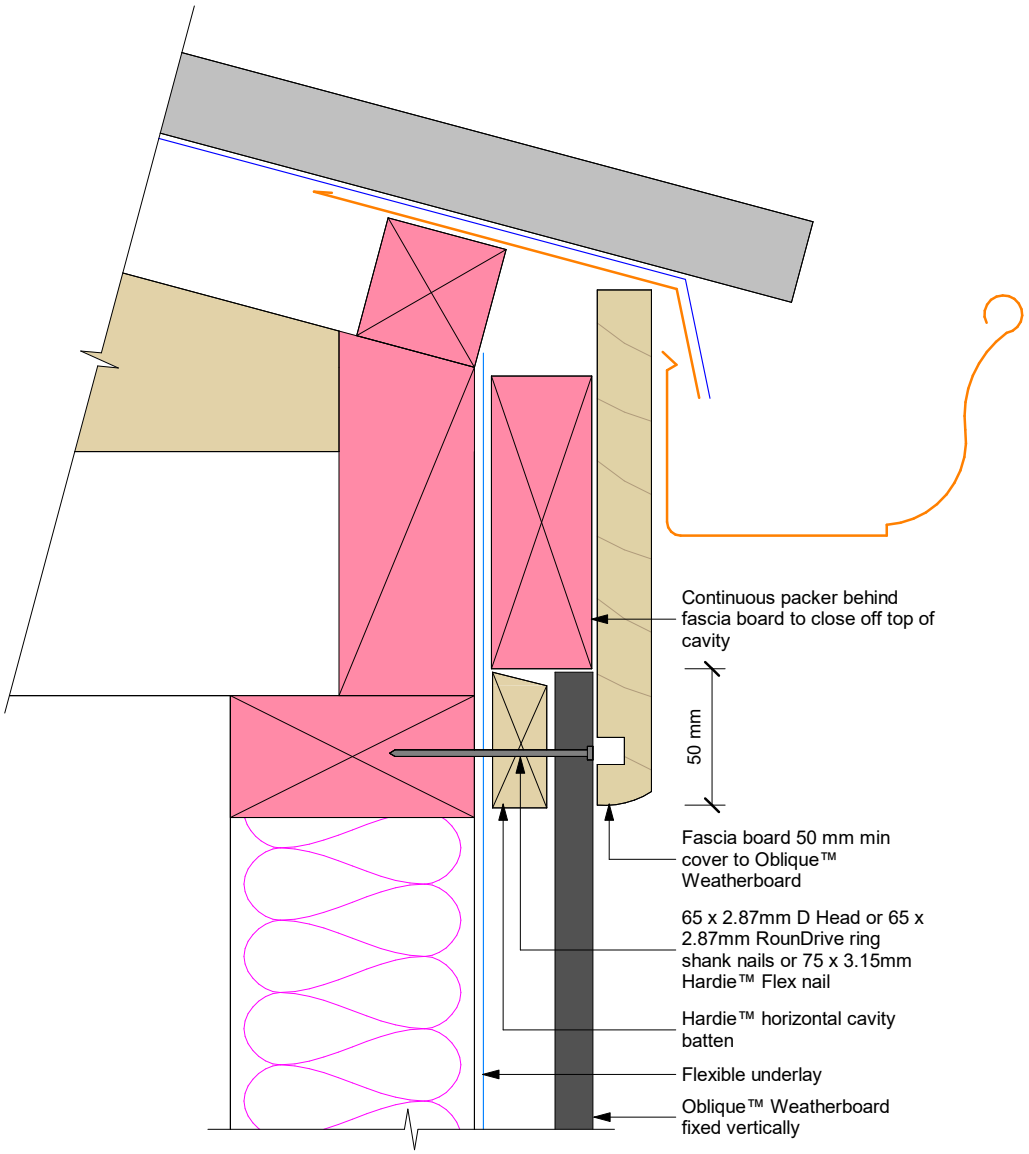
Figure 12: Soffit detail



Note: Site cut edges to be primed

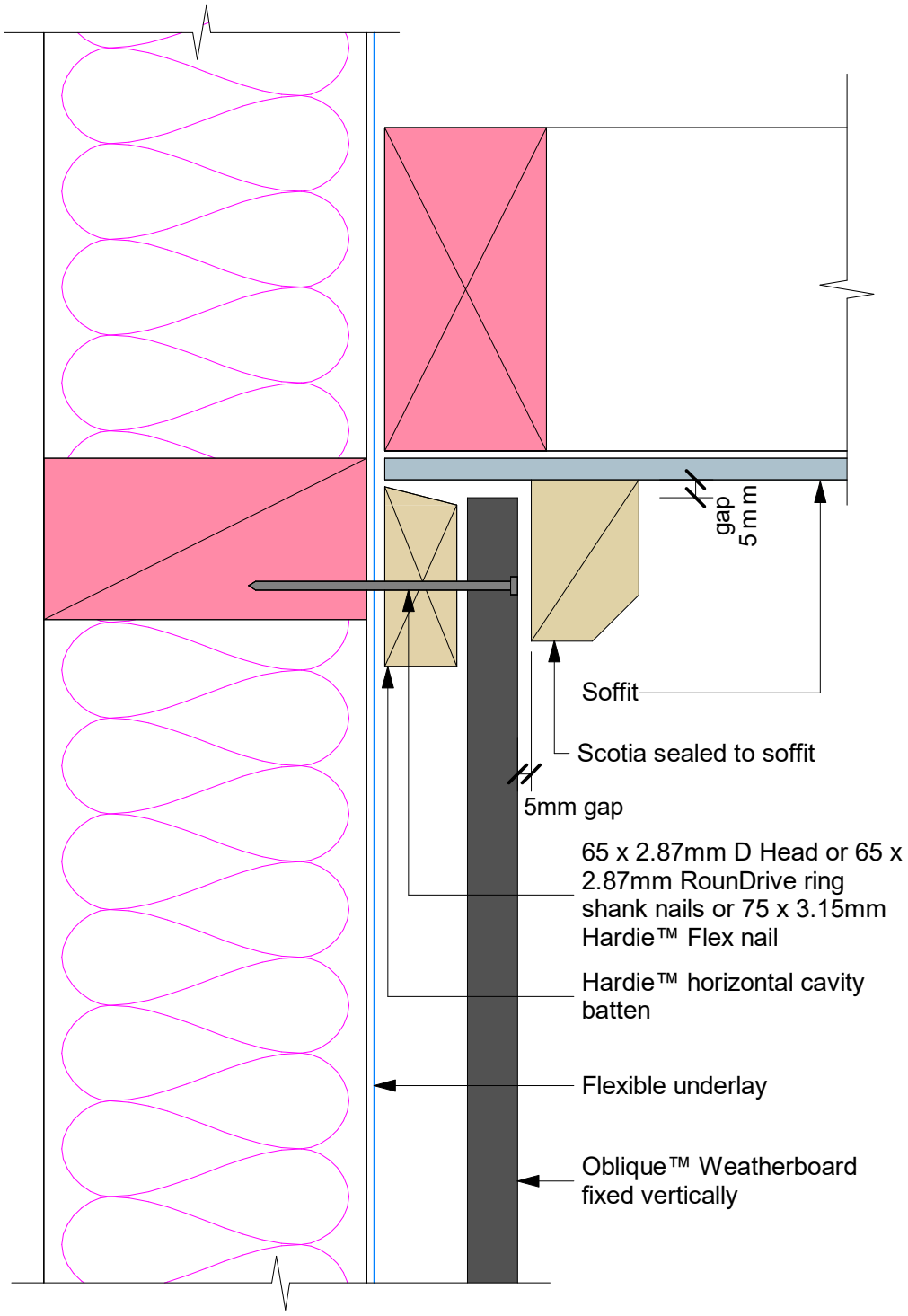
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Figure 13: Nil soffit detail



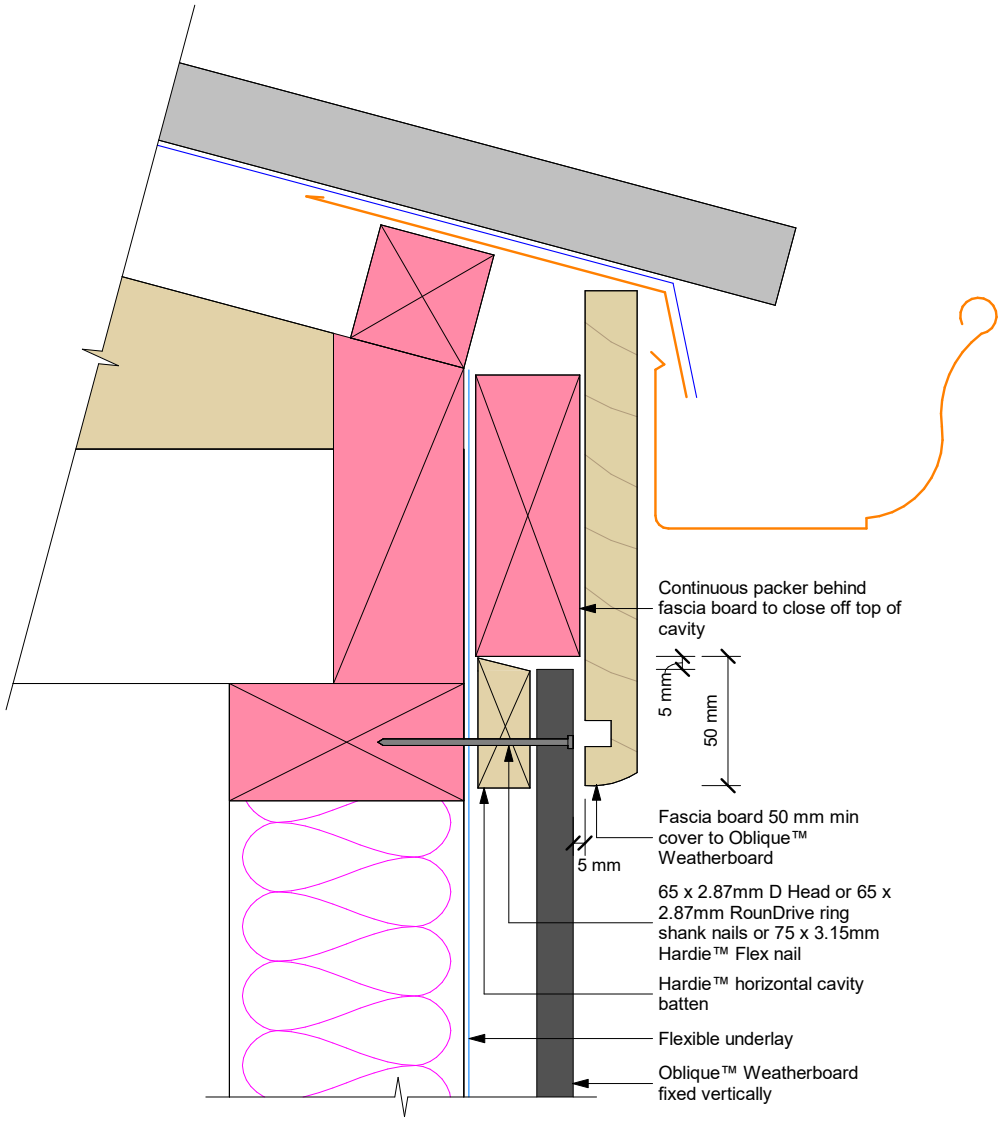
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Figure 14: Soffit detail top ventilation



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Figure 15: Nil soffit detail top ventilation



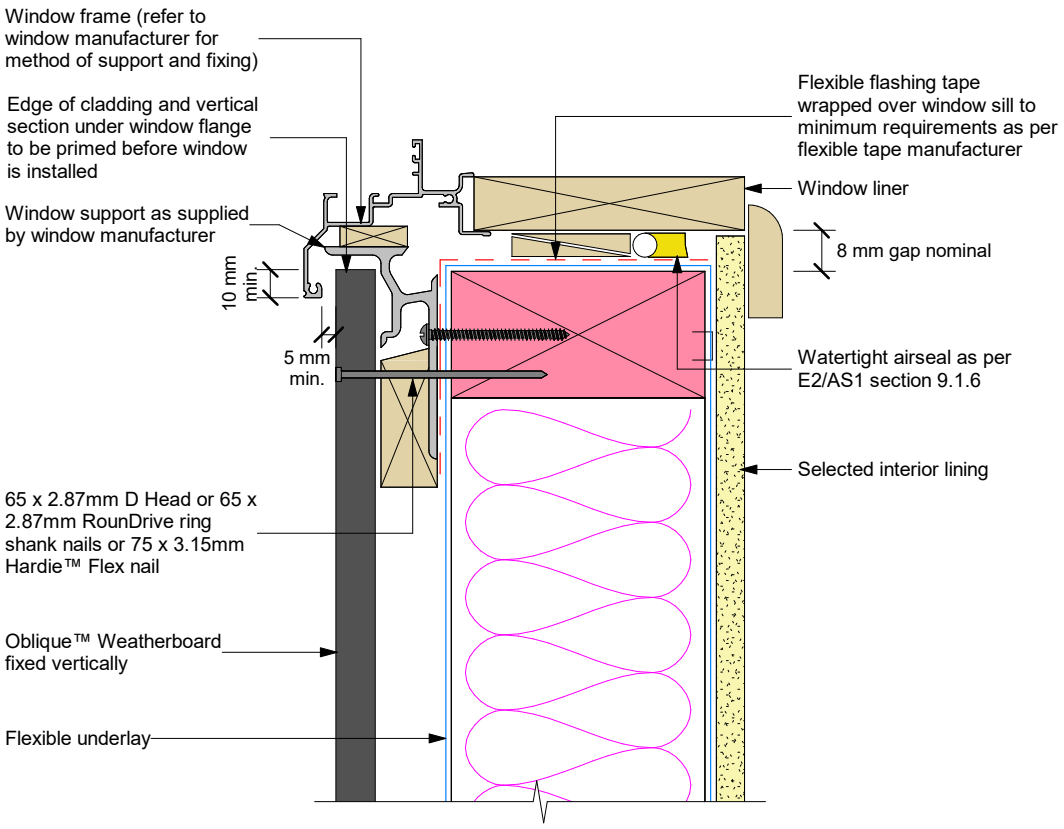
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Figure 16: Window sill

