

SPECIFICATION

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

J-760 Adlam Residence

(project name)

33 Great West Road, Pomare, Rotorua, New Zealand

(project address)

Mr S & Mrs L Adlam

(client)

Project Ref: J-760

Date: 17 March 2022

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1013 DOCUMENT CONTROL

1 DOCUMENT CONTROL

Document Control

1.1 PREPARED BY

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1.2 DOCUMENT DETAILS

Project Name:	J-760 Adlam Residence
Project Number:	J-760
Client:	Mr S & Mrs L Adlam
Version:	V1

1.3 REVISION CONTROL

Issue:	Building Consent / Construction
Revision:	A

1220 PROJECT

1 GENERAL

This general section describes the project including:

- A description of the work
- Design construction safety
- Principal's Health & Safety matters
- Site description, features and restrictions
- Design parameters for design by contractor
- Archaeological discovery

1.1 READ ALL SECTIONS TOGETHER

Read all general sections together with all other sections.

1.2 DESCRIPTION OF THE WORK

Construct new two story residential detached dwelling with internal access garage.

1.3 RESTRICTED BUILDING WORK

This project includes Restricted Building Work.

Design Construction Safety

1.4 DESIGN CONSTRUCTION SAFETY

The project designers are unaware of unusual or atypical features, which a reasonably experienced contractor may not be aware of, that may present a hazard or risk during a typical construction process. The Contractor is still required to undertake its own assessment, to determine if they consider there are any further safety matters and provide for these in carrying out the construction of the work.

Principal's Health & Safety Matters

1.5 PRINCIPAL'S SITE HEALTH AND SAFETY PLAN

Obtain a copy of the principal's site health and safety plan.

Site

1.6 SITE

Refer to site plan on sheet 1 of the architectural drawings for all information pertaining to the site of works.

1.7 LEGAL DESCRIPTION

The site of the works, the street address and the legal description are shown on the drawings.

1.8 SITE FEATURES

Refer to site plan on sheet 1 of the architectural drawings for all information pertaining to the site of works.

Site environment - Durability

1.9 EXPOSURE ZONE

The exposure zone is to [NZS 3604](#), Section 4 Durability, 4.2 Exposure zones and [NZBC E2/AS1](#).
The site zone is: Zone B (Low)

Site environment - Wind

1.10 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN

The design wind pressures are to [NZS 3604](#), Table 5.4 Determination of wind zone, up to and including Extra High Wind Zone.
Building wind zone Very High / 1.55kPa 50m/s (refer to [NZS 3604](#), table 5.4)

Site environment - Seismic

1.11 EARTHQUAKE ZONE - NON SPECIFIC DESIGN

The zone is to [NZS 3604](#), Section 5 Bracing design, 5.3 Earthquake bracing demand.
The earthquake zone Zone 2
is:

Archaeological discovery

1.12 REPORT FINDING ANY ANTIQUITIES AND ITEMS OF VALUE

Report the finding of any fossils, antiquities and other items of value, to the Contract Administrator.
All to remain undisturbed until approval is given for removal.

Pre-1900, items or evidence of human activity on the site, come under the [Heritage New Zealand Pouhere Taonga Act 2014](#). If such items or evidence is discovered work must stop immediately and the Contract Administrator must be notified immediately. The site may be classified as an Archaeological Site under the Act, and the Contract Administrator or Owner must contact the Heritage New Zealand for authority to proceed.

Post-1900 items remain the property of the owner, pre-1900 items may remain the property of the owner or the Crown subject to what is found.

1232 INTERPRETATION & DEFINITIONS

1 GENERAL

This general section relates to definitions and interpretation that are used in this specification.

Definitions

1.1 DEFINITIONS

Hold point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may not proceed on that particular part until the contract administrator and any other nominated person has advised that work can continue. A notice period of 2 Working Days is required unless stated otherwise.
Notification point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may continue and the contract administrator and any other nominated person may choose whether or not they wish to witness the particular work being carried out. A notice period of 2 Working Days is required unless stated otherwise.
Product:	A thing or substance produced by natural process or manufacture.
Proprietary:	Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
Provide and fix:	"Provide" or "fix" or "supply" or "fix" if used separately mean provide and fix unless explicitly stated otherwise.
Required:	Required by the documents, the New Zealand Building Code or by a statutory authority.
Review:	Review by the contract administrator and other consultants is for general compliance only. Review does not remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Neither can the review be construed as authorising departures from the contract documents.
Working day:	Working day means a calendar day other than any Saturday, Sunday, public holiday or any day falling within the period from 24 December to 5 January, both days inclusive, irrespective of the days on which work is actually carried out.
Workplace:	Workplace means the place where work is being carried out, or is customarily carried out, for a business or undertaking including any place where a worker goes, or is likely to be, while at work (under Health and Safety at Work Act 2015).

1.2 PERSONNEL

Principal: The person defined as "Principal" in the conditions of contract.

Contractor: The person contracted by the principal to carry out the contract.

Contract administrator: The person appointed by the principal to administer the contract on the principal's behalf. Where no person has been appointed by the principal, it means the principal or the principal's representative.

1.3 ABBREVIATIONS

The following abbreviations are used throughout the specification:

AAMA	American Architectural Manufacturers Association
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
ASTM	American Society for Testing and Materials
AWCINZ	Association of Wall and Ceiling Industries of New Zealand Inc.
BCA	Building Consent Authority
BRANZ	Building Research Association of New Zealand
BS	British Standard
COP	Code of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
HERA	Heavy Engineering Research Association
LBP	Licensed Building Practitioner
MBIE	Ministry of Business, Innovation and Employment
MPNZA	Master Painters New Zealand Association Inc
NZBC	New Zealand Building Code
NZS	New Zealand Standard
NZS/AS	Joint New Zealand/Australian Standard
NZTA	New Zealand Transport Agency
NUO	Network Utility Operator
OSH	Occupational Safety and Health
PCBU	Person Conducting a Business or Undertaking (under Health and Safety at Work Act 2015)
RBW	Restricted Building Work
SARNZ	Scaffolding and Rigging New Zealand Inc
SED	Specific Engineering Design
TA	Territorial Authority
TNZ	Transit New Zealand (Transit New Zealand is now New Zealand Transport Agency NZTA - some specifications are still prefixed TNZ)

1.4 DEFINED WORDS

Words defined in the conditions of contract, New Zealand Standards, or other reference documents, to have the same interpretation and meaning when used in their lower case, title case or upper case form in the specification text.

1.5 WORDS IMPORTING PLURAL AND SINGULAR

Where the context requires, words importing singular only, also include plural and vice versa.

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

1234 DOCUMENTATION

1 GENERAL

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

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

Building Consent Authority documentation

1.1 BUILDING CONSENT

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

1.2 BUILDING CONSENT COMPLIANCE

It is an offence under the [Building Act 2004](#)

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

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

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

1.3 PROJECT PERSONNEL

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

Licensed Building Practitioner documentation

1.4 LICENSED BUILDING PRACTITIONERS

Provide LBP details. Provide names, LBP numbers, areas of practice and contact information.

Provide this information to the BCA before commencing work on the Restricted Building Work in the form required by the BCA. Advise the BCA of any change to an LBP previously advised.

Include the following as applicable

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

Also provide names and contact details of the following

- Registered drainlayer
- Registered plumber
- Registered gasfitter
- Registered electrician

1.5 RECORD OF WORK

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

Compliance information

1.6 DOCUMENTATION REQUIRED FOR CODE COMPLIANCE

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

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

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

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

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

1.7 PRODUCER STATEMENTS

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

Residential building contract

1.8 CHECKLIST

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

1.9 DISCLOSURE STATEMENT

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

1.10 BUILDING CONTRACT

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

1.11 DOCUMENTATION REQUIRED ON COMPLETION

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

Information and documentation relating to:

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

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

Substitutions**1.12 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS**

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

1.13 NO SUBSTITUTIONS

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

1.14 PROPOSED SUBSTITUTIONS

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

1.15 NOTIFICATION OF SUBSTITUTIONS

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

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

Plus an assessment of:

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

and if requested:

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

1.16 ACCEPTANCE OF SUBSTITUTIONS

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

Amendments to issued Building Consent

1.17 CONTRACTOR AMENDMENTS TO BUILDING CONSENT

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

The contractor must:

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

1.18 PRINCIPAL AMENDMENTS TO BUILDING CONSENT

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

The principal will:

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

Manufacturer's documents**1.19 MANUFACTURER'S AND SUPPLIER'S INSTALLATION REQUIREMENTS**

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

1.20 CONTRACTOR TO OBTAIN CURRENT DOCUMENTATION

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

1.21 DOCUMENTATION PROVIDED FOR BUILDING CONSENT

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

Branded work sections**1.22 BRANDED PRODUCTS / SYSTEMS**

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

1.23 CROSS REFERENCED WORK SECTIONS

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

Care of construction documents**1.24 CONSTRUCTION ISSUE**

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

1.25 REVISIONS TO CONSTRUCTION ISSUE

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

Delete superseded documents by either:

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

1.26 RETURN DOCUMENTS ISSUED FOR CONSTRUCTION

On completion of the contract works:

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

The Contract Administrator will advise whether such documents shall be:

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

Confidentiality of documents

1.27 CONFIDENTIALITY OF DOCUMENTS

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

2 SELECTIONS

Receipt of construction documents

2.1 INITIAL ISSUE & REVISIONS

No hard copies to be issued. All documentation to be issued as electronic copies. (.PDF files)

1238 AS BUILT DOCUMENTATION

1 GENERAL

This general section relates to common requirements for the preparation, submission and review of as built documentation referred to within this specification and referred to within separate specifications/documents relating to this project. Detailed requirements for as built documentation for particular parts of the work may be included in specific work sections.

1.1 SCHEDULE SECTION

Refer to 1238S1 SCHEDULE OF AS BUILT DOCUMENTATION for work sections contained in this specification that have requirements for as built documentation.

1.2 AS BUILT DOCUMENT REQUIREMENTS

Where requirements for the as built documents and records are not stated in a specific section, they shall include:

As built drawings recording:

- The actual positions as constructed of all sewer, stormwater, sanitary plumbing, piped and ducted services, electrical and mechanical services.
- Inverts and locations of services at key points within the building and at the property lines.
- Dimension services in relation to the structure and building grid lines.
- Ductwork, piping, conduit and equipment, including such items provided for future use.
- Depth of various elements of foundations in relationship to the ground floor level
- Field changes of dimensions
- Other significant deviations and changes which are concealed in construction and cannot be identified by visual inspection
- Access doors and panels

Records of:

- Products and materials selected for alternatives specified
- Approved substitutions and accepted alternatives
- Other approved changes and deviations to items specified.

1.3 PROVISIONAL AS BUILT DOCUMENTS

Prior to practical completion provide provisional/draft as built documents in sufficient detail to allow the principal to operate, maintain, adjust and re-assemble the contract works and to allow for review by the reviewer. Where no named reviewer has been nominated, submit the as built documentation to the contract administrator. Submit in hard copy and electronic form.

1.4 AS BUILT DOCUMENT REVIEW

As built document review indicates only that the reviewer is satisfied that the documents are legible. The review is not a check of the accuracy or completeness of the documents, however the reviewer may comment on any aspect of the documentation and require the documents to be revised and resubmitted. Review of as built documents does not relieve the contractor of responsibility for their correctness.

Where no time is stated in a specific section, allow 10 working days for review by the reviewer.

Where a large amount of documentation is involved more time will be necessary.

1.5 COMPLETE AS BUILT DOCUMENTS

Prior to the end of the defects notification/liability period, provide complete as built documents reflecting any review requirements, with all Information of good quality and properly titled, numbered, cross-referenced and dated. Provide documents in sufficient detail to allow the principal to operate, maintain, adjust and re-assemble the contract works. Submit in hard copy and electronic form to the contract administrator.

1.6 AS BUILT DOCUMENTS - ELECTRONIC COPY

Provide an electronic copy of the as built documents in the following format:

Drawings: PDF format (in addition provide DWG files if available)
 Other documents: PDF format

1239 OPERATION & MAINTENANCE

1 GENERAL

This general section relates to operation and maintenance (O&M) documentation referred to within this specification and referred to within separate specifications/documents relating to this project.

This documentation is required by the principal so that they can operate and maintain the contract works.

1.1 SCHEDULE SECTION

Refer to 1239S1 SCHEDULE OF OPERATION & MAINTENANCE INFO for work sections contained in this specification that have requirements for:

- Information for operation and maintenance
- Operation and maintenance manuals
- Maintenance contract proposals

Operation and maintenance documents

1.2 OPERATION AND MAINTENANCE INFORMATION - BUILDING ACT

Provide in writing the information and documentation prescribed by regulations made under the Building Act, to the owner/principal and the relevant territorial authority.

1.3 OPERATION AND MAINTENANCE INFORMATION

Provide operation and maintenance documentation necessary to operate and maintain the works.

This documentation is to include:

- Contractors name and contact details.
- A complete list of subcontractors' names, addresses and telephone numbers noting which portions of the contract each provided.
- A complete list of equipment and appliances including serial numbers, manufacturers' names and sources of supply.
- Copies of all manufacturers' and suppliers' product literature containing maintenance requirements/instructions, for any products in the building work.
- Information for operation and maintenance as required by work sections.
- Operation and maintenance manuals as required by work sections.
- Maintenance contract proposals as required by work sections.
- Final as built documents.
- Originals of all warranties and guarantees properly executed.
- Other information listed or referred to in this general section.
- Operation and maintenance information required by other project documents.

1.4 MAINTENANCE REQUIREMENTS

Provide details of any maintenance requirements required by the Building Act. In addition provide maintenance requirements for items including:

- Details of suggested building washing programme.
- Details of suggested re-painting programme.
- Location of flushing points for sub soil drainage systems.
- Location of surface water filter systems requiring regular cleaning.
- Overflow relief gully location and means of keeping charged.

1.5 APPLIANCE MANUALS AND OPERATING INSTRUCTIONS

Provide appliance manuals and operating information for all appliances including details of all isolating valves and switches including:

- Water supply isolating valve.
- Location of isolating valves for appliances including dishwasher, clothes washer and fridge with and icemaker connection.
- Gas supply isolating valve.
- Electrical main switch and all sub boards.
- Location of isolating switches for electrical appliances including cooker and cook top, kitchen extract system, electric under floor heating.
- Fire and heating device operating instructions.

1.6 SELECTIONS INFORMATION

Provide details of actual selections used in the construction of the works including:

- Tapware type and supplier details.
- Sanitary ware including accessories type and supplier details.
- Light fitting type and supplier details.
- Door hardware type and supplier details.
- Carpet type and colour including underlay and the supplier details.
- Vinyl flooring type and colour including supplier details.
- Overlay timber floor type and supplier details.
- Tile type and supplier details.
- Fire supplier details.
- Aluminium joinery system and finish.
- Paint type and colours used.

Include brochures and other information included with the items supplied.

1.7 SELECTIONS INFORMATION - SUBSTITUTIONS

Provide details of any selections used in the construction of the works that are different from what was specified.

Documentation format

1.8 O&M DOCUMENTATION FORMAT

Unless otherwise specified in a work section,

- Provide O&M drawings at scales appropriate to the detail to enable good legibility.
- Provide manufacturers documentation at the original scale.
- Provide written text generally in A4 format using a font not less than 10 point.

Submit O&M documentation in both hard copy and as electronic portable document format (PDF) files.

Submission and review

1.9 O&M DOCUMENTATION SUBMISSION & REVIEW

Unless otherwise specified in a work section, provide draft O&M documentation no later than the date of practical completion or the date on which the principal takes occupation of the works, whichever occurs first.

Submit O&M documentation to the named reviewer for review.

- Where no time is stated in a specific section, allow 10 working days for review by the reviewer. Where a large amount of documentation is involved more time will be necessary.
- Where no person is named in a specific section as the reviewer, submit the O&M documents to the contract administrator.
- Submit a proposed index system (as required for final documentation) to the contract administrator for review.

O&M review indicates only that the reviewer is satisfied that the documents are legible. The review is not a check of the accuracy of the documents, however the reviewer may comment on any aspect of the documentation and require the documents to be revised and resubmitted. Review of operation and maintenance documentation does not relieve the contractor of responsibility for the correctness of the documentation.

The reviewer may advise that:

- The O&M documentation has been reviewed and has been accepted without the need for further modification. The information can be included in the final documentation; or
- The O&M documentation has been reviewed and the information can be included in the final documentation subject to revision required by notes, annotations or comments provided; or
- The O&M documentation has been reviewed and is not acceptable, refer to notes, annotations or comments provided. Resubmit corrected/altered documentation for review.

Amalgamate the reviewed accepted and corrected O&M documentation into the final O&M documentation

Final documentation

1.10 SUBMISSION OF FINAL DOCUMENTATION

Prior to the end of the defects notification/liability period, provide complete O&M documentation in both hardcopy and electronic form.

1.11 FINAL O&M DOCUMENTATION - HARDCOPY

Provide the hard copy version of the O&M documentation in a loose-leaf binder with a contents index identifying operation and maintenance documents, requirements, manuals, operating instructions and selections. In addition include the project name, contractor's name and the date of practical completion on the index page.

Include indexed sections to identify all operation and maintenance manuals that are not contained within the binder. Provide a copy of the front cover or other identifying feature of the manual within the section with a note stating "this manual has been provided separately".

Provide a title on the binder edge "Operation and maintenance instructions for (project name)". If more than one binder is required identify each binder by number and ranking (e.g. Volume 2 of 3) and group information logically between the binders for ease of reference.

Provide operation and maintenance manuals clearly and neatly marked on the spine or front cover so as to identify the project name. Where operation and maintenance manuals are a collection of loose leaf documentation, provide documentation in a loose-leaf binder as described above.

1.12 FINAL O&M INFORMATION - ELECTRONIC COPY

Provide a copy of all hardcopy information in PDF format arranged in logical named folders. In addition provide DWG files of documentation if available.

1.13 REVIEW OF FINAL DOCUMENTATION

The contract administrator may review the final documentation and require alteration and resubmission.

2 SELECTIONS**O&M Documentation****2.1 FINAL DOCUMENTATION - INFORMATION FOR OPERATION AND MAINTENANCE**

Provide a complete electronic copy to the contract administrator.

Provide two hardcopy sets of completed O&M documentation to the contract administrator. At least one set is to contain all available original documentation. The contractor is to retain a third hardcopy set for their records.

Provide any documentation (including required original documentation) as required to the relevant territorial authority.

2.2 FINAL DOCUMENTATION - OPERATION AND MAINTENANCE MANUALS

Provide a complete electronic copy to the contract administrator.

Provide two hardcopy sets of completed maintenance manuals to the contract administrator. At least one set is to contain all available original documentation. The contractor is to retain a third hardcopy set for their records.

Provide any documentation (including required original documentation) as required to the relevant territorial authority.

Maintenance contract proposals**2.3 MAINTENANCE CONTRACT PROPOSALS**

Unless otherwise specified in a work section, provide maintenance contract proposals to the contract administrator no later than the date of Practical Completion. Provide in electronic and hardcopy form.

1240 ESTABLISHMENT

1 GENERAL

This general section relates to site establishment including:

- Notices and approvals
- Inspections
- Site preparation
- Temporary construction

Notices and approvals

1.1 STATUTORY OBLIGATIONS

Comply with all statutory obligations and regulations of regulatory bodies controlling the execution of the works.

1.2 BUILDING CONSENT AUTHORITY AND NETWORK UTILITY APPROVALS

Attend on building consent authority officers, statutory and network utility inspectors, as necessary to obtain approvals, including those required for the completion of the works.

1.3 NOTIFY NETWORK UTILITY OPERATORS

Notify all network utility operators of proposed works before commencing site operations. Ascertain location of services or confirm that none exist in the vicinity of the works. Take all necessary precautions to avoid damage to existing services.

Inspections

1.4 CARRY OUT INSPECTIONS

Carry out all inspections as required on site by;

Architectural Designer
 Structural Engineer
 Geotechnical Engineer
 Main Contractor
 Sub Contractors (with approval of Main Contractor only)
 Local Authority Building Inspectors
 Local Authority Planning Inspectors
 Client (with approval of Main Contractor only)

Site preparation

1.5 SITE ACCESS

Refer to site plan on sheet 1 of the architectural drawings for all information pertaining to the site of works.

1.6 WORKING AREA

Refer to site plan on sheet 1 of the architectural drawings for all information pertaining to the site of works.

1.7 SITE AND SOIL SURVEYS

Carry out all investigations necessary and peruse all information available to determine ground conditions and likely ground performance both on the site and adjacent to it. Also refer to the territorial authority project information memorandum (PIM).

1.8 GROUND CONDITIONS

Refer to the geotechnical / soils report included with this specification.

Temporary construction

1.9 TEMPORARY BUILDINGS

Provide as necessary temporary sheds, offices, lunch rooms, sanitary accommodation and other temporary buildings required for storage, management of the works, for the use of workers while on site and as required by Acts and Regulations.

1.10 TEMPORARY SITE FENCING

Provide and maintain a temporary 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.

1.11 SITE - SAFETY SIGNAGE

Provide hazard board and other safety signage as required.

1.12 SITE - PROJECT SIGN

Obtain approval to, provide and erect a timber framed sign board 1000mm x 500mm. Sign to be, fully painted with vinyl lettering or fully printed, and displaying:

- Title of contract
- Principal's name
- Contractor's name
- If the contractor wishes, names of subcontractors.

First aid

1.13 FIRST AID EQUIPMENT

Provide first aid equipment.

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 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

1.5 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

1.6 SITE HOARDINGS

Provide and maintain hoardings, 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 hoardings with continuous cladding of:

- close butted timber at least 19mm thick; or
- 6mm exterior grade plywood on studs at 600mm centres maximum; or
- 9mm exterior grade plywood on studs at 1 metre centres maximum; or
- continuous metal cladding suitably supported to provide strength and rigidity

1.7 GANTRIES, PLANKED FOOTWAYS, GUARD RAILS

Provide temporary gantries, planked footways and guard rails as necessary to protect the public and others, for the proper execution of the works and to meet the requirements of territorial or other authority.

1.8 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.

1.9 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

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

Control run off from:

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

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

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

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

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

Spilt or surplus material:

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

Pump washwater away from drains, waterways and adjoining property.

1.10 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

1.11 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

- 1.12 WATER
Provide clean, fresh water for the works and make arrangements for distributing about the site.
- 1.13 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.
- 1.14 TELEPHONE
Provide on-site temporary telephone facilities.
- 1.15 COMPUTER FACILITIES
Provide on-site temporary computer facilities complete with an email and internet connection capable of sending, receiving and printing site communications.
- 1.16 PRINTER
Provide on-site temporary printing facilities capable of printing A4 and A3 colour prints.
- 1.17 IMAGING
Keep available devices able to take and send quality printable digital photographs.

Care and protection - Site

- 1.18 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.
- 1.19 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.
- 1.20 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.
- 1.21 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.
- 1.22 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 - Project

- 1.23 TEMPORARY PROTECTION
Provide and maintain temporary protection as required to protect products during transport, storage and handling. Provide temporary protection as required to protect the work in progress and the finished work. Refer to 1270 CONSTRUCTION for removal of protection.
- 1.24 SPECIAL PROTECTION GENERAL
Refer to individual work sections for any special protection requirements.

Care and protection - miscellaneous

1.25 CONSTRUCTION KEYING AND SECURITY

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

1.26 TEMPORARY STORAGE

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

Rubbish removal

1.27 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.

1270 CONSTRUCTION

1 GENERAL

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

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

1.1 SCHEDULE SECTION

Refer to 1270S1 SCHEDULE OF SAMPLES & PROTOTYPES for work sections contained in this specification that have requirements for samples and prototypes.

Refer to 1270S2 SCHEDULE OF SPARES & MAINTENANCE PRODUCTS for work sections contained in this specification that have requirements for spares and maintenance products.

Quality control and assurance

1.2 QUALITY ASSURANCE

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

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

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

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

1.3 NOTICE

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

1.4 NOTIFIABLE WORK

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

Noise and nuisance

1.5 LIMIT CONSTRUCTION NOISE

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

1.6 ACCEPTABLE NOISE LEVELS

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

1.7 PROVIDE INFORMATION TO NEIGHBOURS

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

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

1.8 INCONVENIENCE TO OTHERS

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

1.9 ROADWAY AND FOOTPATH

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

1.10 VEHICLE CROSSING

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

1.11 DIRT AND DROPPINGS

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

1.12 DAMAGE AND NUISANCE

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

1.13 SMOKE FREE REQUIREMENTS

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

1.14 RESTRICTIONS

Do not:

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

Set-out and tolerances

1.15 SURVEY INFORMATION

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

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

1.16 DATUM

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

1.17 SET-OUT

Set out the work to conform with the drawings.

1.18 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.

1.19 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.

1.20 USE OF SET-OUT INSTRUMENTS

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

1.21 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.

1.22 TOLERANCES

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

Concrete construction:	To NZS 3109 Concrete construction Clause 3.9 Tolerances for reinforcement Table 5.1 Tolerance for precast components Table 5.2 Tolerance for in situ construction To NZS 3114 Concrete surface finishes
Masonry construction:	To NZS 4210 Masonry construction: Materials and workmanship Clause 2.6.5 Tolerances Table 2.2 Maximum tolerances
Structural steelwork:	To NZS 3404.1 Steel structures standard Section 14.4 Tolerances (after fabrication) Section 15.3 Tolerances (erection)
Timber framing:	To NZS 3604 Timber-framed buildings Clause 2.2 Tolerances Table 2.1 Timber framing tolerances

Refer to work sections for tolerance requirements for finishes.

Execution**1.23 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.

1.24 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.

1.25 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.

1.26 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.

1.27 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.

1.28 MINIMISE DELAYS DUE TO WEATHER

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

Defective or damaged work**1.29 DEFECTIVE OR DAMAGED WORK**

Repair defective, damaged and marked elements, or replace them where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Refer to individual work sections for any special requirements.

Hot work - fire safety**1.30 HOT WORK**

Generally, to [NZS 4781](#) Code of Practice for Safety in Welding and Cutting, includes but not limited to: Welding; flame cutting; disc cutting; grinding; bitumen blowers; blow lamps; brazing; burning off; soldering; use of hot air guns.

Note - where the standard refers to the use of asbestos, alternative fire-resistant materials are to be used.

1.31 COMBUSTIBLE MATERIAL

Manage fire risk to adjacent combustible materials by isolating hot work at a safe distance away, or store combustible materials away from fire hazards. Additional precautions may be necessary if combustible material cannot be separated from hot work, refer to [NZS 4781](#), 6.1.4.

1.32 HOT WORK PERMIT

A hot work permit, issued by the main contractor, is required when it is not possible to isolate hot work from adjacent fire hazards. Refer to example in [NZS 4781](#), Appendix A.

1.33 FIRE SYSTEMS

Fire systems should remain operational where possible while welding or cutting work is performed. Where required, shield fire systems to [NZS 4781](#) clause 6.4.

1.34 DURING SUSPENDED WORK

Maintain a fire watch at least 30-minutes after hot works are suspended e.g. during lunch breaks or overnight, to [NZS 4781](#), clause 6.2.7.

For hot works in confined spaces, prevent potential ignition of flammable gases, to [NZS 4781](#) clause 6.5.

Qualifications**1.35 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.

1.36 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.

1.37 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.

1.38 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.

1.39 QUALIFICATIONS WORKERS – INDUSTRY QUALIFICATION REQUIREMENTS

Where workers and / or supervisors of work are required to be trained / licensed / certified or similar under industry rules or contractual requirements, they must have a current qualification before they start the work and maintain currency until their part of the work has been completed. Refer to individual work sections for details.

1.40 QUALIFICATIONS – PRODUCER STATEMENTS

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

1.41 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**1.42 NEW PRODUCTS**

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

1.43 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.

1.44 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.

1.45 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.

1.46 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.

1.47 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.

1.48 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.49 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**1.50 SAMPLES FOR REVIEW**

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

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

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

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

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

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

Refer to SAMPLES clauses in work sections for further detail.

1.51 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.

1.52 OTHER SAMPLE REQUIREMENTS

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

Prototypes

1.53 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.

1.54 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.

1.55 PROTOTYPES - GENERAL

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**1.56 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**1.57 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.

1.58 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

1.59 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**1.60 SPECIAL REQUIREMENTS**

Refer to individual work sections for any special completion requirements.

1.61 LEAVE WORK

Leave work to the standard required for the following procedures.

1.62 COMPLETION - TESTS & CERTIFICATION

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

1.63 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.

1.64 COMPLETE ALL SERVICES

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

1.65 CLEANING BY CONTRACTOR

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

- Wipe all surfaces to remove construction dust.
- Clean out service ducts and accessible concealed spaces.
- Clean out all gutters and rainwater heads.
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal scrappers that may damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings.
- Clean out the interior of all cabinetry.
- Wash down external concrete including driveways and concrete masonry. Take care when waterblasting to not cause damage to the surface or allow water to enter the building.
- Remove rubbish and building material from the area immediately adjacent to the contract works.

Commissioning**1.66 SPECIAL REQUIREMENTS**

Refer to individual work sections for any special commissioning requirements.

1.67 MOVING PARTS

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

1.68 COMMISSIONING - TESTS & CERTIFICATION

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

1.69 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.

1.70 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**1.71 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.

1.72 ADDITIONAL PRACTICAL COMPLETION REQUIREMENTS

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

Defects period submissions**1.73 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**1.74 FINAL COMPLETION - SUBMISSIONS**

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

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

2210 PREPARATION & GROUNDWORK

1 GENERAL

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

- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

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

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

1.2 SITE SAFETY

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

1.3 ARCHAEOLOGICAL DISCOVERY

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

2 PRODUCTS

2.1 EXCAVATED CLEAN FILL

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

2.2 VOLCANIC TUFF FILL

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

2.3 ROCK FILL

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

2.4 SAND FILL

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

2.5 HARD FILL

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

2.6 GRANULAR FILL

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

2.7 DRESSING COURSE

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

2.8 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

3 EXECUTION

3.1 WASHOUT BAY FOR TRUCK

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

3.2 EXCAVATION GENERALLY

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

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

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

3.5 EROSION CONTROL

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

3.6 SURFACE PREPARATION

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

3.7 STOCKPILE TOPSOIL

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

3.8 GENERAL EXCAVATION

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

3.9 ROCK EXCAVATION

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

3.10 FOUNDATION EXCAVATION

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

3.11 INADEQUATE BEARING

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

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

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.

Confirm any changes with the territorial authority.

For inadequate bearing or over excavation of service trenches, use hardfill compacted in 150mm layers.

3.12 STANDARD OF COMPACTION

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

3.13 GRANULAR BASE FOR SLABS

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

3.14 GENERAL BACKFILLING

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

3.15 RETAINING WALLS

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

3.16 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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 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.	

1.2 QUALIFICATIONS

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

1.3 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 TIMBER TRUSSES

To [FTMA CoP](#). Moisture content 16% at supply.

2.3 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.

2.4 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL

H3.1 or H3.2 Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Temporary fix battens before being fixed into the framing with the cladding fixings. To [NZS 3602](#), table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.5 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL

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

Components

2.6 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.

2.7 SCREWS

Wood screws to the requirements of [NZS 3604](#), 2.4 Fastenings and Fabrication, and section 4, **Durability**, and of the type, number and form required for each screw application to [NZS 3604](#), sections 6 - 10.

2.8 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, noggs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

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

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

3.5 SET-OUT

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

3.6 FRAMING FLOORS

Framed and fastened to [NZS 3604](#), section 7, **Floors**.

3.7 FRAMING WALLS

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

3.8 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**.

3.9 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**.

3.10 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.11 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.).

3.12 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.13 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

4.1 FLOOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Mid floor joists:	Radiata pine	SG8	H1.2
Boundary joists:	Radiata pine	SG8	H1.2

4.2 EXTERIOR WALL FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Exterior walls:	Radiata pine	SG8	H1.2
Parapets:	Radiata pine	SG8	H1.2
Enclosed decks and balconies:	Radiata pine	SG8	H1.2
Cantilevered joists enclosed decks and balconies:	Radiata pine	SG8	H3.2
Nogs	Radiata pine	SG8	H1.2
Wall battens (not cavity):	Radiata pine	Merch	H1.2
Jamb battens:	Radiata Pine	Merch	H3.1

4.3 CAVITY BATTENS

Cavity battens	Species	Grade	Treatment
Timber - Non Structural:	Radiata pine	Merchantable	H3.1

4.4 ROOF FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Rafters:	Radiata pine	SG8	H1.2
Trusses:	Radiata pine	SG8	H1.2
Purlins:	Radiata pine	SG8	H1.2
Ceiling joists and battens:	Radiata pine	SG8	H1.2
Valley boards:	Radiata pine	Merchantable	H1.2
Sarking:	Radiata pine	Merchantable	H1.2
Skillion roof framing:	Radiata pine	SG8	H1.2
Enclosed flat roof framing:	Radiata pine	SG8	H1.2

4.5 INTERIOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Non structural walls:	Radiata pine	SG8	H1.2
Structural and braced walls:	Radiata pine	SG8	H1.2

4.6 EXTERIOR EXPOSED TIMBERS

Member	Species	Grade	Treatment
Posts:	Radiata pine	SG8	H3.2 CCA
Joists:	Radiata pine	SG8	H3.2 CCA
Exterior stairs and steps:	Radiata pine	SG8	H3.2 CCA
Pergola:	Radiata pine	SG8	H3.2 CCA
Ground contact members	Radiata pine	SG8	H5 CCA

Note all CCA to be preservative code 01 or 02

4131NS NURALITE PREPRUFE & BITUTHENE TANKING SYSTEMS

1 GENERAL

This section relates to the supply and installation of Nuralite Waterproofing Ltd, Preprufe® and Bituthene® tanking systems.

It includes:

- Preprufe® 300R Plus Tanking membrane as a single layer under the slab
- Preprufe® 300R Plus Tanking membrane as a single layer on walls (if blindside tanking) or
- Bituthene® 3000 Self-Adhesive Tanking membrane as a single layer on walls
- All components and accessories to complete installation

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

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

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

Bituthene®/ Preprufe® Detail Drawings

Bituthene®/ Preprufe® Install Method Statement (including checklists)

Bituthene®/ Preprufe® Products - Technical Data Sheets

Bituthene® BBA Certification - BBA 97/3325 21/9/2018

Preprufe® BBA Certification - BBA 97/3325 11/7/2018

[BRANZ Appraisal 1158](#) - Nuralite Damp Proof and Tanking Membranes

Manufacturer/supplier contact details

Company: **Nuralite Waterproofing Limited**

Web: www.nuralite.co.nz

Email: info@nuralite.co.nz

Telephone: 09 579 2046 Auckland / 0800 Nuralite (0800 687 254)

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years For Bituthene®/ Preprufe® tanking materials

- Provide this warranty on the Nuralite Waterproofing Materials Warranty form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of completion of installation of tanking

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years For installation of Bituthene®/ Preprufe® tanking

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be licensed by Nuralite Waterproofing Ltd. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 PRE INSTALLATION MEETING

Convene a meeting between the applicator, contractor, all associated consultants and Nuralite Waterproofing Ltd to ensure all parties know what is required for effective performance of the system, prior to tanking installation.

1.7 SPECIFIC DETAILS

All detailing to be in accordance with Nuralite Waterproofing Ltd standard details. Where required, specific details must be requested and provided prior to proceeding with installation.

1.8 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:
Nuralite Tanking products maintenance requirements.

Provide this information prior to practical completion.

Compliance information**1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE**

Provide the following compliance documentation: -

- Applicators approval certificate from Nuralite Waterproofing Limited
- Manufacturer's, importer's or distributors warranty
- Installer's / applicator's warranty
- Producer Statement - PS3 Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS**Materials - Bituthene®****2.1 BITUTHENE 3000® SELF ADHESIVE TANKING MEMBRANE**

Bituthene 3000® is a self-adhesive membrane comprising of a modified bitumen sheet on a cross laminated polyethylene backing. Supplied in black, 1.5mm thick x 1m wide x 20m long rolls.

2.2 PRIMER - FOR DRY CONCRETE SUBSTRATES

Bituthene® Solvent Primer is a bitumen based solvent primer for use over dry concrete substrates over 28 days old.

2.3 PRIMER - FOR GREEN CONCRETE SUBSTRATES

Bituthene® Primer Type C is a water based membrane primer for use over damp concrete substrates over 7 days old.

Materials - Preprufe®**2.4 PREPRUFE® SHEET TANKING & WATERPROOFING MEMBRANE**

Preprufe® 300R Plus is a composite membrane sheet comprising of a thick heavy duty polyethylene film, pressure sensitive adhesive and weather resistant protective coating. Supplied in white rolls, Preprufe® 300R Plus 1.2mm thick x 1.17m wide x 31.15m long rolls.

Components - Generally**2.5 BITUTHENE LIQUID MEMBRANE LM**

Bituthene® Liquid Membrane LM, is a two-part asphalt-polyurethane mastic. Used for fillet forming and all other detailing with Bituthene® and Preprufe® membranes.

Components - Preprufe®**2.6 PREPRUFE TAPE**

Self-adhesive tape for sealing Preprufe® end laps, cut edges and detailing Preprufe® to piles and penetrations. Supplied in 100mm wide x 15m long rolls.

2.7 PREPRUFE CJ TAPE

Self-adhesive tape for detailing Preprufe® at construction joints and detailing Preprufe® to piles. Supplied in 200mm wide x 15m long rolls.

2.8 PREPRUFE DETAIL TAPE

Double sided, self-adhesive tape for specialized membrane detailing. Supplied in 50mm wide x 15m long rolls.

Accessories**2.9 CONCRETE SUBSTRATE REPAIR**

Nurapatch is a two part, high strength, smoothing and repair compound for concrete walls.

2.10 HYDROPHILIC WATERSTOP

SwellSeal® 2010 is an extruded, vulcanised, hydrophilic, expansive rubber strip for use as a water stop in concrete construction joints. Supplied in 10mm x 20mm x 9.75m rolls.

2.11 HYDROPHILIC MASTIC

SwellSeal® WA is a single component, hydrophilic polyurethane mastic for detailing starter bars and forming hydrophilic water stops to rough concrete surfaces.

2.12 TOP EDGE ANCHOR STRIP

Aluminium termination bar with mechanical fixings. Refer to SELECTIONS for details.

2.13 SEALANT

IKO Pro Stickall: a single component, elastomeric modified bitumous sealant for below grade applications or Millennium LPS: a single component, elastomeric modified polyurethane sealant for above grade applications.

2.14 DRAINAGE / PROTECTION SHEET

Nuradrain is a dimpled, polyethylene rot-proof board for use as a protective barrier and drainage medium behind retaining walls. Install using Nuralite supplied tape and/or Nuradrain self-adhesive mechanical fixings. Supplied in 2.1m wide x 28m rolls.

2.15 DRAINAGE / PROTECTION SHEET - FIXINGS

Nuradrain self-adhesive mechanical fixings for Nuradrain sheets.

3 EXECUTION**Conditions****3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS**

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products. Store Nuralite waterproofing systems rolls and accessory materials under conditions that ensure no deterioration or damage. Store in shade or cover in hot sun. Protect liquid components from freezing.

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. Ensure there is adequate safe working space for applicators. Complete any remedial work identified and allow to cure before commencing tanking application.

3.4 PLAN LAYOUT

Plan installation so that joints in tanking membrane are minimised and occur in suitable locations.

3.5 WEATHER CONDITIONS

Apply Nuralite waterproofing systems tanking systems only in fair weather with air temperature above 5°C. Apply adhesives and make site joints only in weather conditions compatible with perfect jointing.

3.6 DE-WATERING

Maintain water level at not less than 300mm below the level of the base concrete during the progress of the tanking work and until protective loading coats and walls are complete and fully set.

3.7 DRAINAGE

Install approved drainage system to remove water from foundations. Ensure drain is protected with geotextile cloth to prevent it clogging with fines, and that it is correctly located, 150mm from the membrane and below the footing.

3.8 CURING OF NEW CONCRETE

Allow concrete and masonry to dry to the Nuralite Waterproofing Limited requirements before applying tanking. Recommended curing of new concrete: 28 days. This is not applicable for blockwork or site lean concrete. Special attention and methods for installation between 7 and 28 days of pour.

Installation - generally

3.9 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.10 INSTALLATION GENERALLY

Comply with the Nuralite Waterproofing Limited requirements and instructions. Installation to be in accordance with Bituthene®/ Preprufe® Install Method Statements.

Application - Under slab, Preprufe®

3.11 SUBSTRATE PREPARATION

Preprufe® is to be laid over compacted hard fill or over a site concrete blinding slab (prior to the concrete floor being poured). Dress off surface of hardfill with a 15mm layer of fine, clean sand rolled to a smooth surface. Ensure substrate is regular, smooth and stable with no gaps greater than 12mm wide and 12mm deep. Ensure substrate has been designed to resist the weight and force of concrete placement with movement or deflection.

If using a site concrete blinding slab, ensure concrete surface is a smooth steel trowel U3 surface to [NZS 3114](#). Grind off any steps or sharp protrusions. The surface does not require to be dry prior to the application of Preprufe® tanking membrane but all standing water must be removed.

3.12 INSTALL PREPRUFE 300R PLUS

Place Preprufe® 300R Plus membrane HDPE side to the substrate with the coat adhesive face towards the concrete pour. Place sheets to overlap the previous sheet 75mm along the marked selvedge with end laps staggered. Peel back green top side and blue underside release liners simultaneously while bonding laps together. Ensure a continuous bond is achieved without wrinkles and roll firmly with a heavy roller. For roll ends and cut edges overlap by a minimum 75mm. Apply Preprufe® tape centered over the lap and roll firmly.

Install the reinforcing steel (by others).

3.13 WALL/FLOOR CONSTRUCTION JOINT

Protrude the under slab Preprufe® membrane beyond the perimeter of the footing by a minimum 150mm to allow for the required wall / floor joint.

Form joint between Preprufe® under slab tanking membrane and wall tanking membrane in accordance with Nuralite Waterproofing Ltd requirements and details. Run the vertical material over the outside of the underfloor sheet to ensure correct discharge of any water.

Install selected hydrophilic water stop to all wall/floor construction joints.

3.14 DETAILING TO PENETRATIONS - PIPES, DEWATERING WELLS, ETC

Install Preprufe® membrane to blinding and around penetration with 10mm clearance. Cut a square of Preprufe® membrane at least 150mm larger than penetration. Mark penetration diameter on Preprufe® square and pie-cut membrane on inside of mark. Pie cuts to be minimum 50mm long.

Install minimum 25mm x 25mm fillet of Bituthene® LM to penetration Preprufe® turn-up. Extend Bituthene® LM at 2.5mm thick, 75mm up penetration and 75mm to Preprufe®.

Remove release film from Preprufe® pie-cut square, and place over penetration and bed fully into Bituthene® LM fillet. Bituthene® LM must fill all gaps between pie-cuts and penetration. Wrap Preprufe® Tape around pie-cut fingers (while progressively removing release films), over Bituthene® LM and up penetration to fully seal.

Seal Preprufe® cut square to underlying Preprufe® membrane using Preprufe® Tape. Roll all Preprufe® Tape with a -roller to seal without wrinkles. Apply 10mm diameter bead of Swellseal Mastic WA around penetration, 100mm from blinding.

3.15 PROTECT HORIZONTAL SURFACES

Protect the horizontal tanking from damage during laying by ensuring applicators wear soft soled shoes. Except for inspection and reinforcement placement purposes do not allow traffic on the tanking after installation.

3.16 SUPERVISION OF CONCRETE POUR

Membrane installer to supervise concrete placement operations to ensure no damage is caused to the waterproofing system. Refer to the appropriate concrete section.

Application - Bituthene® 3000 - Walls**3.17 SUBSTRATE PREPARATION**

Ensure all surfaces are clean and free from voids, spalled areas, loose particles, and sharp protrusions. Check that masonry joints are struck off flush, if not flush point blockwork with Nurapatch.

Remove all sharp projections, wire-brush and remove all debris, leaving the surface dust-free, oil-free and clean, with nothing that could diminish the adhesion of primers or cause damage to the tanking. Ensure form oils or release agents and curing compounds are completely removed.

Repair surface imperfections including voids greater than 12mm and fill tie holes flush and smooth with Nurapatch. Grind off steps or sharp protrusions caused by formwork joints.

Clean surfaces with a broom or oil free compressed air to remove dust, loose particles and material that could affect bonding.

3.18 TURN UPS

Where tanking is turned up against hardened concrete, ensure the surface is smooth and free of all sharp projections. Fill internal corners with a 20mm x 20mm fillet of Bituthene® LM.

3.19 TURN DOWNS

Where tanking is turned over an external corner, first grind the corner to produce a smooth 15mm radius or chamfer.

3.20 REMOVE BACK FORMS

Remove back forms to ensure no vapour pressure develops beneath the membrane.

3.21 PRIMING

Prime substrate with selected primer to suit conditions of the wall and apply in accordance with Nuralite Waterproofing Ltd specifications and application instructions. Apply membrane primer at 6-8 m²/L with a roller. Allow primer to fully dry off before applying the membrane. Only prime areas which are receiving the membrane on the same day.

3.22 INSTALL BITUTHENE 3000

Progressively peel back the protective release paper and apply Bituthene® 3000 membrane to the primer substrate. Membrane to be firmly smoothed and brushed onto surface to ensure free of air bubbles and wrinkles. Overlap sheets minimum 50mm at selvedge, lined up with printed guideline on the membrane and end laps and cuts are to be overlapped 150mm minimum. Pressure roll all edges and end laps.

3.23 REINFORCE CORNERS AND CONSTRUCTION JOINTS

Reinforce all internal corners, external corners, and construction joints (including joint between concrete blockwork and footing) with a 300mm min strip of Bituthene® 3000 before overlaying with the Bituthene® 3000 sheet membrane.

3.24 DETAILING TO PENETRATIONS - PIPES ETC

Install minimum 25mm x 25mm fillet of Bituthene® LM to penetration. Extend Bituthene® LM at 2.5mm thick, 75mm up penetration and 75mm to Bituthene® 3000 membrane. Ensure specified water stop is installed between penetration and concrete wall.

3.25 TERMINATION AT BASE - WITH PREPRUFE 300R PLUS UNDERSLAB

Form joint between Preprufe® 300R Plus under slab tanking membrane and Bituthene® 3000 wall tanking, in accordance with Nuralite Waterproofing Ltd requirements and details. Run the Bituthene® 3000 vertical material over the outside of the Preprufe® underfloor sheet to ensure correct discharge of any water.

Bituthene® 3000 to extend to the base of slab/footing or a minimum 200mm below finished floor level. Seal the Bituthene® 3000 to the toe or footing on the vertical face and finish with a strip of Bituthene® LM Liquid Membrane to bottom edge. Alternately, form joint with Preprufe CJ Tape.

3.26 TERMINATION AT BASE

Seal the Bituthene® 3000 to the toe or footing on the vertical face. Finish with a strip of Bituthene® LM Liquid Membrane to bottom edge. Wrap underslab vapour barrier over Bituthene® 3000 and provide a Bituthene® 3000 cover strip allowing for 150mm lap joint.

3.27 TERMINATION AT TOP - TERMINATION STRIP

The upper (top) edge will normally be terminated at ground level. Secure the top edge with a mechanically fastened metal strip or Nuralite aluminium strip.

Bed fastening strips in Bituthene® LM Liquid Membrane and complete strip with Bituthene® LM Liquid Membrane.

3.28 INSTALL NURADRAIN PROTECTION SHEETS

Install Nuradrain in accordance with Nuralite Waterproofing Ltd requirements. Install Nuradrain with raised side against membrane or over Enertherm PIR Insulation sheets if using. Overlap sheet joints by 120mm horizontally & 200mm vertically and hold in place using Nuralite adhesive tape and/or Nuradrain self-adhesive mechanical fixings to Nuralite requirements.

3.29 SUPERVISION OF BACKFILLING

Membrane installer to supervise backfilling operations to ensure no damage is caused to the waterproofing system. Refer to the appropriate drainage section for subsoil drainage and backfilling.

Completion & Commissioning**3.30 COMPLETION MATTERS**

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

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Tanking Systems**4.1 UNDERSLAB TANKING - PREPRUFE 300R PLUS**

Location:	Underslab
Substrate:	Hardfill
Tanking:	Preprufe® 300R Plus
Components:	Preprufe® Tape, Preprufe® CJ Tape & Preprufe® Detail Tape
Tanking sealant	Bituthene® LM
Accessories:	Millennium Lockin Pocket® - penetration seals

4.2 WALL TANKING - BITUTHENE 3000

Location:	Block walls
Substrate:	concrete blockwork
Preparation:	Nurapatch, if required
Primer:	Bituthene® Solvent Primer - for use over dry concrete substrates over 28 days old or Bituthene® Primer Type C - for use over damp concrete substrates over 7 days old.
Tanking:	Bituthene® 3000
Tanking sealant	Bituthene® LM
Accessories:	Mechanically fastened metal strip or Nuralite termination bar

Protection / Drainage Sheet**4.3 NURAPLY DRAINAGE SHEETS**

Location:	Protection drainage sheet
Supplier:	Nuralite Waterproofing Limited
Brand:	Nuradrain

Hydrophilic Components**4.4 HYDROPHILIC WATERSTOP**

Location:	Hydrophobic waterstop
Brand / type:	SwellSeal® 2010

4.5 HYDROPHILIC MASTIC

Location:	Hydrophobic mastic
Brand / type:	Swellseal Mastic WA

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

1 GENERAL

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

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

NZMRM New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

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

Documents

1.2 DOCUMENTS

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

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:

Thermakraft product manual and technical data sheets.

[BRANZ Appraisal 329](#) - Supercourse 500™ Damp-Proof Course and Concealed Flashing

[BRANZ Appraisal 611](#) - James Hardie Rigid Air Barriers

[BRANZ Appraisal 651](#) - Thermakraft Covertex™ 407 Roof and Wall Underlay

[BRANZ Appraisal 695](#) - Watergate Plus™ Wall Underlay

[BRANZ Appraisal 743](#) - Thermakraft Covertex 405™ Roof and Wall Underlay

[BRANZ Appraisal 878](#) - Thermakraft Aluband™ Window Flashing Tape

[BRANZ Appraisal 912](#) - Thermakraft 220™ Synthetic Wall Underlay

[BRANZ Appraisal 917](#) - Thermakraft Covertex 403™ Roof and Wall Underlay

[BRANZ Appraisal 942](#) - OneSeal™ Multi-Fit Pipe and Cable Penetration Seals

[BRANZ Appraisal 943](#) - Thermakraft Covertex 401™ Roof Underlay

[BRANZ Appraisal 1000](#) - Thermakraft Thermabar 397™ Light Diffusing Reflective Underlay

[BRANZ Appraisal 1029](#) - Thermakraft Ausnet™ Hexagonal Wire Mesh

[BRANZ Appraisal 1104](#) - Thermaflame Orange™ Concrete Underlay

[BRANZ Appraisal 1122](#) - Thermaflash™ Flashing Tape

[Code Mark Certificate 30069](#) - Thermakraft Covertex 403™ Absorbent Breathable Roof Underlay

[Code Mark Certificate 30030](#) - Thermakraft Covertex 405™ Absorbent Breathable Roof Underlay

[Code Mark Certificate 30028](#) - Thermakraft Covertex 407™ Absorbent Breathable Roof Underlay

[Code Mark Certificate 1002](#) - Thermakraft Watergate Plus™ Wall Underlay

Manufacturer/supplier contact details

Company: Thermakraft Ltd

Web: www.thermakraft.co.nz

Email: info@thermakraft.co.nz

Telephone: 0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Ltd warrant performance of products if design and installation comply with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft™ Product Warranty available on request.

Requirements

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 NO SUBSTITUTIONS

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

Compliance information

1.7 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Applicators approval certificate from the manufacturer / importer / distributor
- Manufacturer / supplier warranty
- Installer / applicator warranty
- Producer Statement - Construction from the applicator / installer
- Producer Statement - Construction Review from an acceptable suitably qualified person
- Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS

Materials

Damp Proof Course

2.1 SUPERCOURSE 500™ DPC

Supercourse 500™, high-impact polyethylene film to [AS/NZS 2904](#) and embossed on both sides. Manufactured in NZ from 100% recycled materials for use as a damp-proof course and concealed flashings around doors and windows and to [BRANZ Appraisal 329](#). Thickness 500 microns minimum. Refer to SELECTIONS for type of joining tape.

Roof underlays**Roof underlays - synthetic, self-supporting (non fire-retardant)****2.2 COVERTEK 401™ LIGHTWEIGHT SYNTHETIC ROOF UNDERLAY**

Covertex 401™, a non-woven self-supporting roof underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro-porous inner layer, designed for use as a water absorbent, breathable, water resistant roof underlay for sloped roofs. Suitable for use where FIRE RETARDANCE IS NOT REQUIRED. Refer to [BRANZ Appraisal 943](#). Available in 1350mm and 2700mm roll widths.

Window and joinery flashing tape**2.3 THERMAFLASH™ WINDOW FLASHING TAPE**

Thermaflash™ is a self-adhesive synthetic flexible window flashing tape, with superior adhesion. can be used with rigid air barrier or rigid wall underlay products. Suitable for use as a flexible flashing around window and door joinery openings, available in widths of 75mm, 150mm and 200mm. On windows, the use of a Thermakraft Corner Mould™, is optional however butterfly strips must be applied. Use in conjunction with air seals and joinery flashing systems around window and door joinery on timber, steel framed and medium rise buildings. Compatible with a wide range of sealants but check compatibility. Maximum exposure 180 days. Refer to [BRANZ Appraisal 1122](#).

Approved for use with the James Hardie™ RAB™ Board system, refer to [BRANZ Appraisal 611](#).

Joining tape**2.4 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 -10oC. 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 to [BRANZ Appraisal 611](#). Not to be used as a flashing tape.

2.5 WHITE GENERAL PURPOSE TAPE™

Thermakraft White General Purpose Tape™ is a medium duty acrylic tape is commonly used on synthetic underlays, damp proof and for sealing edges of vapour control layers. Not to be used as a flashing tape. Suitable for joining and sealing underlays, foils and membranes.

Penetration seal**2.6 ONESEAL™ MULTI-FIT SEALS FOR CABLE AND PIPE PENETRATIONS**

Thermakraft OneSeal™, multi-fit pipe seals comprise a UV resistant EPDM material which forms a weathertight air seal for pipes and penetrations with a high strength acrylic adhesive suitable for use on all underlay systems. Available for use with pipes 15-110mm and cables 7-22mm both are pre-punched ensuring a tight accurate fit. No special tools required for installation. Approved for use with the James Hardie™ RAB™ Board system, refer to [BRANZ Appraisal 611](#).

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.
Carry out remedial work identified before laying underlay

3.4 GENERAL REQUIREMENTS

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

Application generally

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Application DPC

3.6 DPC TO LOSP/CCA TREATED TIMBER

Lay Supercourse 500™ DPC under LOSP or CCA treated bottom plate of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.7 DPC TO TIMBER / STEEL

Lay Supercourse 500™ under the bottom plate of all timber / steel framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.
Refer to SELECTIONS for type.

3.8 DPC TO MASONRY AND BRICK VENEER

Lay Supercourse 500™ along based of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

Application - wall underlay

3.9 WALL UNDERLAY

Fix horizontally to outside face of framing in true alignment, with succeeding sheets overlapping 150mm to [NZBC E2/AS1](#), 9.1.7, Wall underlay, and refer to Thermakraft for requirement for fastenings. Fix to Thermakraft Technical Data specifications. Scribe neatly around penetrations and openings to leave no gaps. Flash all openings and tape all penetrations in accordance with Thermakraft Installation Guides. Keep clean, undamaged and without visible weather deterioration until closed in.

Application - roof underlay

3.10 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixings. Lay underlay to avoid excessive dishing between purlins. When used vertically, limit individual runs to 10 metres for bituminous underlays. Do not lay vertically on roof pitches under 10° without support.

Horizontally lay across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations and avoid prolonged exposure by installing the roof immediately.

Application - Drainage mat

3.11 COMPLETION MATTERS

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

4 SELECTIONS

For further details on selections go to www.thermakraft.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

Damp Proof Course

4.1 THERMAKRAFT SUPERCOURSE 500™ DPC

Location: Damp Proof Course
 Type: Supercourse 500™
 Joining tape: Thermakraft™ Aluband™ joinery and flashing tape
 Thermakraft Thermaflash™ flashing tape

Roof underlays - synthetic, self-supporting (non fire-retardant)

4.2 THERMAKRAFT COVERTEK 401™ ROOF UNDERLAY

Location: Roof underlays - synthetic, self-supporting (non fire-retardant)
 Type: Covertek 401™
 Joining tape: Thermakraft White General Purpose Tape™
 Thermakraft Premium Joining Tape™
 Flashing tape: Thermakraft Thermaflash™ joinery and flashing tape
 Thermakraft Aluband™ flashing tape
 Accessories: Thermakraft Oneseal™ penetration seal

Window and joinery flashing tape

4.3 THERMAKRAFT THERMAFLASH™ FLASHING TAPE

Location: Window and joinery flashing tape
 Sill/head tape: 150mm Thermakraft Thermaflash™ (for 90mm framing)
 200mm Thermakraft Thermaflash™ (for 140mm or 150mm framing)
 Sill second layer: 75mm Thermakraft Thermaflash™ (on top of sill over first layer)
 Sill corners: Thermakraft Thermaflash™
 Head corners: 75mm Thermakraft Thermaflash™ butterfly corners
 Accessories: Thermakraft Corner Mould™

Joining tape

4.4 THERMAKRAFT PREMIUM JOINING TAPE™

Location: Joining tape
 Joining tape: 75mm Thermakraft Premium Joining Tape™

4.5 THERMAKRAFT WHITE GENERAL PURPOSE TAPE™

Location: Joining tape
 Joining tape: 60mm Thermakraft White General Purpose Tape™

Penetration seals

4.6 THERMAKRAFT ONESEAL™ PENETRATION SEAL

Location: Penetration seals
 Type: Thermakraft OneSeal™

4171HR JAMES HARDIE® RIGID AIR BARRIERS

1 GENERAL

This section relates to the supply and fixing of James Hardie® rigid air barrier products;

- HomeRAB™ Pre-Cladding
- RAB™ Board - 6mm and 9mm

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:

FRR	Fire resistance rating
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 C/AS2	Protection from fire
NZBC E2/AS1	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

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®

Bracing Design Manual by James Hardie®

Fire and Acoustic Design Manual by James Hardie®

CodeMark™ Certificate GM-CM30130 RevA HomeRAB™ Pre-Cladding and RAB™ Board by James Hardie®

[BRANZ Appraisal 611](#) - James Hardie® HomeRAB™ Pre-Cladding and RAB™ Board

[BRANZ Appraisal 775](#) - 3M All Weather Flashing Tape 8067

[BRANZ Appraisal 846](#) - SUPER-STICK Flexible Flashing Tape

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

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years: For HomeRAB™ Pre-Cladding and RAB™ Board (refer to James Hardie® product warranty)

15 years: 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

1.5 QUALIFICATIONS

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

1.6 SAFE WORKING

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

1.7 NO SUBSTITUTIONS

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

Performance - Wind

1.8 PERFORMANCE, WIND

The design wind pressures are to [NZS 3604](#), up to and including Very High Wind Zone. This is within the scope of the manufacturer's literature and details.

Performance - Bracing

1.9 BRACING REQUIREMENTS

Provide the HomeRAB™ PreCladding/RAB™ Board bracing system. Refer to Bracing Design Manual for selection.

Performance - Acoustic

1.10 ACOUSTIC REQUIREMENTS

Refer to James Hardie Acoustic Systems for details.

2 PRODUCTS

Materials

2.1 RAB BOARD

Hardie™ RAB™ Board, 6mm or 9mm thick, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving manufactured to [AS/NZS 2908.2](#), face and edge sealed.

Components

2.2 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	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized or Grade 316 Stainless

2.3 GALVANIZED NAILS

Hot-dip galvanized nails to James Hardie® requirements. Refer to SELECTIONS.

2.4 STAINLESS STEEL NAILS

316 Stainless Steel nails to James Hardie® requirements. Refer to SELECTIONS.

2.5 HORIZONTAL FLASHING - RAB™ BOARD

RAB™ uPVC Horizontal Flashing for horizontal joints.

Accessories

- 2.6 SEALING TAPE - VERTICAL JOINTS/CORNER JOINTS
SUPER-STICK Building Tape® (75mm wide) or 3M™ All Weather Flashing Tape 8067 (75 mm wide) or Thermakraft™ Premium Jointing Tape.
- 2.7 FLASHING TAPE / WINDOW FLASHING TAPE
SUPER-STICK Building Tape® or 3M™ All Weather Flashing Tape 8067 or Thermaflash Flashing Tape.
- 2.8 BRACING ELEMENT HOLD DOWN - CONCRETE FLOOR
Ramset bracing anchor kit Concrete or GIB Handibrac® with 15kN anchor to suit brace type.
- 2.9 BRACING ELEMENT HOLD DOWN - TIMBER FLOOR
Ramset bracing anchor kit Wood or GIB Handibrac® with 12 x 150mm galvanized coach screw to suit brace type.

3 EXECUTION

Conditions

- 3.1 STORAGE
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.
- 3.2 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage.
- 3.3 PRE-INSTALLATION REQUIREMENTS
Check work previously carried out and confirm it is of the required standard for this part of the work.
- 3.4 FRAMING - RAB™ BOARD
Provide framing plumb, level, in true alignment and in accordance with [NZS 3604](#) or SED requirements. Stud and nog spacing must not exceed James Hardie® requirements. Moisture content of timber framing must not exceed the requirements specified by [NZS 3602](#) to minimise shrinkage and movement after sheets are fixed.

Application - particular installations

- 3.5 BRACING SYSTEM RAB™ BOARD
Fix sheets in accordance with the Bracing Design Manual by James Hardie®. Refer to the bracing manual bracing table for specific requirements.

Application - generally

- 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:
- Openings formed in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®.
 - Materials lapped in a way that water tracks down to the exterior face of the Rigid Air Barrier.
 - Underlay / tapes 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.
- 3.7 CUT EDGES
Cut edges where exposed (not covered by uPVC flashing, flashing or sealing tape) must be primed prior to installation. Refer to SELECTIONS for primer.

Install Rigid Air Barriers

3.8 SHEET LAYOUT

Refer to the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie® for sheet layouts to suit general installations.

3.9 VERTICAL JOINTS

Join sheets to the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®.

3.10 HORIZONTAL JOINTS

Join sheets to the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®.

3.11 EXTERNAL AND INTERNAL CORNERS

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®, using a 75mm minimum wide sealing tape.

3.12 FIXING SHEETS

Fix in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie® with the sealed face towards the external cladding and unsealed face towards the framing. Fix sheets to suit installation requirements for general fixing, bracing and fire rating requirements. Refer to SELECTIONS for fixing type. Use hand-driven nailing for fixing bracing sheets.

3.13 PENETRATIONS

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®.

3.14 OPENINGS

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®. Exposed timber framing around window, door, meter box and other penetrations must be covered with a 150mm wide minimum flashing tape or sealing tape. Flashing tapes must be lapped over the HomeRAB™ Pre-Cladding or RAB™ Board by 50mm minimum.

3.15 FLASHINGS AND JUNCTIONS

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®. Install flashing tape over any flashings and at all junctions with other materials or building elements.

3.16 AT SOFFITS

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®.

3.17 BASE CLEARANCES

Form in accordance with the HomeRAB™ Pre-Cladding and RAB™ Board Installation Manual by James Hardie®. Lining is required to extend below the bottom plate / floor joist by 15mm minimum to form a drip edge and must finish a minimum 100mm clear of finished ground. Where base of sheets are cut to suit site requirements seal the bottom edge with primer.

Completion

3.18 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused and temporary materials and elements from the site.

3.19 REPLACE

Replace all damaged or marked elements.

3.20 LEAVE

Leave work to the standard required for following procedures.

3.21 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

4.1 RAB™ BOARD - RIGID AIR BARRIER 6MM

Brand/type: Hardie™ RAB™ Board

Sheet length: 2450, 2750 or 3000mm

Sheet thickness: 6mm

Nails:

Note: Where the cladding is expected to meet 50 year durability, RAB™ Board must be fixed with stainless steel nails.
Refer to Bracing Design Manual by James Hardie® for fixing bracing sheets.

Hand-driven nails: 40 x 2.8mm stainless steel Hardie™ Flex nails
40 x 2.8mm hot dipped galvanized Hardie™ Flex nails

Nail gun nails: 50 x 2.8mm stainless steel round head gun nails
50 x 2.8mm galvanized round head gun nails
60 x 2.8mm stainless steel round head gun nails
60 x 2.8mm galvanized round head gun nails

Primer: Dulux® 1 Step, Resene Quick Dry

Primer: Dulux® 1 Step, Resene Quick Dry to exposed cut edges

4.2 RAB™ BOARD - BRACING SYSTEMS

Refer to Bracing Design Manual by James Hardie®. For bracing element location refer to drawn documentation.

4231HL JAMES HARDIE® LINEA™ CLADDING

1 GENERAL

This section relates to the supply and fixing of the following fibre cement products:

- Hardie™ Linea™ Weatherboard cladding
- Hardie™ Linea™ Oblique™ 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	Weathertightness
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

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie® documents relating to this part of the work:

Linea™ Weatherboard Technical Specification

Linea™ Oblique™ Weatherboard Horizontal Installation Technical Specification

Linea™ Oblique™ Weatherboard Vertical Installation Technical Specification

James Hardie® Technical Supplement - James Hardie® Claddings Installation to Steel Framing

James Hardie® Fire and Acoustic Design Manual

James Hardie® Bracing Design Manual

[BRANZ Appraisal 446](#) - Linea™ Weatherboard Direct Fixed Cladding

[BRANZ Appraisal 447](#) - Linea™ Weatherboard Cavity Cladding

[BRANZ Appraisal 896](#) - Linea™ Oblique™ Weatherboard (Horizontal) Cavity Cladding

[BRANZ Appraisal 897](#) - Linea™ Oblique™ Weatherboard (Vertical) Cavity Cladding

CodeMark™ [GM-CM30018](#) James Hardie® Linea™ Weatherboard Direct fixed and Cavity Cladding

CodeMark™ [GM-CM30059](#) James Hardie® Linea™ Oblique™ 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

BRANZ appraisal is available at www.branz.co.nz.

CodeMark™ Certificate is available at www.building.govt.nz

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER - LINEA™ OBLIQUE™ WEATHERBOARD

Provide a material manufacturer/supplier warranty:

25 years: Linea™ Oblique™ 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 - NON-CODEMARK INSTALLATION

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

1.5 NO SUBSTITUTIONS

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

1.6 SAFE WORKING

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

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Provide relevant James Hardie® maintenance requirements at completion of the work. Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the information.

Requirements - Linea™ Oblique™ weatherboard**1.8 LINEA™ OBLIQUE™ HORIZONTAL WEATHERBOARD INSTALLATION INFORMATION**

Installer to comply with all the relevant information in;

- Linea™ Oblique™ Weatherboard Horizontal Installation Technical Specification
- [BRANZ Appraisal 896](#)

1.9 LINEA™ OBLIQUE™ VERTICAL WEATHERBOARD INSTALLATION INFORMATION

Installer to comply with all the relevant information in;

- Linea™ Oblique™ Weatherboard Vertical Installation Technical Specification
- [BRANZ Appraisal 897](#)

1.10 LINEA™ OBLIQUE™ WEATHERBOARD INSTALLATION CHECKLIST

Installer to complete, sign and provide a James Hardie® Installation Checklist. Contact James Hardie® for a copy of the Installation Checklist.

Performance**1.11 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**Materials****2.1 LINEA™ OBLIQUE™ WEATHERBOARDS**

Hardie™ Linea™ Oblique™ Weatherboards, rusticated profile, 16mm thick, pre-primed, manufactured from a reduced density cellulose fibre cement formulation and cured by high pressure autoclaving, manufactured to [AS/NZS 2908.2](#), tested to [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 EXTERIOR 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 - Linea™ Oblique™ Weatherboards horizontally fixed**2.4 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING**

Perforated uPVC with upstands.

2.5 STRIA™ ALUMINIUM CAVITY CLOSURE

Perforated aluminium moulding, with upstands.

- 2.6 OBLIQUE™ TRIMLINE JOINT FLASHING
Aluminium flashing extrusion with fin used behind cladding at vertical joints.
- 2.7 WEATHERBOARD INTERNAL "W" CORNER
Anodised aluminium extrusion to flash behind cladding at internal corners.
- 2.8 LINEA™ OBLIQUE™ WEATHERBOARD EXTERNAL BOX CORNER
Anodised aluminium extrusion at external corners.
- 2.9 ALUMINIUM WINDOW JAMB FLASHING
Aluminium moulding to flash behind cladding at external corners.

- 2.10 FLEXIBLE SEALANT
Bostik Seal N Flex-1 or Sikaflex AT Facade or Sikaflex MS sealants.

- 2.11 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 (specific engineering design) requirements for microclimate conditions. For fastener type refer to following clause(s).

- 2.12 HOT DIPPED GALVANIZED NAILS
Hot-dipped galvanized, 75 x 3.06mm D head or 75 x 3.06mm RoundDrive ring shank nails for fixing Linea™ Oblique™ Weatherboards over cavity battens over rigid air barrier
- 2.13 GRADE 316 STAINLESS STEEL NAILS
Grade 316 stainless, 75 x 3.06mm D head or 75 x 3.15mm RoundDrive ring shank nails for fixing Linea™ Oblique™ Weatherboards over cavity battens over rigid air barrier

Components - Linea™ Oblique™ Weatherboards vertically fixed

- 2.14 HARDIE™ HORIZONTAL CAVITY BATTEN
Proprietary profiled radiata pine battens, minimum 45mm wide x 20mm thick, H3.1 treated to [NZS 3602](#), Table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.
- 2.15 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated uPVC, with upstands.
- 2.16 OBLIQUE™ TRIMLINE JOINT FLASHING
Aluminium flashing extrusion used behind cladding at horizontal joints.
- 2.17 TRIMLINE JOINTERS
Aluminium jointers to joint Oblique™ Trimline Joint Flashings at flashing ends, external corners and internal corners.
- 2.18 FLEXIBLE SEALANT
Bostik Seal N Flex-1, Sikaflex AT Facade or Sikaflex MS sealants.
- 2.19 WEATHERBOARD INTERNAL "W" CORNER
Anodised aluminium extrusion to flash behind cladding at internal corners.
- 2.20 LINEA™ OBLIQUE™ WEATHERBOARD EXTERNAL BOX CORNER
Anodised aluminium extrusion to flash behind cladding at external corners.

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

2.22 CAVITY BATTEN NAILS

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

2.23 HOT DIPPED GALVANIZED NAILS

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

2.24 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 Linea™ Oblique™ Weatherboards over battens over rigid air barrier.

Accessories

2.25 SEALANT

Silaflex AT-Facade sealant.

3 EXECUTION

Conditions

3.1 STORAGE

Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and cover to keep dry until fixed.

3.2 HANDLING

Avoid distortion and contact with potentially damaging surfaces. Carry weatherboards on edge. Do not drag weatherboards across each other, or across other materials. Protect edges, corners and surface finish from damage.

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 sheets are fixed.

Application - particular installations

3.4 FIRE RESISTANCE RATING

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

3.5 BRACING SYSTEM

Fix Linea™ Weatherboards to James Hardie® Bracing Design Manual.

Application - generally

3.6 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.

3.7 INSTALL CAVITY BATTENS - LINEA™ OBLIQUE™ VERTICAL WEATHERBOARD

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).

3.8 PENETRATIONS AND FLASHINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. 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).

3.9 INSTALL LINEA™ OBLIQUE™ WEATHERBOARDS - HORIZONTAL INSTALLATION

Cut weatherboards to required lengths for vertical jointing. Fit vertical jointers, internal and external corners and fix weatherboards as per Linea™ Oblique™ Weatherboard Horizontal technical specifications.

3.10 INSTALL LINEA™ OBLIQUE™ WEATHERBOARDS - VERTICAL INSTALLATION

Cut weatherboards to required lengths. Fit joint flashing, internal corners and external corners and fix weatherboards as per Linea™ Oblique™ Weatherboard Vertical technical specifications

3.11 INSTALL FLASHINGS

Install flashings at all wall openings, penetrations, junctions, connections, window sills, heads and jambs to [NZBC E2/AS1](#).

Completion**3.12 REPLACE**

Replace all damaged or marked elements.

3.13 LEAVE

Leave work to the standard required for following procedures.

3.14 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz. Substitutions are not permitted to the following, unless stated otherwise.

Linea™ Oblique™ Weatherboards horizontally fixed

4.1 JAMES HARDIE® LINEA™ OBLIQUE™ WEATHERBOARDS HORIZONTALLY FIXE

Location: Exterior wall cladding
 Brand/type: James Hardie® Linea™ Oblique™ Weatherboard:
 Thickness: 16mm
 Width: 200mm or 300mm
 Construction: Cavity fix
 Fixing: Refer to items under 2.0 PRODUCTS

4.2 STRIA™ ALUMINIUM CAVITY CLOSURE

Location: Cavity closure
 Brand/Type: Stria™ Aluminium Cavity Closure

4.3 JAMES HARDIE® LINEA™ OBLIQUE™ ALUMINIUM EXTERNAL BOX CORNEF

Location: External corner
 Brand/Type: Oblique™ Aluminium External Box Corner
 Finish: Etched primed aluminium extrusion

4.4 OBLIQUE™ TRIMLINE JOINT FLASHING

Location: Joint flashing
 Brand/type: Oblique™ Trimline Joint Flashing
 Finish: Etched primed aluminium extrusion

4.5 PRIMER TO CUT ENDS

Type: Dulux Primacryl, Acraprime 501/1, Resene Quick Dry or similar product. Select to ensure primer is compatible with paint system.

Linea™ Oblique™ Weatherboards vertically fixe**4.6 JAMES HARDIE® LINEA™ OBLIQUE™ WEATHERBOARDS VERTICALLY FIXE**

Location: Exterior wall cladding
 Brand/type: James Hardie® Linea™ Oblique™ Weatherboard:
 Thickness: 16mm
 Width: 200mm or 300mm
 Construction: Cavity fix
 Fixing: Refer to items under 2.0 PRODUCTS

4.7 JAMES HARDIE® HORIZONTAL CAVITY BATTENS

Supplier: James Hardie®
 Timber species: Radiata pine
 Treatment: H3.1

4.8 JAMES HARDIE® LINEA™ OBLIQUE™ ALUMINIUM EXTERNAL BOX CORNEF

Location: External corner
 Brand/Type: Oblique™ Aluminium External Box Corner
 Finish: Etched primed aluminium extrusion

4.9 OBLIQUE™ TRIMLINE JOINT FLASHING

Location: Joint flashing
 Brand/type: Oblique™ Trimline Joint Flashing
 Finish: Etched primed aluminium extrusion

4.10 PRIMER TO CUT ENDS

Type: Dulux 1 Step, Acraprime 501/1, Resene Quick Dry or similar product. Select to ensure primer is compatible with paint system.

Finishing**4.11 PAINTING**

Refer to painting section(s) for details.

4239JH JAMES HARDIE® SOFFITS

1 GENERAL

This section relates to the supply and fixing of **James Hardie®** products to the underside of exterior soffits, verges and eaves. It includes:

- James Hardie® Eclipsa™ Eaves Lining
- James Hardie® Hardie™ Flex Eaves Lining
- James Hardie® Hardie™ Groove Soffit Lining
- James Hardie® Villaboard™ Soffit Lining

Documents

1.1 DOCUMENTS

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

NZBC E2/AS1	External moisture
AS/NZS 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
NASH Standard Part 2	May 2019 Light Steel Framed Buildings

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie® documents relating to this part of the work:
Eaves and Soffits Installation Manual by James Hardie®
Fire and Acoustic Design Manual by James Hardie®

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

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years: For James Hardie® HardieGroove™ Soffit Lining & HardieFlex™ Eaves Lining

(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

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

1.5 NO SUBSTITUTIONS

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

1.6 SAFE WORKING

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

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Provide relevant James Hardie maintenance requirements at completion of the work.

Performance**1.8 PERFORMANCE - UP TO AND INCLUDING VERY HIGH WIND ZONE**

The design wind speeds/zones are to [NZS 3604](#), up to and including Very High Wind Zone. Eaves and Soffits Installation Manual by James Hardie® requirements are suitable for these conditions.

2 PRODUCTS**Materials****2.1 HARDIE™ FLEX EAVES LINING**

James Hardie® Hardie™ Flex Eaves Lining 4.5mm and 6mm thick cellulose fibre reinforced cement sheet. Manufactured to [AS/NZS 2908.2](#) from Portland cement, ground sand, cellulose fibre and water.

2.2 HARDIE™ GROOVE SOFFIT LINING

James Hardie® Hardie™ Groove Soffit Lining, 7.5mm thick cellulose fibre reinforced cement sheet with grooves lengthways to sheet and half grooves to long sheet edges. Manufactured to [AS/NZS 2908.2](#) from Portland cement, ground sand, cellulose fibre and water.

Components**2.3 FASTENER TYPE**

Fasteners to minimum durability requirements of the NZBC. Refer to [NZBC E2/AS1](#), Table 20, Material selection for fixing material, and [NZBC E2/AS1](#), Table 21, Compatibility of materials in contact, for selection of suitable fixing materials and their compatibility with other materials.

Exposure	Fixing	Fixing Material	Zone
Sheltered	Nail	Hot-dip galvanized steel	B
Sheltered	Nail	Stainless steel	B, C, D, E
Sheltered	Screw	Stainless steel	B, C, D, E

Check against SED (specific engineering design) requirements for microclimate conditions. Refer to SELECTIONS for fastener type.

Components - Hardie™ Flex Eaves Lining**2.4 SOFFIT JOINTERS AND MOULDS**

Extruded uPVC jointer, capping and scotia mould.

2.5 HARDIE™ FLEX NAILS

Hardie™ Flex Nail, 40 x 2.8mm stainless steel or galvanized nail, Refer to SELECTIONS.

2.6 INSEAL TAPE

Inseal® 3259, 1.5mm thick x 48mm wide black compressible medium density closed cell foam tape.

2.7 POLYPROPYLENE TAPE

Polypropylene tape, 30mm minimum width.

Components - Hardie™ Groove Soffit Lining**2.8 SCOTIA MOULD**

Extruded uPVC two piece scotia mould

2.9 SCREW

Hardie™ Drive Screw, 316 stainless steel, 30mm x 7g or Villadrive Screw, 30mm x 6g, Class 3. Refer to SELECTIONS.

- 2.10 **HARDIE™ FLEX NAIL**
Hardie™ Flex Nail, 40 x 2.8mm stainless steel or galvanized nail, Refer to SELECTIONS.
- 2.11 **ADHESIVE**
Refer to SELECTIONS.
- 2.12 **INSEAL TAPE**
Inseal® 3259, 1.5mm thick x 48mm wide black compressible medium density closed cell foam tape.
- 2.13 **BASE COMPOUND**
Hardie™ Base Coat.

Components - General

- 2.14 **FLEXIBLE JOINT SEALANT**
Refer to SELECTIONS.

3 EXECUTION

Conditions

- 3.1 **STORAGE**
Take delivery of products dry and undamaged. Store on site, lay flat on a smooth level surface clear of the ground. Protect materials, finished surfaces, edges and corners from damage, water and moisture.
- 3.2 **HANDLING**
Move/handle goods in accordance with James Hardie® requirements. Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage. Reject and replace goods that are damaged or will not provide the required finish. Install materials in a dry state.
- 3.3 **SUBSTRATE - TIMBER FRAMING**
Do not commence work until the substrate is of the standard required 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 sheets are fixed.
- 3.4 **COMMENCE WORK**
Do not commence work until the roof has been installed.

Application - general

- 3.5 **SHEET LAYOUT**
All sheet edges must be fully supported by framing or rebates in fascia and barge boards.
- 3.6 **CUTTING SOFFIT CLADDING**
Cut sheets dry using score and snap method, hand guillotine method or fibreshear heavy duty method. If these methods are not feasible, use an alternative manufacturer approved method.
- 3.7 **CIRCULAR HOLE FORMING**
Mark the centre of the hole on the sheet, pre-drill a pilot hole. Use the pilot hole as a guide for a hole saw fitted to a heavy duty electric drill.
- 3.8 **IRREGULAR HOLE FORMING**
Drill a series of small holes around the perimeter of the proposed hole, tap out the waste piece from the sheet face.
- 3.9 **INSTALL HARDIE™ FLEX EAVES LINING**
Install in accordance with James Hardie® installation manual requirements. Refer to SELECTIONS for fixing and jointing methods.

3.10 INSTALL HARDIE™ GROOVE SOFFIT LINING

Install in accordance with James Hardie® installation manual requirements. Where required butt joint short ends of cladding (cut square and form chamfer to match) and align to provide continuation of grooved profile line Refer to SELECTIONS for fixing and jointing methods.

3.11 BUTT JOINT

Paint sheet edges prior to installation.

3.12 CONTROL JOINT

Install control joint to James Hardie® installation manual requirements.

3.13 FASTENER - SIZE AND LAYOUT

Fix sheets to framing using fasteners as nominated in SELECTIONS. Fix to James Hardie® installation manual requirements.

3.14 SEALANTS

Application and use of sealants to manufacturer's instructions. Check with sealant manufacturer prior to coating over sealants.

3.15 PAINTING

Refer to painting section/s for protective coating system.

Completion

3.16 COMPLETE

Ensure the work is complete with all components, accessories, trim, sealant and finishing properly installed so the soffit cladding system is completely weathertight.

3.17 REPLACE

Replace all damaged or marked elements.

3.18 CLEAN

Clean surfaces.

3.19 LEAVE

Leave work to the standard required for following procedures.

3.20 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Materials

4.1 HARDIEFLEX™ EAVES LINING

Location:	Soffits
Brand/type:	James Hardie® HardieFlex™ Eaves Lining
Thickness:	4.5mm
Width:	900mm - 4.5mm thick sheet (2400mm length). 1200mm - 4.5mm thick sheet (1800, 2400, 2700, 3000mm length). 1200mm - 6mm thick sheet (2400, 2700, 3000mm length).
Fixing Method:	HardieFlex™ nails (usual fixing method). Alternatively use Fastfix method (Fastfix fastener, adhesive & nails) for 4.5mm thick sheet.
Fixing type:	Stainless steel HardieFlex™ Nail, 40 x 2.8mm Stainless steel nail suitable for Zone B, Zone C, Zone D, Zone E. Galvanized HardieFlex™ Nail, 40 x 2.8mm Suitable for Exposure Zone B only (due to sheltered location). Fastfix fastener and Sikaflex-11FC Sika adhesive or Seal N Flex-1 Bostik adhesive.
Joint detail:	40x10 timber cover battens to sheet joints Express joint with Inseal 3259 tape (10mm max. gap, detail requires 70mm width framing).

4.2 HARDIEGROOVE™ SOFFIT LINING

Location:	Soffits
Brand/type:	James Hardie® HardieGroove™ Soffit Lining
Thickness:	7.5mm
Length:	2400mm, 2700mm, 3000mm (1200mm width).
Fixing method:	Combined screw and adhesive - recommended fixing method. Combined nail and adhesive - recommended fixing method. Screw fix only - alternative fixing method. Nail fix only - alternative fixing method.
Fixing type:	HardieDrive™ Screw s/s 316 (Recess screw head and stop or finish flush). Suitable for Zone B, Zone C, Zone D, Zone E / Microclimates. Refer to NZS 3604 , section 4, Durability. Check against SED requirements for microclimate conditions. Villadrive Screw 6g x 30mm (Recess screw head and stop). Suitable for Exposure Zone B Stainless steel HardieFlex™ Nail, 40 x 2.8mm suitable for Zone B, Zone C, Zone D, Zone E. Galvanized HardieFlex™ Nail, 40 x 2.8mm Suitable for Exposure Zone B only (due to sheltered location).
Adhesive:	Sikaflex-11FC by Sika or Seal N Flex-1 by Bostik Delete this option if screw fix only or nail fix only fixing method selected.

Painting

4.3 PAINTING

Refer to painting section/s for details.

4311D DIMOND PROFILED METAL ROOFING

1 GENERAL

This section relates to the supply and fixing of **Dimond Roofing** profiled roofing and includes:

- Metal roofing
- Duraclad roofing
- and associated accessories and components

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

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

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 G12/AS1	Water Supplies
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 1734	Aluminium & aluminium alloys – flat sheets, coiled sheet and plate
AS/NZS 2728	Prefinished / prepainted sheet metal products for interior / exterior building applications
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1566	Copper & copper alloys, rolled flat products
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
BS EN 988	Zinc & zinc alloys, specification for rolled flat products for building
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

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

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

Web only based: **Dimond** Roofing and Cladding Systems Manual

Manufacturer/supplier contact details:

Company:	Dimond Roofing
Web:	www.dimond.co.nz
Email:	hello@fletchersteel.co.nz
Telephone	0800 346 663 (0800 DIMOND)

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

18 years: for failure of coating adhesion
30 years: for weatherproofing by material penetration

- Provide this warranty on **Dimond Roofing** 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/appliator warranty:

5 years from the date of completion of the roof

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

Include a copy of the **Dimond Roofing** maintenance requirements with the warranty.

Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

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

1.7 QUALIFICATIONS

Roofers to be Dimond Roofing Recommended Installer, or experienced, competent roofers familiar with **Dimond Roofing** 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 with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding

Compliance information

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Manufacturer's, importer's or distributors warranty
- Installer's warranty
- Producer Statement - Construction from the installer
- Other information required by the BCA in the Building Consent Approval documents

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone:

Very High /1.55kPa / 50 m/s kPa ULS(refer to [NZS 3604](#), table 5.4)

Refer to **Dimond Roofing** for "Wind Load Span Capacity charts".

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters. Refer to **Dimond Roofing** Technical Information for load span tables and fixing charts for the selected profile. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Fixing pattern to also take into account fixing method and purlin spacings.

Performance - General

1.11 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.

1.12 PERFORMANCE

Select installation method of the roof materials and accept responsibility for the weather-tight performance of the completed roofing system including penetrations through the roof and junctions with walls and parapets.

1.13 DRINKING WATER

Roofing for collecting potable water to [NZBC G12/AS1](#).

2 PRODUCTS

Materials

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 [NZBC E2/AS1](#) and/or the [NZMRM CoP](#) and Dimond Roofing requirements.

For fixing patterns refer to Dimond Roofing Fixing Charts for the selected profile.

2.3 FIXING SCREWS

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

For aluminium roofing use Alutite or stainless steel fixings and for copper or stainless steel roofing use stainless steel fixings. Refer to SELECTIONS

2.4 RIVETS - ALUMINIUM

Sealed aluminium, minimum diameter 4mm, for use with zinc coated, zinc/aluminium coated or aluminium roofing.

Components

2.5 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, 0.5mm BMT for Copper 0.7mm and 0.90 for aluminium (or 0.7mm for small aluminium flashings) to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.6 FLASHINGS TO VERGE, RIDGE AND HIP

Supplied by the roofing manufacturer to match or to suit the roofing in the same material as the roof.

2.7 BOOT FLASHINGS

Generally to [NZBC E2/AS1](#), 8.4.17 **Roof penetrations** (note; [NZBC E2/AS1](#), Figure 54 **Soaker flashing for pipe penetration**, has an error, use as guide only)

EPDM proprietary pipe flashing laid on 45° bias to roofing, with over-flashing (soaker flashing) if required.

A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

2.8 NATURAL LIGHTING

Refer to 4312D DIMOND PROFILED GRP NATURAL LIGHTING.

Accessories

2.9 WIRE NETTING AND SAFETY MESH

Refer to 4161 UNDERLAYS, FOIL AND DPC.

- 2.10 UNDERLAY AND REFLECTIVE FOIL
Refer to 4161 UNDERLAYS, FOIL AND DPC
- 2.11 SEALANT
Neutral curing MS sealant or polymer sealant as required by the roofing manufacturer and used as directed.
- 2.12 CLOSURE STRIPS
Non-bituminous compressible, profiled foam strips to fit the sheet profile.
- 2.13 LAP SEALING TAPE
Closed cell self adhesive nitrile tape.

3 EXECUTION

Conditions

- 3.1 INSPECTION - STRUCTURE
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 all sheets for any damage and accept packs of roofing undamaged on delivery. Reject all damaged material. Store on a level firm base 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 movement between sheets.
- 3.4 HANDLING
Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage. Use soft, flat sole shoes when fixing and for all other work on the roof. Walk along the purlin line whenever possible.

Application - Preparation

- 3.5 SEPARATION
Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible or inert materials. Place isolators such as flashing tapes or drainage mat between metals and CCA treated timber, cement based materials, and mixing aluminium sheet and steel mesh. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.
- 3.6 FIX INSULATION
Refer to Thermal Insulation sections.
- 3.7 FIX UNDERLAY
Refer to 4161 UNDERLAYS, FOIL AND DPC.

Application - General

- 3.8 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.

3.9 END LAPS

End laps should be avoided, except where specifically detailed. Where end laps are necessary, seal both ends of the lap with lap sealing tape or sealant and 4mm sealed pop rivets at maximum 50mm centres, to detail in [NZMRM CoP](#).

3.10 SEAL CUT EDGES

In very severe marine environments seal cut edges of pre-coated steel sheet with edge protection lacquer before fixing to the cladding manufacturer's requirements.

3.11 THERMAL MOVEMENT

For sheet lengths more than 18 metres, make provision for thermal expansion where required

3.12 FIXING GENERALLY

Install and fix in accordance with [NZBC E2/AS1](#), the [NZMRM CoP](#) and the Dimond Roofing required fixing patterns and details for each area of the building roofing. Use only screws and clips as required by Dimond Roofing. Paint colour matched fixings and accessories before installation.

3.13 MARKING AND CUTTING

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

3.14 FIX SHEETS

Fix sheets in place using the fastening system required by Dimond for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.15 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.

Application - Flashings**3.16 FLASHINGS**

Flash roof to parapets, walls and penetrations to detail. Flashings to be installed on timber framing with moisture content of less than 18%. Where no detail is provided flash to [NZMRM CoP](#) recommendations and Dimond requirements. Cut accurately and fix using sealant and rivets to detail and to Dimond requirements to form a weatherproof cover. For highly visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.17 USE OF SEALANTS

Select and use sealants only as recommended by Dimond. Remove any swarf and clean down, apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces. Do not use sealant on Copper material, these materials are required to be soldered to complete any joint.

3.18 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**3.19 REPLACE**

Replace damaged or marked elements.

3.20 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.

3.21 REMOVE

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

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Coating system

4.1 COATING SYSTEM - EXPOSURE ZONE B-C (CAT 1-3)

Project Exposure Zone B-C to [NZS 3604](#), C 1-3 to ISO 9223.

Profile/location: Solar Rib Roofing
 Base material: Zinalume on steel
 Coating system: Colorsteel Endura
 Paint colour: TBC

Roofing

4.2 DIMOND ROOFING - SOLAR RIB

BMT/material: 0.55mm steel
 Effective cover: 1015 mm
 Profile height: 51mm
 Fixings: 14g x 100mm Woodteks c/w neoprene washer, 36mm EPDM & LSW (crest fix only)
 14g x 100mm Woodteks no neo, with 25mm embossed washer (crest fix only)
 Fixing pattern: Refer to Dimond Roofing Solar Rib literature for details

Accessories

4.3 FLASHINGS - GENERALLY

Profile: Refer to architectural drawings and details
 BMT/material: 0.55mm steel
 Coating system: To match roofing
 Paint colour: To match roofing

4.4 UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC.

4337E ECOPLY® ROOFING & DECKING

1 GENERAL

This section relates to the use of plywood sheets for:

- membrane roofs
- membrane decks
- membrane gutters
- substrate for roofing

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:

FSC® Forest Stewardship Council®
COC Chain of Custody

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/AS1	External moisture
AS/NZS 1170.2:2011	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed 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.

1.3 MANUFACTURER'S DOCUMENTS

CHH Woodproducts documents relating to work in this section are:

Ecoply® Structural plywood properties and application manual

Ecoply® Specification and installation guide December 2011

FSC Certificate No FSC-C012019, COC Code SCS-COC-001316, expires 5 June 2023

Copies of the current product literature are available from Carter Holt Harvey Woodproducts Ltd

Web: www.chhwoodproducts.co.nz

Telephone: 0800 326 759

1.4 NO SUBSTITUTIONS

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

Requirements

Performance

1.5 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of NZS 3604, table 5.4.

Refer to general section 1220 PROJECT for details.

1.6 SEISMIC - NON SPECIFIC DESIGN

Design the system and its anchorages/fixings to resist the earthquake loads of the earthquake zone in accordance with NZS 3604, 5.3 Earthquake bracing demand.

Refer to general section 1220 PROJECT for details.

2 PRODUCTS

Materials

2.1 ECOPLY® FLOORING (T&G) F8 GRADE

Radiata pine veneer ply to [AS/NZS 2269.0](#), face sanded, CD grade and H3.2 CCA treated to AS/NZS 1604.1, if required.

Components

2.2 NAILS

Galvanized flat head, annular grooved or twisted shank. Stainless steel nails annular grooved. Refer to CHH Woodproducts requirements for size and use.

7 - 9mm plywood:	40mm x 2.5mm
12 -15mm plywood:	50mm x 2.8mm
17 - 21mm plywood:	60mm x 2.8mm
25mm plywood:	75mm x 3.15mm

2.3 SCREWS IN TIMBER

Stainless steel, counter-sunk. Refer to CHH Woodproducts requirements for size and use. General:

- 7 - 9mm plywood: No. 8 x 30mm
- 12 -15mm plywood: No. 8 x 40mm
- 17mm plywood: No. 10 x 40mm
- 19 - 21mm plywood: No. 10 x 45mm
- 25mm plywood: No. 10 x 50mm

Under membranes:

- 17 - 25mm plywood: No. 10 x 50mm (to E2/AS1, 8.5.5.1)

2.4 ADHESIVE

Single pack waterproof general purpose construction adhesive.

2.5 TIMBER FILLETS

20mm H3.2 CCA treated triangular timber internal corner fillets, for membrane installations.

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 SUPPORT FRAMING

Ensure support framing is completed to CHH Woodproducts stated requirements for laying plywood sheets.

Application

3.4 SUPPORT EDGES AND JOINTS

Fully support edges and joints on square edged sheets.

3.5 FIXINGS

150mm centres along edges, minimum 7mm, maximum 15mm from the edge and, 300mm maximum centres on intermediate supports, or 200mm centres under membranes

3.6 FIXING ECOPLY® PLYWOOD SHEETS

Fix sheets to CHH Woodproducts requirements. Lay sheets in a staggered layout, face-grain of sheet at right-angles to support and with sheets in square, true alignment and plane with a 3mm expansion gap for square edge sheets. Nail fix to CHH Woodproducts requirements.

3.7 UNDER MEMBRANE ROOFING

To [NZBC E2/AS1](#), 8.5 Membrane roofs and decks. Screw and adhesive fix sheets with stainless steel screws for membrane type roofing to CHH Woodproducts and membrane manufacturers' requirements. CD grade plywood with the C face up (or better). Provide a 5mm radius chamfer to external edges where the membrane is to be wrapped over. Fix internal corner fillets.

Provide whichever is the greater falls:

- as shown on the drawings
- to the membrane manufacturer's requirements
- minimum to [NZBC E2/AS1](#), 8.5.1, - 1:30 for roofs, 1:40 for decks and 1:100 for gutters

Completion

3.8 COMPLETION MATTERS

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

4 SELECTIONS

4.1 ECOPLY® FLOORING (T&G)

Location:	Membrane deck substrate
Manufacturer:	CHH Woodproducts
Brand/grade:	Ecoply® Flooring (T&G) / CD
Stress grade:	F8 (red tongue)
Thickness:	Minimum 17mm
Treatment:	H3.2 CCA
Fixing:	Screw, stainless steel

4.2 SCREWS

Type/size/material: 10g x 50mm stainless steel screws required by [NZBC E2/AS1](#) for membrane installations.

4.3 ADHESIVE

Type: Refer to CHH Woodproducts literature and/or membrane supplier for recommended adhesives.

4421N NURAPLY MEMBRANE ROOFING & DECKING

1 GENERAL

This section relates to the application of **Nuralite Waterproofing Limited** NURAPLY roofing systems as external membrane waterproof coverings, adhesive fixed to:

- construction plywood
- concrete
- Enertherm PIR Insulation board
- reconstituted wood products (Strandboard)
- with accessories
- cross laminated timber

to produce a fully adhered bituminous membrane system.

1.1 DOCUMENTS

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

NZBC B2/AS1	Durability
AS 2122.1	Combustion characteristics of plastics - Determination of flame propagation - Surface ignition of vertically orientated specimens of cellular plastics
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
BRANZ Good practice guide	Membrane roofing
CodeMark CM70032 – The Nuraply 3PM Roofing Membrane System	

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

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

NURALITE Waterproofing Limited: CAD drawings
 Nuraply 3PM Roofing Membrane Installation Manual
 NURALITE Waterproofing Limited: Substrate Readiness Checklist
[BRANZ Appraisal 547](#) - Nuraply Roof and Deck Membranes
[BRANZ Appraisal 732](#) - Nuraply Nuratherm Insulating Roof System

Manufacturer/supplier contact details

Company: **Nuralite Waterproofing Limited**
 Web: www.nuralite.co.nz
 Email: info@nuralite.co.nz
 Telephone: 09 579 2046 Auckland
 0800 Nuralite (0800 687 254)

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years: For system under normal environmental and use conditions against failure.

- 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 completion of the application

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years: NURAPLY applicator to warrant this work under normal environmental and use conditions against failure of materials, waterproofing and execution.

- Provide this warranty on the installer/applicator standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of completion of the application

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 WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be licensed by NURALITE Waterproofing Limited. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.7 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Applicators approval certificate from the distributor
- Distributors warranty
- Installer's / applicator's warranty
- Producer Statement - Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance - general**1.8 TEST**

Where possible, flood test all gutters with a maximum 50mm depth of water at the outlet or scuppers for 24 hours. Make good any lack of water tightness when the surface is completely dry. Not all applications can be flood-test checked. All gutters should be checked.

1.9 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed NURAPLY roofing system, including all penetrations through the roof and junctions with walls and parapets. In the event that there are issues relating to any aspect of this work, arrange for a meeting to resolve these issues.

The following should attend:

- NURAPLY roofing applicator
- NURALITE Waterproofing Limited representative
- Contractor
- Principal
- Principal's consultant(s)

1.10 AS APPROVED

"As approved" means that the materials are compatible with NURAPLY 3PM roofing and are part of the system required by the roofing supplier for each specific location.

1.11 COMPLIANCE CODEMARK CERTIFICATE - NURAPLY 3PM

NURAPLY 3PM Roofing Membrane System meets the requirements of the CodeMark® certificate CodeMark [CM70032](#) when used within the conditions and limitations of its Certificate of Conformity.

2 PRODUCTS**Materials - general****2.1 EDGE TRIM**

To Nuralite Waterproofing Limited details and to suit the specific location. NURATRIM aluminium verge trim where detailed.