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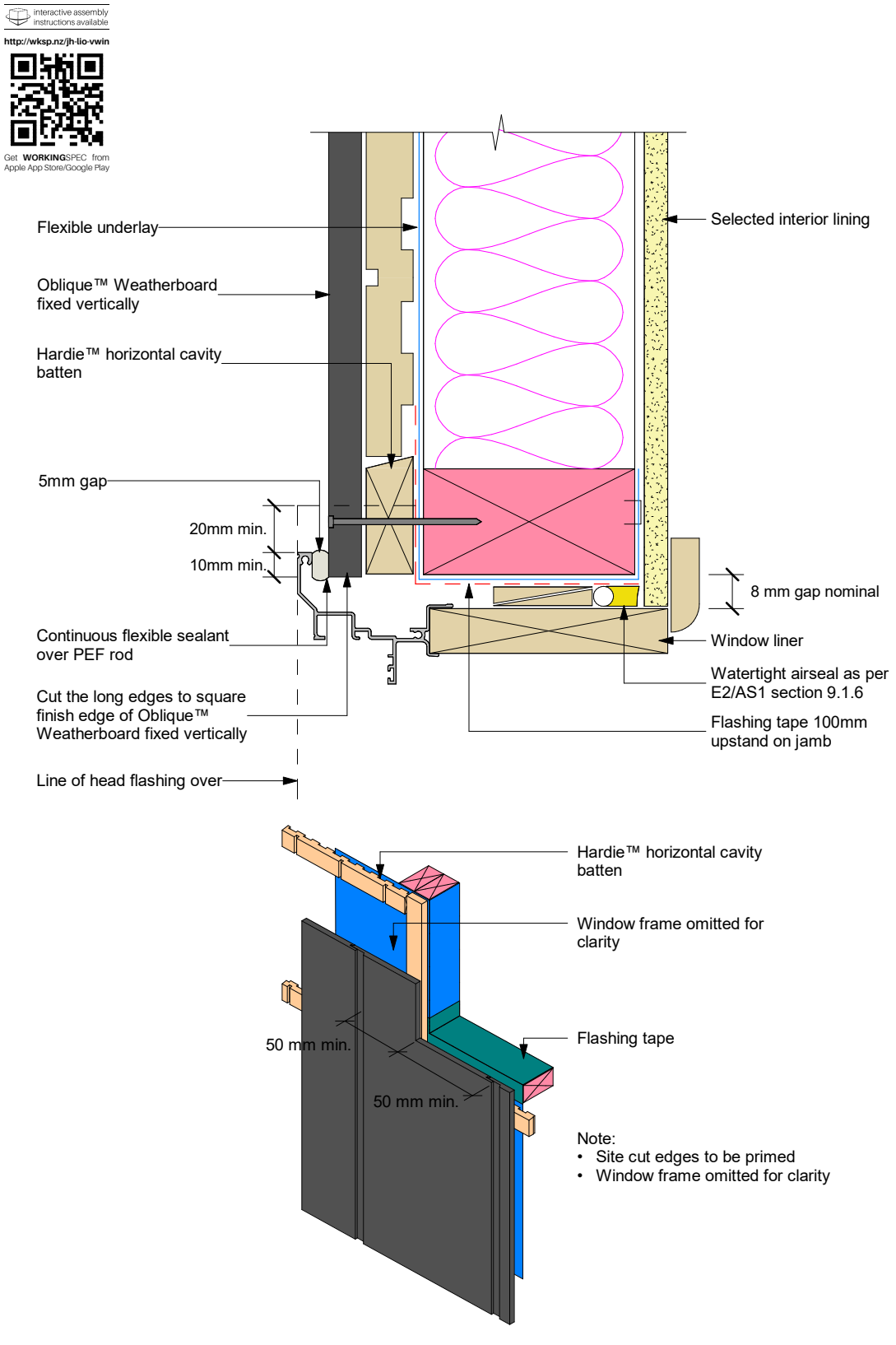
General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of the NZBC E2/AS1
2. Flexible underlay must comply with acceptable solution E2/AS1
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact
4. When HomeRAB™ Pre-Cladding/RAB™ Board is used flashing tape to be applied to the entire window opening

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

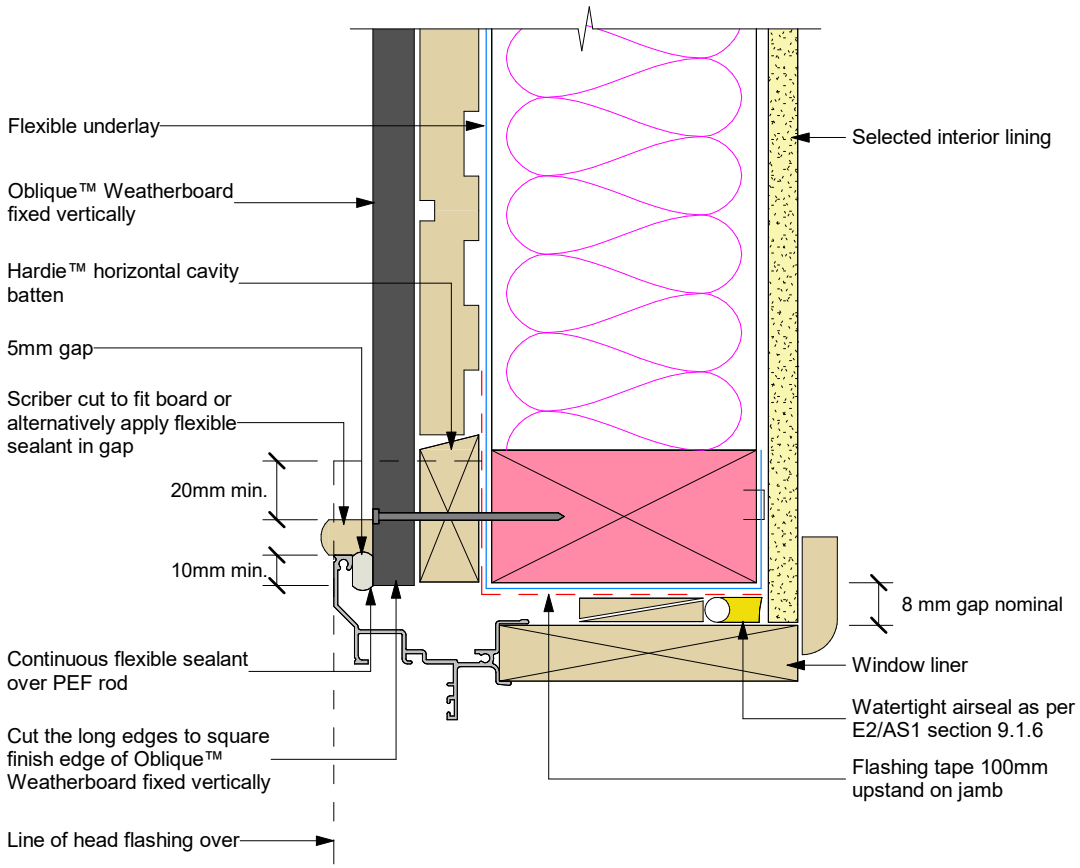
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Figure 17: Window jamb



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Figure 18: Window jamb with scriber



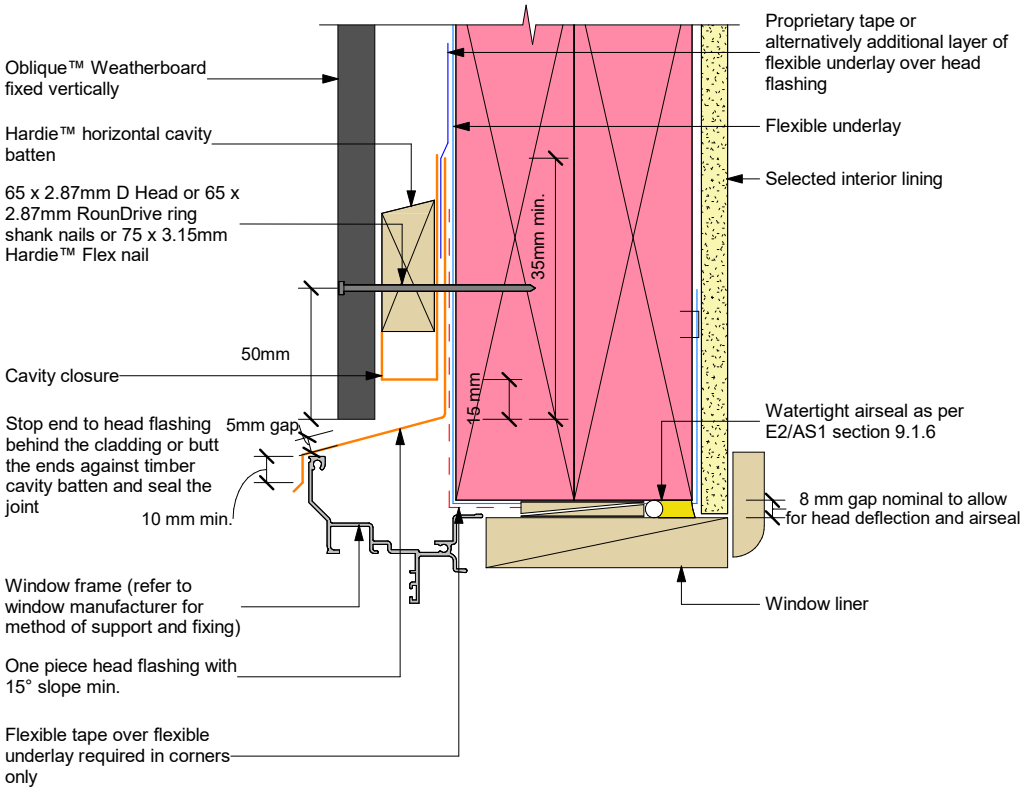
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Figure 19: Window head with cladding cut around head flashing

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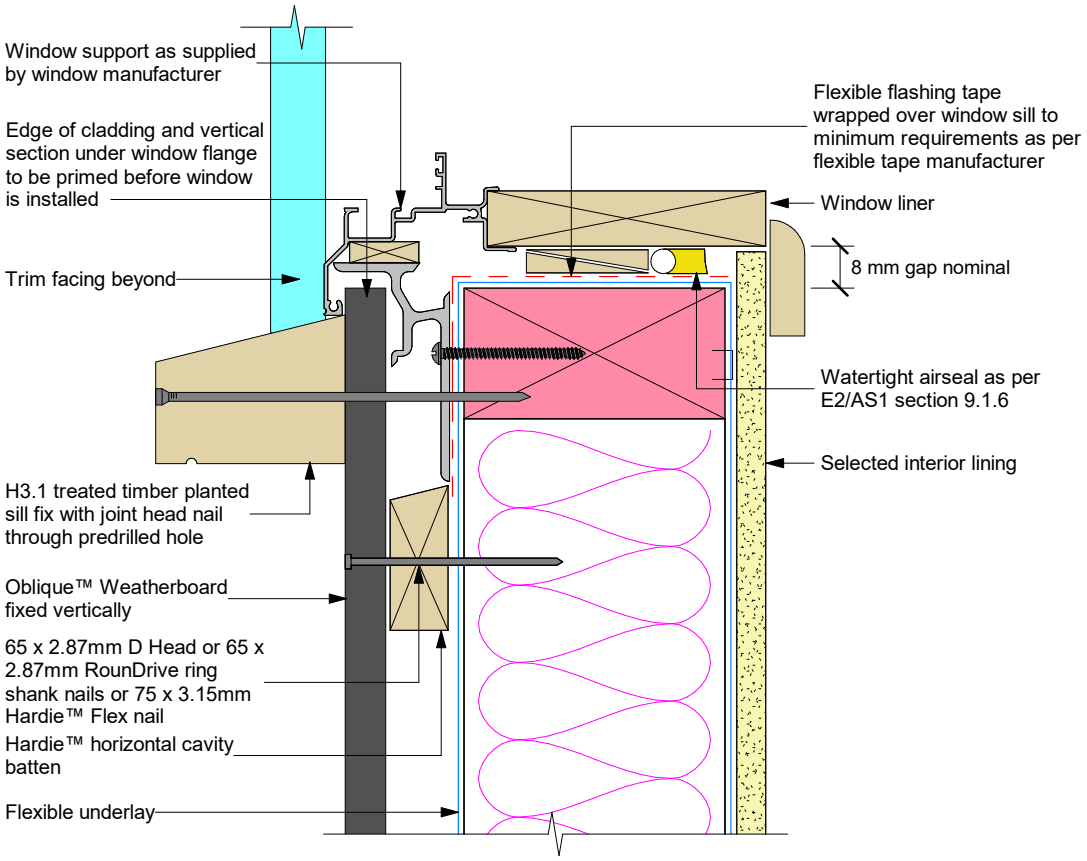
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Note:
1. Site cut edges to be primed
2. Sealant must be installed between head flashing and window flange in VH and above wind zones. Refer to Figure 71 of E2/AS1

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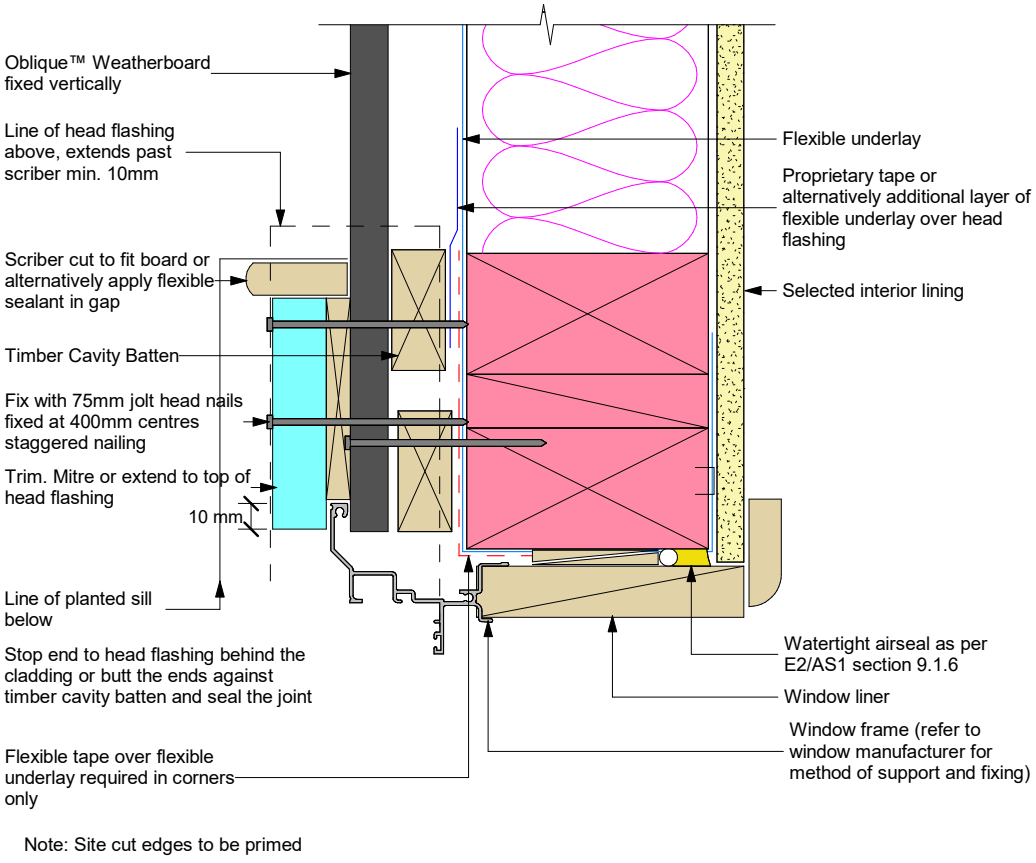
Figure 20: Window sill with facing



General notes for materials selection
1. Flexible underlay must comply with acceptable solution E2/AS1
2. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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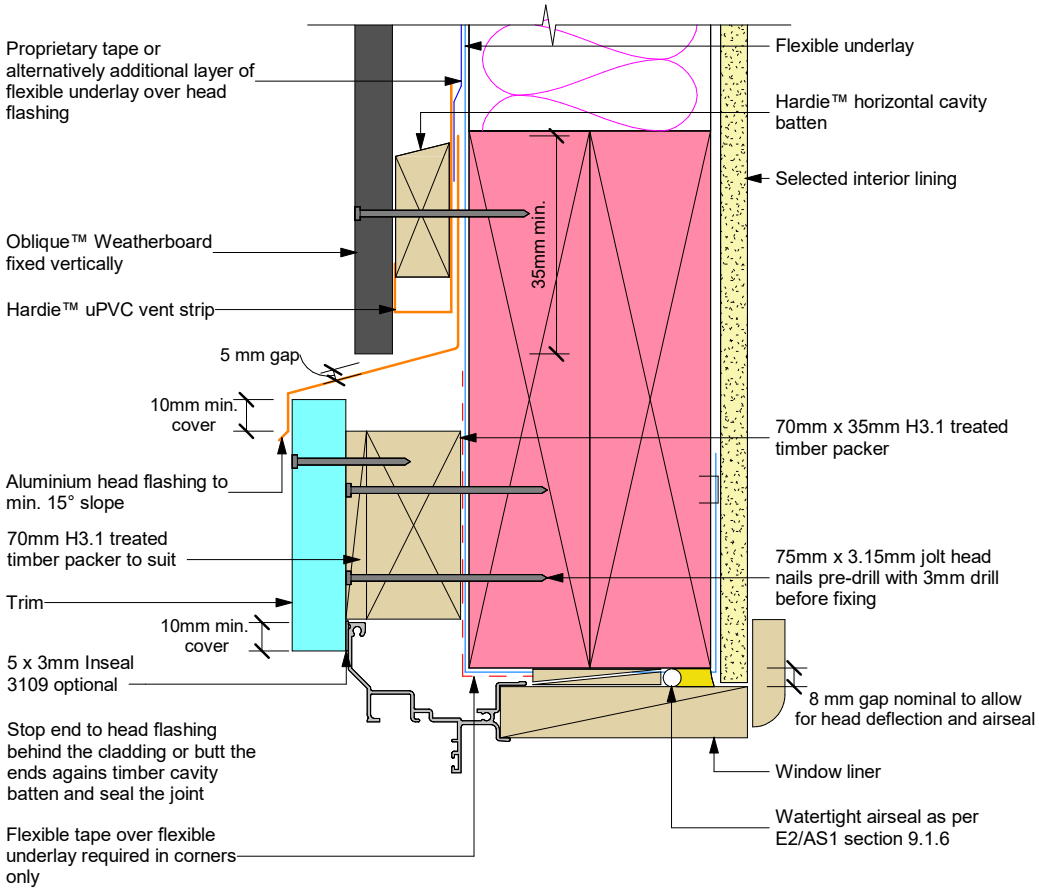
Figure 21: Window jamb with facing



Note: Site cut edges to be primed

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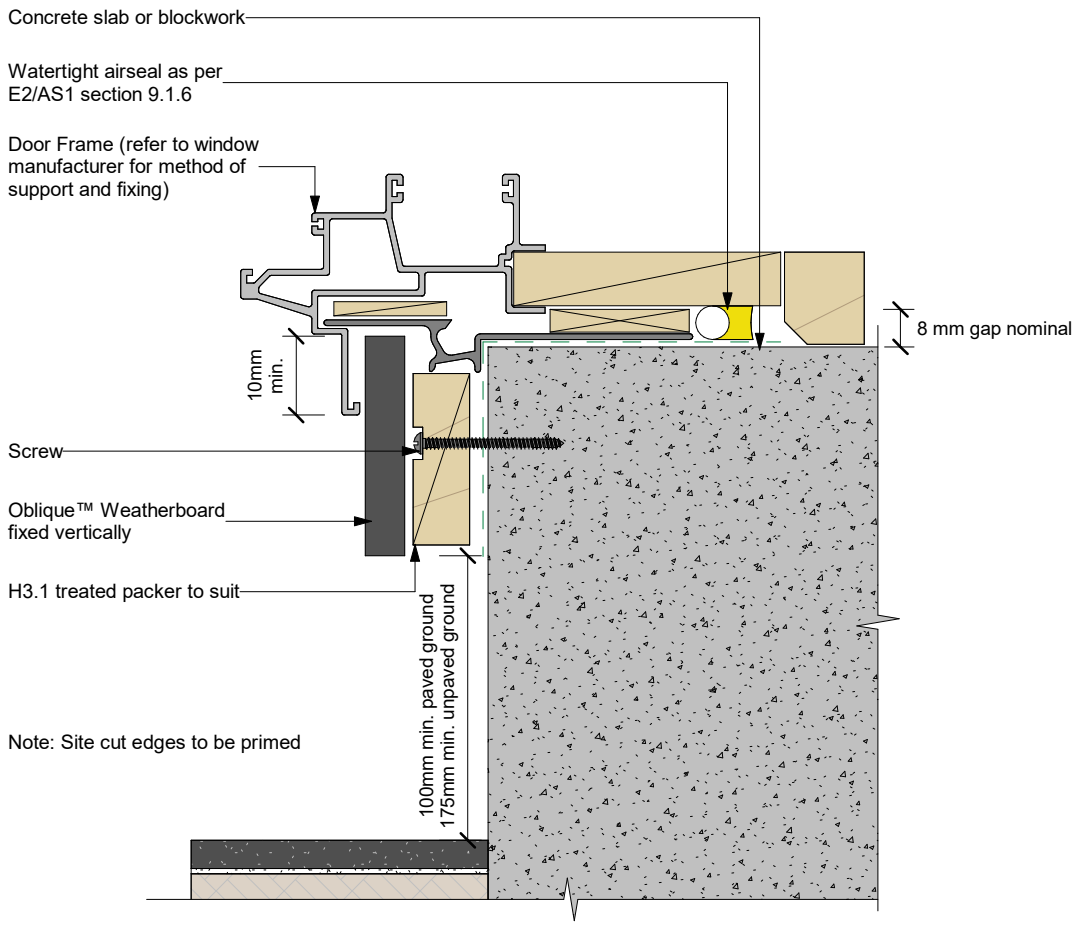
Figure 22: Window head with facing



Note:
- Sealant must be installed between head flashing and Trim in VH and EH wind zones and SED pressures
- Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1

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Figure 23: Door sill support detail



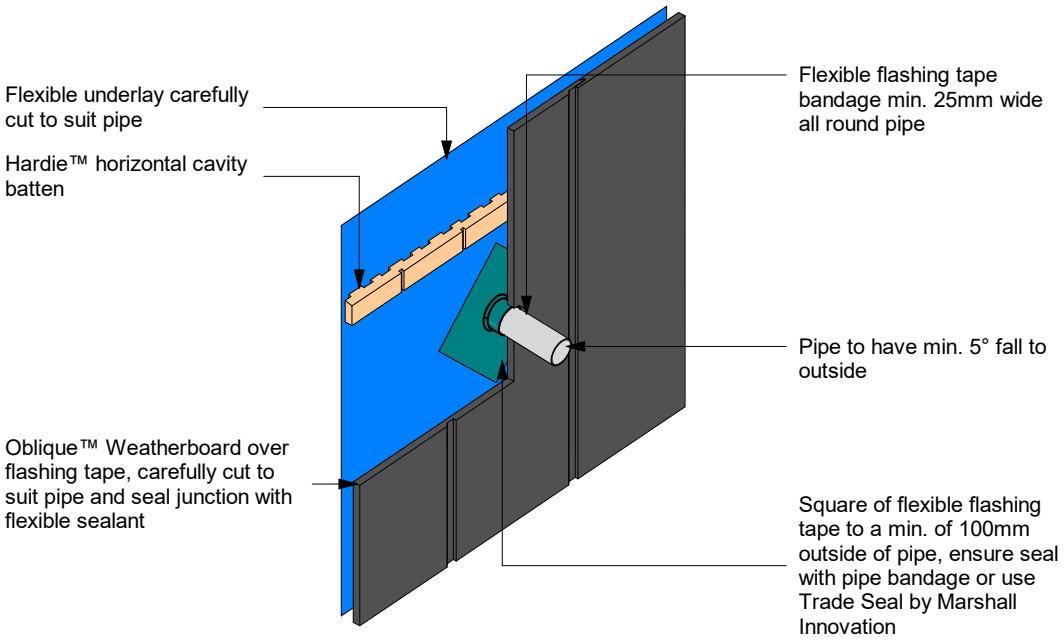
Refer to the manufacturer or supplier for technical information for these materials

General notes for materials selection

1. Flexible underlay must comply with acceptable solution E2/AS1
2. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact

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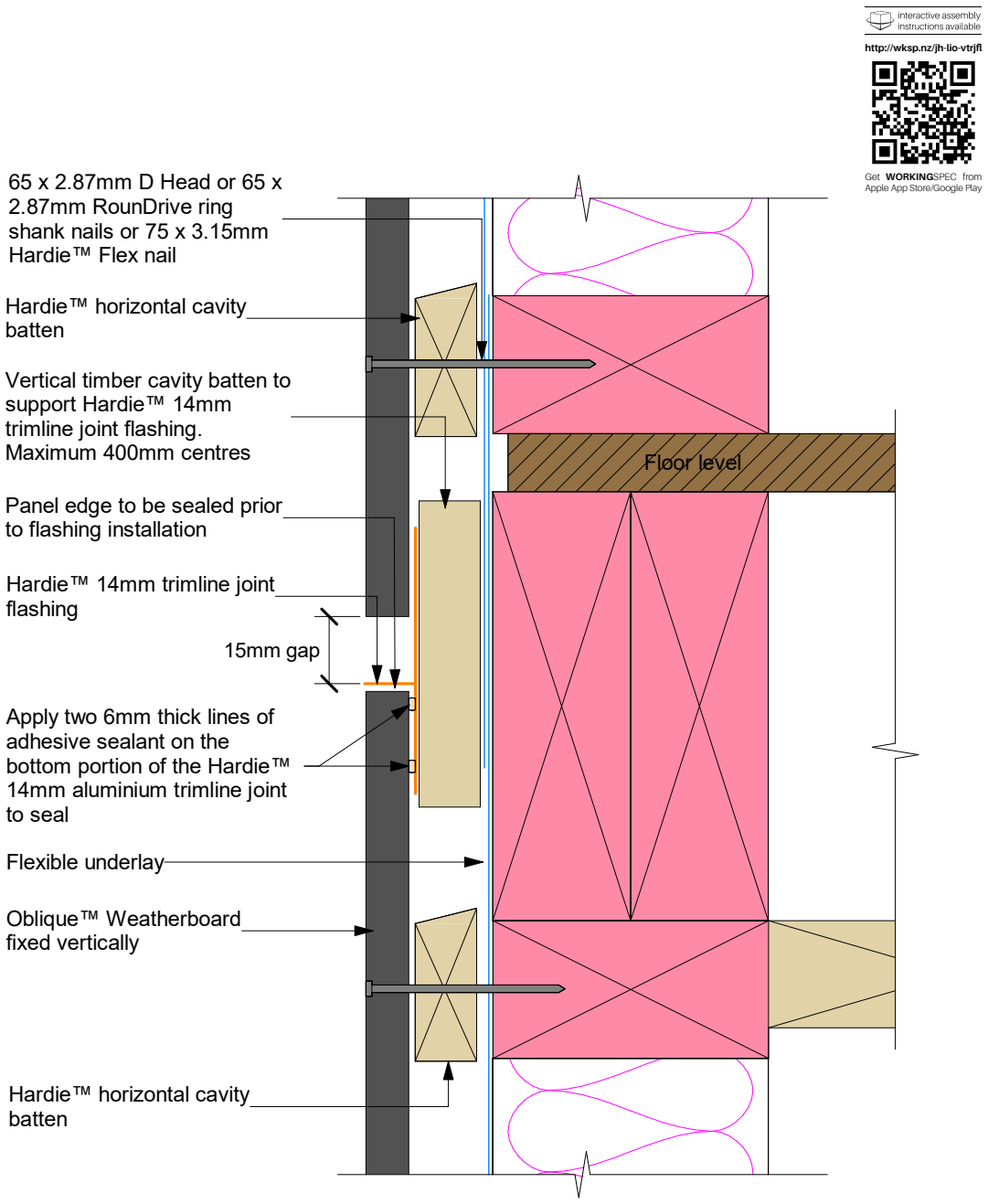
Figure 24: Pipe penetration