- 2.2 OUTLETS
As detailed and rebated into surfaces as required by NURALITE Waterproofing Limited.
- 2.3 GUTTER LIP TRIM
0.55 folded sheet to provide a protected face to insulation board at gutter lip.
- 2.4 MS DETAIL
Liquid waterproofing to provide additional waterproofing protection.
- 2.5 NURADECK BANDAGE SYSTEM
Liquid applied elastomeric, fibre reinforced waterproofing system.

Materials - Nuraply 3PM two layer system

- 2.6 NURAPLY WATERPROOFING MEMBRANE, FULLY BONDED BASE LAYER
NURAPLY 3PB-SA provides a 3mm thick first layer in two layer applications on plywood, timber or Strandboard. Supplied in 1m wide x 15m long rolls.
- 2.7 NURAPLY WATERPROOFING MEMBRANE, MINERAL FACE TOP LAYER
NURAPLY 3PM single layer, 4mm thick reinforced fibre asphalt waterproofing membrane with textured mineral aggregate finish. Top layer over NURAPLY 3PB-SA or NURAPLY 3PV-SA basesheet. Supplied in 1m x 7.5m long rolls.

Accessories

- 2.8 ADHESIVES
NURAFLEX No. 10, water-based adhesive for bonding NURAPLY roofing systems to plywood substrates, to NURALITE Waterproofing Limited specification.
- 2.9 PRIMER
NURAFLEX QD or NURAFLEX WB primer for substrate preparation prior to bonding NURAPLY roofing systems to concrete and plywood, to NURALITE Waterproofing Limited specification.
- 2.10 SEALANT
IKO Stickall Bitumen - high performance MS mastic sealant.
Millennium LPS - single component elastomeric polyurethane UV stable sealant.
- 2.11 EXPANDING FOAM
Holdfast Gorilla Nailpower fire rated expanding foam.
- 2.12 DECK SUPPORT SYSTEMS - NURAJACKS & NURAPADS
Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for specification.
- 2.13 ALUMINIUM TAPE
3M Aluminium tape in 150mm or 48mm widths.
- 2.14 BITUMEN FILLET
NURALITE Triangular.
- 2.15 PENETRATION SEAL
Lockin Pocket.
- 2.16 MOUNTING PLATE
NURALITE Fixing Plate.
- 2.17 DRIP EDGE
"L" profile 50mm x 50mm
- 2.18 CABLE DUCT
NURALITE Goose Neck

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

- Take delivery of rolls undamaged and include for site handling facilities where required. Stack on end, off the ground on a level surface and with accessories. Store in shade or cover in hot sun. Protect liquid components from freezing.

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 GENERALLY

Work and materials to Nuraply 3PM Installation Manual, BRANZ Good practice guide - Membrane roofing, and to NURALITE Waterproofing Limited installation instructions.

3.4 LAYOUT

Refer to drawings for details. Supplement with Nuralite generic details if situation is not covered on drawings. If not detailed on the drawings, confirm the layout to suit site conditions and for the performance of the NURAPLY 3PM system. Stagger junctions of NURAPLY 3PM rolls to avoid 4 layer membrane build-up at corner lap joints.

Installation - preparation

3.5 PRELIMINARY WORK

Ensure that preliminary work, including formation of falls, flashing rebates, grooves, ducts, provision of battens and fillets and outlets rebated to levels, is complete and properly constructed to enable the system to work as intended. This work and the substrate to be smooth, clean and dry.

3.6 ACCEPTANCE OF SUBSTRATE

Confirm that the substrate, including fillets, sumps, rebated outlets and projections, will ensure NURAPLY work of the required standard. Ensure the substrate is smooth, clean and dry. Complete "Substrate Readiness Checklist" provided by NURALITE Waterproofing Limited. Refer to MANUFACTURER/SUPPLIER DOCUMENTS.

3.7 PLYWOOD SUBSTRATE

Ensure that sheets have been stretcher bond laid to falls, are rigid, with joints flush, edges arised, upstands filleted, no lumps or hollows, smooth, clean, dry and free of debris. Plywood grain across the line of supports below.

Constructed falls on roofs and decks to be 1 in 80 minimum and 1 in 100 for gutters.

3.8 MOISTURE ABSORBENT SUBSTRATE

Lay NURAPLY to cover the moisture absorbent dry-laid base on the same day the base is laid or ensure that the base is kept covered and dry until NURAPLY is laid. Seal exposed NURAPLY edges at the end of each work period.

Installation - general

3.9 WELD JOINTS

Heat fuse joints minimum width 80mm side and 100mm end laps using NURALITE Waterproofing Limited self-checking lap welding techniques.

3.10 PENETRATIONS

Form mould, weld and flash all upstands, downturns and penetrations to NURALITE Waterproofing Limited details including raised, anti-ponding water deflectors on the upside of penetrations.

3.11 MOVEMENT JOINTS

Form and weatherproof movement joints as designed to NURALITE Waterproofing Limited details.

3.12 JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of NURAPLY roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof.

Required work includes the following:

- Roofing installation neatly finished to all sides of openings and to all wall and parapet junctions.
- Installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Installation - Nuraply 3PM two layer system

3.13 FIRST LAYER ON PLYWOOD, CROSS LAMINATED TIMBER AND STRANDBOARD

Lay the first NURAPLY 3PB-SA layer into NURAFLUX NO.10, NURAFLUX WB or NURAFLUX QD primer to NURALITE Waterproofing Limited requirements, with joints to be welded lapped a minimum of 80mm down the roll edges and 100mm across the roll ends. Lay in order from low points, sumps, through gutters, valleys, eaves, verges main roof and upstands to cover flashings.

3.14 LAYING AND JOINTING SECOND LAYER - MINERAL FACE

Lay the second NURAPLY 3PM layer by heat fusing over the cleaned repaired and NURAFLUX primed (if necessary) surface of the first layer in the same sequence. Joints in the second layer must not correspond with joints in the first layer. Second layer joints to be welded lap-joints, minimum 80mm wide down roll edges and minimum 100mm wide across roll ends, to the NURAPLY 3PM supplier's requirements. Roll junctions must be staggered to avoid 4-layer lap-weld build-up of NURAPLY 3PM at corners. Ensure unobstructed drainage flow at outlets.

Installation - Nurajack and Nurapad deck support system

3.15 NURAJACK & NURAPAD INSTALLATION

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for details.

Conditions - completion

3.16 ACCESS BOARDS

Provide access boards for later operations and remove when no longer needed.

3.17 FOOT TRAFFIC

Do not allow construction foot traffic on the NURAPLY 3PM installation after laying to avoid dirt and damage to the surface.

In areas where ongoing maintenance traffic is anticipated, fully bond a third layer of Nuraply 3PM in a contrasting colour to act as a walkway and wear course.

3.18 ACCEPTANCE

Arrange for an inspection of the completed work. Protect and maintain roofing until completion of the contract works.

3.19 SUBSEQUENT WORK

Make good any covering cut or deformed by later work. Making good to take the form of inserting a new whole or part infill sheet to maintain the appearance of the covering as originally laid.

Completion

3.20 COMPLETION MATTERS

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

4 SELECTIONS

For further details on selections go to www.nuralite.co.nz. Substitutions are not permitted to the following, unless stated otherwise.

Nuraply 3PM two layer system

4.1

NURAPLY 3PM TWO LAYER SYSTEM ON PLYWOOD, CROSS LAMINATED TIMBER AND STRANDBOARD

Location:	Membrane deck
Supplier:	NURALITE Waterproofing Limited
First layer:	NURAPLY 3PB-SA
Substrate adhesion:	NURABOND 10 or NURAFLUX
Second layer:	NURAPLY 3PM
Colour:	Slate or Charcoal

Accessories

4.2 **NURAJACK & NURAPAD DECK SUPPORT SYSTEM**

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for details.

4521NR ALTUS RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

This section relates to the fabrication, supply and installation of **Altus NZ Ltd (Altus)** residential aluminium windows and doors by Bradnams®, Fisher®, Nebulite®, Nulook®, Rylock® or Vistalite®. It includes:

- WeatherTight™ windows and doors - by Bradnams® and Nulook®
- SovereignSeries™ windows and doors - by Bradnams® and Nulook®
- Millennium™ Roof Windows - by Bradnams® and Nulook®
- 41Architectural windows and doors - by Bradnams® and Nulook®
- Pacific Residential windows and doors - by Fisher®, Nebulite®, Rylock®, or Vistalite®
- Pacific Architectural windows and doors - by Fisher®, Nebulite®, Rylock®, or Vistalite®
- Atlantic® High Performance windows and doors - by Bradnams®, Nulook®, Fisher®, Nebulite®, Rylock®, or Vistalite®
- Breezeway Altair® Louvres - by Bradnams®, Nulook®, Fisher®, Nebulite®, Rylock®, or Vistalite®
- HighbrookLouvres™ - by Bradnams®, Nulook®, Fisher®, Nebulite®, Rylock®, or Vistalite®
- 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 B2/AS1	Durability
NZBC E2/AS1	External moisture
NZBC E2/VM1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	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
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels.
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels.
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
BRANZ BU 636	Protecting Glass From Damage
Window & Glass Association NZ (WGANZ) documents:	
Window Installation Guide	Guide to Window Installation as described in E2/AS1 Amendment 7
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)
US Federal Specification:	
TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Altus NZ Ltd Ltd product literature
Altus Windows & Doors Specifier's Guide

Manufacturer/supplier contact details:

Company: **Altus NZ Ltd**
Web: www.altuswindows.co.nz
Email: technical@altus.co.nz
Telephone: 0800 397 263

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/fabricator warranty:

5 years: For fabrication

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

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:

2 years: For installation

- Provide this warranty in the installer standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements**1.6 NO SUBSTITUTIONS**

Substitutions are not permitted to any specified Altus NZ Ltd 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.

1.8 COMPLIANCE

Windows and doors to be manufactured and installed to [NZBC E2/AS1](#).

1.9 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**1.10 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.

1.11 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 (design by contractor)**1.12 DESIGN PARAMETERS - NON SPECIFIC DESIGN**

Design the installation to the wind zone parameters of [NZS 3604](#), table 5.4.

Refer to SELECTIONS for wind zone.

Performances - finishes**1.13 CERTIFY COATINGS - POWDER COATING**

Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided. The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS**2.1 WINDOWS**

Refer to SELECTIONS for type and finish.

2.2 DOORS

Refer to SELECTIONS for type and finish.

Materials

2.3 ALUMINIUM EXTRUSIONS

Alloy designation to comply with [AS/NZS 1866](#). Branded and extruded for anodising or powder coating.

2.4 ALUMINIUM SHEET AND STRIP

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

2.5 STAINLESS STEEL SHEET AND STRIP

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

2.6 GLASS

Refer to the glazing section for glass types and installation.

Reveals

2.7 REVEALS - TIMBER PAINTED

Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

2.8 REVEALS - ALUMINIUM

Aluminium reveals fitted to frame via thermal break.

Flashings

2.9 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

2.10 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.

2.11 SILL SUPPORT BAR

Extruded aluminium support bar with built in drainage and ventilation to [NZBC E2/VM1](#), [NZBC B2/AS1](#) and BRANZ Evaluation Method EM6, to provide continuous support to the window unit.
Size to suit cladding type.

Components

2.12 GLAZING GASKETS

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

2.13 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.

2.14 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to [NZBC F4/AS1](#), Section 2.0, **Opening windows**.

2.15 FIXING BRACKETS

Designed by manufacturer to specific design.

2.16 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 ($\pm 25\%$ movement) to US Federal Specification [TT-S-00230C](#).

Finishes**2.17 INTERPON POWDER COATED ALUMINIUM**

Polyester based powder coating in accordance with [WGANZ PQAS](#), AS 3715, AAMA 2603, AAMA 2604 and AAMA 2605. Refer to SELECTIONS for system and colour.

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 AVOID DISTORTION

Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE

Store windows and doors on site in a clean and dry environment in such a manner as to prevent damage to prefinished surfaces. Stack the units in a vertical position resting on their sills, with layers interleaved between to prevent rubbing. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS

Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS

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

3.7 ADDITIONAL PROTECTION

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

Conditions - fixings and fastenings**3.8 SUPPLY OF FIXINGS**

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with [AS/NZS 4680](#).

3.9 INSTALLATION FIXING

To [NZBC E2/AS1](#), 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanized jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings. Install packers between reveals and framing at fixing points, except at the head.

Assembly

3.10 FABRICATION

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

3.11 TIMBER / PVC REVEALS

Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces. Securely fix reveals through aluminium fin.

3.12 HARDWARE GENERALLY

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

3.13 SAFETY STAYS

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

Installation - windows and doors

3.14 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.

3.15 EXPOSED FIXINGS AND FASTENINGS

Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 304 stainless steel.

3.16 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](#).

3.17 CORROSION PROTECTION

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

3.18 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 underlay 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.

3.19 INSTALLATION

Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.20 INSTALLATION CAVITY CONSTRUCTION

Install to [NZBC E2/AS1](#) and window manufacturers details and drawings including cavity closers, sill support bars and support angles.

3.21 INSTALL FLASHINGS

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

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

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

3.22 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.

3.23 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing**3.24 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 wind zones, seal between underside of head flashing and top edge of window head flange in accordance with **NZBC E2/AS1 9.1.10.4 Head flashings** Fig 71 (c). Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.25 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.

3.26 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.

3.27 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.

Cleaning**3.28 REMOVE TRADE DEBRIS**

Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.29 TRADE CLEAN

Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion**3.30 COMPLETION MATTERS**

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

3.31 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. Remove protection on completion.

3.32 REPLACE

Replace damaged, cracked or marked elements.

3.33 PROTECTION

Protect finishes against damage from adjacent and following work.

3.34 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.

3.35 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.altuswindows.co.nz. Substitutions are not permitted to the following, unless stated otherwise.

4.1 SUPPLY AND INSTALLATION

Supply and installation of the specified Altus NZ Ltd aluminium joinery system by one of the following options:

Supply :	By fabricator
Supply and installation:	By fabricator
Installation only:	By main contractor

Performance**4.2 THERMAL PERFORMANCE**

R-value: R0.26 (as determined from [NZBC H1/VM1](#) or [H1/AS1](#))

Performance - Wind (design by contractor)**4.3 DESIGN PARAMETERS - NON SPECIFIC DESIGN**

Building wind zone: VH (Very high wind speed of 50 m/s) 1550 Pa ULS (refer to [NZS 3604](#), table 5.4)

Window and door system - WeatherTight™ by Nulook® or Bradnams®**4.4 ALTUS WEATHERTIGHT™ SUITE - AWNING WINDOWS**

Brand:	Altus Weathertight™ Suite (35mm)
Frame:	Standard (with 19mm facing), flat faced (with 25mm facing or chair frame)
Frame ventilation:	In frame passive ventilation system or non-ventilating
Glass:	Double glazed

4.5 ALTUS WEATHERTIGHT™ SUITE - HINGED & FRENCH DOORS

Brand:	Altus Weathertight™ Suite (35mm)
Sill:	Standard or flush
Opening direction:	Open out or open in
Glass:	Double glazed

- 4.6 ALTUS WEATHERTIGHT™ SUITE - SLIDING DOORS, STANDARD AND FLUSHLINE
 Brand: Altus Weathertight™ Suite (35mm)
 Type: Standard or Flushline
 Glass: Double glazed
- 4.7 ALTUS WEATHERTIGHT™ SUITE - STACKER DOORS, STANDARD AND FLUSHLINE
 Brand: Altus Weathertight™ Suite (35mm)
 Type: Standard or Flushline
 Glass: Double glazed
- 4.8 ALTUS WEATHERTIGHT™ SUITE - URBANSLIDER™ DOORS
 Brand: Altus Weathertight™ Suite (35mm)
 Type: Outside sliding
 Glass: Double glazed
- 4.9 ALTUS WEATHERTIGHT™ SUITE - URBANSTACKER DOORS
 Brand: Altus Weathertight™ Suite (35mm)
 Type: Outside sliding
 Glass: Double glazed

Finishes - Interpon powder coating systems

- 4.10 INTERPON D1000 POWDER COAT FINISH
 Manufacturer: Interpon Powder Coatings
 Brand/type: interpon D1000
 Environments: Exposure zone B & C
 Finish: Matt, Satin, Gloss or Textura (check with manufacturer for availability)
 Colour: Refer to manufacturer for colour ranges available, includes pearlescents and textured and custom colours
 DFT > 60 microns
 Warranty: 10 year Bronze Global warranty for film and colour integrity
 Suite: Applicable to Weathertight™, 41 Architectural and SovereignSeries™ Suites only

Glazing

- 4.11 GLASS
 Type/thickness: Refer to glazing section(s) for type and thickness or specify type.

Hardware

- 4.12 WINDOW HARDWARE
 Brand: Aria, Malta or Lucerne - other options may also be available
 Window fasteners: Low profile, high profile or venting (double tongue).
 Safety stays: Non-releasable or disconnectable
- 4.13 HINGED & BI-FOLD DOOR HARDWARE
 Brand: Aria, Malta or Lucerne, - other options may also be available
 Lock type: Single point, twin bolt, multi-point
 Hold back devices: Wall mount, floor mount or post mount. Delete if not required
 Door restrictors: Self-closer or casement stay. Delete if not required.
 Cylinder: Keyed both sides (deadlock)
 Key and turn knob
 Half cylinder (where there is no requirement for outside lock)
 All cylinders can be keyed alike e.g. hinged doors, sliding doors, bi-folding doors, patio bolts, sash locks (one key home)

4.14 SLIDING DOOR HARDWARE

Brand:	Aria, Malta or Lucerne, - other options may also be available.
Handle type:	D-Pull handle or Flush Pull handle
Lock type:	Mortice lock (for D-Pull and Flush Pull handles) or budget Albany Endeavour surface mounted
Door restrictors:	Door stop or auto closer. Delete if not required.
Cylinder:	Keyed both sides (deadlock) Key and turn knob Half cylinder (where there is no requirement for outside lock) All cylinders can be keyed alike e.g. hinged doors, sliding doors, bi-folding doors, patio bolts, sash locks (one key home)

4.15 HARDWARE FINISH

Finish:	Powder coated, satin chrome or stainless steel
Powder coat colour:	Black is standard; other colours available.

Flashings and Sealant

4.16 FLASHINGS

Material/type:	Folded 0.55mm colotsteel or folded aluminium
Pattern:	Formed to suit details provided

4.17 WEATHERING SEALANT

Type:	1-part polyurethane moisture curing, elastic joint sealant MS sealant (high performance multi-purpose modified silicone sealant to manufacturer's specifications). Silicone sealants can bleed into natural stonework causing coloured stains. Water run-off from silicone sealant can also cause streaking on glass which can be difficult to clean off.
Colour:	Sealant to be copacetic colour to the joinery units and/or the finished cladding colours.

Reveals

4.18 WINDOW AND DOOR REVEALS - TIMBER

Timber species:	Radiata pine clears grade, or finger jointed to AS/NZS 1491 , would be an appropriate specification for a paint finish. Unless specified otherwise, timber reveals are generally supplied pre-primed for an opaque finish.
Grade/treatment:	H3.1 is minimum for Radiata pine (refer NZS 3602), delete if not required.
Thickness:	Range includes 19mm, 25mm and 30mm
Reveals:	Grooved for wall linings or flush finish for architraves
Finish:	Painted or clear

4.19 ALUMINIUM REVEALS - ADAPTOR/INFILLS

Type:	Refer to Altus NZ Ltd Concrete wall reveals: Refer to Altus NZ Ltd Reveals: Refer to Altus NZ Ltd
Finish:	Powder coated to match joinery

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	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 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

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

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

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

Performance

1.4 ENERGY EFFICIENCY

Provide glazing to meet the energy requirements of NZS 4218 and NZBC H1/AS1 for housing small buildings.

Refer to SELECTIONS and schedules for location and type of glazing.

2 PRODUCTS

Materials

2.1 CLEAR FLOAT GLASS

Clear ordinary annealed transparent float glass for general window glazing. Thickness to [NZS 4223.1](#) and [NZS 4223](#). Supp 1.

2.2 TEXTURED, PATTERNED OR OBSCURE GLASS

Translucent, annealed, rolled glass with a decorative pattern on one surface.

2.3 LAMINATED GLASS

Grade A Safety Glass to [AS/NZS 2208](#) with PVB or CIP resin interlayer.

2.4 TOUGHENED GLASS

Grade A Safety Glass to [AS/NZS 2208](#).

Heat soaked toughened glass to [NZS 4223.1](#), Appendix E required for critical areas. Refer to SELECTIONS.

2.5 TINTED FLOAT GLASS

Body tinted float glass.

2.6 INSULATING GLASS UNITS (IGU'S)

To [AS/NZS 4666](#), [NZS 4223.2](#) and the IGU Manufacturers Association (IGUMA) requirements. Marking to [NZS 4223.2](#) as modified by [NZBC B2/AS1](#), 3.5.

Refer to SELECTIONS for specified surfaces of the IGU.

Surface numbering order for glass panes in an IGU are #1, #2, #3, and #4 as follows:

- Surface #1 - outer face of exterior pane
- Surface #2 - cavity face of the exterior pane
- Surface #3 - cavity face of the interior pane
- Surface #4 - outer face of the interior pane

Materials, mirrors

2.7 SAFETY MIRROR GLASS

4mm, 5mm and 6mm annealed float glass mirror vinyl back safety glazing material to [AS/NZS 2208](#).

Materials, screens

2.8 GLASS SCREENS SHOWER & BATH

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

Components, aluminium and uPVC glazing

2.9 GLAZING TAPE AND GASKETS

Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.

2.10 SETTING BLOCKS

Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

Components, wall mounted glass (mirrors and splashbacks)

2.11 GLASS ADHESIVE

Adhesive mirror-mastic and double-sided adhesive tape.

2.12 MIRROR DE-MISTER

Refer to BATHROOM AND TOILET FIXTURES for type.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To [NZS 4223.1](#), [NZS 4223.3](#), [NZS 4223.4](#). All external glazing to be wind and watertight on completion.

3.2 DELIVERY

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

3.3 GLASS CONDITION

All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS

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

3.5 REBATE DIMENSIONS

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

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY

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

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS

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

3.8 SAFETY GLAZING MATERIAL

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

3.9 CONTAINMENT

Edge cover to comply with [NZS 4223.1](#), Section 4 Glazing, table 5. Otherwise to [NZS 4223.3](#), 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS

All working of glass as required in [NZS 4223.1](#).

3.11 EDGE WORK AND BEVELLING

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

3.12 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS

To [NZS 4223.3](#).

Application aluminium

3.15 INSTALL GLASS TO ALUMINIUM FRAMES

Install glass to NZS4223.1.

- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

Application - wall mounted glass (mirrors and splashbacks)**3.16 WALL MOUNTED GLASS, ADHESIVE FIXED**

For mirrors and splashbacks, fix with adhesive mirror-mastic and double-sided adhesive tape. Adhesive area 0.2 m² per 1 m² of glass to [NZS 4223.3](#).

Application miscellaneous**3.17 INSTALL GLASS BALUSTRADES**

Confirm/design and carry out installation to [NZS 4223.3](#), 22 Barriers (Balustrades, fences, and screens). [NZBC F4/AS1](#): Safety from falling, 1.0 Barriers in buildings.

3.18 INSTALL GLASS POOL FENCES

Confirm/design and carry out installation to [NZBC F9/AS1](#) Means of restricting access to residential pools [NZS 4223.3](#), 22 Barriers (Balustrades, fences, and screens). [NZBC F4/AS1](#): Safety from falling, 1.0 Barriers in buildings.

3.19 INSTALL GLASS SHOWER & BATH SCREENS

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

Finishing**3.20 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**3.21 TRADE CLEAN**

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

3.22 REPLACE

Replace damaged, cracked or marked glass.

3.23 LEAVE

Leave work to the standard required by following procedures.

3.24 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS**Performance - wind****4.1 WIND ZONE - NON-SPECIFIC DESIGN**

Building wind zone: VH (Very high wind speed 50 m/s) 1760 Pa ULS (as determined from [NZS 3604](#), [NZS 4223.4](#))

4710EW EARTHWOOL® GLASSWOOL INSULATION

1 GENERAL

This section relates to **Earthwool® glasswool** thermal and acoustic insulation systems including installation.

It includes:

Earthwool® glasswool insulation

- Earthwool® glasswool insulation: Underfloor Rolls with wind wash barrier
- Earthwool® glasswool insulation: Underfloor Quilted Batts with wind wash barrier
- Earthwool® glasswool insulation: External Wall Batts
- Earthwool® glasswool insulation: Internal Wall Batts
- Earthwool® glasswool insulation: Ceiling Batts
- Earthwool® glasswool insulation: Roof blankets

Documents

1.1 DOCUMENTS

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

NZBC C/AS1-C/AS2	Protection from fire
NZBC H1/AS1	Energy efficiency
NZBC H1/VM1	Energy efficiency
AS/NZS 3000	Electrical installations (Australian/New Zealand Wiring Rules)
AS/NZS 4859.1:2002	Materials for the thermal insulation of buildings - General criteria and technical provisions
AS/NZS 5110	Recessed Luminaire Barriers
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
NZS 4218	Thermal insulation - Housing and small buildings
NZS 4220	Code of Practice for energy conservation in non-residential buildings
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.

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

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

BRANZ Appraisal 648	- Earthwool® glasswool Insulation
CodeMark	GM-CM30095-RevA1 Refer to conditions and limitations listed in the CodeMark. Refer to CODEMARK CERTIFICATE for a list of Product datasheets and installation instructions
GreenTag	KNI-001-v2-2016

Manufacturer/supplier contact details

Company:	Knauf Insulation New Zealand
Web:	www.knaufinsulation.co.nz
Email (Technical):	tech.nz@knaufinsulation.com
Email (Sales):	sales.nz@knaufinsulation.com
Telephone:	0800 KNAUFI (562 834)

Warranties

1.3 WARRANTY

Provide a warranty for:

- 50 years: For unfaced Earthwool® glasswool insulation materials
- 15 years: For Earthwool® glasswool insulation underfloor

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS - GENERAL

Refer to 1270 CONSTRUCTION for requirements relating to experience, skill, and qualifications.

1.5 NO SUBSTITUTIONS

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

Performance - thermal insulation

1.6 R-VALUE RATING

Refer to SELECTIONS for location, type, R-Value, and thickness.

Performance - acoustic insulation

1.7 SOUND RATING REQUIREMENTS

Provide sound rated systems as detailed in SELECTIONS.

Performance - Fire properties

1.8 FIRE PROPERTIES

Earthwool® glasswool insulation is non-combustible to test criteria under the 30's Needle Flame Test to [AS/NZS 60695.11.5](#).

Compliance

1.9 CODEMARK CERTIFICATE

Earthwool® glasswool meets the requirements of the NZBC when used in accordance with the conditions and limitations of its Certificate of Conformity. Refer to MANUFACTURER/SUPPLIER DOCUMENTS for CodeMark certificate.

The following Earthwool® glasswool Product Datasheets and Installation Instructions are listed in the CodeMark conditions and limitations:

- Acoustic:	Product datasheet ref: KINZ0914116DS, January 2017
- Ceiling batts:	Product datasheet ref: KINZ1213029DS, April 2017
- Ceiling Roll:	Product datasheet ref: KINZ0914115DS, January 2017
- Underfloor Roll:	Product datasheet ref: KINZ0616380DS, June 2016
- Wall:	Product datasheet ref: KINZ00914114DS, January 2017
- Multi-Use roll:	Product datasheet ref: KINZ0616396DS, June 2017
- Quilted underfloor batt:	Product datasheets ref KINZ0317511DS, August 2017
- Ceiling batt:	Installation instructions, ref: KINZ1017631MIS
- Ceiling Rolls:	Installation instructions, ref: KINZ1017632MIS
- Quilted Underfloor batt:	Installation instructions, ref: KINZ0817602MIS
- Underfloor Roll:	Installation instructions, ref: KINZ1017636MIS
- Wall batts:	Installation instructions, ref: KINZ1017633MIS

2 PRODUCTS

Materials - Underfloor Thermal Insulation

2.1

EARTHWOOL® GLASSWOOL INSULATION: UNDERFLOOR ROLLS WITH WIND-WASH BARRIER

Faced Underfloor is an insulation roll to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass, and with ECOSE® Technology, the insulation roll is faced with a black glass wind-wash barrier.

Refer to SELECTIONS for options.

Materials - External Wall Thermal Insulation

2.2 EARTHWOOL® GLASSWOOL INSULATION: WALL BATTS

A rectangular batt to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass and with ECOSE® Technology, it is suitable for thermal applications.

Refer to SELECTIONS for options.

Materials - Mid-Floor Thermal and Acoustic Insulation

2.3 EARTHWOOL® GLASSWOOL INSULATION: MID-FLOOR (BATTS OR ROLLS)

A rectangular batt, or roll, to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass and with ECOSE® Technology.

Refer to SELECTIONS for options.

Materials - Ceiling Thermal Insulation

2.4 EARTHWOOL® GLASSWOOL INSULATION: CEILING BATTS

A rectangular batt to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass and with ECOSE® Technology, it is suitable for thermal and acoustic applications.

Refer to SELECTIONS for options.

2.5 EARTHWOOL® GLASSWOOL INSULATION: CEILING ROLLS

An insulation roll to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass and with ECOSE® Technology, it is suitable for thermal and acoustic applications.

Refer to SELECTIONS for options.

2.6 EARTHWOOL® GLASSWOOL INSULATION: ROOF BLANKET

A rectangular batt to [NZBC H1/AS1](#), [AS/NZS 4859.1:2002](#). Made using recycled glass and with ECOSE® Technology, it is suitable for thermal and acoustic applications.

Refer to SELECTIONS for options.

Components

2.7 TAPES:

Polypropylene or similar strapping stapled across framing to retain insulation in wall and ceiling applications.

Accessories - General

2.8 WIRE NETTING

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

2.9 REFLECTIVE FOIL

Refer to 4161 UNDERLAYS, FOIL AND DPC for reflective foil.

2.10 VAPOUR BARRIER

Refer to 4161 UNDERLAYS, FOIL AND DPC for vapour barrier.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

Do not use damaged or wet insulation material.

3.2 HAZARD & RISK MANAGEMENT

To [Health and Safety at Work Act 2015](#) and take all safety precautions necessary to reduce potential hazards and risks. Refer also to [NZS 4246](#), Appendix B. - Health and Safety.

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.

The building envelope must be maintained to a weathertight condition to ensure the insulation remains dry. Cavities must be clean and dry before fitting insulation.

3.4 PRE-INSTALLATION REQUIREMENTS

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

Moisture content:	16% maximum for framing
Location and framing:	are free from moisture, that the cavities are not interconnected.
Insulation re-loft	Allow to re-loft/relax to specified thickness.
Discard	Damaged or wet insulation
Underlays	Ensure roof and wall underlays are installed, dry, clean, undamaged and free of debris before being covered with insulation
Vapour Barriers	Ensure vapour barrier forms one homogeneous sheet

Installation

3.5 INSTALLATION - GENERAL

Lay, install, fit and fix to [NZBC H1/AS1](#): Energy efficiency, 2.0 Building thermal envelope, and to manufacturer requirements. Install in housing to [NZS 4218](#) and [NZS 4246](#). Do not cover vents.

Allow a clear gap around metal flues as recommended by the fireplace manufacturer. Refer to manufacturer installation instructions and [NZS 4246](#) for further details.

3.6 RECESSED LIGHT FITTING CLEARANCES - 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

Refer to clause INSULATION CLEARANCES GENERALLY for clearances.

3.7 INSULATION CLEARANCES FROM HEAT SOURCES - GENERAL

Insulation may need to have a gap to some mechanical and electrical services and equipment, including ducts and chimneys. The gaps should be to the [NZS 4246](#) based tables below or to the equipment manufacturer requirements if they require larger gaps. Smaller gaps to manufacturer requirements can be used for equipment specifically manufactured with heat shielding or similar (excludes light fittings). Installed gap not to be more than 50mm bigger than the required gap. The following tables are subject to:

- The requirements of [NZS 4246](#).
- The insulation is exposed to the source of heat or equipment etc.
- Insulation, has passed the needle flame test to [AS/NZS 60695.11.5](#) and/or is non-combustible.
- Gaps to hot surfaces may have to be increased with non-compliant insulation and plastic/polymeric type insulation (EPS, XPS, PIR, etc), check with insulation manufacturer.
- Gaps to hot surfaces may be able to be reduced with non-combustible insulation, check with equipment manufacturer.
- "Secure insulation" if required means, glue, mechanical fix, or provide fixed barriers at gap edge of insulation to hold in place. Rigid or semi rigid insulation may only need a firm friction fit (secure loose pieces).

INSULATION CLEARANCES FROM RECESSED LIGHT FITTINGS

Type of fitting	Minimum insulation clearance	Comments
Recessed, marked NON-IC, or unmarked	100mm(increase if over 100W)	NON-IC fittings and new or old unmarked & unknown fittings, and/or insulation. Secure insulation.
Recessed, CA 80, CA 90 or CA 135	Abut fittings	Do NOT cover the fittings
Recessed, IC, IC-F or IC-4	Abut & cover fittings	Ensure insulation complies
Recessed, marked Do-Not-Cover	Manufacturers clearances	Do not cover the fittings
Independent control gear	Place on top of insulation and 50mm from fitting	If not on top allow 50mm clearance to insulation, do not cover. Includes, transformers, ballasts & drivers etc. Maintain clearance by placing guard around control gear, refer to NZS 4246 figure 15.
Surface fittings not exposed to insulation	Nil	Where surface fittings are isolated from insulation by appropriate linings. Excludes high heat fittings.
Surface fittings & exposed insulation	200mm	This is exposed insulation to any part of the exposed fitting & bulb/tube (e.g. exposed light in an unlined basement). Secure insulation.

FOR MINIMUM INSULATION CLEARANCES TO INBUILT RECESSED HOT APPLIANCES - REFER TO [NZS 4246](#)

INSULATION CLEARANCES FROM EXTRACTS, VENTS, PIPES & ROOF UNDERLAY

Application	Minimum insulation clearance	Comments
Ducted fan motors	50mm	Includes ducted rangehoods, extractors etc. Applies to the motor unit and electrical enclosures (not the ducts).
Ducted fan ducts	Abut	Excludes motor unit and electrical enclosures.
Unducted fan motors usually discharging to ceiling space	200mm	Includes unducted, rangehoods, extractors etc, discharging into roof space. To prevent debris falling into motor. Clearance may be able to be reduced, by providing a fixed barrier around the vent.
Passive vents (still in use)	200mm	To prevent debris falling through. Clearance may be able to be reduced, with more cohesive insulation, like some of the rigid plastic types or providing a fixed barrier around the vent.
Plumbing penetrations through floors	100mm	Keep gap between pipe penetration and floor insulation in case of leaks.
Roofing material/underlay	25mm	From underside of roofing or flexible roofing underlay, to prevent wicking.

Installation - Underfloor insulation

3.8 UNDERFLOOR ROLLS

Staple insulation between floor joists and butt joints tightly to ensure there are no gaps. Staple into the joists at 200mm intervals on both sides. Ensure the facing is 75mm below the floor, facing down, and that it is pulled tight so that there are no bulges in accordance with the installation instructions. Refer to [NZS 4246](#) for installation guidelines and Earthwool® glasswool insulation underfloor Installation Instructions.

Installation - Wall Framing

3.9 TIMBER FRAMING

Friction fit wall batt between framing members and linings. Cut on site to fill cavity and provide a close even fit. When cutting to fill a void, oversize by up to 10mm to ensure a tight fit. Ensure there is a friction fit on all faces of the insulation. If cavity depth is greater than the insulation nominal thickness, fix or strap the product to secure in accordance with installation instructions. Cut into smaller pieces for smaller spaces and around penetrations to achieve efficient thermal performance. Do not fold, tuck or compress the insulation. Refer to [NZS 4246](#) for installation guidelines and Earthwool® glasswool insulation Product Data sheets listed in the CodeMark, for detailed installation instructions.

Installation - Mid-floor insulation

3.10 MID-FLOOR FRAMING

Friction fit insulation between framing members and linings. Cut on site to fill cavity and provide a close even fit. When cutting to fill a void, oversize by up to 10mm to ensure a tight fit. Ensure there is a friction fit on all faces of the insulation. If cavity depth is greater than the insulation nominal thickness, fix or strap the product to ensure the insulation is installed hard against the flooring or the ceiling lining. Cut into smaller pieces for smaller spaces and around penetrations to achieve efficient thermal performance. Refer to [NZS 4246](#) for installation guidelines.

Installation - Ceilings/Skillion Roofs/Membrane Roofs and Below Decks.

3.11 SINGLE LAYER BATTS - BETWEEN CEILING FRAMING

Friction fit insulation between framing members. Cut across the roll to fit nogs and small spaces around penetrations. Leave no gaps and maintain full thickness of insulation over the whole of the installation. Leave gap around metal flues to the manufacturer requirements.

3.12 CEILING INSULATION EDGE DETAIL

Where perimeter of ceiling space is too low to allow full depth of insulation plus the 25mm air gap to the underlay, provide reduced perimeter insulation to [NZS 4246.6.2](#) and maintain the 25mm gap.

3.13 BELOW MEMBRANE ROOFS AND DECKS - INSULATION CLEARANCES

Friction fit insulation between joists/rafters. Use a sharp craft knife to cut to required size or around penetrations if required. Maintain a minimum clearance of 20mm between the underside of the substrate (plywood etc) and any insulation to [NZBC E2/AS1 clause 8.5.2](#)

Completion & Commissioning**3.14 COMPLETION MATTERS**

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

Earthwool® glasswool insulation packaging is recyclable.

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Underfloor - Thermal Insulation**4.1****EARTHWOOL® GLASSWOOL INSULATION: UNDERFLOOR ROLLS WITH WIND-WASH BARRIER**

Location:	Underfloor - suspended timber floors only
Brand:	Earthwool® glasswool insulation
R-value:	R 1.8
Thickness:	75 mm
Size:	500mm x 10000mm or 600mm x 10000mm

External Wall - Thermal Insulation**4.2 EARTHWOOL® GLASSWOOL INSULATION: EXTERNAL WALL BATTS**

Location:	External wall insulation
Brand:	Earthwool® glasswool insulation
R-value:	R2.8
Thickness:	90mm
Size:	580mm x 1160mm

Mid-Floor - Thermal and Acoustic Insulation**4.3 EARTHWOOL® GLASSWOOL INSULATION: MID-FLOOR BATTS**

Location:	Midfloor insulation
Brand:	Earthwool® glasswool insulation
R-value:	R2.8
Density:	27.0
Insulation category / type:	Wall
Thickness:	90 mm
Size:	430mm x 1160

Ceiling - Thermal Insulation**4.4 EARTHWOOL® GLASSWOOL INSULATION: CEILING BATTS**

Location:	Ceiling insulation
Brand:	Earthwool® glasswool insulation
R-value:	R5.2
Thickness:	210mm
Size:	430mm x 1160mm

Roof - Thermal Insulation

4.5 EARTHWOOL® GLASSWOOL INSULATION: MEMBRANE ROOF AND/OR BELOW DECKS

Location: Roof - membrane deck area only
Brand: Earthwool® glasswool insulation
R-value: R4.1
Thickness: 140mm
Size: 580mm x 1160mm

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
[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

Components

2.2 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.

2.3 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims

GIB® UltraFlex® high impact corner mould

GIB® Levelline® Tape on Trim

2.4 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.5 CONTROL JOINTS

GIB® Rondo® P35 control joints.

GIB® Goldline™ tape-on trims

GIB® plastic W-profile control joints.

Accessories

2.6 ADHESIVE

Timber frame and/or steel frame:

GIBFix® One ultra low VOC water based wallboard adhesive

GIBFix® All-Bond solvent based wallboard adhesive

2.7 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

2.8 JOINTING TAPE

GIB® jointing tape.

2.9 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 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 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in [AS/NZS 2589](#).

3.4 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**.

3.5 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).

3.6 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).

3.7 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

3.8 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.

4 SELECTIONS

Plasterboard

4.1 GIB® STANDARD SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Wall linings	GIB® Standard plasterboard	10mm	Level 4

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Wall linings	GIB Aqualine® plasterboard	10mm	Level 4

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Ceiling linings	GIB® Standard plasterboard	13mm	Level 4

4.4 GIB® WATER RESISTANT SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Ceiling linings	GIB Aqualine® plasterboard	13mm	Level 4

4.5 GIB® BRACING SYSTEMS

Refer to:

- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Systems (2011)

For bracing element location refer to drawn documentation.

5433E ECOPLY® FLOORS

1 GENERAL

This section relates to the use of Carter Holt Harvey Plywood Ltd (CHH PLY) plywood sheets for floors.

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:

FSC® Forest Stewardship Council®
COC Chain of Custody

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 C/VM2	Protection from fire
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2269.0	Plywood - structural - specifications
NZS 3604	Timber-framed 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.

1.3 MANUFACTURER DOCUMENTS

Carter Holt Harvey Plywood Ltd documents relating to work in this section are:
Ecoply® Specification and installation guide September 2015
Product Technical Statement July 2015 Ecoply® Plywood Products: Flooring
Carter Holt Harvey Plywood - Tokoroa Certificate Code: SCS-COC-001316 Trademark License Code: FSC-C012019, Controlled Wood SCS-CW-001316, expires 5 June 2023.

Copies of the above literature are available from Carter Holt Harvey Plywood Ltd

Web: www.ecoply.co.nz
Telephone: 0800 326 759

1.4 NO SUBSTITUTIONS

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

Requirements

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

Performance

2 PRODUCTS

Materials

2.1 ECOPLY® STRUCTURAL SQUARE EDGE

Radiata pine veneer ply to AS/NZS 2269.0. F8 stress grade. CD surface grade, face sanded veneer and square sheet edges. Veneers bonded together with synthetic phenolic (PF) resin forming a Type A bond. H3.2 CCA treated to AS/NZS 1604.1, when used as a wet area substrate.

Components

2.2 NAILS - HOT DIPPED GALVANIZED

Hot dipped galvanized flat head, ring shank or annular grooved nails to Carter Holt Harvey Plywood Ltd requirements for size and use.

15 - 21mm plywood: 60mm x 2.8mm

25mm plywood: 75mm x 3.15mm

2.3 NAILS - STAINLESS STEEL

Stainless steel flat head, annular grooved nails to Carter Holt Harvey Plywood Ltd requirements for size and use.

15 - 21 mm plywood: 60mm x 2.8mm

25mm plywood: 75mm x 3.15mm

2.4 SCREWS IN TIMBER

Stainless steel, counter-sunk to Carter Holt Harvey Plywood Ltd requirements for size and use.

15mm plywood: 8g x 40mm

17 - 21 mm plywood: 10g x 50mm

25mm plywood: 10g x 50mm

2.5 ADHESIVE

Refer to SELECTIONS.

2.6 BRUSH ON TREATMENT

Soudal Metalex Ready to Use or Soudal Metalex Concentrated Timber Preservative. Clear colour product.

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.

Moisture content: 18% maximum for framing

3.4 SUPPORT FRAMING

Ensure support framing is completed to Carter Holt Harvey Plywood Ltd stated requirements for laying plywood sheets.

Application**3.5 TREAT**

Treat cuts and holes in sheets with a brush on treatment.

3.6 SUPPORT SQUARE EDGES AND JOINTS

Fully support edges and joints of square edged sheets.

3.7 SHEET LAYOUT

Lay sheets to Carter Holt Harvey Plywood Ltd requirements. Lay sheets in a staggered layout, face-grain of sheet at right-angles to support and with sheets in square, true alignment and plane.

Provide a 2 to 3mm expansion gap between square edges of sheets and a 5mm expansion gap at the perimeter of the floor. Lay sheets continuous over at least two spans. Refer to SELECTIONS for fixing requirements.

3.8 ADHESIVE FIXING

Apply a bead or daubs of adhesive to adhesive manufacturers and Carter Holt Harvey Plywood Ltd requirements and fastener pattern, work from the middle of the sheet outwards to develop glue line pressure.

3.9 MECHANICAL FIXINGS

Fixings at least 3 fastener diameters or 7 mm from square edges and 15mm from tongue and groove edges. Fasten edges and ends of sheets at 150 mm centres, and within the panel at no more than 300 mm centres.

3.10 WET AREAS

Ensure plywood is structural grade treated to H3 or H3.2 (CCA treated), to AS/NZS 1604.1. Plywood substrates must have moisture content not more than 18% before installing membrane. With primed/sealed face and edges.

NOTE: Treated plywood must be allowed to breath for a minimum of 7 days before installation of membrane. Fixing must be to manufacturer specifications. LOSP treated plywood must not be used.

Requirements if used for:

Flooring: Stress grade F8, minimum thickness 18mm with framing at minimum 400mm centres both ways, or min 21mm with framing at 600mm centres both ways. Fixing, glue and stainless steel screws.

Floor Overlay: Stress grade 8, minimum thickness 12mm.

Completion & Commissioning

3.11 COMPLETION MATTERS

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

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Materials

4.1 ECOPLY® STRUCTURAL SQUARE EDGE FLOORING

Location:	Timber flooring
Manufacturer:	Carter Holt Harvey Plywood Ltd
Brand/grade:	Ecoply® Structural Square Edge / CD
Stress grade:	F8
Thickness:	19mm or 21mm
Sheet width:	1200mm
Sheet length:	2400mm or 2700mm
Treatment:	Untreated or H3.2 CCA for wet areas
Fixing:	Screw & Adhesive

Components

4.2 ADHESIVE

Type: Soudal Gorilla PRO foam
Bostik® Wallboard Gold (elastomeric)
Elastomeric adhesives should meet the requirements of APA Performance specification AFG 01 Adhesives for field gluing plywood to wood framing. Other types should have appraisal from an independent authorising body such as BRANZ or equivalent authorities for the specific applications proposed.

6221 TILING SYSTEMS

1 GENERAL

This section relates to the supply and installation of interior and exterior floor and wall tiles. It includes:

- Underlays
- Screeds and levelling compounds
- Primers
- Waterproofing systems
- Tile adhesives
- Grouts and sealants
- Tiles
- All other required components and accessories necessary to complete installation

Documents

1.1 DOCUMENTS

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

NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4671	Steel reinforcing materials
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide: Tiling

Warranties

1.2 WARRANTY - INSTALLER/APPLICATOR - FOR TILING SYSTEMS

Provide an installer/applicator warranty:

2 years: For installation of tiling systems

- 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.

1.3 WARRANTY - INSTALLER/APPLICATOR - FOR WATERPROOFING SYSTEMS

Provide an installer/applicator warranty:

5 years: For installation of waterproofing systems

- 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 - TILING SYSTEMS

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

1.5 QUALIFICATIONS - WATERPROOFING SYSTEMS

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

1.6 NO SUBSTITUTIONS

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

1.7 DEFLECTION CRITERIA FOR SUSPENDED FLOORS

Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.8 ADHESIVES COMPATIBILITY

Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

1.9 INTERNAL / EXTERNAL MOISTURE

Wet area membranes under tiled areas to AS 3740, [NZBC E2/AS1](#) (exterior), [NZBC E3/AS1](#) (interior) and to BRANZ Good Practice Guide: Tiling.

2 PRODUCTS**Materials****2.1 TILES**

Refer to SELECTIONS for product selection.

Materials - preparation & underlays**2.2 REINFORCING MESH**

To [AS/NZS 4671](#), galvanized 500mm x 500mm x 2.5mm.

2.3 SEPARATING LAYER

Single layer heavy gauge polyethylene film.

2.4 FIBRE CEMENT TILE UNDERLAY

6mm or 9mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish. Underlays to [AS/NZS 2908.2](#) Cellulose-cement products Part 2: Flat Sheets.

2.5 FLOOR LEVELLING COMPOUND

Proprietary floor levelling compound. Refer to SELECTIONS for details.

2.6 SAND/CEMENT SCREED

Mix of 3:1 Portland cement, coarse washed sand gauged to the tile manufacturer's stated requirements. If required, liquid polymer additive added to manufacturer's stated requirements.

2.7 PROPRIETARY SCREED

Manufactured screed systems. Refer to SELECTIONS for details

Materials - waterproofing**2.8 LIQUID WATERPROOFING MEMBRANE**

To AS 3740. Refer to SELECTIONS for details.

Materials - adhesive and grout**2.9 TILE ADHESIVE**

To AS ISO 13007.1.

2.10 SAND AND CEMENT GROUT

1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.11 PROPRIETARY GROUT

Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

Components

2.12 MOVEMENT AND EXPANSION JOINTS - RIGID JOINTS

Either, proprietary aluminium/brass with rubber or foam and compound infill, or rigid stabilised PVC sides with flexible central section.

Refer to SELECTIONS for product selection

2.13 MOVEMENT JOINT SEALANT

To BRANZ Good practice guide: Tiling, section 5.0.

- Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

Accessories**2.14 UNDERFLOOR HEATING**

Refer to 7553 UNDERFLOOR HEATING MAT SYSTEM for underfloor heating section for electric undertile heating system.

2.15 TILE EDGE TRIMS

Refer to SELECTIONS for product selection

3 EXECUTION**3.1 DELIVERY, STORAGE AND HANDLING**

Take delivery of materials and goods and store on site and protect from damage.

Protect finished surfaces, edges and corners from damage.

Move/handle goods in accordance with manufacturer's requirements.

Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY

Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions**3.6 INSPECT BACKGROUND CONDITIONS**

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

Inspect background and substrate materials for any conditions unsuitable for tiling over.

Substrate material must be even and true with a maximum variation in plane of no greater than 4mm in every 2m, in accordance with AS 3958.1, section 4.

Do not commence work until the affected area is rectified. Commencement of installation constitutes acceptance of site conditions.

3.7 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.8 MOISTURE CONTENT

Ensure concrete floors & concrete and/or concrete block walls are cured and dry. Ensure moisture content is such that shrinkage is complete and thermal movement has been accommodated.

If in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

3.9 LIGHTING

Light the tile work as closely and clearly as possible to that of the finished lighting, to ensure that differences in plane surface are highlighted during installation.

Application - preparation

3.10 PREPARE SUBSTRATES

Prepare backgrounds as described in AS 3958.1, Section 4 as modified by BRANZ Good practice guide: Tiling. All surfaces to be structurally sound, dry, clean and free from movement, dirt, dust, oil, grease, wax, curing compounds, release agents and any other loose or contaminating materials.

Ensure surfaces are flat and true to a tolerance of ± 4 mm in 2 metres from the required plane. Remove projections, unevenness and loose material to leave a clean dust and dirt free surface.

Suitably prepare backgrounds and substrates in accordance with the manufacturer's instructions of the tiling installation products for the relevant substrate type.

3.11 CONTAMINATED SUBSTRATES - GENERAL

Ensure contaminated substrates are prepared in accordance with the manufacturer's instructions of the tiling installation products. Completely remove existing surface contaminants or surface finishes oil that may affect bonding or adhesion. Surface to finish clean and dry with a texture giving a complete key.

3.12 CONTAMINATED SUBSTRATES - CONCRETE

Generally concrete surfaces are prepared via mechanical abrasion such as scabbling, grinding or shot blasting to a clean, sound surface. The surface requires preparation so as to expose the aggregate to enable a good mechanical key for subsequent applications.

3.13 PRIME SUBSTRATES

Surfaces should be primed as per manufacturer's instructions for the selected products and substrate types. Refer to SELECTIONS.

Application - movement joints

3.14 FORM MOVEMENT AND EXPANSION JOINTS

Install movement joints to go right through the tile and bed to the background, maintaining any waterproofing. Ensure any slip layer backing (bond breaker) required, is installed.

Joint width minimums:

- 4-6mm interior tiles on concrete (with low moisture content)
- 6-8mm interior tiles on dry timber structure
- 8-10mm exterior tiles on concrete (with low moisture content)
- 10-12mm exterior tiles on dry timber structure
- To match grout width, if equal/larger than above
- Larger to suit joint infill requirements (preformed jointers)

In wall tiling provide joints at; internal vertical corners, as well as joints at, floors, columns/beams, nibs, hobs and similar. Provide joints around sanitary fixtures, around fixtures interrupting the tile surface, at junctions with joinery fixtures, including window and door frames and built in cupboards, and at changes in substrate or background. In large area wall tiling provide vertical joints at not more than 3.6 metres spacing along the length of a wall and horizontal joints at each storey rise in the height of a wall, and over all existing substrate expansion joints.

In large areas of floor tiling provide joints at not more than 4 metres spacing in both directions and 3.6 metres externally. Provide expansion joints, at the perimeter of tile floors, at changes of level or slope, around structural features, changes in substrate, around sanitary fixtures and other fixtures interrupting the tile surface, and over all existing substrate expansion joints.

3.15 MOVEMENT AND EXPANSION JOINTS, INSTALL RIGID JOINTS

Metal or plastic joints, refer to SELECTIONS.

Accurately locate as detailed and fix joints in situ, with the bedding, or on top of the bedding, to finish flush with the installed tile and to the tile manufacturer's requirements. Fit and fix rubber/rubber compound inserts to finish flush.

3.16 MOVEMENT AND EXPANSION JOINTS, INSTALL COMPOUND/SEALANT FILL

Carefully clean out the joint, insert the backing rod if required and fill with compound/sealant placed by gun. After the correct interval, finish the surface off smooth, and flush on flat areas or concave in corners, to the compound/sealant manufacturer's requirements.

Application - waterproofing**3.17 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS**

Install waterproofing membrane to manufacturers requirements and in accordance with AS3740 and BRANZ Good Practice Guide, Tiling 6.0 Wet area tiling and 7.0 Waterproofing interior wet areas.

Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide: Tiling; 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install minimum areas of waterproof membrane as follows:

Enclosed shower cubicle

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along all tiled walls and sealed to shower screens.
- To tiled shower base and hobs (upstands).

Unenclosed shower cubicle

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along walls at least 1500mm from fixed shower rose and plus hose length for flexible rose.
- To the floor within 1500mm of fixed shower rose and plus hose length for flexible rose.

Bath with a shower over

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above floor.
- Along walls the greater of, bath length plus 300mm, or 1500mm from fixed shower rose, and 1500mm plus hose length for flexible rose.
- To the floor, waterproof under the bath and match the extent of the wall waterproofing..

Bath (no shower over)

- Around the bath to 300mm away from the bath in all directions, also waterproof under the bath.

Splashback to a vanity

- Up wall from floor and behind the vanity, to 150mm above and beyond each side of vanity.
- To floor under the vanity to match wall waterproofing and at least 600mm from wall.

Application - floor underlays and screeds**3.18 FIBRE CEMENT TILE UNDERLAY TO TIMBER FLOORS**

Cover timber floors with selected fibre cement sheet tile underlay on the flooring and across the joists, glued and nailed with relief joints, to the overlay manufacturer's requirements.

3.19 FLOOR LEVELLING

Ensure all existing surfaces are smooth and level. If levelling is required, prepare for and apply floor levelling compounds to manufacturer's instructions.

3.20 FLOOR SCREEDS

Form screeds to manufacturer's instructions with a deviation from plane of not more than 5mm over 3 metres.

3.21 FLOOR SCREED AND SEPARATING LAYER

Lay polyethylene sheet/building underlay to a smooth surface, joints lapped 100mm minimum. Place galvanized steel mesh over with spacers to centralise it in the mortar bed. Thoroughly mix and place the proprietary screed mix to the manufacturer's requirements and compact to the required level. Ensure drying times are observed before installation of tiles by thin/thick set method.

3.22 FLOOR FALLS

Form screeds, to manufacturer's instructions, in areas where water is used in significant amounts with a deviation from plane of not more than 5mm over 3 metres. Unless otherwise specified form screeds with the following falls:

Unless stated otherwise provide minimum fall gradients to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.

1 : 40 minimum	For tiled decks which also acts as a roof
1 : 60 minimum	For paving over ground
1 : 50 minimum	For unenclosed shower bases (to NZBC E3/AS1 , 3.3.5)
1 : 60 minimum	For enclosed shower bases
1 : 50 minimum	For shower bases for people with disabilities (to NZS 4121 , 10.5.11.3 (b).)
1 : 60 minimum	For commercial kitchens or similar

Application - Undertile heating

3.23 INSTALL UNDERTILE FLOOR HEATING

Refer to 7553 UNDERFLOOR HEATING MAT SYSTEM for electric undertile heating system.

Application –tile installation generally

3.24 FITTING TILES

Setting out, cutting and fitting of tiles to be as described in AS 3958.1. Ensure cut edges are smooth and installed without jagged or flaked edges. Always use whole tiles or if tiles have to be cut the largest portion of a cut tile possible. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.25 TILE FINISH AND JOINTS

Ensure finished surfaces are flat and true to a tolerance of ± 4 mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation, measured at the tile face. Ensure joint alignment is consistent throughout the installation and to a tolerance of ± 4 mm in 2 metres from the detailed joint alignment.

3.26 ADHESIVE APPLICATION

Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive. If required, mix adhesive to manufacturer's instructions.

Notched trowel method

- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method

- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations

- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

3.27 INSTALL TRIMS

Accurately locate and fully bed edge trim units, dividing strips, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

Application - grouting**3.28 APPLY GROUTING**

Grout tiling to AS 3958.1, clause 5.7. Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.29 APPLY PROPRIETARY GROUTING

Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Application - sealing**3.30 SEALING**

Apply selected sealer to tiling in accordance with manufacturer's requirements.

Cleaning**3.31 CLEAN TILES**

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion**3.32 ROUTINE CLEANING**

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.33 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

3.34 PROTECTION

Provide the following temporary protection of the finished work:
Provide protection to floor tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4 SELECTIONS

6700D DULUX PAINTING GENERAL

1 GENERAL

This section relates to the general matters related to painting work using **Dulux** paint.

1.1 RELATED WORK

Refer to 6711D DULUX PAINTING EXTERIOR for exterior paint systems.

Refer to 6721D DULUX PAINTING INTERIOR for interior paint systems.

Refer to 6711DE DULUX ENVIRONMENTAL PAINTING EXTERIOR for environmental exterior paint systems.

Refer to 6721DE DULUX ENVIRONMENTAL PAINTING INTERIOR for environmental interior paint systems.

Refer to 6744D DULUX PROTECTIVE COATINGS for protective coatings or 6742DF DULUX - FIRESHIELD INTUMESCENT COATINGS for intumescent coating systems.

1.2 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

1.3 DOCUMENTS

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

AS/NZS 2311	Guide to the painting of buildings
AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 9001	Quality management systems - Requirements
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	

1.4 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

Dulux DuSpec specification sheets and product data sheets

Copies of relevant literature are available from **Dulux**

Web: www.dulux.co.nz/specifier or www.duspec.co.nz

Email: specifier@dulux.co.nz

Telephone: 0800 800 424

Facsimile: 0800 801 424

Warranties

1.5 WARRANTY

Warrant this work under normal environmental and use conditions against failure of materials and execution.

Product warranty: Products must be applied in accordance with application and preparation procedures according to **DuluxDuSpec** Specifications and Product Data Sheets. Contact a **Dulux** Trade Representative for project specific warranties.

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

Requirements

1.6 NO SUBSTITUTIONS

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

If in the applicator's own expertise and judgement an amendment to this specification is required, or where a substrate preparation or required painting system is not covered in this specification, this shall be brought to the attention of the contract administrator and any amendment agreed before work proceeds any further.

1.7 QUALIFICATIONS

Painters to be experienced competent workers, familiar with Dulux products and the required application techniques specified and may be a member of the Master Painters New Zealand Association Inc. or hold a recognised painter/decorator qualification.

The applicator is to have the necessary skill, experience and equipment to undertake the work. The applicator remains responsible for ensuring proper completion of the work.

Painters to be selected from the Dulux Accredited Painter programme, which recognises painters in the industry who demonstrate high levels of workmanship and pride themselves on their professionalism, customer service and reliability.

Refer to <https://www.dulux.co.nz/services/find-a-painter-nz> for a list of Dulux Accredited Painters in the local area.

1.8 HEALTH AND SAFETY

Refer to 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.

1.9 PRIOR TO WORK COMMENCING

Before any work commences painters should verify with architect or specifying authority, that their paint matches a previously supplied standard card or panel. Differently coloured paints will vary in price, opacity and durability. **Dulux** normally only specify two coats of colour but with certain colours such as bold, brights and some corporate colours, three coats may be needed.

1.10 SAFETY DATA SHEETS

Refer to **Dulux** for the safety data sheets for every applicable product and comply with the safety procedures listed. Keep sheets on the site. Refer to www.dulux.co.nz/specifier.

Performance

1.11 DULUX INSPECTION

Permit representatives of **Dulux** to inspect the work in progress and take samples of their products from site if requested.

1.12 INSPECTION OF THE WORK

Inspection of the whole of the work at each of the stages set out in SELECTIONS 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 product specified.

2.2 MATERIALS GENERALLY

Use only **Dulux** product which are guaranteed for their consistency and performance under [AS/NZS ISO 9001](#) and APAS approval, prepared, mixed and applied as directed in the **Dulux** DuSpec specification sheets, specification manuals and product data sheets.

2.3 THINNERS/ADDITIVES

Use only if and when expressly directed by **Dulux** for their particular product in a particular application.

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 preparation system.

2.5 GYPSUM FILLER - INTERIOR

Finishing compound to match the plasterboard stopping system and finishing grade gypsum plaster to match the fibrous plaster system. For interior surfaces such as paper faced plasterboard use **Dulux** Professional Ultra 5 Surface Prep & Finish as an aid to achieving a Level 5 finish.

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 CORROSION PROTECTION SUPERVISION FOR STRUCTURAL STEEL

To [AS/NZS 5131](#), 9.9.20, for corrosion protection of structural steel. Provide an Inspection and Test Plan (ITP) to [AS/NZS 5131](#), 13.9.1, prior to commencement. Corrosion protection painting to be supervised by a competent person.

3.3 PREPARE

Prepare surfaces to **Dulux** requirements.

3.4 COATED SURFACES

Ensure that substrate surfaces are able to achieve the specified finish.

3.5 PRE-PRIMED SURFACES

Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.6 BRUSH DOWN

Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.7 COMPATIBILITY

Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.8 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.

3.9 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 2x coats or 1x 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 2x coats or 1x 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.

3.10 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.

3.11 LEAD-BASED PAINT, ASBESTOS

Handle cautiously lead-based paint and asbestos, if present, as required in the MPNZ Health and Safety Programme and [WorkSafe: Guidelines for the management of lead-based paint](#).

3.12 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.

3.13 PROTECTION

Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation

3.14 PREPARATION

Refer to the **DuSpec** specification sheets for detailed substrate preparation notes relating to SELECTIONS contained in:

- 6711D DULUX PAINTING EXTERIOR,
- 6721D DULUX PAINTING INTERIOR,
- 6711DE DULUX ENVIRONMENTAL PAINTING EXTERIOR,
- 6721DE DULUX ENVIRONMENTAL PAINTING INTERIOR, and
- www.duspec.co.nz.

Application - before applying final coatings

3.15 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.

3.16 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.

3.17 CONCEALED JOINERY SURFACES

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.18 CONCEALED METAL SURFACES

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.19 DOORS

Prime or seal and paint all six faces of doors before hanging.

3.20 PUTTY FRONTING

According to the putty manufacturer's instructions allow putty to set, then prime with an appropriate Dulux primer, either **Dulux 1 Step Acrylic Primer Sealer & Undercoat**, or **Dulux 1 Step Oil Based Primer, Sealer & Undercoat**. Fully protect the putty by completing the **Dulux** coating system as soon as it is sufficiently firm.

Application - generally

3.21 PAINTING GENERALLY

Comply with the **Dulux** DuSpec specification sheets, product data sheets and the additional requirements of this work section.

3.22 MIXING

Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.23 ENVIRONMENT

Paint exterior surfaces only in favourable weather conditions:

- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively
- as far as possible apply paint in the temperature range 15°C to 25°C
- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

3.24 SEQUENCE OF OPERATIONS

Painting work to generally the following sequence:

- Back-painting and pre-installation painting, then post-installation exposed-face painting
- Complete surface preparation before commencing painting
- Apply primers, sealers, stains, undercoats, paints and clear coatings in the sequences laid down by **Dulux**
- Allow the full drying times between coats laid down by **Dulux**
- Do not expose primers, sealers and undercoats beyond a few days 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.

3.25 PAINT APPLICATIONS

Select brush, roller, or pad and apply paint to the requirements of **Dulux** and to obtain a smooth even coating of correct thickness, uniform gloss and colour.

3.26 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.

3.27 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.

3.28 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the **Dulux** paint system specified.

3.29 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

Note that some colours may require more than two top coats and/or the use of a tinted undercoat.

This is particularly relevant when using bright or high chromatic coloured paints (e.g. colours derived off True Red, Bold Yellow, Orange, and Extra Bright base) or when painting over existing dark colours.

Completion**3.30 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.

3.31 CLEAN EQUIPMENT

Use **DuluxEnviroWash** 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. Phone 0800 800 424 for information regarding this system.

3.32 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.

3.33 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.

3.34 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 SELECTIONS

Refer to 6711D DULUX PAINTING EXTERIOR and 6721D DULUX PAINTING INTERIOR for selections.

Refer to 6711DE DULUX ENVIRONMENTAL PAINTING EXTERIOR and 6721DE DULUX ENVIRONMENTAL PAINTING INTERIOR for selections.

6711D DULUX PAINTING EXTERIOR

1 GENERAL

This section relates to the surface preparation and painting of new and existing exterior substrates using **Dulux** exterior paint systems.

1.1 RELATED WORK

Refer to 6700D DULUX PAINTING GENERAL for general matters related to painting work.

2 PRODUCTS

2.1 PRODUCTS

Refer to 6700D DULUX PAINTING GENERAL for product clauses.

3 EXECUTION

3.1 EXECUTION

Refer to 6700D DULUX PAINTING GENERAL for execution clauses.

4 SELECTIONS

For further details on selections go to www.dulux.co.nz/specifier.

Substitutions are not permitted to the following, unless stated otherwise.

Refer to DULUX DuSpec for up to date VOC levels as these are subject to change.

4.1 BACK PAINTING SCHEDULE

Paint 2 coats (including any pre-prime) to match exposed face coating.

Refer to all manufacturers specifications for back painting requirements and cut edge painting requirements for all claddings and linings.

Extent options:	To cladding manufacturer's requirements
	Bottom edge & 150mm up
	Paint whole back, bottom & concealed edges of cladding
	Paint cladding under trim before fixing
	Paint whole back, bottom & concealed edges of trim

Fibre cement sheet substrates - new cladding

4.2 EXTERIOR FIBRE CEMENT SHEET NEW - CLADDING - PAINT

Gloss level:	Semi Gloss
Coating type:	Water based
System:	DuSpec NZ_SD09169
1st coat:	DULUX 1 Step Prep Acrylic Primer Sealer Undercoat @ 14 m ² /L
2nd coat:	DULUX Weathershield X10 @ 16 m ² /L
3rd coat:	DULUX Weathershield X10 @ 16 m ² /L

Timber substrates - new trim, doors, frames, etc

4.3 EXTERIOR TIMBER NEW - TRIM, DOORS AND FRAMES - WATER BASED ENAMEL

Gloss level:	Semi Gloss
Coating type:	Water based enamel
System:	DuSpec NZ_SD09147
1st coat::	DULUX 1 Step Prep Acrylic Primer Sealer Undercoat @ 14 m ² /L
2nd coat:	DULUX Aquaname! @ 16 m ² /L
3rd coat:	DULUX Aquaname! @ 16 m ² /L

Timber substrates - new fences, pergolas, etc

4.4 EXTERIOR TIMBER NEW - FENCES AND PERGOLAS - PAINT

Gloss level: Low Sheen
 Coating type: Water based
 System: [DuSpec NZ_SD09236](#)
 Preparation: CABOT'S Deck Clean @ 12-16 m²/L
 1st coat: DULUX Timbacryl @ 16.4 m²/L
 2nd coat: DULUX Timbacryl @ 16.4 m²/L
 3rd coat: DULUX Timbacryl @ 16.4 m²/L

4.5 EXTERIOR TIMBER NEW - FENCES AND PERGOLAS - WATER BASED STAIN

Gloss level: Matt
 Coating type: Water based stain
 System: [DuSpec NZ_SW09224](#)
 Preparation: INTERGRAIN Reviva @ 20-40 m²/L
 1st coat: INTERGRAIN NaturalStain @ 9 m²/L
 2nd coat: INTERGRAIN NaturalStain @ 9 m²/L
 3rd coat: INTERGRAIN NaturalStain @ 9 m²/L (optional)

Timber substrates - new decks

4.6 EXTERIOR TIMBER NEW - DECKS - PAINT

Gloss level: Low Sheen
 Coating type: Water based
 System: [DuSpec NZ_SD09236](#)
 1st coat: DULUX Timbacryl @ 16.4 m²/L
 2nd coat: DULUX Timbacryl @ 16.4 m²/L
 3rd coat: DULUX Timbacryl @ 16.4 m²/L

4.7 EXTERIOR TIMBER NEW - DECKS - WATER BASED OIL

Gloss level: Matt
 Coating type: Water based oil
 System: [DuSpec NZ_SW09228](#)
 Preparation: INTERGRAIN Reviva @ 20-40 m²/L
 1st coat: INTERGRAIN UltraDeck @ 12 m²/L
 2nd coat: INTERGRAIN UltraDeck @ 12 m²/L
 3rd coat: INTERGRAIN UltraDeck @ 12 m²/L (optional)

4.8 EXTERIOR TIMBER NEW - DECKS - WATER BASED STAIN

Gloss level: Matt
 Coating type: Water based stain
 System: [DuSpec NZ_SW09224](#)
 Preparation: INTERGRAIN Reviva @ 20-40 m²/L
 1st coat: INTERGRAIN NaturalStain @ 9 m²/L
 2nd coat: INTERGRAIN NaturalStain @ 9 m²/L
 3rd coat: INTERGRAIN NaturalStain @ 9 m²/L (optional)

6721D DULUX PAINTING INTERIOR

1 GENERAL

This section relates to the surface preparation and painting of new and existing interior substrates using **Dulux** interior paint systems.

1.1 RELATED WORK

Refer to 6700D DULUX PAINTING GENERAL for general matters related to painting work.

2 PRODUCTS

2.1 PRODUCTS

Refer to 6700D DULUX PAINTING GENERAL for product clauses.

3 EXECUTION

3.1 EXECUTION

Refer to 6700 PAINTING GENERAL for execution clauses.

4 SELECTIONS

For further details on selections go to www.dulux.co.nz/specifier.

Substitutions are not permitted to the following, unless stated otherwise.

Refer to DULUX DuSpec for up to date VOC levels as these are subject to change.

4.1 BACK PAINTING SCHEDULE

Paint 2 coats (including any pre-prime) usually to match exposed face coating. If there is no coating use water resistant clear finish sealer.

Refer to all manufacturers specifications for back painting requirements and cut edge painting requirements for all claddings and linings.

Extent options:

- To lining manufacturer's requirements
- Bottom edge & 150mm up
- Paint whole back, bottom & concealed edges of lining
- Paint lining under trim before fixing
- Paint whole back, bottom & concealed edges of trim

Paperfaced plasterboard substrates - new ceilings

4.2 INTERIOR PAPERFACED PLASTERBOARD NEW - CEILINGS - PAINT

Gloss level: Flat
 Coating type: Water based
 System: [DuSpec NZ_SD09005](#)
 Fire rating: Group Number 1-S, Report Number 5054, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX 1 Step Prep Acrylic Primer Sealer & Undercoat @ 14 m²/L
 2nd coat: DULUX Professional Ceiling Flat @ 12.8 m²/L
 3rd coat: DULUX Professional Ceiling Flat @ 12.8 m²/L

4.3 INTERIOR PAPERFACED PLASTERBOARD NEW - CEILINGS - WET AREAS - PAINT

Gloss level: Flat
 Coating type: Water based
 System: [DuSpec NZ_SD12409](#)
 Fire rating: Group Number 1-S, Report Number 5054, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX 1 Step Prep Acrylic Primer Sealer & Undercoat @ 14 m²/L
 2nd coat: DULUX Ceiling White Plus Kitchen & Bathroom @ 12 m²/L
 3rd coat: DULUX Ceiling White Plus Kitchen & Bathroom @ 12 m²/L

Paperfaced plasterboard substrates - new walls

4.4 INTERIOR PAPERFACED PLASTERBOARD NEW - WALLS - PAINT

Gloss level: Low Sheen
 Coating type: Water based
 System: [DuSpec NZ_SD09023](#)
 Fire rating: Group Number 1-S, Report Number 5054, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX 1 Step Prep Acrylic Primer Sealer & Undercoat @ 14 m²/L
 2nd coat: DULUX Wash & Wear 101 @ 16 m²/L
 3rd coat: DULUX Wash & Wear 101 @ 16 m²/L

4.5 INTERIOR PAPERFACED PLASTERBOARD NEW - WALLS - WET AREAS - PAINT

Gloss level: Low Sheen
 Coating type: Water based
 System: [DuSpec NZ_SD09011](#)
 Fire rating: Group Number 1-S, Report Number 5054, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX 1 Step Prep Acrylic Primer Sealer & Undercoat @ 14 m²/L
 2nd coat: DULUX Wash & Wear Plus Kitchen & Bathroom @ 16 m²/L
 3rd coat: DULUX Wash & Wear Plus Kitchen & Bathroom @ 16 m²/L

Timber substrates - new ceilings, walls, trim, doors, frames - clear and stained

4.6 INTERIOR TIMBER NEW - WALLS, TRIM, DOORS, FRAMES AND CEILINGS - STAINED

Gloss level: Satin
 Coating type: Water based - stain + clear
 System: [DuSpec NZ_SW08874](#)
 Fire rating: Group Number 3, Report Number 5095, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX Intergrain UltraClear (Tinted) @ 13 m²/L
 2nd coat: DULUX Intergrain UltraClear @ 13 m²/L
 3rd coat: DULUX Intergrain UltraClear @ 13 m²/L

Timber substrates - new trim, doors, frames, etc - paint

4.7 INTERIOR TIMBER NEW TRIM, DOORS AND FRAMES - WATER BASED PAINT

Gloss level: Semi Gloss
 Coating type: Water based enamel
 System: [DuSpec NZ_SD08884](#)
 Fire rating: Group Number 3, Report Number 5095, [NZBC C/VM2 A1.5](#)
 1st coat: DULUX 1 Step Prep Acrylic Primer Sealer & Undercoat @ 14 m²/L
 2nd coat: DULUX Aquanamel @ 16 m²/L
 3rd coat: DULUX Aquanamel @ 16 m²/L

6811 WATERPROOFING & ACOUSTIC UNDERLAY SYSTEM

1 GENERAL

This section relates to a waterproofing membrane and an acoustic underlay as a system:

- applied to floor and wall surfaces to provide a waterproof and noise reducing barrier
- under internal wet area wall and floor finishes
- under external deck finishes such as tiles

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

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 E3/AS1	Internal moisture
NZBC G6/VM1	Airborne and impact sound
NZS 4121	Design for access and mobility - Buildings and associated facilities
BRANZ	Good practice guide: Tiling

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Manufacturer/supplier contact details

Company: Construction Technologies Australia Pty LTD

Web: www.ctaust.com.au

Telephone: +64 92711442

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years: For product

- 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 applicator

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS

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

1.7 MAINTENANCE CONTRACT PROPOSAL

Provide a proposed contract for the certified installer to inspect annually to ensure weather tightness and durability of waterproofing System.

Compliance information**1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE**

Provide the following compliance documentation: -

- Applicators approval certificate from the manufacturer / importer / distributor
- Manufacturer's, importer's or distributors warranty
- Installer's / applicator's warranty
- Producer Statement - Construction from the applicator / installer
- Producer Statement - Construction Review from an acceptable suitably qualified person
- Other information required by the BCA in the Building Consent Approval documents.

Performance**1.9 QUALITY ASSURANCE**

Maintain quality necessary to assure that work is performed in accordance with this specification and the qualifying requirements of the Manufacturer.

2 PRODUCTS**Materials****2.1 WATERPROOFING UNDERLAY**

Liquid applied or sheet waterproofing membrane. Refer to SELECTIONS.

Accessories**2.2 ADHESIVE**

Adhesive to suit the material and substrate and to the membrane manufacturer's requirements.

2.3 PRIMER AND SEALER

To the adhesive manufacturer's requirements for the particular substrate.

2.4 DETAIL TAPE

To the adhesive manufacturer's requirements tape used for detailing internal corners, drains, posts and penetrations. Installed prior to installation of the membrane.

2.5 MASTIC

To the mastic manufacturer's requirements, a rubberised adhesive, semi liquid membrane used to seal at membrane terminations and at end laps; for seam sealing and for membrane repairs.

2.6 TILE ADHESIVE

Refer to the tiling section(s) for compatible tile adhesive.

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 CHECK SUBSTRATE

Ensure that the substrate is in a suitable condition to allow work of the required standard and will comply with the requirements of the [NZBC E2/AS1](#) or [NZBC E3/AS1](#) for the relevant substrate and membrane requirements.

Ensure that the substrate construction is well braced against movement and deflection and structurally sound. Ensure that the substrate falls to the rainwater/water outlets and water must not pond. Ensure all surfaces are clean, dry and free from dust and dirt, oils or grease with no projections of sharp materials. Complete any remedial work identified before commencing any work.

3.3 CURING OF NEW CONCRETE

Allow concrete to fully cure before applying membranes. Maximum moisture content of concrete 75%.

3.4 SURFACE PREPARATION - GENERAL

Ensure surface to receive the membrane is clean, dry and free of any foreign matter that may adversely affect the adhesion of the membrane. Do not use the products in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp
- When the substrate is wet
- Where the membrane will be left exposed to the weather or UV for a prolonged period of time as specified by the manufacturer.
- Where the surface temperature is below 10°C or above 35°C

3.5 FILM THICKNESS

Ensure that the dry film thickness specified in the membrane manufacturer's installation documents is achieved. Film thickness is an important factor to the waterproofing performance of the membrane and its long term durability.

3.6 SAFETY PRECAUTIONS

Take extra precautions when applying the membrane and associated products, in areas where there is insufficient ventilation. Do not breathe fumes. Avoid contact with skin, wear eye /face protection.

Substrate

3.7 SUBSTRATE - PLYWOOD

Ensure plywood is structural grade treated to H3 or H3.2 (CCA treated). Plywood substrates must have moisture content not more than 18% before installing membrane. With primed/sealed face and edges.

NOTE: Treated plywood must be allowed to breath for a minimum of 7 days before installation of membrane. Fixing must be to manufacturer's specifications. LOSP treated plywood must not be used.

Requirements if using for:

Flooring:	Stress grade F8, minimum thickness 18mm with framing at minimum 400mm centres both ways, or min 21mm with framing at 600mm centres both ways. Fixing, glue and stainless steel screws.
Wall lining:	Stress grade F8, minimum thickness 12mm with framing at minimum 600mm centres
Floor overlay:	Stress grade 8, minimum thickness 12mm.

3.8 SUBSTRATE - CONCRETE

Concrete must have a smooth steel trowel finish and be allowed to cure for a minimum of 28 days prior to installation of membrane. Any imperfections in the concrete must be removed and any voids filled with cementitious filler before installing the membrane. The relative humidity of the concrete surface must be 75% RH or less.

3.9 SUBSTRATE - FIBRE CEMENT SHEETING

Ensure fibre cement sheeting is wet area grade and is suitable for installing the membrane (refer to Sheet manufacturers details for correct fixing, thicknesses and sheet layout). Minimum Type B, Category 3. With primed/sealed face and edges.

Requirements if using for:

Flooring: Minimum thickness 18mm with joists at minimum 400mm centres and blocking at 1200 centres. Fixing, glue and stainless steel screws.

Wall lining: Minimum thickness 9mm with framing at minimum 600mm centres.

Floor overlay: Minimum thickness 6mm.

3.10 SUBSTRATE - RECONSTITUTED WOOD PANELS

Ensure reconstituted wood panel is bonded with PMDI resin, water repellent, has an average density of 680kg/m³ and treated to H3 (waterborne not LOSP). Wood panel substrates must have moisture content not more than 16% before installing membrane. With primed/sealed face and edges.

NOTE: Treated reconstituted wood panel must be allowed to breath for a minimum of 7 days before installation of membrane. Fixing must be to manufacturer's specifications.

LOSP treated plywood must not be used.

Particleboard must not be used.

Requirements if used for:

Flooring: Non-oriented strand board, minimum thickness 20mm with framing at 600mm centres both ways. Fixing, glue and stainless steel screws.

Wall lining: Non-oriented strand board, minimum thickness 12mm with framing at minimum 600mm centres.

Floor Overlay: Reconstituted wood panel, minimum thickness 16mm.

3.11 SUBSTRATE - PLASTERBOARD

Plasterboard wall linings must be wet area plasterboard, manufactured and installed to manufacturer's instructions. Minimum thickness 10mm.

3.12 FALLS FLOOR

All floors must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to the installation of the membrane.

Unless stated otherwise minimum fall gradients to wastes to be provided to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.

1 : 50 minimum unenclosed shower bases (to [NZBC E3/AS1](#), 3.3.5)

1 : 60 minimum enclosed shower bases

1 : 50 minimum shower bases for people with disabilities (to [NZS 4121](#), 10.5.11.3 (b).)

1 : 60 minimum commercial kitchens or similar

1 : 40 minimum For tiled decks which also act as a roof

3.13 WASTE/DOWN PIPE OUTLETS

Drainage and waste outlets to be flange type. Ensure outlet pipes are fixed securely and the top surface set flush with the surface receiving the membrane application, to the membrane manufactures installation instructions.

Where falls are required ensure that the substrate falls to the outlets and water will not pond.

NOTE: Fitting the outlet is the responsibility of the contractor or plumber.

Finishes**3.14 TILES**

Tiles to be direct bonded to the membrane.

3.15 FINISHES / MATERIALS OVER

Install finishes / materials to manufacturers requirements over underlay.

Installation - acoustic materials

3.16 INSTALL ACOUSTIC PRODUCTS

Place acoustic underlay to the floor and isolation strips around the base of walls, columns and any vertical fixtures. Glue fix underlay to substrate using adhesive as required by the underlay manufacturer, ensuring pads are placed diagonally to the joints in the surface floor coverings. Tightly butt to the walls and other vertical elements.

Installation - waterproof membrane - general**3.17 PRIMING - INTERIOR**

Apply water based primer for interior applications. Shake the bottle well before tipping into a paint tray. Apply primer with either a brush or roller. Allow primer to cure fully before installing the detail tape or membrane. Do not install membrane over wet primer. Clean up with water.

3.18 PRIMING - EXTERIOR

Apply solvent based primer for exterior applications. Mix the contents of the can well before use. Primer to be applied with either a brush or roller. Allow primer to cure fully before installing the detail tape or membrane. Primer will feel dry to the touch when fully cured. Do not install membrane or detail tape over wet primer. Clean up with thinners. Only prime as much area as can be installed over in half a day. Re-apply the primer where it has been exposed for more than half a day.

3.19 PREPARATION

Prime all surfaces with selected primer and allow to cure.

3.20 DETAILING - CORNERS (FLOOR, WALL)

Cut required lengths of detail tape. Fold 150mm wide tape in half along its length with the backing paper to the outside. Remove backing paper from one half of the tape and apply along the floor or along one side of the corner and tightly into the junction. Remove remaining backing paper and adhere remaining half of the tape to the other side of the corner.

Ensure the detail tape is pressed tight into the corner, being sure to keep voids from occurring behind the detail tape. When joining detail tape allow for a 100mm overlap. Do not remove the protective plastic film from face of the detail tape until ready to lay the membrane.

3.21 INSTALL MEMBRANE

Install the membrane to manufacturer's requirements.

3.22 OVER JOINING STRIP

Position over the joining strip to manufacturers requirements.

3.23 MEMBRANE TO DRAINAGE/WASTE OUTLETS

Install the membrane over the installed detail tape to manufacturer's instructions. Star cut the membrane and fold down into the drain. Trowel smooth a bead of selected mastic around the inner lip of the drain at the termination of the membrane.

Installation - waterproof membrane - internal detailing**3.24 WALLS, INTERNAL CORNERS, TRANSITIONS**

A trowelled bead of selected mastic should be placed at all membrane terminations, on internal corner seams and at vertical to horizontal transitions. End joints must be lapped a minimum of 150mm and sealed using selected mastic.

NOTE: For maximum performance, 100% contact of the membrane to the primed surface must be achieved by lightly rolling the membrane.

3.25 SHOWER MEMBRANE

Apply the membrane 1800mm up the walls or to a height of 300mm above the shower rose if higher. For unenclosed showers the membrane must extend a minimum of 1500mm out from the shower rose.

3.26 COVER ENTIRE FLOOR

Cover the entire floor in the wet area with the membrane.

3.27 BOND BREAKER TAPE/SEALANT

Silicones must not come into direct contact with the membrane. A bond breaker tape or bond breaker sealant must be in place under all silicone joints as per Tiling Best Practice Guidelines.

3.28 UNDERFLOOR HEATING

Co-ordinate with underfloor heating installation.

Installation - waterproof membrane - external detailing**3.29 PROTRUSIONS**

Apply detail tape 75mm onto the floor and 75mm up the post/protrusion. Stretch and mould the detail tape all the way around the post/protrusion.

Install membrane to the floor. Wrap the base of the post/protrusion with 150mm wide strip of membrane. Apply a generous bead of mastic at the base joint and trowel smooth.

Posts/protrusions must be clad and finished as per manufacturer's specifications.

3.30 UPSTANDS, INTERNAL CORNERS, TRANSITIONS

Ensure a trowelled bead of mastic is placed at all membrane terminations, on internal corner seams and at vertical to horizontal transitions.

End joints must be lapped a minimum of 150mm and sealed using mastic.

3.31 COVER ENTIRE DECK

Cover the entire deck area with the membrane.

3.32 CONTROL JOINTS

Control joints must be installed as required.

NOTE: Silicones must not come into direct contact with the membrane. A bond breaker tape or bond breaker sealant must be in place under all silicone joints as per Tiling Best Practice Guidelines.

Finishing**3.33 REPAIRS - TRAPPED AIR**

When air becomes trapped under the membrane during installation, puncture with a sharp instrument and press flat expelling all air. Prime the area at least 150mm beyond the damaged area and allow to dry. Apply a patch of membrane as big as the primed area. Press on the patch and roll firmly. Trowel smooth a bead of mastic around the joining edge.

Completion**3.34 PROTECTION**

It is the responsibility of the main building contractor to ensure all sub-trades likely to be working in the vicinity of the membrane are aware that a waterproofing membrane has been installed and all care must be taken to protect the membrane from damage.

The tiler must lay tiles in accordance with best practice guidelines.

Commissioning**3.35 WATERPROOF TESTING**

Conduct a flood test before tiling commences, to ensure membrane is watertight and suitable for use as a waterproofing membrane for wet areas. Meet the BCA compliance requirements for the test and documentation of the test.

4 SELECTIONS**4.1 WATERPROOFING UNDERLAY**

Location:	Tiled Wet Area Showers
Brand/type:	Construction Technologies Australia - Aquablok
Substrate:	Concrete , Plasterboard and Fiber Cement

7120 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

Documents

1.1 DOCUMENTS

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

NZBC B2/AS1	Durability
NZBC C/AS1-AS2	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1: 2018	Plumbing and drainage - Water services
AS/NZS 3500.4: 2018	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.
Gas (Safety and Measurement) Regulations 2010	
Plumbers, Gasfitters and Drainlayers Act 2006	
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2011 , Field testing of backflow prevention devices and verification of air gaps	

Warranties

1.2 WARRANTY

Provide warranty for:

2 years: For the supply and installation of the plumbing system and fixtures

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

Requirements

1.3 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the [Plumbers, Gasfitters and Drainlayers Act 2006](#).

1.4 HOT WATER TEMPERATURES

To [NZBC G12/AS1](#), 6.14

Storage water heaters to store water at not less than 60°C.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:

- 45°C - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 55°C - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

Performance

1.5 TESTING - TO NZBC G12/AS1

Test to [NZBC G12/AS1](#), 7.5, **Watertightness**, for hot and cold water.

- Test to a pressure of 1500 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.

1.6 TESTING - TO AS/NZS 3500

Test to [AS/NZS 3500.1](#), Section 18, **Testing and commissioning**, for cold water.

- Test reticulation system to a pressure of 1500 kpa for period not less than 30 minutes, to [AS/NZS 3500.1](#), 18.3.1 **Hydrostatic test**. Test storage tanks to [AS/NZS 3500.1](#), 18.3.2 **Storage tanks**.

and

[AS/NZS 3500.4](#), Section 9, **Testing and commissioning**, for hot water.

- Test reticulation system (excluding tanks, water heaters, and some fixtures, valves etc) to a pressure of 1500 kpa for period not less than 30 minutes, to [AS/NZS 3500.4](#), 9.3 **Testing**. Test complete system (including valves, pumps, water heaters etc) under normal working conditions for a minimum of 48 hours, then check visually, to [AS/NZS 3500.4](#), 9.3 **Testing**.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.7 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.8 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.9 GAS APPLIANCE COMPLIANCE

Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS**Materials****2.1 COPPER PIPE**

To [NZS 3501](#) complete with copper-alloy compression fittings or crox type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), Table 1 and [NZBC G12/AS1](#), Table 1.

2.2 PVC-U PIPE

Complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#) Durability, Table 1 and [NZBC G12/AS1](#), Table 1. Protect from sunlight.

2.3 POLYBUTYLENE PIPE

Polybutylene tubing to [AS/NZS 2642.1](#), [AS/NZS 2642.2](#) and [AS/NZS 2642.3](#) complete with fittings and accessories brand-matched with durability to [NZBC B2/AS1](#) Durability, table 1 and [NZBC G12/AS1](#), table1. Protect from sunlight.

2.4 POLYETHYLENE PIPE

To [AS/NZS 4130](#) Series 1 complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/AS1](#), table1. Except for solid black PE, protect from sunlight.

2.5 POLYPROPYLENE RANDOM WATER PIPE

PP-R Polypropylene pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/VM1](#). Protect from sunlight.

2.6 CROSS LINKED POLYETHYLENE PIPE

Cross Linked Polyethylene Pipe to [AS/NZS 2492](#) and fittings to [AS/NZS 2537.2](#) with a minimum pressure capability of 1200 kPa complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/VM1](#). Except for solid black PE-X, protect from sunlight.

2.7 WATER METER

To the requirements of the network utility operator.

2.8 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to [NZBC G12/AS1](#).

2.9 BACKFLOW PREVENTION DEVICES

Provide backflow prevention devices to [AS/NZS 2845.1](#) where it is possible for water or contaminants to backflow into the potable water supply. Refer to [NZBC G12/AS1](#) 3.4 Backflow protection, and [NZBC G12/AS1](#), table 2, Selection of Backflow Protection.

2.10 TEMPERING VALVE

Tempering valve to [NZS 4617](#) to [NZBC G12/AS1](#).

Materials - Hot water heating appliances

- 2.11 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
To [NZS 4305](#), ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.
- 2.12 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Continuous flow unit with an integral gas burner and flue to [NZS 4305](#).

Components

- 2.13 INSULATION
Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to [NZBC H1/AS1](#).
- 2.14 PROTECTIVE TAPE
Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION

- 3.1 EXECUTION GENERALLY
Generally carry out the whole of this work and tests to [NZBC G12/VM1](#) or [NZBC G12/AS1](#).
- 3.2 HANDLE AND STORE
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.
- 3.3 CORE HOLES AND SLEEVES
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.
- 3.4 CONCEAL
Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.
- 3.5 CORROSION
Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.
- 3.6 THERMAL MOVEMENT
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.
- 3.7 PIPE SIZE
Flow rates to each outlet to be no less than those given in [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in [NZBC G12/AS1](#), table 4, Tempering valve and nominal pipe diameters.
- 3.8 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.
- 3.9 EXCAVATE
Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Jointing

- 3.10 JOINTING COPPER PIPE
Braise pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to [NZBC G12/AS1](#).

3.11 JOINTING PVC-U PIPE

Solvent welded joints using spigots and sockets, flanged joints and seal ring compression joints to [NZBC G12/AS1](#).

3.12 JOINTING POLYBUTYLENE PIPE

Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

3.13 JOINTING POLYETHYLENE PIPE

Seal ring compression joints and electrofusion to [NZBC G12/AS1](#).

3.14 JOINTING POLYPROPYLENE PIPE

Fusion weld joints to manufacturer's requirements.

Application - Pipework installation**3.15 WATER SUPPLY CONNECTION**

Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to [NZBC G12/AS1](#).

3.16 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.17 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1.

3.18 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES

If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to [NZBC G12/AS1](#), 9.0.

3.19 IN-LINE FILTER

Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems**3.20 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. Valve-vented systems to [NZS 4607](#).

3.21 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES

Gas appliances to be restrained to manufacturer's requirements, [AS/NZS 5601.1](#) and [NZBC C/AS1-AS2](#), 7.2 Gas-burning Appliances.

3.22 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES

Non-gas (electric, wet-back, solar etc) water heating appliances (storage water heaters) to be restrained to manufacturer's requirements and [NZBC G12/AS1](#), 6.11, Water Heater Installation.

3.23 INSTALLING HOT WATER PIPE INSULATION

Insulate all hot water pipes to [NZBC H1/AS1](#) Energy Efficiency, [AS/NZS 3500.4](#), section 8.2 Thermal insulation, and to the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs.

3.24 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](#). Valve-vented systems to [NZS 4607](#).

3.25 INSTALL GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Install complete with the necessary fittings to the manufacturer's requirements and in accordance with [NZBC G12/AS1, 6.11](#), Water heater installation. Install flue in accordance with the manufacturer's details and requirements and, [AS/NZS 5601.1](#) (for internal or external appliances) or [NZBC G4/AS1](#) (internal appliances). Also refer to section 7221 GAS APPLIANCES for installation of gas appliances.

3.26 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to [NZBC G12/AS1](#).

3.27 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.

3.28 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Installation - Valves**3.29 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.

3.30 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.31 INSTALLING BACKFLOW PREVENTION DEVICE

Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS 2845.3 or [NZ Backflow Testing Standard](#).

Completion**3.32 LABEL**

Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.33 CLEAN IN-LINE FILTER

Clean all in-line filters on completion of works.

3.34 REPLACE

Replace damaged or marked elements.

3.35 LEAVE

Leave work to the standard required by following procedures.

3.36 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS**Water main****4.1 POLYETHYLENE WATER MAIN**

Size: 25mm outside diameter (i.e. DN 25 in [AS/NZS 4130](#))

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 DOCUMENTS

Documents referred to in this section are:

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: 2018	Plumbing and drainage - Sanitary plumbing and drainage
Plumbers, Gasfitters and Drainlayers Act 2006	

1.2 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the [Plumbers, Gasfitters and Drainlayers Act 2006](#).

2 PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to [AS/NZS 1260](#) complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3 EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1

Carry out this work to [NZBC G13/AS1](#) and [NZBC G1/AS1](#) and complete all tests to G13/AS1, 7.1 **Test Methods**.

3.2 EXECUTION GENERALLY - AS/NZS 3500.2

Carry out this work to [AS/NZS 3500.2: 2018](#), as modified by [NZBC G13/AS3](#), and complete all tests to [AS/NZS 3500.2: 2018](#), 15 **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 EQUIPOTENTIAL BONDING METALLIC WASTE PIPES

If it is an electrical requirement, before enclosing, ensure metallic waste pipes connected to metallic drains and attached metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) similar to [NZBC G12/AS1](#), 9.0.

3.5 INSTALL TRAPS, WASTE AND VENT PIPES - NZBC G13/AS1

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to [NZBC G13/AS1](#) and [AS/NZS 2032](#). Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.6 INSTALL TRAPS, WASTE AND VENT PIPES - AS/NZS 3500.2: 2018

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to [AS/NZS 3500.2: 2018](#), as modified by [NZBC G13/AS3](#), and jointing to [AS/NZS 2032](#). Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.7 INSTALL ELECTRIC PAN VENTS

Install electric pan vents to manufacturers' requirements. Leave ready for electrical connection by electrician.

3.8 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.9 TEST

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to [NZBC G13/AS1](#) or [AS/NZS 3500.2: 2018](#), 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.10 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4 SELECTIONS

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 F7/AS1	Warning systems
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
AS 3786	Smoke alarms using scattered light, transmitted light or ionization
NZS 4514:2009	Interconnected smoke alarms for houses
NZS 4246	Energy Efficiency - Installing bulking thermal insulation in residential buildings
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance.
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 61643	Components for low voltage surge protection devices
Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).	
TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services	

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

Warranties

1.3 WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year: Warranty period

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

Requirements

1.4 COMPLY

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 GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

Workers and supervisors to be appropriately qualified to applicable legislative requirements. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.7 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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.

2 PRODUCTS**2.1 MAINS SUPPLY**

Tough plastic sheathed neutral screened cable to [AS/NZS 5000.2](#) and [AS/NZS 3008.1.2](#), with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to [AS/NZS 5000.2](#), stranded above 1.0mm², and to [AS/NZS 3008.1.2](#). Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm ² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm ² on 16 amp MCBs
Power circuits:	2.5mm ² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm ² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm ² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm ² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to [AS/NZS 3439.3](#), or AS/NZS 61439.3, and installed in accordance with [AS/NZS 3000](#). Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with [AS/NZS 3190](#). MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units. 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 SMOKE ALARMS

Type 1 domestic smoke alarm to [NZBC F7/AS1. 1.2 Descriptions of alarm systems](#). Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class II surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class III surge protection to switched socket outlets.

2.12 CEILING ROSES

White plastic mounting base with screwed cover, manufactured to [AS/NZS 3113](#). Terminal type. Suspended fittings to have sheathed round flexible cord to [AS/NZS 3008.1.2](#). Refer to SELECTIONS.

2.13 BATTEN HOLDERS

Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.14 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.

3 EXECUTION**3.1 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.

3.2 MAIN SUPPLY

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.3 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.

3.4 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.

3.5 CIRCUIT PROTECTION

Install MCBs at distribution board to [AS/NZS 3000](#) to protect each final sub circuit.

3.6 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.

3.7 EARTH LEAKAGE PROTECTION

Install RCD protection to [AS/NZS 3000](#).

3.8 RCD - RESIDENTIAL INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to [AS/NZS 3000](#).

3.9 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.

3.10 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.

3.11 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.

3.12 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.

3.13 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or noggs. Fix switch panel wall boxes to solid blocking.

3.14 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.15 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer requirements.

3.16 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](#).

3.17 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 SMOKE ALARMS

Install Type 1 domestic smoke alarm system to [NZBC F7/AS1 3.0 Domestic smoke alarms](#), [NZS 4514](#) and to the alarm manufacturer requirements. Fit neatly and without damage to the surrounding finish.

3.20 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 II protection at the switchboard, protect the device by a dedicated MCB.

3.21 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.

3.22 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](#).

3.23 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.

3.24 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.

3.25 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Security system

3.26 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.

Completion & Commissioning

3.27 COMPLETION MATTERS

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

Electrical automation system

3.28 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

3.29 CONTROL PANEL

Control panel system with a minimum of one installer code, one master code, 6 zones minimum and 6 user codes. The installer to select codes to suit installation.

3.30 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.

3.31 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.

3.32 CABLING

Security alarm wiring to NZS/AS 1125 for cables.

Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm².

3.33 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.

3.34 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.

4 SELECTIONS

4.1 SWITCH UNITS - PERSON WITH DISABILITIES

In addition to clause SWITCH UNITS above, units shall comply with [NZBC G9/AS1](#), 2.0.1.b) and d). Refer to SELECTIONS.

4.2 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.

Refer to clause INSULATION & GENERAL CLEARANCES for clearances from insulation and other elements.