Note: Site cut edges to be primed

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Figure 25: Trimline joint flashing at floor level

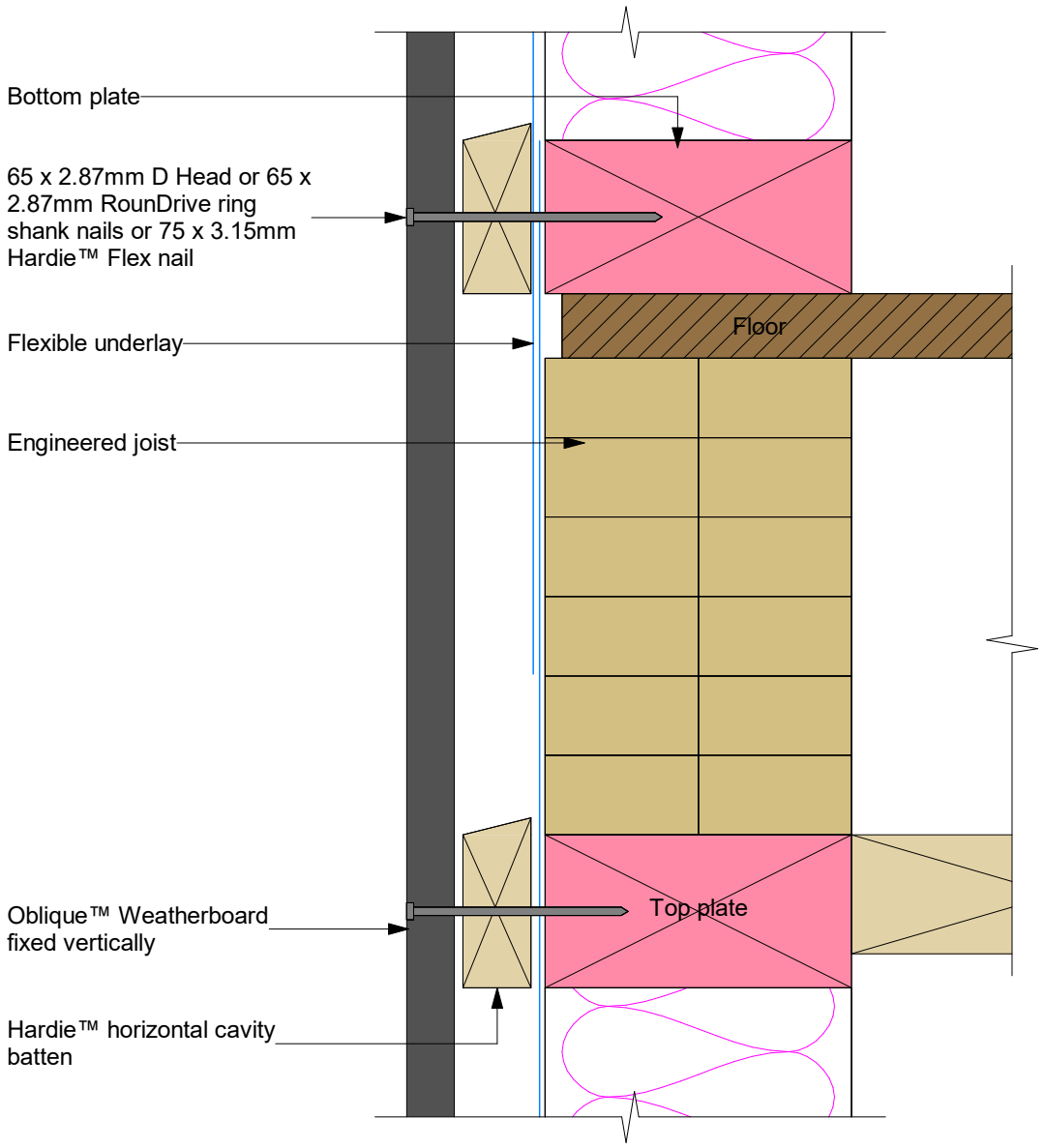


Notes:

- The flashing to be placed in the centre of the floor joists. Do not fix cavity battens or cladding into floor joists
- Hardie™ 14mm aluminium trimline joint, take care to ensure continuous seal is formed between panel and the trimline joint
- Trimline horizontal jointer 'L' shaped flashing will be required over the butt joint of the Hardie™ 14mm aluminium trimline joint
- Site cut edges to be primed

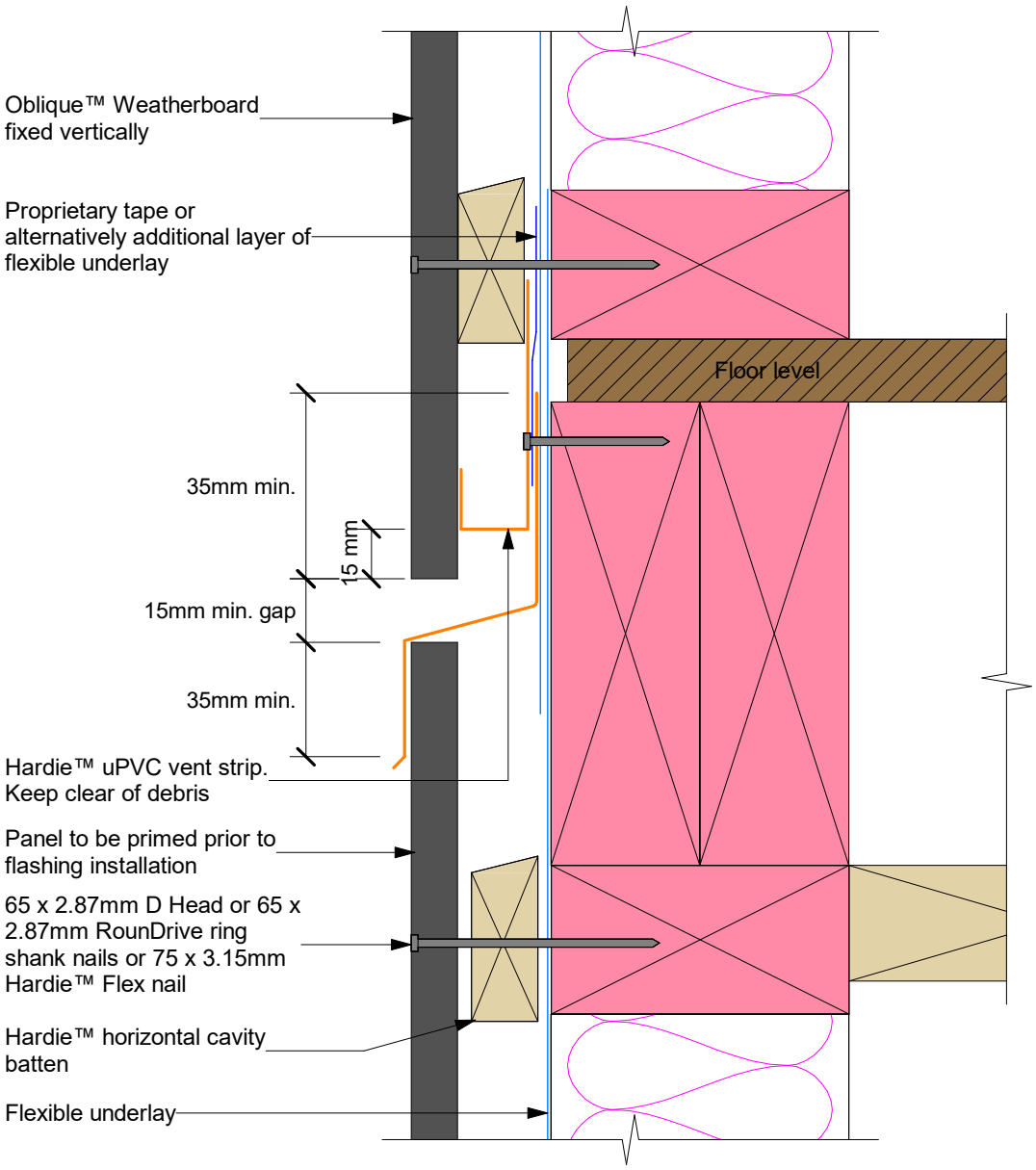
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Figure 26: Continous cladding over joist at floor level



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Figure 27: Drained flashing joint at floor level

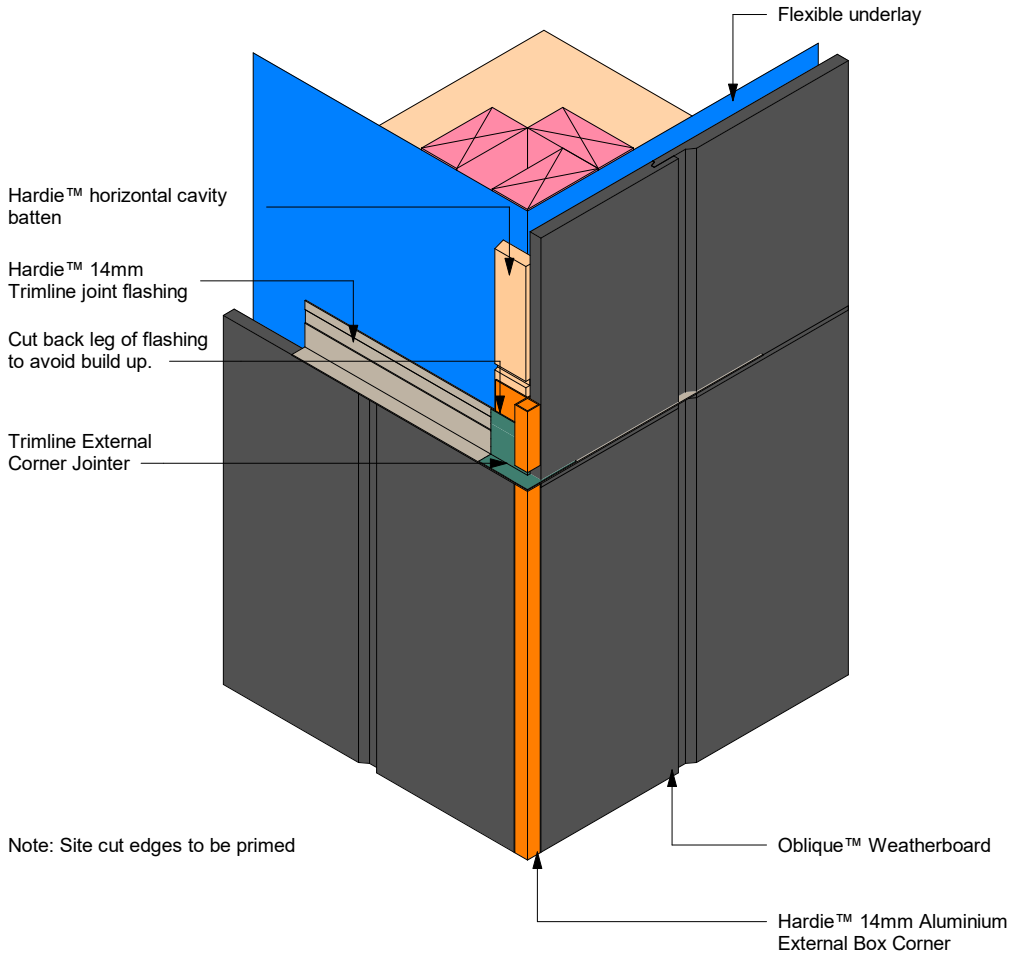


Note:

- This detail is required to limit cavities to a maximum of 2 stories or 7 metres. Refer to E2/AS1 clause 9.1.9.4
- Check architect's plans for the type of flashing to be used
- Cut edges need to be primed
- When 50 year durability is requred refer Table 20 E2/AS1
- The flashing to be placed in the centre of the floor joists. Do not fix timber cavity battens or cladding into floor joists

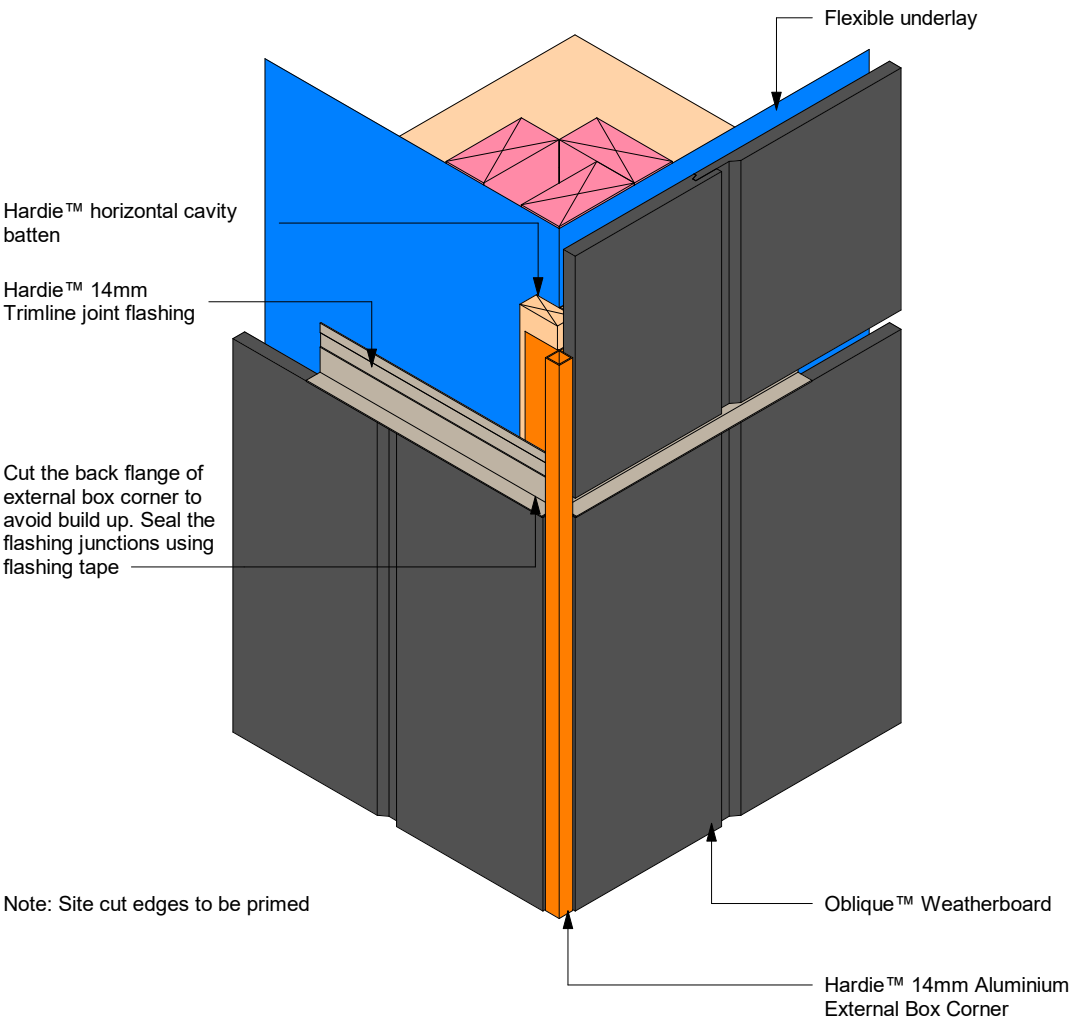
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Figure 28: Trimline joint flashing at external corner



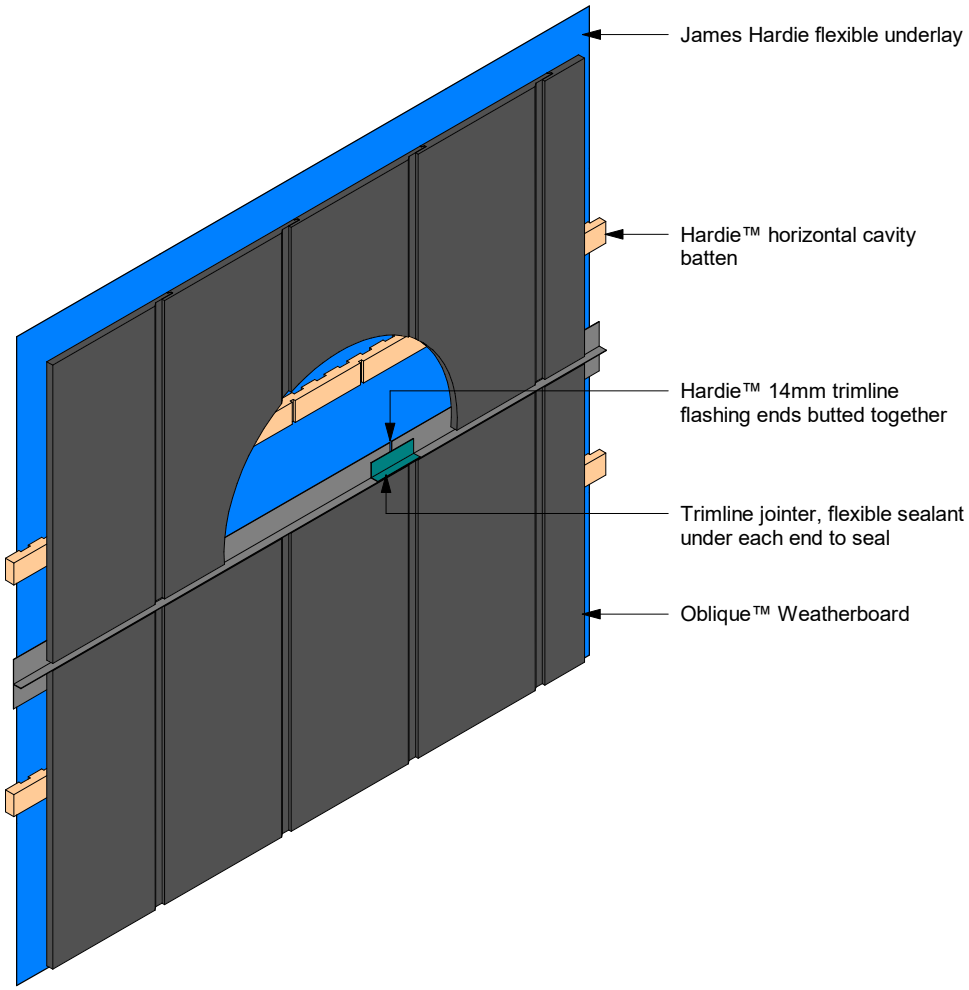
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Figure 29: Trimline joint flashing at full external corner



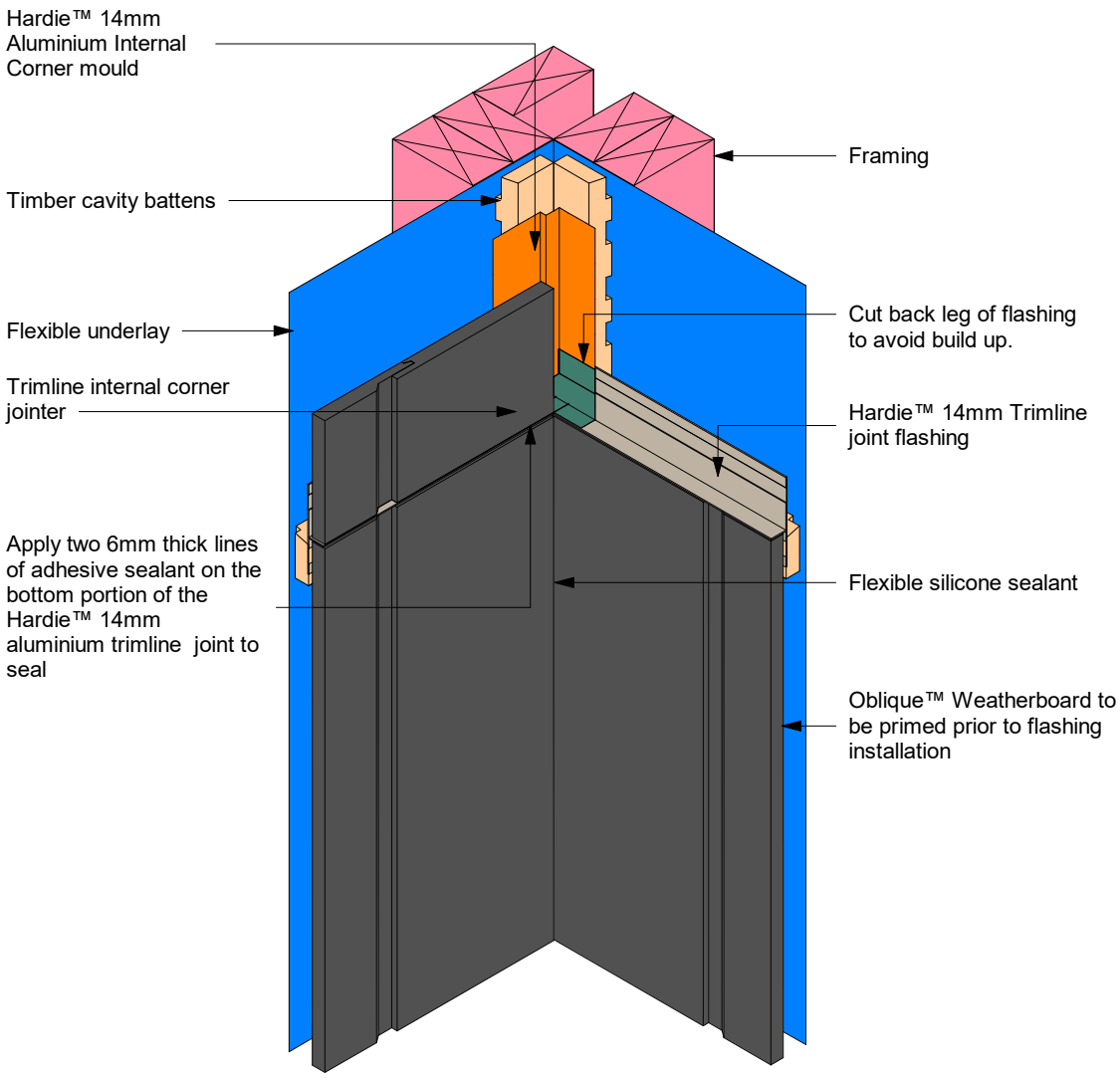
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Figure 30: Trimline joint flashing



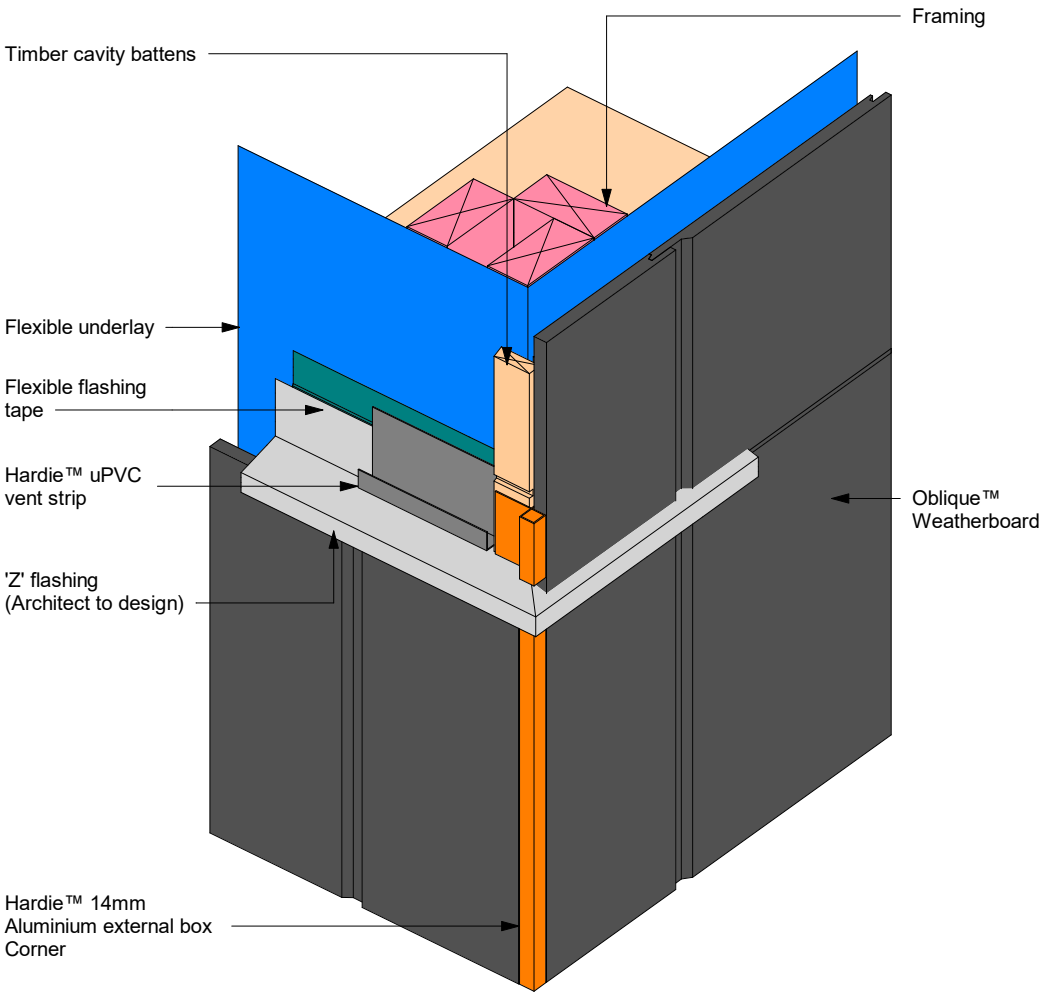
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Figure 31: Trimline joint flashing at internal corner