4.3 RECESSED LIGHT FITTINGS - NON-RESIDENTIAL

Non-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 - NON-IC, Do-not Cover, CA 80, CA 90, CA 135, IC, IC-4, and IC-F.

Refer to clause INSULATION & GENERAL CLEARANCES for clearances from insulation and other elements.

4.4 EXTERIOR LIGHT FITTINGS

Using materials with superior UV protection, impact strength, and addition chemical resistance.

Weather protection minimums:

- IP54 for protected areas under eaves or verandahs etc.
- IP55 for exposed areas not subject to pressurised water (hoses).
- IP66 for areas subject to pressurised water or major splashing.
- IP67 for inground lights
- IP68 for submerged pool fittings

4.5 EARTHING CONDUCTIVE STRUCTURE & MATERIALS

Earth all at risk structural metalwork and conductive building materials to [AS/NZS 3000](#), 5.4.6, and the Electricity (Safety) Regulations 2010.

If they form part of the building, this includes:

- Structural steel frames or members
- Light steel framing
- Exposed conductive materials, like metal sink/tub or vanity benches etc, with attached electrical units or equipment

4.6 EQUIPOTENTIAL BONDING

Equipotential Bond extraneous conductive parts together and to the electrical installation earthing system to [AS/NZS 3000](#), 5.6, and the Electricity (Safety) Regulations 2010 and the fitting manufacturer requirements.

If they form part of the building, this includes:

- Conductive water piping (including tap etc) and exposed related connected conductive surfaces (like metal sink benches or metal cladding etc). Not required where isolated by non-conductors (plastic pipe etc) from the mass of earth.
- Other conductive piping (not earthed by other means) and exposed related connected conductive surfaces.
- Concrete reinforcing - for floor or wall forming part of a room with a shower or bath, or the shell and surround of a swimming/spa pool
- Built-in Swimming pool and spa pool - exposed conductive parts of electrical equipment, as well as exposed conductive, fixtures, fittings and pool structures within 1.25m of pool edge

4.7 ARC FAULT DETECTION DEVICE (AFDD)

To [AS/NZS 3000](#) clause 2.9, AFDD on all final sub-circuits not exceeding 20A.

4.8 RCD-AFDD COMBINED - RESIDENTIAL INSTALLATIONS

Install a 30mARCD - AFDD combined device (RCD Type II) at the switchboard for all final sub circuits not exceeding 20A, to control and protect outlets and lighting to [AS/NZS 3000](#), (2018, 2.6 & 2.9). Protect over 20A to 32A final sub circuits with separate RCD and to [AS/NZS 3000](#).

4.9 SWITCHES AND SWITCHED SOCKET UNITS

Fit all switch units and socket units to the manufacturers requirements with heights and mounting directions as indicated in SELECTIONS.

4.10 SWITCHES AND SWITCHED SOCKET UNITS - FOR PERSON WITH DISABILITIES

Fit all switch units and socket units to the manufacturers requirements with heights (& mounting direction) and location to [NZBC G9/AS1](#) and SELECTIONS.

4.11 INSULATION & GENERAL CLEARANCES

Some electrical and mechanical services, and equipment may need to have a gap to insulation and some building elements. The gaps should be to the [NZS 4246](#) based tables below or to the equipment manufacturers requirements if they require larger gaps. Smaller gaps to manufacturers requirements can be used for equipment specifically manufactured with heat shielding or similar (excludes light fittings).

Installed gap not to be more than 50mm bigger than the required gap.

The following tables are subject to:

- The requirements of [NZS 4246](#) for insulation.
- The insulation is exposed to the source of heat or equipment etc.
- Insulation, has passed the needle flame test to [AS/NZS 60695.11.5](#) and/or is non-combustible.
- Gaps to hot surfaces may have to be increased with non-compliant insulation and plastic/polymeric type insulation (EPS, XPS, PIR, etc), check with insulation manufacturer.
- Gaps to hot surfaces may be able to be reduced with non-combustible insulation, check with equipment manufacturer.
- "Secure insulation" if required means, glue, mechanical fix, or provide fixed barriers at gap edge of insulation to hold in place. Rigid or semi rigid insulation may only need a firm friction fit (secure loose pieces).
- Loose fill insulation will require fixed barriers to [NZS 4246](#) to maintain gaps.

4.12 LIGHT FITTINGS TO INSULATION

Type of fitting	Minimum insulation clearance	Comments
Recessed, marked NON-IC, or unmarked	100mm (increase if over 100W)	To NZS 4246 . NON-IC fittings and new or old unmarked & unknown fittings, and/or insulation. Insulation to be secured.
Recessed, CA 80, CA 90, or CA 135.	Abut fittings	To NZS 4246 . Do not cover the fittings.
Recessed, IC, IC-F, or IC-4.	Abut & cover fittings.	To NZS 4246 . Ensure insulation complies.
Recessed, marked Do-Not-Cover	Manufacturer clearances	To NZS 4246 . Do not cover the fittings.
Independent control gear	Place on top of insulation & 50mm from fittings	To NZS 4246 . If not on top allow 50mm clearance to insulation, do not cover. Includes, transformers, ballasts & drivers etc.
Surface fittings not exposed to insulation	Nil	To NZS 4246 . Where surface fittings are isolated from insulation by appropriate linings. Excludes high heat fittings.
Surface fittings & exposed insulation	200mm	To NZS 4246 . This is exposed insulation to any part of the exposed fitting & bulb/tube (e.g. exposed light in an unlined basement). Insulation to be secured.

4.13 RECESSED LIGHT FITTINGS TO COMBUSTIBLE BUILDING ELEMENTS

Type of recessed fitting	Minimum building element clearance **	Comments
Marked NON-IC, or unmarked, ≤100W	100mm, vertical & horizontal	To AS/NZS 3000:2018
Marked NON-IC, or unmarked, >100W	200mm, vertical & horizontal	To AS/NZS 3000:2007
CA 80, CA 90 or CA 135	100mm, vertical & horizontal	To AS/NZS 3000:2018
IC, IC-F or IC-4	100mm, horizontal NA, vertical	To AS/NZS 3000:2018 To be NA vertical, fitting must be covered by insulation. If not covered use 100mm clearance.
Marked Do-Not-Cover	100mm, vertical & horizontal	To AS/NZS 3000:2018 . Manufacturer clearances if greater than 100mm

** Combustible building elements exclude metal elements, but include timber framing or other timber based elements, and normal linings etc. Highly flammable materials & those likely to melt will need more clearance.

4.14 INBUILT RECESSED HOT APPLIANCES TO INSULATION

Appliance	Minimum insulation clearance	Comments
Electrical heaters	Manufacturer clearances	To NZS 4246 .
Electrical heaters	100mm	Manufacturer clearances not known. To NZS 4246 . Clearance may be able to be reduced with non-combustible insulation. Insulation to be secured.
Heat producing appliances & equipment	Manufacturer clearances	To NZS 4246 .
Heat producing appliances & equipment	50mm	Manufacturer clearances not known. To NZS 4246 . Clearance may be able to be reduced with non-combustible insulation. Insulation to be secured.

Note - Appliances and equipment excludes cables, junction boxes, light switches & power sockets etc

4.15 EXTRACTS, VENTS & ROOF UNDERLAY TO INSULATION

Appliance	Minimum insulation clearance	Comments
Ducted fan motors	50mm	To NZS 4246 . Includes ducted rangehoods, extractors etc. Applies to the motor unit and electrical enclosures (not the ducts).
Ducted fan ducts	Abut	To NZS 4246 . Excludes motor unit and electrical enclosures.
Unducted fan motors usually discharging to ceiling space	200mm	To NZS 4246 . Includes unducted, rangehoods, extractors etc, discharging into roof space. To prevent debris falling into motor. Clearance may be able to be reduced, by providing a fixed barrier around the vent.
Roofing material/underlay	25mm	To NZS 4246 . Maintain clearance from underside of roofing or flexible roofing underlay, to prevent wicking.

4.16 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.

SPECIFICATION

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

J-760 Adlam Residence

(project name)

33 Great West Road, Pomare, Rotorua, New Zealand

(project address)

Mr S & Mrs L Adlam

(client)

Project Ref: J-760

Date: 17 March 2022

Contract Appendix Documents Index

Design IT PS1	2
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Truss Design FDS	27
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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 1170:2002 Structural design actions, Parts 0 and 1.
4. AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
5. AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.
6. AS 1720.1:2010 Timber structures. Part 1: Design methods.
7. 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: 3 February 2021

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:	Matt Gaunt
Business name:	AH Architectural Design & Drafting LTD
Address:	130 Otonga Road Springfield Rotorua 3015
Email:	matt@ahdesign.kiwi

Project & site details:

Project:	J-760 Adlam Residence
Reference:	J-760
Site address:	33 Great West Road Baxendale Rotorua 3015
For (owner/s):	Mr & Mrs Adlam
Design wind zone	Very high
Snow loading	Design snow zone: N0

MEMBER DESIGN DETAILS

Member 1

- 1) **Member code and description** S1 - Studs - In single or upper load bearing walls
- 2) **Date prepared** 04 June 2021

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

4) Design inputs

Stud height	2450 mm
Stud spacing	600 mm
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Roof load width 'RLW'	4.5 m
Rafter or truss spacing	900 mm

5) Member specification

Size, stress grade/product	Use 90 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Wind load - W_s^*	16.3 mm	6.3 mm	2.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}	
		End kN ⁴	Horizontal kN
1.35G	0.60	-2.2	
1.2G + 1.5Q	0.80	-3.5	
1.2G + W_u + $\Psi_c Q$	1.00	-6.8	1.0
0.9G + W_u	1.00	1.6	0.8

8) Installation requirements

- Wall studs to be nogged at maximum 1350 mm
- Notching of wall studs is not permitted.

Member 2

1) Member code and description S2 - Studs - in lower storey of two storey construction

2) Date prepared 04 June 2021

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

4) Design inputs

Stud height	2750 mm
Stud spacing	400 mm
Floor load width 'FLW'	3.0 m
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Roof load width 'RLW'	4.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

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

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Wind load - W _s *	18.3 mm	8.9 mm	2.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}	
		End kN ⁴	Horizontal kN
1.35G	0.60	-3.3	
1.2G + 1.5Q	0.80	-5.3	
1.2G + W _u + Ψ _c Q	1.00	-5.0	0.7
0.9G + W _u	1.00	0.1	0.6

8) Installation requirements

- Wall studs to be nogged at maximum 1350 mm
- Notching of wall studs is not permitted.

Member 3

1) Member code and description

FJ1 - Floor joist - Supporting floor loads only

2) Date prepared

04 June 2021

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	4.6 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Lateral restraint condition	Bottom edge restrained by ceiling/ceiling battens at 600 crs max.

5) Member specification

Size, stress grade/product	Use 240 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ²

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ _L Q	15.0 mm	11.6 mm (long term)	1.3
Live load - Ψ _S Q	9.0 mm	8.4 mm	1.1
Floor flexibility - Ψ _S Q*	2.0 mm	1.9 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.3
1.2G + 1.5Q	0.80	-2.7
1.2G + 1.5Q	0.94	-3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance
- Provide intermittent blocking along lines of support - refer Detail H21

Member 4

1) Member code and description	FJ2 - Floor joist - Supporting floor loads only
2) Date prepared	04 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	4.4 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Lateral restraint condition	Bottom edge restrained by ceiling/ceiling battens at 600 crs max.
5) Member specification	
Size, stress grade/product	Use 240 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q$	14.7 mm	12.5 mm (long term)	1.2
Live load - $\Psi_S Q$	9.0 mm	7.1 mm	1.3
Floor flexibility - $\Psi_S Q^*$	2.0 mm	1.8 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-3.2
1.2G + 1.5Q	0.94	-3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance

- Provide intermittent blocking along lines of support - refer Detail H21

Member 5

1) Member code and description	FJ3 - Floor joist - Supporting floor loads only
2) Date prepared	25 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.4 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
5) Member specification	
Size, stress grade/product	Use 140 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ²

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ}	8.0 mm	5.4 mm (long term)	1.5
Live load - $\Psi_S Q$	6.7 mm	3.1 mm	2.1
Floor flexibility - $\Psi_S Q^*$	2.0 mm	1.8 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.8
1.2G + 1.5Q	0.80	-1.7
1.2G + 1.5Q	0.94	-3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance

Member 6

1) Member code and description	FJ4 - Floor joist - Supporting floor loads only
2) Date prepared	25 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.4 m - single span
Joist spacing	400 mm

Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN

5) Member specification

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

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ}	8.0 mm	4.1 mm (long term)	2.0
Live load - Ψ_{SQ}	6.7 mm	3.1 mm	2.1
Floor flexibility - Ψ_{SQ}^*	2.0 mm	1.8 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.6
1.2G + 1.5Q	0.80	-1.4
1.2G + 1.5Q	0.94	-3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance

Member 7

1) Member code and description L1 - Lintels in lower storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span	2.8 m
Floor load width 'FLW'	2.0 m
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	4.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 2/240 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	9.3 mm	4.9 mm (long term)	1.9
Live load - $\Psi_S Q$	7.8 mm	1.7 mm	4.5

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-8.0
1.2G + 1.5Q	0.80	-13.4
1.2G + W_u + $\Psi_c Q$	1.00	-12.4
0.9G + W_u	1.00	5.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 8

1) Member code and description L2 - Lintels in lower storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span	2.8 m
Floor load width 'FLW'	1.0 m
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	4.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 2/200 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	9.3 mm	6.4 mm (long term)	1.5
Live load - $\Psi_S Q$	7.8 mm	1.5 mm	5.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴

1.35G	0.60	-6.1
1.2G + 1.5Q	0.80	-8.6
1.2G + W _u + Ψ _c Q	1.00	-10.7
0.9G + W _u	1.00	6.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 9

1) Member code and description L3 - Lintels in lower storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span	2.8 m
Floor load width 'FLW'	2.4 m
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	0.1 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 2/240 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ _L Q*	9.3 mm	4.2 mm (long term)	2.2
Live load - Ψ _S Q	7.8 mm	2.1 mm	3.7

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-6.8
1.2G + 1.5Q	0.80	-16.1
1.2G + W _u + Ψ _c Q	1.00	-6.2
0.9G + W _u	1.00	-4.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 10

- 1) Member code and description** L4 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared** 04 June 2021
- 3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs**
- Span 5.7 m
 - Roof load width 'RLW' 1.0 m
 - Roof type and mass Light roof and ceiling - 40 kg/m²
 - Nominal wall thickness 90 mm
- 5) Member specification**
- Size, stress grade/product Use 2/300 x 45 hySPAN
 - Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	10.0 mm	5.9 mm (long term)	1.7
Live load - Ψ sQ	15.0 mm	1.3 mm	11.6
Wind load - W _s	28.5 mm	5.1 mm	5.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.3
1.2G + 1.5Q	0.80	-3.1
1.2G + W _u + Ψ cQ	1.00	-4.8
0.9G + W _u	1.00	3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 11

- 1) Member code and description** L5 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared** 04 June 2021
- 3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs**
- Span 5.7 m
 - Roof load width 'RLW' 1.0 m
 - Roof type and mass Light roof and ceiling - 40 kg/m²
 - Nominal wall thickness 90 mm

5) Member specification

Size, stress grade/product	Use 2/300 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	10.0 mm	5.9 mm (long term)	1.7
Live load - $\Psi_S Q$	15.0 mm	1.3 mm	11.6
Wind load - W_s	28.5 mm	5.1 mm	5.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3} End kN ⁴
1.35G	0.60	-2.3
1.2G + 1.5Q	0.80	-3.1
1.2G + W_u + $\Psi_c Q$	1.00	-4.8
0.9G + W_u	1.00	3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 12

1) Member code and description	VB1 - Verandah beams
2) Date prepared	23 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.7 m - single span
Roof mass	40 kg/m ²
Roof load width 'RLW'	4.5 m
5) Member specification	
Size, stress grade/product	Use 2/290 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	6.8 mm	3.1 mm (long term)	2.2
Live load - $\Psi_S Q$	10.8 mm	0.7 mm	14.5
Wind load - W_s	13.5 mm	4.2 mm	3.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-4.6
1.2G + 1.5Q	0.80	-6.6
1.2G + W _u + $\Psi_c Q$	1.00	-13.6
0.9G + W _u	1.00	11.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer AS 1684

Member 13

- 1) Member code and description VB2 - Verandah beams
- 2) Date prepared 23 June 2021
- 3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs
- Span 4.0 m - single span
 - Roof mass 40 kg/m²
 - Roof load width 'RLW' 4.2 m
- 5) Member specification
- Size, stress grade/product Use 300 x 90 hyONE
 - Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	10.0 mm	4.7 mm (long term)	2.1
Live load - $\Psi_S Q$	12.0 mm	1.1 mm	10.6
Wind load - W _s	20.0 mm	6.4 mm	3.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-6.2
1.2G + 1.5Q	0.80	-8.9
1.2G + W _u + $\Psi_c Q$	1.00	-18.2
0.9G + W _u	1.00	15.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Notes for interpretation of serviceability data

- '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.
- 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%

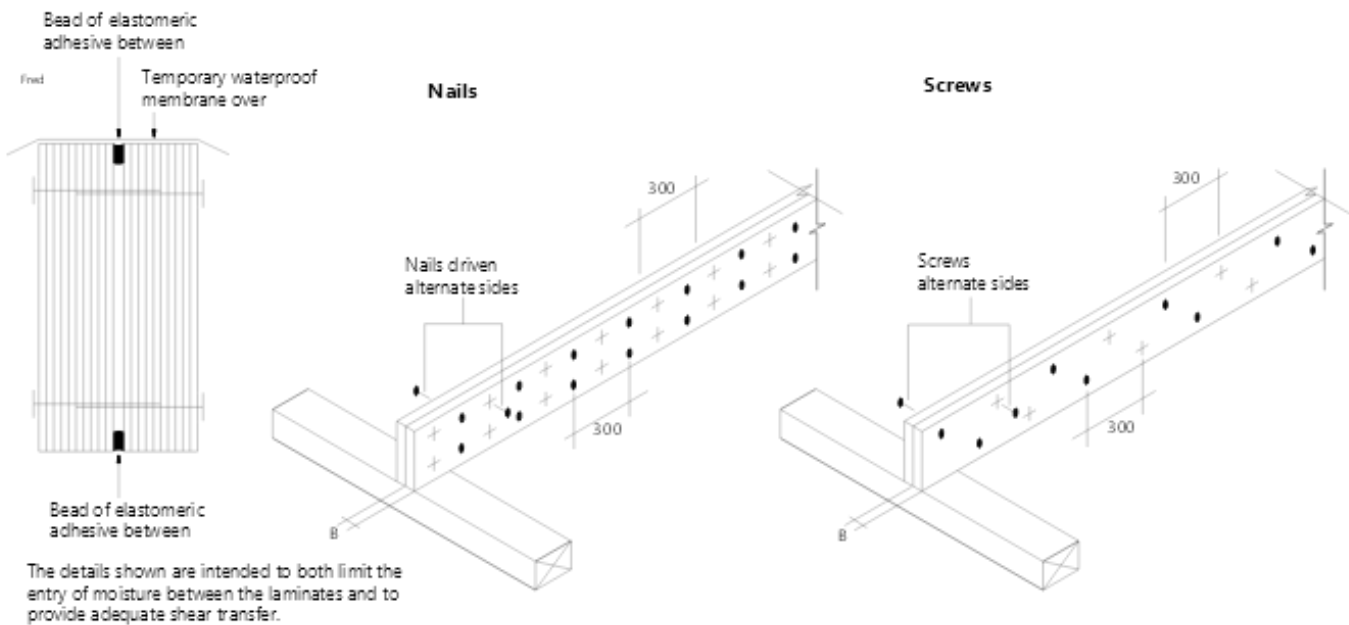
As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

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

- Duration of load factor 'k1' for strength as per NZS 3603:1993
- Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
- Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
- End reaction includes allowance for overhang/cantilever where one has been designed

Detail H1: Vertical Lamination - Two Pieces



Section Size 'B'	Minimum Nail Diameter	Minimum Nail Length	Minimum Screw Gauge	Minimum Screw Length
35	3.06 mm	75 mm	-	-
45	3.30 mm	90 mm	14 g	75 mm
63	3.30 mm	100 mm	14 g	100 mm
90	-	-	14 g	150 mm

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 1170:2002 Structural design actions, Parts 0 and 1.
4. AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
5. AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.
6. AS 1720.1:2010 Timber structures. Part 1: Design methods.
7. 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: 3 February 2021

For further information or advice contact:

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Specifier details:

Specifier:	Matt Gaunt
Business name:	AH Architectural Design & Drafting LTD
Address:	130 Otonga Road Springfield Rotorua 3015
Email:	matt@ahdesign.kiwi

Project & site details:

Project:	J-760 Adlam Residence
Reference:	J-760
Site address:	33 Great West Road Baxendale Rotorua 3015
For (owner/s):	Mr & Mrs Adlam
Design wind zone	Very high
Snow loading	Design snow zone: N0

MEMBER DESIGN DETAILS

Member 1

- 1) **Member code and description** S1 - Studs - In single or upper load bearing walls
- 2) **Date prepared** 04 June 2021

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

4) Design inputs

Stud height 2450 mm
 Stud spacing 600 mm
 Roof type and mass Light roof and ceiling - 40 kg/m²
 Roof load width 'RLW' 4.5 m
 Rafter or truss spacing 900 mm

5) Member specification

Size, stress grade/product Use 90 x 45 SG8
 Material type Dry softwood, machine stress graded and verified (NZS 3622)
 Assumed design density < 480 kg/m³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Wind load - W _s *	16.3 mm	6.3 mm	2.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}	
		End kN ⁴	Horizontal kN
1.35G	0.60	-2.2	
1.2G + 1.5Q	0.80	-3.5	
1.2G + W _u + Ψ _c Q	1.00	-6.8	1.0
0.9G + W _u	1.00	1.6	0.8

8) Installation requirements

- Wall studs to be nogged at maximum 1350 mm
- Notching of wall studs is not permitted.

Member 2

1) Member code and description S2 - Studs - in lower storey of two storey construction

2) Date prepared 04 June 2021

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

4) Design inputs

Stud height 2750 mm
 Stud spacing 400 mm
 Floor load width 'FLW' 3.0 m
 Joist spacing 400 mm
 Floor dead load 40 kg/m²
 Floor live load 2.0 kPa/1.8 kN
 Wall type and height Light wall: 2.7 m
 Roof load width 'RLW' 4.5 m
 Roof type and mass Light roof and ceiling - 40 kg/m²

5) Member specification

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

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Wind load - W _s *	18.3 mm	8.9 mm	2.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}	
		End kN ⁴	Horizontal kN
1.35G	0.60	-3.3	
1.2G + 1.5Q	0.80	-5.3	
1.2G + W _u + Ψ _c Q	1.00	-5.0	0.7
0.9G + W _u	1.00	0.1	0.6

8) Installation requirements

- Wall studs to be nogged at maximum 1350 mm
- Notching of wall studs is not permitted.

Member 3

1) Member code and description

FJ1 - Floor joist - Supporting floor loads only

2) Date prepared

04 June 2021

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	4.6 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Lateral restraint condition	Bottom edge restrained by ceiling/ceiling battens at 600 crs max.

5) Member specification

Size, stress grade/product	Use 240 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ²

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ _L Q	15.0 mm	11.6 mm (long term)	1.3
Live load - Ψ _s Q	9.0 mm	8.4 mm	1.1
Floor flexibility - Ψ _s Q*	2.0 mm	1.9 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.3
1.2G + 1.5Q	0.80	-2.7
1.2G + 1.5Q	0.94	-3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance
- Provide intermittent blocking along lines of support - refer Detail H21

Member 4

1) Member code and description	FJ2 - Floor joist - Supporting floor loads only
2) Date prepared	04 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	4.4 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Lateral restraint condition	Bottom edge restrained by ceiling/ceiling battens at 600 crs max.
5) Member specification	
Size, stress grade/product	Use 240 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q$	14.7 mm	12.5 mm (long term)	1.2
Live load - $\Psi_S Q$	9.0 mm	7.1 mm	1.3
Floor flexibility - $\Psi_S Q^*$	2.0 mm	1.8 mm	1.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-3.2
1.2G + 1.5Q	0.94	-3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance

- Provide intermittent blocking along lines of support - refer Detail H21

Member 5

1) Member code and description	FJ3 - Floor joist - Supporting floor loads only
2) Date prepared	04 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.0 m - single span
Joist spacing	400 mm
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Lateral restraint condition	Bottom edge restrained by ceiling/ceiling battens at 600 crs max.
5) Member specification	
Size, stress grade/product	Use 140 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q$	6.7 mm	2.6 mm (long term)	2.6
Live load - $\Psi_S Q$	5.6 mm	1.5 mm	3.7
Floor flexibility - $\Psi_S Q^*$	2.0 mm	1.3 mm	1.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.7
1.2G + 1.5Q	0.80	-1.4
1.2G + 1.5Q	0.94	-2.9

8) Installation requirements

- Provide at least 30 mm bearing at end supports (floor loads only)
- Bearing requirements for joists supporting load bearing walls may be greater - refer published literature/ Floor joist calculator for guidance

Member 6

1) Member code and description	L1 - Lintels in lower storey load bearing walls
2) Date prepared	04 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.8 m

Floor load width 'FLW'	2.0 m
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	4.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 2/240 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	9.3 mm	4.9 mm (long term)	1.9
Live load - Ψ sQ	7.8 mm	1.7 mm	4.5

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-8.0
1.2G + 1.5Q	0.80	-13.4
1.2G + W _u + Ψ cQ	1.00	-12.4
0.9G + W _u	1.00	5.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 7

1) Member code and description L2 - Lintels in lower storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span	2.8 m
Floor load width 'FLW'	1.0 m
Floor dead load	40 kg/m ²
Floor live load	1.5 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	4.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product Use 2/200 x 45 hySPAN

Material type

Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	9.3 mm	6.4 mm (long term)	1.5
Live load - Ψ sQ	7.8 mm	1.5 mm	5.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-6.1
1.2G + 1.5Q	0.80	-8.6
1.2G + W _u + Ψ cQ	1.00	-10.7
0.9G + W _u	1.00	6.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 8

1) Member code and description L3 - Lintels in lower storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span	2.8 m
Floor load width 'FLW'	2.4 m
Floor dead load	40 kg/m ²
Floor live load	2.0 kPa/1.8 kN
Wall type and height	Light wall: 2.7 m
Nominal wall thickness	90 mm
Roof load width 'RLW'	0.1 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 2/240 x 45 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	9.3 mm	4.2 mm (long term)	2.2
Live load - Ψ sQ	7.8 mm	2.1 mm	3.7

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-6.8
1.2G + 1.5Q	0.80	-16.1
1.2G + W _u + Ψ _c Q	1.00	-6.2
0.9G + W _u	1.00	-4.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 9

1) Member code and description L4 - Lintels - In single or upper storey load bearing walls

2) Date prepared 04 June 2021

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

4) Design inputs

Span 5.7 m
 Roof load width 'RLW' 1.0 m
 Roof type and mass Light roof and ceiling - 40 kg/m²
 Nominal wall thickness 90 mm

5) Member specification

Size, stress grade/product Use 2/300 x 45 hySPAN
 Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ _L Q [*]	10.0 mm	5.9 mm (long term)	1.7
Live load - Ψ _S Q	15.0 mm	1.3 mm	11.6
Wind load - W _S	28.5 mm	5.1 mm	5.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.3
1.2G + 1.5Q	0.80	-3.1
1.2G + W _u + Ψ _c Q	1.00	-4.8
0.9G + W _u	1.00	3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 10

- 1) Member code and description** L5 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared** 04 June 2021
- 3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs**
- | | |
|------------------------|---|
| Span | 5.7 m |
| Roof load width 'RLW' | 1.0 m |
| Roof type and mass | Light roof and ceiling - 40 kg/m ² |
| Nominal wall thickness | 90 mm |
- 5) Member specification**
- | | |
|----------------------------|---|
| Size, stress grade/product | Use 2/300 x 45 hySPAN |
| Material type | Structural Laminated Veneer Lumber to AS/NZS 4357 |

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	10.0 mm	5.9 mm (long term)	1.7
Live load - Ψ sQ	15.0 mm	1.3 mm	11.6
Wind load - Ws	28.5 mm	5.1 mm	5.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.3
1.2G + 1.5Q	0.80	-3.1
1.2G + W _u + Ψ cQ	1.00	-4.8
0.9G + W _u	1.00	3.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Member 11

- 1) Member code and description** VB1 - Verandah beams
- 2) Date prepared** 23 June 2021
- 3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs**
- | | |
|-----------------------|----------------------|
| Span | 2.7 m - single span |
| Roof mass | 40 kg/m ² |
| Roof load width 'RLW' | 4.5 m |
- 5) Member specification**

Size, stress grade/product	Use 2/290 x 45 SG8
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m ³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	6.8 mm	3.1 mm (long term)	2.2
Live load - $\Psi_s Q$	10.8 mm	0.7 mm	14.5
Wind load - W_s	13.5 mm	4.2 mm	3.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-4.6
1.2G + 1.5Q	0.80	-6.6
1.2G + W_u + $\Psi_c Q$	1.00	-13.6
0.9G + W_u	1.00	11.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination required - refer AS 1684

Member 12

1) Member code and description	VB2 - Verandah beams
2) Date prepared	23 June 2021
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	4.0 m - single span
Roof mass	40 kg/m ²
Roof load width 'RLW'	4.2 m

5) Member specification

Size, stress grade/product	Use 300 x 90 hyONE
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	10.0 mm	4.7 mm (long term)	2.1
Live load - $\Psi_s Q$	12.0 mm	1.1 mm	10.6
Wind load - W_s	20.0 mm	6.4 mm	3.1

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-6.2
1.2G + 1.5Q	0.80	-8.9
1.2G + W _u + Ψ_c Q	1.00	-18.2
0.9G + W _u	1.00	15.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports

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%

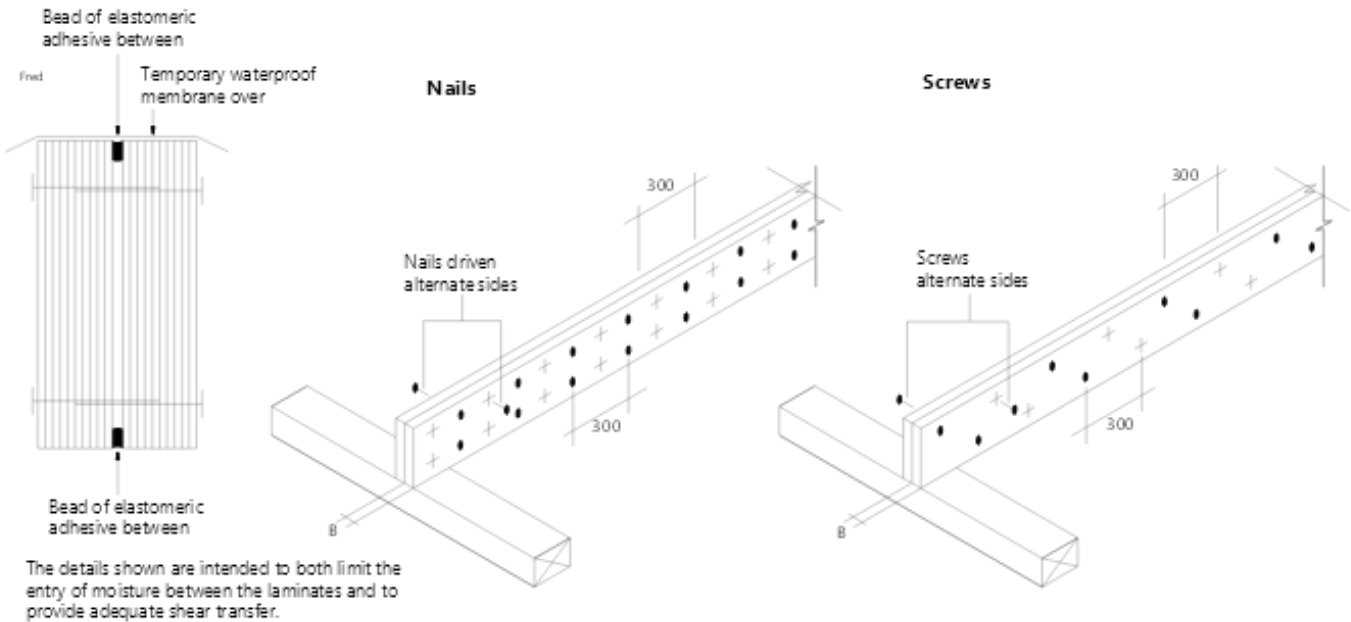
As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

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

Detail H1: Vertical Lamination - Two Pieces



Section Size 'B'	Minimum Nail Diameter	Minimum Nail Length	Minimum Screw Gauge	Minimum Screw Length
35	3.06 mm	75 mm	-	-
45	3.30 mm	90 mm	14 g	75 mm
63	3.30 mm	100 mm	14 g	100 mm
90	-	-	14 g	150 mm

Fabricator / Designer Statement

Job Ref: **PS21078**

This statement may be used by the Building Consent Authority for compliance purposes and is issued by a licensed truss fabricator using the Pryda Build software.

CLIENT Name: *Bunnings Rotorua*

SITE Details:

Address : *ADLAM*
33 GREAT WEST ROAD

City: *ROTORUA*

Post Code:

Nominal Design Criteria:

Design working life: 50 years
Building importance: Residential (Importance Level 2)
Roofing: Longrun (6.0 kg/sq.m)
Ceiling: 13mm Gib-board (8.5 kg/sq.m)
Top chord purlins: 900 mm

Design roof snow load: 0 Pa
(incl. probability factor)
Ground snow load: 0 Pa
Location: Region N0 - upper Nth Island
Altitude above sea level: 100 m

BC restraints: Battens at 600 mm crs
Standard truss spacing: 900 mm
Standard roof pitch: 30.00 deg.
Ult. design wind speed: 50 m/s (wind classification = Very high)

Max. eaves height: 3 m
Max. ridge height: 6 m

Int pressure coeff. up: 0.2
Overhang Condition: No fascia

The correctness of the Design Criteria used by the Pryda Build truss design software is the responsibility of the fabricator.

Note : Where relevant, a structural fascia beam is required at all hip and dutch hip corners to support the short creeper/rafter overhangs, as shown in AS4440-2004

Note: This statement must be read in conjunction with the truss layout and detail sheets.

Note: Some trusses in this job support ceiling materials that are different to this nominal data (see individual truss detail sheets).

Note: The Structural Timber products supplied in this building stores approximately '950' kg of carbon.

All truss designs and their connections have been designed using Pryda design software. Additional items such as roof/ceiling plane bracing, special notes, supplementary timber, etc., which may be shown on the plan drawings are the responsibility of others.

All trusses have been manufactured in accordance with the fabrication specifications provided by Pryda, and shall be installed, connected and braced in accordance with the recommendations given in - : AS4440:2004 "Installation of nailplated timber roof trusses" and any other supplementary details that may be provided, such as the Pryda Installation Guides.

Timber verification and grading values are in accordance with clause B1 and timber treatment in accordance with clause B2 of the New Zealand Building Code.

I/we confirm that the trusses for this project have been manufactured in accordance with the fabrication specifications provided by Pryda New Zealand.

Name: Anthony Fernandes

Position: Estimator

Signed: 

Date: 23-06-2021

Fabricator / Designer Statement

Job Ref: **PS21078**

Note 1: All timber framing nails are machine-driven, glue coated, or annular/helical deformed shank.
Use specified fixings with Pryda connectors as noted.

Note 2: The following trusses have not yet fully passed all of the design criteria, eg:-

Truss Mark Status

F1	Fixings and connections have not been designed.
F2	Fixings and connections have not been designed.

Tie-downs to walls/beams:

Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails.

All additional tie-downs are as follows:

Truss Mark	Sup No.	Distance	Fixing	Support		Truss		Fixing Details	
				Jt Grp	Width	Jt Grp	Uplift (kN)		
T1	1	-	1/NPPC6	JD5	90	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails	
	9	7200	1/NPPC6	JD5	90	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails	
T10	10	4115	1/NPPC4	JD5	70	JD5	-1.07	2/12g-11x35 screws, 6/30x3.15d nails	
	11	4715	1/NPPC4	JD5	70	JD5	-1.24	2/12g-11x35 screws, 6/30x3.15d nails	
	12	5315	1/NPPC4	JD5	70	JD5	-1.14	2/12g-11x35 screws, 6/30x3.15d nails	
	13	5915	1/NPPC4	JD5	70	JD5	-1.23	2/12g-11x35 screws, 6/30x3.15d nails	
	14	6515	1/NPPC4	JD5	70	JD5	-1.20	2/12g-11x35 screws, 6/30x3.15d nails	
	4	515	1/NPPC4	JD5	70	JD5	-1.26	2/12g-11x35 screws, 6/30x3.15d nails	
	5	1115	1/NPPC4	JD5	70	JD5	-1.29	2/12g-11x35 screws, 6/30x3.15d nails	
	6	1715	1/NPPC4	JD5	70	JD5	-1.13	2/12g-11x35 screws, 6/30x3.15d nails	
T2	7	2315	1/NPPC4	JD5	70	JD5	-1.24	2/12g-11x35 screws, 6/30x3.15d nails	
	8	2915	1/NPPC4	JD5	70	JD5	-1.07	2/12g-11x35 screws, 6/30x3.15d nails	
	1	-	1/NPPC6	JD5	90	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails	
	9	7200	1/NPPC6	JD5	90	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails	
	T3	9	7200	1/NPPC6	JD5	90	JD5	-3.99	3/12g-11x35 screws, 9/30x3.15d nails
	T5	1	0	1/NPPC6	JD5	75	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails
	T6	9	7200	1/NPPC6	JD5	75	JD5	-4.00	3/12g-11x35 screws, 9/30x3.15d nails
		1	-	1/NPPC4	JD5	90	JD5	-3.52	2/12g-11x35 screws, 6/30x3.15d nails
T7	7	7030	1/NPPC4	JD5	90	JD5	-3.52	2/12g-11x35 screws, 6/30x3.15d nails	
	10	4715	1/NPPC4	JD5	70	JD5	-0.58	2/12g-11x35 screws, 6/30x3.15d nails	
	11	5315	1/NPPC4	JD5	70	JD5	-0.53	2/12g-11x35 screws, 6/30x3.15d nails	
	12	5915	1/NPPC4	JD5	70	JD5	-0.55	2/12g-11x35 screws, 6/30x3.15d nails	
	4	1115	1/NPPC4	JD5	70	JD5	-0.55	2/12g-11x35 screws, 6/30x3.15d nails	
	5	1715	1/NPPC4	JD5	70	JD5	-0.53	2/12g-11x35 screws, 6/30x3.15d nails	
	6	2315	1/NPPC4	JD5	70	JD5	-0.58	2/12g-11x35 screws, 6/30x3.15d nails	
	T8	1	-	1/NPPC8	JD5	90	JD5	-5.82	4/12g-11x35 screws, 12/30x3.15d nails
15		7200	1/NPPC8	JD5	90	JD5	-5.80	4/12g-11x35 screws, 12/30x3.15d nails	
T9	1	0	1/NPPC8	JD5	90	JD5	-5.80	4/12g-11x35 screws, 12/30x3.15d nails	
	15	7200	1/NPPC8	JD5	90	JD5	-5.78	4/12g-11x35 screws, 12/30x3.15d nails	
TG1	1	-	Special	JD5	90	JD5	-18.20		
	7	7030	Special	JD5	90	JD5	-17.86		
TG2	1	-	1/NPPC8	JD5	90	JD5	-5.49	4/12g-11x35 screws, 12/30x3.15d nails	
	7	7030	1/NPPC6	JD5	90	JD5	-4.35	3/12g-11x35 screws, 9/30x3.15d nails	
VN	1	-	1/NPPC4	JD5	90	JD5	-0.74	2/12g-11x35 screws, 6/30x3.15d nails	
	3	855	1/NPPC4	JD5	90	JD5	-0.74	2/12g-11x35 screws, 6/30x3.15d nails	

Note: The fixing type shown 'Special' signifies that none of the standard Pryda connectors are suitable for this connection. This requires a special design.

Primary connections (truss to girder):

Girder	Truss Marks		Connector	Girder	Supported
	Supported	Connector			
TG1	T3	2/MG	8/30x3.15d nails	8/30x3.15d nails	
	T4	2/MG			
TG2	T4	2/MG	8/30x3.15d nails	8/30x3.15d nails	

Secondary fixings (hip & gable ends, valleys):

All trusses are to be fixed at each support with the following:

Hip truss to truncated girder	3 face nails, bottom chords
Jack truss to truncated girder	3 skew nails or back face nails, bottom chords
Creeper truss to hip truss	3 face nails, top and bottom chords
Top chord extensions	2 skew nails

Fabricator / Designer Statement

Job Ref: **PS21078**

Valley trusses 1 skew nail
 Outriggers 2 skew nails

All additional connections are as follows:

<i>Supporting Truss</i>	<i>Supported Truss</i>	<i>Top Chord</i>	<i>Bottom Chord</i>
(Various)	V1	-	2/Z
	V2	-	2/Z
	V3	-	2/Z
T10	O11	1/MGL	-
	O12	1/MGL	-
	O9	1/MGL	-
T8	O1	1/MGL	-
	O3	1/MGL	-
	O4	1/MGL	-
T9	O5	1/MGL	-
	O7	1/MGL	-
	O8	1/MGL	-

Fixing Summary:

<i>Connector</i>	<i>Description</i>	<i>Total</i>	<i>Fixing Method (per connector)</i>	
Primary			<i>Girder</i>	<i>Supported Truss</i>
MG	Multigrips	22	8/30x3.15d nails	8/30x3.15d nails
Secondary			<i>Supporting Truss</i>	<i>Supported Truss</i>
MGL	Multigrip (long)	24	6/30x3.15d nails	4/30x3.15d nails
Z	Z nail	60		
Tiedown			<i>Support</i>	<i>Truss</i>
NPPC4	Purlin cleat	114	2/12g-11x35 screws	6/30x3.15d nails
NPPC6	Purlin cleat	30	3/12g-11x35 screws	9/30x3.15d nails
NPPC8	Purlin cleat	5	4/12g-11x35 screws	12/30x3.15d nails

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T1 (Single Truss)

Date created: 23 Jun 2021
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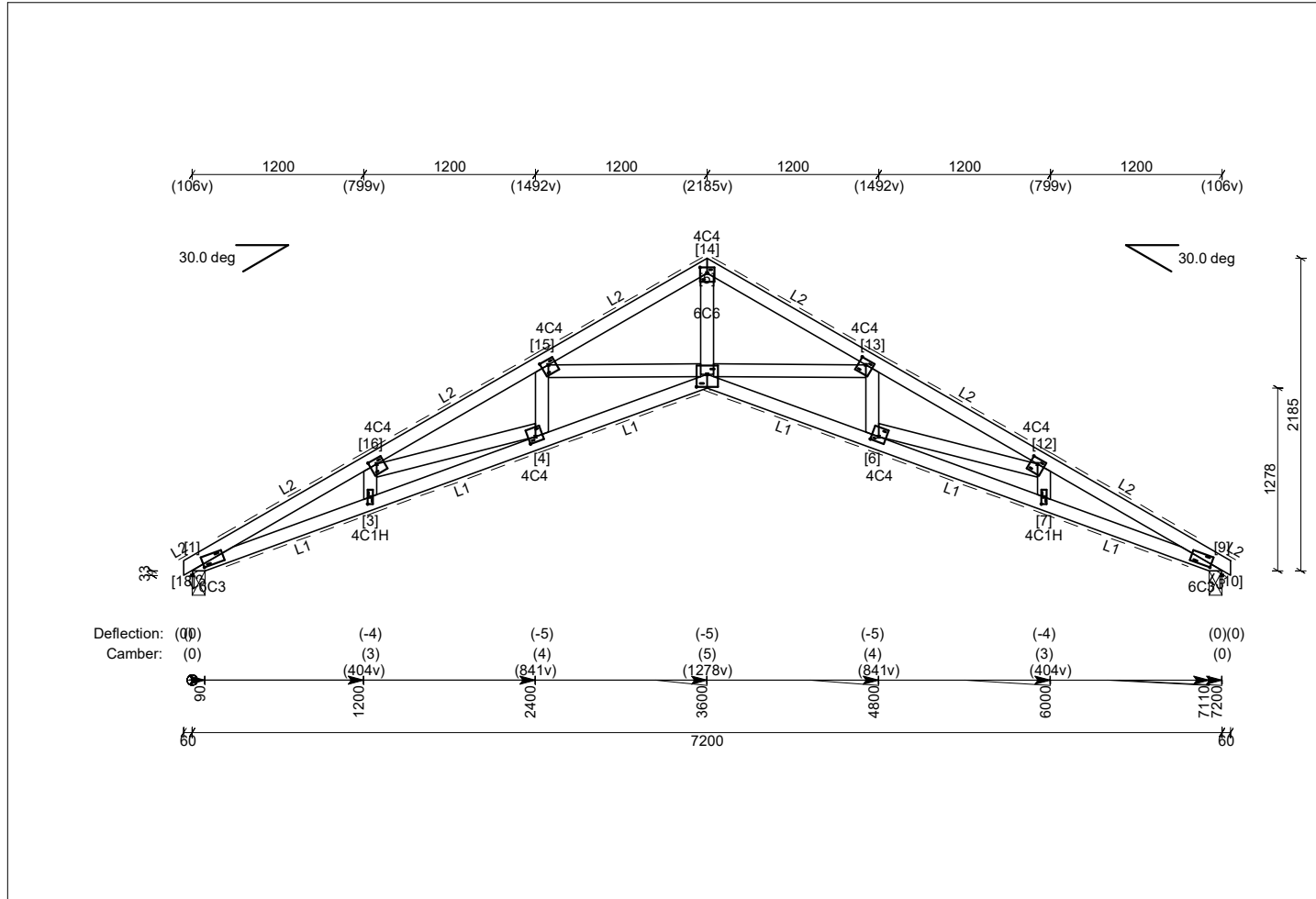
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 3

Building type: Residential



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 1 / 90x45 MSG10 H1 uno
- Bottom Chords 1 / 90x45 MSG10 H1 uno
- Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Beam Ext	90	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-
9	Beam Ext	90	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T2 (Single Truss)

Date created: 23 Jun 2021

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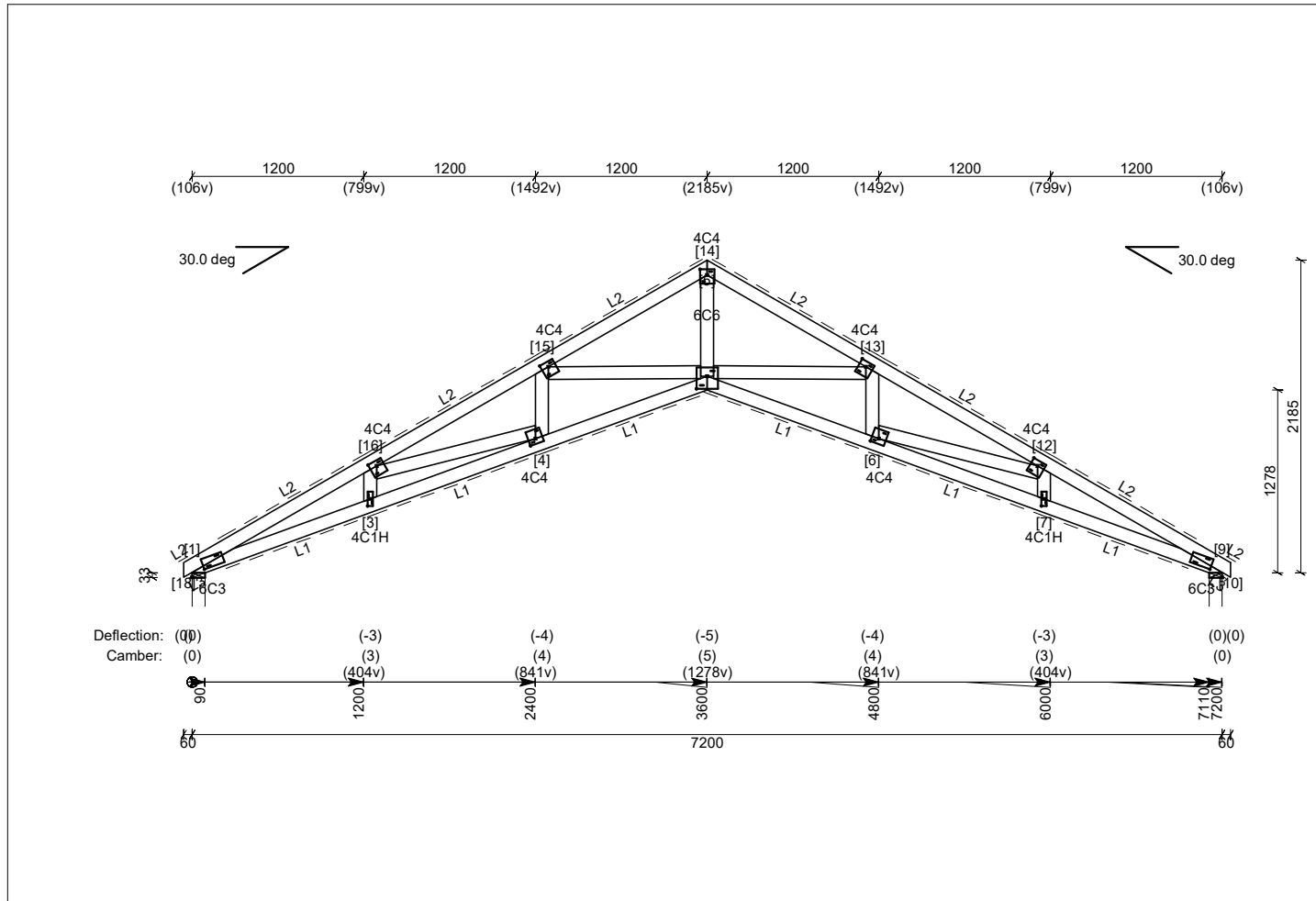
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 4

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).

Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).

Battens @ 900mm.

L3: Fibrecement (6mm) (9.5 kg/sq.m).

Battens @ 600mm.

Timber

Top Chords 1 / 90x45 MSG10 H1 uno

Bottom Chords 1 / 90x45 MSG10 H1 uno

Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-
9	Wall Ext	90	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T3 (Single Truss)

Date created: 23 Jun 2021

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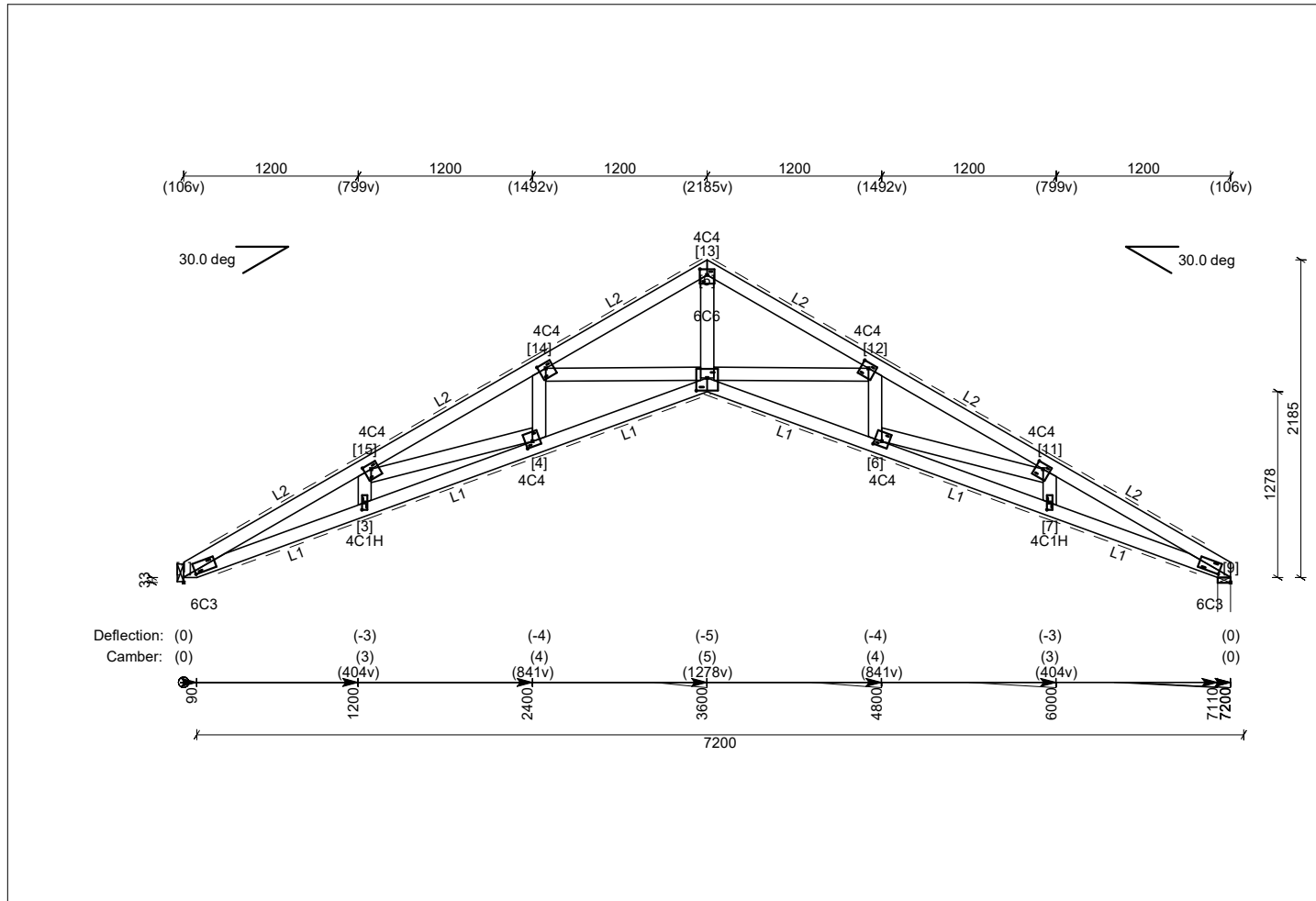
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 7

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).
 Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG10 H1 uno

Bottom Chords 1 / 90x45 MSG10 H1 uno

Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	1.2 kN	3.3 kN (Gc+Wd3)	-4.0 kN	-	MG
9	Wall Int	90	1.2 kN	3.3 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T4 (Single Truss)

Date created: 23 Jun 2021

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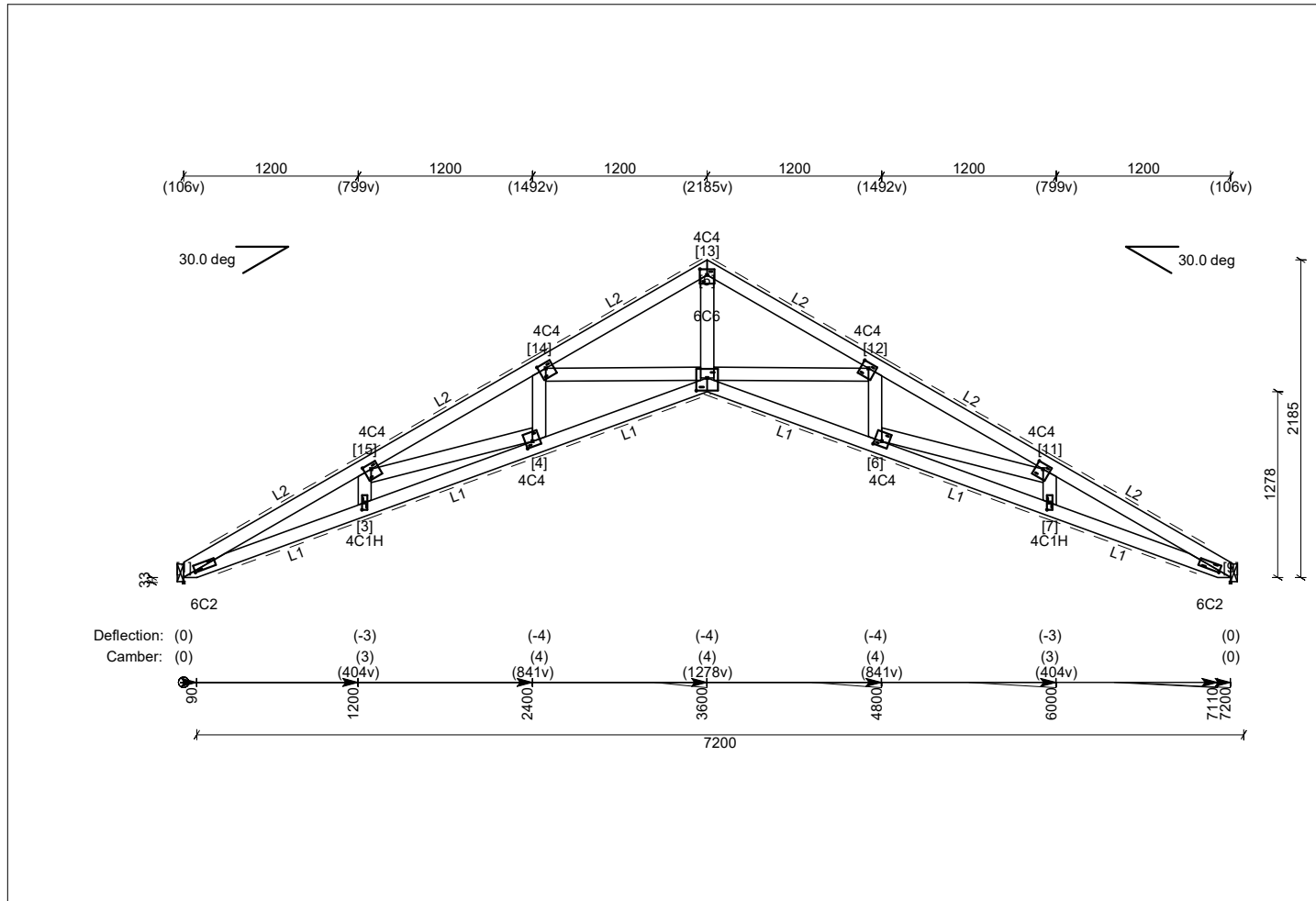
Truss type: Standard

No. plies : 1x45mm

Design spacing : 602mm

No. of : 2

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).

Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).

Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno

Bottom Chords 1 / 90x45 MSG10 H1 uno

Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.9 kN	2.5 kN (Gc+Qj)	-2.6 kN	-	MG
9	Truss Chord	45	0.9 kN	2.5 kN (Gc+Qj)	-2.6 kN	-	MG

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T5 (Single Truss)

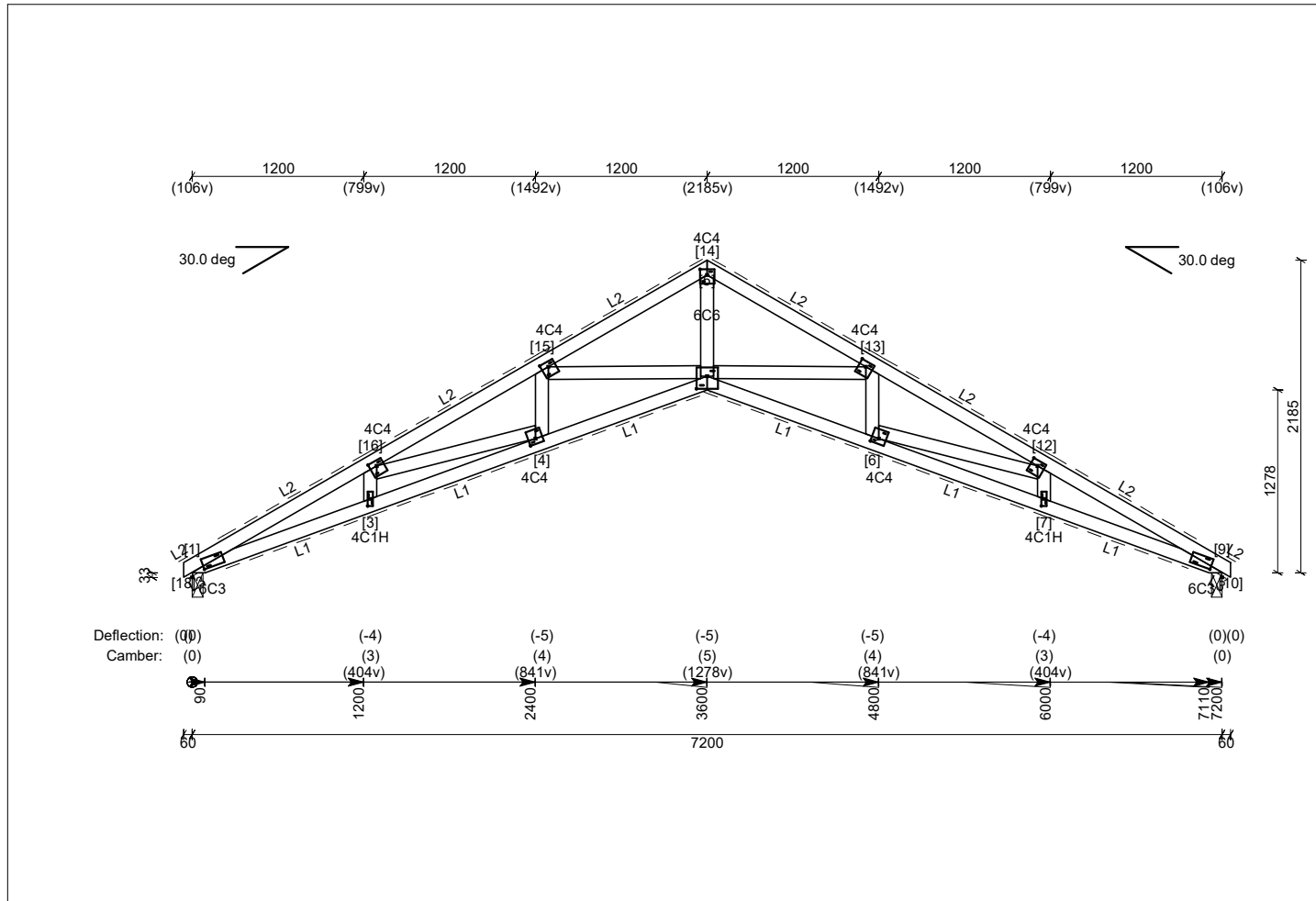
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 4

Building type: Residential



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 1 / 90x45 MSG10 H1 uno
- Bottom Chords 1 / 90x45 MSG10 H1 uno
- Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Beam Ext	75	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-
9	Beam Ext	75	1.3 kN	3.4 kN (Gc+Wd3)	-4.0 kN	1/NPPC6	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T8 (Double Truss)

Date created: 23 Jun 2021
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Truss type: Standard

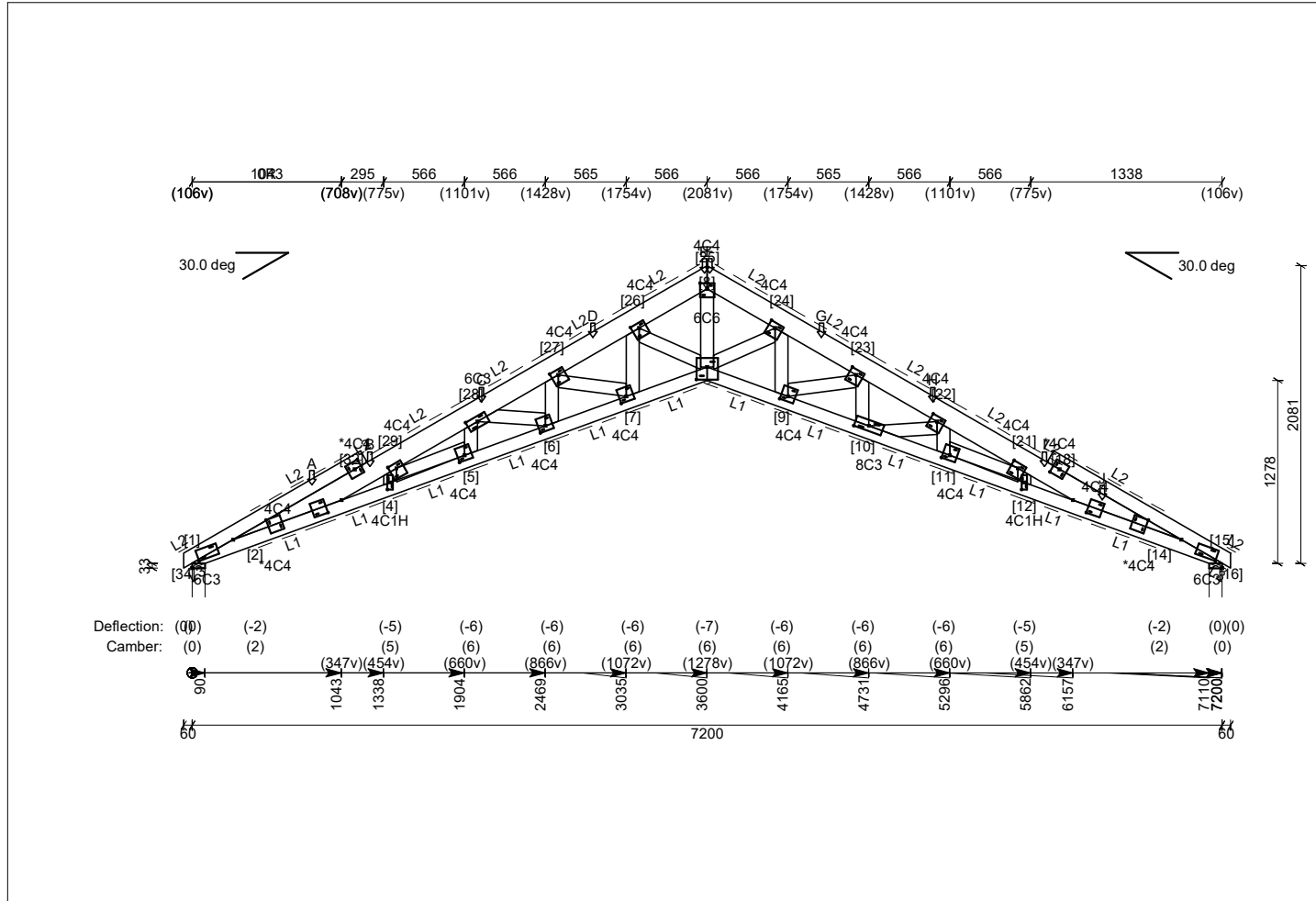
No. plies : 2x45mm

Design spacing : 855mm

No. of : 1

Building type: Residential

D/Gable Station : 0mm



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 2 / 90x45 MSG8 H1 uno
- Bottom Chords 2 / 90x45 MSG10 H1 uno
- Webs 2 / 90x45 MSG8 H1 uno

- TC2 (14-25) 2 / 140x45 MSG8 H1
- TC3 (25-2) 2 / 140x45 MSG8 H1

Supported trusses / Applied point loads

- A: O1 (837) B: O4 (1242)
 - C: O3 (2022) D: O3 (2801)
 - E: O2 (3581) F: O2 (3619)
 - G: O3 (4399) H: O3 (5178)
 - I: O4 (5958) J: O1 (6363)
- Note: numbers in brackets denote distance from left of truss.

Notes

- Deflection = permanent load deflection including creep (negative = downward movement).
- Overhang condition: No fascia.
- Refer to Pryda Installation Guide for full bracing details.
- Refer to layout for overall truss bracing.
- Truss close to gable end: YES

Fixings

Double Truss - Fix plies with 75 x 3.05 dia nails at 250 crs (staggered) in chords and webs (1 row for timber widths up to 100mm, 2 rows up to 200mm, otherwise 3 rows).

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Int	90	2.2 kN	5.5 kN (Gc+Wd1)	-5.8 kN	1/NPPC8	-
15	Wall Int	90	2.2 kN	5.5 kN (Gc+Wd2)	-5.8 kN	1/NPPC8	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T9 (Double Truss)

Date created: 23 Jun 2021

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Truss type: Standard

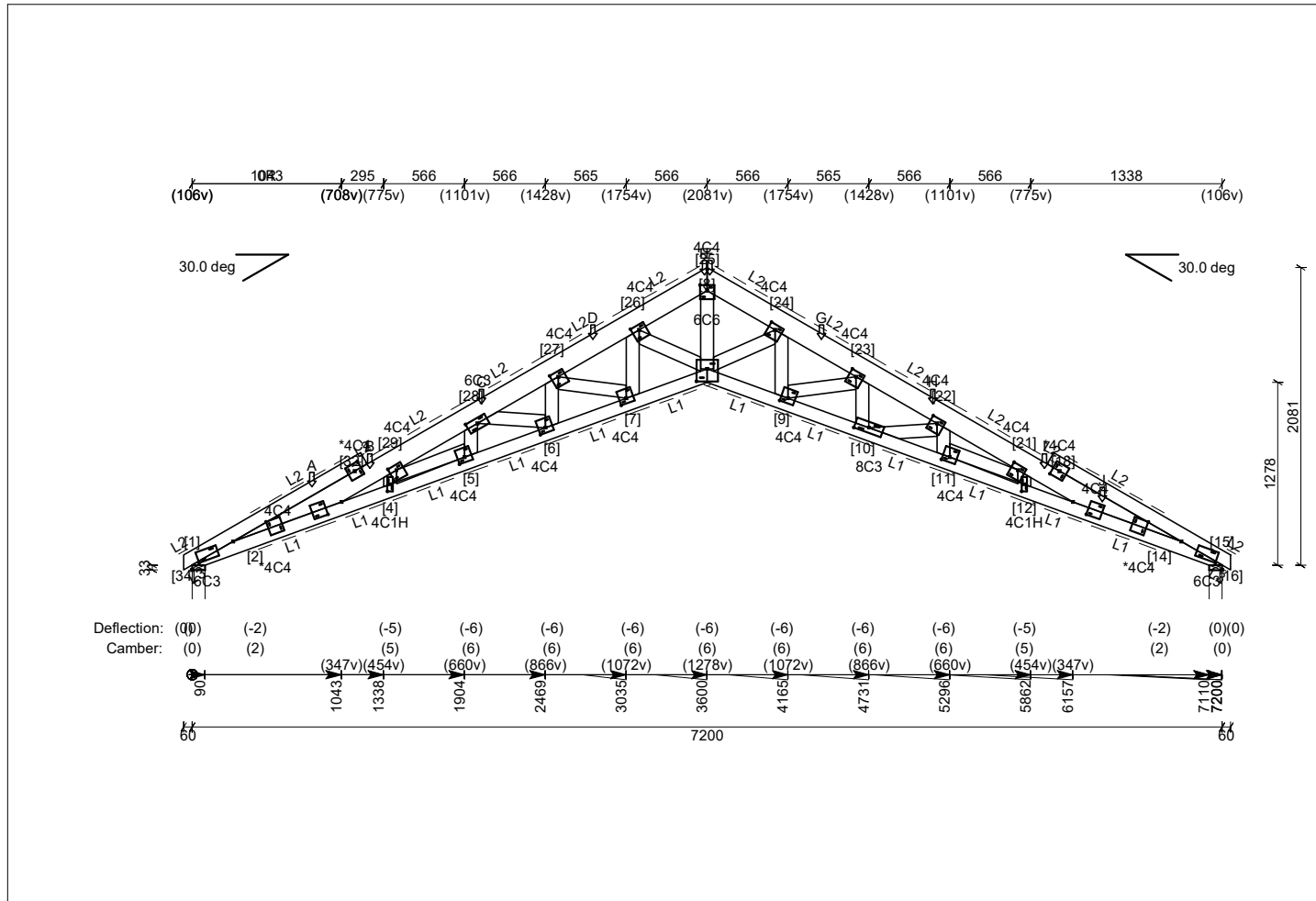
No. plies : 2x45mm

Design spacing : 840mm

No. of : 1

Building type: Residential

D/Gable Station : 0mm



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 2 / 90x45 MSG8 H1 uno
- Bottom Chords 2 / 90x45 MSG10 H1 uno
- Webs 2 / 90x45 MSG8 H1 uno

- TC2 (14-25) 2 / 140x45 MSG8 H1
- TC3 (25-2) 2 / 140x45 MSG8 H1

Supported trusses / Applied point loads

- A: O5 (837)
 - B: O8 (1242)
 - C: O7 (2022)
 - D: O7 (2801)
 - E: O6 (3581)
 - F: O6 (3619)
 - G: O7 (4399)
 - H: O7 (5178)
 - I: O8 (5958)
 - J: O5 (6363)
- Note: numbers in brackets denote distance from left of truss.

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Fixings

Double Truss - Fix plies with 75 x 3.05 dia nails at 250 crs (staggered) in chords and webs (1 row for timber widths up to 100mm, 2 rows up to 200mm, otherwise 3 rows).

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Int	90	2.2 kN	5.5 kN (Gc+Wd1)	-5.8 kN	1/NPPC8	-
15	Wall Int	90	2.2 kN	5.5 kN (Gc+Wd2)	-5.8 kN	1/NPPC8	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T6 (Single Truss)

Date created: 23 Jun 2021

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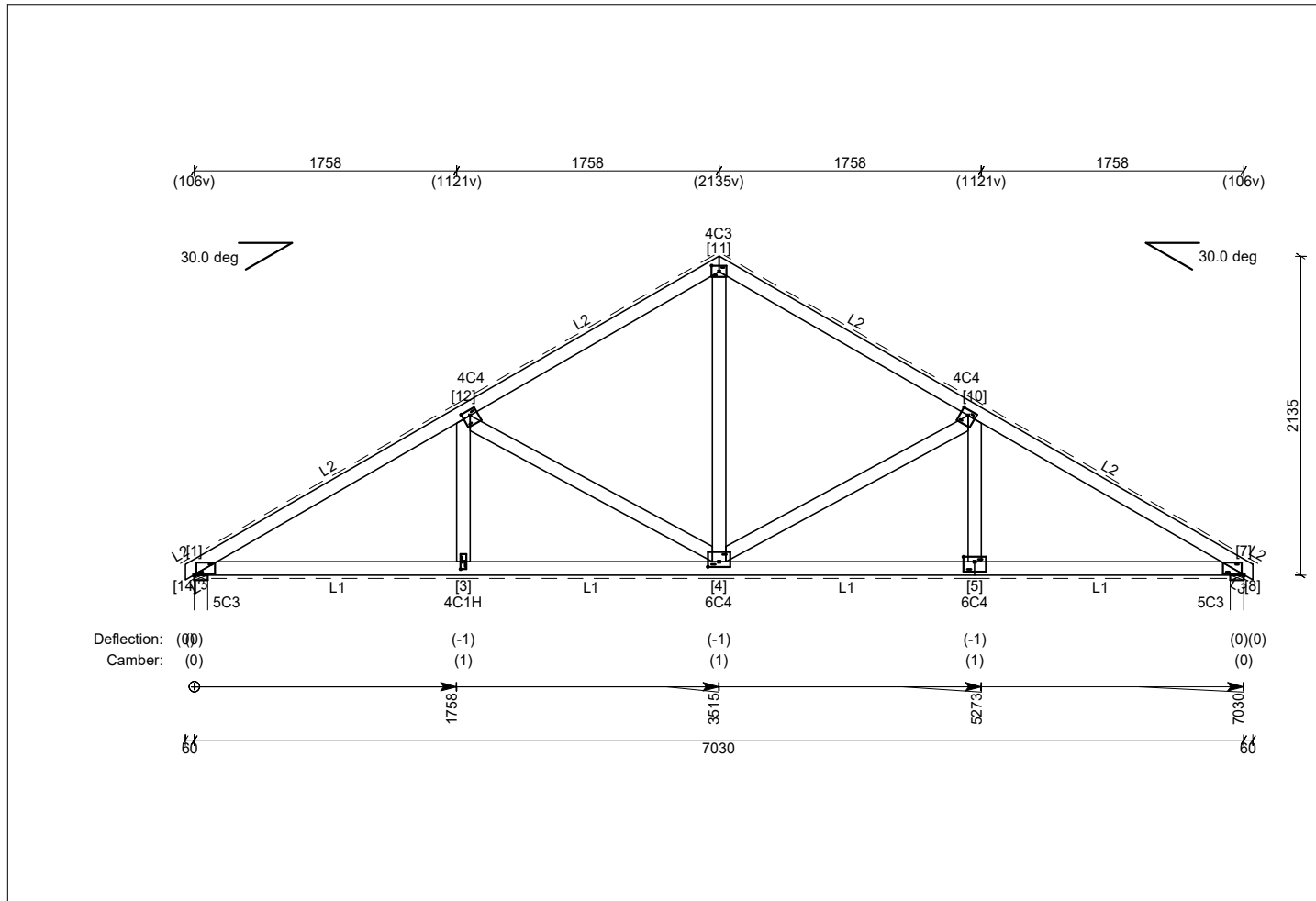
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 19

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).

Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).

Battens @ 900mm.

L3: Fibrecement (6mm) (9.5 kg/sq.m).

Battens @ 600mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno

Bottom Chords 1 / 90x45 MSG8 H1 uno

Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	1.2 kN	3.1 kN (Gc+Wd3)	-3.5 kN	1/NPPC4	-
7	Wall Ext	90	1.2 kN	3.1 kN (Gc+Wd3)	-3.5 kN	1/NPPC4	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T7 (Single Truss)

Date created: 23 Jun 2021
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Truss type: Standard

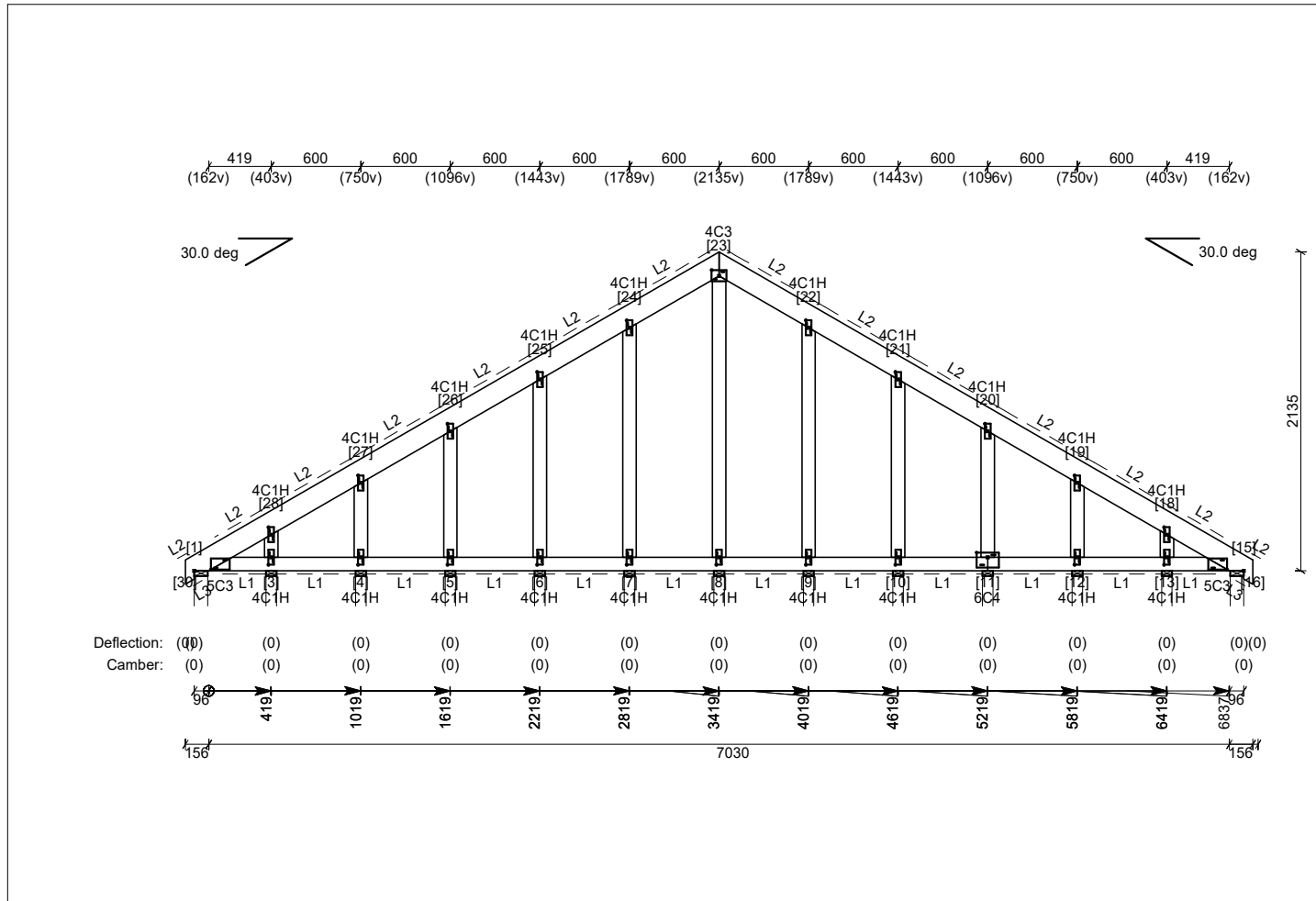
No. plies : 1x45mm

Design spacing : 877mm

No. of : 1

Building type: Residential

D/Gable Station : 0mm



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 1 / 140x45 MSG8 H1 uno
- Bottom Chords 1 / 90x45 MSG8 H1 uno
- Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	0.1 kN	1.5 kN (Gc+Qj)	-0.1 kN	2/90x3.15 dia Skew Nails	-
15	Wall Ext	90	0.1 kN	1.5 kN (Gc+Qj)	-0.1 kN	2/90x3.15 dia Skew Nails	-
3	Wall Int	70	0.1 kN	1.3 kN (Gc+Qj)	-0.4 kN	2/90x3.15 dia Skew Nails	-
4	Wall Int	70	0.1 kN	1.3 kN (Gc+Qj)	-0.5 kN	1/NPPC4	-
5	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.5 kN	1/NPPC4	-
6	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.6 kN	1/NPPC4	-
7	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.4 kN	2/90x3.15 dia Skew Nails	-
8	Wall Int	70	0.1 kN	1.0 kN (Gc+Qj)	No uplift	2/90x3.15 dia Skew Nails	-
9	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.4 kN	2/90x3.15 dia Skew Nails	-
10	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.6 kN	1/NPPC4	-
11	Wall Int	70	0.1 kN	1.2 kN (Gc+Qj)	-0.5 kN	1/NPPC4	-

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : T10 (Single Truss)

Date created: 23 Jun 2021
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Truss type: Standard

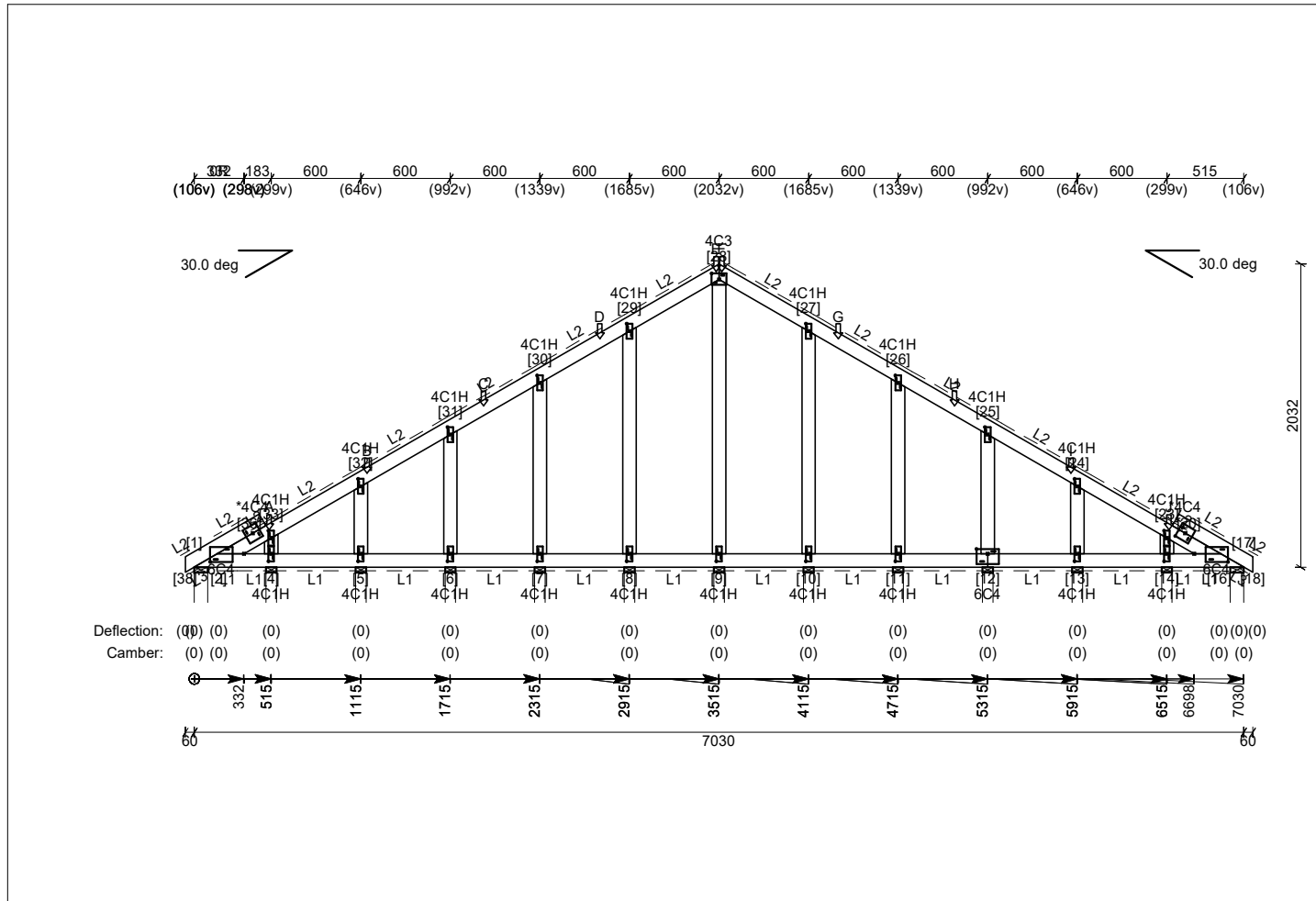
No. plies : 1x45mm

Design spacing : 878mm

No. of : 1

Building type: Residential

D/Gable Station : 0mm



Linings

- L1: 13mm Gib-board (8.5 kg/sq.m).
Battens @ 600mm.
- L2: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L3: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

- Top Chords 1 / 90x45 MSG8 H1 uno
- Bottom Chords 1 / 90x45 MSG8 H1 uno
- Webs 1 / 90x45 MSG8 H1 uno

Supported trusses / Applied point loads

- A: O9 (501) B: O12 (1157)
 - C: O11 (1937) D: O11 (2716)
 - E: O10 (3496) F: O10 (3534)
 - G: O11 (4314) H: O11 (5093)
 - I: O12 (5873) J: O9 (6529)
- Note: numbers in brackets denote distance from left of truss.

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	0.1 kN	1.6 kN (Gc+Qj)	-0.1 kN	2/90x3.15 dia Skew Nails	-
17	Wall Ext	90	0.1 kN	1.7 kN (Gc+Qj)	-0.1 kN	2/90x3.15 dia Skew Nails	-
4	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.3 kN	1/NPPC4	-
5	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.3 kN	1/NPPC4	-
6	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.1 kN	1/NPPC4	-
7	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.2 kN	1/NPPC4	-
8	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.1 kN	1/NPPC4	-
9	Wall Int	70	0.2 kN	1.2 kN (Gc+Qj)	-0.2 kN	2/90x3.15 dia Skew Nails	-
10	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.1 kN	1/NPPC4	-
11	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.2 kN	1/NPPC4	-
12	Wall Int	70	0.3 kN	1.6 kN (Gc+Qj)	-1.1 kN	1/NPPC4	-

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : TG1 (Double Truss)

Date created: 23 Jun 2021

Page No: 11

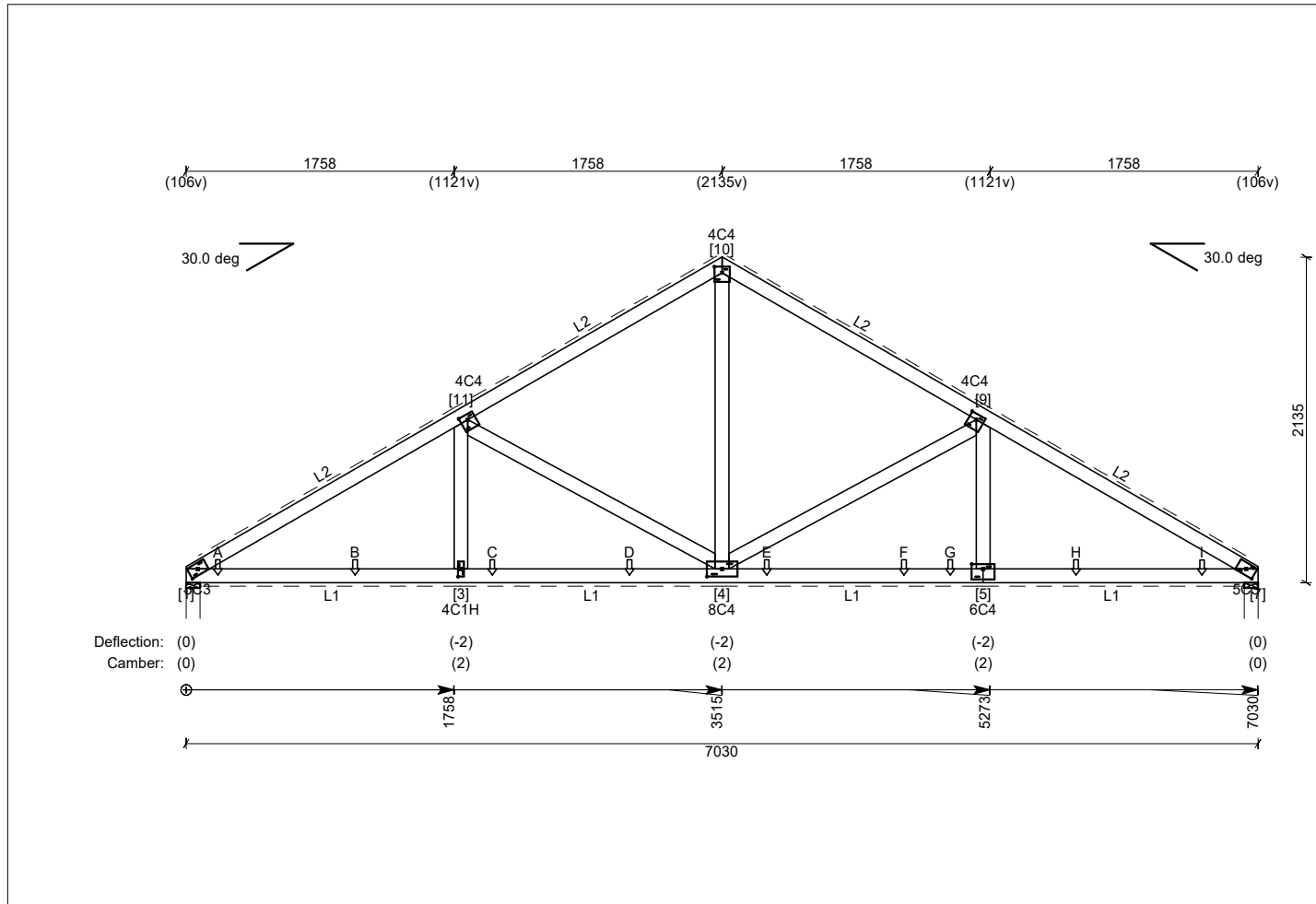
Truss type: Standard

No. plies : 2x45mm

Design spacing : 900mm

No. of : 1

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).

Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).

Battens @ 900mm.

Timber

Top Chords 2 / 90x45 MSG10 H1 uno

Bottom Chords 2 / 90x45 MSG10 H1 uno

Webs 2 / 90x45 MSG8 H1 uno

Supported trusses / Applied point loads

A: T3 (208) B: T3 (1108)

C: T3 (2008) D: T3 (2908)

E: T3 (3808) F: T4 (4708)

G: T4 (5012) H: T3 (5837)

I: T3 (6663)

Note: numbers in brackets denote distance from left of truss.

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Fixings

Double Truss - Fix plies with 75 x 3.05 dia nails at 250 crs (staggered) in chords and webs (1 row for timber widths up to 100mm, 2 rows up to 200mm, otherwise 3 rows).

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	6.4 kN	15.8 kN (Gc+Wd1)	-18.2 kN	Special	-
7	Wall Ext	90	6.4 kN	15.7 kN (Gc+Wd2)	-17.9 kN	Special	-

Notes: Special fixing type signifies that no standard Pryda connectors suit this connection. Special connector required.
 Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : TG2 (Single Truss)

Date created: 23 Jun 2021

Page No: 12

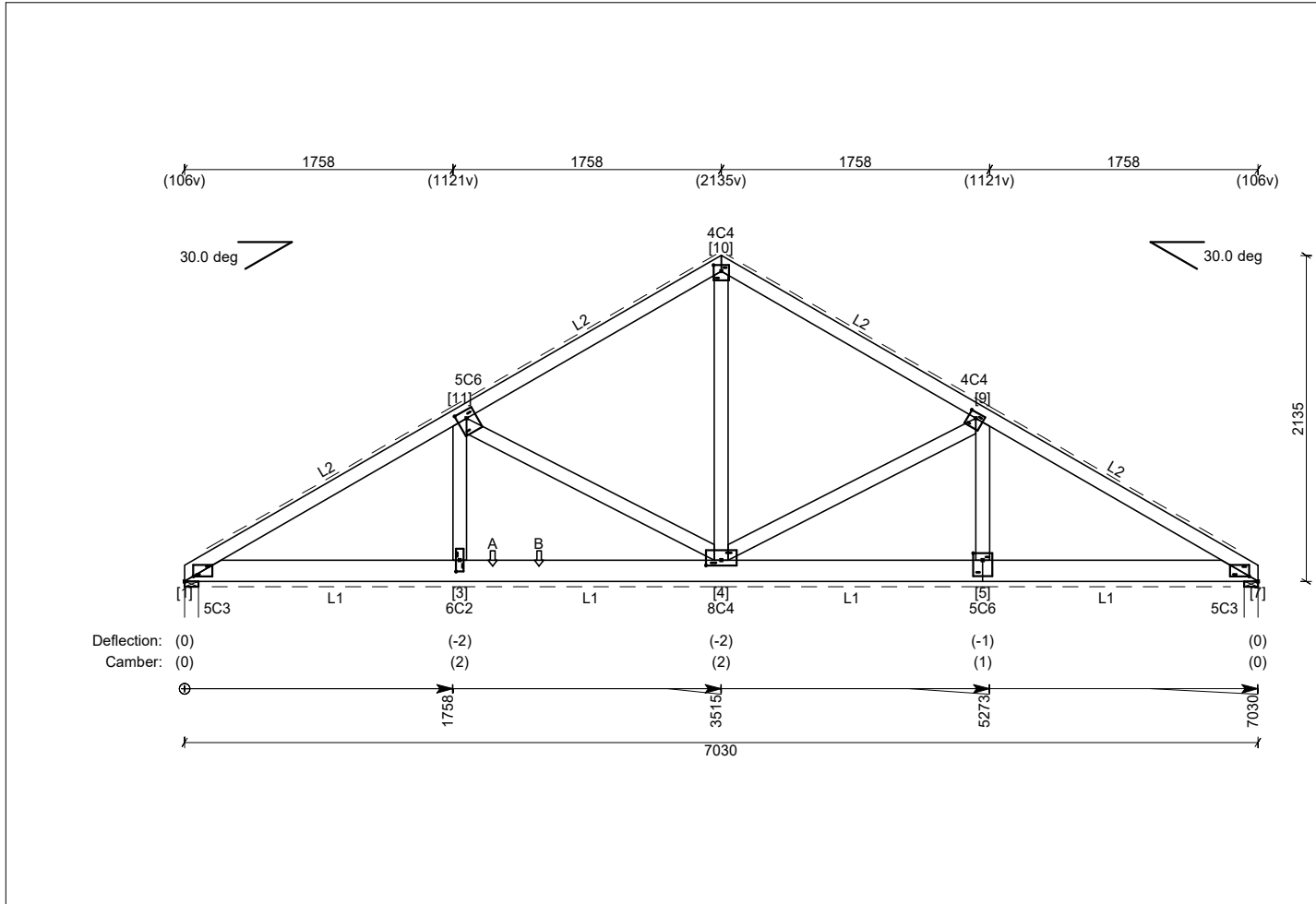
Truss type: Standard

No. plies : 1x45mm

Design spacing : 900mm

No. of : 1

Building type: Residential



Linings

L1: 13mm Gib-board (8.5 kg/sq.m).

Battens @ 600mm.

L2: Longrun (6.0 kg/sq.m).

Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno

Bottom Chords 1 / 140x45 MSG8 H1 uno

Webs 1 / 90x45 MSG8 H1 uno

Supported trusses / Applied point loads

A: T4 (2018) B: T4 (2322)

Note: numbers in brackets denote distance from left of truss.