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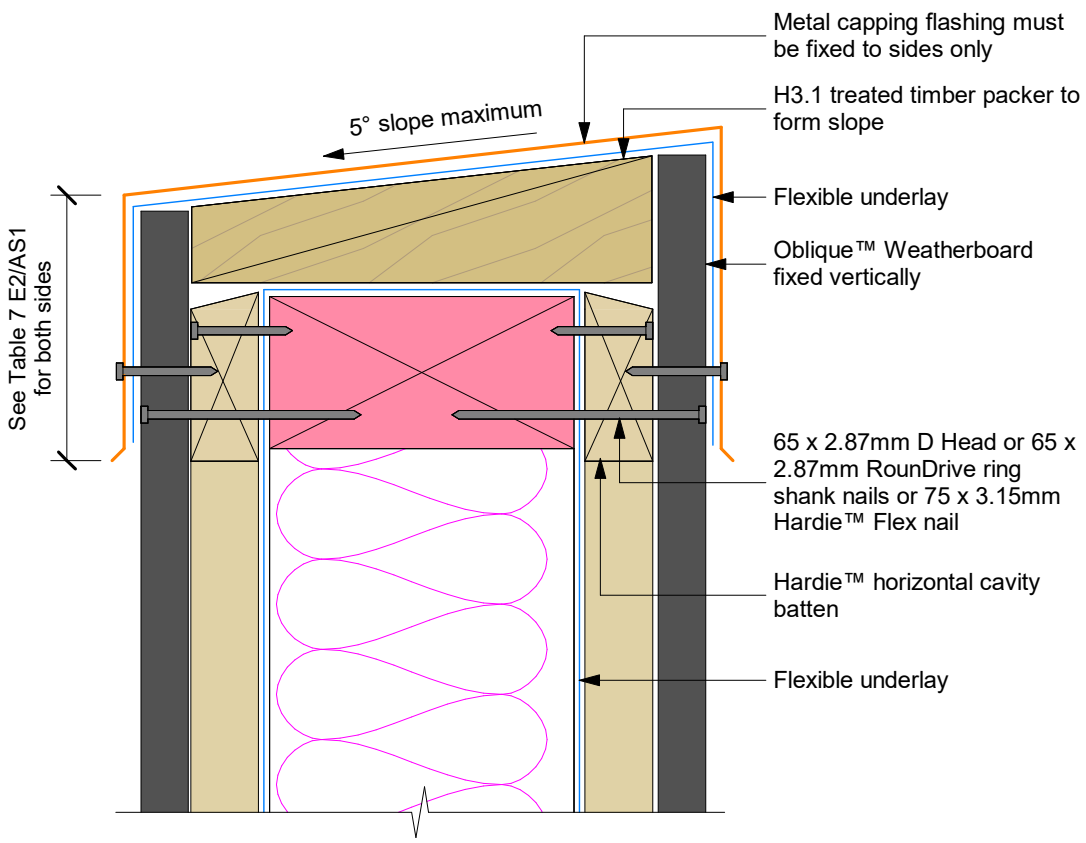
Figure 32: Drained flashing joint at external corner



Note: Site cut edges to be primed

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Figure 33: Parapet flashing



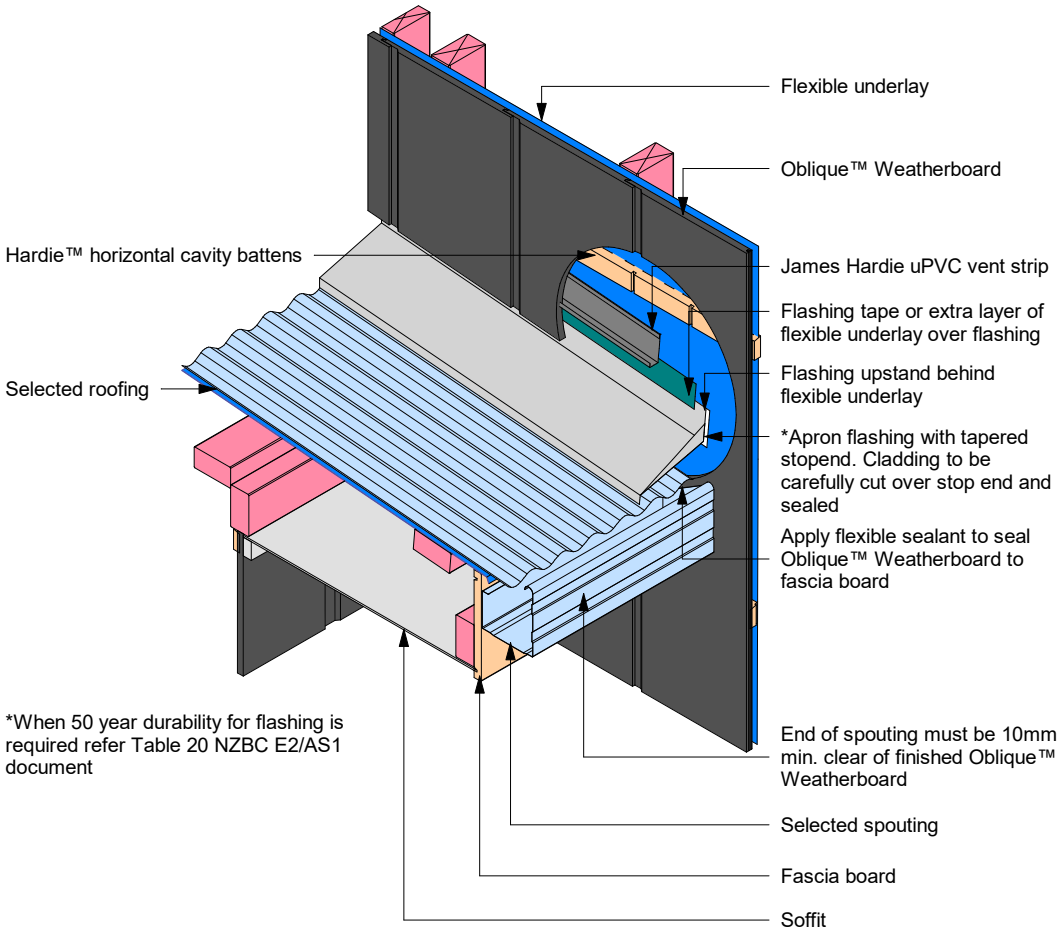
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Figure 34: Roof to wall junction detail

interactive assembly instructions available

http://wksp.nz/jh-lio-vrfw

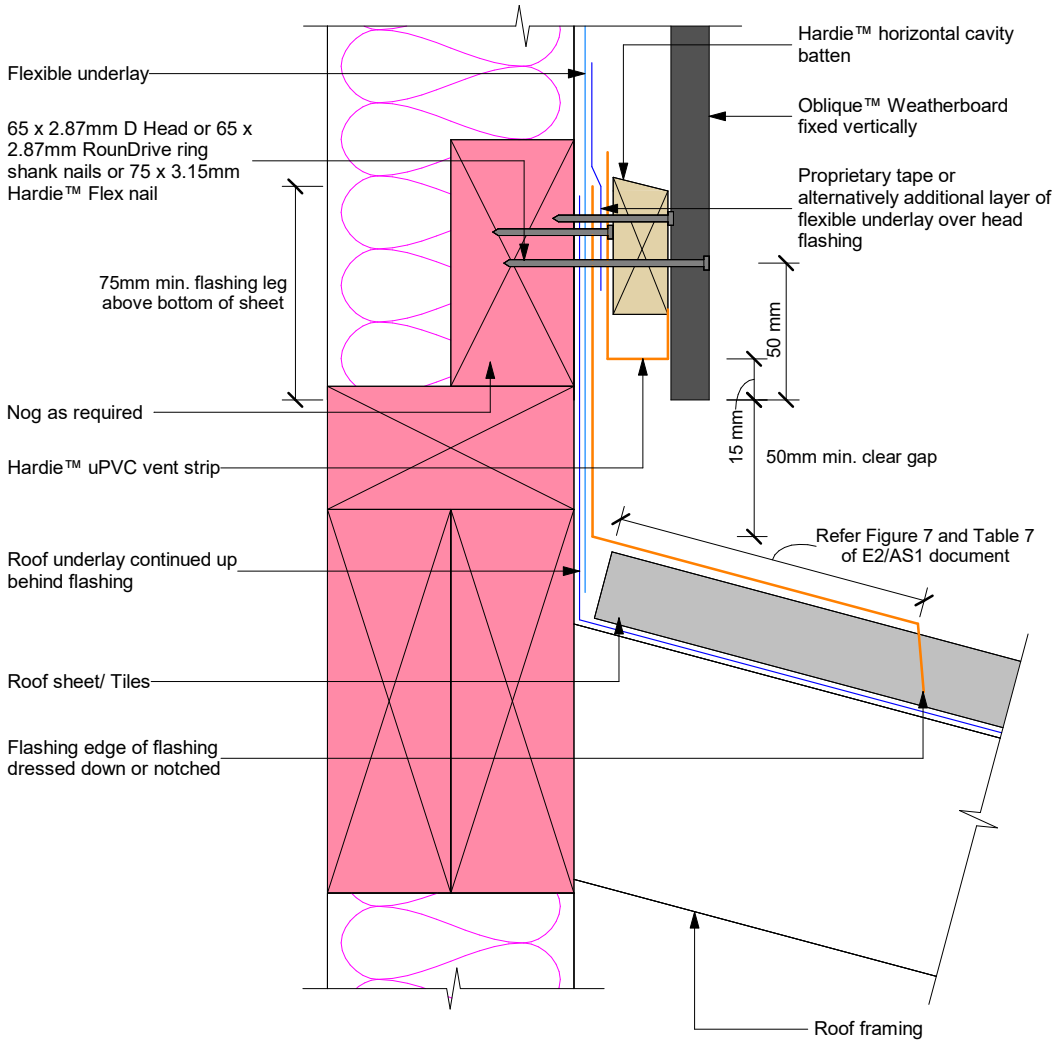
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Note: Site cut edges to be primed

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Figure 35: Apron flashing detail

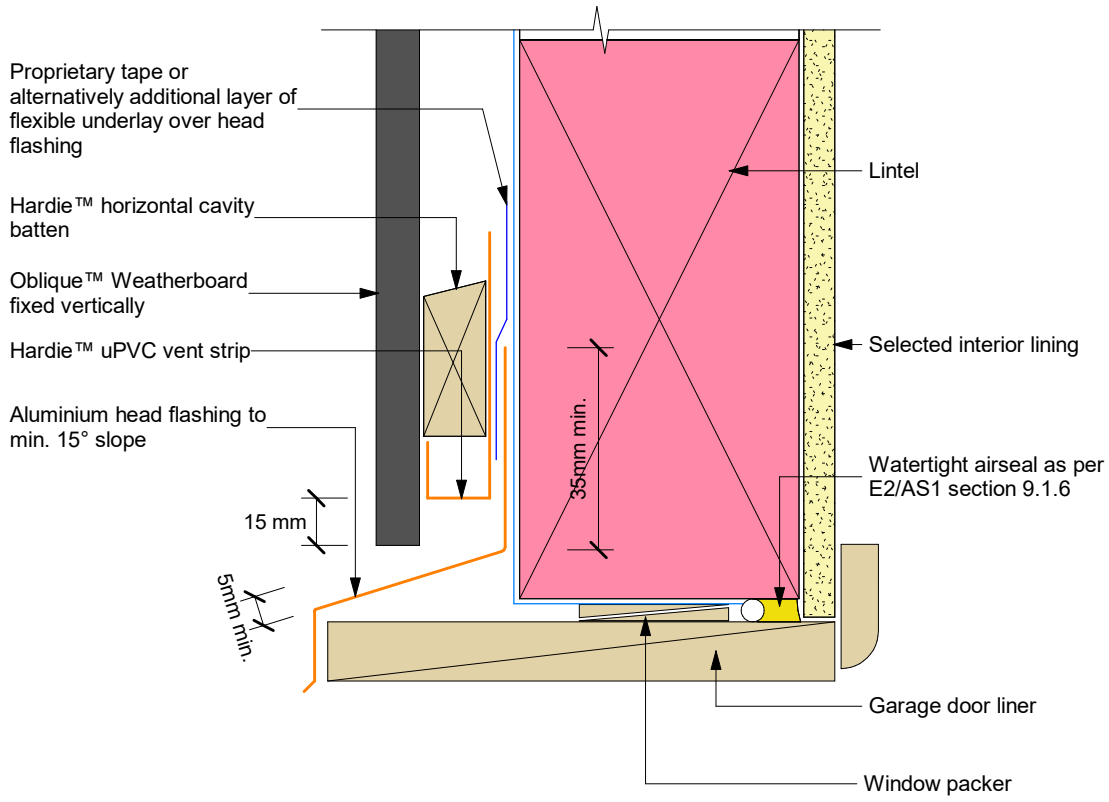


Notes:

- When 50 year durability for flashing is required refer to Table 20 NZBC E2/AS1 document
- Site cut edges to be primed

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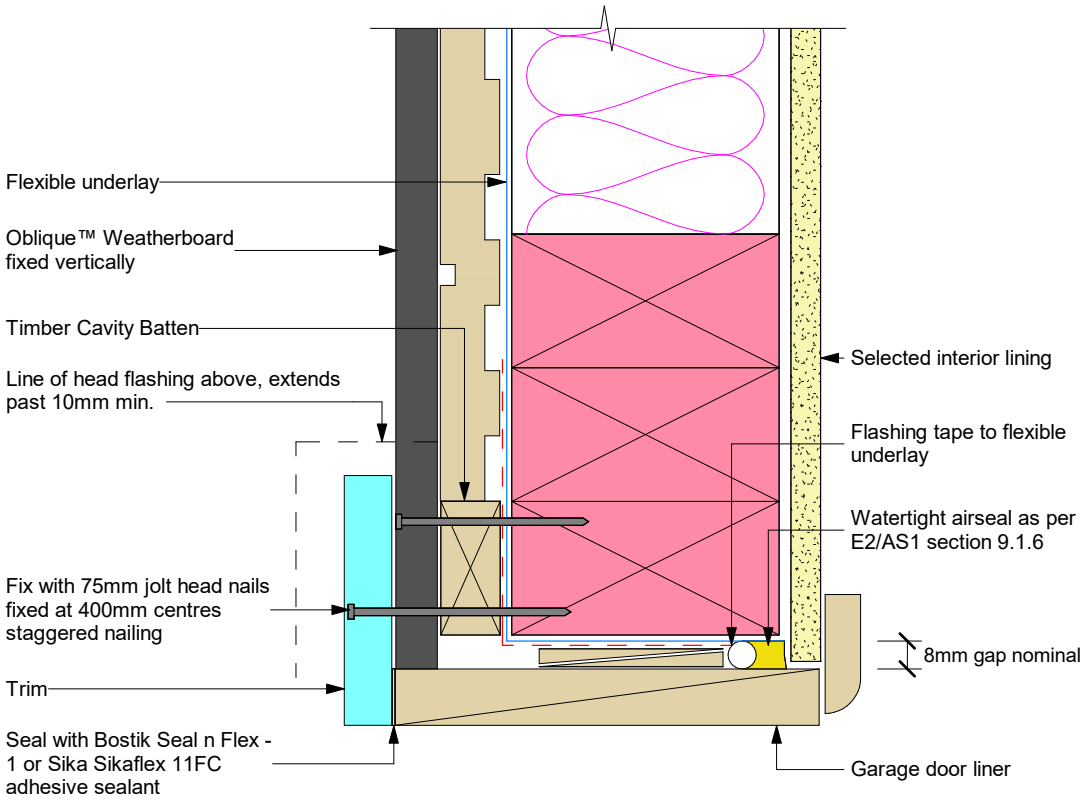
Figure 36: Garage door head



Note:
- Sealant must be applied between head flashing and liner in VH and EH wind zones and SED wind pressures
- Site cut edges to be primed

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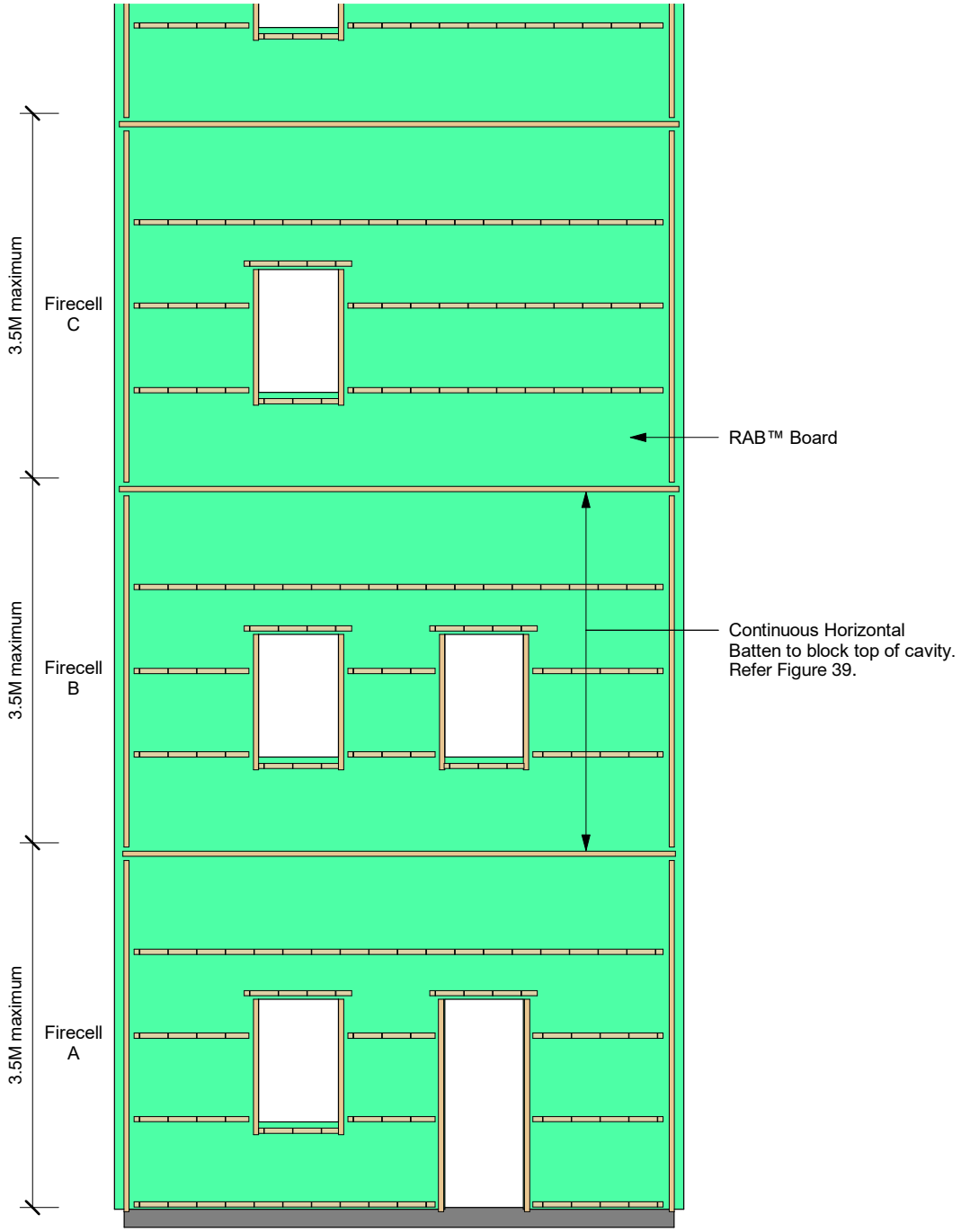
Figure 37: Garage door jamb



Note: Site cut edges to be primed

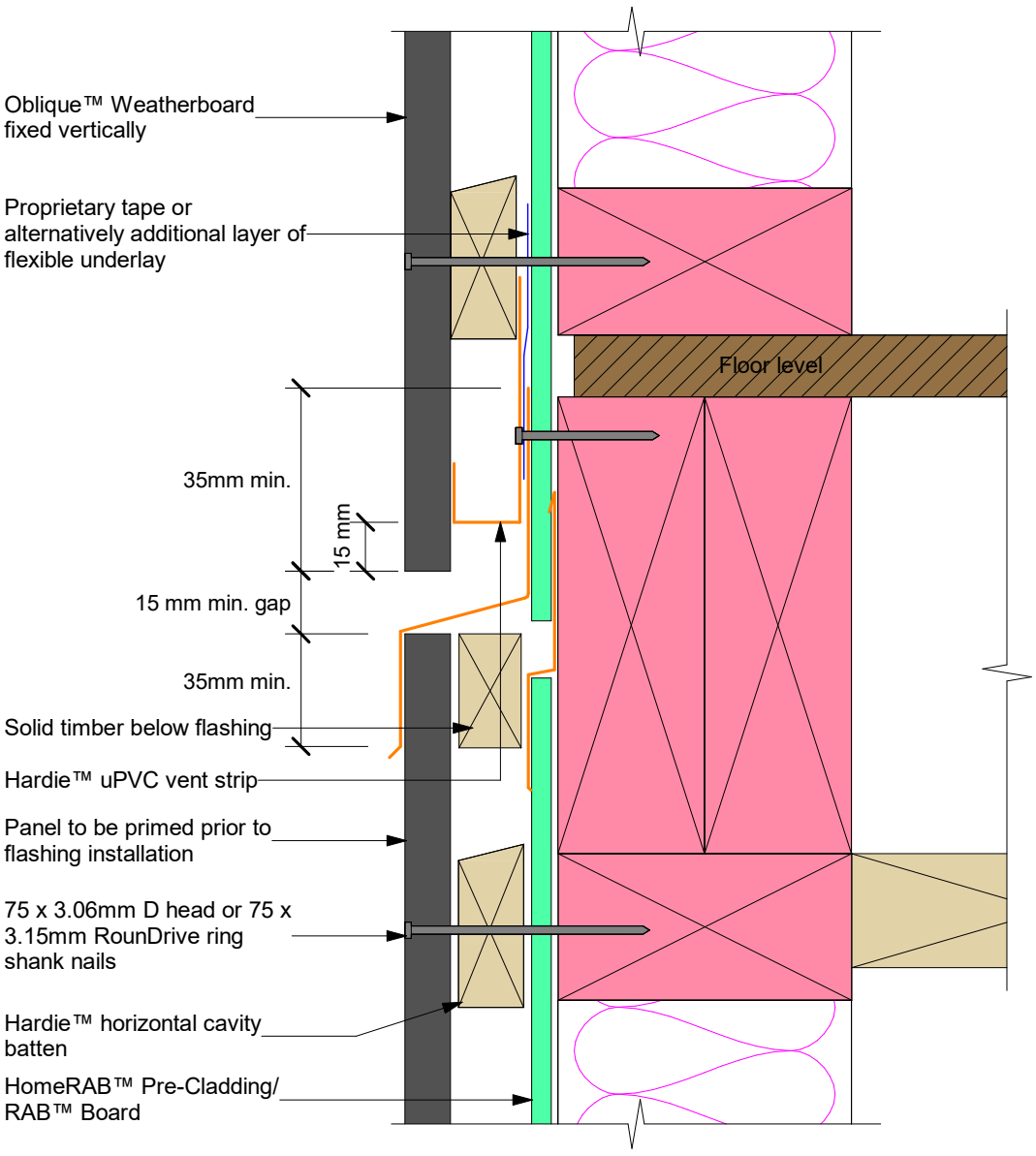
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Figure 38: Framing setout building height over 10m



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Figure 39: Horizontal flashed joint at IT floor



Note:

- Check architect's plans for the type of flashing to be used
- Cut edges need to be primed
- The flashing to be placed in the centre of the floor joists. Do not fix timber cavity battens or cladding into floor joists

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Notes

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Oblique™ Weatherboard

JamesHardie™

Product Warranty

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

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

Conditions of Warranty:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;

b) this warranty is not transferable;

c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;

d) the project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards;

e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);

g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;

h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time..

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. Oblique™ Weatherboard has been appraised by BRANZ as an alternative solution and found to meet the required provisions of the NZBC when installed in accordance with the relevant Oblique™ Weatherboard Technical Specification. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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JamesHardie™

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

CERTIFICATE: **CMNZ 30147**
Version No: **RevA**

3 DESCRIPTION OF BUILDING METHOD OR PRODUCT

Oblique™ Weatherboard Cladding is a cavity-based fibre cement weatherboard wall cladding system.
Oblique™ Weatherboard Cladding consists of Oblique™ Weatherboard, which is a 14mm profile fibre cement weatherboard, fixed horizontally or vertically over battens to form a nominal 20 mm cavity. Proprietary ventilated timber battens are used in the vertical application. The cladding is finished with a latex paint system.
The cladding system incorporates a primary and secondary means of weather resistance (first and second lines of defence) against water penetration by separating the cladding from the external wall framing with a nominal 20 mm cavity. The cavity allows for any occasional ingress of water that may get past the external skin to drain to the exterior of the building, and any remaining moisture to dry by evaporation.

4 INTENDED USE OF BUILDING METHOD OR PRODUCT

The system is designed to be used as part of an external cladding system on timber framed building.

5 NEW ZEALAND BUILDING CODE PROVISIONS

The system if designed, used, installed and maintained in accordance with this certificate will meet the following provisions of the NZBC:

Clause B1 STRUCTURE:	Performance B1.3.1, B1.3.2, B1.3.4 for the relevant physical conditions of B1.3.3 (a), (f), (h), (j) and (q).
Clause B2 DURABILITY:	Performance B2.3.1(b) 15 years and B2.3.2.
Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE:	Performance C3.5, C3.7
Clause E2 EXTERNAL MOISTURE:	Performance E2.3.2, E2.3.5, E2.3.6 and E2.3.7
Clause F2 HAZARDOUS BUILDING MATERIALS:	Performance F2.3.1.

1 CERTIFICATE HOLDER DETAILS

James Hardie New Zealand Limited
Trading as James Hardie
1 O'Rorke Road, Penrose , Auckland
1061, New Zealand,
TechnicalTeam@jameshardie.co.nz
Tel: 0800 808 868,
www.jameshardie.co.nz

ORIGINAL ISSUE DATE	VERSION DATE	RECERTIFICATION
17/10/2022	17/10/2022	17/10/2025

8 SIGNATURE

Herve Michoux, Global Mark Managing Director

2 PRODUCT CERTIFICATION BODY

Global-Mark Pty Ltd
57 Willis Street, Wellington, 6011
customer.service@global-mark.co.nz
+64 9 889 0622
www.global-mark.co.nz

The complaints process for this certificate can be found here:
https://www.global-mark.com.au/?s=complaint

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This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website http://www.building.govt.nz.
The purpose of construction site audits is to confirm the practicability of installing the product; and to confirm the appropriateness and accuracy of installation instructions. In issuing this certificate, Global-Mark has relied on the independent expert and/or laboratory 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.