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	2.5 kN	5.8 kN (Gc+Wd1)	-5.5 kN	1/NPPC8	-
7	Wall Ext	90	1.8 kN	4.3 kN (Gc+Wd4)	-4.3 kN	1/NPPC6	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : V1 (Single Truss)

Truss type: Valley

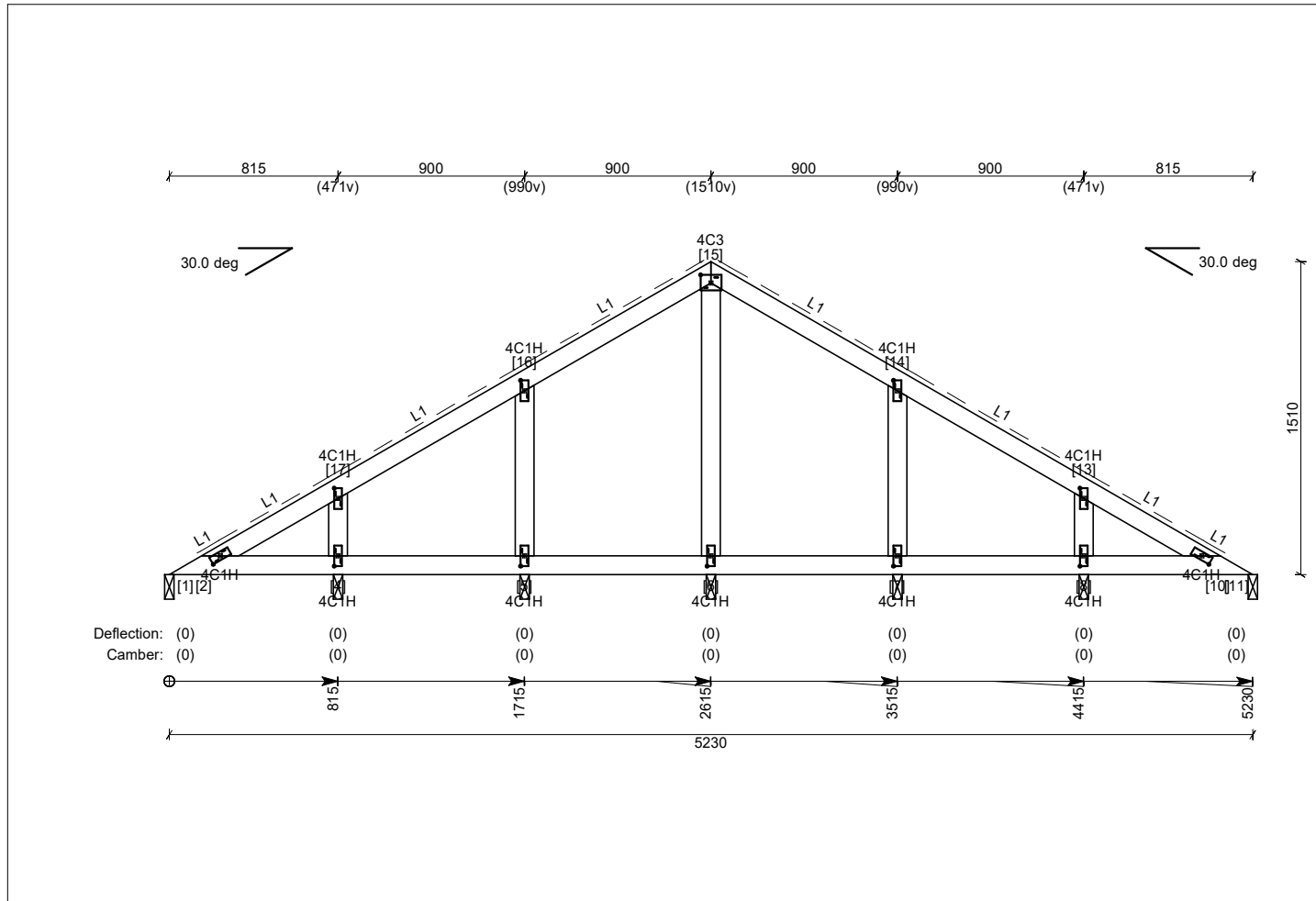
No. of plies : 1x45mm

Design spacing : 900mm

No. of : 2

Building type: Residential

Station : 0mm



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno
 Bottom Chords 1 / 90x45 MSG8 H1 uno
 Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : F1 (Single Truss)

Date created: 23 Jun 2021

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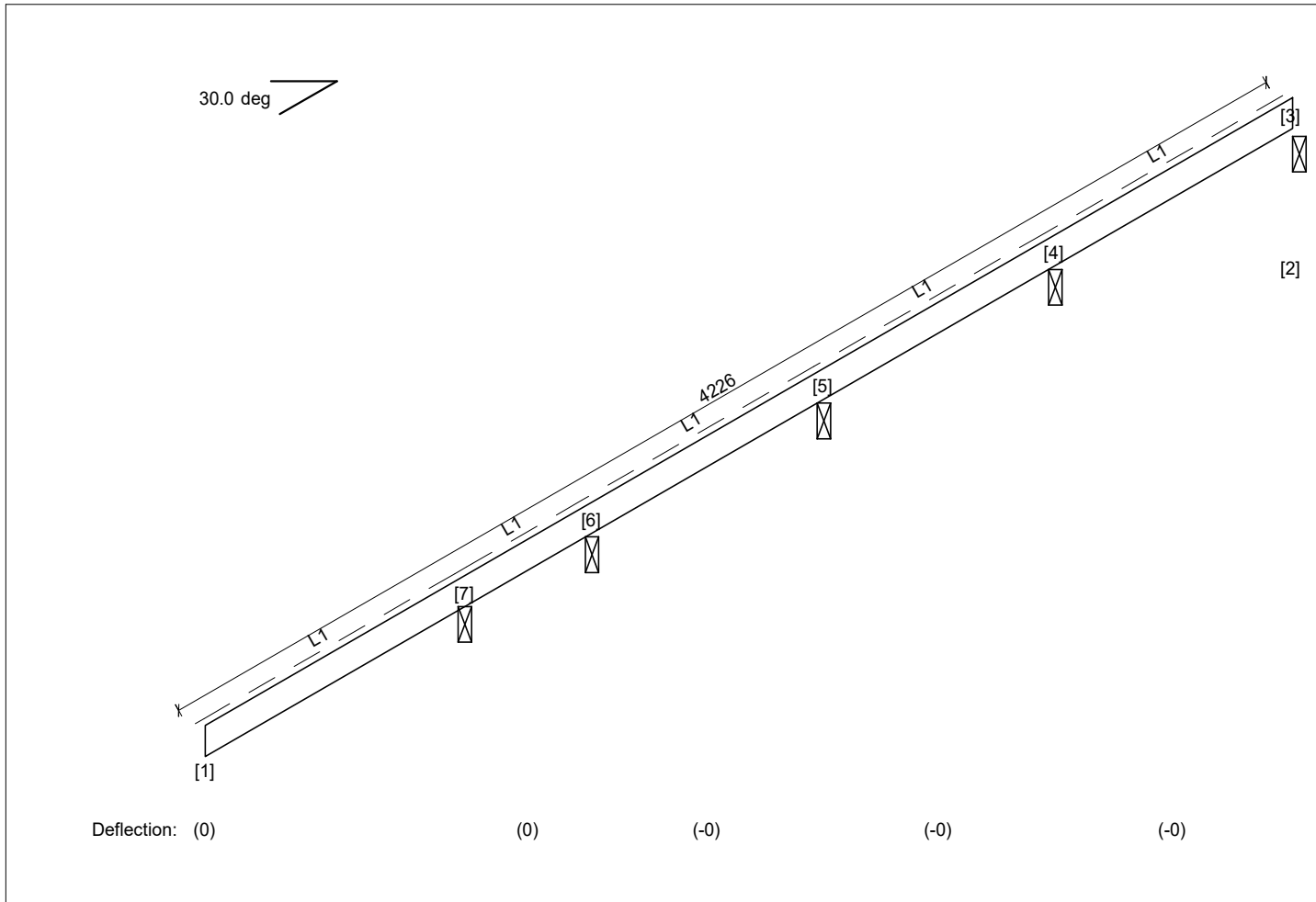
Truss type: Barge Rafter

No. plies : 1x45mm

Design spacing : 460mm

No. of : 4

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
3	Truss Chord	45	0.0 kN	1.7 kN (Gc+Qj)	-0.3 kN	-	-
6	Truss Chord	45	-0.0 kN	0.7 kN (Gc+Qj)	-0.6 kN	-	-
5	Truss Chord	45	0.0 kN	1.1 kN (Gc+Qj)	-0.5 kN	-	-
4	Truss Chord	45	0.0 kN	1.1 kN (Gc+Qj)	-0.5 kN	-	-
7	Truss Chord	45	0.1 kN	2.3 kN (Gc+Qp)	-0.6 kN	-	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : F2 (Single Truss)

Date created: 23 Jun 2021
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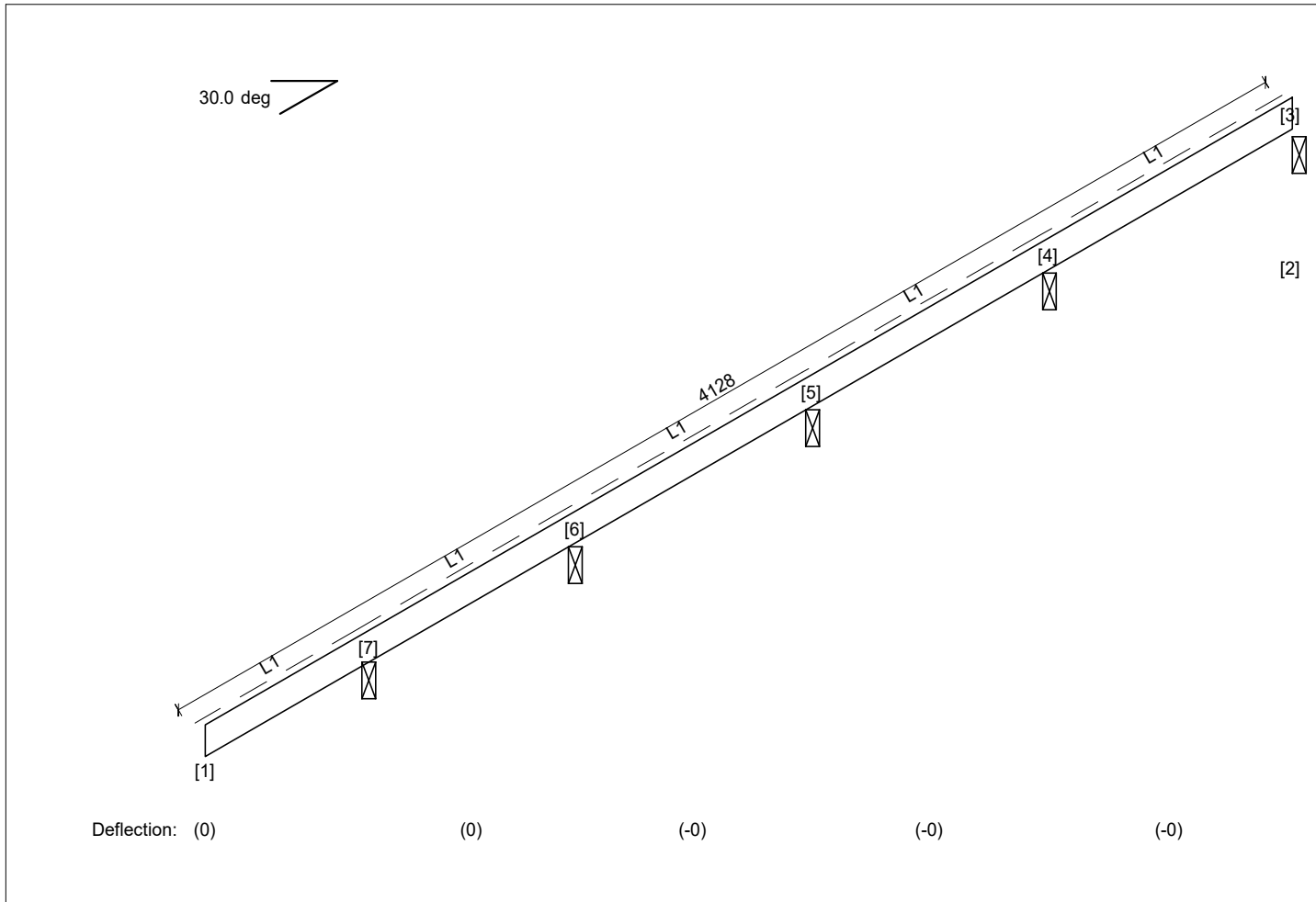
Truss type: Barge Rafter

No. plies : 1x45mm

Design spacing : 460mm

No. of : 2

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
3	Truss Chord	45	0.0 kN	1.7 kN (Gc+Qj)	-0.3 kN	-	-
6	Truss Chord	45	0.0 kN	1.0 kN (Gc+Qj)	-0.4 kN	-	-
5	Truss Chord	45	0.1 kN	1.1 kN (Gc+Qj)	-0.6 kN	-	-
4	Truss Chord	45	0.0 kN	1.1 kN (Gc+Qj)	-0.5 kN	-	-
7	Truss Chord	45	0.1 kN	2.1 kN (Gc+Qp)	-0.1 kN	-	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : V2 (Single Truss)

Date created: 23 Jun 2021
 Page No: 16

Truss type: Valley

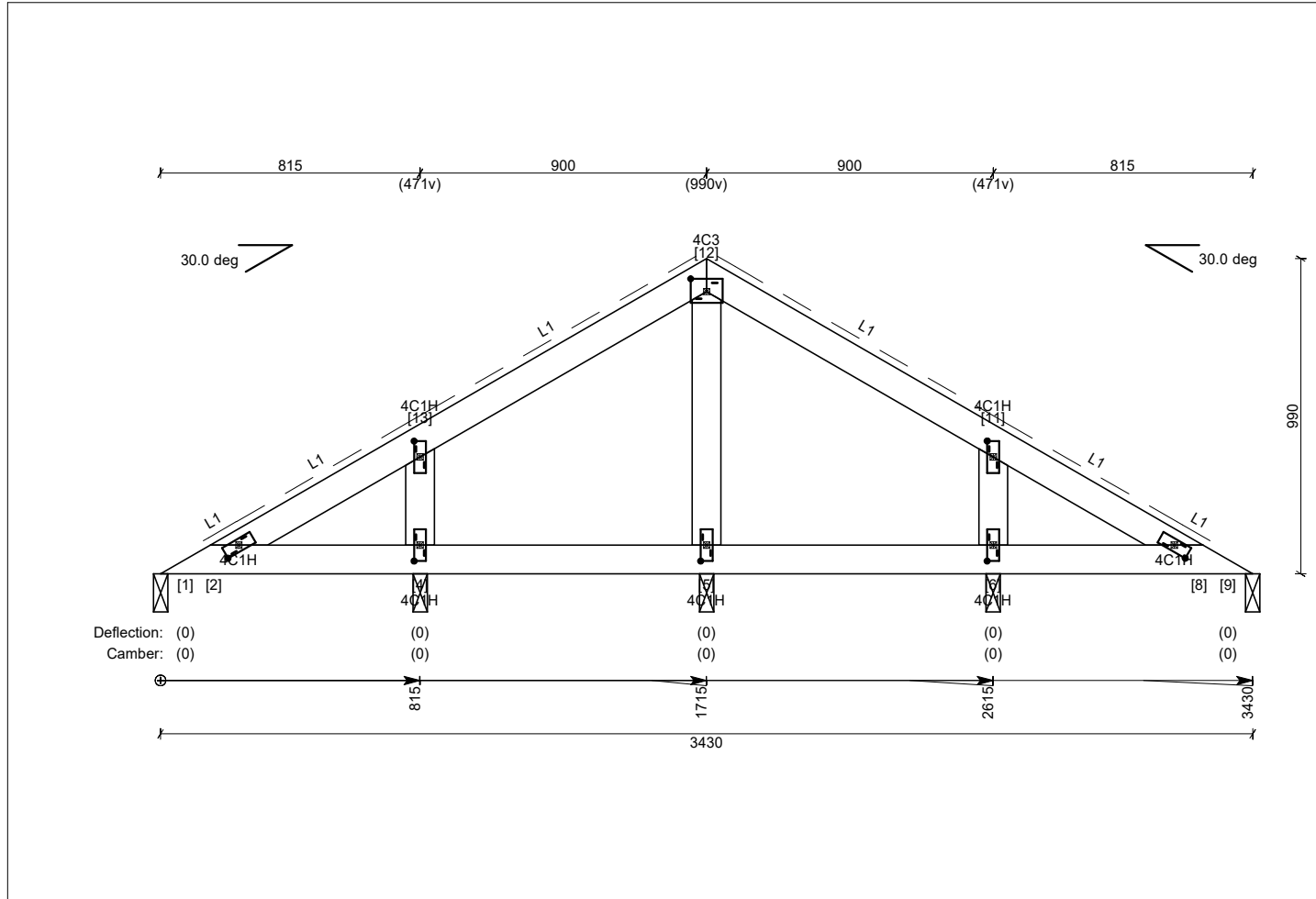
No. plies : 1x45mm

Design spacing : 900mm

No. of : 2

Building type: Residential

Station : 0mm



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno
 Bottom Chords 1 / 90x45 MSG8 H1 uno
 Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : V3 (Single Truss)

Date created: 23 Jun 2021
 Page No: 17

Truss type: Valley

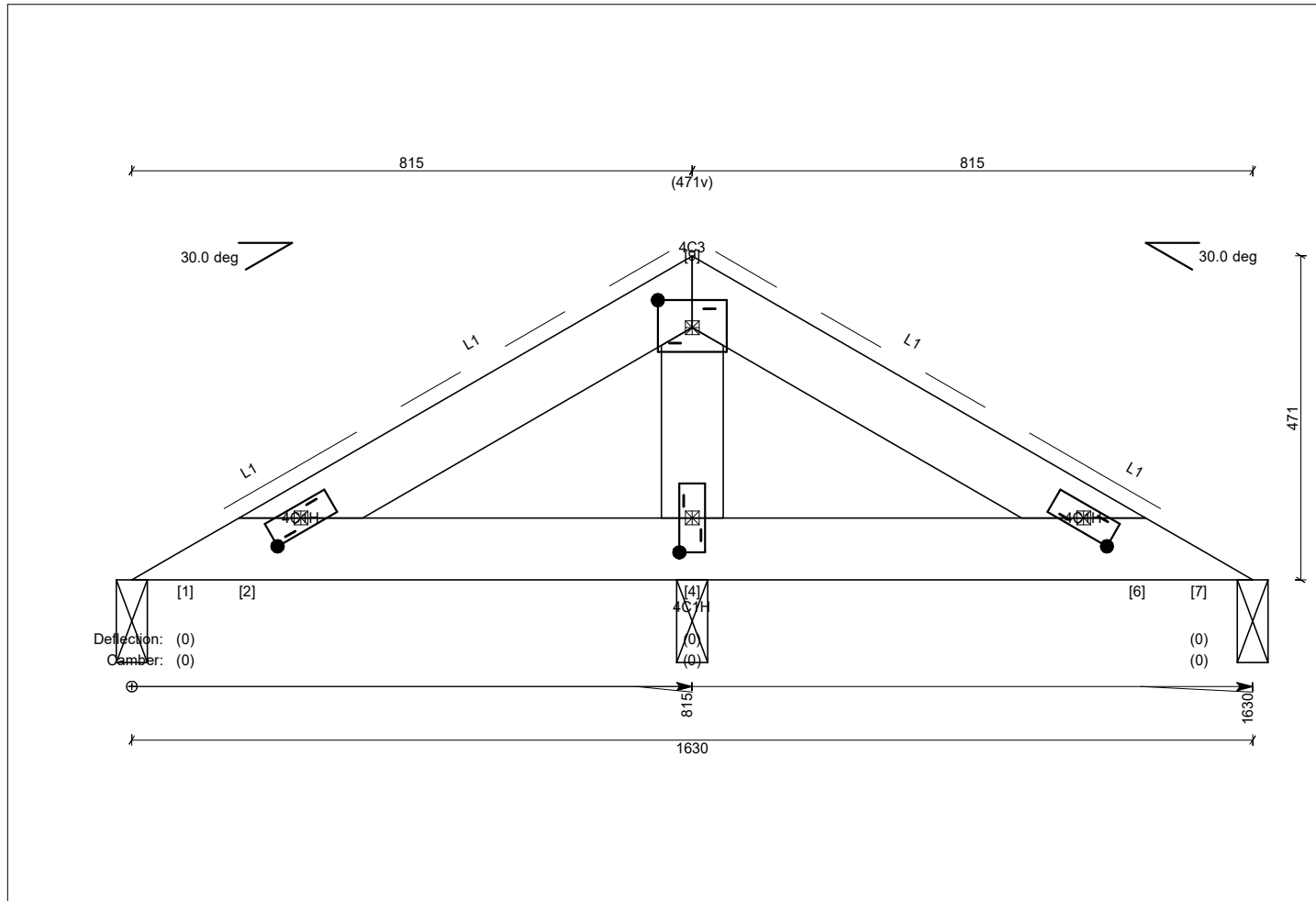
No. plies : 1x45mm

Design spacing : 900mm

No. of : 2

Building type: Residential

Station : 0mm



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

Top Chords 1 / 90x45 MSG8 H1 uno
 Bottom Chords 1 / 90x45 MSG8 H1 uno
 Webs 1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O1 (Single Truss)

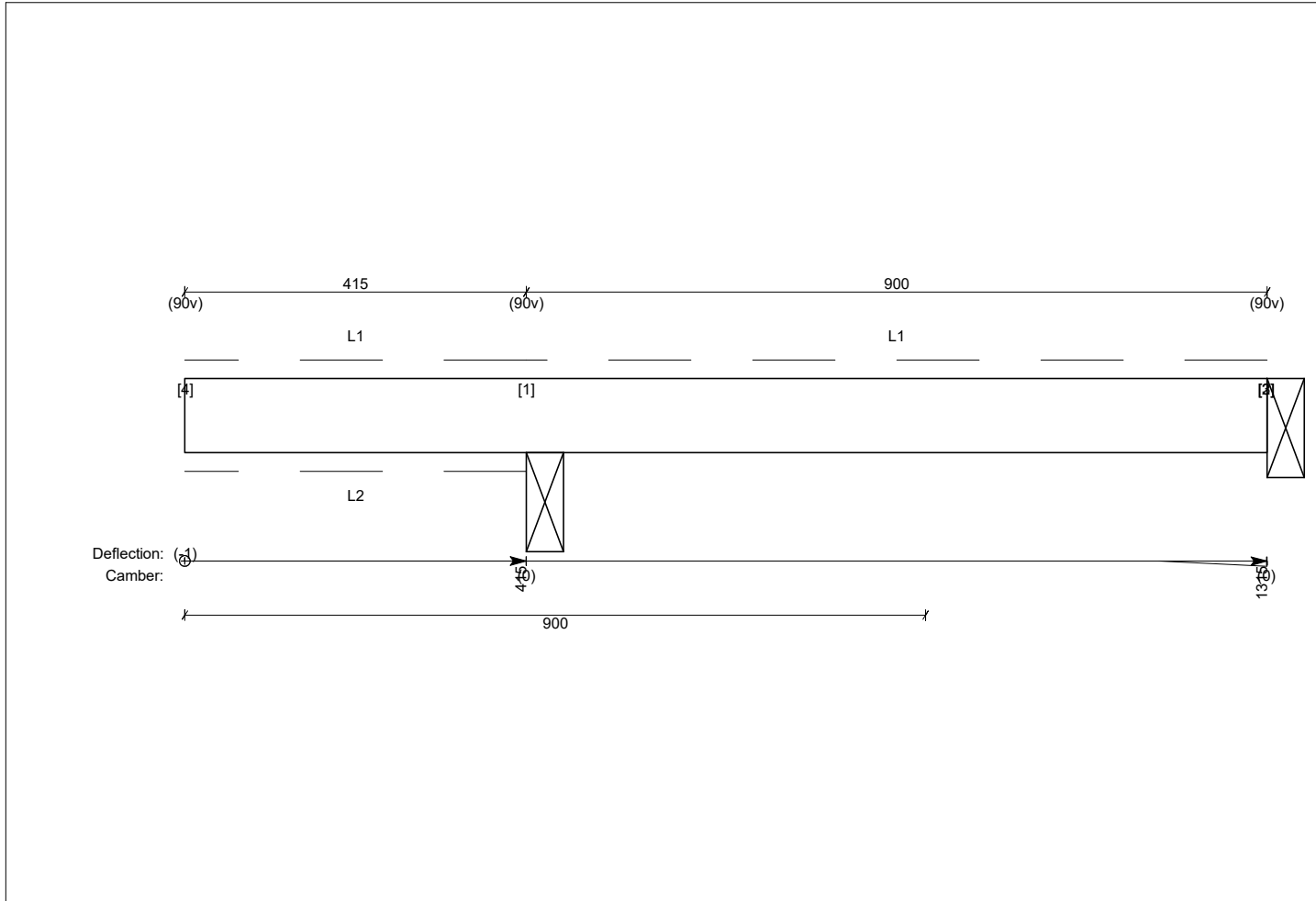
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 1270mm

No. of : 2

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.2 kN (Gc+Qp)	-1.1 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.3 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O2 (Single Truss)

Date created: 23 Jun 2021
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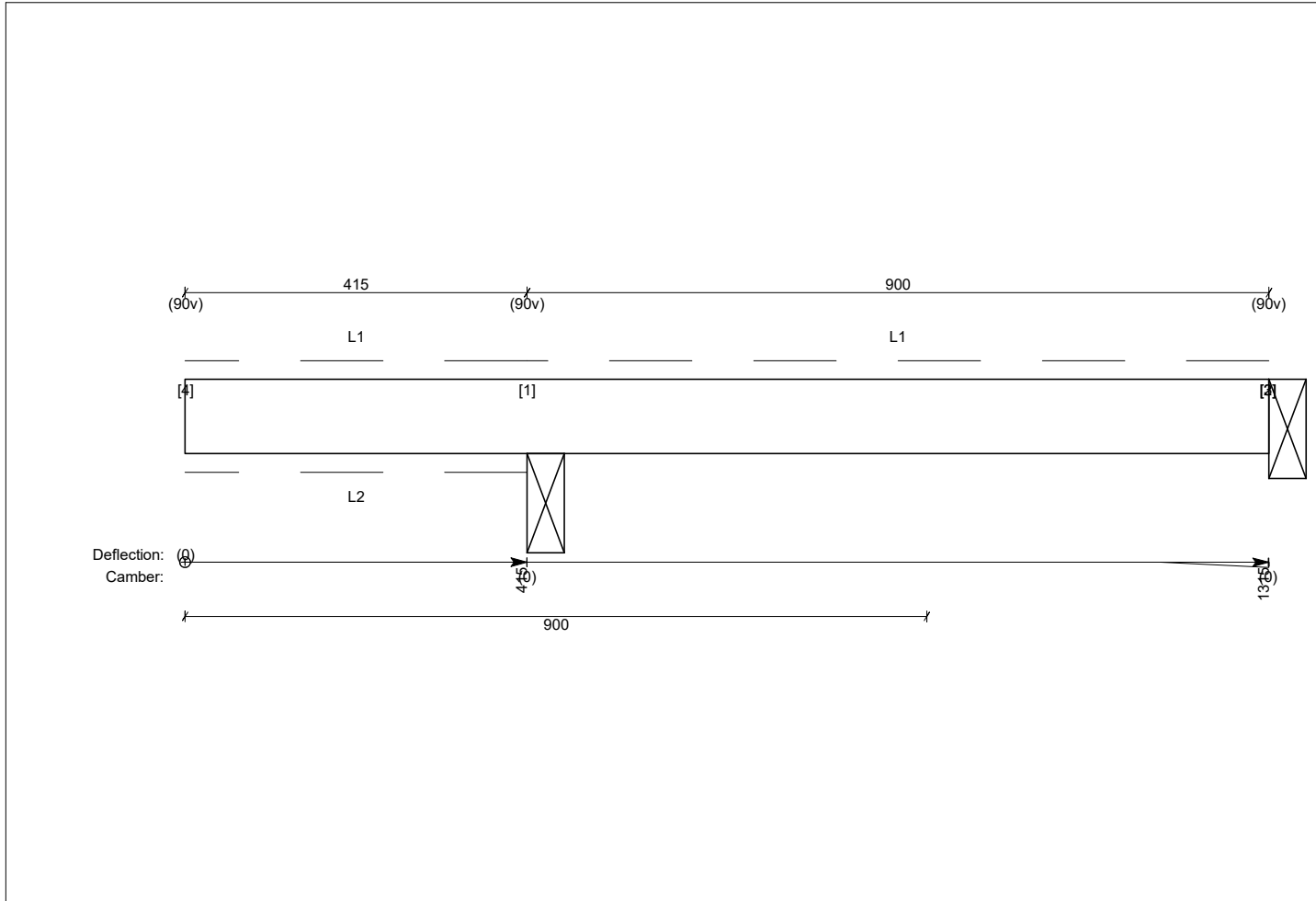
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 473mm

No. of : 2

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	1.8 kN (Gc+Qp)	-0.4 kN	2/90x3.15 dia Skew Nails	-
3	Truss Chord	45	-0.0 kN	0.1 kN (Gc-Wu1)	-0.4 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O3 (Single Truss)

Date created: 23 Jun 2021
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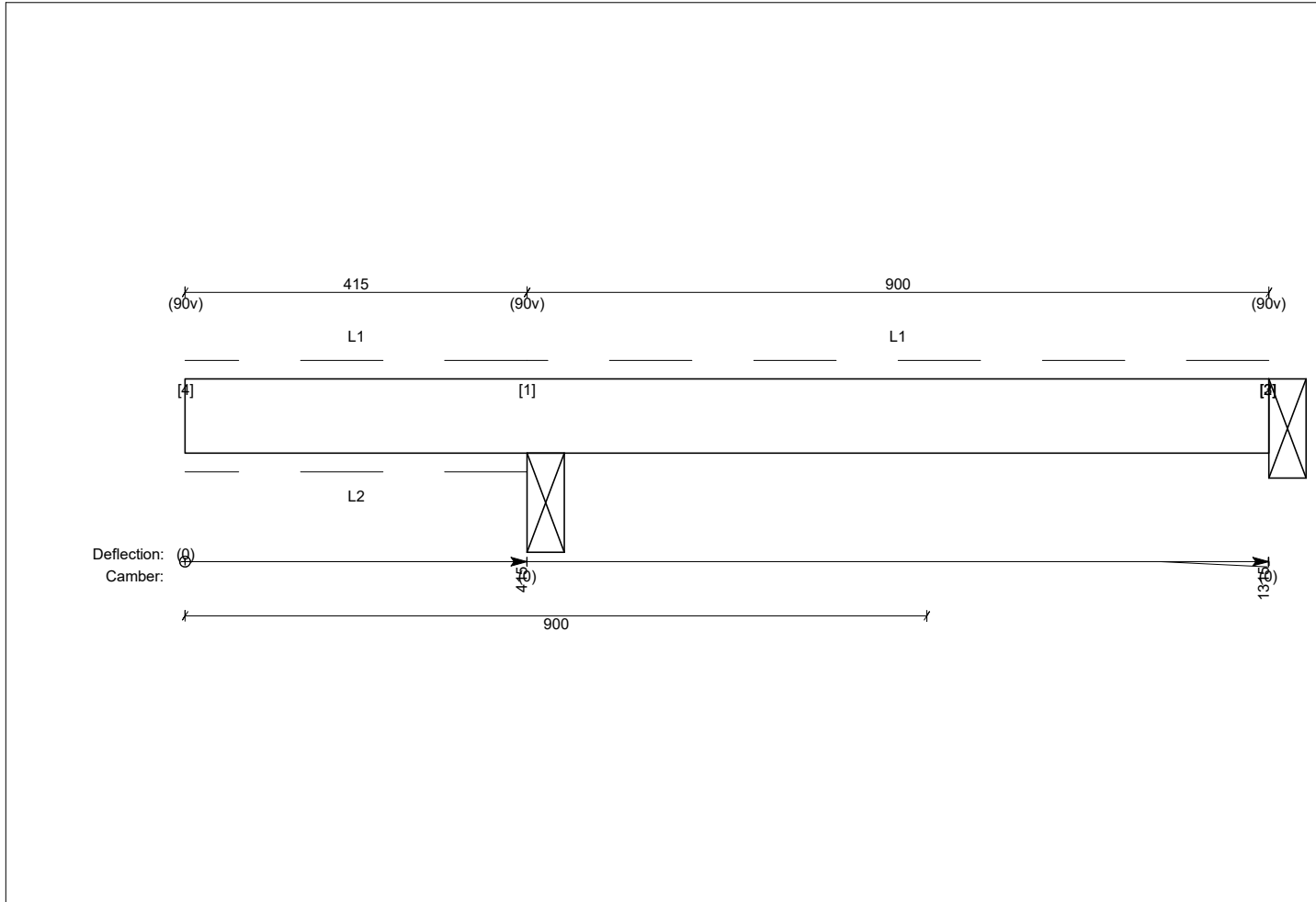
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 900mm

No. of : 4

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.1 kN (Gc+Qp)	-0.8 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O4 (Single Truss)

Date created: 23 Jun 2021
 Page No: 21

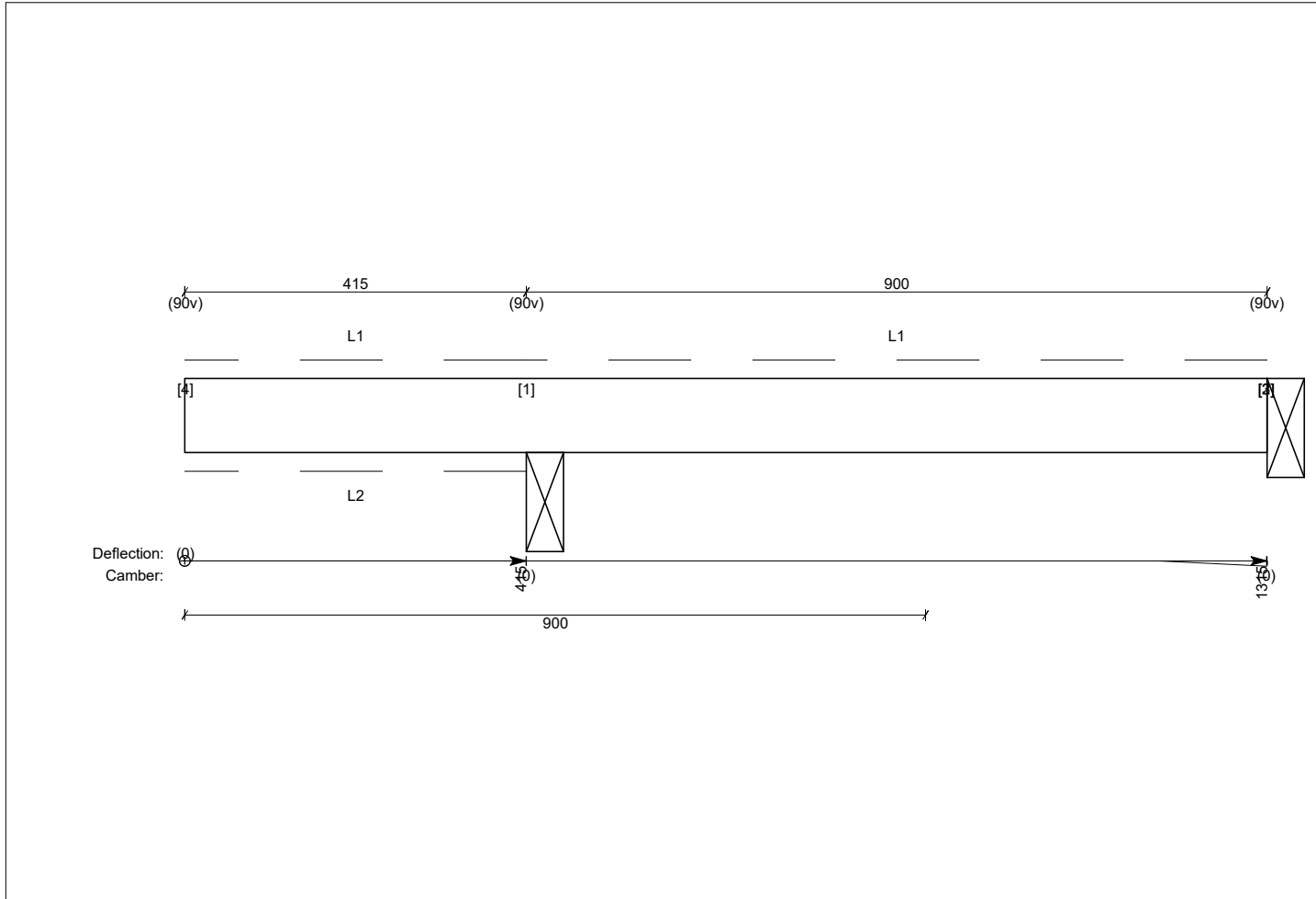
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 684mm

No. of : 2

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.
 L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	2.0 kN (Gc+Qp)	-0.6 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : 09 (Single Truss)

Date created: 23 Jun 2021

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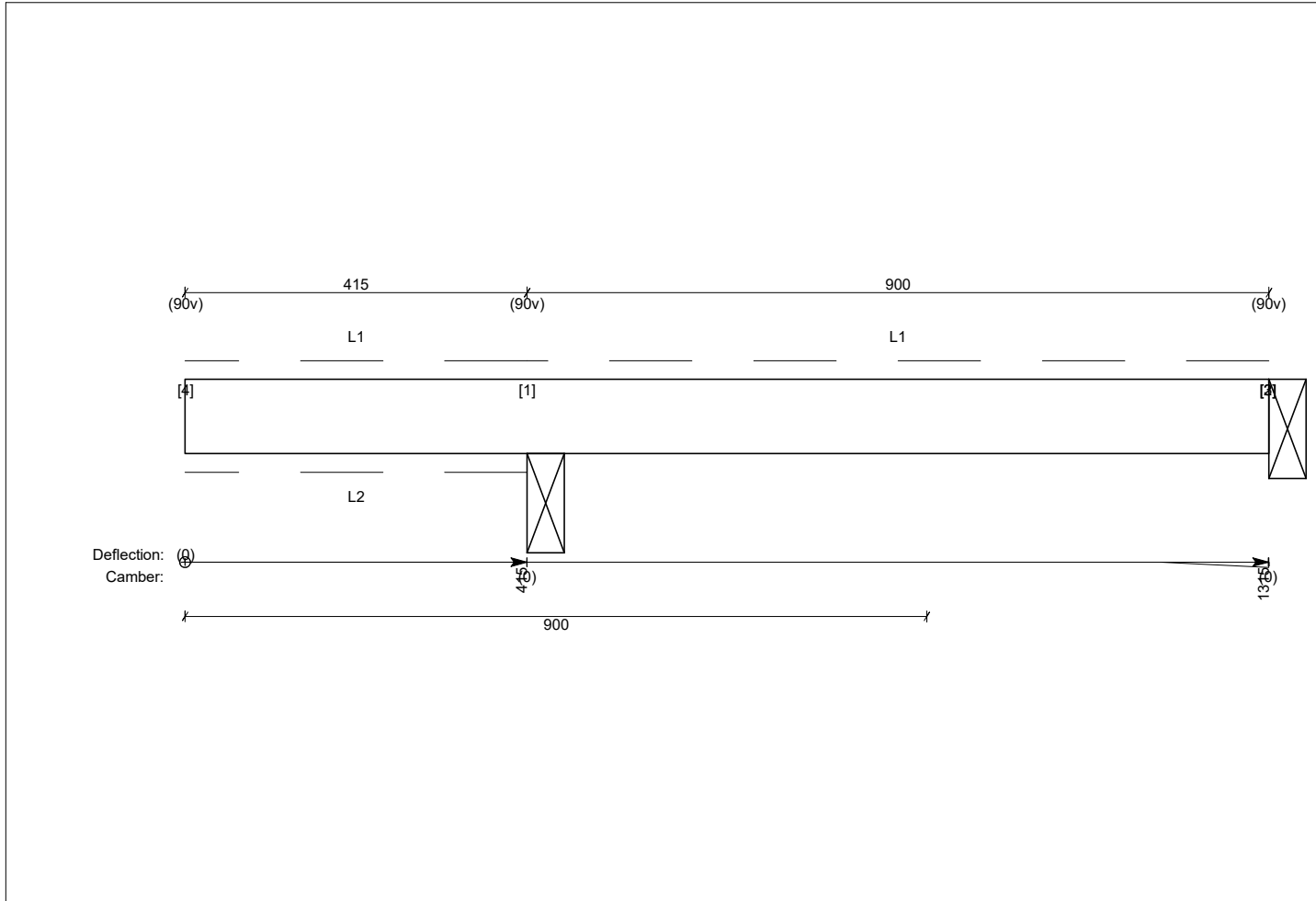
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 1026mm

No. of : 2

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.1 kN (Gc+Qp)	-0.9 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O10 (Single Truss)

Date created: 23 Jun 2021
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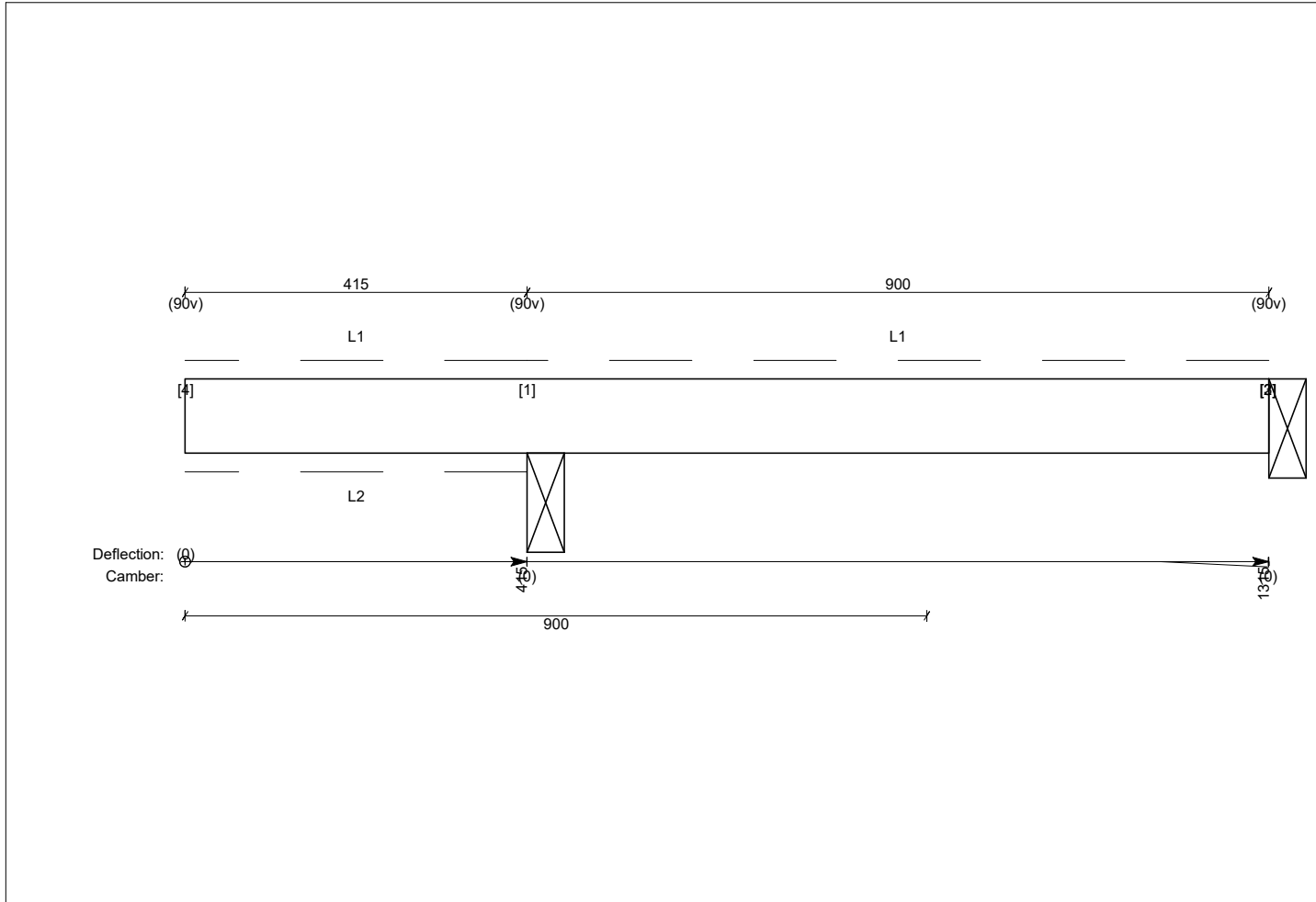
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 473mm

No. of : 2

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	1.8 kN (Gc+Qp)	-0.4 kN	2/90x3.15 dia Skew Nails	-
3	Truss Chord	45	-0.0 kN	0.1 kN (Gc-Wu1)	-0.4 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O11 (Single Truss)

Date created: 23 Jun 2021
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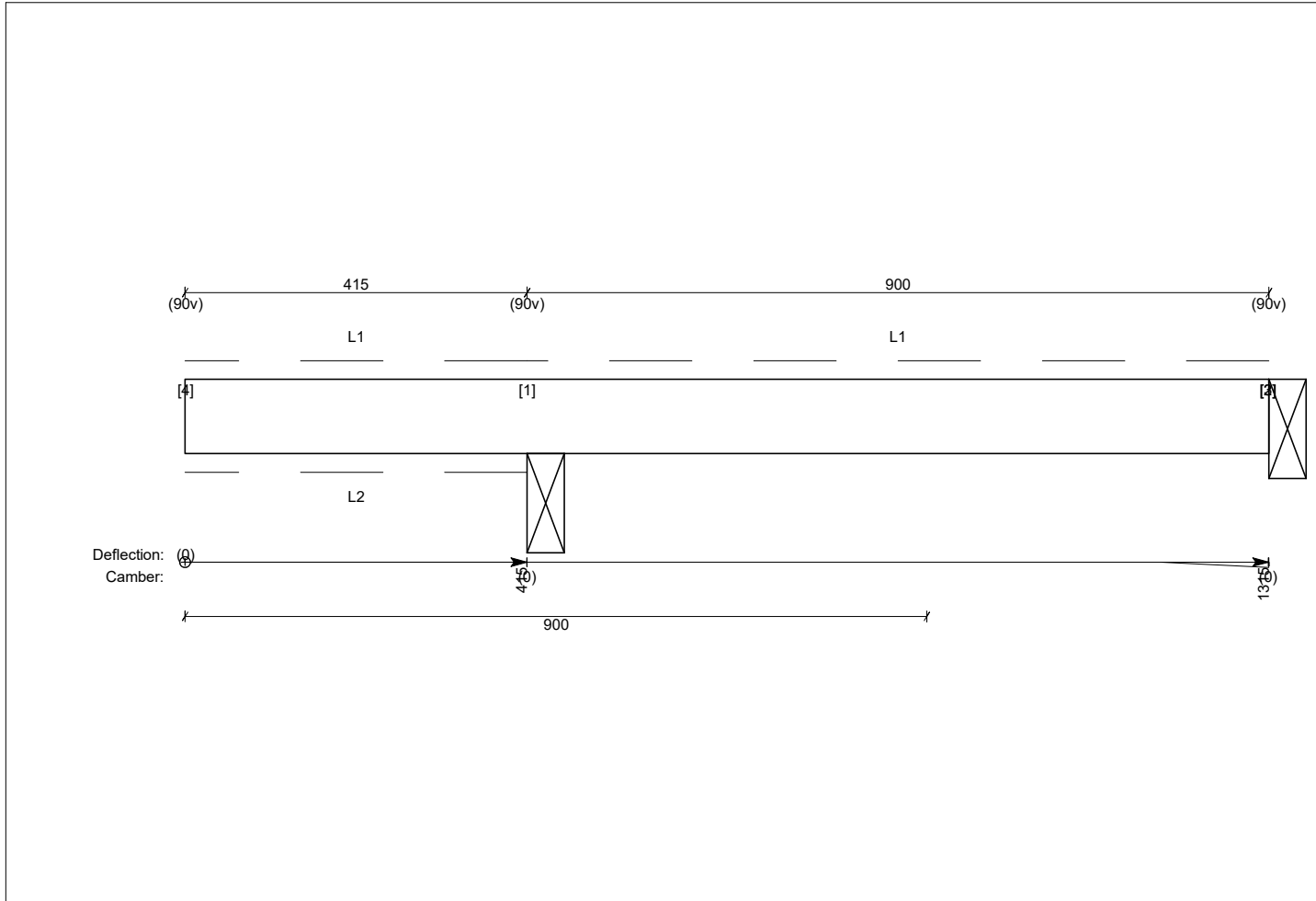
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 900mm

No. of : 4

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.1 kN (Gc+Qp)	-0.8 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O12 (Single Truss)

Date created: 23 Jun 2021
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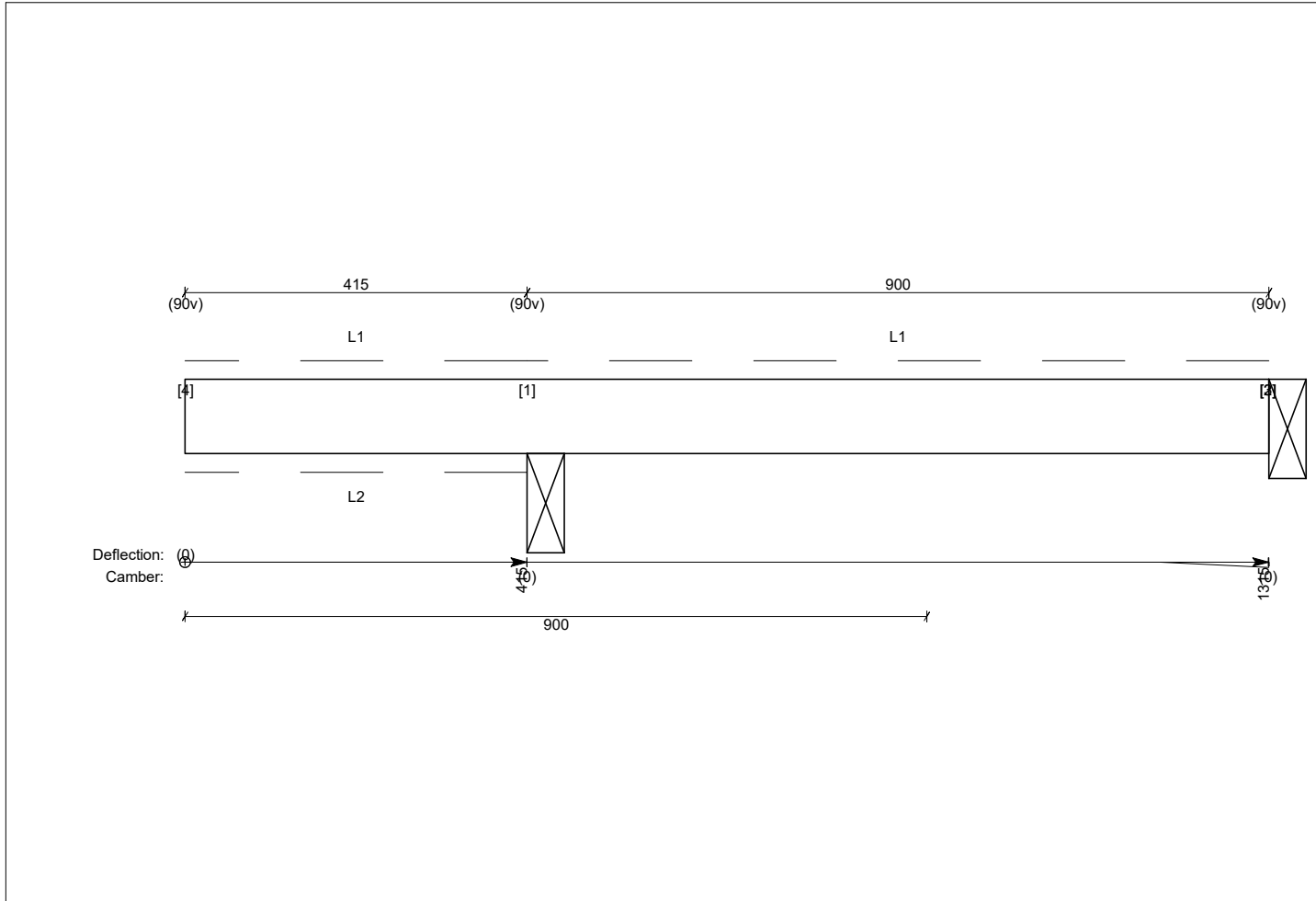
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 829mm

No. of : 2

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	2.1 kN (Gc+Qp)	-0.7 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O5 (Single Truss)

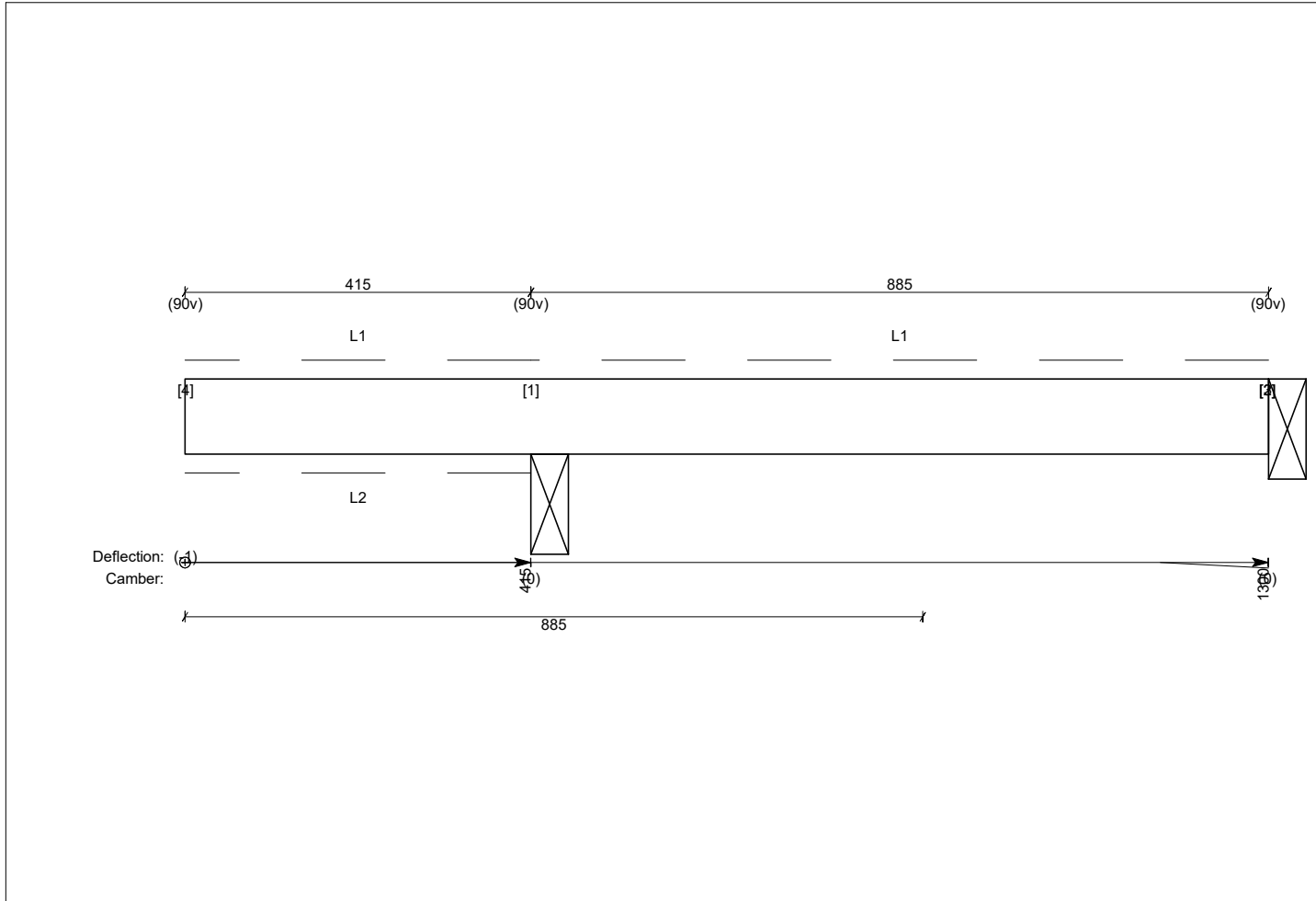
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 1270mm

No. of : 2

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.2 kN (Gc+Qp)	-1.1 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.3 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O6 (Single Truss)

Date created: 23 Jun 2021
 Page No: 27

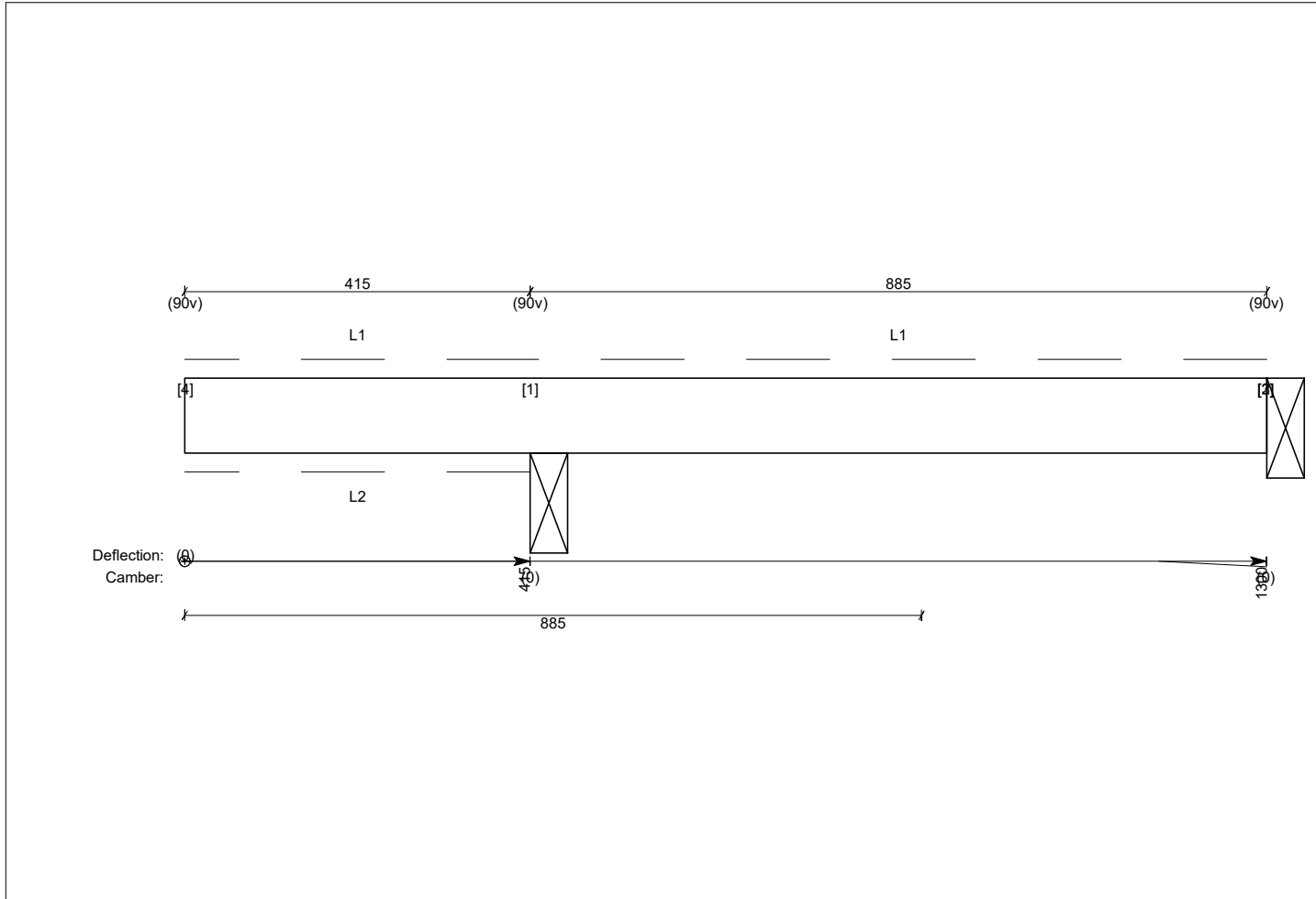
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 473mm

No. of : 2

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	1.8 kN (Gc+Qp)	-0.4 kN	2/90x3.15 dia Skew Nails	-
3	Truss Chord	45	-0.0 kN	0.1 kN (Gc-Wu1)	-0.4 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : 07 (Single Truss)

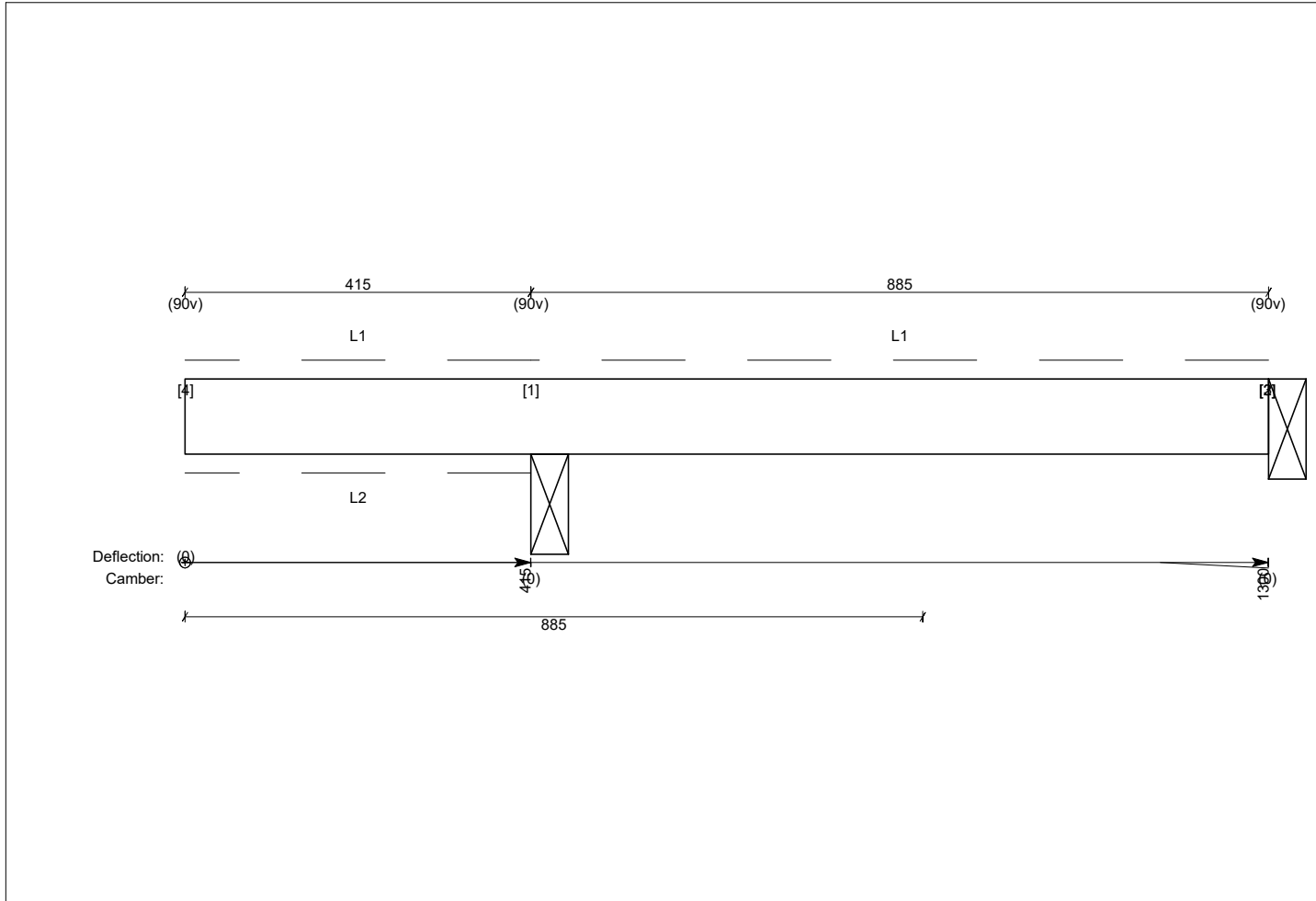
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 900mm

No. of : 4

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.2 kN	2.1 kN (Gc+Qp)	-0.8 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : O8 (Single Truss)

Date created: 23 Jun 2021
 Page No: 29

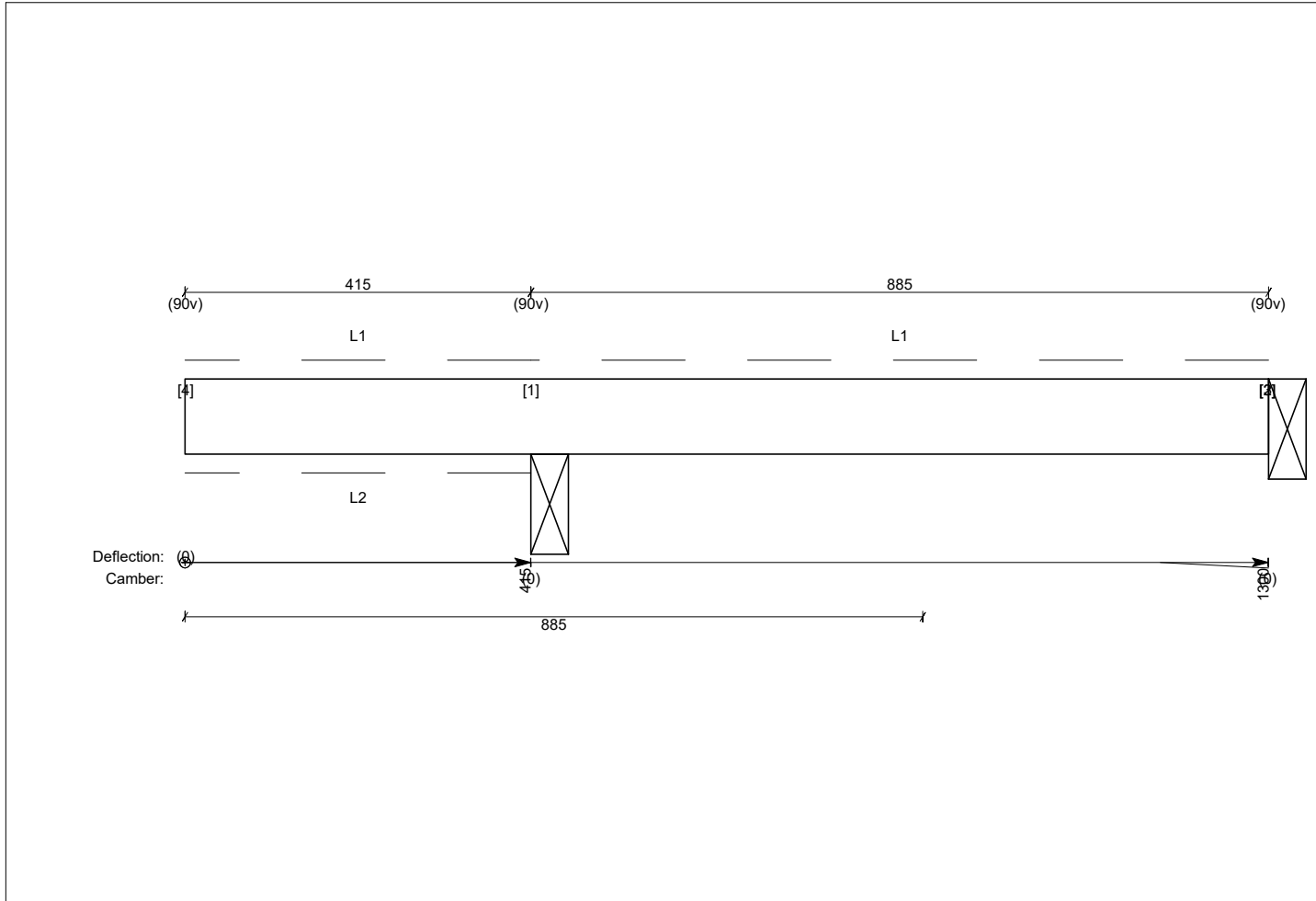
Truss type: Outrigger

No. plies : 1x45mm

Design spacing : 684mm

No. of : 2

Building type: Residential



Linings

- L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.
- L2: Fibrecement (6mm) (9.5 kg/sq.m).
 Battens @ 600mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Truss Chord	45	0.1 kN	2.0 kN (Gc+Qp)	-0.6 kN	1/MGL	-
3	Truss Chord	45	-0.0 kN	0.2 kN (Gc-Wu1)	-0.5 kN	3/90x3.15 dia Skew Nails	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

TRUSS DETAILS (DESIGN)

Job Ref: PS21078

Truss Reference : VN (Single Truss)

Date created: 23 Jun 2021
 Page No: 30

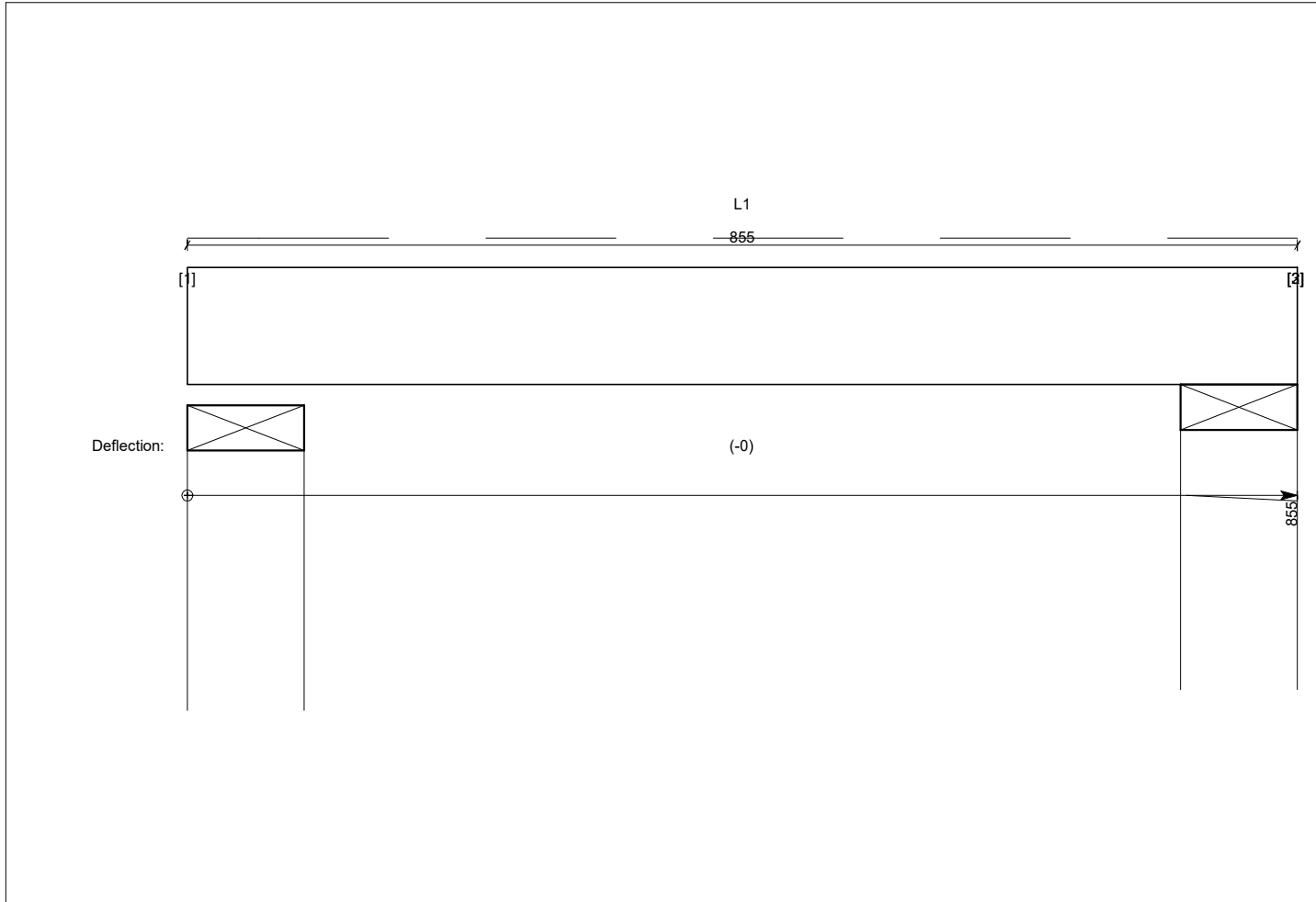
Truss type: Rafter

No. plies : 1x45mm

Design spacing : 900mm

No. of : 30

Building type: Residential



Linings

L1: Longrun (6.0 kg/sq.m).
 Battens @ 900mm.

Timber

1 / 90x45 MSG8 H1 uno

Notes

1. Deflection = permanent load deflection including creep (negative = downward movement).
2. Overhang condition: No fascia.
3. Refer to Pryda Installation Guide for full bracing details.
4. Refer to layout for overall truss bracing.
5. Truss close to gable end: YES

Major supports and factored reactions

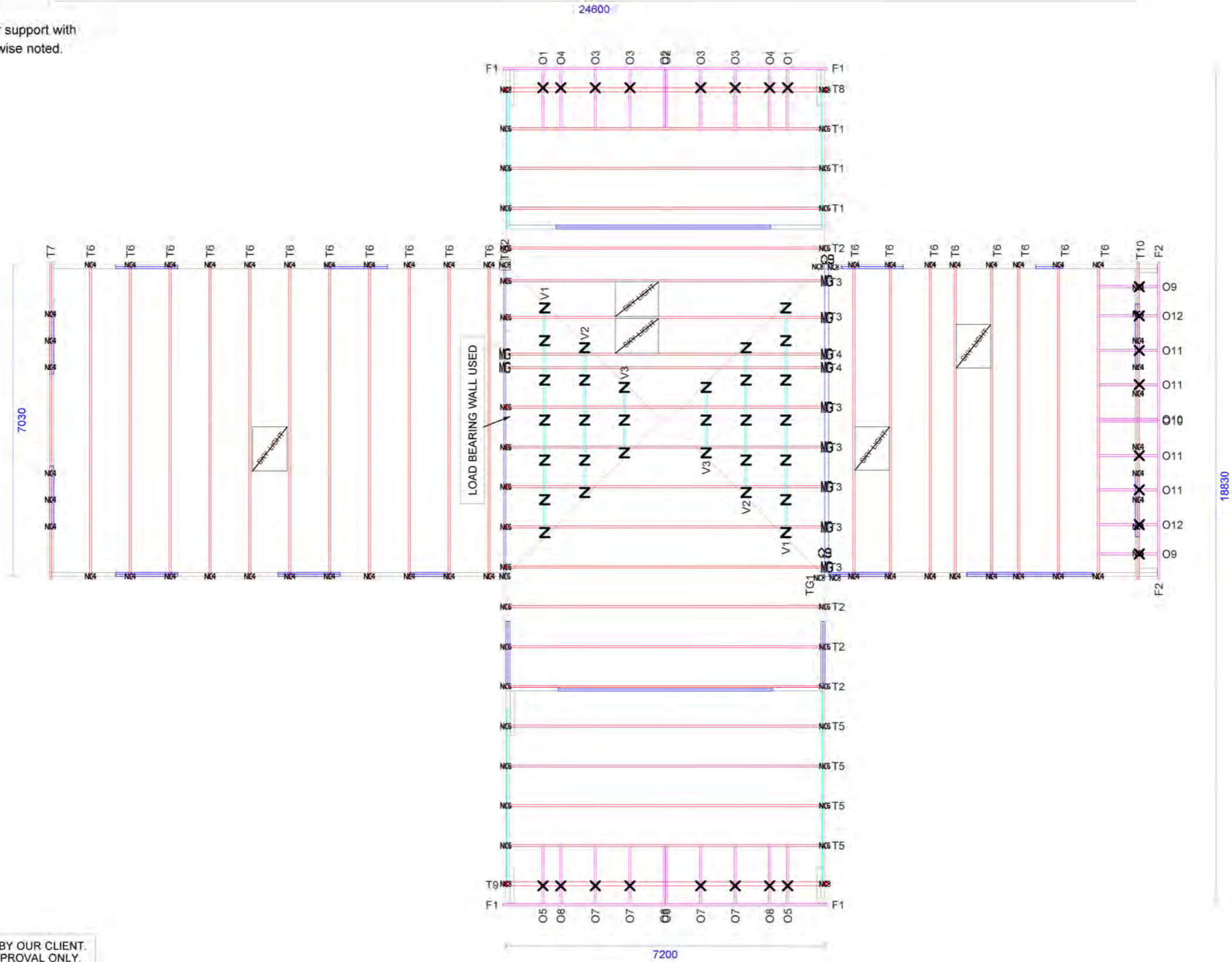
Joint	Type	Width	Perm.	Max. down (LC)	Uplift	Tie-down	Connector
1	Wall Ext	90	0.1 kN	0.8 kN (Gc+Qp)	-0.7 kN	1/NPPC4	-
3	Wall Ext	90	0.1 kN	1.7 kN (Gc+Qj)	-0.7 kN	1/NPPC4	-

Note: Refer to Truss Connections Report / Producer Statement for fixing details.

Truss Connections

- Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails unless otherwise noted.

- NG6 30 x 1/NPPC6 Purlin cleat
- NG8 9 x 1/NPPC8 Purlin cleat
- NG4 54 x 1/NPPC4 Purlin cleat
- MG 11 x 2/MG Multigrips
- Z 30 x 2/Z Z nail
- X 24 x 1/MGL Multigrip (long)
- QB 2 x QHS9 Cyclone Strap



TIMBER GRADE IS MINIMUM 45 KDH1.2, MSG8/LVL8 OR BETTER

LAYOUT GENERATED OFF PLANS SUPPLIED BY OUR CLIENT. THIS LAYOUT IS FOR BUILDING CONSENT APPROVAL ONLY. THERE WILL BE AN "AS MADE LAYOUT" SUPPLIED TO COUNCIL ONCE THE TRUSSES ARE MANUFACTURED.

SCALE: 1:100

PRODUCED IN PARTNERSHIP WITH



Customer : Bunnings Rotorua
 Job Name : ADLAM
 : 33 GREAT WEST ROAD
 : ROTORUA
 Job Ref : PS21078

Wind Speed : 50.00 m/s (Ult.)
 Roofing : Longrun
 Ceiling Lining : 13mm Gib-board (8.5 kg/sq.m.)
 Roof Pitch : 30.00 Deg.
 Detailer : Anthony Fernandes

ALL CARE HAS BEEN TAKEN BY POHUTUKAWA FRAME & TRUSS LTD TO FOLLOW SUPPLIED PLANS ACCURATELY.
 BUILDABLE TRUSS LAYOUT TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL PLANS SUPPLIED.
 IT IS THE RESPONSIBILITY OF THE CLIENT TO CHECK PLAN CONTENT IS CORRECT.



SPECIFICATION

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

J-760 Adlam Residence

(project name)

33 Great West Road, Pomare, Rotorua, New Zealand

(project address)

Mr S & Mrs L Adlam

(client)

Project Ref: J-760

Date: 17 March 2022

Manufacturer Documents Index

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4521NR	Altus Residential Aluminium Windows & Doors	463
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4131NS Nuralite Preprufe & Bituthene Tanking Systems



Nuralite Waterproofing Ltd

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info@nuralite.co.nz

www.nuralite.co.nz

SUPPORTING DOCUMENTS

Bituthene 3000 Installation Method Statement

Ref 27827. Uploaded 23 Jun 2021

Purpose: Performance

Bituthene 3000 TDS

Ref 27820. Uploaded 23 Jun 2021

Purpose: Performance

Installation Checklist

Ref 27825. Uploaded 23 Jun 2021

Purpose: Performance

Preprufe 300R TDS

Ref 27821. Uploaded 23 Jun 2021

Purpose: Performance

Preprufe and Bituthene BRANZ Appraisal

Ref 27823. Uploaded 23 Jun 2021

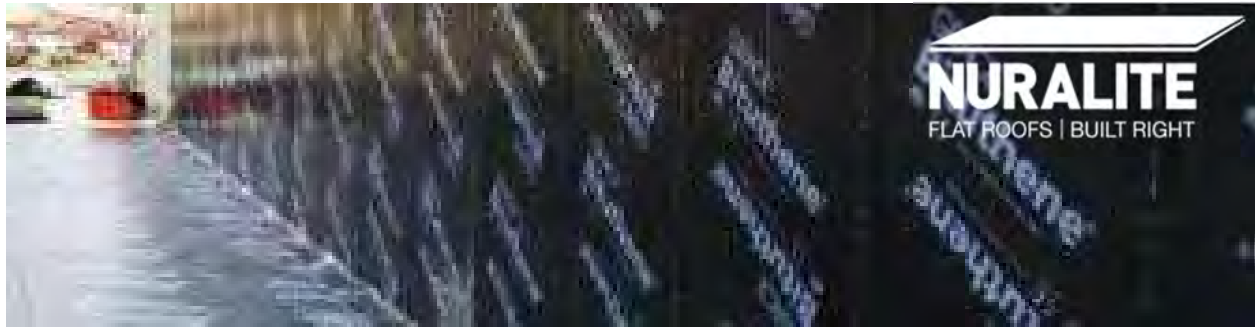
Purpose: Performance

Preprufe Installation Method Statement

Ref 27826. Uploaded 23 Jun 2021

Purpose: Performance

INSTALLATION METHOD STATEMENT



Bituthene

3000

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INTRODUCTION

This Work Method Statement is intended to supplement Bituthene® Data Sheets. Application must be carried out by specialist contractors or site operatives experienced in the correct installation procedures of Bituthene® products. NURALITE Waterproofing Ltd has the authority to vary the method statement to suit the contract drawings and actual site conditions.

PRODUCT SELECTION

- Bituthene® Solvent Primer – primer to prepared, dry concrete
- Bituthene® Primer Type C – primer to prepared, damp concrete
- Bituthene® 3000 – non-exposed waterproof membrane
- Bituthene® LM – detailing of turn-ups, internal corners, penetrations
- Nuradrain-Drain – drainage cell and membrane protection
- Nurapatch – a polymer modified cement repair
- Waterbar XR2010

TYPICAL TOOLS & EQUIPMENT

- Disposable paint brushes and rollers
- Site approved cutter with sharp blade
- Tape measure
- Overlap roller
- Plywood/plastic cutting board
- Metal straight edge
- Soft bristled broom
- 100-500rpm variable speed heavy-duty drill or mixer
- Spiral mixing paddle
- Round nose trowel or spatula
- Cleaning solvent – xylene, MEK, cellulose paint thinner etc

SUBSTRATE

Concrete should be cured 28 days and high strength render 7 days. Where waterproofing of “green” concrete is required, concrete shall be cured no less than 7 days and a primer suitable for green or damp concrete shall be used, as described below.

Concrete provided to the waterproofing applicator must be of high uniform quality and well compacted. Poured concrete surfaces to be finished by light steel trowel. Finishing is to produce a surface that is neither highly porous or burnished.

For off-form concrete, use of plastic faced, self-releasing formwork is recommended, to eliminate the requirement to remove form release agents by water blasting prior to primer or membrane application.

Highly porous concrete may require patching, repair, or additional priming steps to make good.

Burnished, high density concrete may require diamond surface grinding to make good. Concrete finish to be regular, smooth, and stable with no gaps or voids greater than 12mm in size.

SUBSTRATE PREPARATION

Concrete Substrates

Remove all traces of dirt, dust, concrete residue, laitance, curing compounds, oil, grease, and

INSTALLATION METHOD STATEMENT

other contaminants from the concrete substrate by an appropriate method. This may include,

brooming, vacuuming, scraping, water blasting (4000 psi with rotor jet head), captive sand blasting or surface grinding.

Chamfer and radius (minimum 15mm) all external corners receiving Bituthene® membrane.

Repair substrate defects greater than 12mm in size including voids, honeycombing, bugholes and pinholes Nurapatch, low shrinkage polymer modified cement concrete repair. Allow all repairs to cure fully.

Allow cured concrete and repairs to dry to a maximum 5.0% moisture content, or 10% for green or damp concrete.

Other Masonry Substrates

Remove all traces of dirt, dust, concrete residue, laitance, oil, grease, and other contaminants from the substrate by an appropriate method. This may include, brooming, vacuuming, scraping, water blasting (4000 psi with rotor jet head), captive sand blasting or surface grinding.

Chamfer and radius (minimum 15mm) all external corners receiving Bituthene® membrane.

Repair substrate defects greater than 12mm in size and flush point blockwork using high strength Nurapatch, low shrinkage polymer modified cement repair. Allow all repairs to cure fully.

Allow cured repairs to dry to a maximum 5.0% moisture content.

Metals

Remove all traces of dirt, dust, oil, grease, and other contaminants. Remove completely all corrosion and oxides from steel, aluminium, zinc/galvanising copper etc and roughen surface by mechanical abrasion. Roughen stainless steels by mechanical abrasion.

Note – Prevent flash rust or oxidation of steel, aluminium, zinc/galvanising, copper, or other metals prone to rapid oxidation by abrading and xylene/MEK solvent wipe just prior to membrane application. Alternatively, treat these metals with a suitable anti-corrosion coating.

Plastics

Remove all traces of dirt, dust, oil, grease, and other contaminants from.

Note - Immediately prior to membrane or Bituthene® LM fillet application, solvent wipe with methyl ethyl ketone solvent only. As soon as the solvent dries, apply membrane to surface.

DETAILING

Apply 20mm x 20mm fillets of Bituthene® LM to all primed internal corners. Primer and membrane application may proceed immediately.

EXPANSION JOINTS

Thoroughly clean joint and remove all traces of foreign material. Examine joint condition, especially joint arises and rebuild if necessary. Broken or fretted joint arises are to be saw-cut to re-profile joint edges then cleaned of dust and foreign material.

Rebuild and re-profile joint using epoxy mortar to original dimensions. Ensure correct joint geometry is maintained. Allow epoxy mortar to fully cure.

Seal expansion joints using suitable backer rod and sealant, tooled flush with concrete surface,

INSTALLATION METHOD STATEMENT

or seal as per project specification.

Allow sealant to cure for 24 hours. Allow sealant to cure fully for 7 days before applying bituminous membrane or primers, or cover polyurethane sealant with polyethylene faced, self-adhesive blast tape/slip tape.

Bituthene
3000

PRIMER APPLICATION

For dry (below 5.0% moisture content) concrete use Bituthene® Solvent Primer or Bituthene® Primer Type C.

For damp (no surface water present) concrete, use Bituthene® Primer Type C only.

By brush or roller, apply primer to clean, dry, dust free and prepared substrate in one or more coats to give an evenly primed surface. Allow primer to dry tack free.

Avoid applying primer to Preprufe®, metals or other non-porous surfaces, as effectiveness of the bond will be reduced.

MEMBRANE APPLICATION

Peel back the protective release paper and unroll the adhesive surface of the Bituthene® 3000 onto the primed surface, as described on the carton. The membrane should be firmly smoothed and brushed onto the surface to ensure that air is excluded from under the membrane, minimizing air bubbles and wrinkles in the membrane.

Overlap adjacent rolls of Bituthene® 3000 by 50mm at the edges (selvedge) and 150mm at ends to ensure complete continuity. Pressure-roll all edge and end laps to ensure complete adhesion between both layers.

Apply membrane to achieve double layer membrane at internal, corners, external corners, and construction joints. Double layering to extend a minimum 150mm either side of the corner/construction joint.

To expansion joints where movement will be less than 15mm, apply a 300mm wide strip of Bituthene® 3000 centered over the joint, adhesive side away from the concrete. Then install Bituthene® 3000 over substrate and Bituthene® 3000 strip to form a Bituthene® slip joint. For movements greater than 15mm, consult the NURALITE technical department.

Apply membrane to ensure water sheds away from membrane laps.
Detail penetrations by applying a 25mm x 25mm fillet around the penetration extending 65mm.

Where Bituthene® 3000 is to lap onto existing installed Preprufe®, such as at slab edges, continue Bituthene® down the wall, over the Bituthene® LM fillet, over top of slab toe (where present) and down slab edge onto the Preprufe® membrane by a minimum 150mm. Ensure Bituthene® 3000 lap onto Preprufe® is free from bubbles and wrinkles. Pressure-roll the lap to ensure full adhesion.

Where Bituthene® 3000 is expected to be left without backfilling at the top of a wall for any length of time, secure the top edge using NURALITE termination bar or into a chase to prevent slumping. Seal the top chase and flashing with Millennium LPS sealant.

The perimeter of Bituthene® 3000 placed in any given day's operation shall have the free edges sealed by pressure-rolling down tightly to prevent entry of moisture and cleaned before continuing with application.

INSPECTION & REPAIR OF DAMAGED MEMBRANE

Immediately prior to covering the membrane, carefully inspect for accidental damage. Any damaged areas shall be cleaned and patched using Bituthene® 3000 extending a minimum 100mm in all directions beyond the damaged area.

INSTALLATION METHOD STATEMENT

Bituthene

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MEMBRANE PROTECTION

Once applied and inspected, protect the Bituthene® 3000 by applying Nuradrain as soon as practicably possible. On warm sunny days or when installed to “green” or damp concrete, the installed membrane must be covered immediately with Nuradrain to prevent formation of vapour or outgassing blisters beneath the membrane.

Fix Nuradrain to Bituthene® membrane surface using NURALITE Sticky Nails and tape. At top edges of membrane to walls, retain Bituthene® under the NURALITE termination bar which should be encapsulated in LM. Protect the Bituthene® from UV using fibre cement board.

The area of Bituthene® 3000 laid horizontally in a working day should not exceed that which can be adequately protected in the same working period. No storage of materials or trafficking by other trades shall be allowed to take place until the membrane has been covered with protection.

BACKFILLING OPERATIONS

Backfilling must be carried out with care. Backfill shall be free of sharp materials that could puncture membrane and membrane protection during filling or compaction operations.

The back-filling process shall be monitored to prevent membrane damage or displacement of membrane protection/drainage cell. Any damage or displacement that occurs must be reported and corrected by the waterproofing contractor prior to continuing with fill operations. Failure to do so will void warranty conditions.

APPLICATION RECORDS

The waterproofing applicator shall maintain records for future reference, including a photographic record of each stage of application.

The application manager should produce a standard form indicating the records required, which can be used and completed by the applicators.

INSTALLATION METHOD STATEMENT

SAFE2TORCH CHECK LIST (PRIOR TO BASE SHEET INSTALLATION)

It is recommended that anyone preparing a specification or applying a membrane should complete this check sheet and if any boxes are ticked avoid the use of a direct torch-on application in these areas.

Project name: _____

Form completed by: _____

Company: _____

Area ready: _____

Applicator _____

Decks and Insulation	X / ✓
Timber / Other combustible materials.	
Metal deck (refurbishment) where old materials may accumulate in the troughs.	
Insulation – unless specifically designed and tested for use with torch-on membranes.	

Details	X / ✓
Expansion joints with voids and/or combustible fillers.	
Bitumen or timber fillets.	
Detail under all abutments to roof tiles, slates, and roofing iron.	
All timber substrates.	
Change in level details with fixed timber or plastic fascia and/or all soffits, gutters or restricted spaces.	
Windowsills and frames, door sills, louvered vents, air ducts, intakes, and outtakes.	
Junctions to existing waterproofing with flammable insulation/deck materials.	
Vulnerable plastic curbs, domes, pipes, and the like.	
Working when in close proximity to potentially flammable coatings and shrinkwrap.	
Cladding and roofing underlays.	
Working in close proximity to stored chemicals, flammable liquids and explosives.	

Existing weathering components with concealed flammable materials?	X / ✓
Timber, DPC or sarking membranes beneath fixed metal capping systems.	
Existing kitchen extraction plant coated in oils or fats.	
Flammable wrapping to trunking/ducting/bitumen sheet rolls and roll inserts.	
Timber cladding.	
Existing metal or plastic copings/capping's.	

Notes

Signed:

Date:

INSTALLATION METHOD STATEMENT

Bituthene
3000

BITUTHENE®/PREPRUFE® CONCRETE SUBSTRATE READINESS CHECKLIST

Project name: _____
Form completed by: _____
Company: _____
Area ready: _____
Applicator _____

	X/✓
Concrete cured with curing membranes removed. Concrete substrate contains less than 5% moisture content.	
Cavities and cracks filled with repair mortar, flushed off and cured.	
Waterstop installed to construction joints as per specification – located 75mm from rebar.	
Concrete surface firm with any soft concrete or laitance removed.	
All protrusions removed. Surface free from foreign matter.	
Mortar or bitumen fillets to all upstands and smooth 5mm radius to all external edges.	
If terminating into a chase, pre-form the chase and ensure it's straight and 20mm deep.	
Substrate clean, firm, and suitable condition for laying the Nuralite system.	

Notes

Signed:

Date:

INSTALLATION METHOD STATEMENT

Bituthene
3000

BITUTHENE®/PREPRUFE® INSTALLED PRODUCT CHECKLIST ON CONCRETE SUBSTRATE

Project name: _____
 Form completed by: _____
 Company: _____
 Area ready: _____
 Applicator _____

X / ✓

Concrete Substrate checklist completed before work commenced.	
Any movement joints installed to approved specification/detail.	
Mortar/concrete fillets fitted to all internal junctions and corners chamfered at a 45°.	
All corners and upstands incorporate reinforcing or under flashing.	
Under-slab membrane extends beyond footing and protected until vertical membrane installed.	
Side laps and end laps fully bonded and seamed. Bleed visible on all joints where applicable.	
All penetrations installed to specification including under/over flashings.	
Junction of the floor and wall membranes installed to specification fully bonded and watertight.	
All non-standard details installed as per pre-approved specification (attach approved drawings).	
Any mechanical damage to membrane repaired to specification.	
Membrane termination completed to approved detail.	
Suitable drainage system installed below footing as per specification.	
Membrane protection boards installed correctly.	
Membrane fully adhered to substrate with no bridging, bubbling, or delaminating.	
Overall installation free of wrinkles, bubbles, creases, and splits.	

Notes

Signed:

Date:

INSTALLATION METHOD STATEMENT

Bituthene

3000

BITUTHENE®/PREPRUFE® CHECKLIST FOR PROJECT SIGNOFF

Project name: _____
Form completed by: _____
Company: _____
Area ready: _____
Applicator: _____
Product used: _____

	X/√
Under flashings installed to all corners and upstands.	
Drains & overflows installed to specification and watertight.	
Nuraflux adhesive used in correct quantities. Membrane fully adhered to substrate with no evidence of bubbles or lifting.	
In two-layer system, Cap sheet and base sheet fully bonded together, no areas of delamination.	
Cap sheet side laps and end laps fully bonded and tidily seamed off.	
No sign of overheating/excessive bitumen bleed from laps (over 2-3mm).	
Cap sheet and base sheet laps offset satisfactorily. No three-layer lap build-ups.	
Overall installation free of wrinkles, creases, and splits.	
All penetration details completed to specification including under/over flashing.	
All non standard details installed as per pre-approved specifications. (attach approved drawing)	
Any damage to cap sheet repaired to specification.	

Remedial action required:

Signed: _____
Date: _____

The information in this product Method Statement is based on Nuralite Waterproofing Ltd experience and testing. It represents the latest information available at the time of printing, but no guarantee of its accuracy is made or implied, nor responsibility taken for use to which this information may be put. We reserve the right to alter or up-date information parameters and formulations at any time without notice.

INSTALLATION METHOD STATEMENT

Bituthene
3000

DETAILS

NOTES:-
All sharp edges/corners to be eased
Preparation
All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas receiving torch applied membrane should be primed with Bituthene Primer. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.

TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL

THIS DRAWING IS INDICATIVE ONLY AND BY NO MEANS COMPREHENSIVE

gcp applied technologies

Bituthene primer applied to substrate
Bituthene 3000 membrane as specified
All block mortar pointing flush with wall surface
Nuraldrain
Bituthene 3000 strips allowing for 150mm lap joint
Bituthene LM fillet
Geo-textile membrane over drainage pipe to avoid silt
Bituthene LM
Drain with falls of greater than 1:200 and maintainable
Under floor vapour barrier as specified
50mm concrete blinding

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Nuralite Waterproofing Ltd.
500 Leon Laidlaw Ave
Mt Wellington, Auckland
0900 687 254
info@nuralite.co.nz
www.nuralite.co.nz

All applications to be installed by an authorized nuralite applicator. All materials to be applied in accordance with standard published installation instruction and product data sheet should be consulted at all times. This drawing is for comment & approval it must not be used for construction until authorized by the site specifier or other relevant technical expert. This detail drawing is to be used only as a part of the nuralite specification package.
All drawings are subject to copyright. Unauthorized use is prohibited © NURALITE WATERPROOFING LTD.

PRODUCT
BITUTHENE 3000


DESCRIPTION
TANKING AROUND TOE DETAIL

SCALE	NTS	PREVIOUS EDITION	New	DWG NO.	TCS-A1
REVISION	Rev F	DATE	OCT 20		

INSTALLATION METHOD STATEMENT

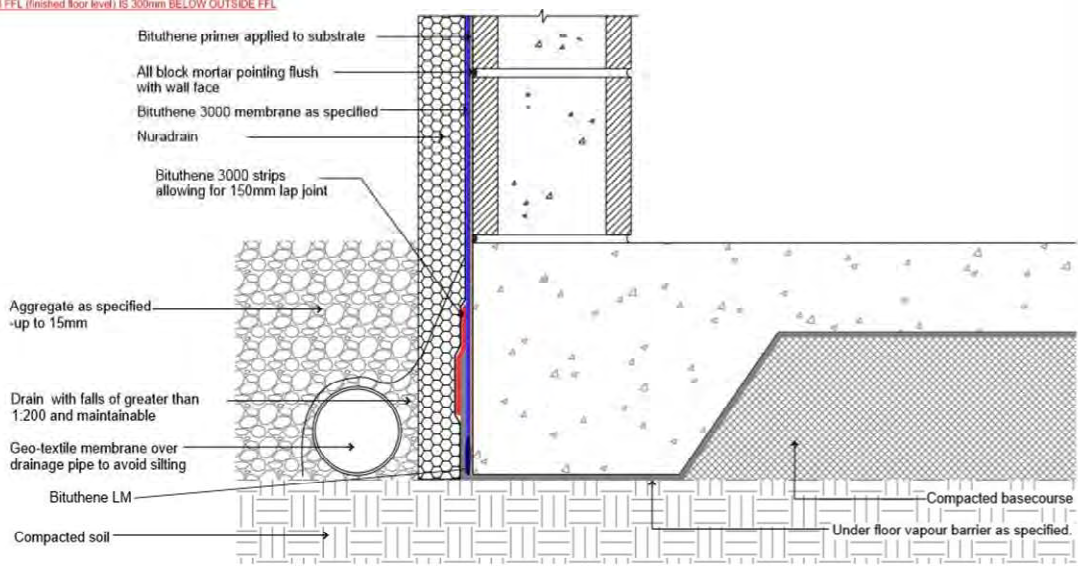
Bituthene
3000

THIS DRAWING IS INDICATIVE ONLY AND BY NO MEANS COMPREHENSIVE



NOTES:-
All sharp edges/corners to be mitred
Preparations
All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas involving torch applied membrane should be primed with Bituthene Primer. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.

TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL



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www.nuralite.co.nz

All applications to be installed by an authorised nuralite applicator. All materials to be applied in accordance with standard published instructions, datasheets and product data sheet should be consulted at all times. This drawing is for information & approval it must not be used for construction until authorised by the site specifier or other relevant technical expert. This detail drawing is to be used only as a part of the nuralite specification package.
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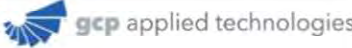
PRODUCT
DESCRIPTION: **BITUTHENE 3000**
TANKING AROUND BASEMENT FOOTING

SCALE: NTS	PREVIOUS DRAWING: New	DATE: OCT 20	DRW-HL: TCS -B1
REVISION: Rev F			

INSTALLATION METHOD STATEMENT

Bituthene
3000

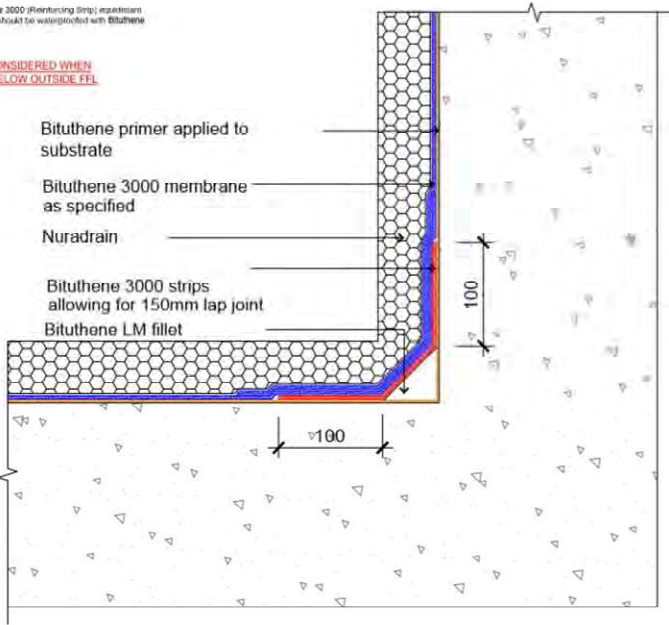
THIS DRAWING IS INDICATIVE ONLY AND BY NO MEANS COMPREHENSIVE



NOTES:
All sharp edges/corners to be mitred
Preparation
All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas requiring tank applied membrane should be primed with Bituthene Primer. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.

TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL

PLAN VIEW



Bituthene primer applied to substrate

Bituthene 3000 membrane as specified


Nuradrain

Bituthene 3000 strips allowing for 150mm lap joint

Bituthene LM fillet

100


100

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	SCALE: NTS REVISION: Rev F	PREPARED BY: New DATE: OCT 20	DWD No: TCS-C1

INSTALLATION METHOD STATEMENT

Bituthene
3000

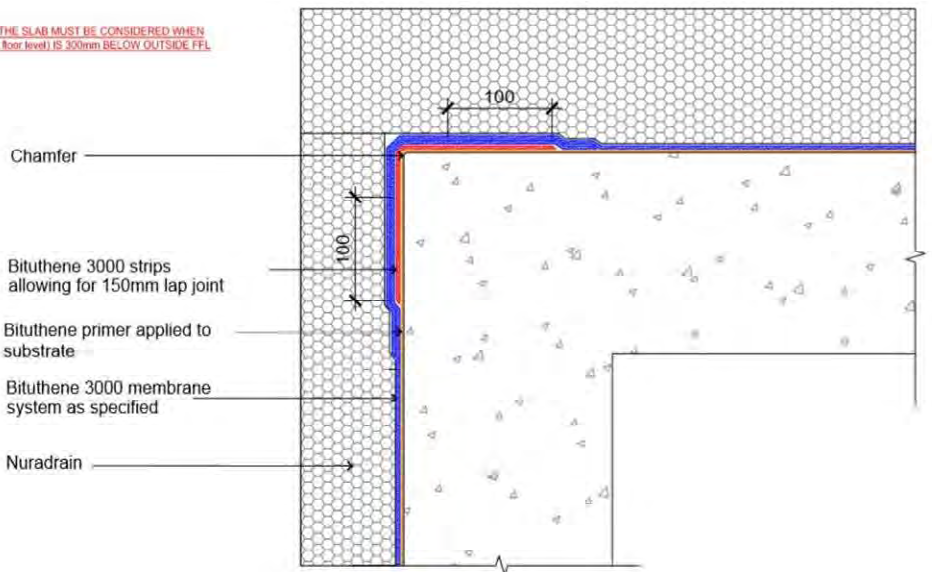
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NOTES:-
All sharp edges/corners to be mitred
Preparations
All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas receiving tank applied membrane should be primed with **Bituthene Primer**. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
These should be reinforced with a 300mm wide piece of **Bituthene 3000** (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with **Bituthene 3000** Membrane.

PLAN VIEW

TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL



Chamfer

Bituthene 3000 strips allowing for 150mm lap joint

Bituthene primer applied to substrate

Bituthene 3000 membrane system as specified

Nuradrain

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FLAT ROOFS | BUILT RIGHT

Nuralite Waterproofing Ltd.
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Mt Wellington, Auckland
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www.nuralite.co.nz

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PROJECT
BITUTHENE 3000
EXTERNAL CORNER

SCALE	NTS	PREVIOUS DWTN	New	DWG NO.	TCS-D1
REVISION	Rev E	DATE	OCT 20		

INSTALLATION METHOD STATEMENT

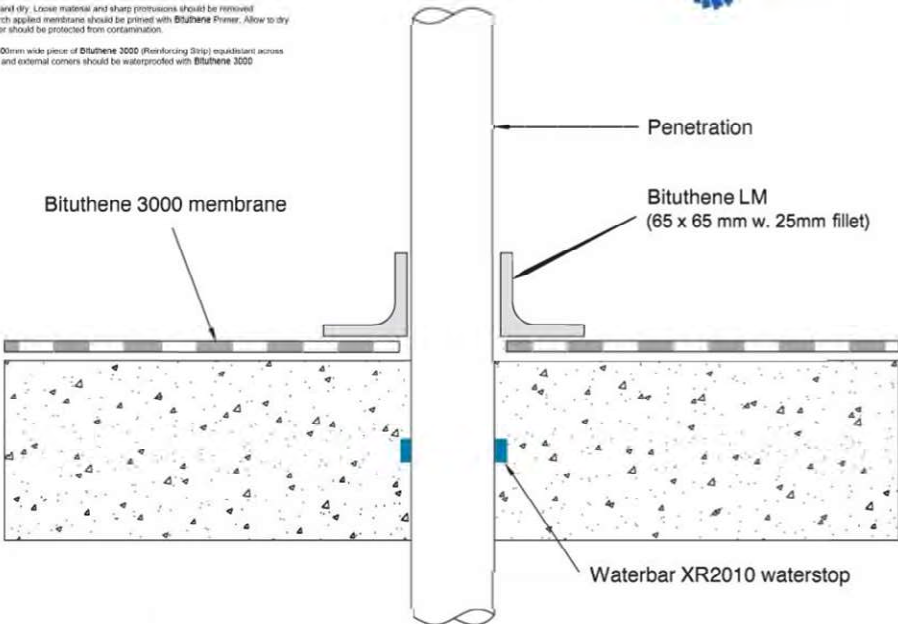
Bituthene
3000

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NOTES:-
 All sharp edges/corners to be bevelled
Preparations
 All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas receiving torch applied membranes should be primed with Bituthene Primer. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
 These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equivalent across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.

PLAN VIEW



TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL


**NOTES - NURADRAIN NOT SHOWN FOR CLARITY
 - NURALITE MAY REQUIRE AN ALTERNATE GCP WATERSTOP BASED ON DESIGN CONDITIONS**

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			DESCRIPTION CONCRETE WALL PENETRATION
SCALE: NTS REVISION: Rev F	PREVIOUS DETAILED: New DATE: OCT 20	DETAILED BY: TCS-E1	

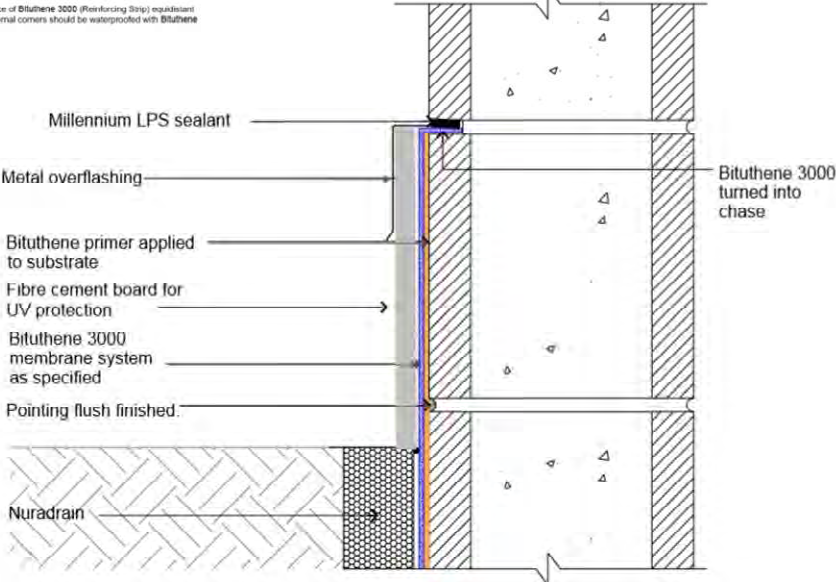
INSTALLATION METHOD STATEMENT

Bituthene
3000


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Angles and Corners
These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.




TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN

 NURALITE FLAT ROOFS RESULT DRIVEN	Nuralite Waterproofing Ltd. 600 Leon Litchfield Ave. Mt Wellington, Auckland 0800 687 214 info@nuralite.co.nz www.nuralite.co.nz	All applications to be installed by an authorised nuralite applicator. All materials to be applied in accordance with standard published manufacturer instructions and product data sheet should be consulted at all times. This drawing is for comment & approval it must not be used for construction until authorized by the site specifier or other relevant technical experts. This detail drawing is to be used only as a part of the nuralite specification package. All drawings are subject to copyright. Unauthorised use is prohibited. © NURALITE WATERPROOFING LTD.	PRODUCT BITUTHENE 3000 TERMINATION INTO CHASE								
	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 30%;">DESCRIPTION</td> <td style="width: 30%;">REVISION</td> <td style="width: 30%;">DATE</td> <td style="width: 10%;">BY</td> </tr> <tr> <td>NTS</td> <td>Rev F</td> <td>OCT 20</td> <td>TCS-F2</td> </tr> </table>		DESCRIPTION	REVISION	DATE	BY	NTS	Rev F	OCT 20	TCS-F2	
	DESCRIPTION	REVISION	DATE	BY							
NTS	Rev F	OCT 20	TCS-F2								
<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 30%;">SCALE</td> <td style="width: 30%;">PREPARED DRAWN BY</td> <td style="width: 30%;">DATE</td> <td style="width: 10%;">CHKD BY</td> </tr> <tr> <td>NTS</td> <td>New</td> <td>OCT 20</td> <td>TCS-F2</td> </tr> </table>		SCALE	PREPARED DRAWN BY	DATE	CHKD BY	NTS	New	OCT 20	TCS-F2		
SCALE	PREPARED DRAWN BY	DATE	CHKD BY								
NTS	New	OCT 20	TCS-F2								

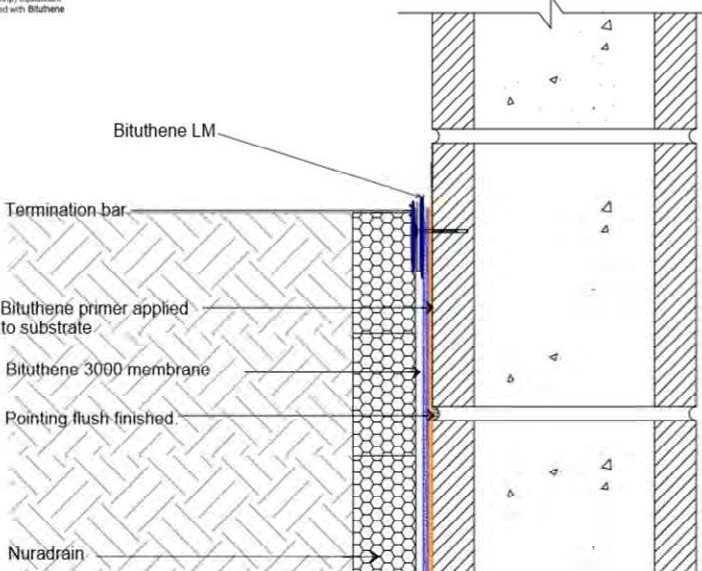
INSTALLATION METHOD STATEMENT

Bituthene
3000


THIS DRAWING IS INDICATIVE ONLY AND BY NO MEANS COMPREHENSIVE



NOTES:-
All sharp edges/corners to be mitred
Preparation
All surfaces must be smooth, clean and dry. Loose material and sharp protrusions should be removed mechanically. All areas receiving torch applied membrane should be primed with Bituthene Primer. Allow to dry completely. The newly applied primer should be protected from contamination.
Angles and Corners
These should be reinforced with a 300mm wide piece of Bituthene 3000 (Reinforcing Strip) equidistant across the previously primed area. Internal and external corners should be waterproofed with Bituthene 3000 Membrane.

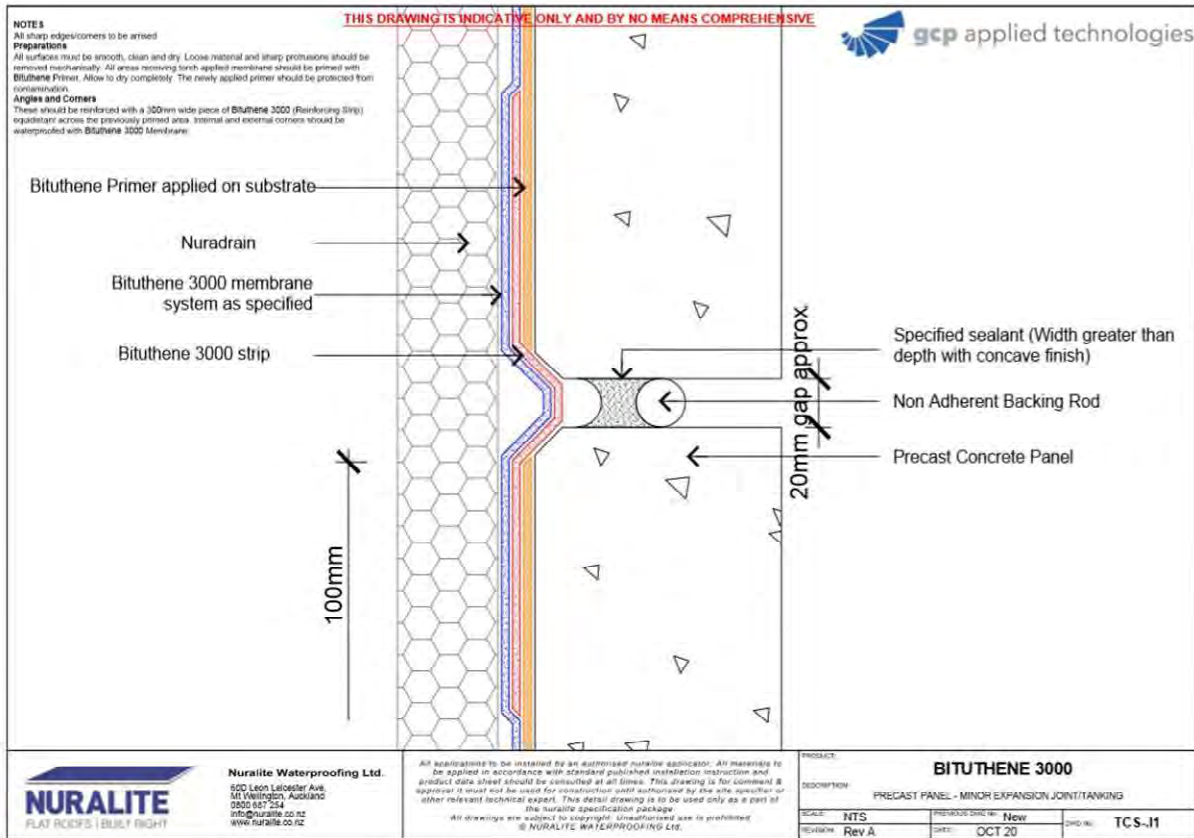


TANKING UNDER THE SLAB MUST BE CONSIDERED WHEN SLAB FFL (finished floor level) IS 300mm BELOW OUTSIDE FFL

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			DESCRIPTION TERMINATION USING TERMINATION BAR
SCALE: NTS REVISION: Rev F	PREPARED DRAWING: New DATE: OCT 20 DWD No: TCS-F3		

INSTALLATION METHOD STATEMENT

Bituthene
3000



TECHNICAL DATA SHEET

DESCRIPTION

BITUTHENE® 3000 is a high performance, cold-applied, flexible, preformed factory controlled thickness waterproof membrane combining a special high performance, cross-laminated, HDPE carrier film with a unique self-adhesive rubber bitumen compound.

Waterproof membrane with high hydrostatic head resistance. The high density cross-laminated polythene film provides dimensional stability and puncture resistance. A simply single layer, reliable, low labour cost with the benefit of site programmed installation.

Gas resistant to methane, carbon dioxide and radon gas protection in excess of the standard requirements in BRE Reports 211 (radon) and 212 (methane and carbon dioxide). Provides external chemical resistance for effective protection against aggressive environments and ozone attack.

Cold applied with no flame or heating required. Self-adhesive rubberised asphalt, ensuring continuity at overlaps and reinforcements. Unique rubber/bitumen formulation allows healing of small punctures and allows flexibility to accommodate minor settlement and shrinkage movement.

TECHNICAL SPECIFICATIONS

Test Method	Technical Specifications	Unit of Measurement	Nominal Value
N/A	LENGTH	m	20
N/A	WIDTH	m	1
N/A	NOMINAL THICKNESS*	mm	1.5
N/A	GROSS WEIGHT	kg	39
ASTM D412 modified**	TENSILE STRENGTH OF MEMBRANE		4N/mm
ASTM D412 modified**	ELONGATION OF MEMBRANE (to ultimate failure of membrane)		200%
ASTM D1876	LAP ADHESION @ 23°C		683N/m
ASTM C836	CYCLING OVER CRACK @ -32°C		No effect over 100 cycles
ASTM E154	PUNCTURE RESISTANCE OF MEMBRANE		>220N
ASTM D5385	RESISTANCE TO HYDROSTATIC HEAD		60m
ASTM E96 (12)	PERMEANCE		1.9na Pa. m2. S

Typical test values represent average values from samples tested. Test methods noted may be modified. * Nominal thickness refers to the thickness of the membrane without release liner. ** The test is run at a rate of 100 mm per minute. Please consult your local NURALITE representative on recommended installation temperature.

AREA OF USE

Basements, sub-structures, elevated or grade level podiums.

Bituthene
3000

TECHNICAL DATA SHEET

INSTRUCTIONS FOR USE

Surface preparation:

- Concrete must be dry, clean and free from sharp projections such as nail heads and concrete nibs.
- Remove all surface imperfections, protrusions, cavities, structurally unsound and friable concrete and repair with NURAPATCH.
- Remove contaminants such as grease, oil, dust, dirt, loose stones, debris and wax from exposed concrete.
- Concrete must be properly dried (minimum 28 days for normal structural concrete and 14 days for lightweight structural concrete).
- Substrate should be prepared using BITUTHENE ® 3000 solvent primer, at the recommended rate (approximately 6/8m² per litre depending on porosity) prior to installation of BITUTHENE ® 3000.
- Primer should be dry before the application of the membrane. Drying time depends of the temperature and humidity.
- Apply NURALITE bitumen fillets where required before membrane placement.

Alignment:

- Start the installation of all membrane plies from the low point or drains, so the flow of water is over or parallel to the plies, but never against the laps. All overlaps at the membrane seams shall be installed so as to have "up" slope laps over "down" slope laps.
- Begin membrane application by unrolling the roll of BITUTHENE ® 3000 membrane and aligning the side laps. Re-roll the roll halfway and hold on the unrolled portion to prevent shifting.

Membrane installation:

- Unroll only the required length of BITUTHENE ® 3000, and cut the piece to the desired shape and size.
- Place the pieces of BITUTHENE 3000® on the area to be covered, and check whether they match with the profile of the marked substrate.
- Peel off the release film from the self-adhesive side and place the membrane so as to ensure a minimum overlap of 50 mm.
- Start unrolling the membrane and press it firmly against the surface, from the middle to the edges in order to drive out entrapped air with a wooden press or roller.
- The surface to be overlapped should be dust free and the membrane must be firmly pressed down to ensure a watertight bond.
- Apply BITUTHENE 3000® reinforcing strips 300mm wide where required.

Protection system:

- In order to prevent damages, BITUTHENE ® 3000 must be protected with NURADRAIN protection board as soon as possible.

INDICATIONS AND IMPORTANT RECOMMENDATIONS

- BITUTHENE 3000® should not be applied when temperature is below +10° without consultation with the NURALITE representative.
- Must be stored in a dry place protected from rain, sun, heat and cold temperatures.
- Sun exposure of the product may difficult the removal of the polyethylene non-stick film. In service, maximum temperature should be below 50°C.

Bituthene
3000

TECHNICAL DATA SHEET

- BITUTHENE 3000® should be kept exposed to the sun for the minimum possible time in order to prevent from U.V. rays damage. It is recommended to cover BITUTHENE ® 3000 within a few hours after application.

Full application instructions are covered in the BITUTHENE ® 3000 Method Statement, and BITUTHENE 3000® details.

SAFETY, STORAGE & HANDLING INFORMATION

Do not stack pallets
Store indoors

TRANSPORT CLASSIFICATION

N/A

The information in this product data sheet is based on our experience and testing. It represents the latest information available at the time of printing, but no guarantee of its accuracy is made or implied, nor responsibility taken for use to which this information may be put. We reserve the right to alter or up-date information parameters and formulations at any time without notice.

Bituthene
3000

Safe2Torch Check List (Prior to base sheet Installation)

It is recommended that anyone preparing a specification or applying a membrane should complete this check sheet and if any boxes are ticked avoid the use of a direct torch on application in these areas.

Project name: _____
 Form completed by: _____
 Company: _____
 Area ready: _____
 Applicator _____

Decks and Insulation	X /
Timber / Other combustible materials.	
Metal deck (refurbishment) where old materials may accumulate in the troughs.	
Insulation – unless specifically designed and tested for use with torch-on membranes.	

Details	X /
Expansion joints with voids and/or combustible fillers.	
Bitumen or timber fillets.	
Detail under all abutments to roof tiles, slates and roofing iron.	
All timber substrates.	
Change in level details with fixed timber or plastic facias and/or all soffits, gutters or restricted spaces.	
Windowsills and frames, door sills, louvered vents, air ducts, intakes and outtakes.	
Junctions to existing waterproofing with flammable insulation/deck materials.	
Vulnerable plastic curbs, domes, pipes and the like.	
Working when in close proximity to potentially flammable coatings and shrinkwrap.	
Cladding and roofing underlays.	
Working in close proximity to stored chemicals, flammable liquids and explosives.	

Existing weathering components with concealed flammable materials?	X /
Timber, DPC or sarking membranes beneath fixed metal capping systems.	
Existing kitchen extraction plant coated in oils or fats.	
Flammable wrapping to trunking/ducting/bitumen sheet rolls and roll inserts.	
Timber cladding.	
Existing metal or plastic copings/capping's.	

Notes

Signed:

Date:

Bituthene®/Preprufe® Concrete Substrate Readiness Checklist

Project name: _____

Form completed by: _____

Company: _____

Area ready: _____

Applicator _____

Concrete cured with curing membranes removed. Concrete substrate contains less than 5% moisture content.	X/✓
Cavities and cracks filled with repair mortar, flushed off and cured.	
Waterstop installed to construction joints as per specification – located 75mm from rebar.	
Concrete surface firm with any soft concrete or laitance removed.	
All protrusions removed. Surface free from foreign matter.	
Mortar or bitumen fillets to all upstands and smooth 5mm radius to all external edges.	
If terminating into a chase, pre-form the chase and ensure it's straight and 20mm deep.	
Substrate clean, firm and suitable condition for laying the Nuralite system.	

Notes

.....

Signed:

Date:

Bituthene®/Preprufe® Installed Product Checklist on Concrete Substrate

Project name: _____
 Form completed by: _____
 Company: _____
 Area ready: _____
 Applicator _____

Concrete Substrate checklist completed before work commenced.	X / ✓
Any movement joints installed to approved specification/detail.	
Mortar/concrete fillets fitted to all internal junctions and corners chamfered at a 45°.	
All corners and upstands incorporate reinforcing or under flashing	
Under-slab membrane extends beyond footing and protected until vertical membrane installed.	
Side laps and end laps fully bonded and sealed. Bleed visible on all joints where applicable.	
All penetrations installed to specification including under/over flashings.	
Junction of the floor and wall membranes installed to specification fully bonded and watertight.	
All non-standard details installed as per pre-approved specification (attach approved drawings).	
Any mechanical damage to membrane repaired to specification.	
Membrane termination completed to approved detail.	
Suitable drainage system installed below footing as per specification.	
Membrane protection boards installed correctly.	
Membrane fully adhered to substrate with no bridging, bubbling, or delaminating.	
Overall installation free of wrinkles, bubbles, creases and splits.	

Notes

Signed:

Date:

DESCRIPTION

PREPRUFE® 300R Plus membranes are unique composite sheets comprised of a thick HDPE film, pressure sensitive adhesive and weather resistant protective coating. Designed with Advanced Bond Technology™ and a dual adhesive ZipLap™, PREPRUFE Plus membranes form a unique, integral bond to poured concrete, preventing both the ingress and lateral migration of water while providing a robust barrier to water, moisture, and gas.

Release liner free and designed for efficient, reliable installation, the PREPRUFE® Plus ZipLap allows for an adhesive to adhesive bond at seam overlaps and delivers superior performance in harsh conditions without the need for specialized equipment, heat, or power.

THE PREPRUFE R PLUS SYSTEM INCLUDES:

- **PREPRUFE® 300R Plus** — heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **PREPRUFE® Tape LT** — for covering cut edges, roll ends, penetrations, and detailing (temperatures between -4°C and +30°C).
- **PREPRUFE® Tape HC** — for covering cut edges, roll ends, penetrations, and detailing (minimum 10°C).
- **PREPRUFE® CJ Tape LT** — for construction joints, and detailing (temperatures between -4°C and +30°C).
- **PREPRUFE CJ Tape HC** — for construction joints, and detailing (minimum 10°C)
- **Bituthene® LM**—for sealing around penetrations, etc.
- **Water-Bar XR or Water-Bar XR-SW**— waterstop for joints in concrete walls and floors.
- **PREPRUFE Tieback Covers** — preformed cover for soil retention wall tieback heads.

PREPRUFE® 300R Plus membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed PREPRUFE® adhesive layers work together to form a continuous and integral seal to the structure.

PREPRUFE® can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use BITUTHENE® self-adhesive membrane or GCP's Polymeric Liquid membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

TECHNICAL DATA SHEET

TECHNICAL SPECIFICATIONS

Test Method	Technical Specifications	300R	160R	PREPRUFE Tape (LT or HC)
N/A	LENGTH	31.15m	36.8m	15m
N/A	WIDTH	1.17m	1.17m	100mm
ASTM D2367	NOMINAL THICKNESS	1.2mm	0.8mm	-
N/A	GROSS WEIGHT	50kg	42kg	2kg
N/A	AREA	36m ²	42m ²	-
N/A	MINIMUM LAPS	75mm	75mm	75mm
	COLOUR	White	White	-
ASTM D412	TENSILE STRENGTH OF, FILM	27.6 Mpa	27.6 Mpa	-
ASTM D412 modified ³	ELONGATION	500%	500%	-
ASTM C836 ⁴	CYCLING OVER CRACK @-32°C 100 CYCLES	Unaffected, Pass	Unaffected, Pass	-
ASTM E154	PUNCTURE RESISTANCE	990 N	445 N	-
ASTM D5385 modified ²	RESISTANCE TO HYDROSTATIC HEAD	71m	71m	-
ASTM E96 method B	PERMEANCE	0.01 perms (0.6 ng/(Pa x s x m ²))	0.01 perms (0.6 ng/(Pa x s x m ²))	-
ASTM D1876 modified ⁶	LAP PEEL ADHESION AT 22°C	1408 N/m	1408 N/m	-
ASTM D1876 modified ⁶	LAP PEEL ADHESION AT 4°C	1408 N/m	1408 N/m	-
ASTM D903 modified ⁵	PEEL ADHESION TO CONCRETE	880 N/m	880 N/m	-
ASTM D5385 modified ¹	LATERAL WATER MIGRATION RESISTANCE	Pass at 71m of hydrostatic head pressure	Pass at 71m of hydrostatic head pressure	-
ASTM D1970	LOW TEMPERATURE FLEXIBILITY	Unaffected at -29°C	Unaffected at -29°C	-

Footnotes:

1. Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
2. Hydrostatic head tests of PREPRUFE® Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 3 mm spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 50 mm per minute.
4. Concrete is cast against the PREPRUFE® membrane and allowed to cure (7 days minimum).
5. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm per minute at room temperature.
6. The test is conducted 15 minutes after the lap is formed (per GCP published recommendations) and run at a rate of 50 mm per minute at 22°C.

TECHNICAL DATA SHEET

AREA OF USE

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites.

INSTRUCTIONS FOR USE

Surface preparation

All surfaces - It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 12 mm. Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal - The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

Vertical - Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 12 mm out of alignment.

Membrane installation

The most current application instructions, detail drawings and technical letters can be viewed at gcpat.com. For other technical information contact your local NURALITE representative.

PREPRUFE® Plus membranes have coloured zip strips at the top and bottom of the seam area on the edge of the roll. Both zip strips cover an aggressive adhesive. Once the green zip strip on the top of the membrane and the blue zip strip on the bottom of the membrane is removed, a strong adhesive to adhesive bond is achieved in the overlap area. This PREPRUFE® ZipLap™ provides an enhanced sealing of the overlaps in harsh conditions combined with a fast and easy way of execution without specialized equipment, heat, or power.

PREPRUFE® Plus membranes can be applied at temperatures of -4°C or above. When installing PREPRUFE® Plus product in cold or marginal weather conditions <4°C the use of PREPRUFE® Tape LT is recommended at all laps and detailing. PREPRUFE® Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, PREPRUFE® Plus Low Temperature (LT) membrane is available for low temperature applications. Refer to PREPRUFE® Plus LT data sheet and GCP tech letter 16 for more information.

Horizontal substrates

Kick out or roll out the membrane HDPE film side to the substrate with the green zip strip facing towards the concrete pour. End laps should be staggered to avoid a build-up of

layers. Leave green and blue zip strips on the membrane until overlap procedure is completed.

Accurately position succeeding sheets to overlap the previous sheet 75 mm along the marked selvedge with the blue zip strip on top of the green zip strip. Ensure the underside of the succeeding sheet is clean, dry, and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

Refer to GCP Tech Letter 15 for information on suitable rebar chairs for PREPRUFE® products.

Vertical substrates

Mechanically fasten the membrane vertically using fasteners appropriate for the substrate with the green zip strip facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low-profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Accurately position succeeding sheets to overlap the previous sheet 75 mm along the marked selvedge with the blue zip strip on top of the green zip strip.

Ensure the underside of the succeeding sheet is clean, dry, and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Roll firmly to ensure a watertight seal.

Roll ends and cut edges

Overlap all roll ends and cut edges by a minimum 75 mm and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply PREPRUFE® Tape LT (or HC in hot climates) centred over the lap edges and roll firmly. Immediately remove tinted plastic release liner from the tape.

Details

Detail drawings are available at <https://www.nuralite.co.nz>

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork, and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean, and free from dust, and allow to dry. Repair small punctures (12 mm or less) and slices by applying PREPRUFE® Tape centred over the damaged area. Repair holes and large punctures by applying a patch of PREPRUFE® Plus membrane, which extends 150 mm beyond the damaged area. Seal all edges of the patch with PREPRUFE® Tape.

Any areas of damaged adhesive should be covered with PREPRUFE® Tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh PREPRUFE® Tape. All PREPRUFE® Tape must be rolled firmly, and the tinted release liner removed. Alternatively, use a hot air gun or similar to

TECHNICAL DATA SHEET

activate the adhesive using caution not to damage the membranes and firmly roll lap to achieve continuity.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of PREPRUFE® Tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper Australian / New Zealand standards or industry guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete. Provide temporary protection from concrete over splash for areas of the PREPRUFE® membrane that are adjacent to a concrete pour.

Removal of Formwork

PREPRUFE® membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond.

PREPRUFE® membranes are not recommended for conventional twin sided wall forming systems, see GCP Tech Letter 13 for information on forming systems used with PREPRUFE® products.

A minimum concrete compressive strength of 20 N/mm² is recommended prior to stripping formwork supporting PREPRUFE® membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to GCP Tech Letter 17 for information on removal of formwork for PREPRUFE® products.

Specification Clauses

PREPRUFE® 300R Plus membranes shall be applied with its protective coating presented to receive fresh concrete to which it will integrally bond. Only GCP Applied Technologies approved membranes shall be bonded to PREPRUFE® products. All PREPRUFE® system materials shall be supplied by NURALITE Waterproofing Ltd, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use PREPRUFE® Tape to tie-in GCP's Polymeric Liquid membrane with PREPRUFE product.

Protection system

In order to prevent damages, PREPRUFE® must be protected with NURADRAIN protection board where applicable as soon as possible.

INDICATIONS AND IMPORTANT RECOMMENDATIONS

PREPRUFE should not be applied when temperature is below -4° without consultation with the NURALITE representative.

TECHNICAL DATA SHEET

Must be stored in a dry place protected from rain, sun, heat, and cold temperatures.

Full application instructions are covered in the PREPRUFE Method Statement, and PREPRUFE® details.

SAFETY, STORAGE & HANDLING INFORMATION

Do not stack pallets

Store indoors

Refer to relevant SDS (Safety Data Sheet). Complete rolls should be lifted and carried by a minimum of two persons.

TRANSPORT CLASSIFICATION

N/A

The information in this product data sheet is based on our experience and testing. It represents the latest information available at the time of printing, but no guarantee of its accuracy is made or implied, nor responsibility taken for use to which this information may be put. We reserve the right to alter or up-date information parameters and formulations at any time without notice.

PREPRUFE
300R PLUS & 160R PLUS



BRANZ Appraised
Appraisal No. 1158 [2021]

NURALITE DAMP PROOF AND TANKING MEMBRANES



Appraisal No. 1158 [2021]

BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 Nuralite Damp Proof and Tanking Membranes are self-adhesive, modified bitumen [Bituthene®] used as a DPM and a pre-applied multi-layered composite sheet waterproofing membrane [Preprufe®] for use as a DPM and tanking membrane on below ground structures.
- 1.2 Bituthene is supplied as a self-adhering SBS polymer-rubber modified bitumen sheet in roll form and Preprufe as a multi-layered composite sheet in roll form.

Scope

- 2.1 Nuralite Damp Proof and Tanking Membranes have been appraised as a DPM or tanking membrane for use under floor slabs complying with NZS 3604 and under floor slabs complying with NZS 4229.
- 2.2 Nuralite Damp Proof and Tanking Membranes have also been appraised for use as a tanking membrane on buildings subject to specific design within the following scope:
 - where the design of the building will be the responsibility of the building designer; and,
 - with clean, sound, continuous substrates of insitu or precast concrete complying with NZS 3101 and AS/NZS 1170; and,
 - where the membrane is adequately protected against damage in service; and,
 - where subsoil drainage has been placed behind basement walls; and,
 - where the membrane is subject to hydrostatic pressure and the pressure does not exceed the equivalent of a 20 m head of water.
- 2.3 Installation of Nuralite Damp Proof and Tanking Membranes must be completed by Nuralite Waterproofing Ltd approved installers in accordance with the Nuralite Waterproofing Limited Technical Literature.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Nuralite Damp Proof and Tanking Membranes, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years. Nuralite Damp Proof and Tanking Membranes meet this requirement. See Paragraph 11.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.3. Nuralite Damp Proof and Tanking Membranes meet this requirement. See Paragraphs 13.1–13.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Nuralite Damp Proof and Tanking Membranes meet this requirement.



Technical Specification

- 4.1 Materials supplied by Nuralite Waterproofing Limited and GCP Applied Technologies are as follows:
- **Bituthene® 3000** is a self-adhesive, modified bituminous membrane made up of 1.4 mm rubberised asphalt and 0.1 mm cross laminated polyethylene outer face for use as a below ground DPM. It is supplied in a roll 1.5 mm thick x 1.0 m wide x 20 m long.
 - **Preprufe® 160R Plus** is a pre-applied, multilayered composite sheet comprising of an HDPE film, pressure sensitive adhesive and a weather-resistant protective coating used for use as a below ground DPM or tanking membrane. Preprufe® 160R Plus is a thinner grade used for vertical applications. It is supplied in a roll 0.8 mm thick x 1.2 m wide x 36.8 m long.
 - **Preprufe® 300R Plus** is a pre-applied, multilayered composite sheet comprising of a thick HDPE film, pressure sensitive adhesive and a weather-resistant protective coating used for use as a below ground DPM or tanking membrane. Preprufe® 300R Plus is a tougher grade used for horizontal applications. It is supplied in a roll 1.2 mm thick x 1.2 m wide x 30 m long.
 - **Preprufe® Tape** is a pre-applied, multilayered composite sheet comprising of a thick HDPE film pressure sensitive adhesive, a weather-resistant protective coating and a self-adhesive underside used to detail all Preprufe® installations. It is supplied in a roll 1.2 mm thick x 100 mm wide x 15 m long.
 - **Bituthene® Liquid Membrane LM** is a two component polyurethane mastic used to seal critical areas and details. It is supplied as a 5.7 L kit.
 - **Bituthene® Primer WB-3000** is a water-based latex primer for formulated to prime concrete surfaces prior to the application of Bituthene®. It is coloured black and in 20 kg containers.
 - **Bituthene® Solvent Based Primer** is a bitumen based solvent primer formulated to prime concrete surfaces prior to the application of Bituthene®. It is coloured black and supplied in 20 L pails.
 - **Nuraflux No 10 Primer** is a water-based adhesive for bitumen-based membranes. It is coloured black and supplied in 15 L pails.
 - **Nuraflux QD Primer** is a quick dry bitumen primer for variety of substrates. It is coloured black and supplied in 25 L pails.
 - **Preprufe CJ Tape** is a two-sided, reinforced, pressure sensitive tape for sealing around penetrations and protrusions. It is supplied in rolls, 15.0 m long and 200 mm wide.
 - **Preprufe Detail Tape** is a two-sided, highly aggressive tape used for detailing Preprufe®. It is supplied in rolls, 15.0 m long and 20 mm wide.
 - **Bitustick 4000** is a double-sided, self-adhesive waterproofing tape used to detail Bituthene®. It is supplied in rolls, 12 m long and either 150 mm or 240 mm wide.
 - **Nuradrain** is a high-density polyethylene dimpled sheet used for protection and drainage in below ground applications. It is coloured black, 20 m long and 2.0 m wide.

Handling and Storage

- 5.1 Handling and storage of all materials whether on-site or off-site is under the control of the installer. Dry storage must be provided for all products and the membranes must be protected from sunlight and ultraviolet (UV) radiation. Rolls of membrane 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 Nuralite Damp Proof and Tanking Membranes. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.



Design Information

Substrate Design

Walls – Bituthene®

- 7.1 Substrate design must be in accordance with the NZBC to a relevant standard, such as NZS 3101 for concrete, and NZS 4229 or NZS 4230 for concrete masonry.
- 7.2 The substrate must have a surface finish that is smooth, clean and free from defects or irregularities which may damage the membrane or allow water to trap behind the membrane.

Control Joints

- 7.3 Where control or construction joints are formed in the substrate, Nuralite Waterproofing Limited must be consulted for use of the membranes over these joints.

Concrete Slab-on-ground

- 7.4 The membranes must be laid on a minimum of 75 mm thickness of site concrete or well compacted sand or well compacted fines. The structural concrete slab placed over the membranes must be a minimum of 100 mm thick.

Backfilling and Drainage

Bituthene® Range

- 8.1 The membranes must be protected against damage by the placement of a protection material between the membranes and the granular fill.
- 8.2 The minimum requirement for backfilling is that a granular, free-draining material is used with the top of the backfill capped with an impervious clay fill that may be covered with topsoil if required. The impervious capping and topsoil must slope with a minimum of 1:30 fall away from the wall.
- 8.3 A minimum 100 mm diameter subsoil perforated drainage pipe must be installed at the bottom of the wall. The pipe must be covered with a geotextile filter fabric, be laid at a minimum 1:200 fall and discharge to a drainage outlet. Provision for cleaning the pipe must also be provided.
- 8.4 Backfilling should begin as soon as possible.

Preprufe® Range

- 8.5 As Preprufe® is a pre-applied DPM tanking membrane, on specifically designed substrates, there is no backfilling required.

Durability

Serviceable Life

- 9.1 Nuralite Damp Proof and Tanking Membranes are suitable DPM and tanking materials, therefore they are expected to have a serviceable life of at least 50 years provided they are installed and maintained in accordance with this Appraisal and are continually protected from sunlight and UV radiation.

Maintenance

- 10.1 Annual inspections must be made of the membranes top edge seal and protection, the backfill capping, and the drainage pipe to ensure all are functioning as originally designed.
- 10.2 If required, the drainage pipe must be cleared to remove any sediment or silt build-up. The slope of the backfill capping must be maintained at all times.



External Moisture

- 11.1 Nuralite Damp Proof and Tanking Membranes, when installed in accordance with this Appraisal and the Technical Literature, will prevent water vapour [DPM] and water [tanking] from penetrating to the interior face of basement retaining walls and floors in spaces where moisture may cause damage. The membranes have a vapour flow resistance of not less than 90 MN s/g.
- 11.2 The membranes can be used to form sealed joints and to seal penetrations. The top edge of the membranes must be sealed to the wall as set out in the Technical Literature and protected.
- 11.3 Building designers must ensure junctions with other membranes, such as at the floor/wall junction, form a waterproof joint. These junctions have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

- 12.1 Installation of the membranes must be completed by Nuralite Waterproofing Limited approved installers.

System Installation – Bituthene® Range

Substrate Preparation

- 13.1 All vertical surfaces must be checked to ensure they are dry, clean, smooth and free from sharp edges, loose or foreign materials, oil, grease or other deleterious material that may affect adhesion or may damage the membranes.

Priming

- 13.2 All substrates must be primed before application of the membranes. The supplier of the membranes, Nuralite Waterproofing Limited, should be contacted to confirm the most suitable primer. Application instructions for the primers are contained in the technical data sheets.

Membrane Installation – Walls

- 13.3 Starting at the lowest point, the membranes must be installed in accordance with the Technical Literature. Sheet edges must be overlapped a minimum of 50 mm as marked on the sheets. End laps must be a minimum of 150 mm, with upper sheets lapped over lower sheets. Internal and external corners must be reinforced with an extra layer of membrane 300 mm wide. Protection material must be installed before backfilling. Backfilling must commence immediately after the membranes are installed to ensure the membranes is not left exposed to sunlight or UV radiation.

Membrane Installation – Floors

- 13.4 Membranes must be installed in accordance with the Technical Literature. Sheet edges must be overlapped a minimum of 50 mm as marked on the sheets and end laps must be a minimum of 150 mm. The membranes must be inspected for damage and any damage must be repaired in accordance with the Technical Literature. The membranes must not be exposed to UV radiation for any longer than two months before the structural concrete slab is placed.

System Installation – Preprufe® Range

Site Preparation

- 14.1 All surfaces are to be sound and solid to eliminate movement during concrete placement. Substrate must be regular and smooth with no gaps or voids greater than 12 mm. Grout must be used around all penetrations such as utility conduits for stability.



Membrane Installation

- 14.2 Preprufe® membranes must be installed to all areas required to achieve a waterproof finish in accordance with Nuralite Waterproofing Limited Technical Literature. Temperatures must be greater than -4°C during installation.
- 14.3 The HDPE film face with the blue selvedge edge strip must be facing the prepared substrate and the treated white adhesion coating surface with the green selvedge edge strip must be facing the new concrete. The end laps must be staggered to avoid build up of layers.
- 14.4 The end laps must be accurately positioned to avoid build up of layers. Sheets must overlap the previous sheet by a minimum of 75 mm [side and end laps]. The underside of the sheet must be clean, dry and free from contamination before making the overlaps.
- 14.5 Vertical lengths greater than 2.4 m must be mechanically fastened under the vertical laps at 0.6 m intervals using flathead nails or fixings suitable for the substrate. Fixings are to be placed through the lap so that the membrane lays flat to enable heavy rolling. Fixings within the sheet must be covered with a patch of Preprufe® Tape.
- 14.6 All cut ends or laps must be completed using Preprufe® Tape.
- 14.7 Concrete must be placed within 40 days.

Inspections

- 14.8 The Technical Literature and the installation company's Quality Control sheets must be referred to during the inspection of the membrane installation.

Health and Safety

- 15.1 Safe use and handling procedures for the membranes are provided in the Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 16.1 The following testing of Nuralite Damp Proof and Tanking Membranes has been undertaken:
 - Tensile strength, elongation, nail tear, water vapour permeability, low temperature flexibility after heat ageing, static indentation, dynamic indentation, unrolling at low temperatures, resistance to water pressure [also tested on joints], peel resistance from concrete heat aged, resistance to sliding, tensile strength of joints, chisel impact, air leakage, shear strength of joints, water vapour transmission, tensile strength, tear resistance, watertightness and resistance to static loading.

Test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 17.1 A durability opinion has 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 has been examined by BRANZ and found to be satisfactory.



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Quality

- 18.1 The manufacture of the membranes and primers have 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.
- 18.2 The quality of materials supplied to the market is the responsibility of Nuralite Waterproofing Limited.
- 18.3 Quality of installation on site is the responsibility of the Nuralite Waterproofing approved installers.
- 18.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Nuralite Waterproofing Limited.
- 18.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Nuralite Waterproofing Limited.

Sources of Information

- NZS 3101: 2006 Concrete structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Design of reinforced concrete masonry structures.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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In the opinion of BRANZ, **Nuralite Damp Proof and Tanking Membranes** 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 **Nuralite Waterproofing 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. **Nuralite Waterproofing 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 **Nuralite Waterproofing 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 **Nuralite Waterproofing Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

16 April 2020



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GENERAL PARAMETERS

This statement describes the material requirements and application procedures for Preprufe® 300R waterproof membrane system.

Preprufe® 300R is designed as a premium quality, pre-applied protective waterproof sheet membrane. Its unique integral adhesive binds with fresh concrete to provide an exceptional bond between the concrete substrate and membrane. This enables Preprufe® 300R to be installed in blind-side applications. It is used in conjunction with Preprufe® Tape and Bituthene® LM Liquid Membrane, to provide a reliable waterproof envelope for long term protection of the structure.

The Preprufe® 300R membrane system is designed to be mindful of the environment, having very low VOC. Preprufe® 300R and Preprufe® Tape are zero VOC materials. Bituthene LM has a low VOC of 80g/L.

Preprufe® 300R is well suited for use in most areas of application in industrial, commercial, and civil design. It has been formulated using patented technology and offers the particular benefits of high tensile, tear and adhesive strengths, plus high (minimum 300%) elongation and puncture resistance. Combined with properties of methane and radon gas resistance, chemical and microbial resistance, as well as being effective in all types of soils and waters (protecting the structure from salt or acid sulphate attack), the Preprufe® 300R system provides long term protection to concrete substrates in high performance applications.

Preprufe® 300R is BBA Certified for basement Grades 2, 3 & 4 to BS 8102:1990

These properties make Preprufe® 300R suitable for areas where soil conditions are problematic and ground settlement is possible, as well as zero access situations such as confined sites and retrofit lift wells etc.

Preprufe® 300R may remain exposed for up to 42 days after application and before placement of concrete, without detrimental effect. The protective surface film of Preprufe® 300R and Preprufe® Tape must be removed before concrete is installed.

Preprufe® 300R may be installed to removable or permanent timber formwork or shuttering. All formwork and void formers installed must be appropriately designed and installed by formwork professionals and the main contractor, to resist movement and blowout during the concrete installation process. Formwork movement or blowout is beyond the control of NURALITE WATERPROOFING LTD or the waterproofing applicator and could result in separation of membrane laps leading water leakage.

The waterproofing applicator is required to follow all requirements detailed in the Project Specification, this MS, NURALITE WATERPROOFING LTD Product Data Sheets and other provided NURALITE WATERPROOFING LTD documentation relative to this project. Variances can be implemented only after consultation between the applicator, the managing contractor and the NURALITE Technical Department & acceptance of the proposed variance by the managing contractor.

PRODUCT SELECTION

- Base slabs and basement floors
- Basement walls
- Tunnels
- Lift pits
- Tanks

PREPARATION

Substrate Suitability

All substrates provided must be regular, smooth and stable with no gaps, voids or irregularities greater than 12mm wide or 12mm deep. Substrates must be designed by the main contractor, architect or substrate supplier to resist the weight and force experienced during concrete placement, without movement or deflection.

Substrate Selection

All surfaces – It is essential to create a sound and solid substrate to eliminate movement during the concrete placement process.

Horizontal Blinding

Monolithic concrete blinding slab should be used. The blinding must be free of loose aggregate and sharp protrusions.

An angular profiled blinding is recommended rather than a sloping or rounded substrate. The surface does not need to be dry before waterproof membrane application, however standing water must be removed.

Vertical - Rockwork

Rockwork shall be sound and smooth with variations less than 12mm. Protrusions larger than 12mm shall be removed.

Large voids in the rockwork surface shall be faced with shotcrete and struck smooth, level with the surrounding rock surface. Where voids are small or limited in number, patch using high strength, low shrink cementitious concrete repair mortar, finishing flush with the surrounding rock surface.

Where shotcrete or patching of rock face voids is not possible or practical, plywood, timber lagging or other lost formworks may be used as the substrate, provided they are designed with sufficient rigidity to resist deflection or movement where they span voids or are otherwise unsupported. The main contractor must be satisfied that this lost formwork is designed suitably for the purpose, based on the concrete mass of their structural design. Formwork systems must be close butted to provide full support to the membrane and be not more than 12mm out of alignment.

If formwork will be subjected to water contact, the formwork must be constructed from a water-resistant material that will not lose strength or rigidity when damp.

DETAILING

Grout all substrate penetrations for stability.

FINAL PREPARATION FOR MEMBRANE APPLICATION

Inspect substrate to verify suitability and readiness.
Remove standing water from substrates.

MEMBRANE APPLICATION

Evaluate Local Conditions

Before proceeding with membrane application, determine if weather conditions will be conducive to achieving quality application. This must be determined by the applicator on site.

Guidelines follow:

- a) Ambient temperature - between -4°C and 40°C.
- b) Substrate temperature - between -4°C and 60°C.
- c) Do not apply materials during conditions of rain, mist, fog or snow. Minor dampness or condensation to selvedge's may be removed by gentle warming with a hot air gun.

If these conditions cannot be met, application should be suspended until conditions are more favourable. Allow to cure fully before membrane application commences.

Required Equipment

Safety knife, straight edge, tape measure, spatula, scrapers, edge roller, brushes, broom, empty pail, clean rags, vacuum or blower.

Preprufe® 300R Application

General

Preprufe® 300R shall be applied at temperatures of -4°C or above. During cold or damp conditions, the selvedge and tape adhesive can be gently warmed using a hot air gun or similar to remove moisture or condensation and improve initial adhesion.

Horizontal Substrates

Place the Preprufe® 300R membrane HDPE side to the substrate with coated adhesive side facing towards the concrete pour. (To identify which side is which, Preprufe has a thin, removable, clear plastic release liner film on the adhesive side. This release liner film should face the concrete pour.)

End laps should be staggered to avoid a build-up of layers. Leave plastic release liners in place until overlap procedure is completed.

Accurate position succeeding sheets to overlap the previous sheet 75mm along the marked selvedge.

Ensure the underside of the succeeding sheet is clean, dry, and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

Immediately remove completely the plastic release liner from the Preprufe® 300R surface. Any initial tack will quickly disappear.

Vertical Substrates

Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the adhesive (plastic release film) side facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or by fixing 50mm below the top edge using large flat headed fasteners or fasteners with washers to spread the load. Fixings can be made through the selvedge so that membrane lays flat and allows firmly rolled overlaps.

Immediately remove completely the plastic release liner from the Preprufe® 300R surface.

Any initial tack will quickly disappear. Fixings not made through the selvedge must be

covered with a 100mm x 100mm patch of Preprufe® Tape.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.

Overlaps

Selvage Overlaps - Roll all overlaps firmly to ensure a watertight seal.

Roll Ends and Cut Edges – Overlap all roll ends and cut edges by a minimum 75mm and ensure the area is clean and free from contamination. Clean the surface with a damp cloth if necessary. If contamination is present and cannot be removed by damp cloth, consult the NURALITE Technical Department.

Allow to dry and apply Preprufe® Tape centred over the lap and roll firmly. Immediately remove completely the plastic release liner from the Preprufe® Tape.

Installation of membrane to Internal and External Corners

When installing membrane to internal or external corners, follow the forming procedure show at the end of this section.

Penetrations

Use the following steps to seal around penetrations such as service pipes, piles, lighting conductors, bolts etc.

Grout around the penetration if the penetration is not stable. Scribe membrane tight to the penetration. If the membrane is not within 12mm of the penetration, apply Preprufe® Tape to cover the gap.

Wrap the penetration with Preprufe® Tape by positioning the tape 12mm above the membrane. Mix and apply Bituthene® LM around the penetration using a 20mm fillet to form a watertight seal between the Preprufe® 300R membrane and the Preprufe® Tape.

Treatment of Expansion Joints

Preparation

Determine precise location of waterstop and mark by stringline on the adhesive surface of the Preprufe® 300R.

Install External Waterstop

Apply Bitustik® Tape Super along the previously marked location for the waterstop. Install Swellseal 2010® external waterstops to the Bitustik® Tape, as required by waterproofing design. Waterstop shall be installed to form a continuous, unbroken waterstop. Waterstop joints shall be heat welded and detailed using Swellseal® Mastic WA if required to ensure waterproof continuity.

Treatment of Construction Joints

Preparation

Clean the concrete surface from the previous pour to remove dirt, dust, concrete waste, concrete protrusions, contamination. Dry the concrete surface to remove all surface water

Install External Waterstop

To smooth finished concrete surfaces, install Swellseal® 2010SW (saltwater grade) Hydro-swelling rubber waterstop. Fix securely to concrete by pinning. Overlap joints by a minimum 100mm. To irregular concrete surfaces, gun Swellseal® Mastic WA to the concrete surface as a 10mm bead. Concrete must be dry or slightly damp, but not wet,

prior to Swellseal® Mastic WA application. Bed the Swellseal® 2010SW waterstop into the Swellseal® Mastic WA and fix securely by pinning. Overlap joins by a minimum 100mm.

Minimum concrete cover must be 75mm. Use Swellseal® Mastic WA to detail corners or as a gap filler. Any damaged sections shall be removed and repaired with either a new section of waterstop or a 20mm x 10mm bead of Swellseal® Mastic WA.

As additional protection, Swellseal® Mastic WA may be used to form a secondary waterstop around and between reinforcing starter bars.

Junction with Associated Waterproof Membranes after Concrete Placement

Bituthene Sheet Membranes

Apply Bituthene® 3000 self-adhesive sheet membrane onto the previously installed Preprufe® 300R, to overlap a minimum 150mm. Roll firmly to facilitate overlap bond and then seal the perimeter edge of Bituthene® 3000 with a 2.5mm thick x 150mm application of Bituthene® LM.

REPAIR OF DAMAGED MEMBRANE

Repair damage by wiping the membrane surface with a damp cloth to ensure the area is clean and free from contaminants. Allow to dry. Apply Preprufe® Tape centred over the damaged area and pressure roll firmly.

Any areas where Preprufe® adhesive has been damaged shall be covered with Preprufe® Tape. Remove plastic release liner from the tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe® Tape, rolling firmly. Alternatively, gently use a hot air gun or similar to activate adhesive and firmly roll the lap to achieve a watertight seal.

INSPECTION

Inspect Installed Membrane and Waterstops

Prior to release of membraned area to other trades, carryout the following visual examinations to confirm membrane integrity.

- 1) All membrane has been applied to correctly engineered blinding or formwork.
- 2) Any membrane damage sustained has been repaired using Preprufe® 300R and Preprufe® Tape.
- 3) All membrane has been installed with plain surface to blinding/formwork and adhesive surface facing to receive concrete.
- 4) All plastic release film has been fully removed from Preprufe® 300R and Preprufe® Tape.
- 5) All selvedge's have been overlapped by the correct amount and align with the selvedge guide marks printed on the Preprufe® 300R.
- 6) All selvedge overlaps are fully sealed, without wrinkles or fishmouths and have been pressure rolled.
- 7) All end laps and cut edge laps have been sealed using Preprufe® Tape and have been pressure rolled.
- 8) All corners are formed correctly and cut edges sealed using Preprufe® Tape and have been pressure rolled. Corner folds shall be well creased and cleanly folded.
- 9) All fastener penetrations have been patched using 100mm x 100mm patches of Preprufe® Tape and the patches have been pressure rolled.
- 10) Surface of Preprufe® is largely clean, free of all ponded water, concrete splashes or other contaminants.
- 11) All penetrations are detailed and sealed using Preprufe® Tape and Bituthene® LM.
- 12) All Bituthene® LM applications are cured and non tacky.
- 13) Expansion joint waterstops are located as per specification requirements,

undamaged, firmly bonded to the Preprufe® membrane and joined in a watertight manner.
14) Construction joint waterstops are located as per specification requirements, undamaged and firmly fixed to substrate.

If all examination parameters above are met, the area may be released for reinforcing installation etc.

After reinforcing installation is complete, make a final examination to identify membrane damage that may have been sustained by other trades. Any damage identified must be rectified prior to concrete placement.

In addition, immediately prior to concrete placement, ensure the membrane surface is free from standing water.

PLACEMENT OF CONCRETE

Concrete Placement Internal

Concrete shall be poured within 42 days of membrane application.

Concrete Placement External

Concrete must be placed and compacted carefully to avoid damage to the membrane. Compaction must be thorough if full waterproof integrity and membrane to concrete bond is to be achieved.

REMOVAL OF FORMWORK

Preprufe® 300R can be applied to removable formwork, such as slab perimeters, elevator and lift pits etc. Formwork must remain in place until the poured concrete has gained sufficient compressive strength to develop the surface bond.

A minimum concrete compressive strength of 10 N/mm² is recommended prior to stripping formwork supporting Preprufe®. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, a structural concrete mix with an ultimate strength of 40 N/mm², will require a concrete cure time of approximately 6 days at an average ambient temperature of 4°C, or 2 days at 21°C.

APPLICATION RECORDS

Inspection Test Plan

The applicator must maintain records for future reference, including a photographic record of each stage of application.

The application manager should draw up an ITP covering the records required, that can be used and completed by the applicators.

As a minimum requirement the following records must be maintained:

- 1) Application area
- 2) Lot numbers of all materials used
- 3) Substrate condition and faults identified
- 4) Method of rectification (by others)
- 5) Waterproofing issues, faults and rectifications raised during the application
- 6) Post application examination results:
 - All membrane has been applied to correctly engineered blinding or formwork.
 - Any membrane damage sustained has been repaired using Preprufe® 300R and Preprufe® Tape.

INSTALLATION METHOD STATEMENT

- All membrane has been installed with plain surface to blinding/formwork and adhesive surface facing to receive concrete.
- All plastic release film has been fully removed from Preprufe® 300R and Preprufe® Tape.
- All selvages have been overlapped by the correct amount and align with the selvedge guide marks printed on the Preprufe® 300R.
- All selvedge overlaps are fully sealed, without wrinkles or fishmouths and have been pressure rolled.
- All end laps and cut edge laps have been sealed using Preprufe® Tape and have been pressure rolled.
- All corners are formed correctly and cut edges sealed using Preprufe® Tape and have been pressure rolled. Corner folds shall be well creased and cleanly folded.
- All fastener penetrations have been patched using 100mm x 100mm patches of

Preprufe® Tape and the patches have been pressure rolled.

- Surface of Preprufe® is largely clean, free of all ponded water, concrete splashes or other contaminants.
- All penetrations are detailed and sealed using Preprufe® Tape and Bituthene® LM.
- All Bituthene® LM applications are cured and non tacky.
- Expansion joint waterstops are located as per specification requirements, undamaged, firmly bonded to the Preprufe® membrane and joined in a watertight manner.
- Construction joint waterstops are located as per specification requirements, undamaged and firmly fixed to substrate.

7) Inspection for damage to waterproofing following reinforcing placement.

8) Inspection immediately prior to concrete placement.

Substrate	Concrete
Substrate Comments	Insitu concrete to be cured before application of Bituthene - Min 28 days
Adhesive/Primer	
Bituthene primer	Yes
Basesheet	
Bituthene	Yes
Preprufe	No
Capsheets	
Nuraply 3PTM	Yes

INSTALLATION METHOD STATEMENT

SAFE2TORCH CHECK LIST (PRIOR TO BASE SHEET INSTALLATION)

It is recommended that anyone preparing a specification or applying a membrane should complete this check sheet and if any boxes are ticked avoid the use of a direct torch-on application in these areas.

Project name: _____
 Form completed by: _____
 Company: _____
 Area ready: _____
 Applicator _____

Decks and Insulation	X / ✓
Timber / Other combustible materials.	
Metal deck (refurbishment) where old materials may accumulate in the troughs.	
Insulation – unless specifically designed and tested for use with torch-on membranes.	
Details	X / ✓
Expansion joints with voids and/or combustible fillers.	
Bitumen or timber fillets.	
Detail under all abutments to roof tiles, slates, and roofing iron.	
All timber substrates.	
Change in level details with fixed timber or plastic fascia and/or all soffits, gutters or restricted spaces.	
Windowsills and frames, door sills, louvered vents, air ducts, intakes, and outtakes.	
Junctions to existing waterproofing with flammable insulation/deck materials.	
Vulnerable plastic curbs, domes, pipes, and the like.	
Working when in close proximity to potentially flammable coatings and shrinkwrap.	
Cladding and roofing underlays.	
Working in close proximity to stored chemicals, flammable liquids and explosives.	
Existing weathering components with concealed flammable materials?	X / ✓
Timber, DPC or sarking membranes beneath fixed metal capping systems.	
Existing kitchen extraction plant coated in oils or fats.	
Flammable wrapping to trunking/ducting/bitumen sheet rolls and roll inserts.	
Timber cladding.	
Existing metal or plastic copings/capping's.	

Notes

Signed:

Date:

INSTALLATION METHOD STATEMENT

Preprufe 300R

BITUTHENE®/PREPRUFE® CONCRETE SUBSTRATE READINESS CHECKLIST

Project name: _____
Form completed by: _____
Company: _____
Area ready: _____
Applicator _____

	X/✓
Concrete cured with curing membranes removed. Concrete substrate contains less than 5% moisture content.	
Cavities and cracks filled with repair mortar, flushed off and cured.	
Waterstop installed to construction joints as per specification – located 75mm from rebar.	
Concrete surface firm with any soft concrete or laitance removed.	
All protrusions removed. Surface free from foreign matter.	
Mortar or bitumen fillets to all upstands and smooth 5mm radius to all external edges.	
If terminating into a chase, pre-form the chase and ensure it's straight and 20mm deep.	
Substrate clean, firm, and suitable condition for laying the Nuralite system.	

Notes

Signed:

Date:

INSTALLATION METHOD STATEMENT

Preprufe 300R

BITUTHENE®/PREPRUFE® INSTALLED PRODUCT CHECKLIST ON CONCRETE SUBSTRATE

Project name: _____
 Form completed by: _____
 Company: _____
 Area ready: _____
 Applicator _____

X / ✓

Concrete Substrate checklist completed before work commenced.	
Any movement joints installed to approved specification/detail.	
Mortar/concrete fillets fitted to all internal junctions and corners chamfered at a 45°.	
All corners and upstands incorporate reinforcing or under flashing.	
Under-slab membrane extends beyond footing and protected until vertical membrane installed.	
Side laps and end laps fully bonded and seamed. Bleed visible on all joints where applicable.	
All penetrations installed to specification including under/over flashings.	
Junction of the floor and wall membranes installed to specification fully bonded and watertight.	
All non-standard details installed as per pre-approved specification (attach approved drawings).	
Any mechanical damage to membrane repaired to specification.	
Membrane termination completed to approved detail.	
Suitable drainage system installed below footing as per specification.	
Membrane protection boards installed correctly.	
Membrane fully adhered to substrate with no bridging, bubbling, or delaminating.....	
Overall installation free of wrinkles, bubbles, creases, and splits.	

Notes

Signed:

Date:



INSTALLATION METHOD STATEMENT

Preprufe 300R

BITUTHENE®/PREPRUFE® CHECKLIST FOR PROJECT SIGNOFF

Project name: _____
Form completed by: _____
Company: _____
Area ready: _____
Applicator: _____
Product used: _____

X/√

Under flashings installed to all corners and upstands.	
Drains & overflows installed to specification and watertight.	
Nuraflux adhesive used in correct quantities. Membrane fully adhered to substrate with no evidence of bubbles or lifting.	
In two-layer system, Cap sheet and base sheet fully bonded together, no areas of delamination.	
Cap sheet side laps and end laps fully bonded and tidily seamed off.	
No sign of overheating/excessive bitumen bleed from laps (over 2-3mm).	
Cap sheet and base sheet laps offset satisfactorily. No three-layer lap build-ups.	
Overall installation free of wrinkles, creases, and splits.	
All penetration details completed to specification including under/over flashing.	
All non standard details installed as per pre-approved specifications. (attach approved drawing)	
Any damage to cap sheet repaired to specification.	

Remedial action required:

Signed: _____
Date: _____

.....
The information in this product Method Statement is based on Nuralite Waterproofing Ltd experience and testing. It represents the latest information available at the time of printing, but no guarantee of its accuracy is made or implied, nor responsibility taken for use to which this information may be put. We reserve the right to alter or up-date information parameters and formulations at any time without notice.

INSTALLATION METHOD STATEMENT

Preprufe 300R

DETAILS

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gcp applied technologies

Bituthene Primer
 Bituthene 3000 membrane
 Nuradrain protection board
 Bituthene 4000 reinforcing strip
 Bituthene LM fillet
 Adcor 500S Waterstop
 Preprufe 300R
 Geo-textile membrane over drainage pipe to avoid silting
 Drain with falls of greater than 1:200 and maintainable
 Bituthene LM
 Preprufe Tape
 Preprufe 300R
 Compacted base course

NURALITE FLAT ROOFS BUILT RIGHT	Nuralite Waterproofing Ltd. 850 Leoni Lakeside Ave, Mt Wellington, Auckland 0600 987 754 info@nuralite.co.nz www.nuralite.co.nz	All applications to be installed by an authorized nuralite applicator. All materials to be applied in accordance with standard published installation instructions and product data sheets should be consulted at all times. This drawing is for comment & approval it must not be used for construction until authorized by the site engineer or other relevant technical expert. This detail drawing is to be used only as a part of the nuralite specification package. All drawings are subject to copyright. Unauthorised use is prohibited. © NURALITE WATERPROOFING LTD.	PROJECT: BITUTHENE/PREPRUFE 300R
			DESCRIPTION: FLOOR SLAB AT FOOTING LEVEL
		SCALE: NTS	PREPARED BY: New
		REVISION: Rev E	DATE: OCT 20
			DWG NO.: BI/PR.001

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gcp applied technologies

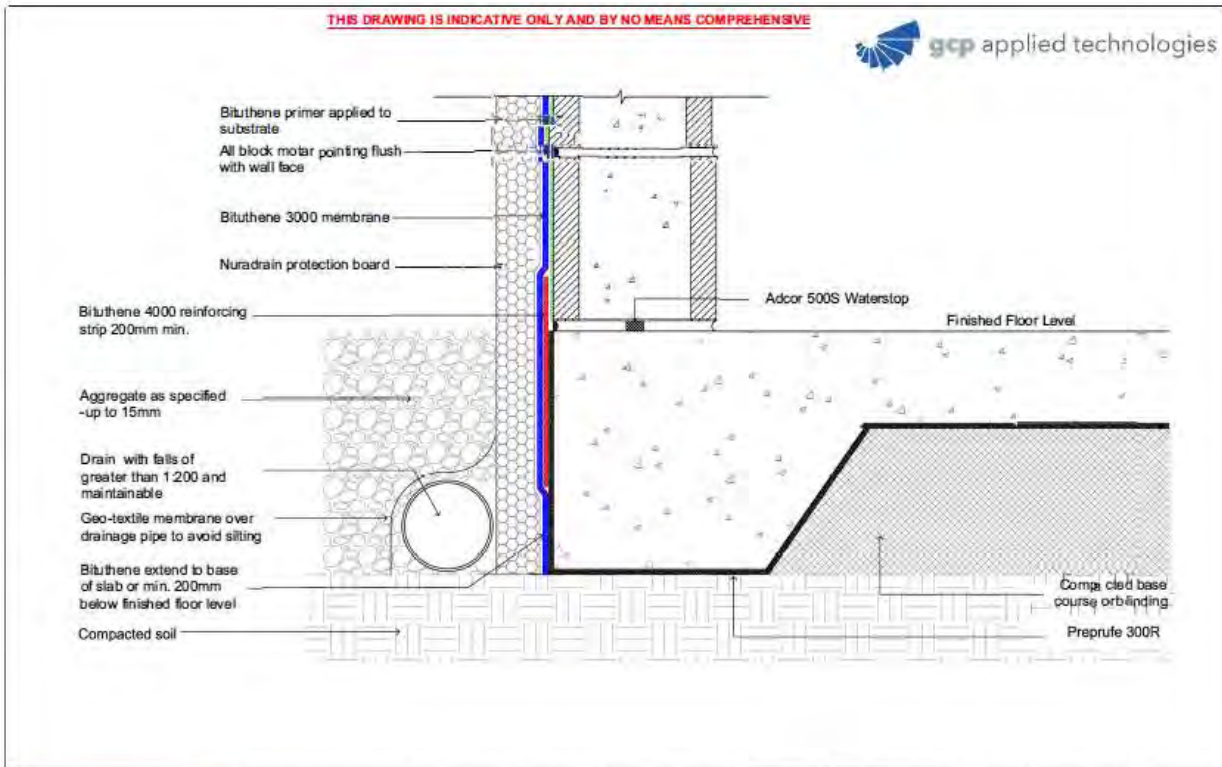
Bituthene Primer
 Bituthene 3000 membrane
 Nuradrain protection board
 Bituthene 4000 reinforcing strip
 Bituthene LM fillet
 Adcor 500S Waterstop
 Preprufe 300R
 Geo-textile membrane over drainage pipe to avoid silting
 Extend to base of footing or 200mm below FFL
 Drain with falls of greater than 1:200 and maintainable
 Bituthene LM
 Preprufe 300R
 FINISH FLOOR LEVEL


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			DESCRIPTION: STRUCTURAL SLAB
		SCALE: NTS	PREPARED BY: New
		REVISION: Rev E	DATE: OCT 20
			DWG NO.: BI/PR.002



INSTALLATION METHOD STATEMENT

Preprufe 300R



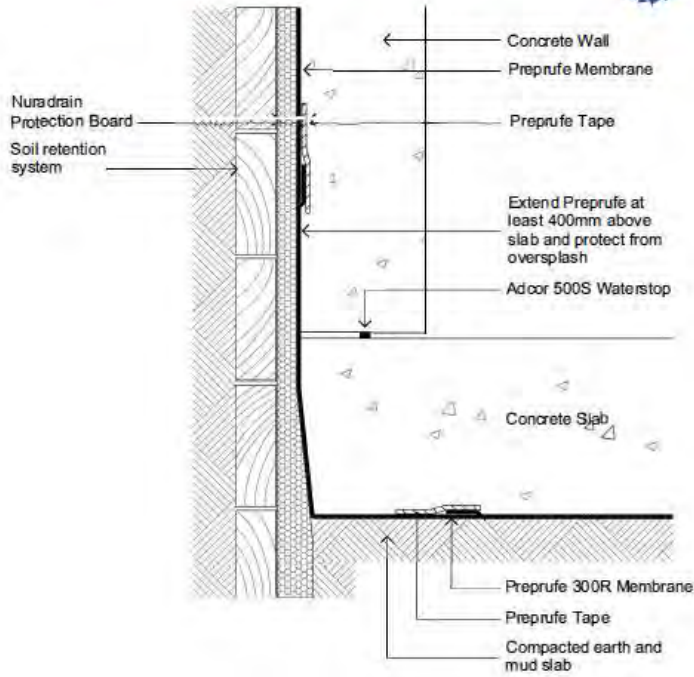
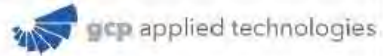
 <p>NURALITE FLAT ROOFS BUILT RIGHT</p>	<p>Nuralite Waterproofing Ltd. 800 Lees Lakeside Ave, Mt Wellington, Auckland 0200 587 754 info@nuralite.co.nz www.nuralite.co.nz</p>	<p><i>All applications to be installed by an authorized nuralite applicator. All materials to be applied in accordance with standard published installation instructions and product data sheets should be consulted at all times. This drawing is for comment & approval it must not be used for construction until authorized by the site specifier or other relevant technical experts. This detail drawing is to be used only as a part of the nuralite specification package.</i></p> <p><i>All drawings are subject to copyright. Unauthorised use is prohibited.</i></p> <p>© NURALITE WATERPROOFING LTD.</p>	<p>PROJECT: BITUTHENE and PREPRUFE 300R</p>					
			<p>DESCRIPTION: TANKING AROUND BASEMENT FOOTING</p>					
			<table border="1"> <tr> <td>SCALE: NTS</td> <td>PREPARED BY: Ngw</td> <td>DATE: OCT 20</td> <td>CDWG No: BMPR.003</td> </tr> <tr> <td>REVISION: Rev E</td> <td></td> <td></td> <td></td> </tr> </table>	SCALE: NTS	PREPARED BY: Ngw	DATE: OCT 20	CDWG No: BMPR.003	REVISION: Rev E
SCALE: NTS	PREPARED BY: Ngw	DATE: OCT 20	CDWG No: BMPR.003					
REVISION: Rev E								



INSTALLATION METHOD STATEMENT

Preprufe 300R

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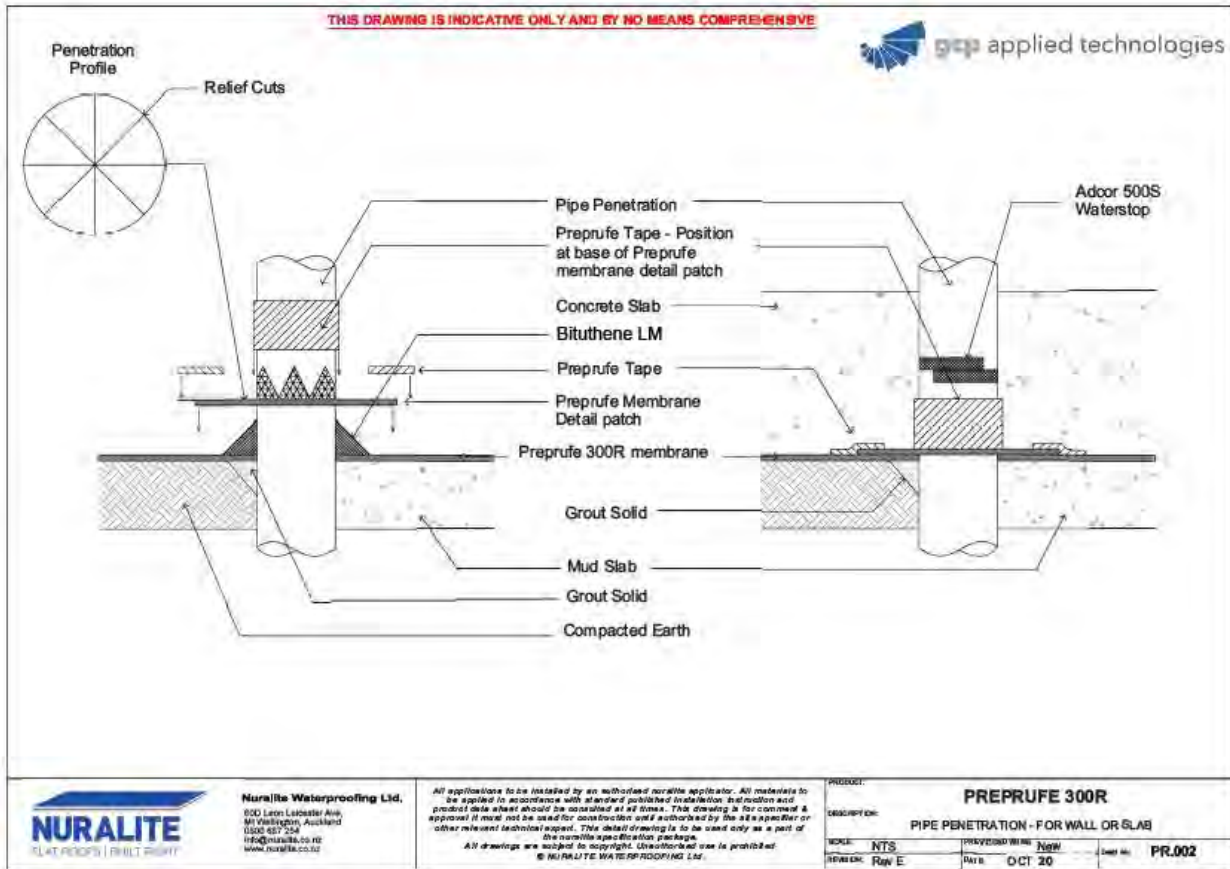


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PROJECT:		PREPRUFE 300R	
DESCRIPTION:		BLIND SIDE WALL TO SLAB TIE-IN	
SCALE:	NTS	PREPARED BY:	NEW
REVISION:	Rev E	DATE:	OCT 20
		INFO NO.:	PR.001

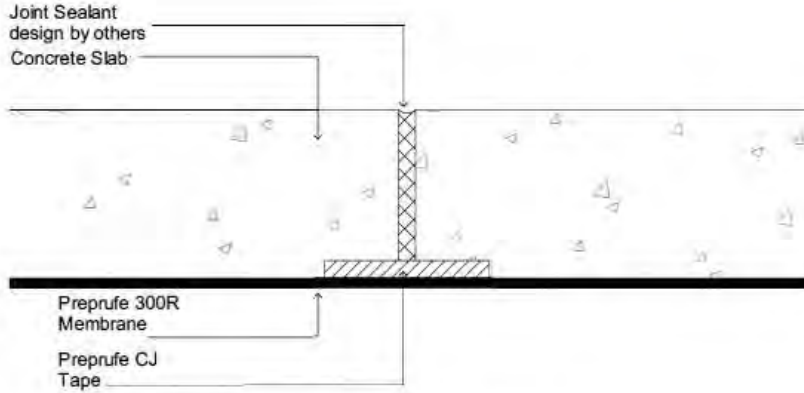
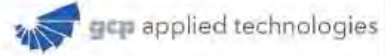




INSTALLATION METHOD STATEMENT

Preprufe 300R

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NOTE: FOR JOINTS WITH EXPECTED MOVEMENT NOT TO EXCEED 13mm

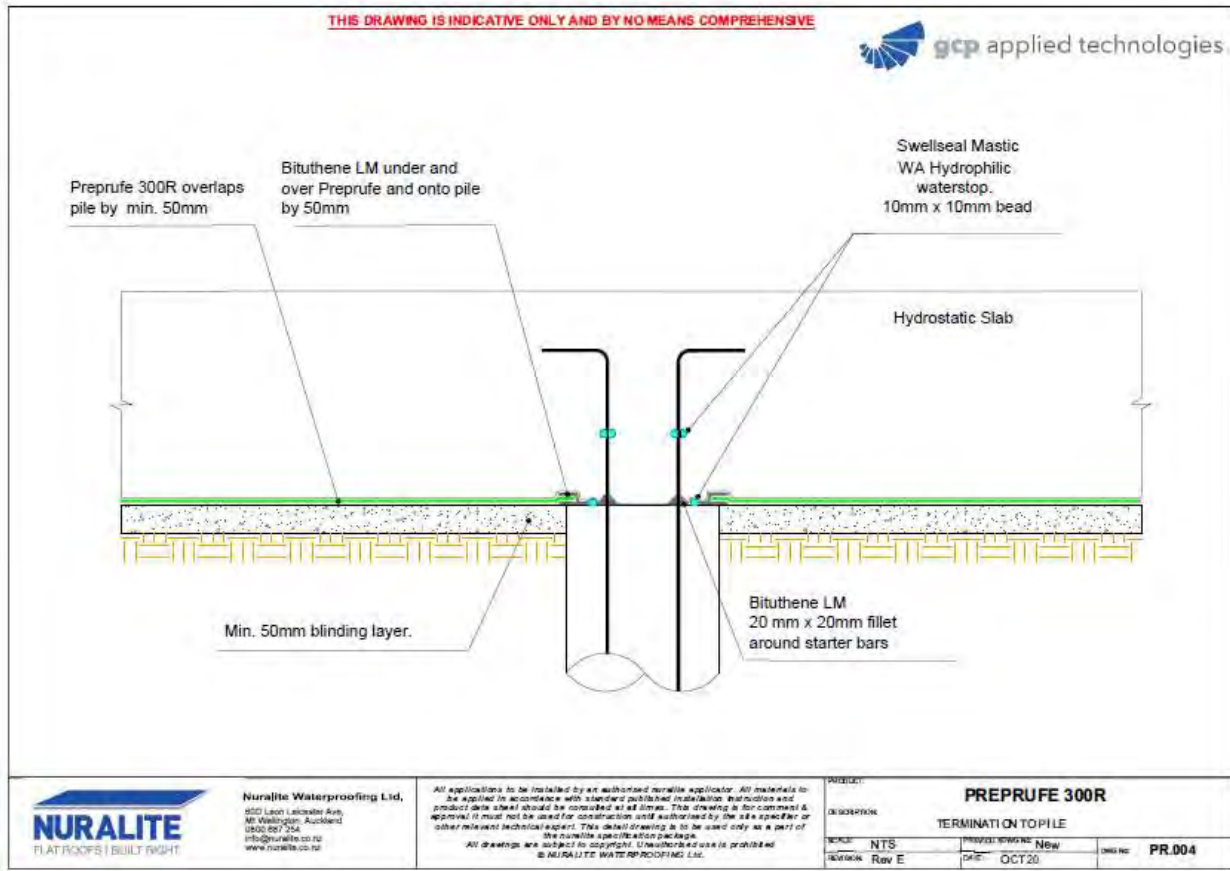


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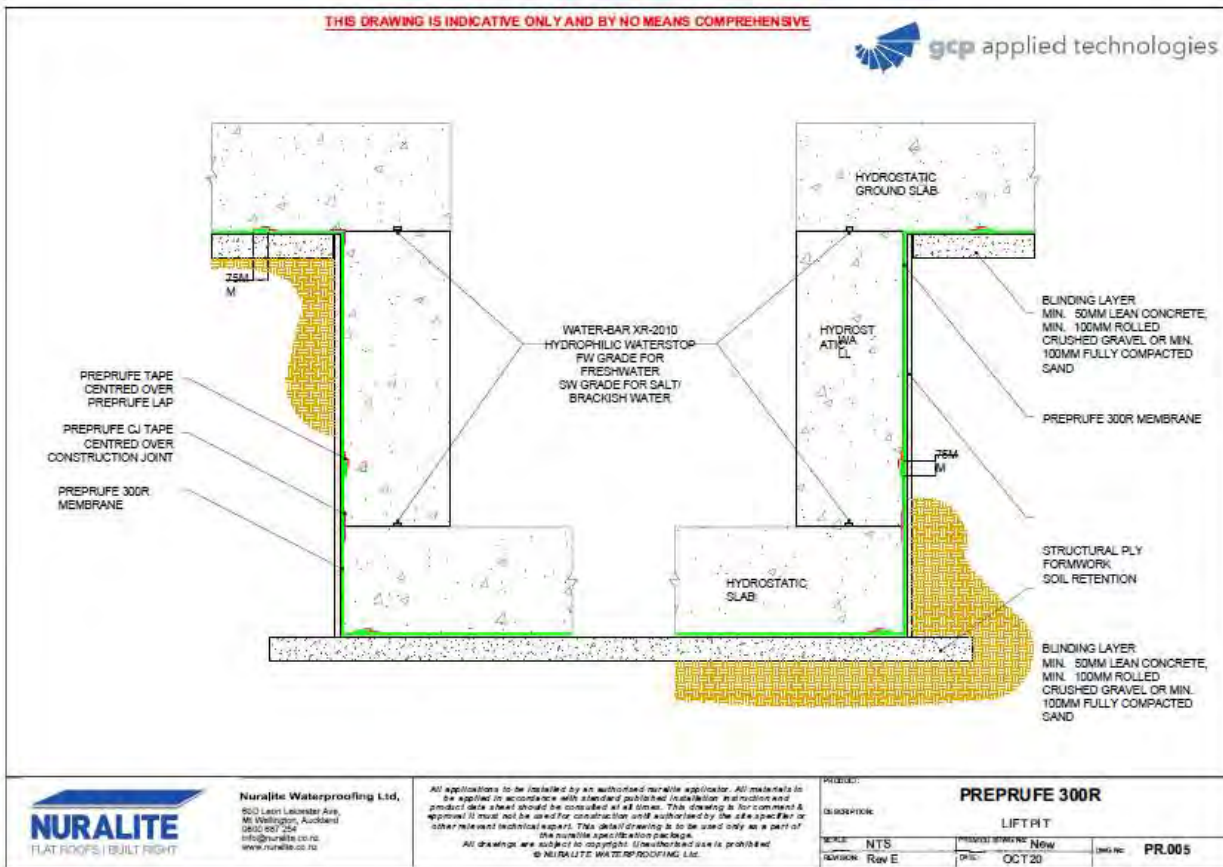
PROJEC			
PREPRUFE 300R			
DESCRIPTION			
JOINT-PREPRUFE WATERPROOFING SYSTEM			
SCOPE	NTS	PROJECT/PROG	New
REVISION	Rev E	DATE	OCT 20
		DWG. NO.	PR.003





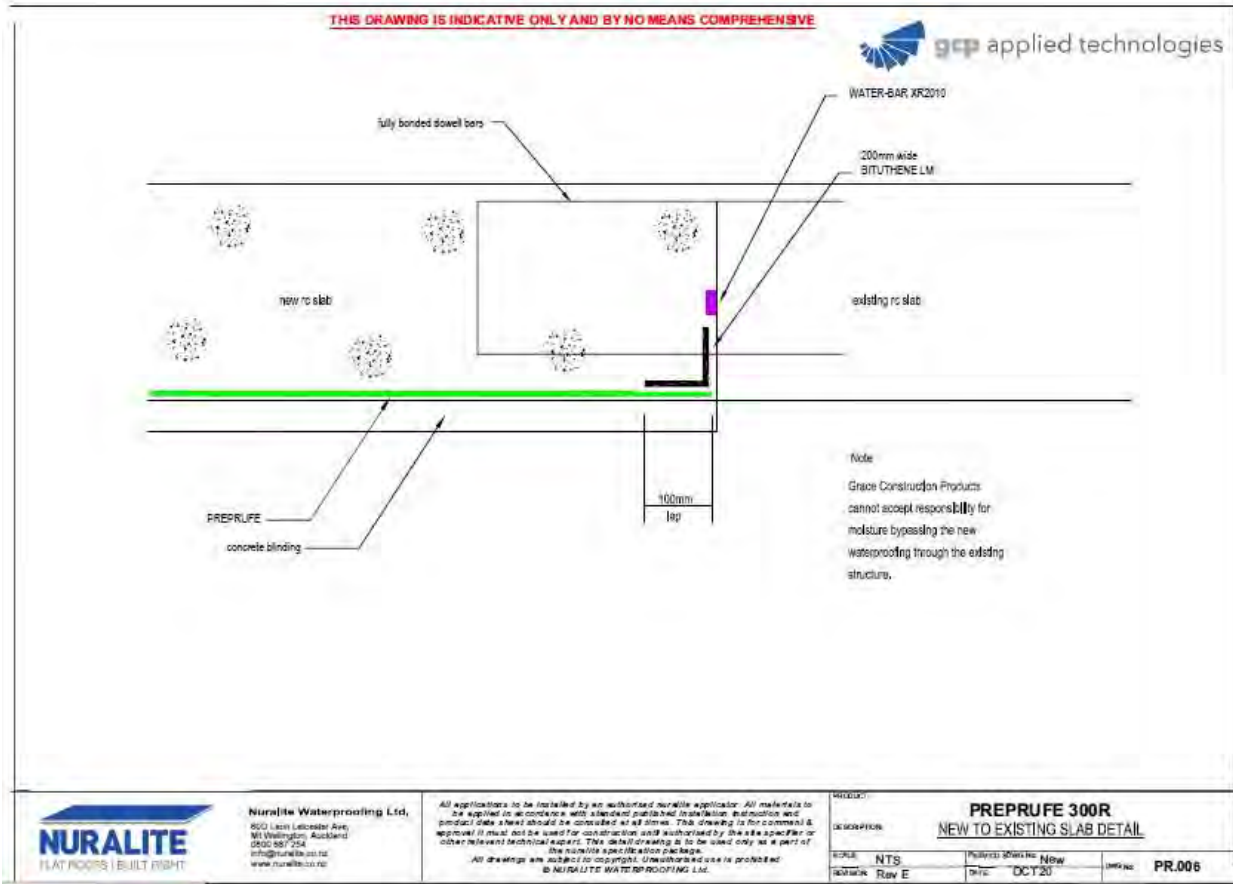
INSTALLATION METHOD STATEMENT

Preprufe 300R



INSTALLATION METHOD STATEMENT

Preprufe 300R



4161T Thermakraft Underlays, Foils, DPC, DPM, & Tapes

The logo for Thermakraft, featuring the word "Thermakraft" in white text on a red rectangular background.

Thermakraft Ltd

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info@thermakraft.co.nz

www.thermakraft.co.nz

SUPPORTING DOCUMENTS

CoverTek 401 - Data Sheet

Ref 27108. Uploaded 11 Jun 2021

Purpose: Performance

Covertex 401 - Installation Guide

Ref 13991. Uploaded 1 Oct 2020

Purpose: Installation



Product Data Sheet

COVERTEK 401

Self-supporting synthetic roof underlay

Covertek 401 is an affordable lightweight roof underlay designed to keep water out and allow moisture to escape. Covertek 401 is a more affordable option if your project does not require a fire-retardant underlay. It is stable, shrink resistant, easy to handle and easy to install.

Covertek 401 comes in four roll sizes:

401	1350mm wide	18.6m long	25m ² coverage*
401	1350mm wide	37m long	50m ² coverage*
401	1350mm wide	55m long	75m ² coverage*
401 Wide	2700mm wide	33.4m long	90m ² coverage*

* **Note:** m² is the roll size for actual coverage, allow for laps and joins.

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Covertex 401

Self-Supporting Synthetic roof underlay

Scope of Use

- Suitable with masonry tile, metal tile or profiled metal roof cladding.
- Suitable for timber or steel framed buildings.
- Self-supporting in roof pitch application greater than or equal to 10 degrees (Refer to installation guide)
- Will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended.
- Covertex 401 may be installed during adverse conditions (rain/snow) without affecting durability or performance.
- Suitable for use under dark coloured roofs.

General

- Covertex 401 is NOT fire retardant.
- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in a well ventilated area. Recommended minimum 7 days.
- Tear resistant and strong.

Limitations

- Cannot be used as a wall underlay.
- Must NOT be exposed to the weather or UV for more than 7 days.

Compliance

Designed for use as a roof underlay within the following scope:

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with regards to building height and floor plan area.
- Situated in NZS3604 Wind Zones up to, and including, 'Extra High' (ROOF ONLY).
- Refer BRANZ Appraisal No 943 (2016) for full details.

Durability

Contributes to meeting the Performance Requirements of NZBC Clauses B2, Durability (B2.3.1 (a) 50 years, B2.3.1 (b) 15 years and B2.3.2), E2 External Moisture E2.3.2), and F2 Hazardous Building Materials F2.3.1, providing:

- It is not damaged.

- Is installed in accordance with instructions.
- Is not left exposed for more than 7 days (roof), same day coverage recommended.
- Is installed by or under guidance of Licensed Building Practitioners.
- Is compatible with cladding system used. (**Note:** specifiers and product users must test for roof cladding system compatibility with the underlay before installation.)

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Ceiling penetrations and entry of warm air into roof cavities.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Low pitched roof.
- Bulk insulation.
- Building structures ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer MRM Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ MRM Roofing Code of Practice).

Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at thermakraft.co.nz or call **0800 806 595**.

Property Performance

NZBC E2/AS1 Table 23 (NZS2295) Wall Underlay Properties	Absorbency	Vapour Resistance	pH of Extract	Shrinkage	Water Resistance
Property Performance Requirement	≥ 150gsm	≤ 0.5 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	≥ 100mm
Property Performance	Pass	Pass	Pass	Pass	Pass

Thermakraft Limited / 0800 806 595

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Installation Guide

COVERTEK 401

Self-supporting synthetic roof underlay

Covertek 401 is an affordable light-weight roof underlay designed to keep water out and allow moisture to escape. Covertek 401 is a more affordable option if your project does not require a fire-retardant underlay. It is stable, shrink resistant, easy to handle and easy to install.

Product Usage

Covertek 401 is a synthetic self-supporting roof underlay designed as a means of managing condensation, water vapour transfer and water ingress in roof applications. Constructed using a microporous water-resistant film sandwiched between two layers of spun-bonded polyolefin. Covertek 401 is absorbent and breathable.

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thermakraft.co.nz



Installation Guide

Application Method

Long-run metal roofing/vertical or horizontal installation method

- Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings on timber framed structure. Fixing at 300mm centres. Fixing types and requirements for steel framed structure can be found in the MRM Code of Practice.
- Refer to table below to determine underlay support requirements.

Roof Pitch	Span	Underlay Support Required	
		Horizontally Installed	Vertically Installed
≥ 10°	> 1200mm	Yes	Yes
	≤ 1200mm	No	No
< 10° (Min 3°)	> 1200mm	Yes	Yes
	≤ 1200mm	No	Yes

- Covertex 401 upper sheet lapped over lower sheets (shiplap) to ensure water is shed to the outer face.

Note: Covertex 401 can move downwards. To prevent this, it must be "Captured" by the fastenings at each purlin. Horizontal fix must not be used on purlin distance greater than 1200mm to allow for 150mm laps.

- Must be laid firmly (tight/taut) without creases. All laps either vertical or horizontal must be a minimum of 150mm lap.
- When underlay support is required, Thermakraft recommend using AUSMESH Safety Mesh, AUSNET hexagonal netting or Thermastrap 201.
- Covertex 401 can be installed above the battens or purlins for profiled metal roof claddings and otherwise in accordance with NZBC E2/AS1.
- If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice), use Thermakraft Aluband window sealing tape or Thermakraft White General Purpose Tape.
- Covertex 401 will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended. DO NOT over expose the product for more than 7 days.
- Covertex 401 may be unwound to the full length from the gutter to the ridge. However, when ridge ventilation is required Covertex 401 may be

terminated or slit at the ridge purlin to allow a free passage of air.

- Covertex 401 must NOT overhang the gutter line by more than 20 mm, or if eaves flashings are used, terminate on the upper side of the flashing. More details can be found in the MRM Code of Practice.
- Flue penetrations must have a minimum distance of 50mm from Covertex 401 (refer to NZ Metal Roof and Wall Cladding Code of Practice 10.11.5).
- Covertex 401 must be free of tears and punctures, fit tightly and be lap taped around all penetrations (except flue penetrations), to provide drainage for any condensation, or surface water from leaks.

Note: Do not use Aluband on penetrations where Polybutene water pipes have been installed. Refer Pipe Manufacturers for instructions on sealing penetrations.

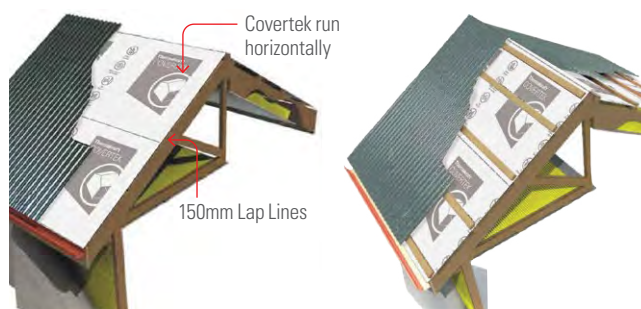
Concrete/metal tile roofing

- Covertex 401 must be laid over rafters prior to fixing the tile battens. The maximum span between rafters for Covertex 401 is 1200mm. Masonry tile roofs must have antiponding boards in accordance with NZBC E2/AS1.
- Installed Covertex 401 may be laid over the top of the antiponding boards and draped into the gutter by no more than 20mm. Antiponding boards must be treated in accordance with NZS 3604.
- Covertex 401 must be installed by a licensed building practitioner.

Application Tips

Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.

Corrugated roofing:



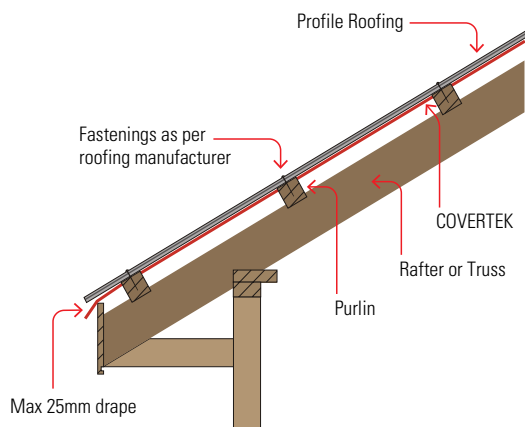
Covertex 401 can be direct fix or cavity fix and must be installed in a manner that prevents ponding of water and span no more than 1200mm.

Continued over...

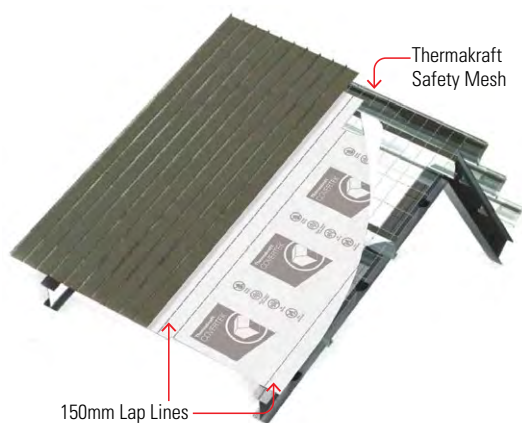
Installation Guide

Long run metal roofing:

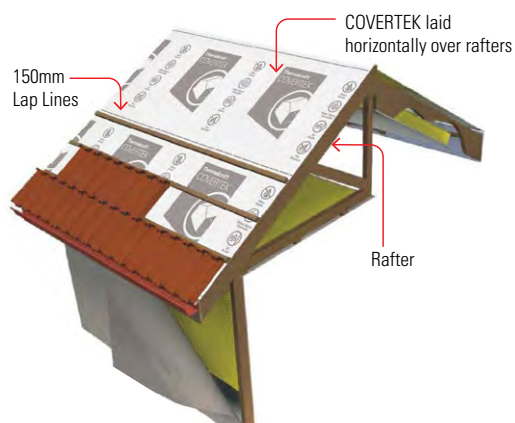
Wooden construction



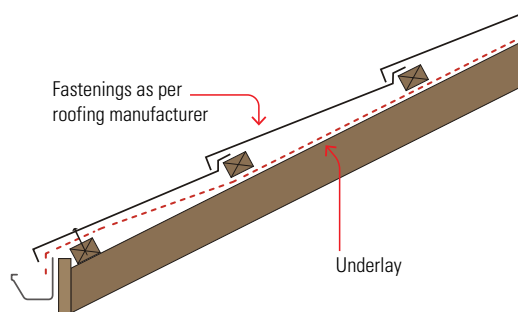
Steel construction



Tile roofing

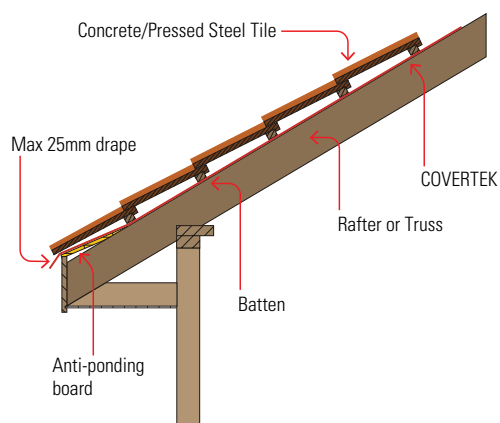


Metal tile installation



Concrete/metal tile roofing:

Tile roofing



Handling and Storage

Covertex 401 must be handled with care to prevent damage such as tearing and roll deformation.

The product must be stored under cover well away from direct moisture, rainfall contact and sunlight (UV). Care should be taken not stack other materials on top of the product.

Thermakraft Limited / 0800 806 595

The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found on the website. E&OE.

4171HR James Hardie® Rigid Air Barriers



James Hardie

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www.jameshardie.co.nz

SUPPORTING DOCUMENTS

BRANZ Appraisal 611 - James Hardie Rigid Air Barriers

Ref 19035. Uploaded 14 Jan 2021

Purpose: Performance

James Hardie Rigid Air Barriers Installation Manual December 2020

Ref 19039. Uploaded 14 Jan 2021

Purpose: Installation

RAB Installation Checklist

Ref 10382. Uploaded 28 Jul 2020

Purpose: Installation



BRANZ Appraised

Appraisal No. 611 [2011]

JAMES HARDIE RIGID AIR BARRIERS

Appraisal No. 611 [2011]

Amended 4 October 2019



BRANZ Appraisals

Technical Assessments of products for building and construction.



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Auckland

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BRANZ

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Product

- 1.1 James Hardie Rigid Air Barriers are a range of rigid wall underlay materials including RAB™ Board and HomeRAB™ Pre-Cladding. They are sealed fibre cement sheets designed for use as rigid wall underlay behind wall cladding systems. HomeRAB™ Pre-Cladding and RAB™ Board are manufactured using a medium density fibre cement formulation.

Scope

- 2.1 HomeRAB™ Pre-Cladding has been appraised for use as a rigid wall underlay and temporary weather-protecting sheathing on timber framed buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - with absorbent wall claddings directly fixed to framing; and,
 - with non-absorbent wall claddings directly fixed to framing with a flexible wall underlay over the HomeRAB™ Pre-Cladding; and,
 - with absorbent and non-absorbent wall claddings installed over a nominal 20 mm drained cavity; and,
 - with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
 - situated in NZS 3604 Wind Zones up to, and including Very High.
- 2.2 RAB™ Board has been appraised for use as a rigid wall underlay and temporary weather-protecting sheathing on timber framed buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - constructed with timber framing, or timber frame infill complying with the NZBC; and,
 - with absorbent wall claddings directly fixed to framing; and,
 - with non-absorbent wall claddings directly fixed to framing with a flexible wall underlay over the RAB™ Board; and,
 - with absorbent and non-absorbent wall claddings installed over an nominal 20 mm drained cavity; and,
 - with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
 - when used in conjunction with wall cladding systems suitable for use with maximum wind pressures for structural and weathertightness design of 1.0 kPa Serviceability Limit State [SLS] and 1.5 kPa Ultimate Limit State [ULS] where studs are at maximum 600mm centres, and 3.0 kPa SLS and 4.5 kPa ULS where studs are at maximum 400 mm centres.

[Note: James Hardie Rigid Air Barriers can be used to provide structural bracing. RAB™ Board can also be used in fire resistance rated construction. These aspects have not been assessed by this Appraisal and are outside its scope.]



- 2.3 RAB™ Board has also been appraised for use as a rigid wall underlay and temporary weather-protecting sheathing on timber framed buildings within the following scope:
- Buildings with a building height not exceeding 25 m; and,
 - constructed with timber framing complying with the NZBC; and,
 - with inter-storey deflections designed for up to height/180 of horizontal in-plane movement during seismic SLS events (based on a 3 m inter-storey height); and,
 - with absorbent and non-absorbent wall claddings installed over a nominal 20 mm drained cavity; and,
 - when used in conjunction with either James Hardie or other cladding systems suitable for use with maximum wind pressures for structural and weathertightness design of 1.0 kPa Serviceability Limit State (SLS) and 1.5 kPa Ultimate Limit State (ULS) where studs are at maximum 600mm centres, and 3.0 kPa SLS and 4.5 kPa ULS where studs are at maximum 400 mm centres.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, James Hardie Rigid Air Barriers, 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 B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. James Hardie Rigid Air Barriers meet the requirements for loads arising from earthquake and wind [i.e. B1.3.3 (f) and (h)]. See Paragraphs 8.1 - 8.7.

Clause B2 DURABILITY: Performance B2.3.1[a], not less than 50 years, B2.3.1[b], 15 years and B2.3.2. James Hardie Rigid Air Barriers meet these requirements. See Paragraphs 9.1 - 9.3.

Clause C3 FIRE AFFECTING AREAS BEYOND THE SOURCE: Performance C3.5 and C3.7.

When used as part of an external wall system, James Hardie Rigid Air Barriers will contribute to meeting this requirement. See Paragraphs 11.2 and 11.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, James Hardie Rigid Air Barriers will contribute to meeting this requirement. See Paragraphs 12.1 and 12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. James Hardie Rigid Air Barriers meet this requirement and will not present a health hazard to people.

Technical Specification *[section reformatted]*

- 4.1 System components and accessories for James Hardie Rigid Air Barriers, which are supplied by James Hardie New Zealand Limited are:
- **HomeRAB™ Pre-Cladding** is a 4.5 mm thick fibre cement sheet, manufactured from a cellulose fibre cement formulation. It is produced in sheet material form with 'HomeRAB' printed on the front face. The sheets are formed, cut to length, and then cured by high pressure autoclaving. The sheet is coated on the front face and four edges with a green tinted water repellent sealer. HomeRAB™ Pre-Cladding is available in sizes of 1200 mm wide and 2450, 2750 and 3000 mm long. It is manufactured to conform to the requirements of AS/NZS 2908.2.
 - **RAB™ Board** are 6.0 mm or 9.0 mm thick fibre cement sheets, manufactured from a cellulose fibre cement formulation. It is produced in sheet material form. The sheets are formed, cut to length, and then cured by high pressure autoclaving. The sheet is coated on the front face and four edges with a green tinted water repellent sealer. RAB™ Board is available in sizes of 1200 mm wide and 2450, 2750 and 3000 mm long. It is manufactured to conform to the requirements of AS/NZS 2908.2 and is classified as a Type A, Category 2 fibre cement product.

Accessories

- **HomeRAB™ Pre-Cladding and RAB™ Board horizontal flashings** - uPVC, available in 3000 mm lengths.



- 4.2 System components and accessories for James Hardie Rigid Air Barriers, which are supplied by the building contractor are:
- **Joint sealing tape and flexible sill and jamb flashing tape system** - 3M™ All Weather Flashing Tape 8067 [3M New Zealand Ltd] and SUPER-STICK Flexible Flashing Tape [Marshall Innovations Ltd].
 - **HomeRAB™ Pre-Cladding and RAB™ Board 6.0 mm sheet fixing** - gun driven 40 mm or 50 x 2.8 mm hot-dip galvanised or ring shank stainless steel round head nails, or hand driven 40 x 2.8 mm hot-dip galvanised or ring shank stainless steel HardieFlex™ nails.
 - **RAB™ Board 9 mm sheet fixing** - 50 x 2.8 mm hot dip galvanised or stainless steel round drive nails. [Note: Hot-dip galvanising must comply with AS/NZS 4680 and stainless steel must be Grade 304 or 316.]
 - **Horizontal Z Flashing** - uPVC, galvanised steel or aluminium

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. James Hardie Rigid Air Barriers 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. The sheathing must always be carried on edge. uPVC flashings and jointers must be protected from direct sunlight and physical damage, and should be stored flat and under cover.
- 5.2 Other accessories must be stored so they are kept clean, dry and undamaged.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Installation Manual for James Hardie Rigid Air Barriers. The Installation Manual must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Installation Manual and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

- 7.1 Timber wall framing behind James Hardie Rigid Air Barriers must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 For HomeRAB™ Pre-Cladding installations, timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 1200 mm centres. [Note: The timber framing must also be suitable for the selected wall cladding. Refer to the selected cladding system's Technical Literature for specific framing requirements.]
- 7.3 For RAB™ Board installations, timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170 considering local factors. In all cases studs must be at maximum 600 mm centres for buildings situated in wind pressures up to 1.5 kPa ULS, and at maximum 400 mm centres for buildings situated in wind pressures greater than 1.5 kPa ULS up to 4.5 kPa ULS. Dwargs must be fitted flush between the studs at maximum 1200 mm centres. [Note: The timber framing must also be suitable for the selected wall cladding. Refer to the selected cladding system's Technical Literature for specific framing requirements.]



7.4 Timber wall framing where James Hardie Rigid Air Barriers are joined must be 45 mm minimum finished width.

James Hardie Rigid Air Barrier Set Out

7.5 James Hardie Rigid Air Barriers must be installed vertically. At the base of the wall, the sheet must hang below the bottom plate a minimum of 15 mm. Sheet overhang where used with timber floors must hang below timber subfloor members a minimum of 15 mm, up to a maximum of 40 mm.

7.6 In all cases, HomeRAB™ Pre-Cladding and RAB™ Board sheet edges must be supported and fixed to the wall framing.

General

7.7 James Hardie Rigid Air Barriers are intended for use as rigid wall underlays fixed over timber framed walls in order to support wind pressures, and to act as a secondary barrier to wind-driven rain.

Temporary Weather Protection

7.8 Commencing from installation, James Hardie Rigid Air Barriers must not be exposed to the weather for more than 180 days.

7.9 James Hardie Rigid Air Barriers may be used as a temporary weather protecting sheathing to allow the insulation and internal lining of the building to proceed before the wall cladding is installed. To achieve temporary weathertightness, all joints, internal and external corners of the James Hardie Rigid Air Barriers must be sealed, the roof cladding and soffit linings must be installed, the flexible sill and jamb flashing tape system must be installed around the window and door openings, and the window and door joinery must be installed complete with head flashings and airseals. The timber wall framing moisture content must not exceed that specified by the internal lining system supplier at the time of the insulation installation and internal lining application.

7.10 James Hardie Rigid Air Barriers are suitable for use under wall claddings as a rigid wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that non-absorbent claddings must not be installed directly over the James Hardie Rigid Air Barriers.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Rigid Wall Underlay Properties	Property Performance Requirement	James Hardie Rigid Air Barriers Actual Property Performance
Vapour Resistance	< 7 MN s/g	0.6 MN s/g
Water Resistance	> 20 mm	Pass

Structure

Mass

8.1 The mass of HomeRAB™ Pre-Cladding is approximately 6.5 kg/m² at equilibrium moisture content. The mass of 6.0 mm RAB™ Board is approximately 8.6 kg/m² at equilibrium moisture content. The mass of 9.0 mm RAB™ Board is approximately 13 kg/m² at equilibrium moisture content. This mass must be added to the selected wall cladding system mass when determining the overall wall cladding mass in terms of NZS 3604.

Wind Zones

8.2 HomeRAB™ Pre-Cladding is suitable for use in all Wind Zones of NZS 3604, up to, and including, Very High. The sheets must be fixed at centres as specified in Table 2. The fixings must be positioned a minimum of 12 mm from all sheet edges, and a minimum of 50 mm horizontally and 75 mm vertically from sheet corners. The fastener heads must finish flush with the sheet surface.



Table 2: HomeRAB™

NZS 3604 Wind Zone	Framing Set Out	HomeRAB™ Pre-Cladding Nailing Centres to Studs, Plates and Dwargs
Low, Medium, High and Very High	Studs at 600 mm centres maximum and dwargs at 1200 mm centres	200 mm

8.3 RAB™ Board is suitable for use in design wind pressures up to and including 4.5 kPa ULS when used in conjunction with wall cladding systems able to resist the same face load pressures. The sheets must be fixed at centres as specified in Table 3. The fixings must be positioned a minimum of 12 mm from all sheet edges, and a minimum of 50 mm horizontally and 75 mm vertically from sheet corners. The fastener heads must finish flush with the sheet surface. Basis of Appraisal

Table 3: RAB™ Board Fixing Centres

Wind Pressure	Framing Set Out	RAB™ Board Nailing Centres to Studs, Plates and Dwargs
≤ 1.5 kPa ULS [NZS 3604 Wind Zone Very High]	Studs at 600 mm centres and dwargs at 1200 mm	200 mm
> 1.5 kPa ULS and ≤ 4.5 kPa ULS [NZS 3604 Wind Zone Extra High and above]	Studs at 400 mm centres and dwargs at 1200 mm	200 mm

Top Plate Hold Down Connections

8.4 James Hardie Rigid Air Barriers can be used as an alternative to wire dog connectors to achieve a top plate connection capacity of 4.7 kN in accordance with Fixing Type B of NZS 3604 Table 8.18. To achieve the connection strength, the HomeRAB™ Pre-Cladding and RAB™ Board sheets must be fixed along the top edge into the top plate with 50 x 2.8 mm hot-dip galvanised or ring shank stainless steel round head nails, or hand driven 40 x 2.8 mm hot-dip galvanised or ring shank stainless steel HardieFlex™ nails at 75 mm centres. The fixings must be positioned a minimum of 20 mm from the sheet edge. The fastener heads must finish flush with the sheet surface. The remainder of the sheet is fixed in accordance with Table 2 or Table 3.

Wall Cladding Fixing

8.5 The length of the selected wall cladding fixing must be increased by a minimum of the thickness of the James Hardie Rigid Air Barrier to maintain the face load strength of the wall cladding system.

Bracing

8.6 HomeRAB™ Pre-Cladding and RAB™ Board can be used to provide structural bracing. This has not been assessed by this Appraisal and is outside its scope.

Inter-storey Deflection

8.7 RAB™ Board is suitable to accommodate inter-storey deflections. When installed in accordance with the detail contained in the technical literature, RAB™ Board is capable to withstanding Serviceability Limit State [SLS] deflections up to height/180. For structures where greater inter-storey deflections are expected, a deflection head should be incorporated into design as detailed in the technical literature in conjunction with specific engineering design.



Durability

- 9.1 James Hardie Rigid Air Barriers meet code compliance with NZBC Clause B2.3.1 [a], not less than 50 years when used 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.

Serviceable Life

- 9.2 Provided they are not exposed to the weather or ultraviolet light for a total of more than 180 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, James Hardie Rigid Air Barriers are expected to have a serviceable life of at least 50 years.
- 9.3 Areas of geothermal activity and coastal locations can be very corrosive to fasteners, especially coastal locations within distances of up to 500 metres of the sea including harbours, or 100 metres from tidal estuaries and sheltered inlets in some instances. These coastal locations are defined in NZS 3604: 2011 as Zone D. For the James Hardie Rigid Air Barriers when used as a rigid sheathing in Zone D they must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot dipped galvanised steel.

Maintenance

- 10.1 James Hardie Rigid Air Barriers will not normally require maintenance. However, if damage occurs to the cladding or lining protecting the sheathing or to the sheathing itself, the repairs or replacement must be carried out to ensure the integrity of the rigid wall underlay.

Prevention of Fire Occurring

- 11.1 James Hardie Rigid Air Barrier Sheets are considered a non-combustible material and need not be separated from heat sources such as fire places, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1, C/AS2 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Vertical Fire Spread

- 11.2 James Hardie RAB™ Board has been tested to NFPA 285 and can be used to meet the requirements of NZBC Clause C3.5 with regard to external vertical fire spread when external walls are constructed to the following specifications:
- 6 or 9 mm RAB™ Board installed in accordance with the technical literature; and,
 - A cladding system comprised entirely of non-combustible components over James Hardie CLD fibre cement cavity battens; and,
 - Pink Batts R2.2 Glasswool or insulation as specified by James Hardie fitted within the framing cavity throughout the external façade.
- [Note: NZBC Clause C3.5 applies only to buildings where the building height exceeds 10 m. In these instances, the compliance of the selected cladding system with all aspects of the Building Code must be addressed by the designer.]
- [Note: Alternative insulation types specified by James Hardie have not been assessed by BRANZ and is outside the scope of this Appraisal.]
- 11.3 James Hardie RAB™ Board with 20 x 40 mm timber cavity battens and James Hardie Axon Panel cladding system has been tested to NFPA 285 and is suitable to meet the requirements of NZBC Clause C3.5 with regard to external vertical fire spread.
- [Note: James Hardie Axon Panel cladding system has not been assessed by BRANZ and is outside the scope of this Appraisal.]



- 11.4 James Hardie RAB™ Board with 20 x 40 mm timber cavity battens and James Hardie Axon Panel cladding system has been tested to NFPA 285 and is therefore considered by NZBC Acceptable Solution C/AS2 to meet the requirements of NZBC Clause C3.7 with regard to external fire spread.
- [Note: James Hardie Axon Panel cladding system has not been assessed by BRANZ and is outside the scope of this Appraisal.]

External Moisture

- 12.1 James Hardie Rigid Air Barriers must be used behind claddings that meet the performance requirements of NZBC Clause E2.
- 12.2 James Hardie Rigid Air Barriers meet the performance requirements for a rigid wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that non-absorbent claddings must not be installed directly over the James Hardie Rigid Air Barriers.
- 12.3 James Hardie Rigid Air Barriers, when installed in accordance with the Installation Manual and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.

Installation Information

Installation Skill Level Requirements

- 13.1 All design and building work must be carried out in accordance with the James Hardie Rigid Air Barriers Installation Manual and this Appraisal by competent and experienced tradespersons conversant with Rigid Air Barriers. 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

- 14.1 James Hardie Rigid Air Barriers may be cut by scoring and snapping, hand guillotine, hand or 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.
- 14.2 Sheets must be dry prior to installation. Cut edges that are left exposed must be sealed prior to installation.
- 14.3 Prior to fixing James Hardie Rigid Air Barriers, a check must be made to ensure all sheet edges will be supported by framing. At the base of the wall, the sheet must hang below the bottom plate by a minimum of 15 mm.
- 14.4 James Hardie Rigid Air Barriers must be fixed to the timber framing with 40 mm or 50 x 2.8 mm hot-dip galvanised or ring shank stainless steel round head nails, or hand driven 40 x 2.8 mm hot-dip galvanised or ring shank stainless steel HardieFlex™ nails. Refer to Table 2, Table 3 and Paragraph 8.4 for fixing centres and Paragraph 9.3 for material selection.
- 14.5 At vertical joints, James Hardie Rigid Air Barriers must be installed with a 2-3 mm gap between the sheet edges and must be supported over vertical framing. At horizontal joints between floor levels, James Hardie Rigid Air Barriers must be installed with a minimum 6 mm gap between the sheet edges and must be supported over horizontal framing. At inter-storey floor levels, James Hardie Rigid Air Barriers must not be fixed to inter-storey joists or blocking and must have a minimum 15 mm gap between the sheet edges at this point to allow for shrinkage of the framing. All horizontal joints must be flashed with a uPVC flashing.
- 14.6 Any damaged areas, such as holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with joint sealing tape.



Joint Sealing Tape Installation

- 14.7 All vertical sheet joints, internal and external corners must be covered with 3M™ All Weather Flashing Tape 8067 or SUPER-STICK flexible flashing tape. The manufacturer's instructions regarding the application temperatures for the joint sealing tapes, and the requirements for the use of adhesive primer must be followed.
- 14.8 James Hardie Rigid Air Barriers must be cleaned of dust and other surface contaminants prior to the application of the joint sealing tape to ensure adequate adhesion is achieved.

Flexible Sill and Jamb Tape Installation

- 14.9 The selected flexible sill and jamb tape flashing system must be installed in accordance with the tape manufacturer's instructions, except where varied by the James Hardie Rigid Air Barriers Installation Manual. Particular attention must be paid to the installation of the sill and jamb tapes around window and door joinery openings to ensure all exposed timber wall framing in the opening is protected.

Inspections

- 14.10 The Installation Manual must be referred to during the inspection of James Hardie Rigid Air Barriers installations. When the construction sequence is followed in accordance with Paragraph 7.10 and the Installation Manual, the BCA inspections for pre-cladding and pre-lining may be combined.

Health and Safety

- 15.1 Cutting of James Hardie Rigid Air Barriers must be carried out in well ventilated areas, and a dust mask and eye protection must be worn.
- 15.2 When power tools are used for cutting, grinding or forming holes, health and safety measures as set out in the Installation Manual must be undertaken because of the amount of dust generated.
- 15.3 Safe use and handling procedures for James Hardie Rigid Air Barriers and the components that make up the cladding system are provided in the relevant manufacturer's Installation Manual.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 16.1 Testing has been carried out by James Hardie Building Products to determine the face load pressure resistance of HomeRAB™ Pre-Cladding. Testing has also been carried out by James Hardie Building Products to determine the face load pressure resistance of RAB™ Board in conjunction with Titan Facade Panels. The testing was completed in a NATA Accredited laboratory and was observed by BRANZ. The test method and results have been reviewed by BRANZ and found to be satisfactory.
- 16.2 The resistance of James Hardie Rigid Air Barriers to water vapour transmission in accordance with AS/NZS 4200.1 and resistance to water penetration in accordance with AS/NZS 4201.4 has been completed by BRANZ.
- 16.3 Testing of specimens assembled containing James Hardie Rigid Air Barriers has been carried out to NFPA 285 by Intertek Group plc.



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Other Investigations

- 17.1 Structural and durability opinions were given by BRANZ technical experts.
- 17.2 BRANZ expert opinion on NZBC E2 code compliance for James Hardie Rigid Air Barriers was based on evaluation of all details within the scope and as stated within this Appraisal. The details contained within the Installation Manual have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for rigid wall underlays.
- 17.3 The non-combustibility of James Hardie Rigid Air Barriers have been assessed by BRANZ technical experts.
- 17.4 The Installation Manual for James Hardie Rigid Air Barriers has been examined by BRANZ and found to be satisfactory.
- 17.5 The Installation Manual for James Hardie Rigid Air Barriers has been examined by BRANZ and found to be satisfactory.

Quality

- 18.1 The manufacture of James Hardie Rigid Air Barriers has been examined by BRANZ, including methods adopted for quality control. Details regarding the composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 18.2 The quality of materials, components and accessories supplied by James Hardie New Zealand Limited is the responsibility of James Hardie New Zealand Limited. The quality control system of James Hardie New Zealand Limited has been assessed and registered as meeting the requirements of ISO 9001: 2015 by Telarc SAI Limited.
- 18.3 Quality of installation on site of components and accessories supplied by James Hardie New Zealand Limited and the building contractor is the responsibility of the installer.
- 18.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems, uPVC flashings, joint seal tapes and flexible sill and jamb tape systems in accordance with the instructions of James Hardie New Zealand Limited.

Sources of Information

- AS/NZS 1170: 2002 Structural design action - General principles.
- AS/NZS 2908.2: 2000 Cellulose-cement products - Flat sheet.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays - Methods of test - Resistance to water penetration.
- 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 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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BRANZ

Amendments

Amendment No. 1, 3 September 2013

This Appraisal has been amended to update clause changes as required by the introduction of NZBC Fire Clauses C1-C6 Protection from Fire and A3 Building Importance Levels.

Amendment No. 2, 15 December 2014

This Appraisal has been amended to replace 3.5 mm thick HomeRAB® Preclad™ Lining with 4.5 mm thick HomeRAB® Pre-Cladding. The use of James Hardie Rigid Air Barriers as an alternative to the NZS 3604 top plate hold down connections has also been included.

Amendment No. 3, 13 March 2019

This Appraisal has been amended to add 9.0 mm RAB Board sheets and to increase the construction exposure time to 180 days and inter-storey deflections, clarify non-combustibility of James Hardie Rigid Air Barriers.

Amendment No. 4, 4 October 2019

The Appraisal has been amended to extend the scope of use regarding building height and clarify external vertical fire spread performance.



BRANZ Appraised
Appraisal No. 611 [2011]

BRANZ Appraisal
Appraisal No. 611 [2011]
26 August 2011

JAMES HARDIE RIGID AIR
BARRIERS



In the opinion of BRANZ, **James Hardie Rigid Air Barriers** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **James Hardie New Zealand**, 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:**
 - 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**.
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** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

26 August 2011



Installation Manual

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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

1 Introduction

James Hardie manufactures a range of rigid air barriers such as HomeRAB™ Pre-Cladding and RAB™ Board.

1.1 HomeRAB Pre-Cladding is a 4.5mm thick fibre cement sheet which is sealed on the face and edges and is used as a rigid air barrier for residential buildings within the scope of NZS 3604. HomeRAB Pre-Cladding is manufactured by James Hardie and complies with the requirements of AS/NZS 2908.2.

It acts as temporary weather protection during construction, ideal for renovations or new construction. It is suitable for use as rigid underlay in residential buildings as per section 9.1.4 of E2/AS1 and complies with the requirements of Table 23 of E2/AS1. HomeRAB Pre-Cladding is suitable to withstand wind pressures experienced in all wind zones up to and including Very High (VH) wind zone as specified in NZS 3604. HomeRAB Pre-Cladding doesn't get fatigued or tear under the wind pressures exerted on it in the long term. HomeRAB Pre-Cladding has been tested to withstand wind pressures up to VH wind zone.

1.2 RAB Board 6mm is a 6mm thick fibre cement sheet which is sealed on the face and edges and is suitable for use as a rigid air barrier in Extra High (EH) wind zones or in wind pressures up to 4.5kPa.

It complies with the requirements of Table 23 of E2/AS1.

It is suitable for use as rigid underlay as per the requirement of section 9.1.4 of E2/AS1. RAB Board 6mm is also suitable to withstand high wind pressures experienced on building facades where it creates a wind barrier which equalises pressure within the cavity to the external pressures. Flexible underlays can deteriorate caused by positive/negative pumping actions created by gusting winds within the cavity and on building facade.

Due to these pressures a flexible underlay may not perform as desired in the long term. RAB Board 6mm has been tested to withstand wind pressures up to 4.5kPa(ULS).

1.3 RAB Board 9mm is a 9mm thick fibre cement sheet which is sealed on the face and edges and is suitable for use as a rigid air barrier in Extra High (EH) wind zones or in wind pressures up to 4.5kPa.

RAB Board 9mm is suitable for specific design shear wall for residential or commercial applications where the structural design require strong/stiffer shear walls.

RAB Board 9mm is an ideal rigid backing substrate for use behind the façade cavities to improve the acoustic performance of the wall assembly. The continuity of RAB Board 9mm on the exterior of framing with its heavier mass cuts down the environmental noise, blocks noise flanking paths and therefore enhances the overall acoustic performance of building facades.

It complies with the requirements of Table 23 of E2/AS1.

It is suitable for use as rigid underlay as per the requirement of section 9.1.4 of E2/AS1. RAB Board is also suitable to withstand high wind pressures experienced on building facades where it creates a wind barrier which equalises pressure within the cavity to the external pressures. Flexible underlays can deteriorate caused by positive/negative pumping actions created by gusting

winds within the cavity and on building facade.

Due to these pressures a flexible underlay may not perform as desired in the long term. RAB Board 9mm is suitable for use for wind pressures up to 4.5kPa(ULS).

1.4 James Hardie rigid air barriers provide the following benefits:

- Resistant to moisture damage and rotting when installed correctly
- Integral sealer applied on the face and edges repels moisture rapidly and helps resist moisture penetration
- Provides temporary weathertightness to the building envelope until the final claddings are installed
- Provides general rigidity to the entire structure
- An efficient way to achieve structural bracing

This manual covers the use of HomeRAB Pre-Cladding and RAB Board in external wall pre-cladding applications only. Further information relating to HomeRAB Pre-Cladding and RAB Board is also available in the following James Hardie design manuals:

- Fire and Acoustic Design Manual
- Bracing Design Manual

The Specifier or other responsible party for the project must ensure that the information in this manual is appropriate for the intended application and that specific design and detailing is undertaken for areas which are not covered in this manual.

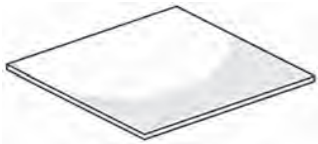


James Hardie rigid air barriers have been tested to comply with the performance requirements of the New Zealand Building Code (NZBC).

James Hardie rigid air barriers have been BRANZ appraised. This should be read in conjunction with this installation manual. BRANZ Appraisal No. 611 can be viewed on www.jameshardie.co.nz or www.branz.co.nz.

1.5 Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

Table 1

HomeRAB Pre-Cladding				
Product	Description	Sheet Sizes		
	HomeRAB Pre-Cladding A fibre cement sheet with a green water repellent sealer applied on the face and edges. Installed with green side facing out. Approximate mass: 6.5 kg/m ²	Thickness: 4.5mm		
		Length (mm)	Width (mm)	Code
		2450	1200	404766
		2750	1200	404768
		3000	1200	404916
RAB Board 6mm				
Product	Description	Sheet Sizes		
	RAB Board A fibre cement sheet with a green water repellent sealer applied on the face and edges. Installed with green side facing out. Approximate mass: 8.6 kg/m ²	Thickness: 6mm		
		Length (mm)	Width (mm)	Code
		2450	1200	402980
		2750	1200	405131
		3000	1200	402981
RAB Board 9mm				
Product	Description	Sheet Sizes		
	RAB Board A fibre cement sheet with a green water repellent sealer applied on the face and edges. Installed with green side facing out. Approximate mass: 12.2 kg/m ²	Thickness: 9mm		
		Length (mm)	Width (mm)	Code
		2450	1200	405132
		2750	1200	404972
		3000	1200	404971

NOTE: All dimensions and masses provided are approximate only and are subject to manufacturing tolerances. Masses are based on Equilibrium Moisture Content (EMC) of product.

Table 2






Accessories/tools supplied by James Hardie			
	HomeRAB 4.5 Horizontal Flashing 3000mm long for horizontal joints CODE: 305798		HardieBlade™ Saw Blade 185mm diameter, Poly diamond blade for fast, clean cutting of James Hardie fibre cement. CODE: 300660
	RAB 6mm Horizontal Flashing 3000mm long for horizontal joints CODE: 305152		HardieKnife™ For easy cutting of fibre cement sheets. CODE: 305926
	RAB 9mm Horizontal Flashing 3000mm long for horizontal joints CODE: 305945		

Table 3

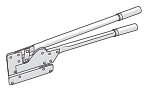

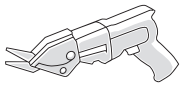
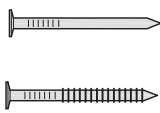

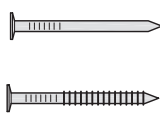



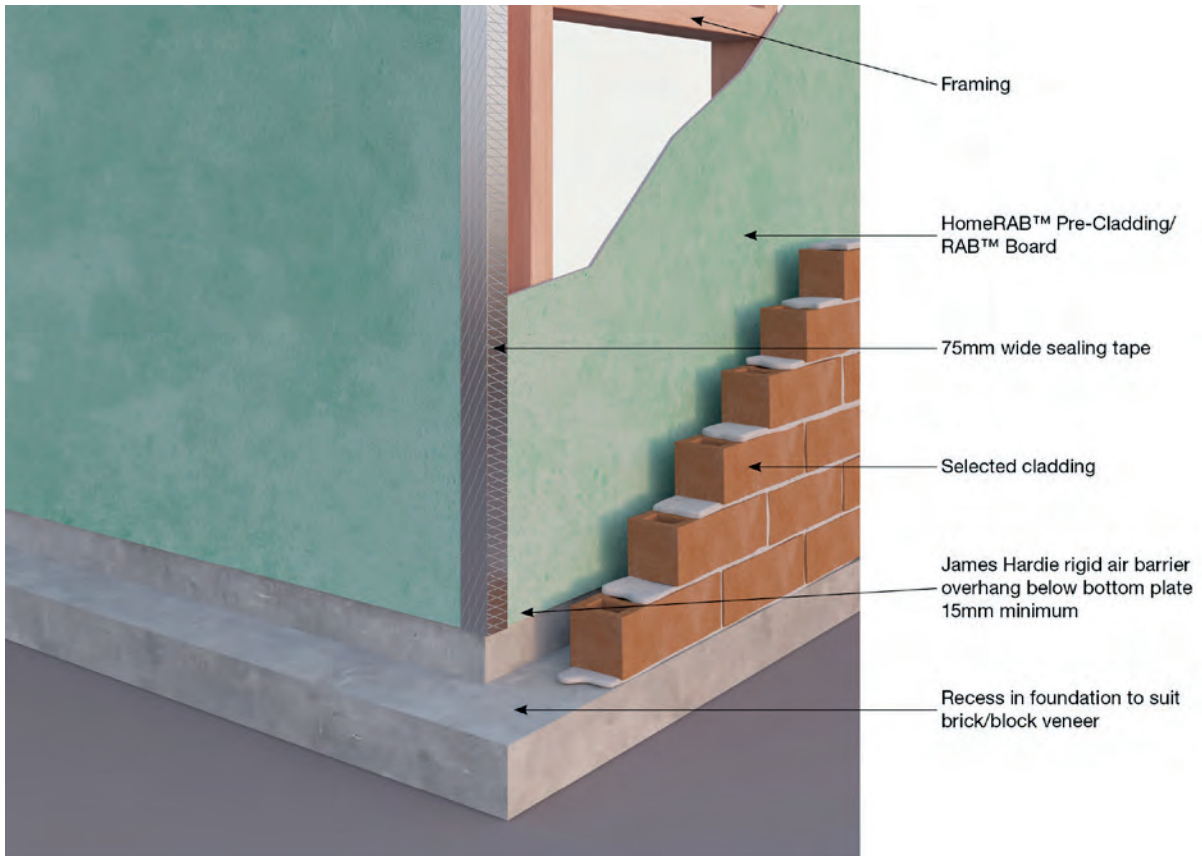
Components not supplied by James Hardie		
James Hardie recommends the following products for use in conjunction with its James Hardie rigid air barriers. James Hardie does not manufacture these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.		
	<p>Hand guillotine Guillotine for cutting fibre cement.</p>	
	<p>Electric shear/fibreshear</p>	
	<p>Fibre cement nails 40 x 2.8mm hot dipped galvanised HardieFlex™ nails as per Table 5.</p> <p>40 x 2.8mm stainless steel HardieFlex™ nails as per Table 5.</p>	
	<p>Fibre cement nails 50 x 2.8mm hot dipped galvanised HardieFlex™ nails as per Table 5.</p> <p>50 x 2.8mm stainless steel HardieFlex™ nails as per Table 5.</p>	
	<p>Tusk 160mm diameter blade Blade for fast, clean cutting of James Hardie fibre cement</p>	
<p>Sealing tape/window flashing tape Tape used to seal vertical joints and flash around window, door and pipe penetrations.</p> <p>Thermakraft™ Premium Joining Tape, Thermoflash Self Adhesive Window Flashing tape - Thermakraft™ Ltd 0800 806 595 SUPER-STICK Building Tape® - Marshall Innovations 0800 776 9727 3M™ All Weather Flashing Tape 8067 - 3M™ 0800 474 787</p>		<p>General installation - Nail gun and nails</p> <ul style="list-style-type: none"> Galvanised/stainless steel round head gun nails minimum length required for specific application.
<p>Bracing installation - Nail gun and nails</p> <ul style="list-style-type: none"> Galvanised/stainless steel round head gun nail minimum length required for specific application. Refer to Section 4.3. 		<p>Penetration Seals</p> <p>OneSeal Multi-Fit by Thermakraft: 0800 806 595 Trade-Seal by Marshall Innovations: 0800 776 9727</p>

Figure 1: James Hardie Rigid Air Barriers with Linea™ Weatherboard



Figure 2: James Hardie Rigid Air Barriers with brick/block cladding



2 Safe working practices

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

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

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

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

If using a dust mask or respirator, use an AS/NZS 1716 P1 filter and refer to Australian/New Zealand Standard 1715:2009 Selection, Use and Maintenance of Respiratory Protective Equipment for more extensive guidance and more options for selecting respirators for workplaces. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

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

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

Avoid breathing in crystalline silica dust

Safe working practices

- ✗ NEVER use a power saw indoors or in a poorly ventilated area
- ✗ NEVER dry sweep
- ✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up
- ✗ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the 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.

Use one of the following methods for cutting HomeRAB Pre-Cladding and RAB Board 6mm

Best

- HardieKnife™
- Hand guillotine
- Fibreshear

Better

Dust reducing circular saw equipped with HardieBlade™ Saw Blade and connected to a M Class or higher vacuum.

When cutting outdoors

- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a 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

When cutting indoors

- ✗ Never cut using a circular saw indoors
- ✓ Position cutting station in a well ventilated area
- ✓ Cut ONLY using a HardieKnife™, hand guillotine or fibreshears (manual, electric or pneumatic)
- ✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

Use the following method for cutting RAB Board 9mm

Dust reducing circular saw equipped with HardieBlade Saw Blade and M Class or higher vacuum.

When cutting

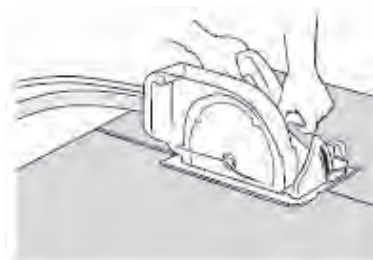
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a HardieBlade Saw Blade (or equivalent) and 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
 - When others are close by, ask them to do the same
- ✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

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

Working instructions

HardieBlade™ Saw Blade

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



Hole forming

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a 'pilot' hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill



For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

2.1 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.

2.2 TIPS FOR SAFE AND EASY HANDLING OF HOMERAB PRE-CLADDING AND RAB BOARD

- ✓ Carry with two people
- ✓ Hold near each end and on edge
- ✓ Exercise care when handling sheet products to avoid damaging the edges/corners

3 Applications

HomeRAB Pre-Cladding is suitable for use as a rigid air barrier for residential buildings up to and including VH wind zone within the scope of NZS 3604 and E2/AS1. HomeRAB Pre-Cladding is fixed directly to the framing. The vertical joints are sealed over the face of the HomeRAB Pre-Cladding. HomeRAB Pre-Cladding is suitable for use behind all James Hardie claddings or alternative claddings such as brick, timber weatherboard, EIFS etc.

RAB Board is suitable for use as a rigid air barrier in EH wind zone in residential or SED project applications to withstand high wind pressures in conjunction with cladding/commercial facades. In these applications, RAB Board is fixed directly to the framing. The vertical joints are sealed over the face of the RAB Board using joint flashing tape.

3.1 JAMES HARDIE RIGID AIR BARRIER

James Hardie rigid air barriers can remain exposed to the external elements for maximum 180 days prior to the external cladding being installed.

The James Hardie rigid air barriers can be used as a backing board behind stucco plasters. Refer to James Hardie Stucco Solution technical specification, E2/AS1 'External Moisture' clause of the NZBC and BRANZ 'Weathertight Solutions Stucco' for further information on stucco plaster. The RAB Board can also be used as a backing board behind other proprietary claddings which comply with the NZBC requirements. Proprietary cladding must be installed as per their manufacturing specifications. In these applications, a building underlay must be used as a slip layer to cover RAB Board and ensure a separation between mortars and RAB Board. The RAB Board is fixed over a minimum 18mm thick cavity batten for these applications. The RAB Board may also be required over the framing to withstand high wind pressures within the cavity.

The claddings/facades used over James Hardie rigid air barriers must satisfy the various performance requirements of the NZBC.

Horizontal profiled metal and uPVC claddings must not be direct fixed over James Hardie rigid air barriers. These must be fixed over an underlay or overlay the James Hardie rigid air barrier using the cavity construction method.

Vertical profiled metal cladding can be direct fixed over James Hardie rigid air barriers with a flexible underlay separator to comply with manufacturers recommendations.

The cladding fastener length must be increased by 5mm minimum to maintain the required nail pull out strength.

In case of gable end trusses sitting on top plates of external wall frame, the frame size must comply with the minimum timber sizes stipulated for wall frames in Section 8 of the NZS 3604.

3.1.1 Temporary weather protection

Installation of internal lining can be started after James Hardie rigid air barriers have been installed on the exterior of the building envelope. In order to achieve this, all sheet joints and penetrations must be sealed and the roof, soffit lining, windows/doors (including head flashings and airseals) must have been installed to ensure the building is weathertight before starting the installation of internal linings. The insulation, electrical cables, plumbing and any other services required in external walls must be installed and inspected by the building consent authority before starting the installation of internal linings. The internal lining and services must be installed in accordance with their manufacturer's product literature and comply with the NZBC requirements.

The claddings must be installed within 180 days after the installation of James Hardie rigid air barriers.

3.1.2 Bracing

For bracing application the James Hardie rigid air barriers must be installed as per HomeRAB Pre-Cladding/RAB Board bracing details in the James Hardie Bracing Design Manual. Bracing with rigid air barriers can only be achieved when fixed direct to frame. The board must be fixed in accordance with the bracing details to all framing. For further information on bracing refer to Section 6 and the James Hardie Bracing Design Manual or Ask James Hardie on 0800 808 868.

3.1.3 Fire rated wall construction

RAB Board is classified as 'Non-Combustible Material'. For fire rated wall applications RAB Board must be installed as per the current James Hardie Fire and Acoustic Design Manual. RAB Board is suitable to achieve fire ratings up to 60 minutes when installed in accordance with fire systems specifications published in the James Hardie Fire and Acoustic Design Manual. The board must be fixed with HardieFlex nails at 150mm centres to all framing.

3.2 STUD TO TOP PLATE FIXING

Refer to Section 5.2, Figures 16 and 17 for alternative stud to top plate connection.

3.3 SEISMIC DEFLECTIONS

RAB Board is suitable for use as rigid backing in buildings where the structure is designed to expect the lateral inter-storey seismic deflections. The seismic deflections can have a significant effect on the performance of the façade system and its components, therefore it is crucial to first understand the amount of inter-storey deflections and then to choose a suitable rigid air barrier and façade system that has been tested to meet the performance appraised.

James Hardie has a range of tested cladding/façade systems with RAB Board that are suitable for a range of seismic deflection. For further design and installation guidance, refer to clause 5.3.3 of this manual and Figure 26.

4 Framing and fixings

4.1 FRAMING

The timber framing shall be in accordance with NZS 3604 or comply with the specific engineering design requirements. The timber treatment must comply with NZBC Acceptable Solution B2/AS1 requirements.

The minimum framing size required for fixing James Hardie rigid air barriers is 90 x 45mm. Ensure that the framing is suitable for installing the selected cladding. Refer to cladding installation manual for further information about the framing requirements.

For specific engineering design projects where the timber framing differs from what's been provided in this manual, Ask James Hardie on 0800 808 868.

Table 4

Product	Wind zone	Framing centres (max)
HomeRAB Pre-Cladding	Up to and including H (High)	600mm
HomeRAB Pre-Cladding	Very High	400mm
RAB Board	Up to and including VH (Very High)	600mm
RAB Board	EH (Extra High) & SED (above 1.5kPa to 4.5kPa)	400mm

NOTE:

- HomeRAB Pre-Cladding must not be used in EH, SED wind zones and on fire rated wall application. Use RAB Board instead

4.2 FIXINGS

James Hardie rigid air barriers must be installed with its sealed face towards the external cladding and unsealed face towards the framing. The sealer applied on the face helps the board to drain the moisture freely over the face and keeps it dry.

- Nails must finish flush with board surface

The HomeRAB Pre-Cladding and RAB Board are fixed as described below.

HomeRAB Pre-Cladding and RAB Board can either be gun nailed or hand nailed. It is recommended to use gun nails to cut down installation time. When gun nailing use round head nails and follow nail gun manufacturer's instructions for correct operation of tool and site safety requirements.

- Nails must have a minimum clearance of 12mm from the sheet edges and a minimum of 50mm horizontally and 75mm vertically from the sheet corners
- When using a nail gun the gun nails must have a full round head to provide the required holding power, and minimum length of the hand nail

Note:

- Refer to Table 5 regarding nail sizes and fixing centres for various applications

Table 5

HomeRAB Pre-Cladding/RAB Board 6mm			
Application	Type of nail	Nailing centres to all framing	Nailing option
General	40 x 2.8mm HardieFlex nail	200mm	Gun nail or hand nail
Fire rating	40 x 2.8mm HardieFlex nail	150mm	Gun nail or hand nail
Bracing	40 x 2.8mm HardieFlex nail	100mm 150mm	Gun nail or hand nail
Stucco plaster (over cavity)	60 x 3.15mm HardieFlex nail	200mm	Gun nail or hand nail

RAB Board 9mm			
Application	Type of nail	Nailing centres to all framing	Nailing option
General	50 x 2.8mm HardieFlex nail	200mm	Gun nail or hand nail
Fire rating	50 x 2.8mm HardieFlex nail	150mm	Gun nail or hand nail
Bracing	50 x 2.8mm HardieFlex nail	100mm 150mm	Gun nail or hand nail

NOTE:

- Nails must finish flush with board surface
- Nails must have minimum clearance of 12mm from the sheet edges and a minimum of 50mm horizontally and 75mm vertically from the sheet corners
- **Do not use D-head nails**

4.3 FASTENER DURABILITY

Fasteners must have the appropriate level of durability required for the intended project to comply with the NZBC. This is of particular importance in coastal areas, areas subject to salt spray and other corrosive environments. Refer to Table 6 for information regarding the types of nails to use to comply with the durability requirements of the NZBC.

Table 6

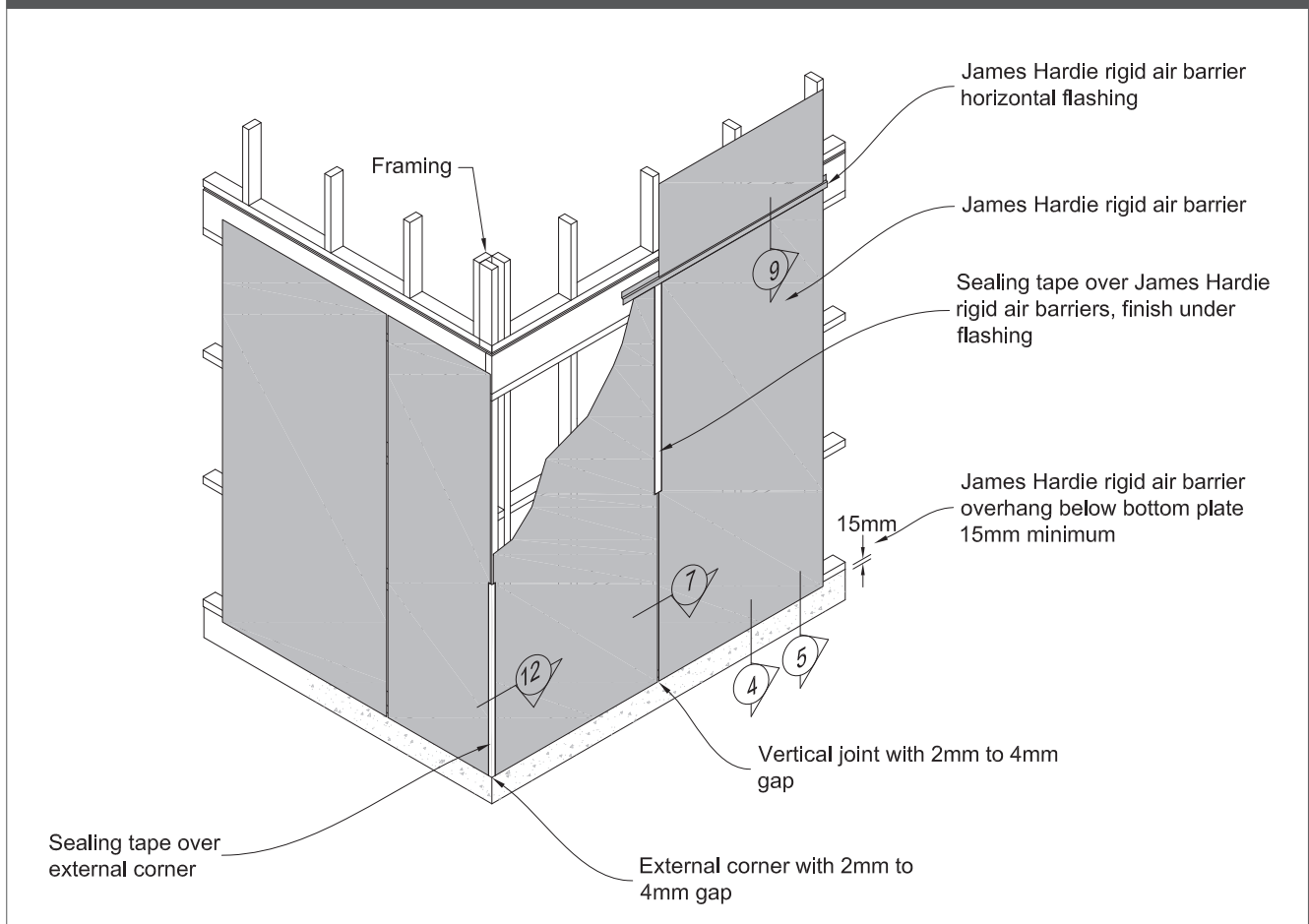
Exposure conditions and nail selection prescribed by NZS 3604		
Zone	Application	Nail material
D (Sea Spray) * and Geothermal hot spots	General	Stainless steel 304/316
	Fire	
	Bracing	
C and B	General	Hot dip galvanised**
	Fire	
	Bracing	

*Where local knowledge dictates that increased durability is required use stainless steel nails

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

Fasteners must be fully compatible with all other materials that they are in contact with to ensure the durability and integrity of the assembly. Contact fastener manufacturers for more information. Also refer to Table 20 and 21 of E2/AS1 for further information about the suitable fastening materials and their compatibility with other materials.

Figure 3: James Hardie rigid air barriers layout



4.4 CLEARANCES

James Hardie rigid air barriers must extend below the bottom plate by 15mm minimum over concrete foundation and 15mm past floor joist of timber foundation. James Hardie rigid air barriers must maintain a 100mm minimum clearance between the bottom edge of the sheet and the finished ground.

Check cladding manufacturer for minimum clearances required for the selected cladding.

Maintain the required clearances between the bottom plate and top of ground to comply with the NZBC and NZ standards. The adjacent finished ground must slope away from the building in accordance with the NZBC requirements. Do not install James Hardie rigid air barriers in such a way that it may remain in contact with standing water.

Figure 4: Foundation detail — direct fix cladding

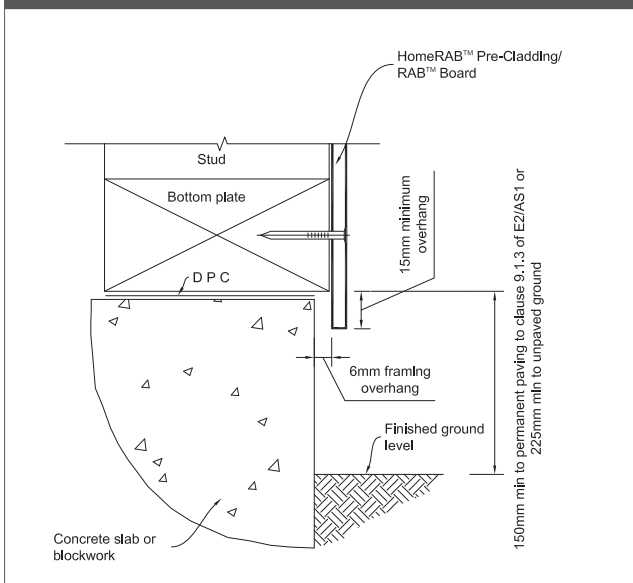


Figure 5: Foundation detail — cavity fix cladding

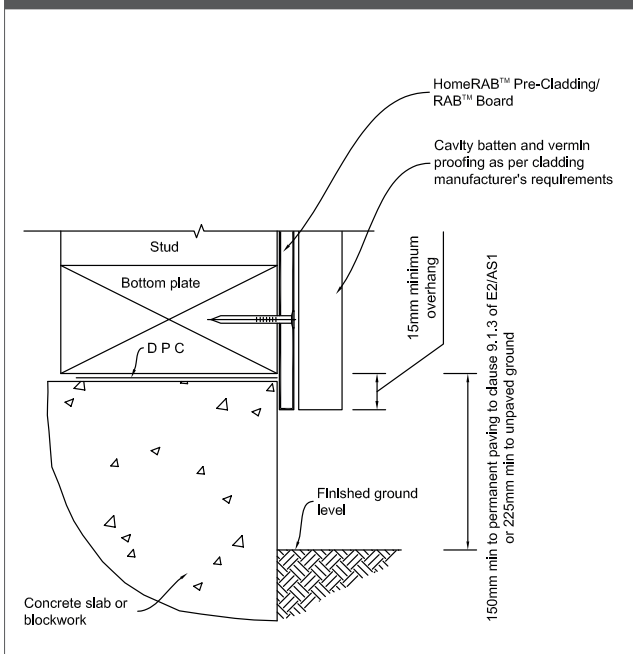
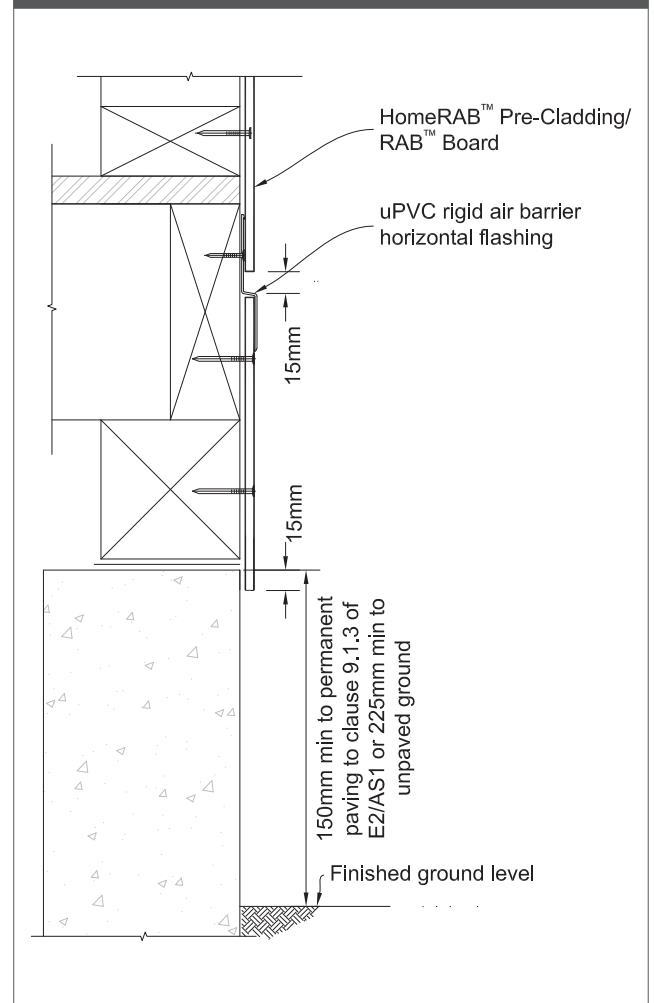


Figure 6: Foundation detail – timber foundation



5 Installation

5.1 BOARD LAYOUT

When using James Hardie rigid air barrier, building underlays are not required over the framing. HomeRAB Pre-Cladding/RAB Board have been tested and comply with the performance requirements of Table 23 of Clause E2 of the NZBC. The sheets are jointed keeping a gap of 2-4mm maximum between the sheet edges. The board must be cleaned of any dust before fixing the jointing tape over the joint.

Cut edges where exposed must be primed prior to installation with Dulux® 1 Step, Resene Quick Dry or similar.

The bottom edge of James Hardie rigid air barriers must overhang below the bottom plate by 15mm minimum, refer to Figures 4 and 5.

5.1.1 Vertical joints

Vertical joints must be sealed to stop the moisture ingress into the framing behind James Hardie rigid air barrier. The vertical joints are sealed over by running a 75mm wide sealing tape e.g. Thermakraft Premium Joining Tape, SUPER-STICK Building Tape/3M All Weather Flashing Tape 8067.

The sealing tapes must be pressed hard over the James Hardie rigid air barriers surface while fixing so that they achieve the required bond. The sealing tapes must not be exposed to elements for more than 180 days. This achieves the required protection when the cladding is installed. The claddings must be installed within 180 days.

NOTE: Refer to sealing tape manufacturers recommendations

regarding the installation of their sealing tapes in cold climate conditions. It is recommended to warm up the sealing tapes eg when the air and substrate temperatures are below 10°C. Check with tape manufacturer for their recommendations

5.1.2 Horizontal joints

The horizontal joint of James Hardie rigid air barriers must be flashed using a uPVC horizontal flashing or alternatively aluminium or colour steel Z flashings can also be used. Refer to Figures 8, 9 and 10. Leave a gap of 15mm minimum at the solid timber floor joist or as specified by the project engineer. The flashing must be lapped by a 35mm minimum on both sides of the joint.

For walls longer than 3m, horizontal uPVC flashing must be lapped by 50mm minimum and silicone sealed.

Rigid air barriers must not be fixed into floor joists.

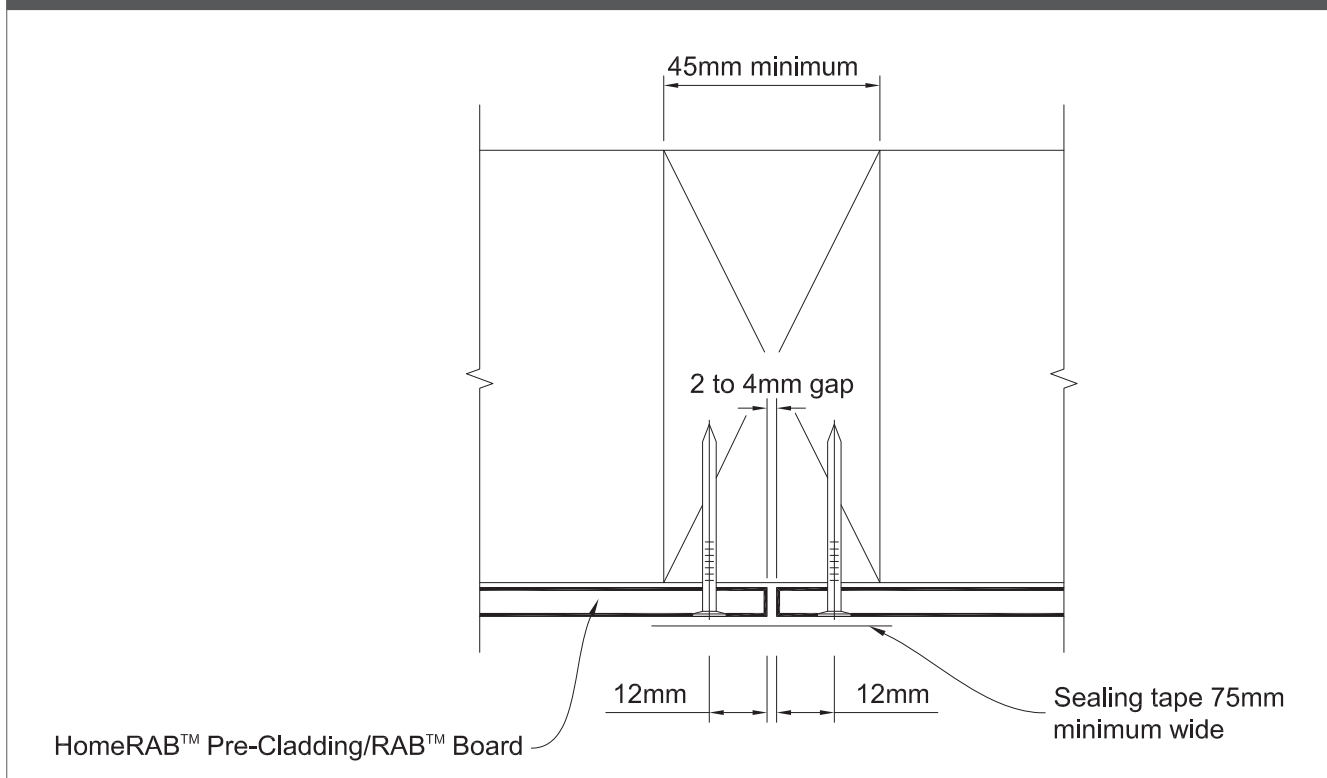
5.1.3 Internal/external corners

James Hardie rigid air barrier corner joints must be sealed using a 75mm minimum wide sealing tape.

When using a uPVC horizontal flashing in horizontal joints, the internal and external corner flashing joints must be sealed using a 75mm minimum wide joint sealing tape. Refer to Figures 13a, 13b and 13c.

When using James Hardie rigid air barrier as a backing board for stucco plaster, the vertical joints of James Hardie rigid air barrier are not required to be sealed using flashing tapes. The horizontal joints at floor level and in tall walls must be flashed to satisfy the requirements of clause E2 of the NZBC.

Figure 7: Vertical joint



5.1.4 Flexible underlay

James Hardie rigid air barriers can also be used in conjunction with flexible underlay in accordance with Section 9.1.7.2 of E2/AS1. When installing rigid underlay as per E2/AS1 requirements, its horizontal and vertical joint does not require to be sealed with flashing tapes, but instead, a flexible underlay is applied over the entire rigid air barrier in accordance with Section 9.1.7.1. The

flexible underlay must comply with Table 23 of E2/AS1. The wall openings must be flashed in accordance with E2/AS1 and this installation manual.

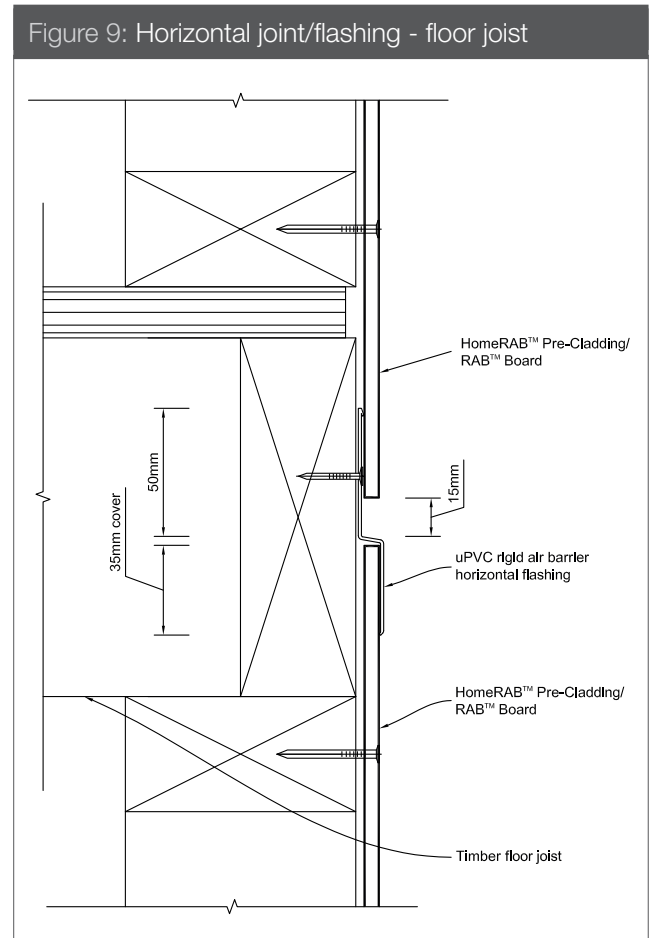
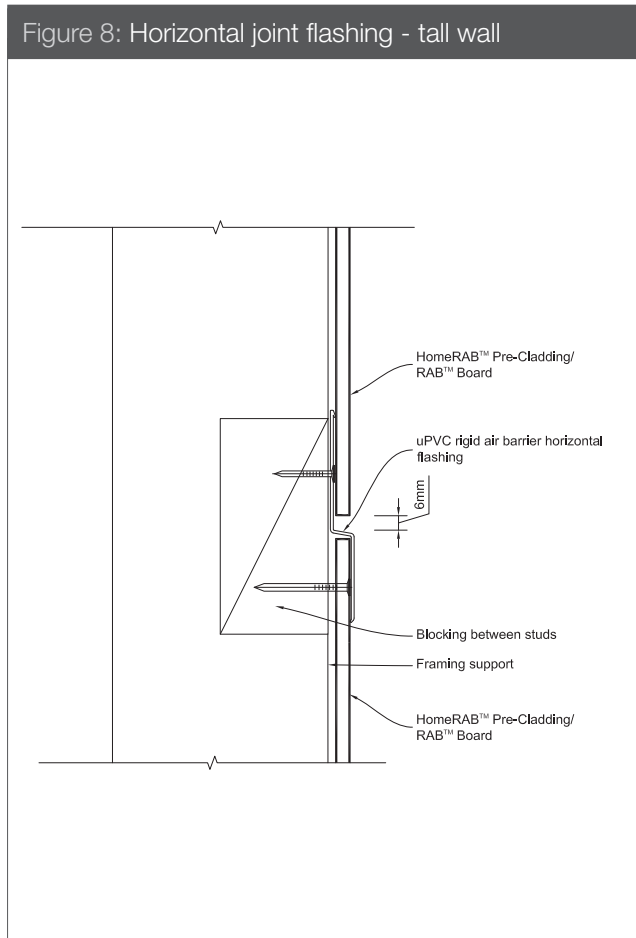


Figure 10: Horizontal joint flashing - concrete beam

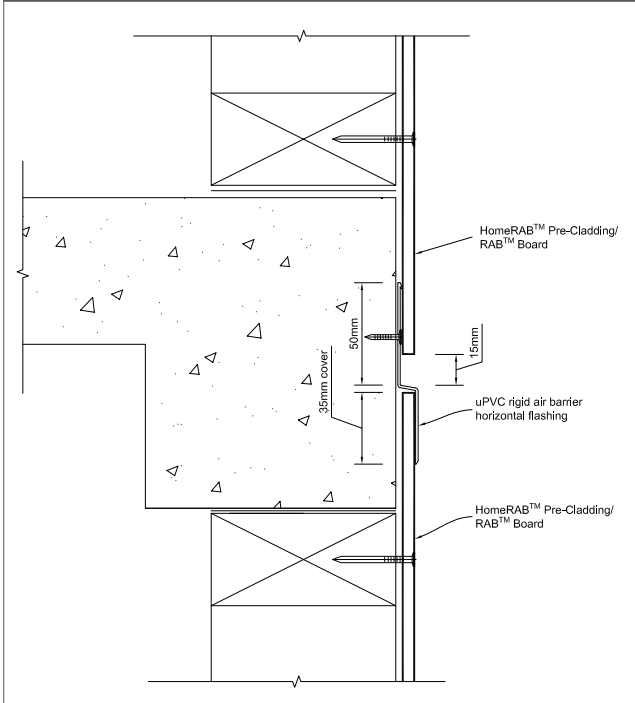


Figure 11: Internal corner joint

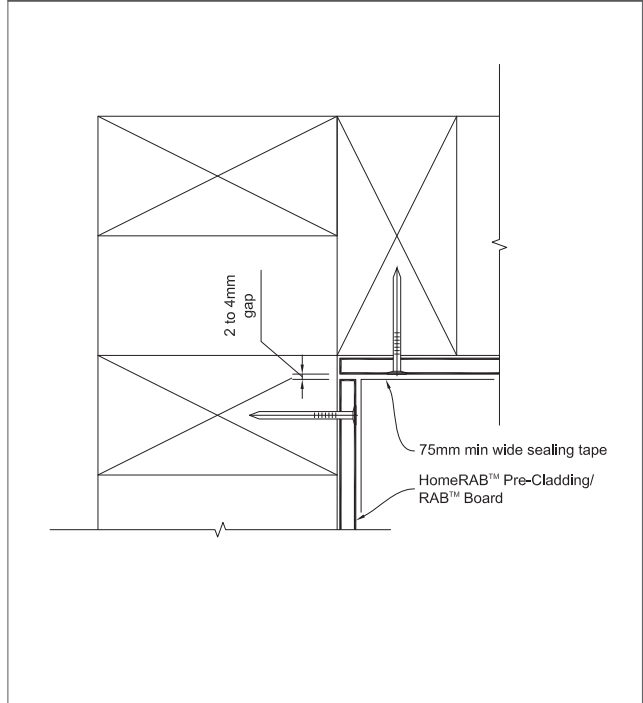


Figure 12: External corner joint

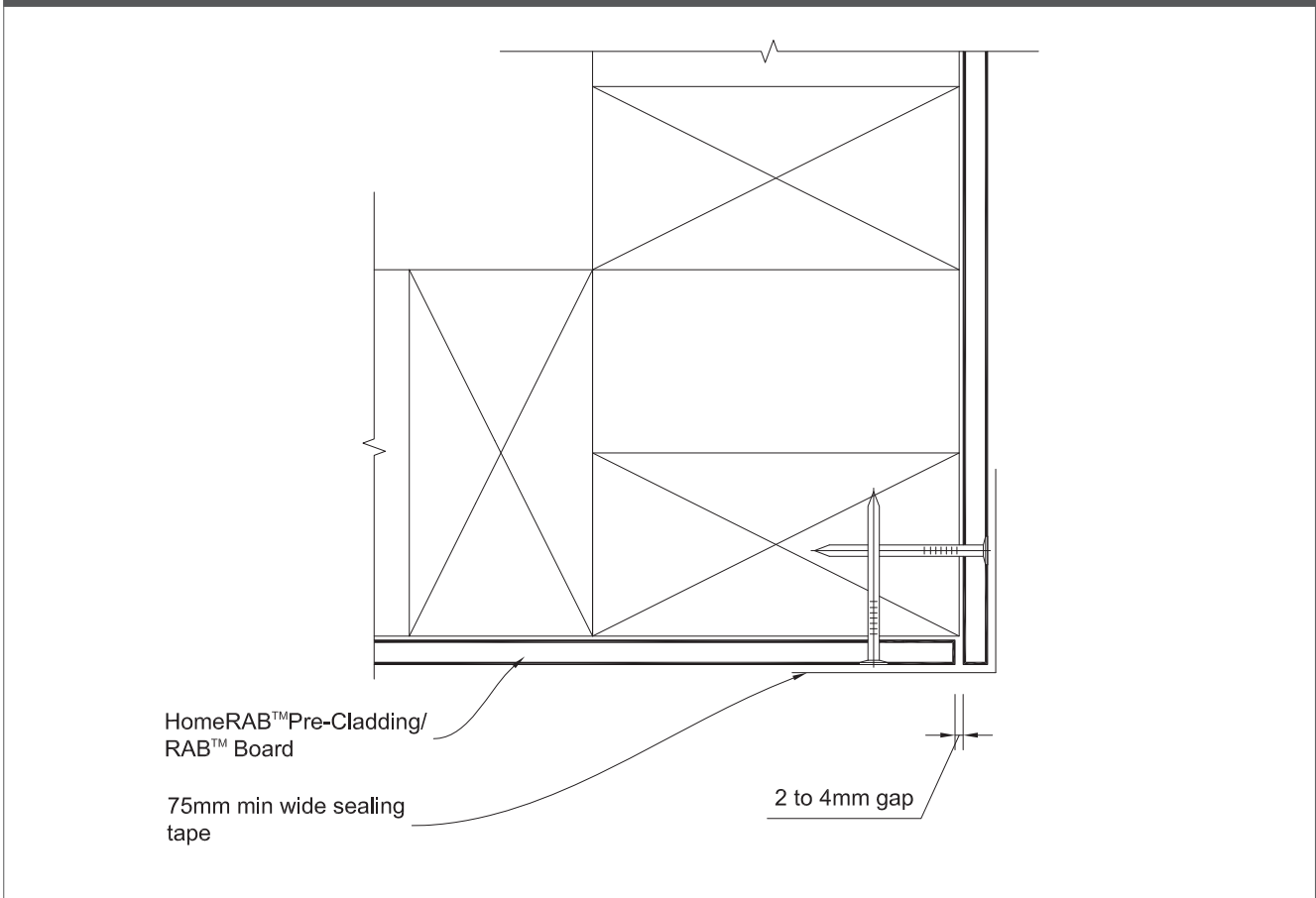


Figure 13a: Corner junction to horizontal joint

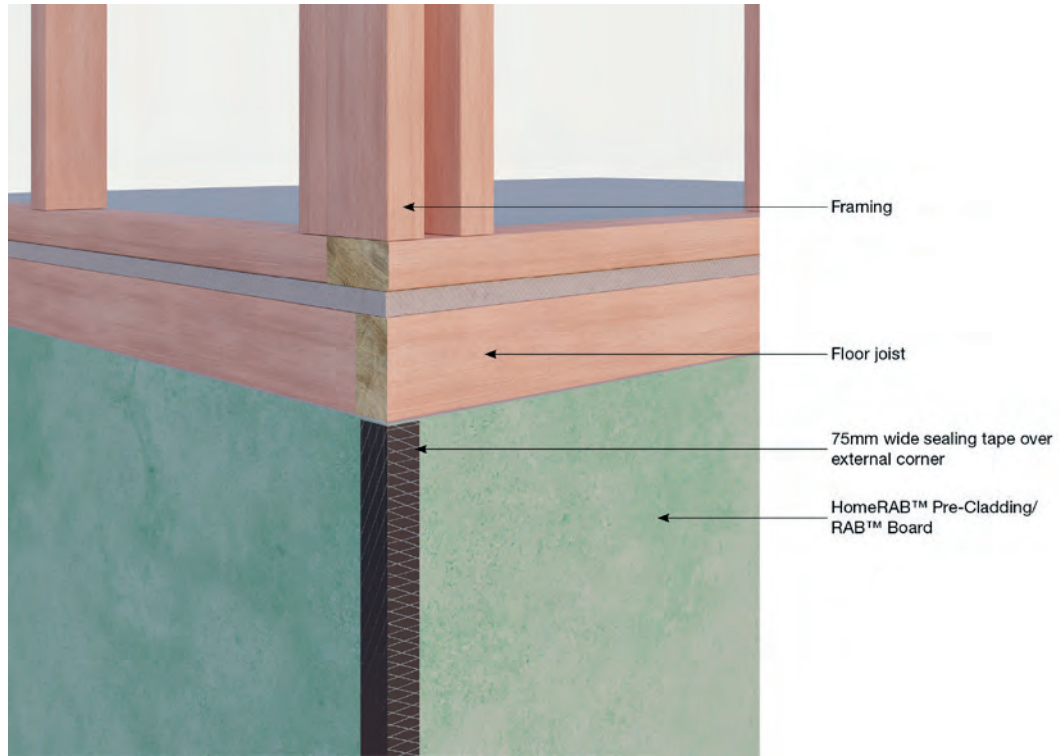


Figure 13b: Corner junction to horizontal joint

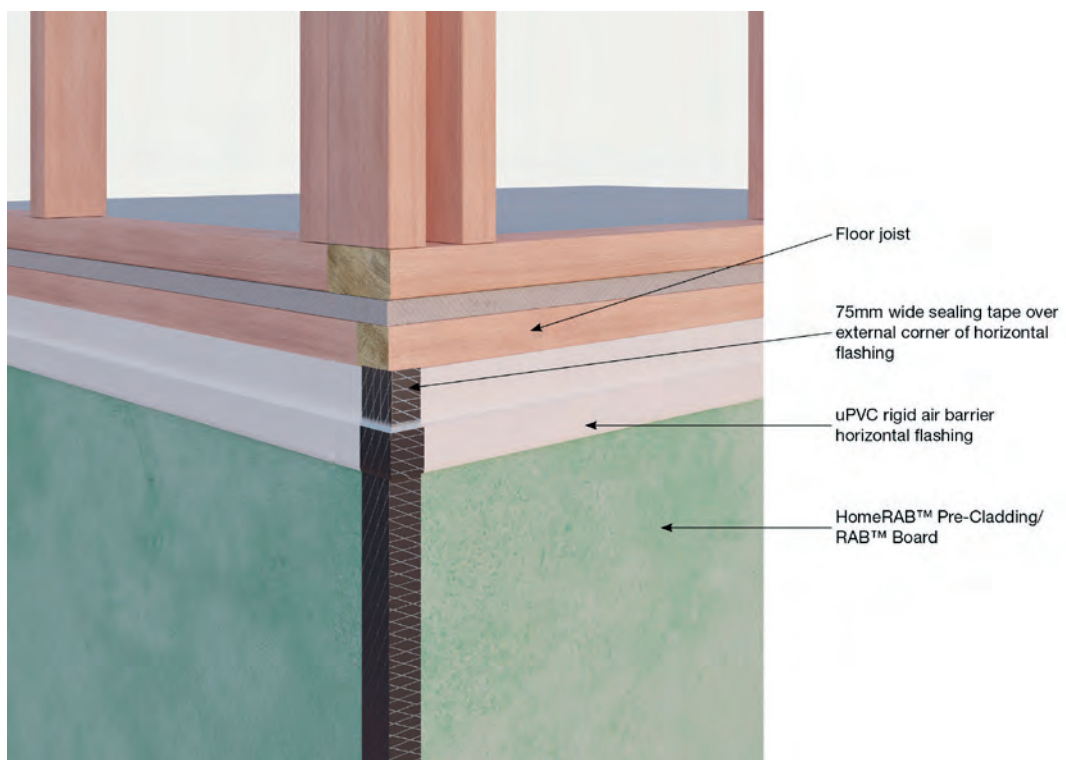


Figure 13c: Corner junction to horizontal joint

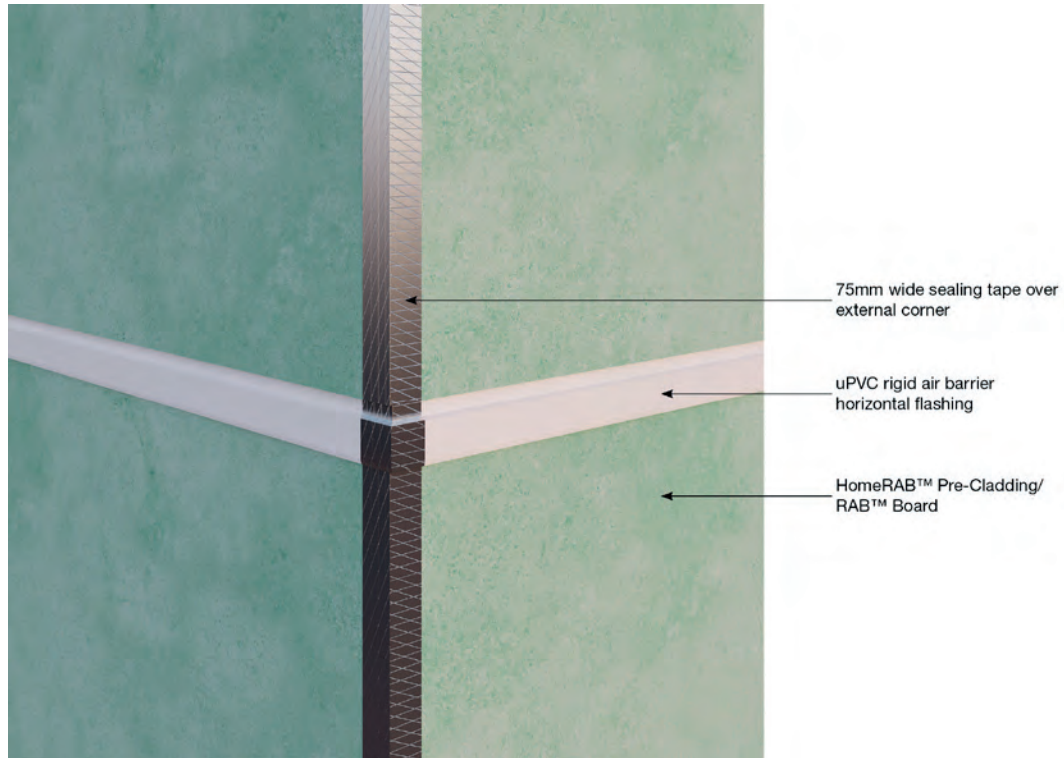


Figure 14: RAB Board used as backing board for stucco plaster/proprietary cladding systems

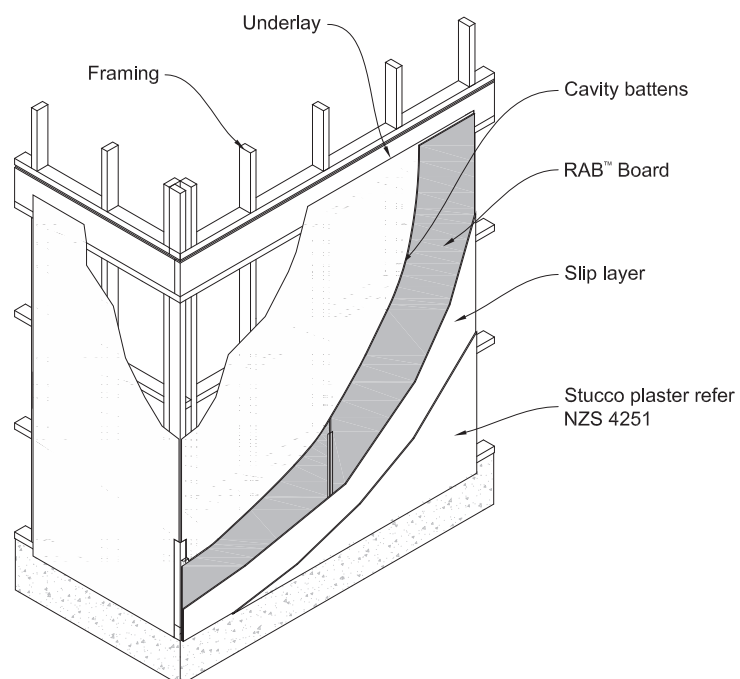
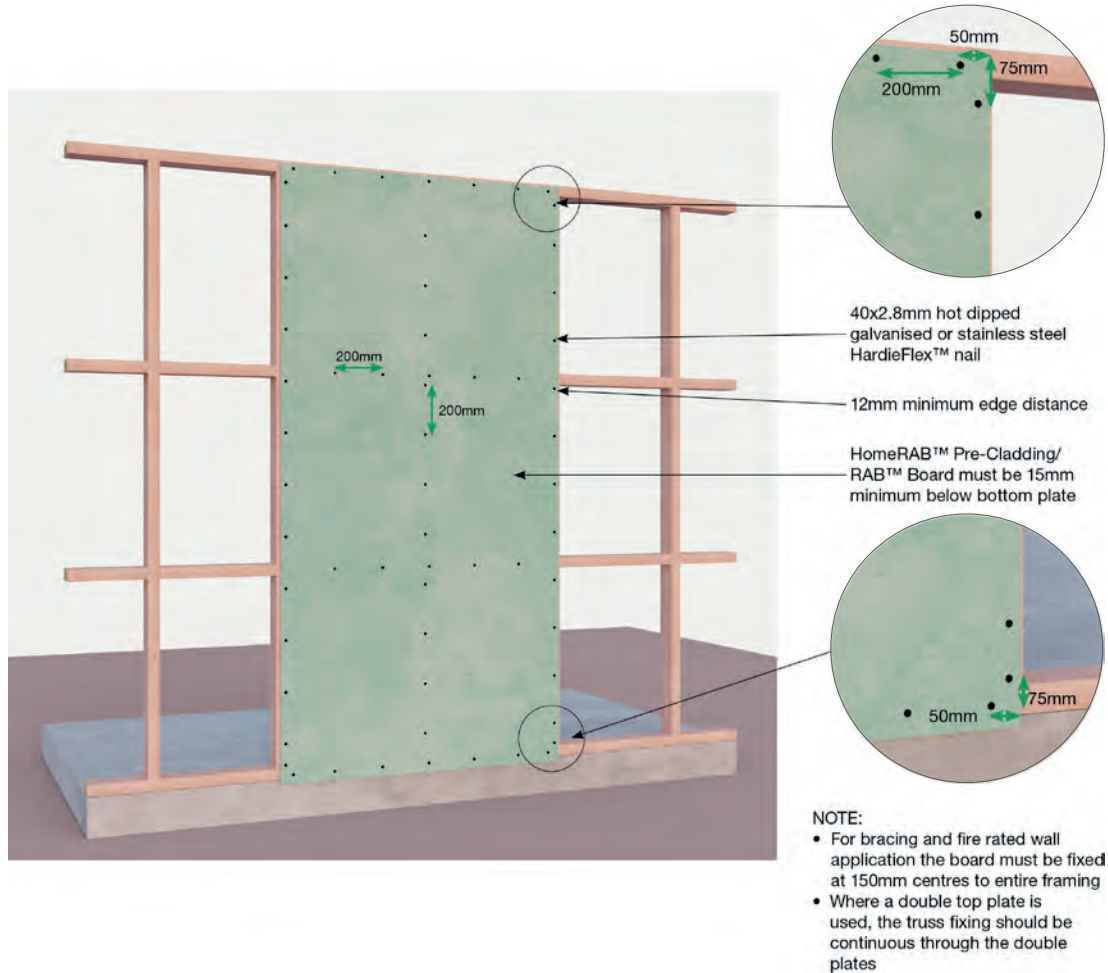


Figure 15: Sheet Fixing - General Application



5.2 STUD TO TOP PLATE FIXING

Table 8.18 of NZS 3604 specifies two types of fixings i.e. Type-A with a fixing capacity of 0.7kN and Type-B with a fixing capacity 4.7kN. HomeRAB Pre-Cladding or RAB Board rigid air barriers have been tested and are verified as suitable alternatives to achieve the required stud top plate connectivity as mentioned above and no special use of straps/plates or wire dogs etc. is required.

For a 0.7kN connectivity, the standard fixing of HomeRAB Pre-Cladding and RAB Board using 40 x 2.8mm HardieFlex nails at 200mm centres maximum will achieve this.

For a 4.7kN connectivity, fix HomeRAB Pre-Cladding or RAB Board using 40 x 2.8mm HardieFlex nails or gun nail at 75mm centres maximum to top plate with a minimum edge distance of 20mm. Refer to Figure 16.

Figure 16: Stud to top plate connection

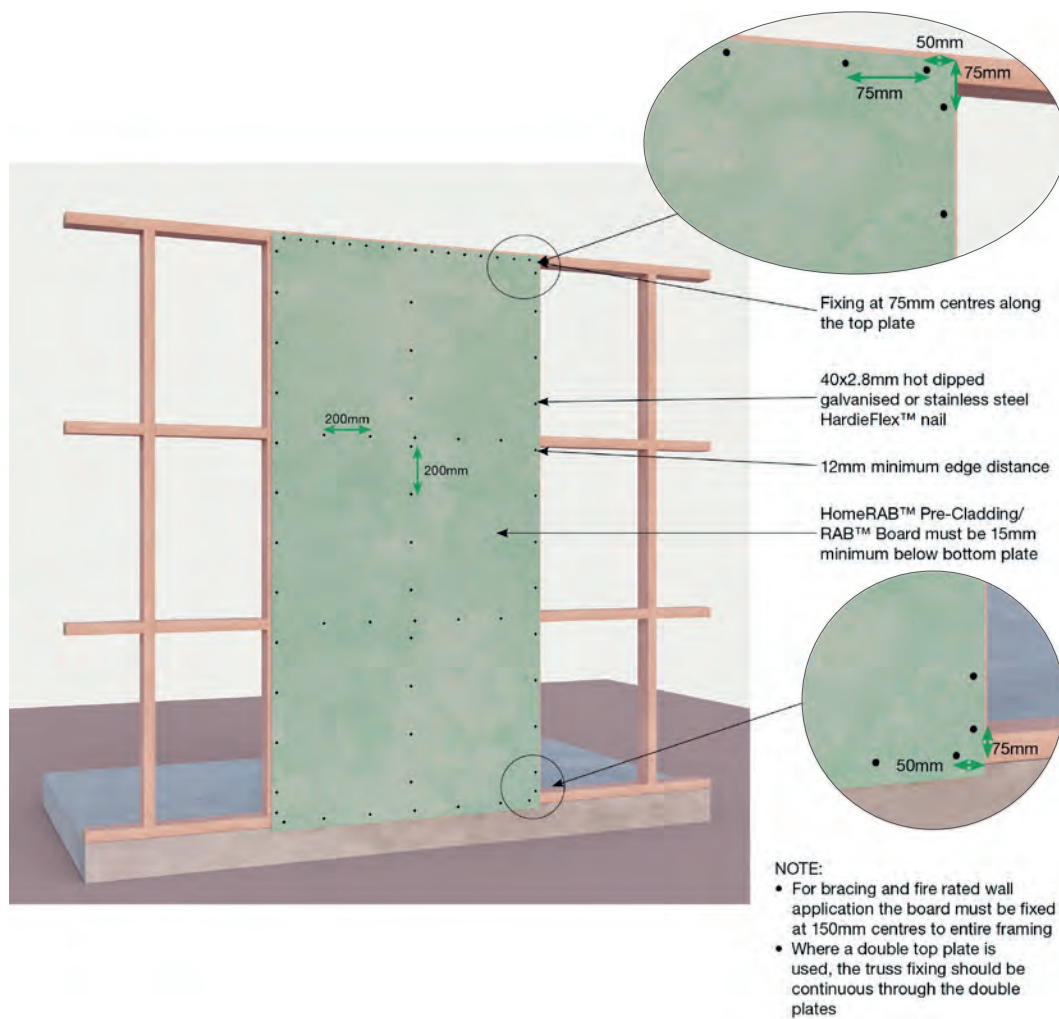
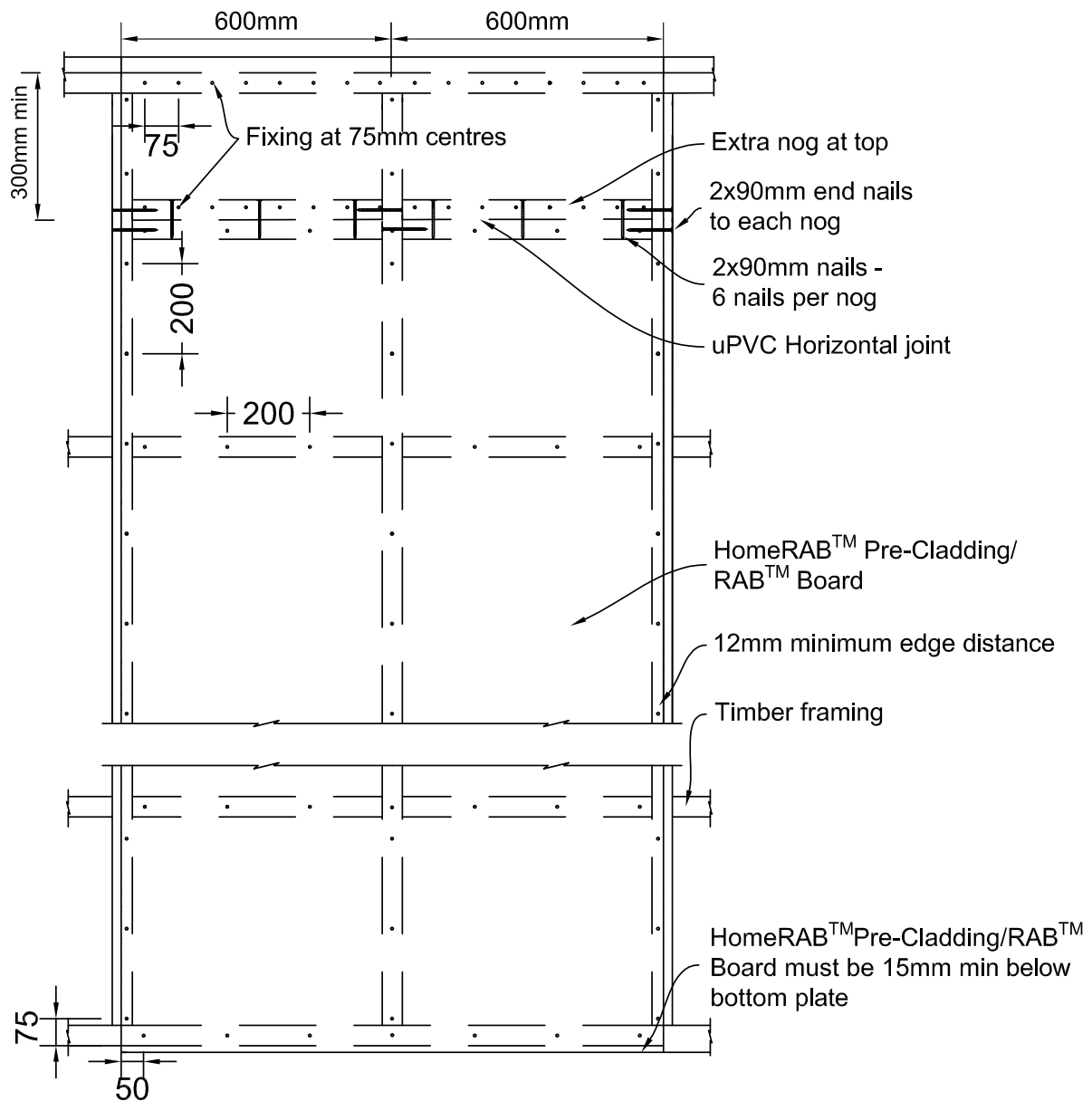


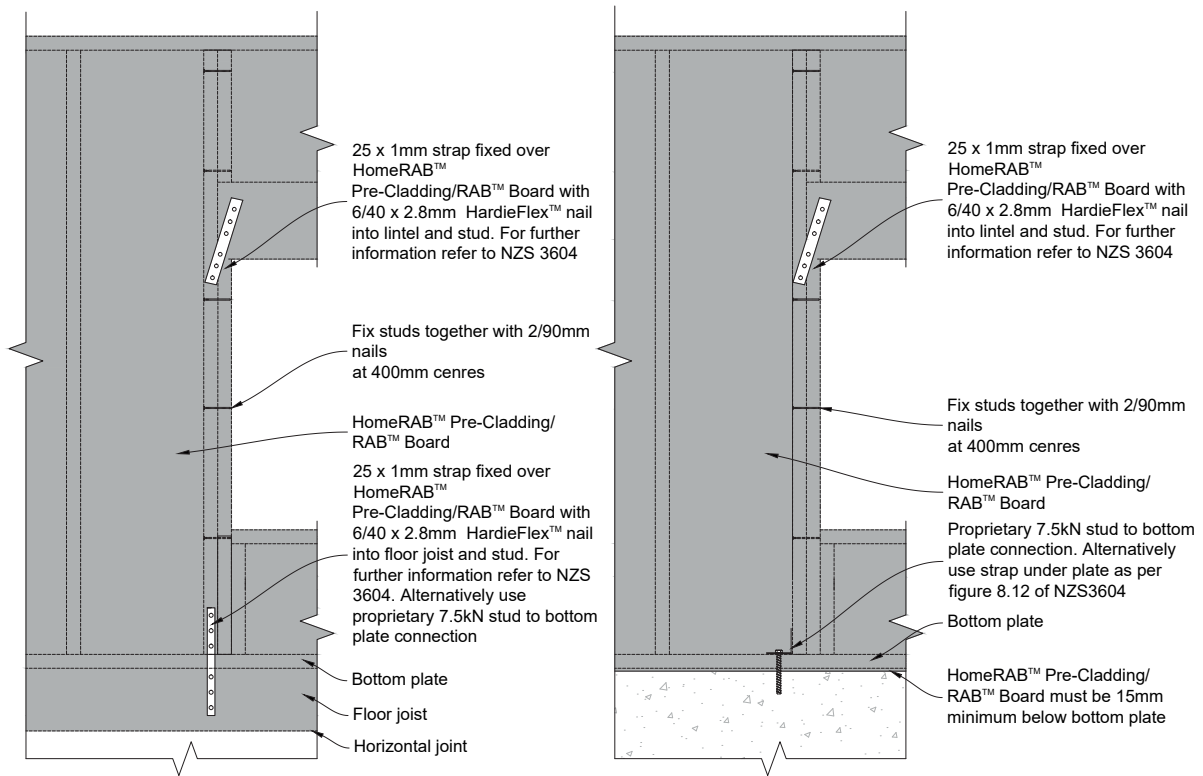
Figure 17: Stud to top plate connection - tall wall



Note:

1. Where a double top plate is used, the truss fixing should be continuous through the double plates.
2. For bracing and fire rated wall application, the board must be fixed at 150mm c/c to entire framing.

Figure 18: Lintel connection



5.3 FLASHINGS

The exposed timber framing around the window jamb can be covered with a 150mm minimum wide flashing tape or a sealing tape refer to Figures 19 and 20. The window sill must be dressed with a 150mm minimum wide flashing tape. The tape is sealed over the face of the James Hardie rigid air barrier.

The James Hardie rigid air barrier surface must be clean, free of grime and dry before the tapes are applied. Some tape manufacturers require a primer tak spray be applied before fixing the tapes to the board surface to achieve a better tape adhesion. Check with the tape manufacturers for further information regarding minimum requirements etc.