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

6 CONDITIONS AND LIMITATIONS OF USE

1. The system is certified:
   a. as a cavity fixed external wall cladding for buildings:
      i. within the scope limitations of the NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Paragraph 1.1,
      ii. with a risk score of up to 20, calculated in accordance with the NZBC Acceptable Solution E2/AS1, 3rd Edition, amendment 10, 5 November 2020, Table 2,
      iii. situated in in NZS 3604:2011 Wind Zones up to, and including Extra High, and
   b. as a cavity fixed external wall cladding for 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,
   c. located:
      i. in all exposure zones (except microclimates) as defined in NZS3604:2011 section 4.2, and
      ii. anywhere in relation to the relevant boundary for Importance Levels 1 to 4 buildings within the scope of:
         1. C/AS1, amendment 5, 5 November 2020 paragraph 1.1.1 or
         2. C/AS2, amendment 2, 5 November 2020 paragraph 1.1.1
2. The system shall be specified, installed, inspected and maintained in accordance with the following sets of documents collectively referenced as the Applicable Technical Specification to the extent that their scope covers that for this Certificate:
   a. For the Horizontal applications,
      i. Oblique™ Weatherboard 14mm Horizontal Installation – Technical specification, October 2022, and
      ii. Fire & Acoustic Design Manual (November 2020) by James Hardie section 4:16 Control of External Fire Spread, figures No's. 1 to 8 and 12 to 20, specifically details JHETGO30h and JHETGO60h. These details have only been assessed and certified with respect to external fire spread via Oblique™ Weatherboard Cladding. For walls located within 1.0 m of a relevant boundary, Oblique™ Weatherboard Cladding may be used as an external façade/cladding attached to the exterior of fire rated wall systems as depicted within the Fire and Acoustic Design Manual (November 2020). Fire Resistance rating performance of the wall assembly falls outside the scope of this certificate
   b. For the Vertical Application,
      i. Oblique™ Weatherboard 14mm Vertical Installation – Technical specification, October 2022, and
      ii. Fire & Acoustic Design Manual (November 2020) by James Hardie section 4:16 Control of External Fire Spread, figures No's. 1 to 8 and 12 to 20, specifically details JHETGO30v and JHETGO60v. These details have only been assessed and certified with respect to external fire spread via Oblique™ Weatherboard Cladding. For walls located within 1.0 m of a relevant boundary, Oblique™ Weatherboard Cladding may be used as an external façade/cladding attached to the exterior of fire rated wall systems as depicted within the Fire and Acoustic Design Manual (November 2020). Fire Resistance rating performance of the wall assembly falls outside the scope of this certificate

   (Note: Provisions within the documents above related to the use of the system with steel-frame construction are outside the scope of this certification).

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

3. In wind zones greater than Very High a rigid air barrier which complies with Table 23 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 for RAB™ Board. (Refer to GM-CM30130)
4. The system is certified for use:
   a. with the ancillary components as described in this certificate,
   b. with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. Only joinery compliant with the requirements of NZS 4211:2008 including amendment 1 for the relevant Wind Zone or wind pressure shall be used.
5. Oblique™ Weatherboard Cladding shall only be installed horizontally or vertically on vertical surfaces.
6. All exposed faces, including top edges at sills and all bottom edges of Oblique™ Weatherboard Cladding Weatherboards 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 weatherboards and the underlay or RAB™ Board's.

7 HEALTH AND SAFETY INFORMATION

Standard industry safety practices and manufacturer safety requirement as detailed in the technical literature including the applicable SDS must be observed at all time. Please refer to James Hardie SDS Fibre Cement Products June 2022

9 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 Clause	Compliance pathway	Evidence
B1 STRUCTURE	Alternative solution -Expert judgement	001, 012, 013, 014, 015, 016, 017, 018, 019, 020, 021, 022,, 024, 025 and 026
B2 DURABILITY	Alternative solution -Expert judgement	001, 023, 025 and 026
C3 FIRE AFFECTING AREAS BEYOND THE SOURCE	Alternative solution -Expert judgement	001, 002, 003, 004, 005, 006, 007, 008, 010, 011, 025, 026and 027
E2 EXTERNAL MOISTURE	Alternative solution -Expert judgement	001, 009, 012, 013, 014, 015, 016, 017, 018, 019, 020, 021, 022, 025 and 026
F2 HAZARDOUS BUILDING MATERIALS	Alternative solution -Expert judgement	001, 021, 025, 026 and 028

10 SUPPORTING DOCUMENTATION FOR CERTIFICATION

Ref	Author	Title	Date and/or revision
001	GLOBAL-MARK	Codemark Certification GM-CM30130 HomeRAB™ Pre-Cladding and RAB™ Board by JAMES HARDIE	Rev A
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

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

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
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*	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
021*	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

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CERTIFICATE V2

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

022*	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
023*	BRANZ	Durability Opinion on the Linea Weatherboard System	DA 0220 dated 24/09/2017
024*	BRANZ	Face Loading Testing of Low Density Thick Weatherboard	Report ST483 dated 20 February 2001
025	James Hardie New Zealand Limited	Oblique™ Weatherboard 14mm Horizontal Installation – Technical specification	October 2022
026	James Hardie New Zealand Limited	Oblique™ Weatherboard 14mm Vertical Installation – Technical specification	October 2022
027	James Hardie New Zealand Limited	James Hardie Fire & Acoustic Design Manual. Section 4:16 Control of External Fire Spread, figures No's. 1 to 9 8 and 12 to 20, specifically details JHETGO30h, JHETGO30v, JHETGO60h and JHETGO60vl	November 2020
028	James Hardie New Zealand Limited	LQA8N - SAFETY DATA SHEET- JAMES HARDIE FIBRE CEMENT SHEETS PRODUCTS	Version No.: 2.0 ISSUED Date : 22/06/2022
* These documents were provided commercial in confidence and are not publicly available			

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

11	SUPPORTING INFORMATION ABOUT DESCRIPTION (OPTIONAL)

The Oblique™ Weatherboard Cladding panels are pre-primed with an acrylic primer on the front face and edges. The Oblique™ Weatherboard Cladding panels are 14 mm thick and are available 200 and 300 mm wide. The boards are supplied 2750 and 4200 mm long. Oblique™ Weatherboards are manufactured from a reduced density cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a rusticated 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 weatherboard. The front edge at the bottom of the board and the board ends are finished square. Oblique™ Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

James Hardie supplies the following ancillary components:

- For horizontal and vertical applications
  - Rigid wall underlay – HomeRAB™ Pre-Cladding and RAB™ Board
  - Hardie™ Axent™ Trim - Hardie™ Axent™ Trim is a 19mm thick, pre-primed fibre cement product available in 3000 mm by 70 mm or 89 mm
  - Hardie™ 14mm Aluminium Trimline Joint Flashing - Aluminium extrusion used behind cladding at horizontal joints available in 3000 mm long
  - Trimline External Corner Jointer - Joins Trimline Joint Flashing at an external corner
  - Trimline Internal Corner Jointer - Joins Trimline Joint Flashing at an internal corner
  - Weatherboard Internal 'W' Corner - Anodised aluminium extrusion used to create internal corners available in 2700 mm and 4000 mm long.
  - Hardie™ 14mm Aluminium Weatherboard Internal Corner - Anodised aluminium extrusion used to create internal corners available in 3000 mm long.
  - Hardie™ 14mm Aluminium Weatherboard External Box Corner - Anodised aluminium extrusion used to create external corners available in 2700 mm and 4000 mm long.
  - Cavity vent strip – Hardie™ 28 mm aluminium cavity closure or Hardie™ uPVC vent strip, available in 3000 mm lengths.
  - Oblique 14mm Plug - To fill recess in Oblique™ Weatherboard 14mm
- For the horizontal applications
  - Trimline Horizontal Jointer - A jointer to cover the butt joint of Oblique Trimline Joint Flashing available in 100 mm long
  - Hardie™ 14mm Aluminium Trimline Joint Flashing - Aluminium extrusion used behind cladding at horizontal joints available in 3000 mm long
  - Hardie™ 14mm Aluminium Jamb Flashing 3000mm - Aluminium moulding used beside window opening to end butt the Oblique™ Weatherboard available in 3000 mm long.
- For the vertical applications
  - Hardie™ 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.
  - HardieTM 14mm Aluminium Internal Corner 3000mm - Anodised aluminium extrusion used to create internal corners available in 3000 mm long.

Other components not supplied by James Hardie but meet the following requirements

- For the horizontal and vertical applications
  - Flexible wall underlay – building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid Codemark Certification for use as wall underlays
  - Flexible wall underlay support – polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. (Note: mesh and wire galvanising must comply with AS/NZS 4534.)

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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.

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PRODUCT CERTIFICATE

Oblique™ Weatherboard by James Hardie Cavity Cladding System

- Flexible sill, head and jamb flashing tape - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid Codemark Certification for use around window and door joinery openings
-
- Flexible window opening flashing tape - A flexible self-adhesive tape used in preparation of a window. Refer to the window installation section in this manual for more information.
- Rigid air barrier vertical joint sealing tape - The tape to be used to seal HomeRAB™ Pre-Cladding/RAB™ Board vertical joints.
- Head flashing - Required over window heads to be supplied by window installer. Material must comply with Table 20 and 21 of E2/AS1.
- Exterior grade filler
- Cavity batten fixings - 40 x 2.8 mm flat head hot-dip galvanised nails.
- Oblique™ Weatherboard fixings (with flexible wall underlays) - 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
- Oblique™ Weatherboard fixings (with rigid wall underlays up to 10 mm thick) 75 x 3.06 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails (Note: Stainless steel fixings must be Grade 304/316 and hot-dip galvanising must comply with AS/NZS 4680).
- 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 20 for durability requirements.
- Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid Codemark Certification for use as a weather sealing sealant for exterior use.

- For the 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 NZBC.
  - Timber trim and moulding fixings - 60 x 3.15 mm or 75 x 3.15 mm hot-dip galvanised jolt head nails and stainless steel ring shank jolt head nail.
  - Planted sill and scribers - timber treated to Hazard Class H3.1, pre-primed before installation. Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid Codemark Certification suitable for use around window, door and other wall penetration openings.
- For the vertical applications
  - Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid Codemark Certification suitable for use around window, door and other wall penetration openings.

12 SUPPORTING INFORMATION ABOUT INTENDED USE (OPTIONAL)
Nil
13 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE (OPTIONAL)
Oblique™ Weatherboard 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.

End of document

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Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and Section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

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THE BUILDING

Street address: 7 Whitenhaven Street	
Suburb:	
Town/City: Oamaru	Postcode:

THE OWNER

Name(s): Burgess & Allen	
Mailing address: 3 Whiterocks Road, Weston	
Suburb:	PO Box/Private Bag:
Town/City:	Postcode:
Phone number: 027 6933483	Email address: shannonmburgess@outlook.com

BASIS FOR PROVIDING THIS MEMORANDUM

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

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

I _____Uros Plajh_____ ~~carried out~~ / supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is restricted building work		Description	Carried out/ supervised	Reference to plans and specifications
Tick(√)if included *Cross (X) if excluded*		*[If appropriate, provide details of the restricted building work]*	*[Specify whether you carried out this design work or supervised someone else carrying out this design work]*	*[If appropriate, specify references]*
Primary structure				
All RBW Design work relating to B1	(√)	-	( ) Carried out (√) Supervised	-
Foundations and subfloor framing	(√)	*Concrete Foundation to NZS3604:2011,*	( ) Carried out (√) Supervised	Sht 7, 13 & 14 (foundation + Cross Sections)
Walls	(√)	*Timber Frame to NZS3604:2011*	( ) Carried out (√) Supervised	Sht 13 & 14 (Cross Sections)
Roof	(√)	*Timber Trusses by Placemakers*	( ) Carried out (√) Supervised	Sht 13 -15 (Cross Sections + Roof Plan) + Prenail Truss Design
Columns and beams	(√)	*Timber Lintels by Placemakers, Timber Lintels to NZS3604:2011*	( ) Carried out (√) Supervised	Sht 15 (Roof Plan)
Bracing	(√)	*Bracing to NZS3604:2011, GIB Ezybrace system, CHH ECOPLY bracing*	( ) Carried out (√) Supervised	Sht 17 (Bracing Plan) + Bracing calculations
Other	(*X*)		( ) Carried out ( ) Supervised	

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EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2

All RBW design work relating to E2	(√)	-	( ) Carried out (√) Supervised	-
Damp proofing	(√)	*0.25 polythene on sand blinding*	( ) Carried out (√) Supervised	Sht 7, 13 & 14 (foundation + Cross Sections)
Roof cladding or roof cladding system	(√)	*Profiled Longrun metal roofing,trapezoidal,*	( ) Carried out (√) Supervised	Sht 10-14 (elevations + Cross Sections)
Ventilation system (for example, subfloor or cavity)	(√)	*Drained & Vented cavity to NZBC E2/AS1*	( ) Carried out (√) Supervised	Sht 13 & 14 (Cross Sections)
Wall cladding or wall cladding system	(√)	*JH Linea w/board, JH Vertical Oblique*	( ) Carried out (√) Supervised	Sht 10-14 (elevations + Cross Sections)
Waterproofing	(√)	*Vinyl to wet areas,*	( ) Carried out (√) Supervised	
Other	(*X*)		( ) Carried out ( ) Supervised	

FIRE SAFETY SYSTEMS: C1 – C6

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other	(*X*)	*Residential Smoke alarms to NZBC C/AS1 (not RBW)*	( ) Carried out ( ) Supervised	

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

Note: continue on another page if necessary.

WAIVERS AND MODIFICATIONS

Waivers or modifications of the building code are required ( ) Yes (√) No

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

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

Note: continue on another page if necessary.

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ISSUED BY

Name: **Uros Plajh**	LBP or Registration number: **BP132726**
The practitioner is a: (√) Design LBP ( ) Registered architect ( ) Chartered professional engineer	
Design Entity or Company (optional):	
Mailing address (if different from below): PO BOX 4516, MOUNT MAUNGANUI SOUTH 3149	
Street address / Registered office:	
Suburb:	Town/City:
PO Box/Private Bag:	Postcode:
Phone number: 07 578 7345	Mobile:
After Hours:	Fax:
Email address: uros@spacelab.nz	Website:

DECLARATION

I **Uros Plajh** , LBP,

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

- Complies with the building code

Signature:

Date: **20 June 2024**

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