Figure 19: Window sealing with flashing tapes

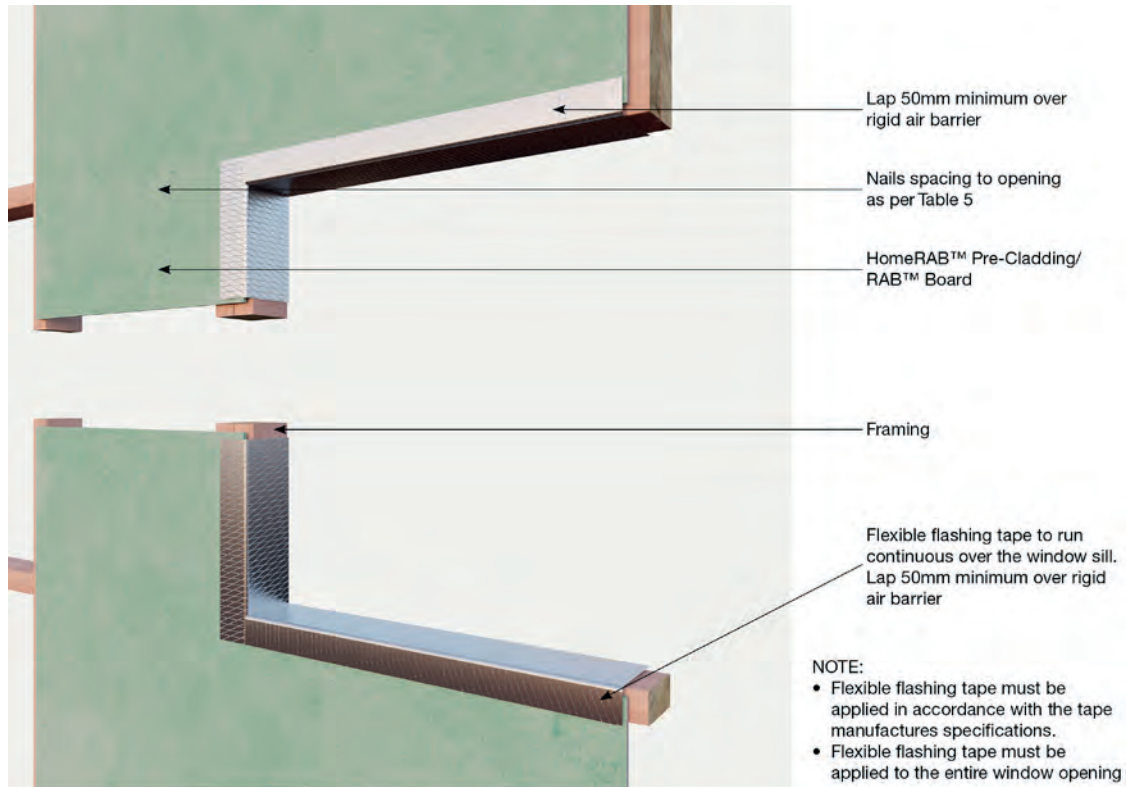


Figure 20: Window jamb with flashing tape

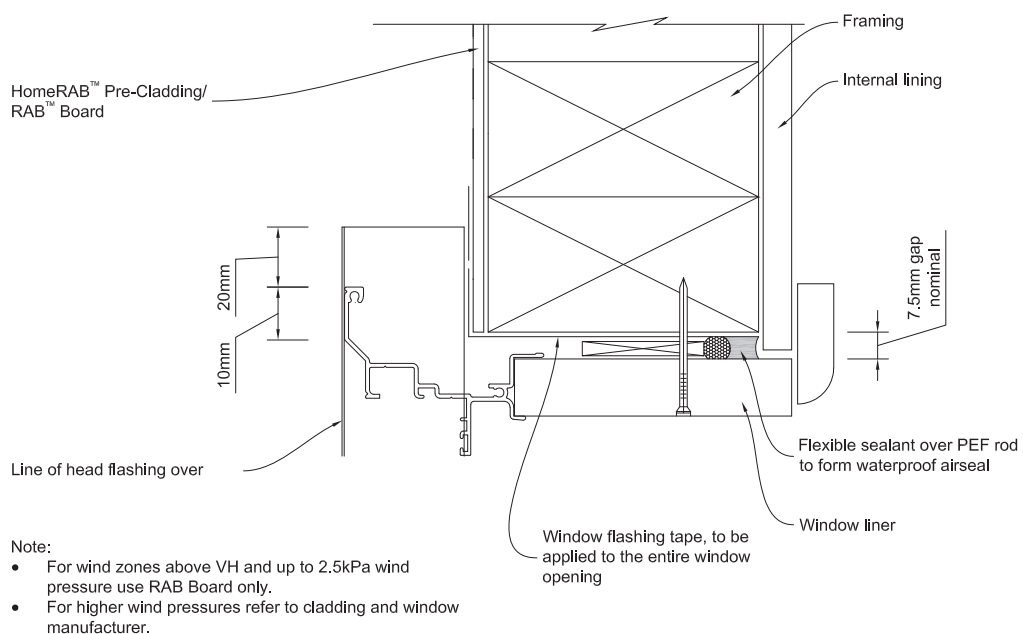


Figure 21: James Hardie rigid air barriers to standard soffit

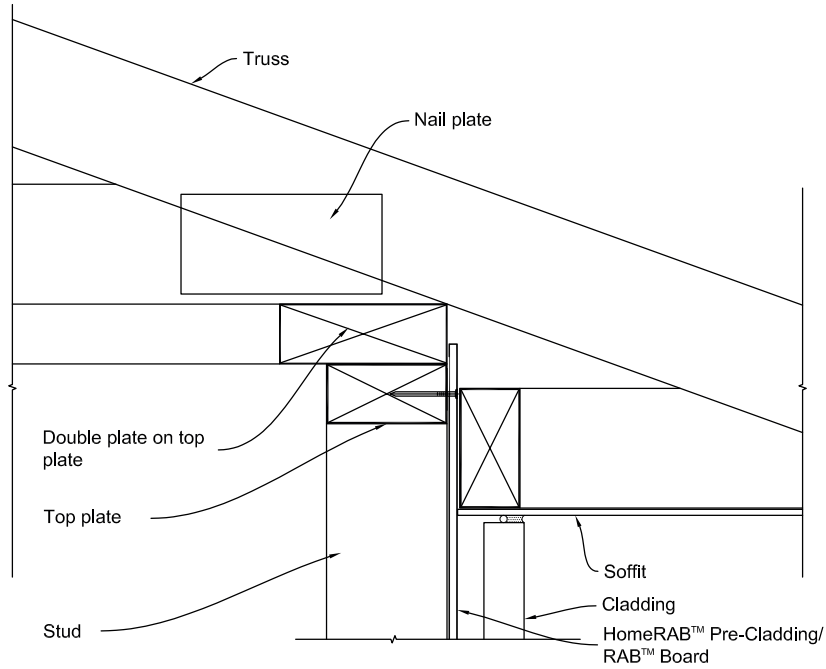
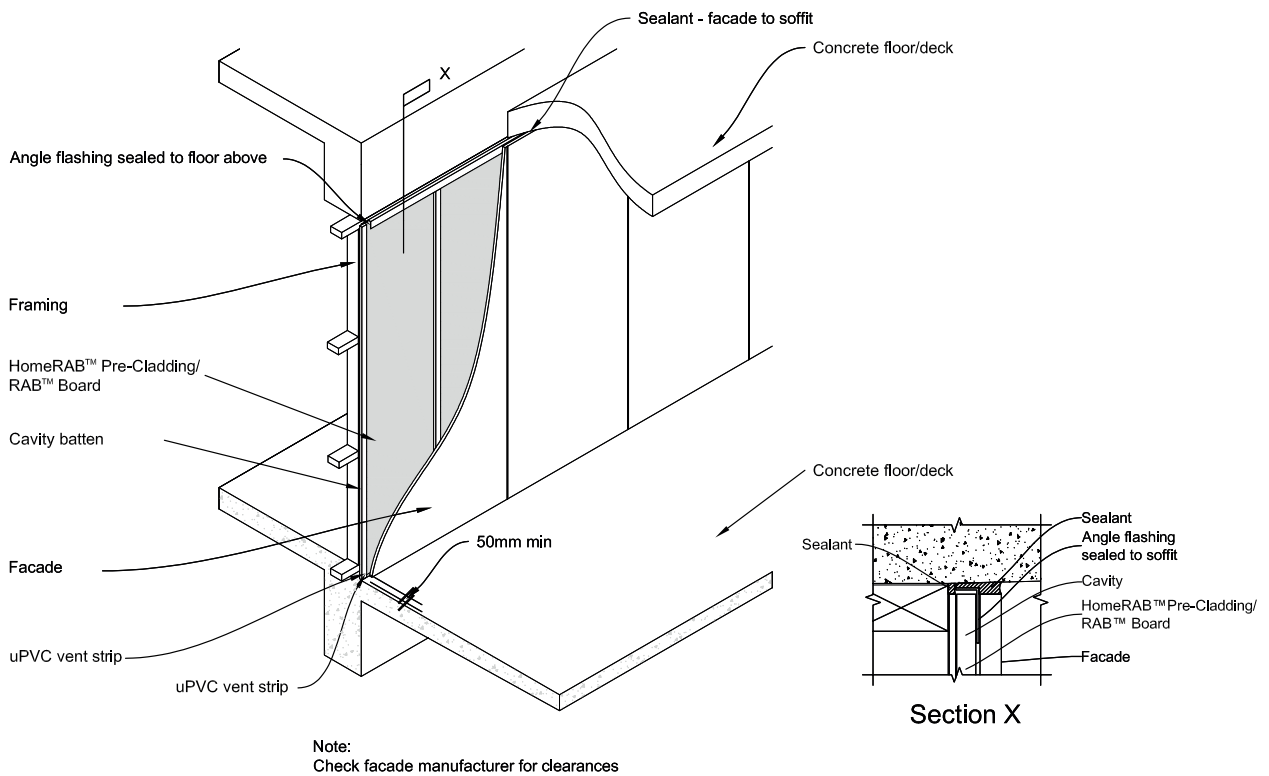


Figure 22: RAB Board to concrete slab junction



5.3.1 Penetrations

The pipe penetrations through James Hardie rigid air barrier must be sealed securely using a flexible flashing tape. Maintain a 100mm minimum cover of flashing over the board around the penetration.

5.3.2 Balustrade to wall junctions

The junctions between balustrades to wall should be appropriately flashed. Refer to E2/AS1 of the NZBC for information and flashing details.

Figure 23: Pipe penetration through James Hardie rigid air barriers

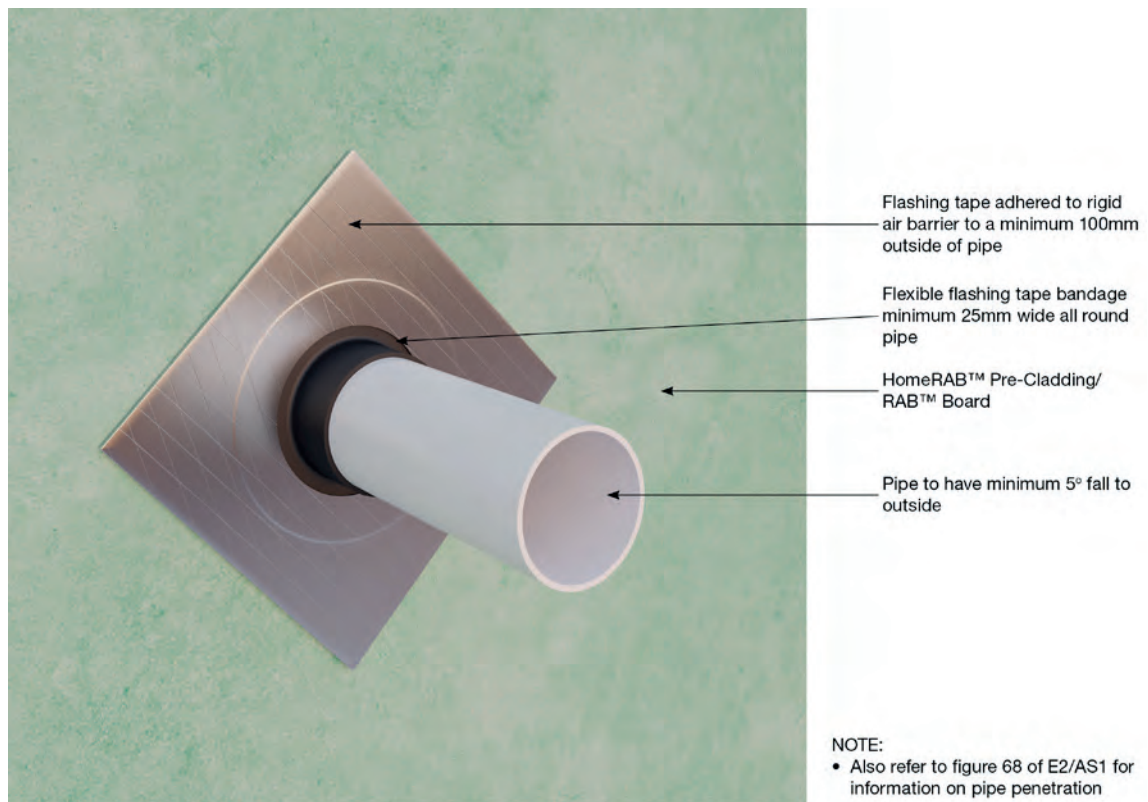


Figure 24: Flashing at balustrade

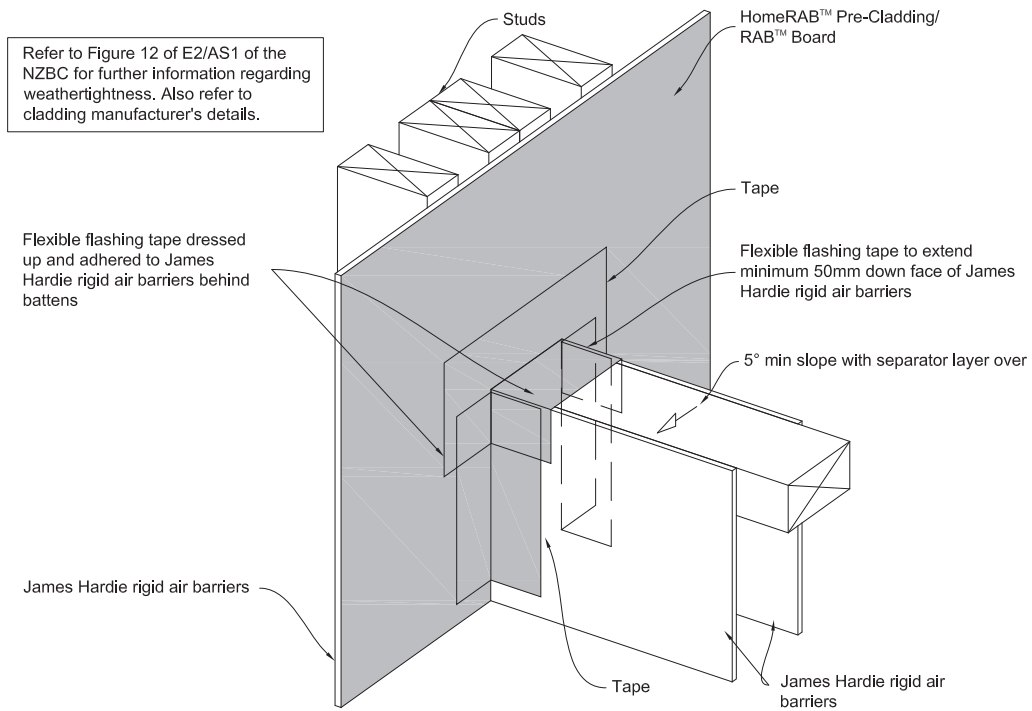
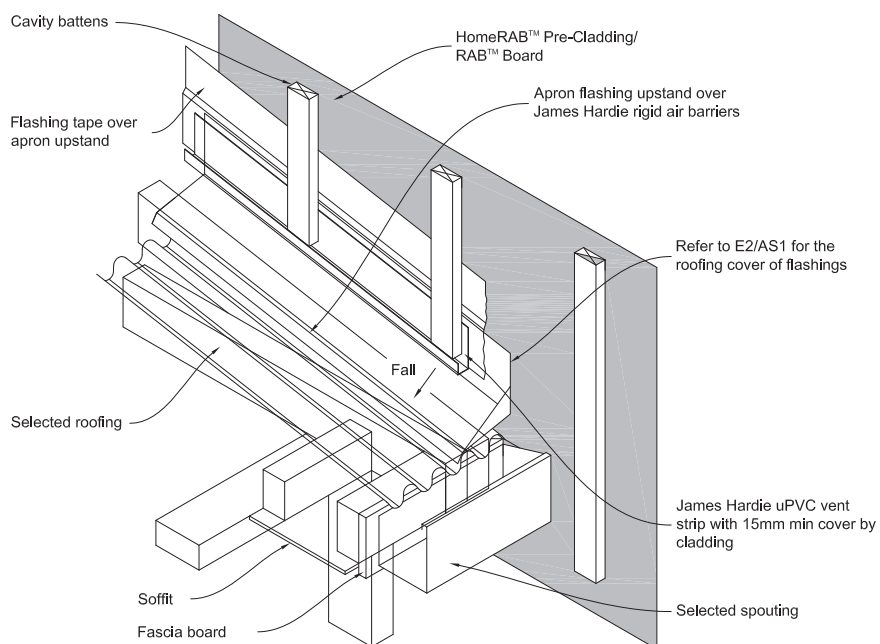


Figure 25: Apron flashing



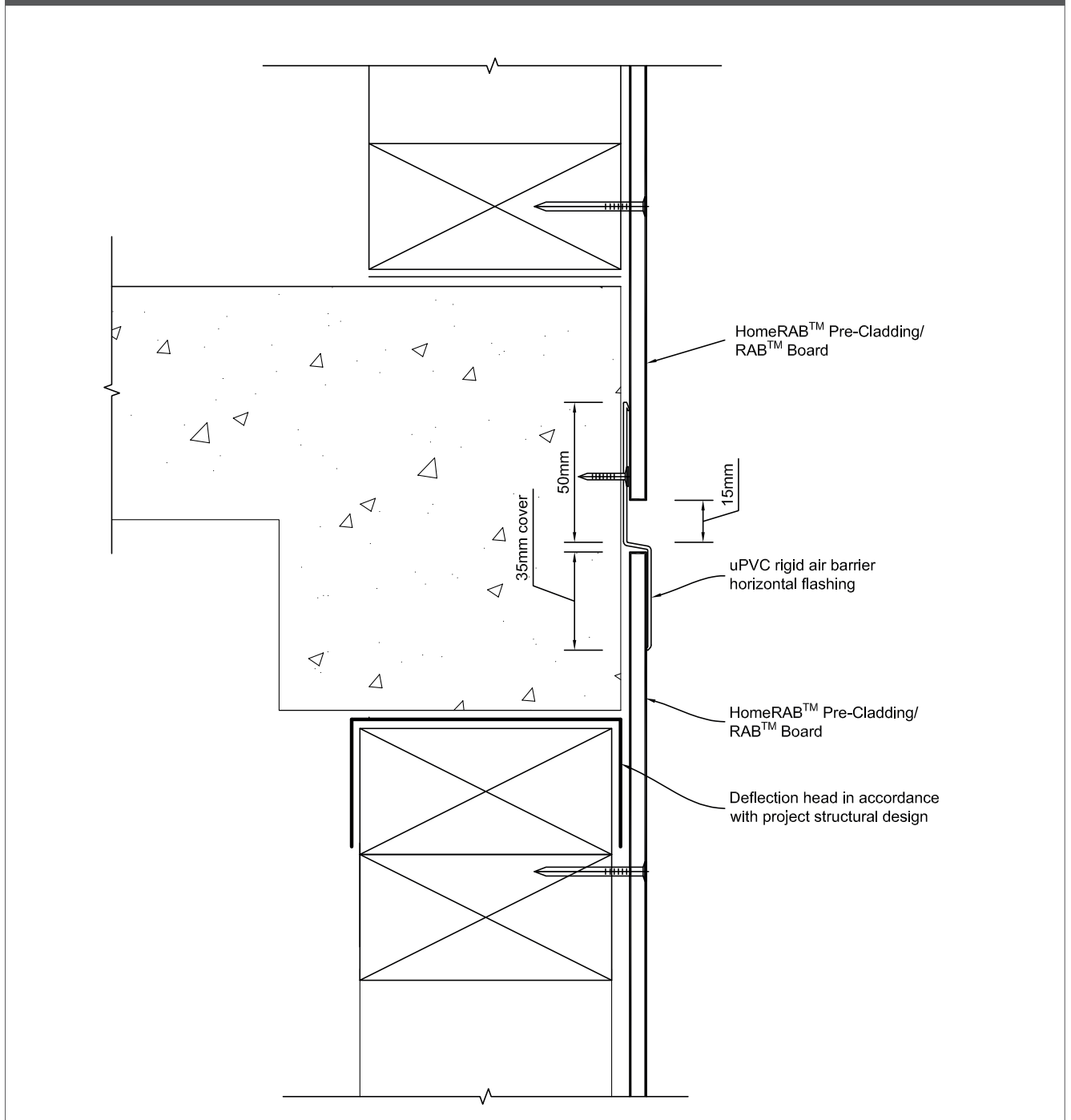
5.3.3 Inter-storey deflections

When installing James Hardie rigid air barriers, a horizontal joint in the RAB Board must be incorporated between sheets at each floor level to accommodate for the inter-storey deflections. Refer to Figures 9 and 10.

For the specific engineering design (SED), where structures are subject to high wind pressures and designed with inter-storey

seismic deflections, the use of 6mm or 9mm RAB Board is recommended. RAB Board, when fixed as per this installation manual, is readily capable of withstanding Serviceability Limit State (SLS) deflections up to span/180. For structures where greater inter-storey seismic deflections are expected, a deflection head should be used, as per the project structural engineer's design and detailing. Refer to Figure 26.

Figure 26: Deflection head



6 Bracing

James Hardie rigid air barriers are suitable for bracing applications. Given below are various bracing systems that have been tested and the bracing values published. Refer to bracing system details for bracing installation or refer to James Hardie Bracing Design Manual for further information.

6.1 BOTTOM PLATE FIXING/ HOLD DOWN RESTRAINTS

The timber framing must be fixed in accordance to table 8.19 of NZS 3604. Additional hold down restraints must be provided as per each bracing system's requirements. Refer to bracing systems details.

6.7.1 Concrete foundation

Pydra brace anchor kits or GIB Handibrac® with a 15kN minimum uplift capacity holding down bolt can be used as end restraints.

6.7.2 Timber foundation

Pydra brace anchor kits or GIB Handibrac® with a M12 x 150mm holding down bolt can be used as end restraints. Alternatively, holding down straps as per NZS 3604 can also be used.

6.2 FASTENER DURABILITY AND SIZE

Coach screws and holding down (HD) bolts, where used, must be M12 hot-dipped galvanised steel fitted with 50 x 50 x 3mm galvanised washers. The holding down bolts and washers must have a protective coating as per Table 4.2 of NZS 3604.

PRE-CLADDINGS:

All nails for fixing the pre-cladding bracing panels in Zone D must be Grade 304/316 stainless steel in accordance with NZS 3604.

All nails for fixing the pre-cladding bracing panels for Zone B and Zone C can be Grade 304/316 stainless steel or hot dipped galvanised steel nail.

Note: Fastener sizes are given in the respective details section for each product or system.

6.3 SHEET NAILING

Nails can be hand driven or gun nailed at a minimum edge distance as shown in the bracing details within this specification. This also applies to dimensions from corners, vertically and horizontally. The sheets must be held hard against the framing during nailing to minimise sheet break-out at the back of sheet. Always drive all nails flush with the sheet surface. For sheet/panel systems do not punch the nail below the surface as it reduces the nail's holding power.

Fix all sheets from the centre working towards outer edges to avoid drumminess. Fixings at 150mm maximum centres when hand nailing.

Gun nails can be used on some bracing systems with fixings at 100mm maximum centres. Must use a 6.85mm \varnothing round head coil nail with a pneumatic nail gun. **Refer to bracing tables for hand or gun nail options available.**

6.4 SHEET ORIENTATION

For the bracing systems specified in this manual, all flat sheets must be fixed vertically with the exception of Villaboard™ Lining, which can either be fixed vertically or horizontally as per the bracing systems details.

Full-height sheets must be used for walls up to 3000mm in height. When bracing walls height exceed 3000mm, sheet jointing is acceptable. Only one horizontal sheet joint is permitted within the element height. The maximum height of bracing wall is limited to 4800mm.

A site cut bracing sheet must be minimum 300mm wide when used in a bracing element. Refer to Figure 16.

Always ensure that the sheet joint is on the centre line of the stud or nog to achieve sufficient cover of fixings.

In internal walls the lining sheet used for bracing must stop 6mm above the finished floor.

6.5 SERVICE PENETRATIONS

Holes/penetrations up to 100 x 100mm positioned no closer than 200mm of the edge or another penetration, are allowed for services. Maximum of two service penetrations are recommended per sheet.

No window/door penetrations are allowed within the bracing elements.

Table 7

HomeRAB™ Pre-Cladding vertically fixed									
System number	Length	Hold down	Refer figures	BU/M		kN/m		Fixing method	
				Wind	Earthquake	Wind	Earthquake	Hand nail	Gun nail
Hpn	1200	N	27	67	71	3.4	3.6	√	
HP	400	Y	28,32,33,34	85	91	4.3	4.6	√	E
	600	Y	28,32,33,34	99	103	5.0	5.2	√	E
	1200 to 2400	Y	29,32,33,34	133*	104	6.7	5.2	√	E
	2400 to 4800	Y	29,32,33,34	141*	67	7.1	3.4	√	E

*A limit of 120BUs/m maximum applies to timber floors and 150BUs/m maximum to concrete floors built as per NZS 3604: 2011 unless a specific engineering design is carried out to ensure the uplift force generated by bracing elements does not exceed the maximum limit for each floor type.

Table 8

HomeRAB™ Pre-Cladding vertically fixed with 10mm GIB® Standard plasterboard									
System number	Length	Hold down	Refer figures	BU/M		kN/m		Fixing method	
				Wind	Earthquake	Wind	Earthquake	Hand nail	Gun nail
HPg	400	Y	28,30,32,33,34	90	98	4.5	4.9	√	E
	600	Y	28,30,32,33,34	127*	136*	6.4	6.8	√	E
	1200 to 2400	Y	29,31,32,33,34	164*	138*	8.2	6.9	√	E

*A limit of 120BUs/m maximum applies to timber floors and 150BUs/m maximum to concrete floors built as per NZS 3604: 2011 unless a specific engineering design is carried out to ensure the uplift force generated by bracing elements does not exceed the maximum limit for each floor type.

Table 9

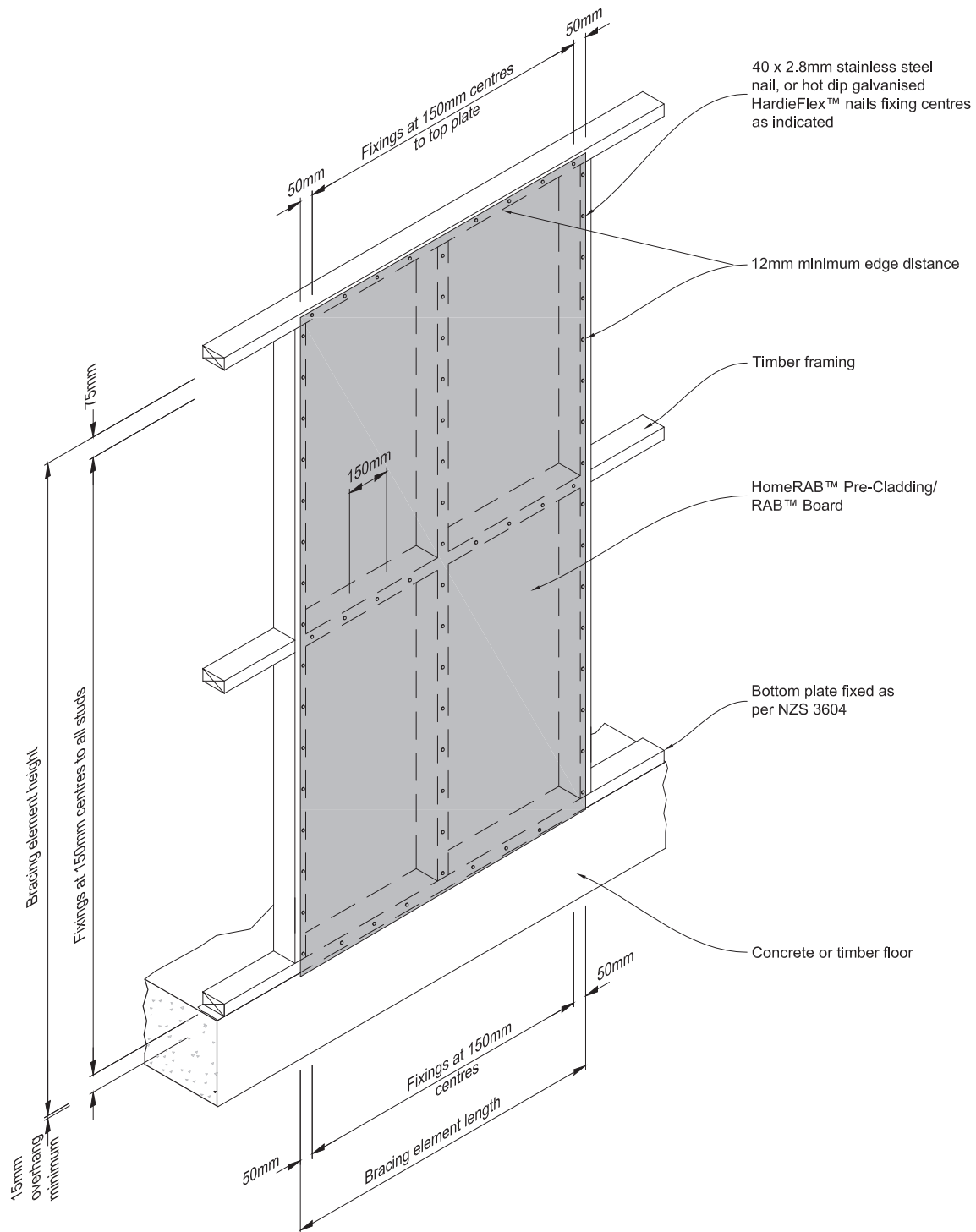
RAB™ Board 6mm or 9mm									
System number	Length	Hold down	Refer figures	BU/M		kN/m		Fixing method	
				Wind	Earthquake	Wind	Earthquake	Hand nail	Gun nail
JHDn	1200	N	27	118	102	5.9	5.1	√	
JHD	400	Y	28,32,33,34	83	107	4.2	5.4	√	E & P
	600	Y	28,32,33,34	99	107	5.0	5.4	√	E & P
	1200 to 2400	Y	29,32,33,34	154*	140*	7.7	7.0	√	E & P
	2400 to 4800	Y	29,32,33,34	133*	150*	6.7	7.5	√	E & P

*A limit of 120BUs/m maximum applies to timber floors and 150BUs/m maximum to concrete floors built as per NZS 3604: 2011 unless a specific engineering design is carried out to ensure the uplift force generated by bracing elements does not exceed the maximum limit for each floor type.

E = Ecko Pneumatic wireless coil nail

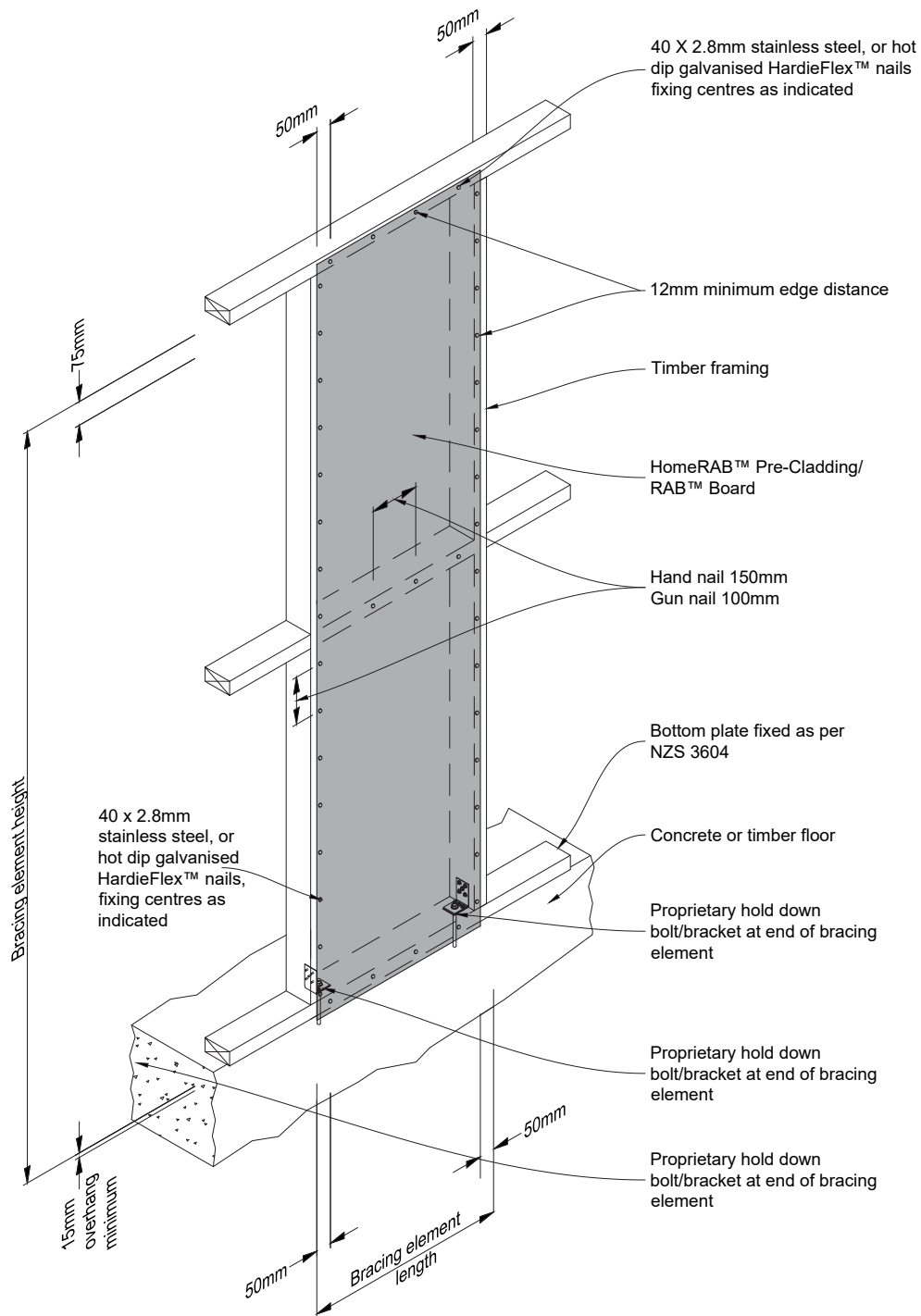
P = Paslode RounDrive ring shank nail

Figure 27: 1200mm HomeRAB™ Pre-Cladding or RAB™ Board to concrete or timber floor
 - no hold down brackets



Product	System	Minimum length
HomeRAB™ Pre-Cladding	HPn	1200mm
RAB™ Board	JHDn	1200mm

Figure 28: 400/600mm HomeRAB™ Pre-Cladding or RAB™ Board to concrete or timber floor



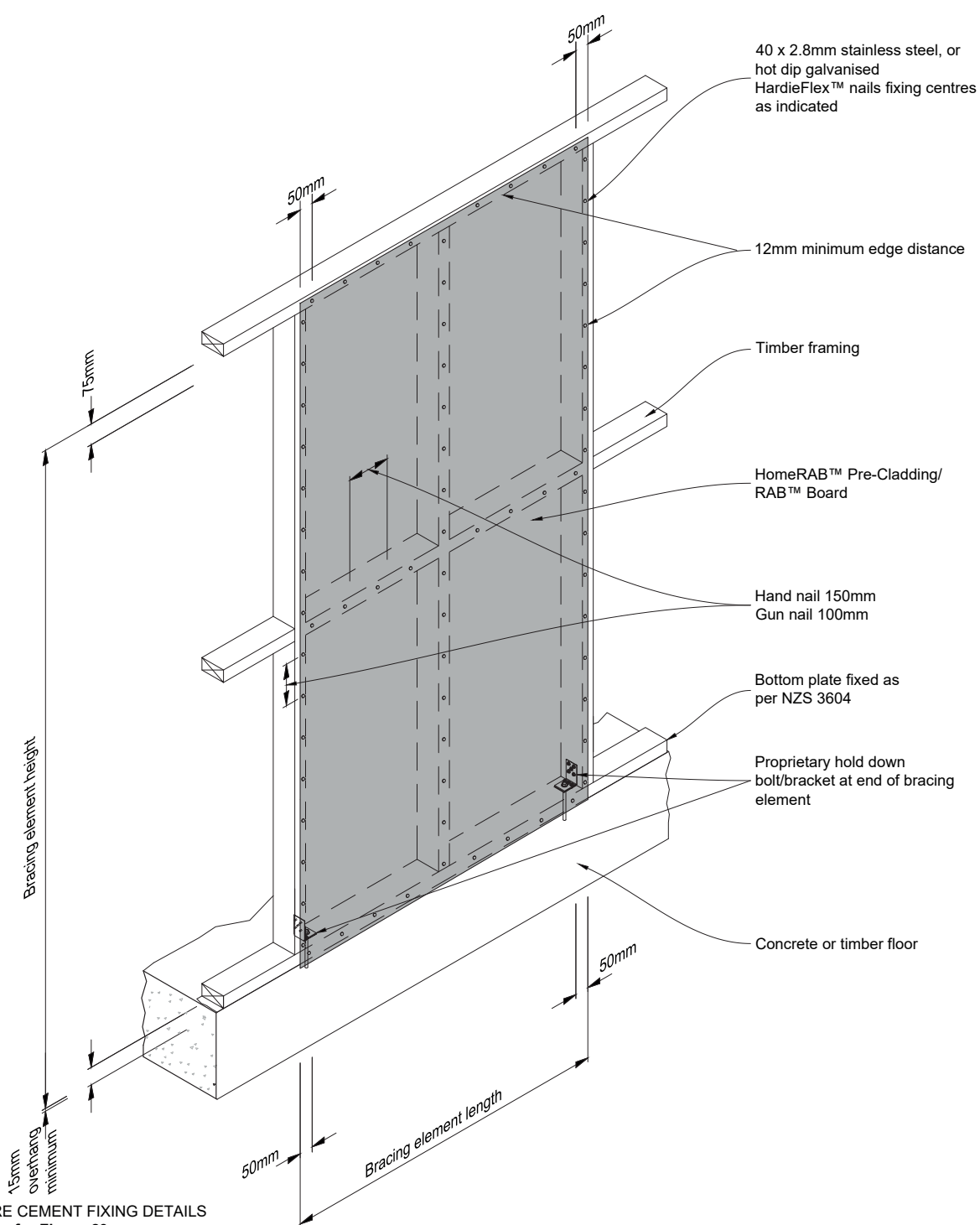
FIBRE CEMENT FIXING DETAILS

Notes for Figure 28:

- **Concrete floor** bottom plate fixing:- Ramset bracing anchor kit Concrete or GIB Handibrac® with 15kN anchor at each end of bracing element
- **Timber floor** bottom plate fixing:- Ramset bracing anchor kit Wood or GIB Handibrac® with a 12x150mm galvanised coach screw at each end of bracing element

Product	System	Minimum length
HomeRAB™ Pre-Cladding	HP	400 or 600mm
HomeRAB™ Pre-Cladding with 10mm GIB® Standard plasterboard	HPg	400 or 600mm
RAB™ Board	JHD	400 or 600mm

Figure 29: 1200mm HomeRAB™ Pre-Cladding or RAB™ Board to concrete or timber floor



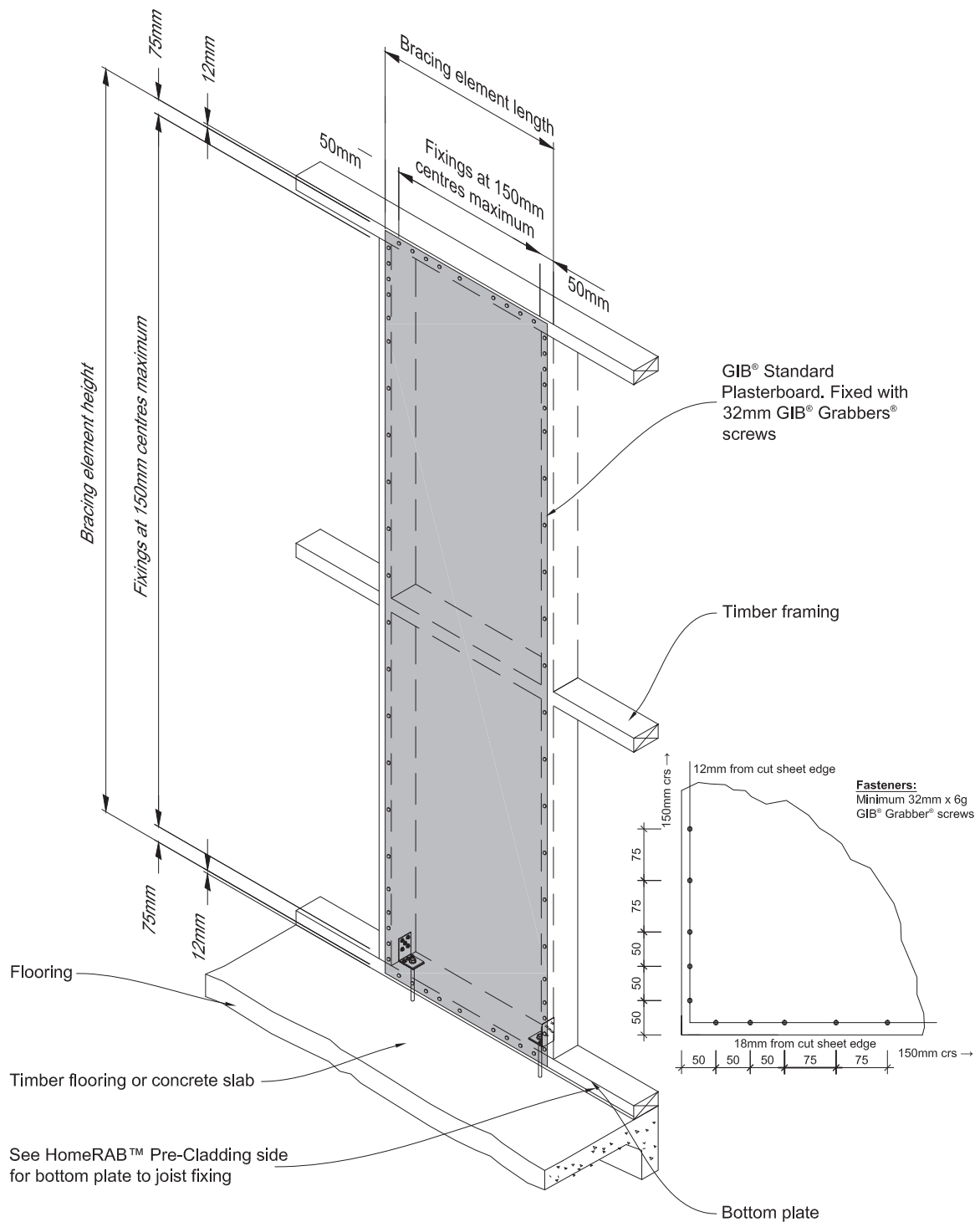
FIBRE CEMENT FIXING DETAILS

Notes for Figure 29:

- **Concrete floor** bottom plate fixing:- Ramset bracing anchor kit Concrete or GIB Handibrac® with 15kN anchor at each end of bracing element
- **Timber floor** bottom plate fixing:- Ramset bracing anchor kit Wood or GIB Handibrac® with a 12x150mm galvanised coach screw at each end of bracing element

Product	System	Minimum length
HomeRAB™ Pre-Cladding	HP	1200mm
HomeRAB™ Pre-Cladding with 10mm GIB® Standard plasterboard	HPg	1200mm
RAB™ Board	JHD	1200mm

Figure 30: 400mm/600mm HomeRAB™ Pre-Cladding with 10mm GIB® Standard Plasterboard



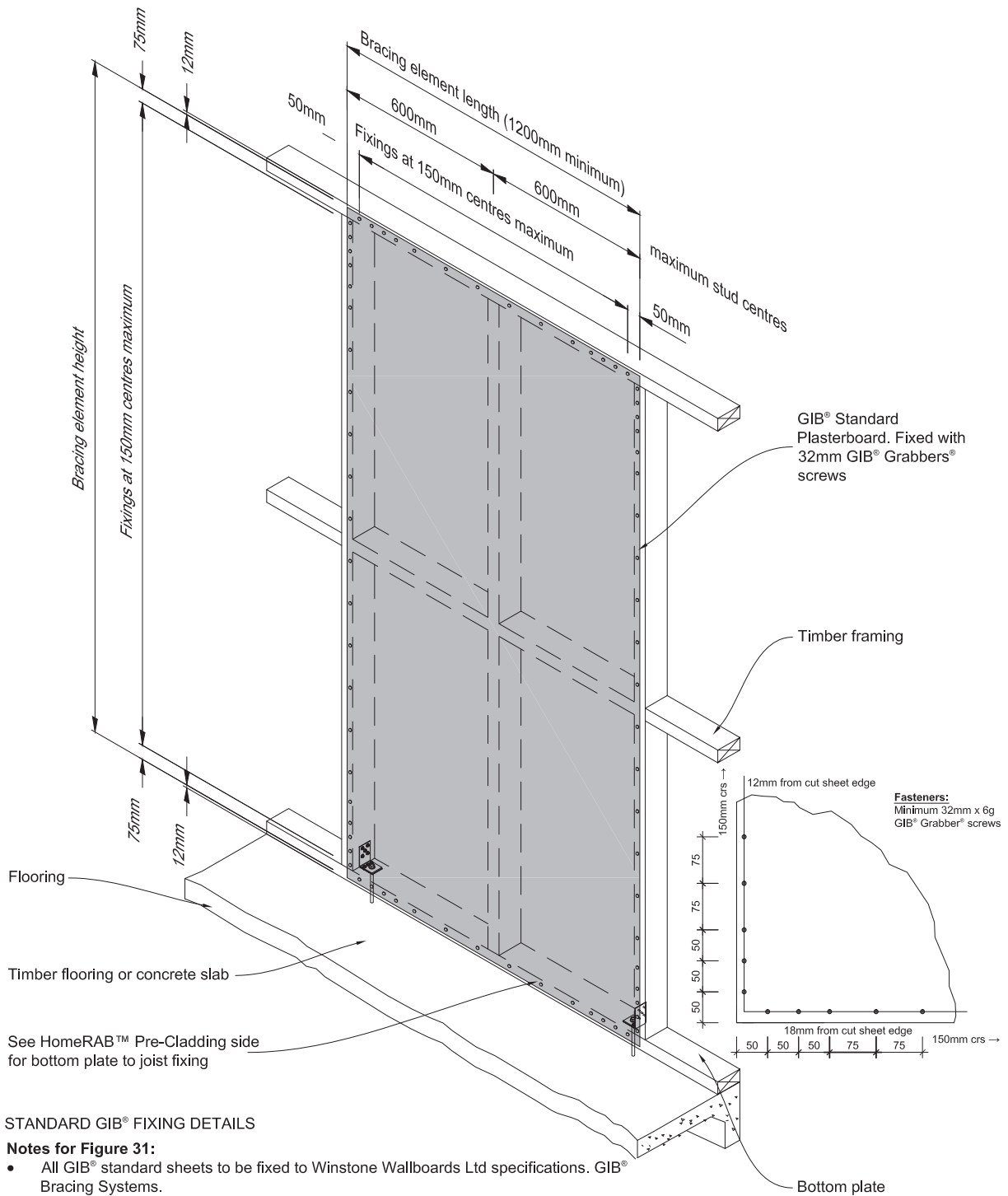
STANDARD GIB® FIXING DETAILS

Notes for Figure 30:

- All GIB® standard sheets to be fixed to Winstone Wallboards Ltd specifications, GIB® Bracing Systems.
- All GIB® bracing sheets to be stopped to Winstone Wallboards Ltd specifications, GIB® Site Guide.
- Refer Winstone Wallboards Ltd specifications for edge distance.

Product	System	Minimum length
HomeRAB™ Pre-Cladding	HPg	400 or 600mm

Figure 31: 1200mm HomeRAB™ Pre-Cladding with 10mm GIB® Standard Plasterboard



STANDARD GIB® FIXING DETAILS

Notes for Figure 31:

- All GIB® standard sheets to be fixed to Winstone Wallboards Ltd specifications. GIB® Bracing Systems.
- All GIB® bracing sheets to be stopped to Winstone Wallboards Ltd specifications. GIB® Site Guide.
- Refer Winstone Wallboards Ltd specifications for edge distance.

Product	System	Minimum length
HomeRAB™ Pre-Cladding/GIB® Standard Plasterboard	HPg	1200mm

Bracing Construction Figures

Figure 32: End bracket to concrete slab

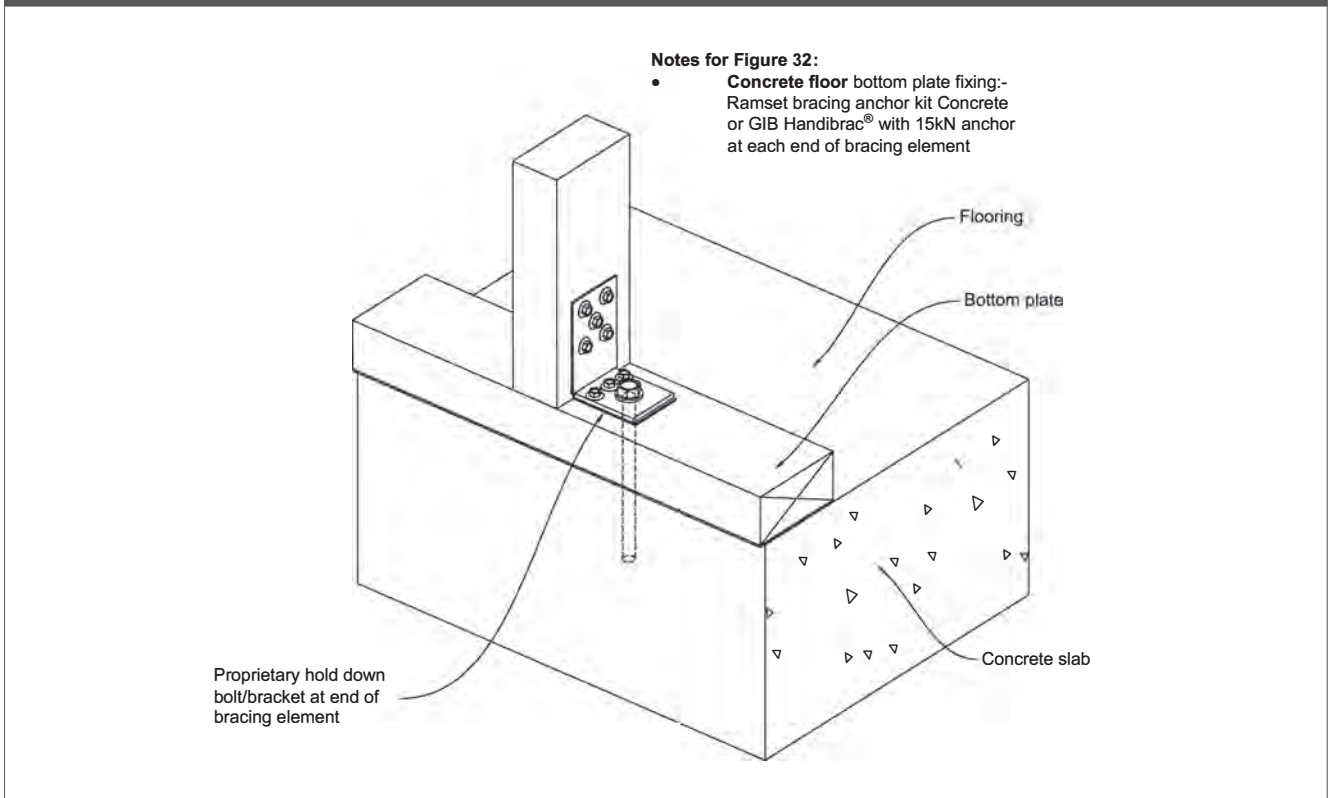


Figure 33: End bracket to timber joist

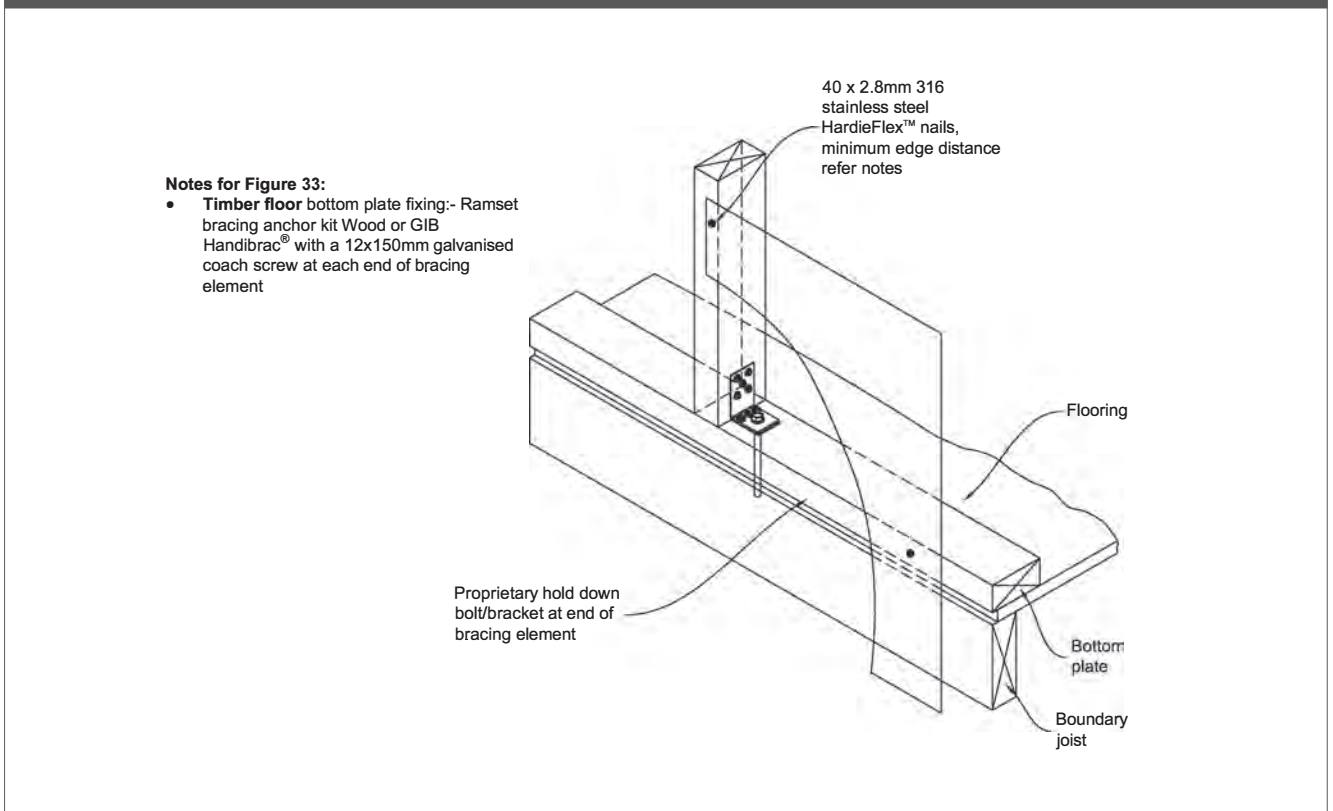
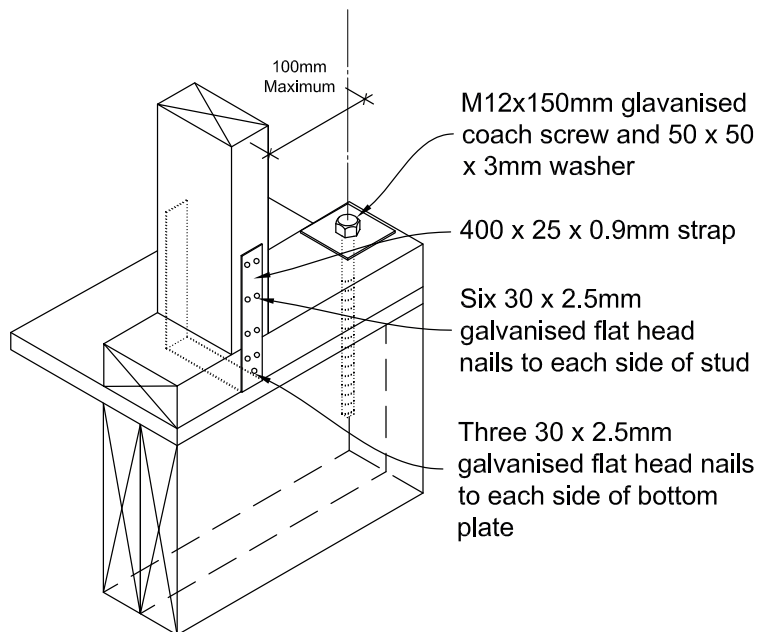
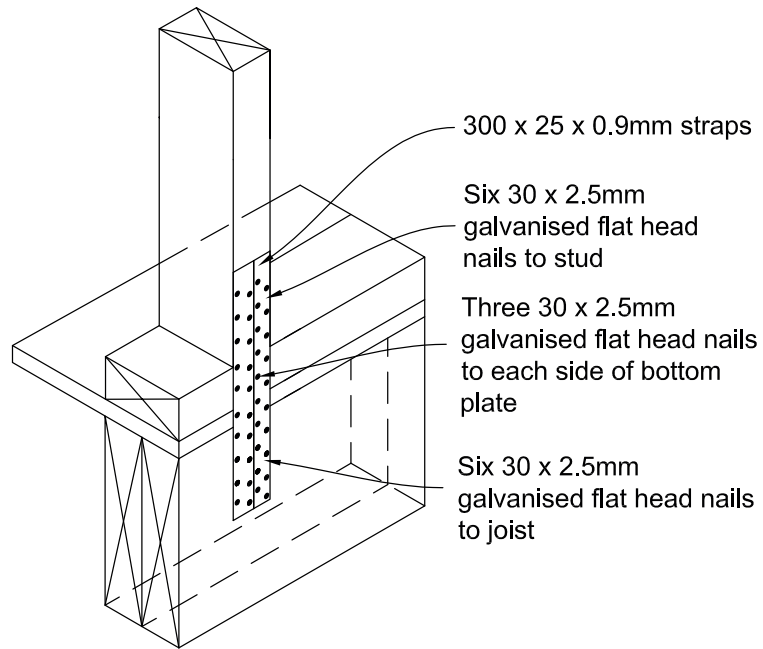


Figure 34: Hold down straps to timber joists



7 Product information

7.1 GENERAL

HomeRAB Pre-Cladding and RAB Board are cellulose fibre reinforced cement building products. The basic composition is Portland cement, ground sand, cellulose fibre and water.

RAB Board is easily identified by the name RAB Board printed on the back face. It has a green colour water repellent sealer applied on its front face.

HomeRAB Pre-Cladding is easily identified by the name 'HomeRAB Pre-Cladding' on the front face. It has a green colour water repellent sealer applied on its front face. The name is also printed on the back face of the lining.

HomeRAB Pre-Cladding and RAB Board are manufactured to conform to the requirements of AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheet (ISO 8336).

HomeRAB Pre-Cladding and RAB Board are classified Type B, Category 3 in accordance with AS/NZS 2908.2.

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

7.2 DURABILITY

Resistance to moisture/rotting

James Hardie rigid air barriers have been assessed for permanent moisture induced deterioration (rotting) and have met the performance requirements of AS/NZS 2908.2.

Resistance to fire

James Hardie rigid air barriers have been tested/assessed and are classified as Non-Combustible Material.

7.3 ALPINE REGIONS

In regions subject to freeze/thaw conditions, James Hardie rigid air barriers must not be in direct contact with snow or ice build up e.g. external walls in alpine regions subject to snow drifts over winter. James Hardie rigid air barriers have been tested to resist freeze thaw in accordance with AS/NZS 2908.2 clause 8.2.3 requirements and is suitable for use in alpine regions.

8 Finishes and maintenance

The selected cladding must be installed and finished within 180 days after the installation of James Hardie rigid air barriers, and the cladding must comply with the requirements of the NZBC. Regular cleaning and maintenance of claddings paints, joints, junctions, penetrations, flashings etc must be carried out at regular intervals and as per the requirements of the material manufacturers. Regular maintenance of cladding is also a requirement under the NZBC.

The ground clearances required for the James Hardie rigid air barriers and the cladding must always be maintained.

Notes

A series of horizontal dotted lines for taking notes.

Product Warranty

HomeRAB™
PRE-CLADDING



RAB™
BOARD



James Hardie New Zealand Limited (“James Hardie”) warrants for a period of 15 years from the date of purchase that the HomeRAB™ Pre-Cladding/RAB™ Board (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. James Hardie has tested the performance of the HomeRAB™ Pre-Cladding/RAB™ Board when installed in accordance with the HomeRAB™ Pre-Cladding/RAB™ Board installation manual 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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Installation Checklist

IMPORTANT NOTES:

- All sections of this checklist should be completed in full.
- Careful adherence to technical specification literature is critically important for completing HomeRAB™ Pre-Cladding and RAB™ Board pre-cladding construction. The construction shall comply with requirements of building consent. Any variations made should be approved by the BCA prior to work being undertaken.
- If you have any queries please Ask James Hardie™ on 0800 808 868.

Property details:

Owner :

Address: _____

Builder/Installer name:

Company name:

Company address:

Installer type:

LBP

(Circle applicable)

LBP No.

Telephone No:

Member of Building Trade

Date completed: / /

Please specify

BUILDER / INSTALLER SECTION

Scope pre-check

		L	M	H	VH	EH
i	Wind zone (per NZS 3604)					
ii	Foundation type	Concrete		Timber		
iii	Floor joist	Standard joist		Engineered joist (type)		
iv	Highest point of cladding above ground/No. of storeys.					
v	Areas of specific engineering design not covered by product literature, if any.					
vi	DP number/Building consent number	DP		Consent number		
vii	BCA Office	Office		Phone		

Framing

	ITEMS TO BE CHECKED	PLS TICK	NOTES
1	External wall timber framing is treated to min H1.2 treatment levels. Specify if any other treatment to be used.		
2	Timber framing set out. I.e. Stud spacing and nog spacing.		
3	Moisture content in timber framing before HomeRAB Pre-Cladding/RAB Board installation must not exceed 24% Timber frame moisture content must be as per NZS 3602 at the time of fixing the external cladding.		
4	Framing straightness. Nogs flush with studs, and studs flush with top and bottom plates.		
5	Risk Score North Elevation..... / South Elevation East Elevation..... / West Elevation.....		
6	Timber framing fixed in accordance with NZS 3604 and project specification. Check for extra fixings that may be required for bracing systems and fire and acoustic systems.		

Sheet fixing and set out

	ITEMS TO BE CHECKED	PLS TICK	NOTES
7	HomeRAB Pre-Cladding/RAB Board to be kept dry and under cover.		
8	HomeRAB Pre-Cladding/RAB Board installed in accordance with James Hardie Rigid Air Barriers Installation Manual.		
9	Tape installed over HomeRAB Pre-Cladding/RAB Board vertical joints, corners and openings in accordance with James Hardie Rigid Air Barriers Installation Manual.		
10	uPVC horizontal flashing used at all horizontal joints		
11	HomeRAB Pre-Cladding/RAB Board to be installed dry.		
12	Fixings: Type - Stainless steel/galvanised nails Size -		
13	Minimum clearance provided to paved or unprotected ground as required by NZS 3604 and E2/AS1		

14	The panels overhang the bottom plate on a concrete slab by a minimum of 15mm as per installation manual.		
15	Penetrations through HomeRAB Pre-Cladding/ RAB Board sealed properly using flexible flashing tape as per E2/AS1		

Flashings

	ITEMS TO BE CHECKED	PLS TICK	NOTES
16	Flexible flashing tapes to be applied to window sill framing and head framing as per E2/AS1 when building underlay used.		
17	Flexible flashing tapes to be applied to entire opening when HomeRAB Pre-Cladding/RAB Board used.		
18	Head and sill flashings to be provided as per figures in technical specification.		
19	Top of walls and junctions etc must be flashed appropriately.		

Window and door installation

	ITEMS TO BE CHECKED	PLS TICK	NOTES
20	Flashings installed as per James Hardie rigid air barrier installation manual and project specific requirements.		
21	Minimum 10mm cover under the window flange at jamb and sill.		
22	An air seal provided at the rear of the window reveal.		
23	Window and door penetrations treated as specified in standard details and project specifications.		
24	Head flashings extend past window edge 20mm each side as per cladding technical specification		



DECLARATION

I/we have installed the HomeRAB Pre-Cladding/RAB Board as per James Hardie Rigid Air Barriers Installation Manual current at the time of construction.

Signed by:
Print Name *Signed Name*

Dated:

4231HL James Hardie® Linea™ Cladding



James Hardie

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SUPPORTING DOCUMENTS

BRANZ Appraisal 896 - Linea™ Oblique™ Weatherboard (Horizontal) Cavity Cladding

Ref 10597. Uploaded 12 Aug 2020

Purpose: Performance

BRANZ Appraisal 897 - Linea™ Oblique™ Weatherboard (Vertical) Cavity Cladding

Ref 10598. Uploaded 12 Aug 2020

Purpose: Performance

Linea Oblique Weatherboard Horizontal Installation Technical Specification - Sep 2018

Ref 10430. Uploaded 30 Jul 2020

Purpose: Installation

Linea Oblique Weatherboard Vertical Installation Technical Specification - Jul 2018

Ref 10431. Uploaded 30 Jul 2020

Purpose: Installation



BRANZ Appraised

Appraisal No. 896 [2015]

LINEA® OBLIQUE WEATHERBOARD [HORIZONTAL] CAVITY CLADDING

Appraisal No. 896 [2015]

Amended 15 December 2015



BRANZ Appraisals

Technical Assessments of products
for building and construction.



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Product

- 1.1 Linea® Oblique Weatherboard [Horizontal] 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 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding consists of Linea® Oblique Weatherboard, which is a rusticated profile fibre cement weatherboard, fixed over timber battens to form the cavity. The cladding is finished with a latex paint system.
- 1.3 The cladding incorporates a primary and secondary means of weather resistance [first and second line of defence] against water penetration by separating the cladding from the external wall 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.

Scope

- 2.1 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding has been appraised as an external wall cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - situated in NZS 3604 Wind Zones up to, and including Extra High.
- 2.2 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding has also been appraised for weathertightness and structural wind loading when used as an external horizontally fixed wall cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.
- 2.3 Linea® Oblique Weatherboard must only be installed horizontally on vertical surfaces.
- 2.4 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[The Appraisal of Linea® Oblique Weatherboard [Horizontal] Cavity Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

[Note: Linea® Oblique Weatherboard [Horizontal] Cavity Cladding can be used to provide fire resistance rated construction, but this aspect has not been assessed by this Appraisal and is outside its scope.]

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Linea® Oblique Weatherboard [Horizontal] Cavity Cladding if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Linea® Oblique Weatherboard [Horizontal] 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. Linea® Oblique Weatherboard [Horizontal] Cavity Cladding meets these requirements. See Paragraphs 10.1 - 10.4.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.7 (a). Linea® Oblique Weatherboard [Horizontal] Cavity Cladding meets this requirement. See Paragraph 12.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Linea® Oblique Weatherboard [Horizontal] Cavity Cladding meets this requirement. See Paragraphs 14.1 - 14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Linea® Oblique Weatherboard [Horizontal] Cavity Cladding meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Linea® Oblique Weatherboards are rusticated profile weatherboards. The weatherboards are pre-primed with an acrylic primer on the front face and edges. Linea® Oblique Weatherboards are 16 mm thick and are available 200 and 300 mm wide. The boards are supplied 2700 and 4200 mm long.

4.2 Linea® 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. Linea® Oblique Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

Accessories

4.3 Accessories used with Linea® Oblique Weatherboard [Horizontal] Cavity Cladding which are supplied by James Hardie New Zealand are:

- **Axent™ Trim** - a 16 mm thick fibre cement trim manufactured from a reduced density cellulose fibre cement formulation. Axent™ Trim is pre-primed with an acrylic primer on the front face and both edges, and is available in sizes of 84 mm and 100 mm wide by 2600 mm long.
- **Joint flashings** - Oblique Trimline Joint Flashing and Vertical Joint Flashing. The joint flashings are available in extruded aluminium in 3000 mm lengths.
- **External and internal corner mouldings** - 90° anodised aluminium external box corner available in 2700 and 4000 mm lengths, and 90° internal corner 'W' mould, available in 2700 mm lengths.
- **Window jamb flashing** - aluminium 'L' extrusion available in 3000 mm lengths.
- **Cavity vent strip** - Stria aluminium cavity closure or uPVC vent strip, available in 3000 mm lengths.

4.4 Accessories used with Linea® Oblique Weatherboard [Horizontal] Cavity Cladding which are supplied by the building contractor are:

- **Flexible wall underlay** - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.

- **Flexible 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** – James Hardie Rigid Air Barriers covered by BRANZ Appraisal No. 611 [2011].
- **Flexible sill, head and jamb flashing tape** – flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Cavity battens** – nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to Hazard Class H3.1.
- **Cavity batten fixings** – 40 x 2.8 mm flat head hot-dip galvanised nails.
- **Linea® 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.
- **Linea® 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.
- **Axent™ Trim 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 nails.

[Note: Stainless steel fixings must be Grade 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.
- **Planted sill and scribes** – timber treated to Hazard Class H3.1, pre-primed before installation.
- **Window and door trim cavity air seal** – air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- **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.

Paint System Specification

- 4.5 Paint systems are not supplied by James Hardie New Zealand 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 Linea® Oblique Weatherboard, Axent™ Trim and accessories must be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by James Hardie New Zealand or the building contractor, whether on site or off site, is under the control of the building contractor. Linea® 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 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Linea® Oblique Weatherboard [Horizontal] Cavity Cladding. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

- 7.1 Timber wall framing behind Linea® Oblique Weatherboard [Horizontal] Cavity Cladding must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 Timber framing must comply with NZS 3604 for buildings or parts of a building within the scope limitations of NZS 3604. Buildings or parts of a building outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Studs must be at maximum 600 mm centres. Nogs must be fitted flush between the studs at maximum 800 mm centres [for studs at 600 mm centres] or maximum 1200 mm centres [for studs at 400 mm centres].
- 7.3 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. *[Note: If weatherboards are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]*
- 7.4 Timber wall framing must have a maximum moisture content of 18% before the weatherboards are painted.

General

- 8.1 When the Linea® Oblique Weatherboard [Horizontal] Cavity Cladding is used for specifically designed buildings up to 2.5 kPa ULS wind pressure, only the weathertightness and structural aspects of the cladding are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.
- 8.2 Punchings in the cavity vent strip provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall.
- 8.3 At ground level the bottom edge of Linea® 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 Linea® 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 2.5 kPa design differential ULS wind pressure. 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.
- 8.6 Where cladding penetrations are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the vertical cavity batten and the flashing to the opening.
- 8.7 Where Linea® Oblique Weatherboard [Horizontal] 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.

Interstorey Junctions

- 8.8 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4[b].

Structure

Mass

- 9.1 The mass of the 200 mm wide Linea® Oblique Weatherboard when installed on the wall is 20.6 kg/m² at equilibrium moisture content [EMC] and the mass of the 300 mm wide board is 19.7 kg/m² at EMC. Linea® Oblique Weatherboard [Horizontal] Cavity Cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

- 9.2 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding will resist impacts likely to be encountered in normal residential use. The likelihood of impact damage to the cladding when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers provided for vulnerable areas.

Wind Zones

- 9.3 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa ULS wind pressure where buildings are specifically designed.

Durability

- 10.1 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding meets the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the Linea® 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 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding installations are expected to have a serviceable life of at least 50 years provided the paint coating system is maintained in accordance with this Appraisal to ensure the Linea® Oblique Weatherboards and fixings remain dry in service. Linea® Oblique Weatherboards must be painted within 3 months 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 metres from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604 Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life in Zone D, Linea® Oblique Weatherboards must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot-dip galvanised steel.
- 10.4 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Linea® Oblique Weatherboards in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604 Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

- 11.1 Regular maintenance is essential for Linea® Oblique Weatherboard [Horizontal] 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.
- 11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *[Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Linea® Oblique Weatherboard [Horizontal] Cavity Cladding.]*

Control of External Fire Spread

- 12.1 Linea® Oblique Weatherboard has a peak heat release rate of less than 100 kw/m² and a total heat released of less than 25 MJ/m² in accordance with NZBC Acceptable Solution C/AS1 Table 5.1. The system is suitable for use on buildings with a SH Risk Group classification, at any distance to the relevant boundary. Linea® Oblique Weatherboard is also suitable for use where a non-combustible material is specified. When Linea® Oblique Weatherboard is finished with a paint coating of not more than 1.0 mm in thickness, the exterior surface finishes requirements of NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.1 do not apply in accordance with NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.2 a).

Prevention of Fire Occurring

- 13.1 Linea® Oblique Weatherboard is considered a non-combustible material and need not be separated from heat sources such as fire places, heating appliances, flues 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, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 - C/AS6 and NZBC Verification Method C/VM1.

External Moisture

- 14.1 Linea® Oblique Weatherboard [Horizontal] Cavity Cladding, when installed in accordance with this Appraisal and the Technical Literature will prevent the penetration of moisture that could cause undue dampness or damage to building elements.
- 14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with Clause E2.3.5.
- 14.3 Linea® Oblique Weatherboard [Horizontal] 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 Clause E2.3.6.
- 14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.
- 14.5 The use of Linea® Oblique Weatherboard [Horizontal] Cavity Cladding where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for junctions, penetrations, etc to remain weather resistant.

Internal Moisture

- 15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

- 15.2 Linea® Oblique Weatherboard [Horizontal] 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 Requirements

- 16.1 Installation of Linea® Oblique Weatherboard and accessories supplied by James Hardie New Zealand and the building contractor must be carried out by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with instructions given within the Linea® Oblique Weatherboard [Horizontal] Cavity Cladding Technical Literature and this Appraisal.

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 Linea® Oblique Weatherboard [Horizontal] 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. James Hardie Rigid Air Barriers must be installed in accordance with the instructions of James Hardie New Zealand. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

Cavity Battens

- 17.2 Cavity battens must be installed over the wall underlay to the wall framing at maximum 600 mm centres where the studs are at 600 mm centres or at 400 mm centres when studs are at 400 mm centres. The battens must be temporarily fixed in place with 40 x 2.8 mm hot-dip galvanised flat-head nails at maximum 800 mm centres.
- 17.3 Where studs are at greater than 400 mm centres and a flexible wall underlay is used, a wall underlay support must be installed over the underlay at maximum 300 mm horizontal centres.

Linea® Oblique Weatherboard Installation

- 17.4 Linea® 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.
- 17.5 Weatherboards must be dry prior to installation. Before the weatherboards are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement.
- 17.6 Linea® Oblique Weatherboards must be installed starting at the bottom of the wall. The bottom course of weatherboards must overhang the bottom plate by a minimum of 50 mm.
- 17.7 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner. The necessary flashings, including window flashings, must be installed before commencing weatherboard fixing.
- 17.8 The first course of weatherboards must be full length, i.e. 4200 mm and commence from an external corner. Jointing of Linea® Oblique Weatherboards is made over cavity battens using the vertical trimline joint flashing or vertical joint flashing. A bead of sealant must be applied to the end of the weatherboard before butting it to the jointer.

- 17.9 Linea® Oblique Weatherboard laps are pre-determined by the machined joint detail. Window and door joinery should be designed so as near to a full board as possible will finish over the joinery.
- 17.10 200 mm wide Linea® Oblique Weatherboards must be fixed to each stud using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nail depending on the location - see Paragraph 10.3. The nail must be positioned 100 mm above the bottom edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.
- 17.11 300 mm wide Linea® Oblique Weatherboards must be fixed to each stud using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails depending on the location - see Paragraph 10.3. The nail must be positioned 150 mm above the bottom edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.

Aluminium Joinery Installation

- 17.12 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.
- 17.13 After installing the window and door joinery, the board recess at the window jamb must be filled with flexible sealant. Axent™ Trim, planted sills and scribes may also be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/weatherboard junction.

Finishing

- 17.14 All punched fixings must be filled. The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. Linea® Oblique Weatherboards and trim must be clean and dry before commencing painting.

Inspections

- 17.15 The Technical Literature must be referred to during the inspection of Linea® Oblique Weatherboard [Horizontal] Cavity Cladding installations.

Health and Safety

- 18.1 Cutting of Linea® Oblique Weatherboard 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 Linea® Oblique Weatherboard 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 BRANZ expert opinion on NZBC E2 code compliance for Linea® Oblique Weatherboard [Horizontal] Cavity Cladding was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Linea® Oblique Weatherboard [Horizontal] Cavity Cladding was tested to NZBC Verification Method E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meterbox head, jamb and sill details, balustrade to wall junction, parapet cap and internal and external corners. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for drained cavity claddings.
- 19.2 Uniform wind face load tests to simulate wind pressures on Linea® Oblique Weatherboards were carried out by a James Hardie 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.
- 19.3 Cone Calorimeter testing to determine the peak rate of heat release and total heat release of Linea® Oblique Weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.
- 19.4 Linea® Oblique Weatherboards have been tested by a James Hardie 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.

Other Investigations

- 20.1 Weathertightness, structural, fire and durability opinions have been provided by BRANZ technical experts.
- 20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 20.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of Linea® Oblique Weatherboard has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of materials, components and accessories supplied by James Hardie New Zealand is the responsibility of James Hardie New Zealand. The quality control system of James Hardie New Zealand has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 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 wall underlay, cavity battens, Linea® Oblique Weatherboard and accessories in accordance with the instructions of James Hardie New Zealand.
- 21.5 Building owners are responsible for the maintenance of Linea® Oblique Weatherboard [Horizontal] Cavity Cladding in accordance with the instructions of James Hardie New Zealand.



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.
- ISO 8336: 2009 Fibre-cement flat sheets -- Product specification and test methods.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 [Amendment 6, 14 February 2014].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 15 December 2015.

This Appraisal has been amended to remove rigid wall underlay complying with NZBC Acceptable Solution E2/AS1.



BRANZ Appraised
Appraisal No. 896 [2015]

BRANZ Appraisal
Appraisal No. 896 [2015]
20 November 2015

LINEA® OBLIQUE
WEATHERBOARD [HORIZONTAL]
CAVITY CLADDING



In the opinion of BRANZ, **Linea® Oblique Weatherboard [Horizontal] 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**, 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:**
 - 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**.
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** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

20 November 2015



BRANZ Appraised

Appraisal No. 897 [2015]

LINEA® OBLIQUE WEATHERBOARD [VERTICAL] CAVITY CLADDING

Appraisal No. 897 [2015]

Amended 15 December 2015



BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 Linea® 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 Linea® Oblique Weatherboard [Vertical] Cavity Cladding consists of Linea® Oblique Weatherboard, which is a rusticated profile fibre cement weatherboard, fixed vertically over ventilated timber battens to form the cavity. The cladding is finished with a latex paint system.
- 1.3 The cladding incorporates a primary and secondary means of weather resistance [first and second line of defence] against water penetration by separating the cladding from the external wall 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.

Scope

- 2.1 Linea® Oblique Weatherboard [Vertical] Cavity Cladding has been appraised as an external wall cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - situated in NZS 3604 Wind Zones up to, and including Extra High.
- 2.2 Linea® Oblique Weatherboard [Vertical] Cavity Cladding has also been appraised for weathertightness and structural wind loading when used as an external vertically fixed wall cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.
- 2.3 Linea® Oblique Weatherboard must only be installed vertically on vertical surfaces.
- 2.4 Linea® Oblique Weatherboard [Vertical] Cavity Cladding is appraised for use with aluminium window and door joinery that is installed with vertical jambs and vertical heads and sills. *[Note: The Appraisal of Linea® Oblique Weatherboard [Vertical] Cavity Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

[Note: Linea® Oblique Weatherboard [Vertical] Cavity Cladding can be used to provide fire resistance rated construction, but this aspect has not been assessed by this Appraisal and is outside its scope.]

Building Regulations

New Zealand Building Code [NZBC]

3.1 In the opinion of BRANZ, Linea® 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. Linea® 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. Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets these requirements. See Paragraphs 10.1 - 10.4.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.7 (a). Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets this requirement. See Paragraph 12.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets this requirement. See Paragraphs 14.1 - 14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Linea® Oblique Weatherboards are rusticated profile weatherboards. The weatherboards are pre-primed with an acrylic primer on the front face and edges. Linea® Oblique Weatherboards are 16 mm thick and are available 200 and 300 mm wide. The boards are supplied 2700 and 4200 mm long.

4.2 Linea® 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. Linea® Oblique Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

Accessories

4.3 Accessories used with Linea® Oblique Weatherboard [Vertical] Cavity Cladding which are supplied by James Hardie New Zealand are:

- **James 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 50 mm wide x 6 mm deep rebates at 150 mm centres, and the front face is grooved with 5 mm wide x 5 mm deep rebates at 150 mm centres. The grooves are offset on each face.
- **Oblique Trimline joint flashing** – extruded aluminium in 3000 mm lengths.
- **Trimline jointers** – aluminium horizontal, internal corner and external corner jointers to cover joints in the Trimline joint flashing.
- **External and internal corner mouldings** – 90° anodised aluminium external box corner available in 2700 and 4000 mm lengths, and 90° internal corner 'W' mould, available in 2700 mm lengths.
- **Cavity vent strip** – uPVC, available in 3000 mm lengths.

4.4 Accessories used with Linea® Oblique Weatherboard [Vertical] Cavity Cladding which are supplied by the building contractor are:

- **Flexible wall underlay** – building paper complying with NZBC Acceptable Solution E2/AS1 Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.

- **Flexible 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** – James Hardie Rigid Air Barriers covered by BRANZ Appraisal No. 611 [2011].
- **Flexible sill, head and jamb flashing tape** – flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Cavity batten fixings** – 40 x 2.8 mm flat head hot-dip galvanised nails.
- **Linea® 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.
- **Linea® 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 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.
- **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.

Paint System Specification

- 4.5 Paint systems are not supplied by James Hardie New Zealand 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 Linea® 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.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by James Hardie New Zealand or the building contractor, whether on site or off site, is under the control of the building contractor. Linea® 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 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Linea® Oblique Weatherboard [Vertical] Cavity Cladding. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

- 7.1 Timber wall framing behind Linea® 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. Studs must be at maximum 600 mm centres. Nogs/dwangs must be in a continuous line and be fitted flush between the studs at maximum 600 mm centres.
- 7.3 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. [Note: If weatherboards are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]
- 7.4 Timber wall framing must have a maximum moisture content of 18% before the weatherboards are painted.

General

- 8.1 When the Linea® Oblique Weatherboard [Vertical] Cavity Cladding is used for specifically designed buildings up to 2.5 kPa ULS wind pressure, only the weathertightness and structural aspects of the cladding are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.
- 8.2 Punchings in the cavity vent strip and rebates in the cavity batten provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall. [Note: James 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 Linea® 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 Linea® 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 2.5 kPa design differential ULS wind pressure. 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.
- 8.6 Where cladding penetrations are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the vertical cavity batten and the flashing to the opening.
- 8.7 Where Linea® 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.

Interstorey Junctions

- 8.8 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4[b].

Structure

Mass

- 9.1 The mass of the 200 mm wide Linea® Oblique Weatherboard when installed on the wall is 20.6 kg/m² at equilibrium moisture content [EMC] and the mass of the 300 mm wide board is 19.7 kg/m² at EMC. Linea® Oblique Weatherboard [Vertical] Cavity Cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

- 9.2 Linea® 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.

Wind Zones

- 9.3 Linea® Oblique Weatherboard [Vertical] Cavity Cladding is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa ULS wind pressure where buildings are specifically designed.

Durability

- 10.1 Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the Linea® 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 Linea® 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 Linea® Oblique Weatherboards and fixings remain dry in service. Linea® Oblique Weatherboards must be painted within 3 months 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 metres from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604 Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life in Zone D, Linea® Oblique Weatherboards must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot-dip galvanised steel.
- 10.4 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Linea® Oblique Weatherboards in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604 Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

- 11.1 Regular maintenance is essential for Linea® 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.
- 11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *[Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Linea® Oblique Weatherboard [Vertical] Cavity Cladding.]*

Control of External Fire Spread

- 12.1 Linea® Oblique Weatherboard has a peak heat release rate of less than 100 kw/m² and a total heat released of less than 25 MJ/m² in accordance with NZBC Acceptable Solution C/AS1 Table 5.1. The system is suitable for use on buildings with a SH Risk Group classification, at any distance to the relevant boundary. Linea® Oblique Weatherboard is also suitable for use where a non-combustible material is specified. When Linea® Oblique Weatherboard is finished with a paint coating of not more than 1.0 mm in thickness, the exterior surface finishes requirements of NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.1 do not apply in accordance with NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.2 a).

Prevention of Fire Occurring

- 13.1 Linea® Oblique Weatherboard is considered a non-combustible material and need not be separated from heat sources such as fire places, heating appliances, flues 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, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 - C/AS6 and NZBC Verification Method C/VM1.

External Moisture

- 14.1 Linea® 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 sub-floor space to meet code compliance with Clause E2.3.5.
- 14.3 Linea® 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 Clause E2.3.6.
- 14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.
- 14.5 The use of Linea® 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 Linea® 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 Requirements

- 16.1 Installation of Linea® Oblique Weatherboard and accessories supplied by James Hardie New Zealand and the building contractor must be carried out by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with instructions given within the Linea® Oblique Weatherboard [Vertical] Cavity Cladding Technical Literature and this Appraisal.

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 Linea® Oblique Weatherboard [Vertical] Cavity Cladding system. Flexible wall underlay must be installed vertically and be continuous around corners. Underlay must be lapped 75 mm minimum at vertical joints and 150 mm minimum over studs at vertical joints. James Hardie Rigid Air Barriers must be installed in accordance with the instructions of James Hardie New Zealand. 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.

James Hardie Horizontal Cavity Battens

- 17.2 James 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 weatherboards. The cavity battens must be fixed in place with 40 x 2.8 mm hot-dip galvanised flat-head nails at maximum 800 mm centres to temporarily fix the battens in place prior to installation of the cladding.
- 17.3 A wall underlay support must be installed over flexible wall underlay at maximum 300 mm horizontal centres.

Linea® Oblique Weatherboard Installation

- 17.4 Linea® 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.
- 17.5 Weatherboards must be dry prior to installation. Before the weatherboards are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement.
- 17.6 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.
- 17.7 Linea® 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.

- 17.8 Linea® Oblique Weatherboard laps are pre-determined by the machined joint detail.
- 17.9 200 mm wide Linea® Oblique Weatherboards must be fixed to each framing member [nog/dwang] using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nail depending on the location - see Paragraph 10.3. The nails must be positioned 100 mm in from the over lapping edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.
- 17.10 300 mm wide Linea® Oblique Weatherboards must be fixed to each framing member [nog/dwang] using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails depending on the location - see Paragraph 10.3. The nail must be positioned 150 mm in from the over lapping edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.

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.

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. Linea® 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 Linea® Oblique Weatherboard [Vertical] Cavity Cladding installations.

Health and Safety

- 18.1 Cutting of Linea® Oblique Weatherboard 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 Linea® Oblique Weatherboard 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 BRANZ expert opinion on NZBC E2 code compliance for Linea® Oblique Weatherboard [Vertical] Cavity Cladding was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Linea® Oblique Weatherboard [Vertical] Cavity Cladding was tested to NZBC Verification Method E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meterbox head, jamb and sill details, balustrade to wall junction, parapet cap, internal and external corners and James Hardie horizontal cavity battens. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for drained cavity claddings.
- 19.2 Uniform wind face load tests to simulate wind pressures on Linea® Oblique Weatherboards were carried out by a James Hardie 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.

- 19.3 Cone Calorimeter testing to determine the peak rate of heat release and total heat release of Linea® Oblique Weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.
- 19.4 Linea® Oblique Weatherboards have been tested by a James Hardie 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.

Other Investigations

- 20.1 Weathertightness, structural, fire and durability opinions have been provided by BRANZ technical experts.
- 20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 20.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of Linea® Oblique Weatherboard has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of materials, components and accessories supplied by James Hardie New Zealand is the responsibility of James Hardie New Zealand. The quality control system of James Hardie New Zealand has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 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 wall underlay, cavity battens, Linea® Oblique Weatherboard and accessories in accordance with the instructions of James Hardie New Zealand.
- 21.5 Building owners are responsible for the maintenance of Linea® Oblique Weatherboard [Vertical] Cavity Cladding in accordance with the instructions of James Hardie New Zealand.

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.
- ISO 8336: 2009 Fibre-cement flat sheets -- Product specification and test methods.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 [Amendment 6, 14 February 2014].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 15 December 2015.

This Appraisal has been amended to remove rigid wall underlay complying with NZBC Acceptable Solution E2/AS1.



BRANZ Appraised
Appraisal No. 897 [2015]

BRANZ Appraisal
Appraisal No. 897 [2015]
20 November 2015

LINEA® OBLIQUE
WEATHERBOARD [VERTICAL]
CAVITY CLADDING



In the opinion of BRANZ, **Linea® 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**, 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:**
 - 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**.
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** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

20 November 2015



Horizontal Installation Technical Specification

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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

1 Application and scope

1.1 APPLICATION

Linea™ Oblique™ Weatherboard installed as per this specification gives a rusticated profile weatherboard appearance. Linea Oblique Weatherboard can be fixed to timber-framed external walls. A wide range of colours can be used varying from light to dark. Linea Oblique Weatherboard is available in 200mm or 300mm wide x 4200mm or 2700mm lengths and is 16mm thick.

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 James Hardie Technical Specification. All of the details provided in this document must be read in conjunction with the project specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure that you have the current manual. Additional installation information, warranties and warnings are available at www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

1.2 SCOPE

This specification covers the installation of Linea Oblique Weatherboard fixed horizontally over timber cavity battens on buildings that fall within the scope limitation of NZS 3604 and E2/AS1 of the New Zealand Building Code (NZBC).

This specification also covers the installation of Linea Oblique Weatherboard on projects, which are subject to specific engineering design (SED) up to a wind pressure of 2.5kPa (ULS).

1.3 DETAILS

Various typical Linea Oblique Weatherboard horizontal 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.

1.4 SPECIFIC DESIGN

For use of the Linea Oblique Weatherboard on a specific design 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.

2 Design

2.1 COMPLIANCE

Linea Oblique Weatherboard has been issued a Code Mark certificate number GM-CM30059 which confirms Linea Oblique Weatherboard is deemed to comply with the requirements of the NZBC. Please refer to our website www.jameshardie.co.nz for a copy of the Code Mark certificate. Linea 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 this Linea Oblique Weatherboard Horizontal Installation technical specification. BRANZ Appraisal number 896 (2015) at www.branz.co.nz or www.jameshardie.co.nz



2.2 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. 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.

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.

2.3 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.

2.4 SURFACE 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.

Linea Oblique Weatherboard must overhang the bottom plate by a minimum of 50mm, as required by E2/AS1.

Linea 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 3 and 4.

2.5 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 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 weather tightness, 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

2.6 STRUCTURE

2.6.1 Timber Framing

Timber-framed buildings must either be in accordance with NZS 3604 (Timber-framed Buildings) or designed as per specific engineering design. For a building requiring a specific engineering design, the framing stiffness must be equivalent to, or more than, the stiffness requirements of NZS 3604.

For specific design projects, the timber framing must be designed in accordance with the requirements of NZS 3603 and AS/NZS 1170.

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.

2.6.2 Wind Pressures

Linea Oblique Weatherboard is suitable for use in wind zones up to and including EH as defined in NZS 3604.

Linea Oblique Weatherboard is also suitable in specific design projects up to wind pressures of 2.5kPa ULS.

2.7 FIRE RATED WALLS

Linea 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 of the NZBC, when the walls are constructed in accordance with the current James Hardie 'Fire and Acoustic' Design Manual.

Linea Oblique Weatherboard is classified as a 'non-combustible' material suitable for use on walls close to a boundary.

2.8 STRUCTURAL BRACING

Linea Oblique Weatherboard installed as per this specification cannot be used to achieve any structural bracing. However, bracing can be achieved by using a James Hardie rigid air barrier board installed direct to framing instead of a flexible underlay or by using Villaboard™ Lining bracing system on the internal face of the wall. Refer to the James Hardie Bracing Design Manual for further information.

2.9 ENERGY EFFICIENCY

External walls constructed as per this technical specification using Linea Oblique Weatherboard and bulk insulation, where the area of glazing is 30% or less of the total wall area, complies with the insulation requirements for walls in the NZBC Acceptable Solution H1/AS1 (Energy Efficiency Clause H1), Replacement Table 1.

To meet thermal insulation requirements for the construction, the bulk insulation as specified in Table 1 must be used. This insulation may be substituted with insulations having higher R-values. The thermal insulation of a wall changes when the size or spacing of timber framing is increased or decreased. The calculation used in Table 1 is based on a timber framing size 90 x 45mm and using an internal lining material such as Villaboard Lining or a 10mm plasterboard.

Table 1

Insulation capability		
Climate zone*	R-value requirement*	Minimum cavity insulation infill requirement
1 and 2	1.9 m ² °C/W	R2.0*
3	2.0 m ² °C/W	R2.2*

Total construction R-value depends on the insulation material used and the framing ratio. The insulation material R-values specified in this table are for studs spaced at 600mm centres and nogs spaced at 800mm centres.

* To achieve higher R-values of construction the wall insulation material must be replaced with an insulation material having higher R-values to suit the requirements.

For further guidance on insulation requirements refer to the current edition of 'House Insulation Guide' published by BRANZ.

3 Framing

3.1 GENERAL

Linea 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.

For Linea Oblique Weatherboard horizontal installation:

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 800mm centres maximum

Note: For fixing Linea Oblique Weatherboard, fastener spacing is provided in Section 5.

3.2 TIMBER FRAMING

3.2.1 Dimensions

A 90 x 45mm minimum framing size is required.

A minimum 90mm wide stud is required at vertical joint flashing.

3.2.2 Structural grade

Timber grade used must be in accordance with timber grades specified in NZS 3604.

3.2.3 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.

3.2.4 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:

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 800mm centres maximum
- When studs are spaced at 400mm centres then the nogs/dwangs may be provided at 1200mm centres
- 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 design requirements but not exceeding 600mm maximum.

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 provider statement.

3.3 SPECIAL FRAMING REQUIREMENTS

The following are special framing requirements for both timber and steel framing:

- Double studs are required at internal corners, refer to Figure 15
- Extra packers may be required at external corners

3.4 TOLERANCES

In order to achieve the required performance and an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances shall comply with Table 2.1 of NZS 3604 and the manufacturer's specifications. All framing shall be made flush.

4 Preparation

4.1 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 of 9.1.7 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. James Hardie HomeRAB Pre-Cladding complies with these requirements and is suitable for use in this situation. It must be installed in accordance with the James Hardie Rigid Air Barriers installation manual.

4.2 RAB BOARD

For EH wind zone or for specific engineering design (SED) projects where the wind pressure is higher than 1.5kPa, James Hardie RAB™ Board must be used instead of flexible underlay.

To achieve the temporary weathertightness using James Hardie RAB Board, windows/doors need to be temporarily installed. Refer to the James Hardie Rigid Air Barriers installation manual for further information regarding its installation.

4.3 CAVITY CLOSURE/VENT STRIP

The James Hardie Stria™ Aluminium Cavity Closure or 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. James Hardie cavity closure/vent strip has an opening area of 1000mm²/m length.

4.4 CAVITY BATTENS

Linea 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 timber cavity battens must be minimum H3.1 treated in accordance with NZS 3640 (Chemical preservation of rough and sawn timber) to comply with the durability requirements of B2/AS1.

Cavity battens must comply with E2/AS1 and:

- Be minimum 18mm thick
- Be as wide as the width of studs
- Fixed vertically to studs
- 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

4.5 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:

- 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:

- When studs are spaced at 400mm centres; or
- When rigid air barriers instead of flexible underlays are used

4.6 FLASHINGS

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to Linea 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 James Hardie rigid air barrier boards, 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 manufacturer. Refer to the James Hardie Rigid Air Barriers installation manual for further information.

4.7 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 Linea Oblique Weatherboard which meet the performance requirements of E2 External Moisture, an approved document of the NZBC, refer to Figures 16 to 25.

5 Installation

5.1 GENERAL

Linea Oblique Weatherboard must be installed horizontally using the cavity construction method as per the details and information published in this document.

Linea 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 weatherboard 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.

Linea Oblique Weatherboard must be fully supported and fixed through timber cavity battens. Ensure that cladding is hard against the battens to avoid drumminess.

To achieve best aesthetic results it is recommended to position the vertical jointer by the corner of openings or coinciding with the centre line of openings.

This technical specification only covers the horizontal installation of Linea Oblique Weatherboard. Refer to the Linea Oblique Weatherboard Vertical Installation Technical Specification for vertical installation.

5.2 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 2.

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 2

Exposure conditions and nail selection prescribed by NZS 3604		
NAIL MATERIAL		
Zone D	Zone C outside sea spray zone, Zone B and geothermal hot spots	Bracing - all zones
Grade 316 Stainless	Hot-dipped galvanised or Grade 316 Stainless	Grade 316 Stainless

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

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.

5.3 FASTENER – SIZE AND LAYOUT

Linea Oblique Weatherboard must be fixed horizontally to framing using fixings as specified in Table 3 below and follow the edge distance required for nails as shown in the details.

Table 3

Weatherboard fixing up to and including VH wind zone		
CAVITY CONSTRUCTION OVER FLEXIBLE UNDERLAY		
Linea Oblique Weatherboard 200	65x2.87mm D head nail or 65x2.87mm RounDrive ring shank nail or 60x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 5
Linea Oblique Weatherboard 300	65x2.87mm D head nail or 65x2.87mm RounDrive ring shank nail or 60x3.15mm HardieFlex nail	Fix one nail 150mm from bottom edge of board per nog/plate. Refer to Figure 6

Weatherboard fixing up to and including VH wind zone

CAVITY CONSTRUCTION OVER HOMERAB PRE-CLADDING/RAB BOARD		
Linea Oblique Weatherboard 200	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nails or 75x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 5
Linea Oblique Weatherboard 300	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nails or 75x3.15mm HardieFlex nail	Fix one nail 150mm from bottom edge of board per nog/plate. Refer to Figure 6

Weatherboard fixing EH wind zone and SED projects

CAVITY CONSTRUCTION OVER RAB BOARD		
Linea Oblique Weatherboard 200	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate. Refer to Figure 5
Linea Oblique Weatherboard 300	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail at 150mm from bottom edge of board per nog/plate. Refer to Figure 6.

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 the weatherboard surface
- RounDrive nails - finish nails flush with the weatherboard surface
- HardieFlex nails - finish nails flush with the weatherboard surface

6 Joints

6.1 VERTICAL JOINT

Linea Oblique Weatherboard shall be jointed using the trimline joint flashing. Refer to Figures 11 and 12.

A single stud is required when using the trimline joint flashing. Refer to Figure 11.

Alternatively if a vertical joint flashing shall be used a double stud is required for this joint, refer to Figures 13 and 14.

6.2 HORIZONTAL JOINT

Linea Oblique Weatherboards are lapped over each other as per Figures 5 and 6. There is a 23-25mm lap between the two weatherboards. Ensure that the Linea Oblique Weatherboards are securely interlocked before nailing. Linea Oblique Weatherboard can run continuous over floor joists without any horizontal joint when LVL timber floor joists or an engineered joist are used, refer to Figure 28.

When using a solid timber joist, a horizontal joint or a movement joint must be formed at floor joist, refer to Figures 29 and 32.

6.3 DRAINAGE JOINT

After every two floors a horizontal drainage joint flashing is required as per E2/AS1, refer to Figure 32.

6.4 EXTERNAL CORNER

An external box corner flashing is used to fix the external corners, refer to Figure 15. Alternatively an Axent™ Trim external boxed corner can also be formed, refer to Figure 16.

6.5 INTERNAL CORNER

An internal corner flashing is to be used to form an internal corner joint, refer to Figure 17.

An extra stud is required in internal corners.

Note: All joint mouldings to be fixed at 400mm centres both sides.

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

Linea 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 Linea Oblique Weatherboard is mandatory to meet the durability requirements of the NZBC and 25 year James Hardie product warranty. Linea 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 Linea 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.

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.

8 Storage and handling

When storing Linea Oblique Weatherboard, they must be laid flat on a smooth level surface. Edges and corners must be protected from chipping.

To ensure optimum performance, store weatherboards under cover and keep dry prior to fixing. If the weatherboards become wet, allow them to dry thoroughly before fixing.

Do not carry weatherboards on the flat, carry on edge to avoid excessive bending.

9 Maintenance

The extent and nature of maintenance required will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to maintain the effectiveness of the cladding.

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*
- Re-coating exterior protective finishes**
- Regular inspection and repair if necessary of the cladding, joints, sealants, nail head fillers etc
- Cleaning out gutters, down pipes and overflow pipes as required
- Pruning back vegetation which is close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained, especially where gardens are concerned
- The clearance between the bottom edge of the Linea Oblique Weatherboard and the finished/unfinished ground must always be maintained

**Do not use a water blaster to wash down the cladding. In extreme coastal conditions or sea spray zones, wash every 3-4 months.*

***Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.*

10 Product information

10.1 MANUFACTURING AND CLASSIFICATION

Linea 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 'Linea Oblique'.

Linea Oblique Weatherboard is manufactured to Australian/New Zealand Standard AS/NZS 2908.2 'Cellulose-Cement Products' (ISO 8336 'Fibre-Cement Flat Sheet').

Linea 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.

10.2 PRODUCT MASS

Linea Oblique Weatherboard is manufactured in 16mm thickness and has a mass of 20.57kg/m² for 200mm and 19.67kg/m² for 300mm.

Linea Oblique Weatherboard is defined as a Light Weight Wall Cladding (not exceeding 30kg/m²) as per NZS 3604.

10.3 DURABILITY

Linea Oblique Weatherboard and James Hardie rigid air barrier installed and maintained as per this technical specification will meet the durability requirement for cladding as per the NZBC clause B2 Durability.

10.3.1 Resistance to Moisture/Rotting

Linea 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)

10.3.2 Control of External Fire Spread

Linea Oblique Weatherboard meets the requirements of Appendix C C7.1.1 and is classified as 'Non-Combustible Material' which is suitable for use as external wall cladding and complies with the requirements of Paragraph 5.4 of the NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of Acceptable Solutions C/AS2 to C/AS6 of the NZBC.

10.3.3 Alpine Regions

In regions subject to freeze/thaw conditions, Linea Oblique Weatherboard and James Hardie rigid air barrier 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 is expected.

These products meet the requirements of the AS/NZS 2908.2 Clause 8.2.3.

11 Safe working practices

11.1 STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALLINE SILICA

Crystalline Silica

What is it? Why and when is it a health hazard?

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

11.2 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 extractor unit as a minimum and always hose down with water/wet wipe for clean up
- 🚫 NEVER use grinders
- 👍 ALWAYS use a circular 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
- 👍 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 an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:

BEST

- HardieKnife™
- Hand guillotine
- Fibreshear



BETTER

- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

Working outdoors

- 👍 Make sure you work in a well ventilated area
- 👍 Position cutting station so wind will blow dust away from yourself and others in the working area
- 👍 Cut products with either a HardieKnife™ or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit



- 👍 When sawing, sanding, rebating, drilling or machining fibre cement products, always:

- Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers' instructions) and when others are close by, ask them to do the same
- If you are not clean shaven, then use a powered air respirator with a loose fitting head top
- Wear safety glasses
- Wear hearing protection
- When others are close by, ask them to do the same

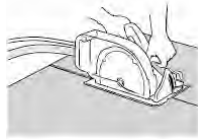
Working indoors

- 🚫 Never cut using a circular saw indoors
- 👍 Position cutting station in a well ventilated area
- 👍 Cut ONLY using a HardieKnife™, hand guillotine or fibreshears (manual, electric or pneumatic)
- 👍 Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.

Working Instructions

- Refer to Recommended Safe Working Practices before starting any cutting or machining of product



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 deflector or a dust collector connected to a vacuum system. 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

11.3 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.

11.4 TIPS FOR SAFE AND EASY HANDLING


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













Sheet products

- 👍 Carry with two people
- 👍 Hold near each end and on edge
- 👍 Exercise care when handling sheet products to avoid damaging the edges/corners

12 Product and accessories





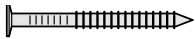
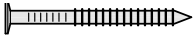


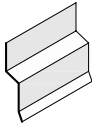
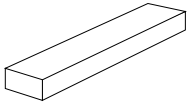
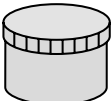
Linea Oblique Weatherboard information						
Product	Description	Size (mm)			Code	
		Thickness	Length	Width		
	Linea Oblique Weatherboard A 16mm profiled weatherboard for residential cladding. Factory sealed on all six sides. Each weatherboard has a manila white colour primer applied on its face, which accepts a wide range of paint finishes.	16	2700	200	404855	
					300	404856
			4200	200	404849	
				300	404848	

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

Accessories/tools supplied by James Hardie			
Accessories	Description	Size	Code
	Oblique Trimline Joint Flashing Aluminium extrusion used behind cladding at vertical joints.	3000mm long	305826
	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	55 x 55mm	305870
	Trimline Internal Corner Jointer Joins Trimline Joint Flashing at an internal corner	60 x 60mm	305872
	Vertical Joint Flashing Aluminium extrusion used behind cladding at vertical joints.	3000mm long	305507
	JH Weatherboard Internal 'W' Corner Anodised aluminium extrusion used to create internal corners.	2700mm long	300386
	Linea Oblique Weatherboard External Box Corner Anodised aluminium extrusion used to create external corners.	2700mm long 4000mm long	305825 305873
	Aluminium Window Jamb Flashing Aluminium moulding used beside window opening to end butt the Linea Oblique Weatherboard.	3000mm long	305430
	Stria Aluminium Cavity Closure Aluminium moulding used as vermin proofing.	3000mm long	305431
	uPVC Vent Strip PVC moulding used as vermin proofing.	3000mm long	302490
	Linea Oblique Plug To fill recess in Linea Oblique Weatherboard	11mm W x 19mm H x 8mm T	305930
Tools			
	HardieBlade™ Saw Blade Diamond tip fibre cement circular saw blade. Spacers not included.	184mm 254mm	300660 303375

Accessories/tools not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with Linea Oblique Weatherboard and James Hardie rigid air barrier. 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 James Hardie rigid air barrier vertical joints. 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
	Flexible sealant Required to seal the vertical joints. Bostik Seal N Flex-1, Sikaflex AT Facade, Sikaflex MS or similar.
	65 x 2.87mm 'D' head nail or 65 x 2.87 RoundDrive nail (ring shank hot dipped galvanised/stainless steel) For fixing Linea Oblique Weatherboard.
	75 x 3.06mm 'D' head nail or 75 x 3.15 RoundDrive nail (hot dipped galvanised or ring shank stainless steel) For fixing Linea Oblique Weatherboard.
	40 x 2.8mm or longer HardieFlex™ 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.
	Timber cavity batten H3.1 minimum treated Timber cavity batten the cladding is fixed over.
	Exterior grade filler CRC ADOS Builders Fill or similar two part filler to fill over nail holes

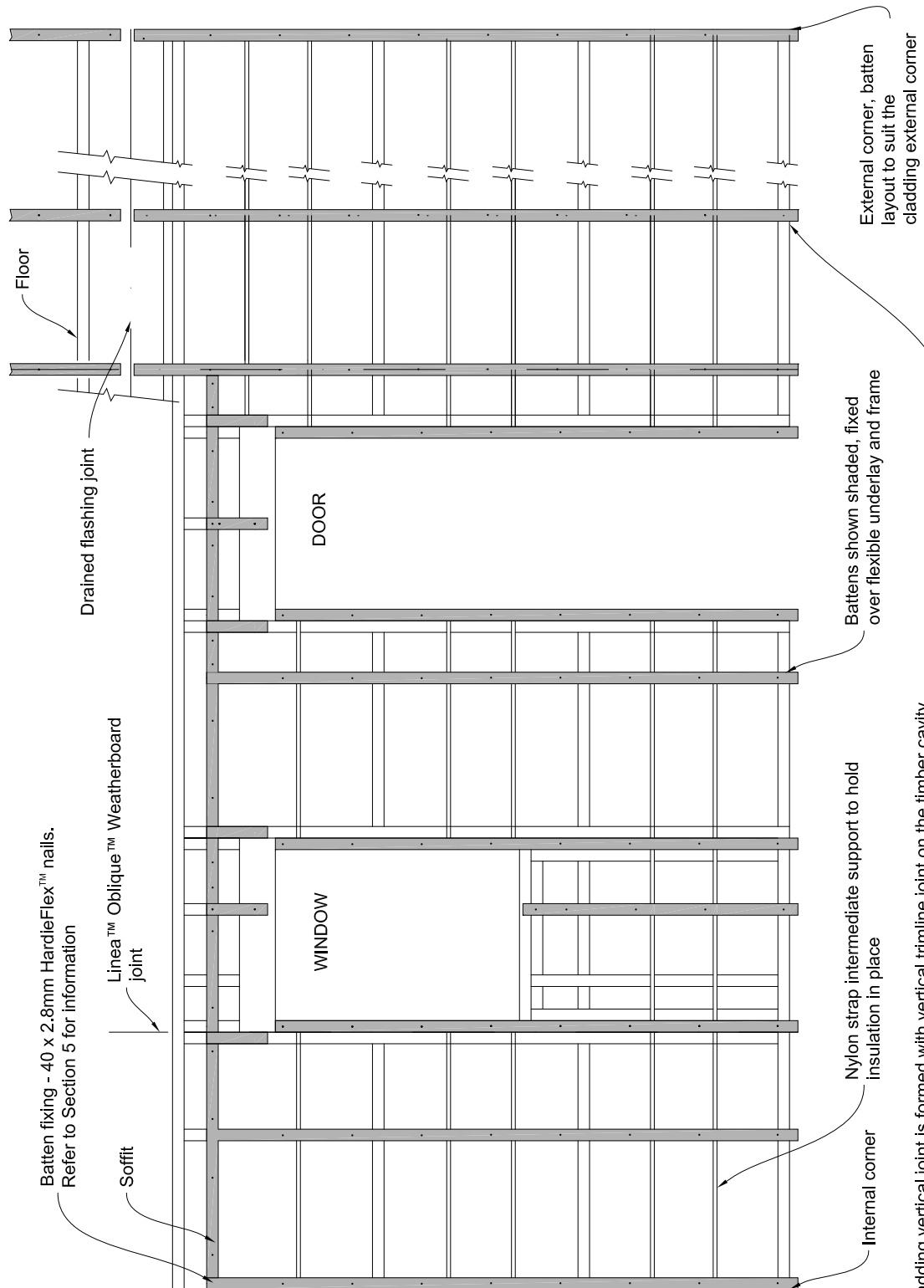
13 Details

The following generic details have been provided in this document for cavity construction methods.

Table 5

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Figure 1: Framing set out



- The cladding vertical joint is formed with vertical trimline joint on the timber cavity batten fixed over the stud.
- If studs are placed at 400mm centres no intermediate support is required.

Figure 2: Batten fixing set out

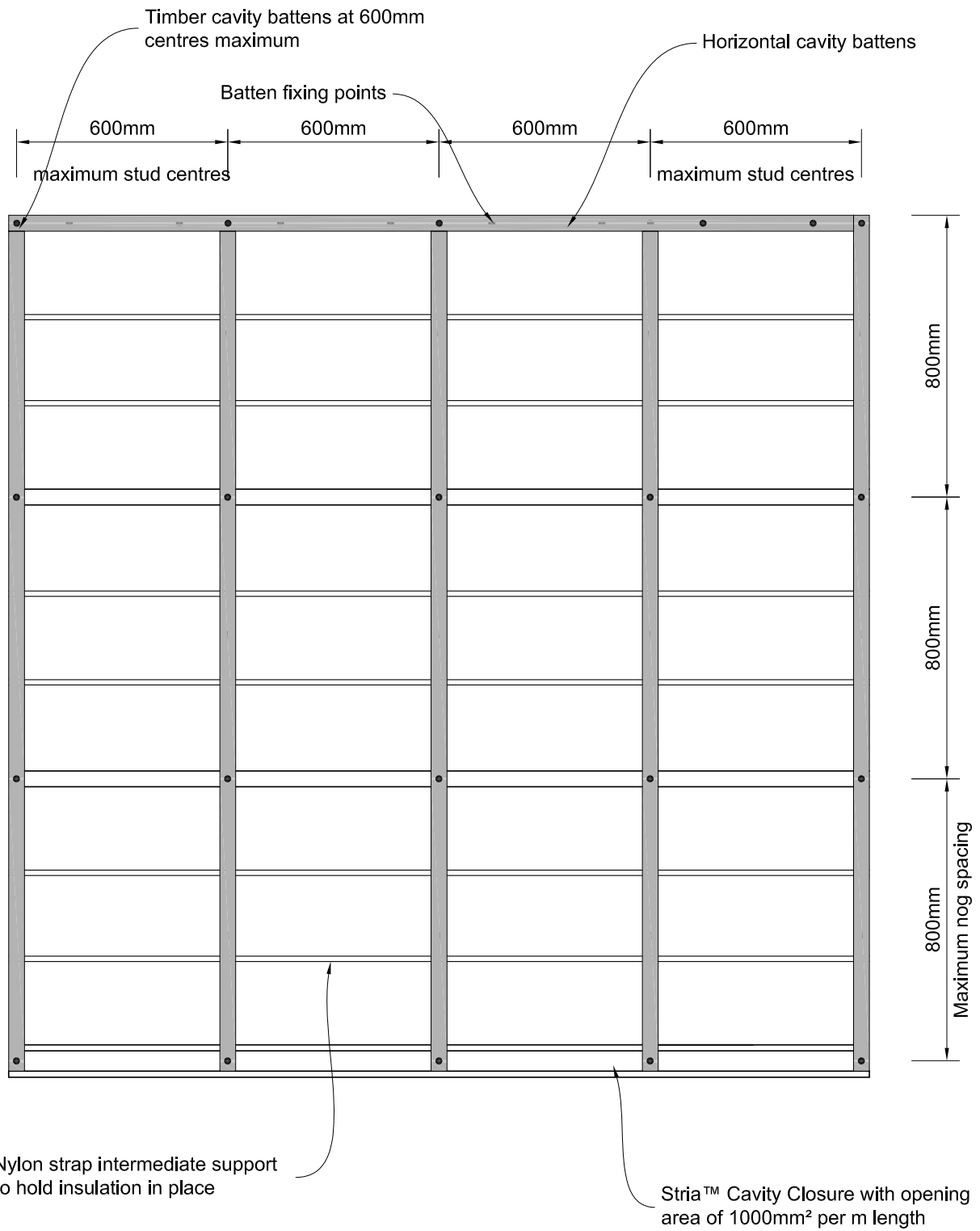


Figure 3: Foundation detail – option 1

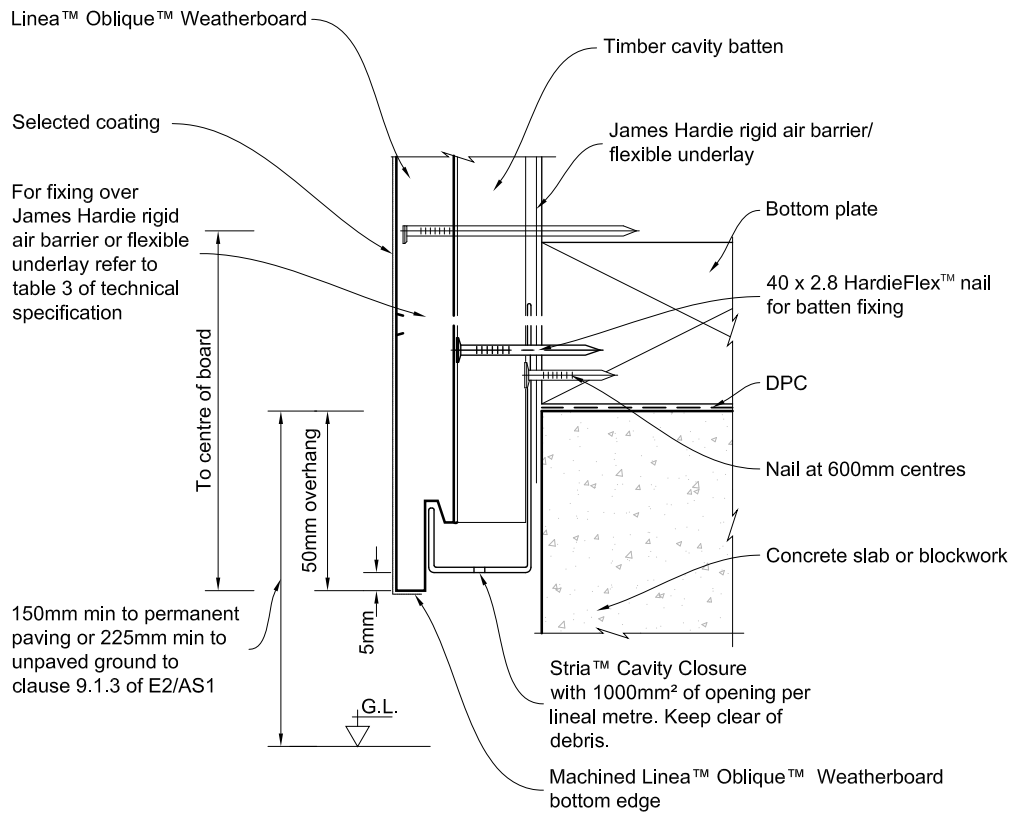


Figure 4: Foundation detail – option 2

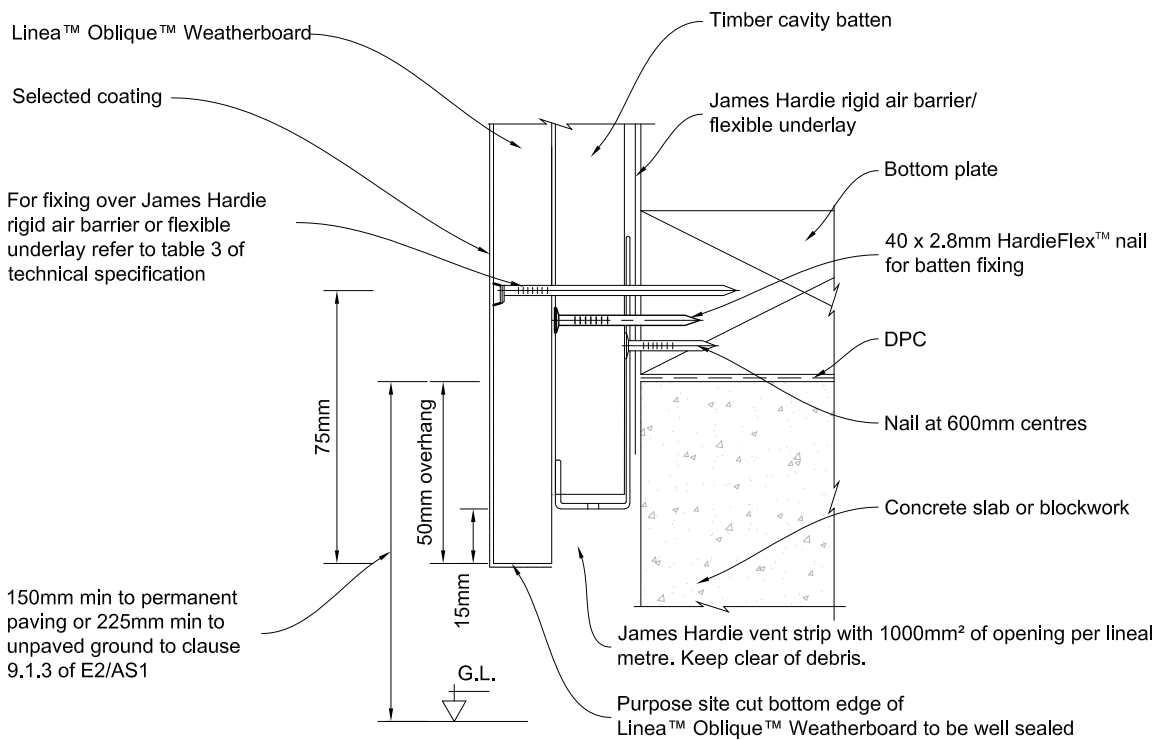


Figure 5: Fixing detail 200mm

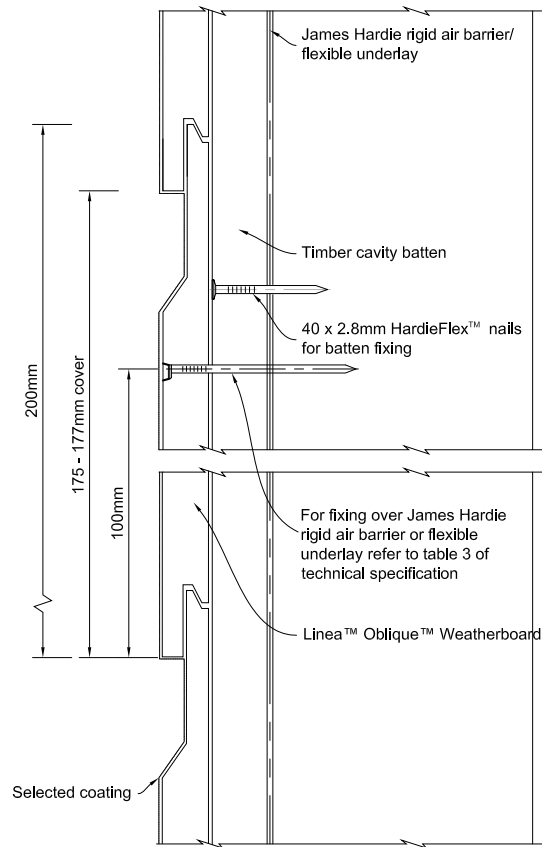


Figure 6: Fixing detail 300mm

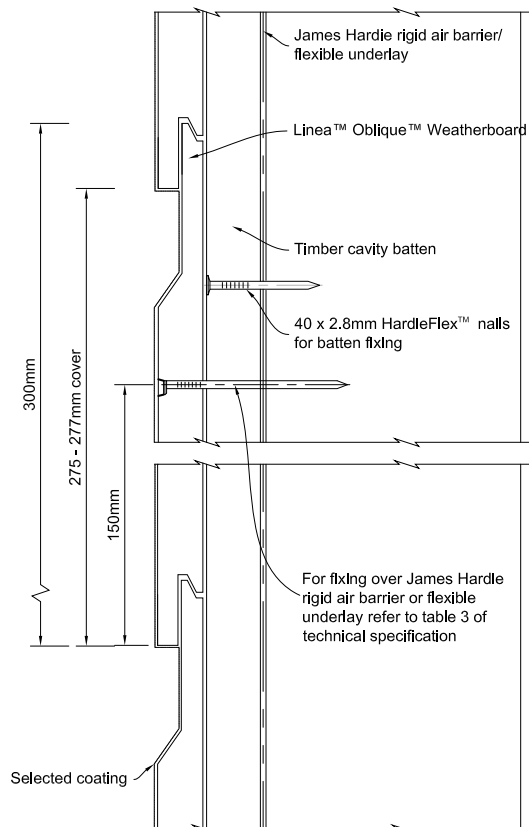


Figure 7: Soffit detail

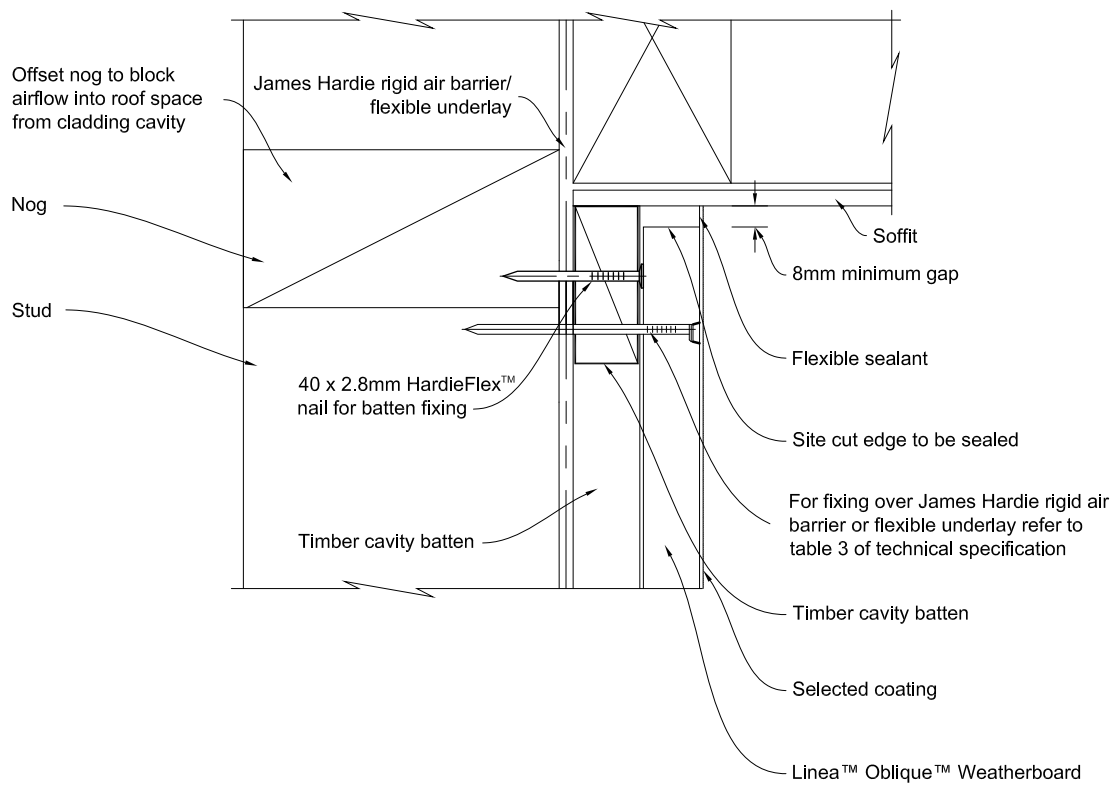


Figure 8: Soffit Detail - Top ventilated cavity

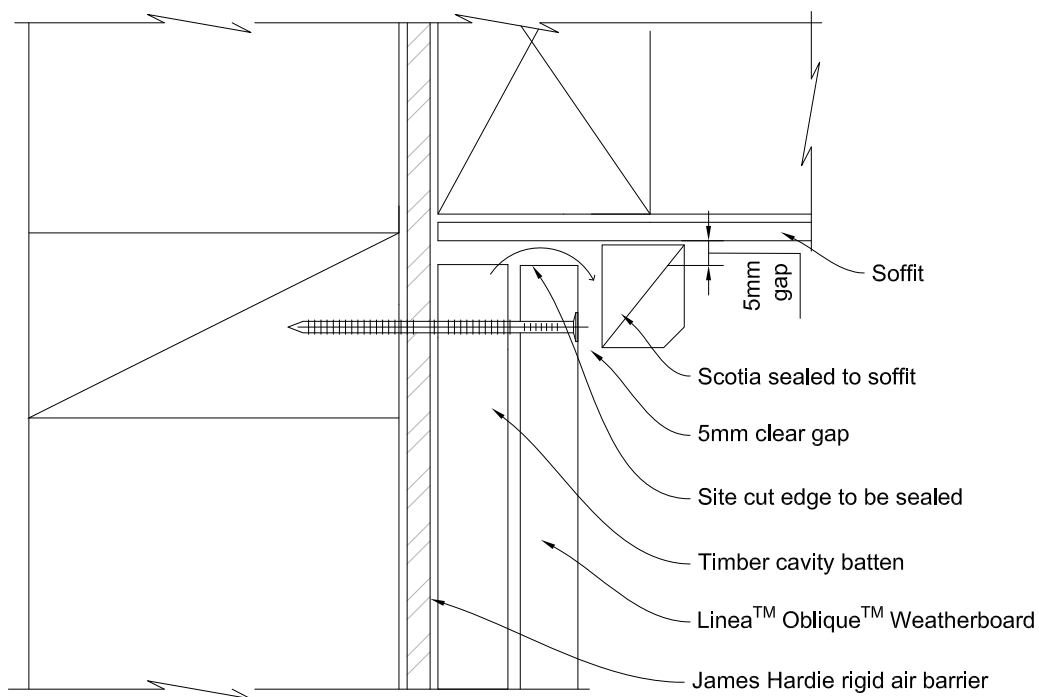


Figure 9: Nil soffit detail

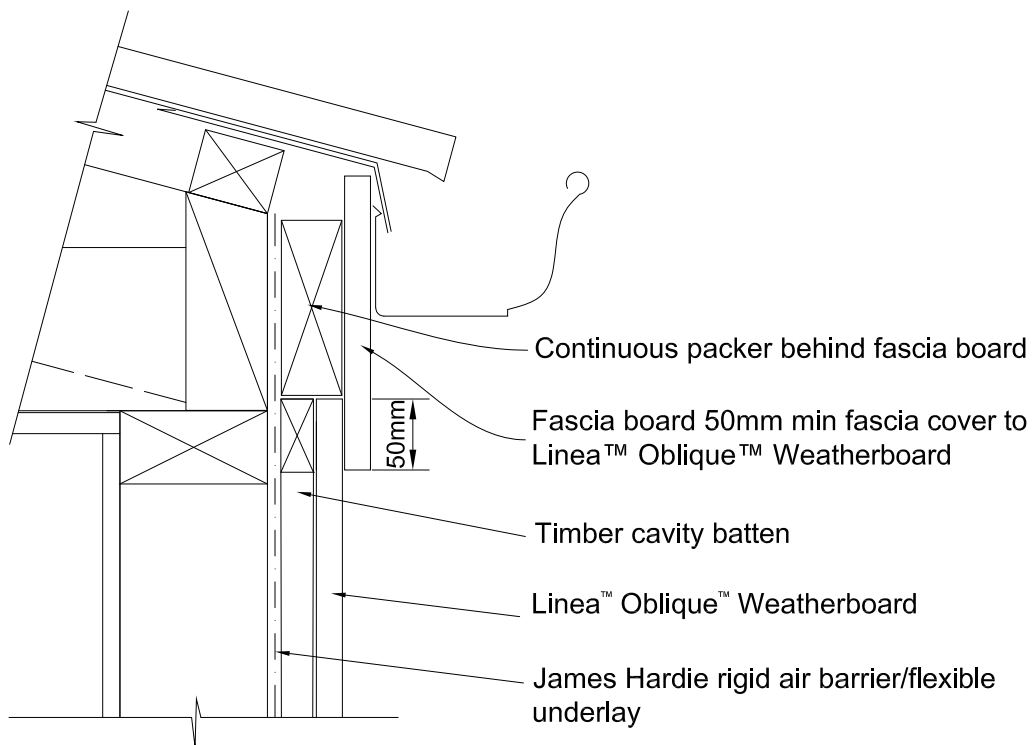


Figure 10: Nil soffit detail - Top ventilated cavity

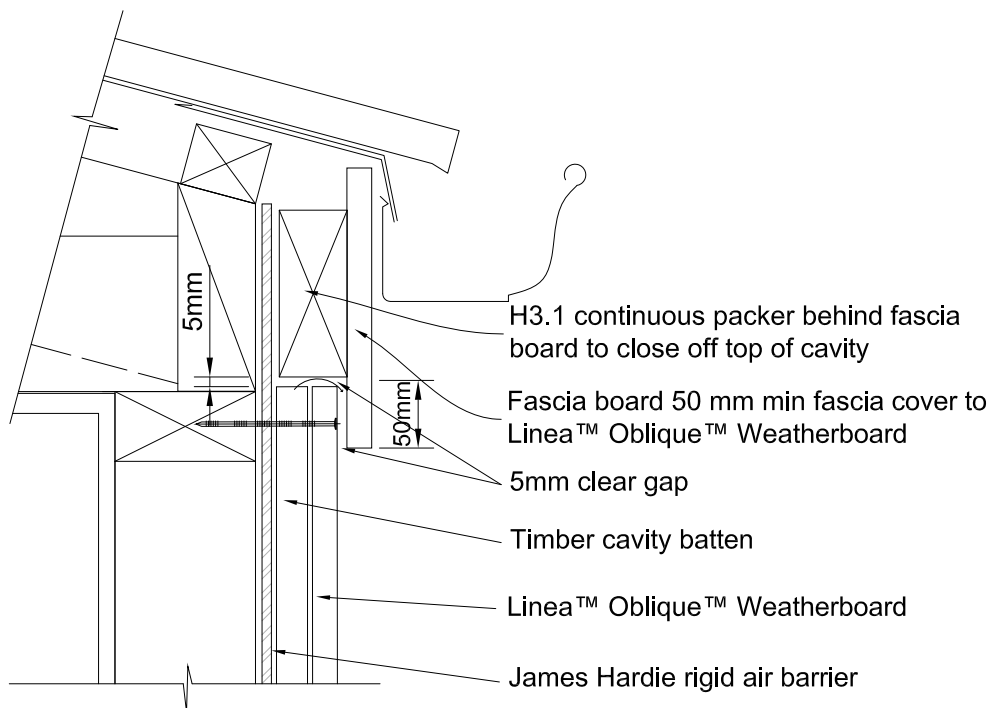
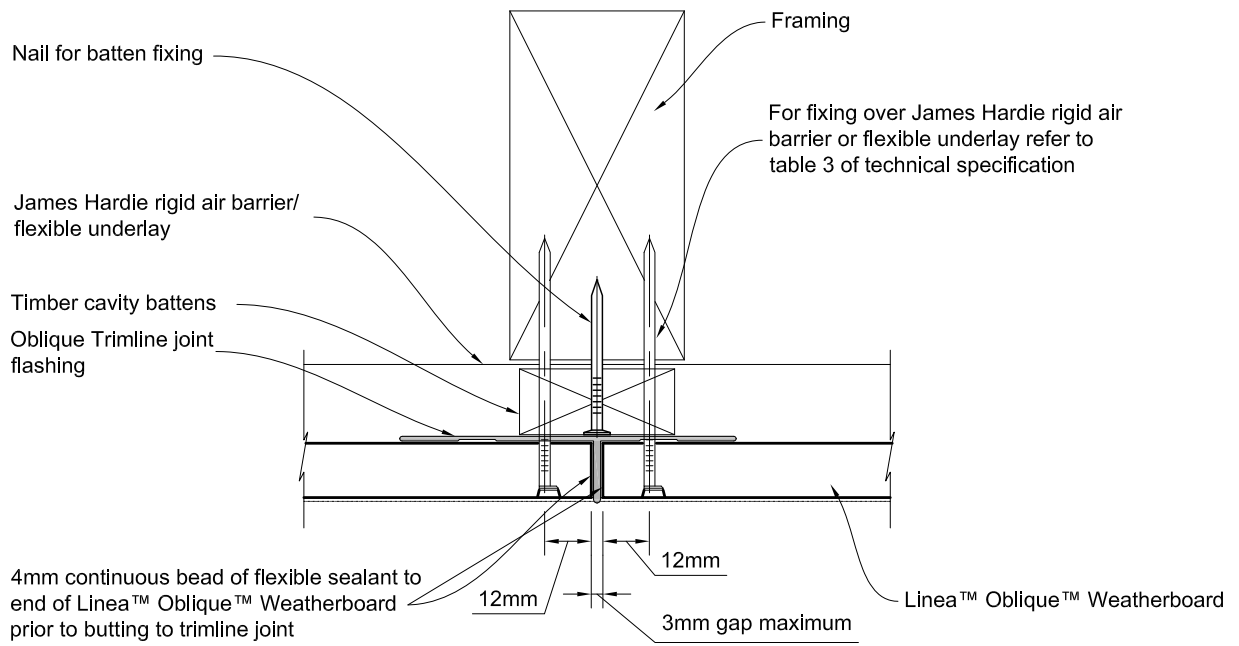


Figure 11: Vertical joint flashing



Note: All site cut edges to be sealed

Figure 12: Vertical trimline joint flashing

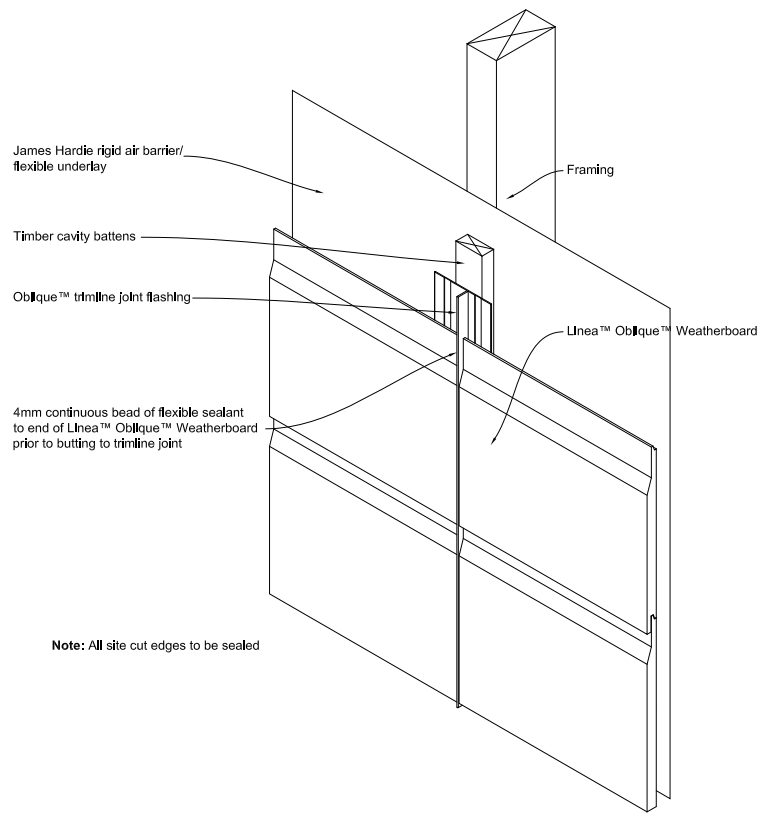


Figure 13: Vertical jointing option

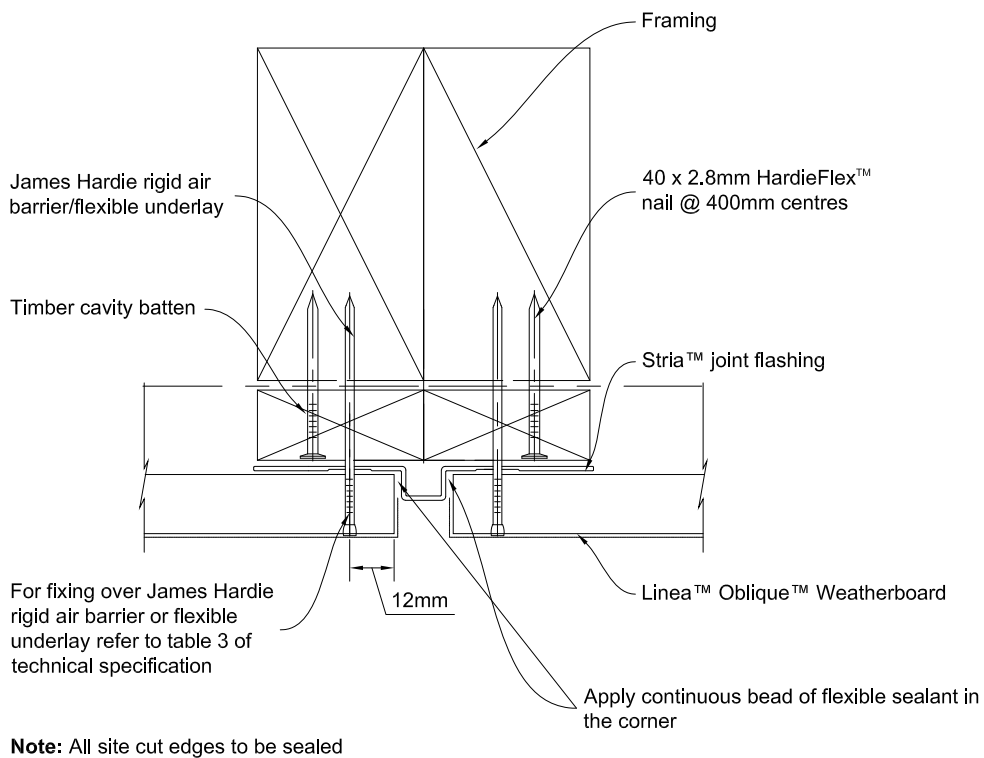
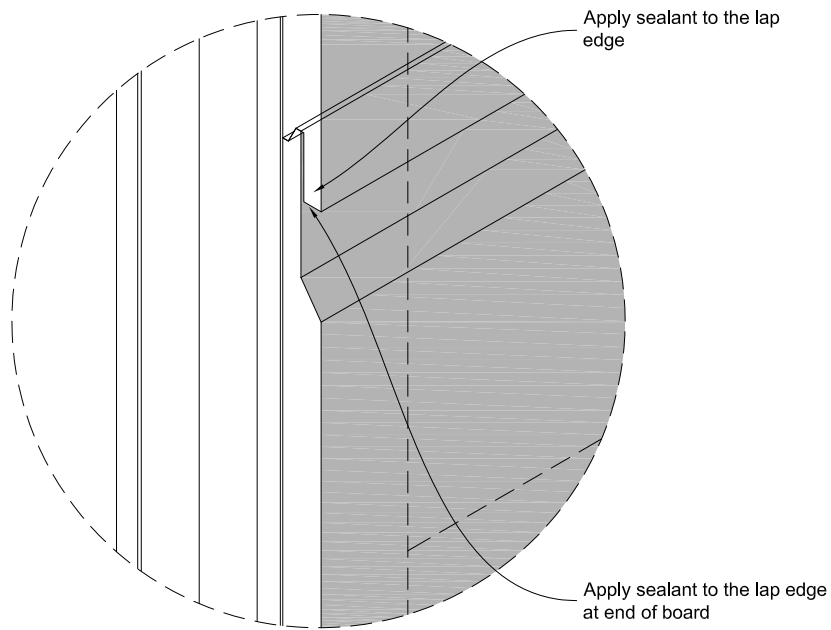
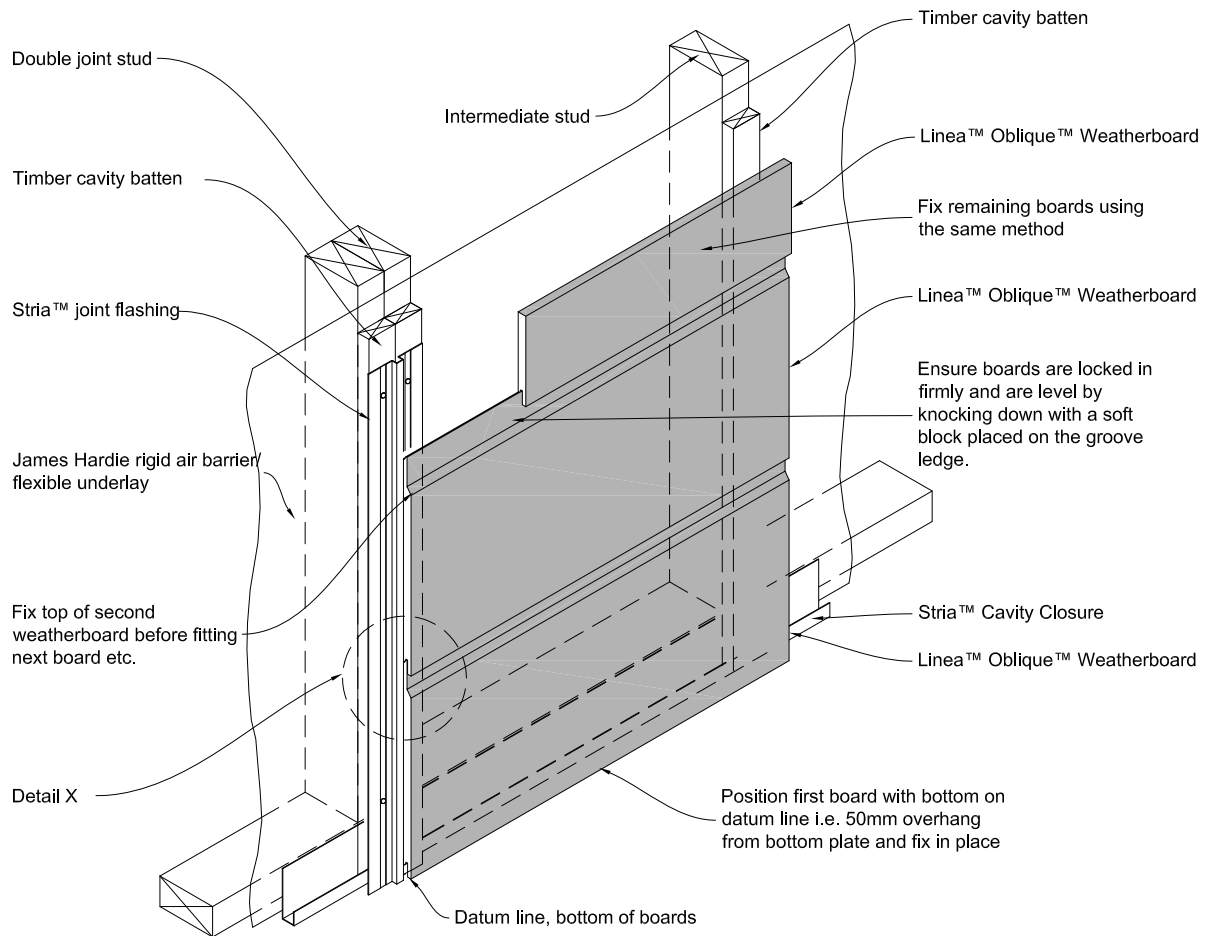


Figure 14: Cladding installation



Enlarged Detail X

Note: All site cut edges to be sealed

Figure 15: External aluminium box corner

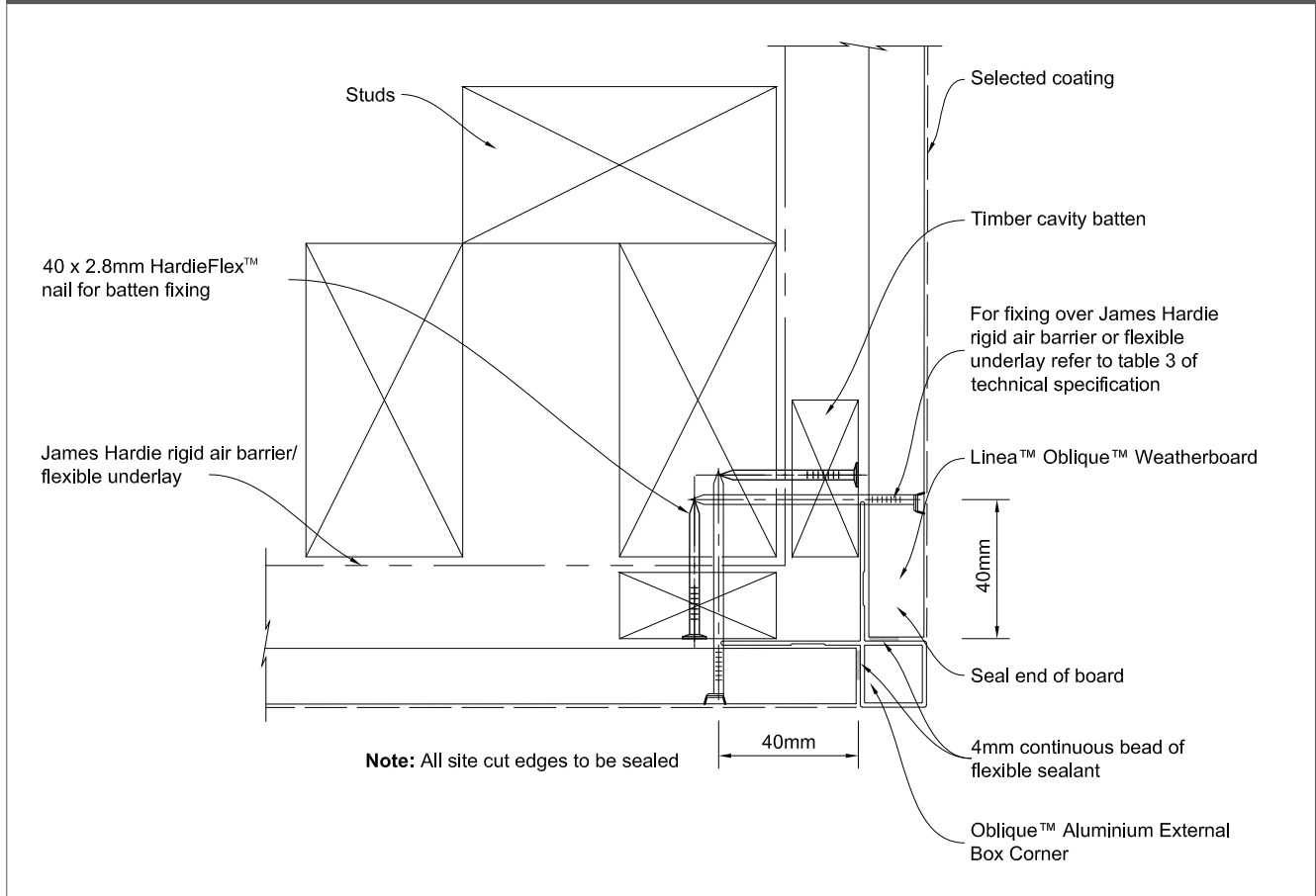


Figure 16: Axent trim external box corner

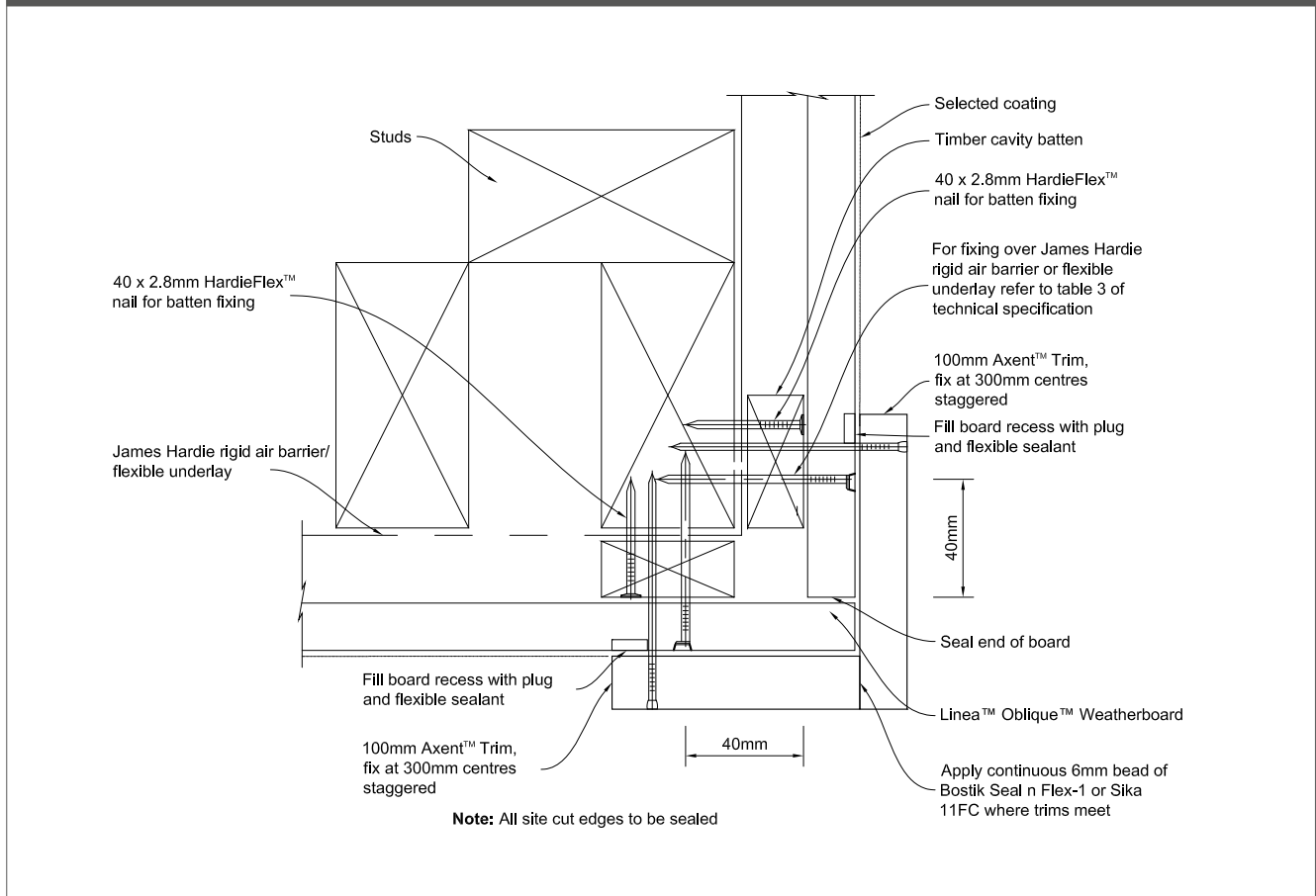


Figure 17: Internal aluminium corner

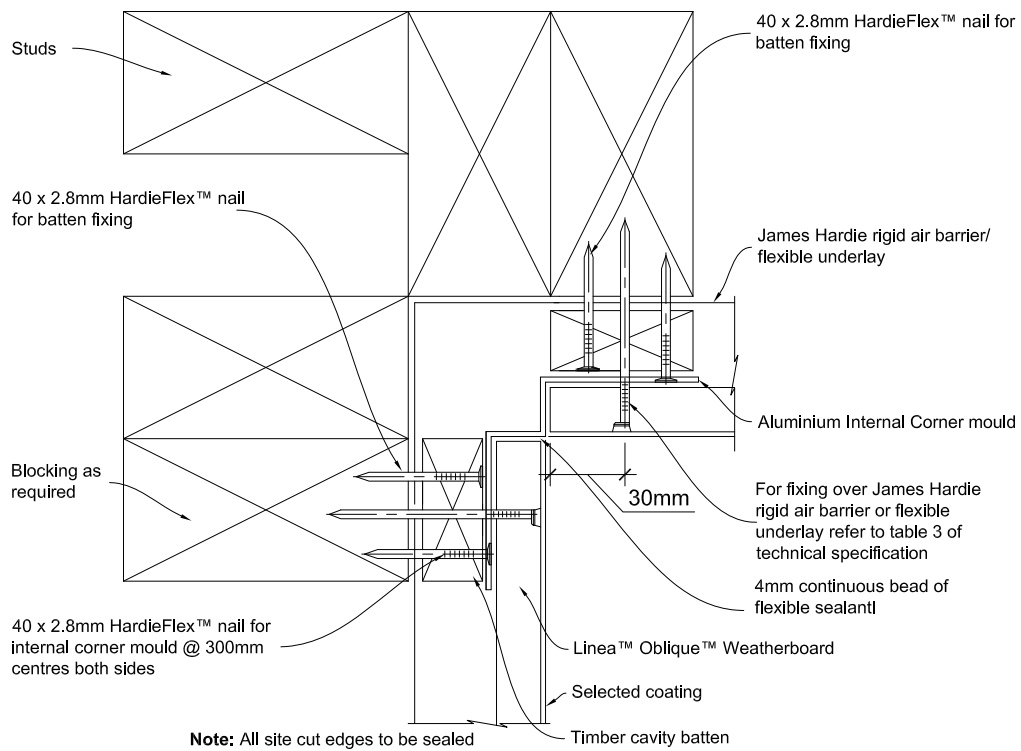
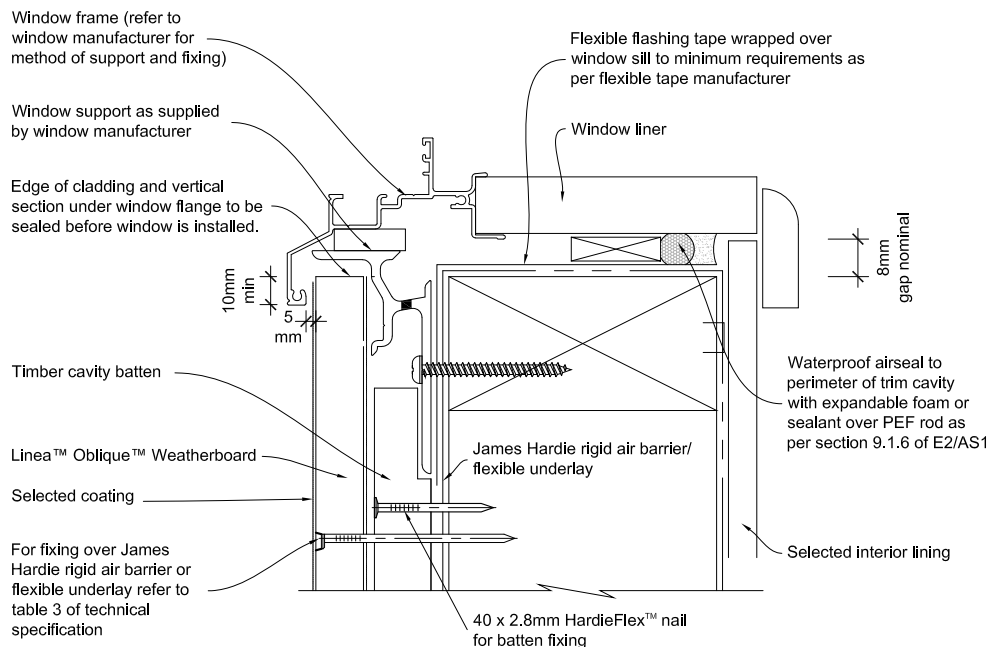


Figure 18: Window sill



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.
4. When James Hardie rigid air barriers are used flashing tape to be applied to the entire opening.

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

Figure 19: Window jamb

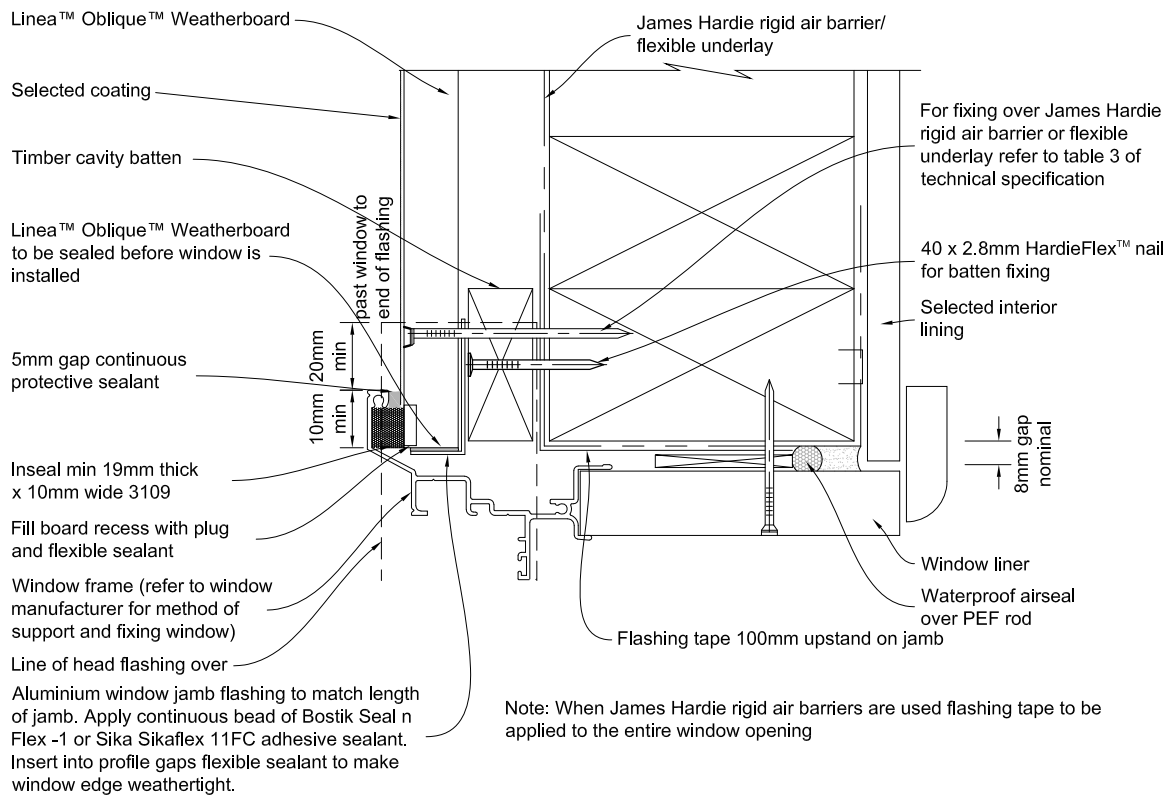


Figure 20: Window head with full cladding across head flashing

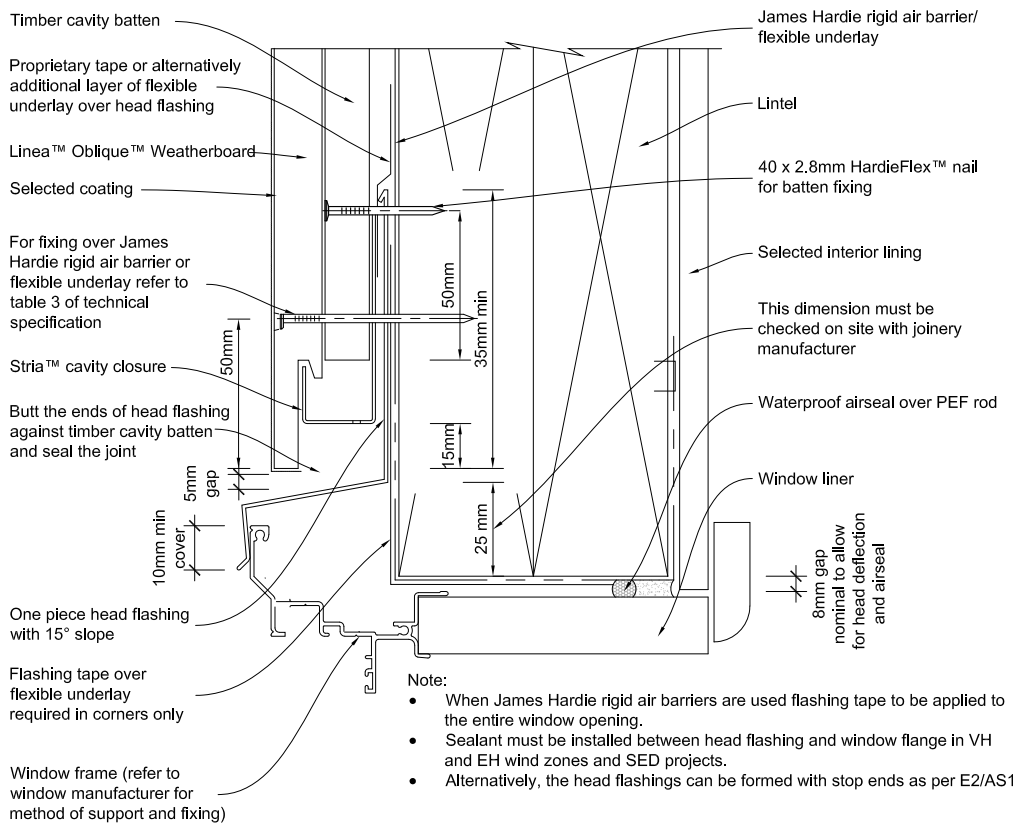


Figure 21: Window head to cladding full board

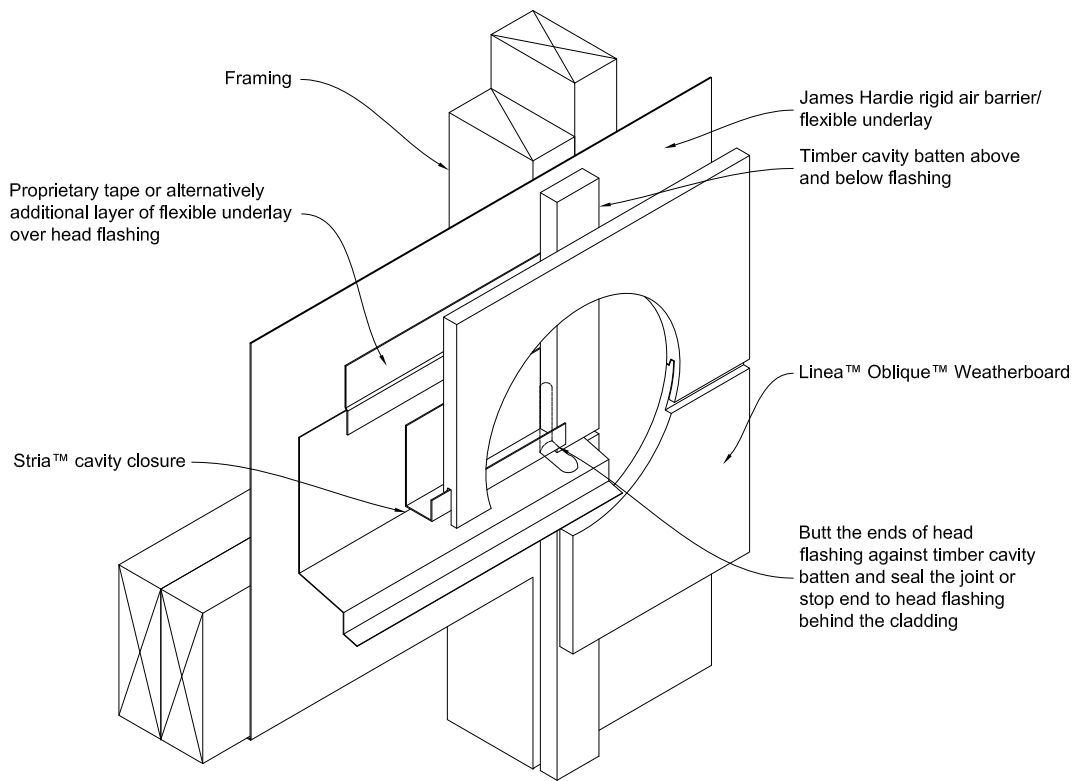


Figure 22: Window jamb flashing

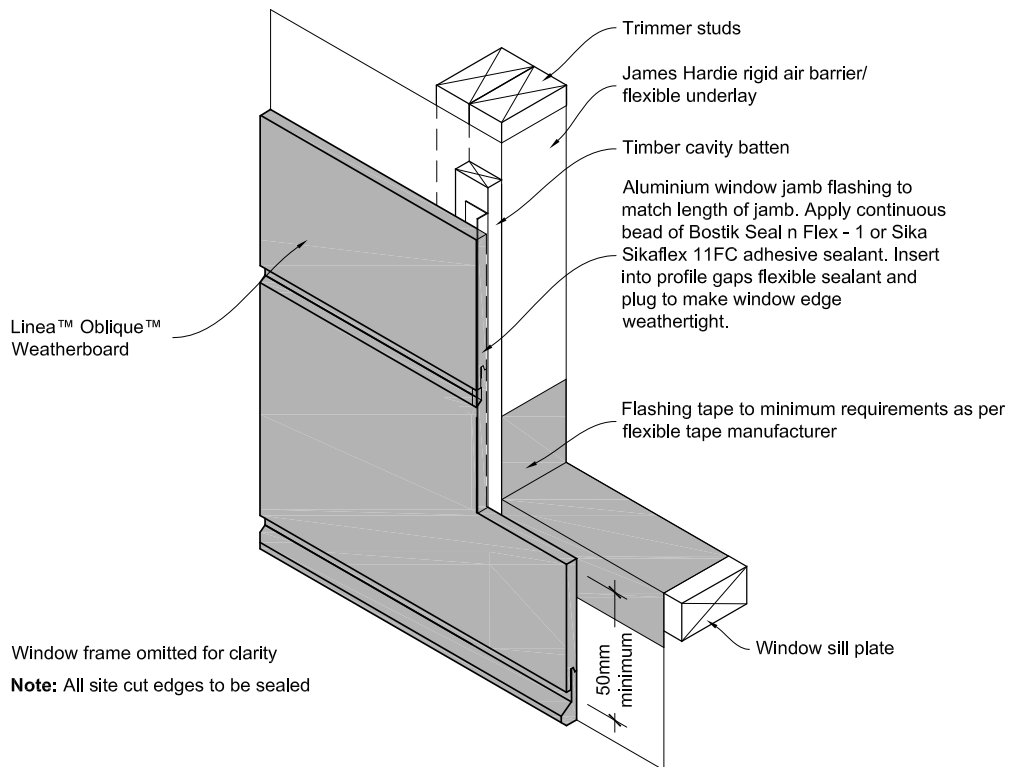


Figure 23: Window head with cladding cut around head flashing

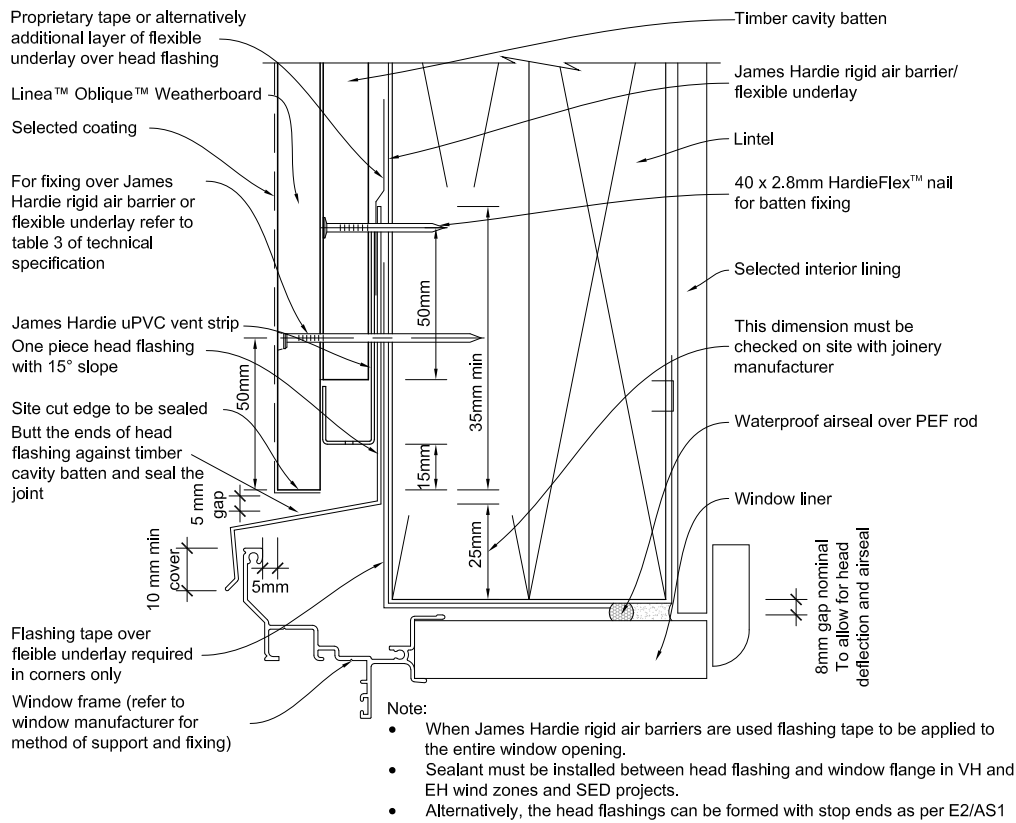


Figure 24: Window head to Linea™ Oblique™ Weatherboard 300mm cut board

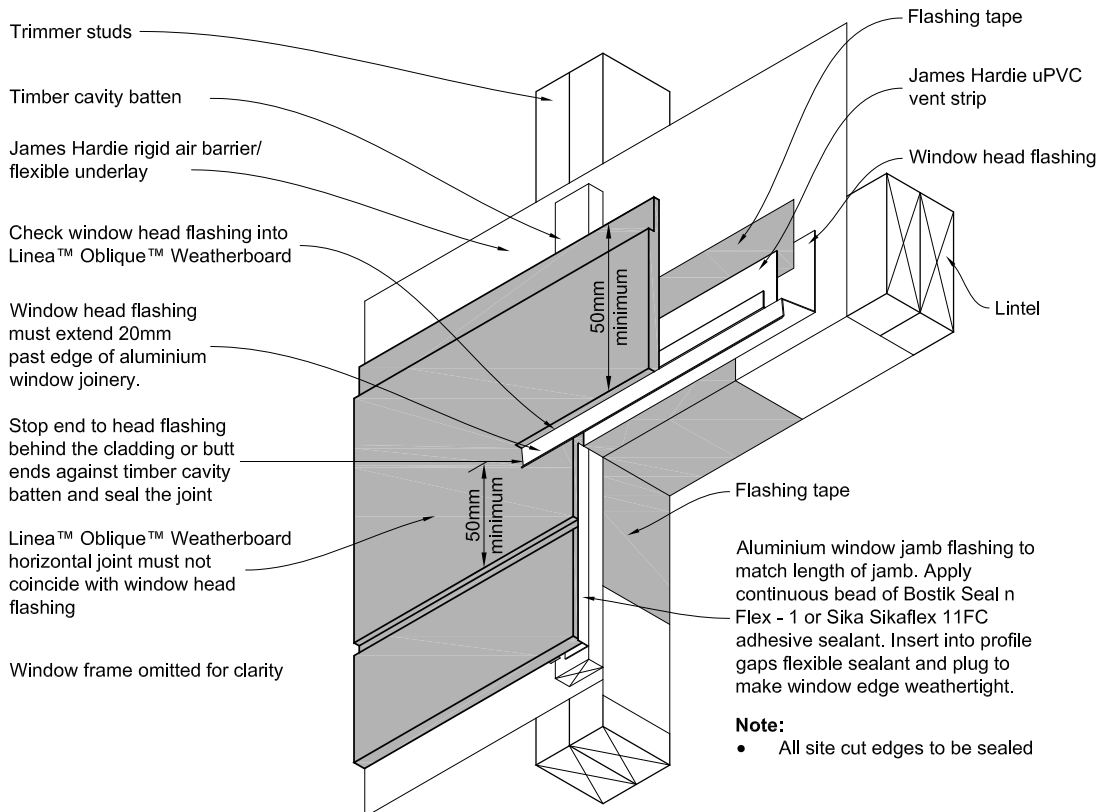
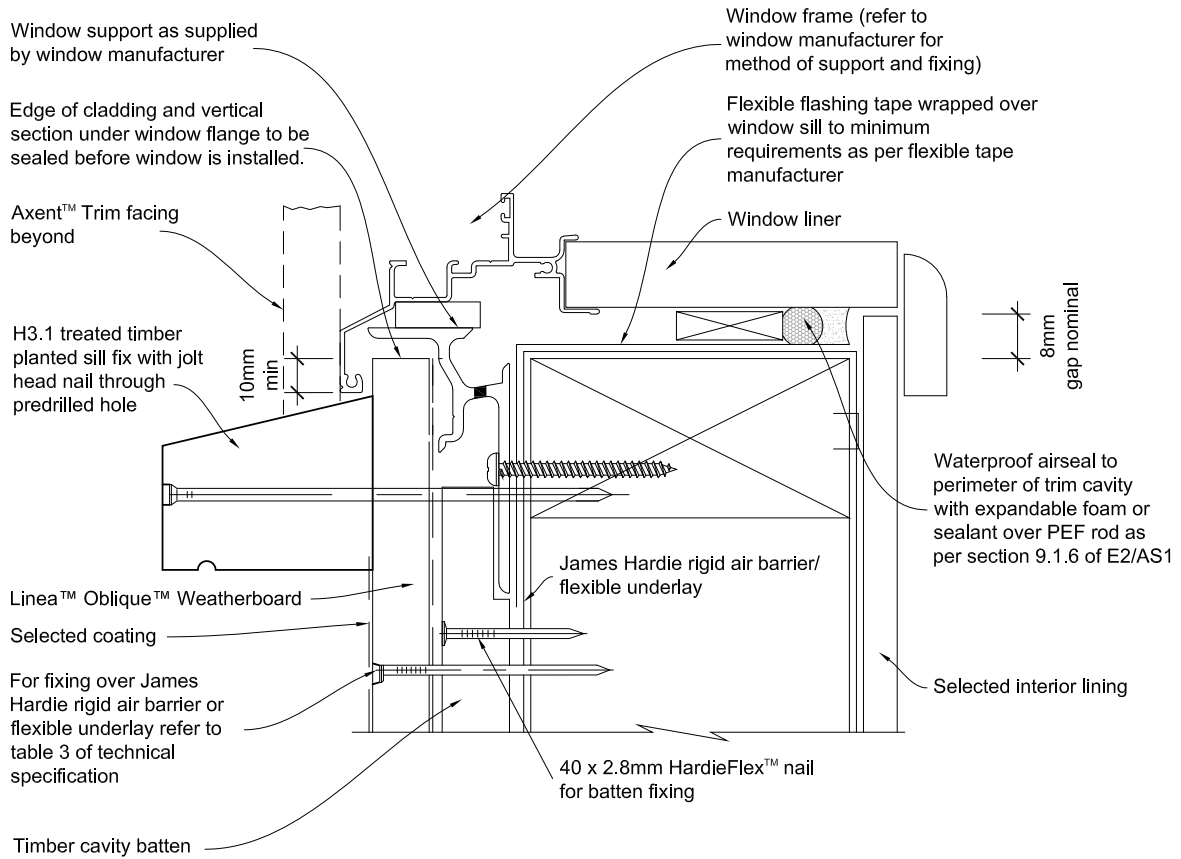


Figure 25: Window sill with facings

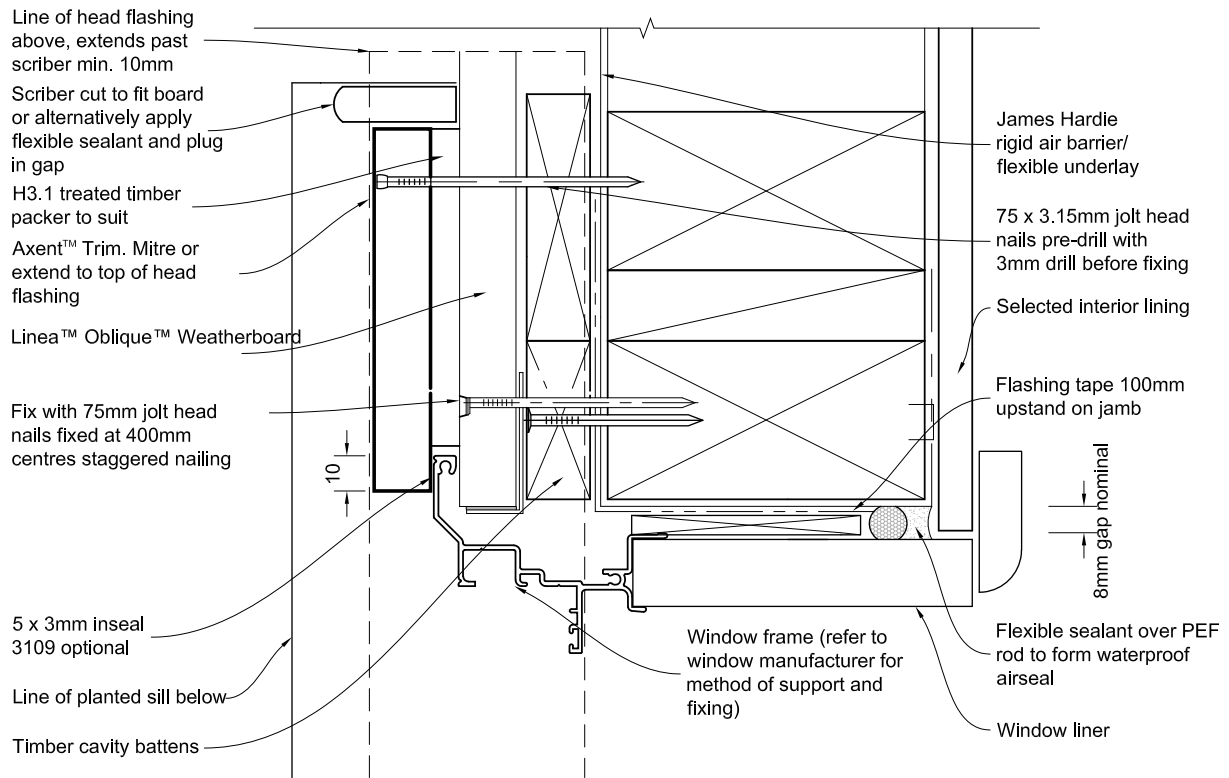


General notes for materials selection

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
4. When James Hardie rigid air barriers are used flashing tape to be applied to the entire opening

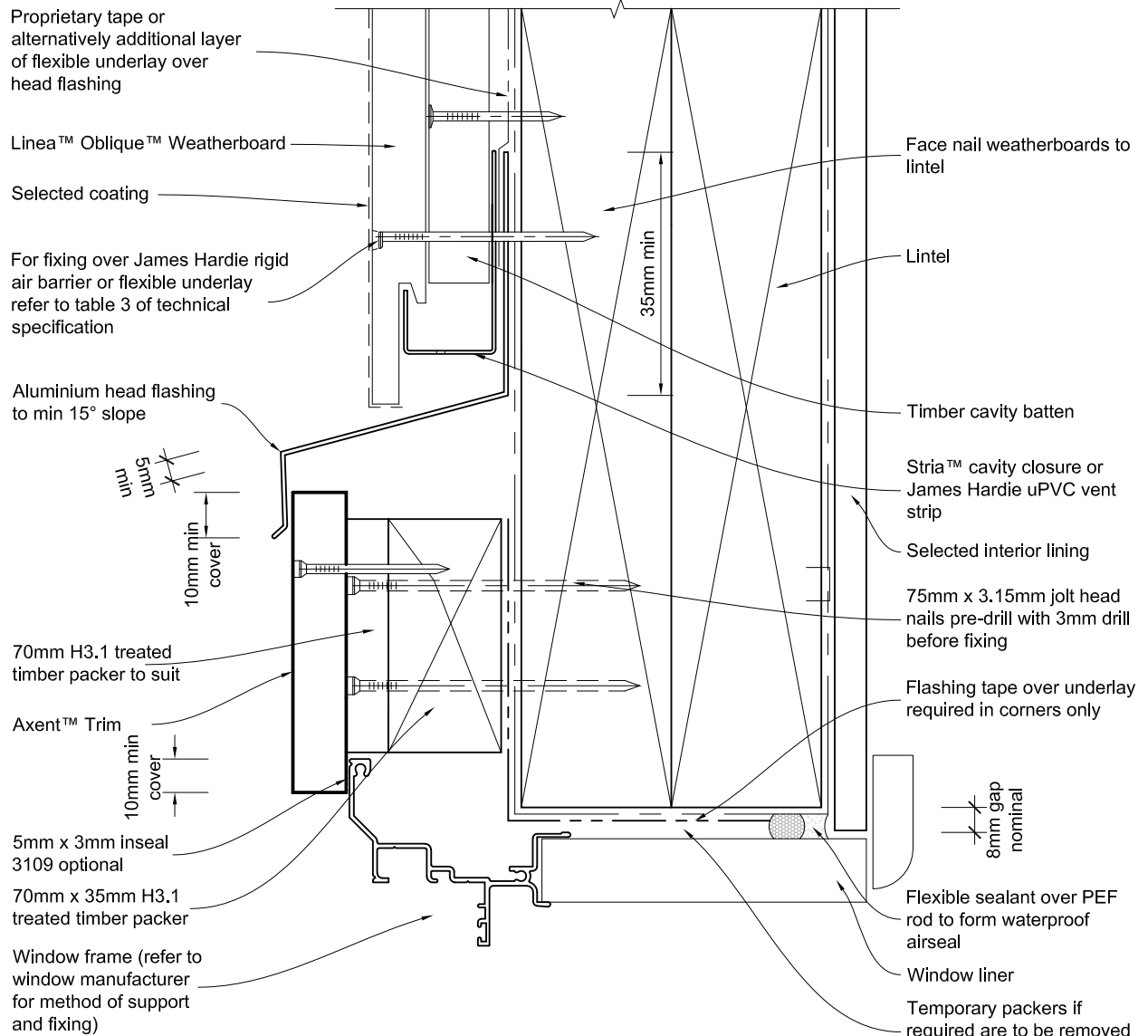
Refer to the manufacturer or supplier for technical information for these materials.

Figure 26: Window and door jamb with facings



Note:
When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening.

Figure 27: Window and door head with facings



Note:

- When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening.
- Sealant must be installed between head flashing and window flange VH and EH wind zones and SED pressures.
- Alternatively, the head flashings can be formed with stop ends as per E2/AS1

Figure 28: Over joist at floor level

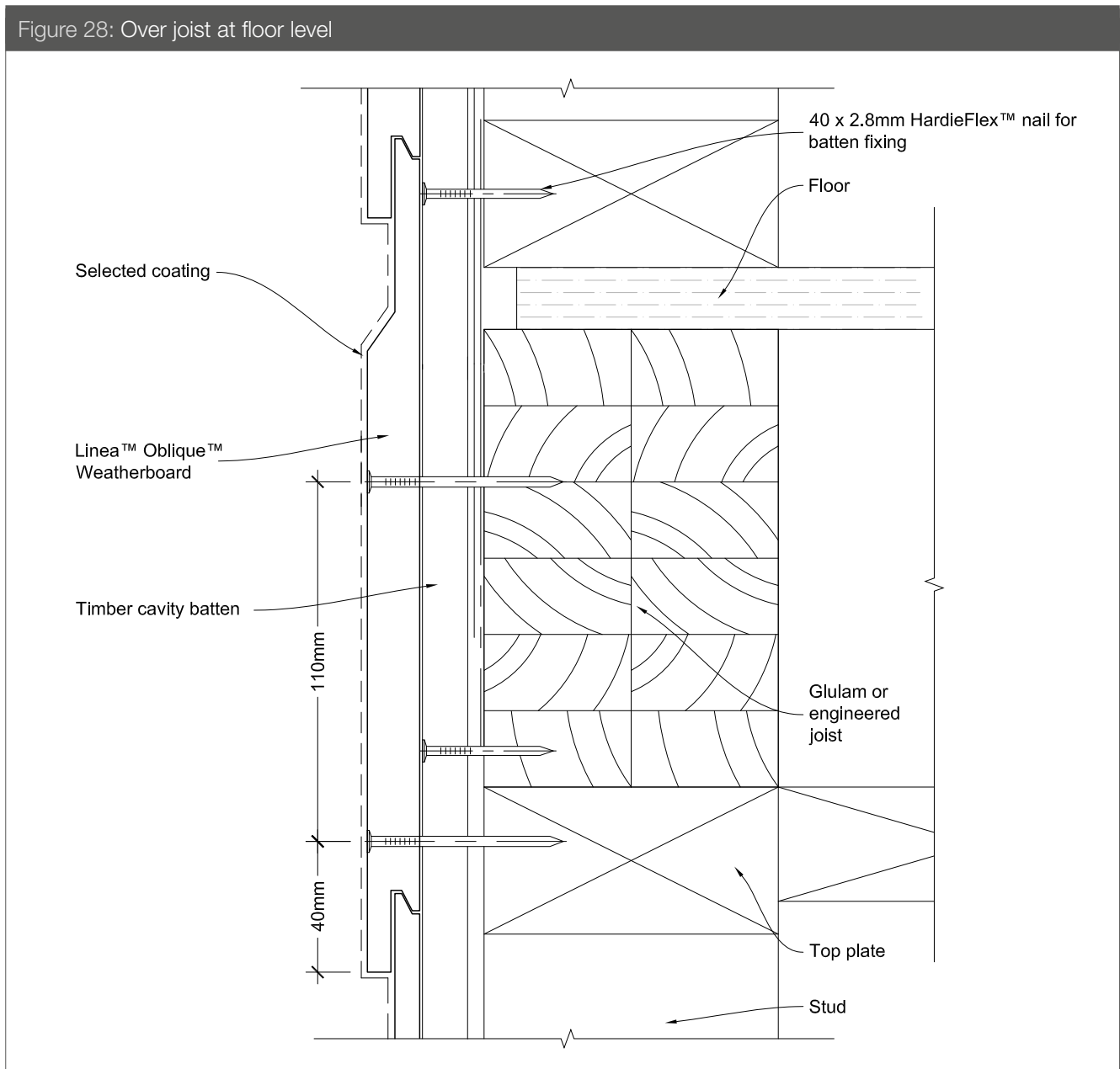
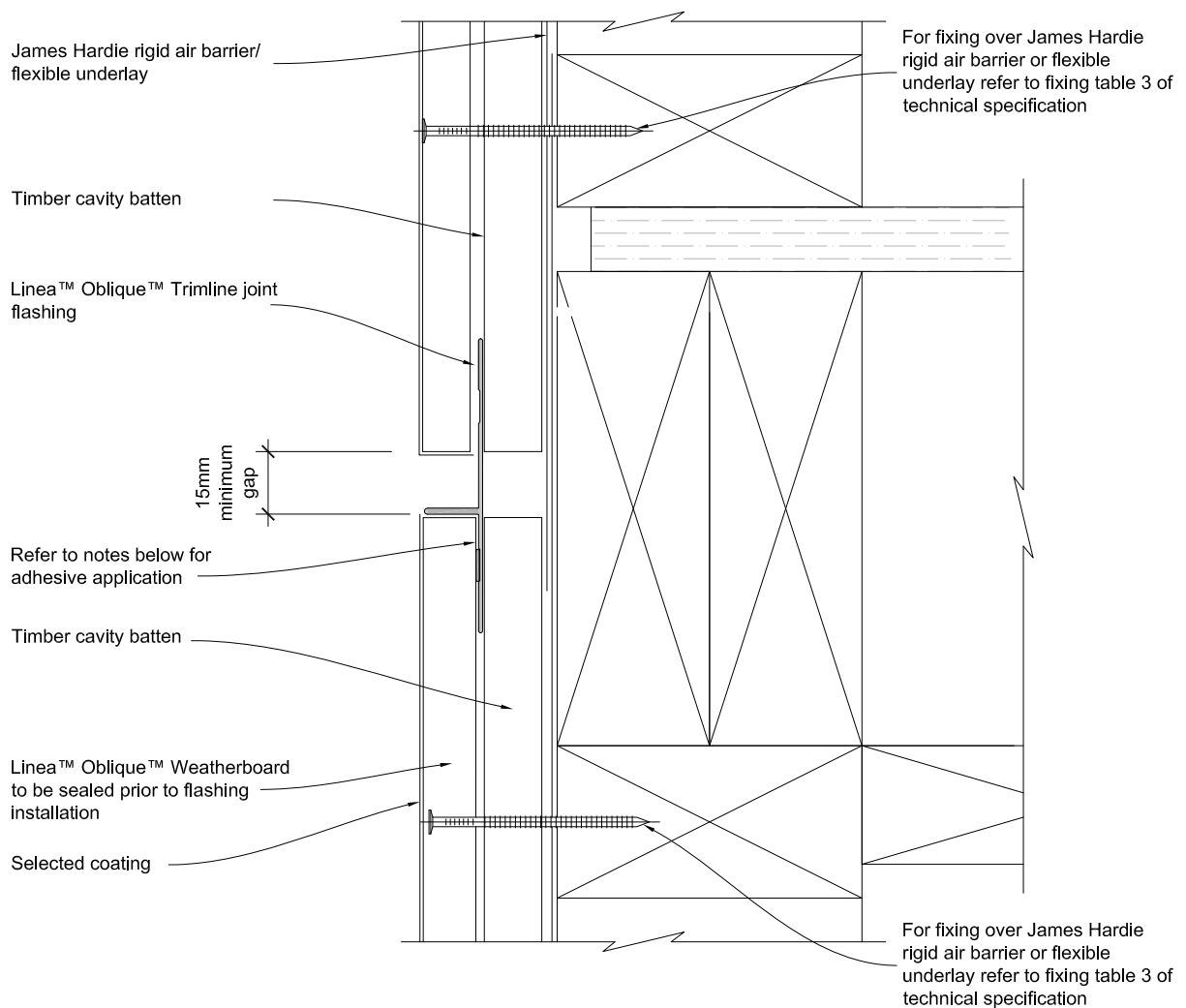


Figure 29: Trimline flashing joint at floor level



STEP 1

- Ensure flat James Hardie rigid air barrier/ flexible underlay is in place

STEP 2

- James Hardie horizontal cavity batten to be installed over the studs and nogs. - Nylon strapping intermediate support to hold insulation in place between studs

STEP 3

- Install the lower weatherboards with aluminium trimline flashing
- Install the upper weatherboard keeping a 15mm gap

Notes:

- The aluminium trimline flashing is installed prior to weatherboard. Apply two 6mm thick lines of adhesive sealant on the bottom portion of aluminium trimline flashing to seal. Take care to ensure continuous seal is formed between weatherboard and aluminium trimline flashing
- The adhesive sealant must continue between flashing flange and weatherboard edge
- Install purpose-made jointer 50mm over each end of trimline flashing and seal with flexible sealant to prevent water ingress

Figure 30: Drained flashing joint at floor level

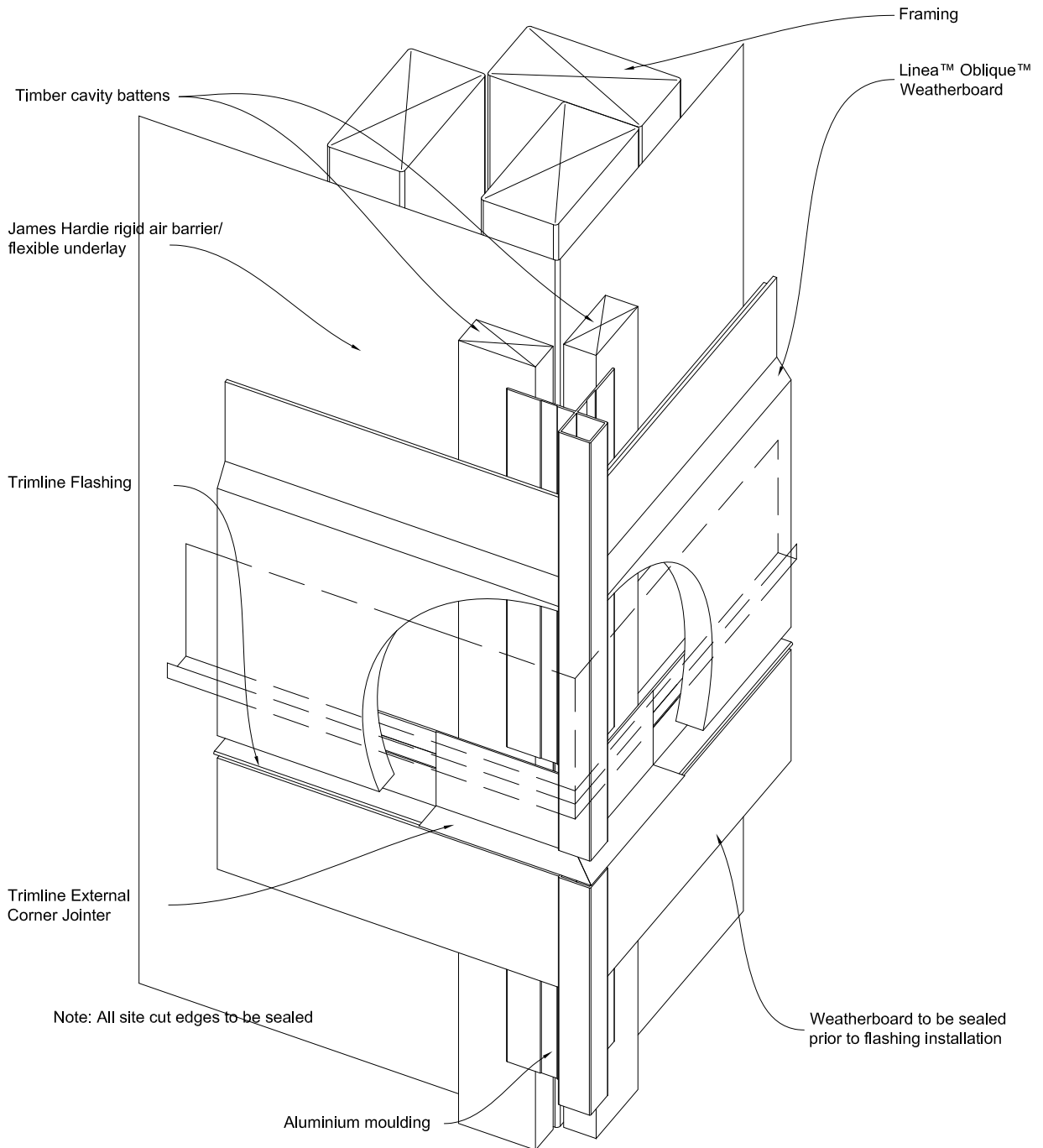


Figure 31: Trimline joint

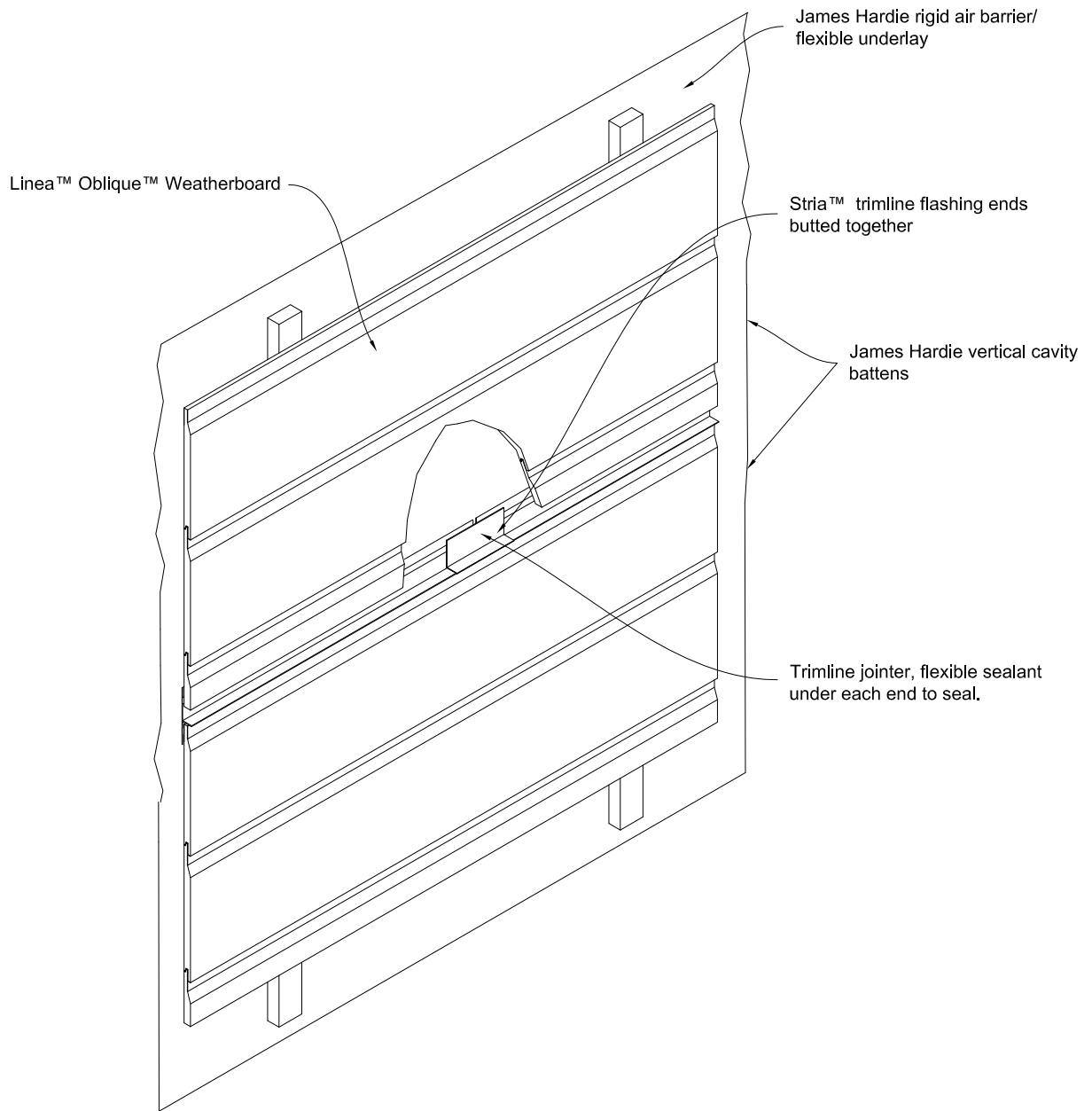
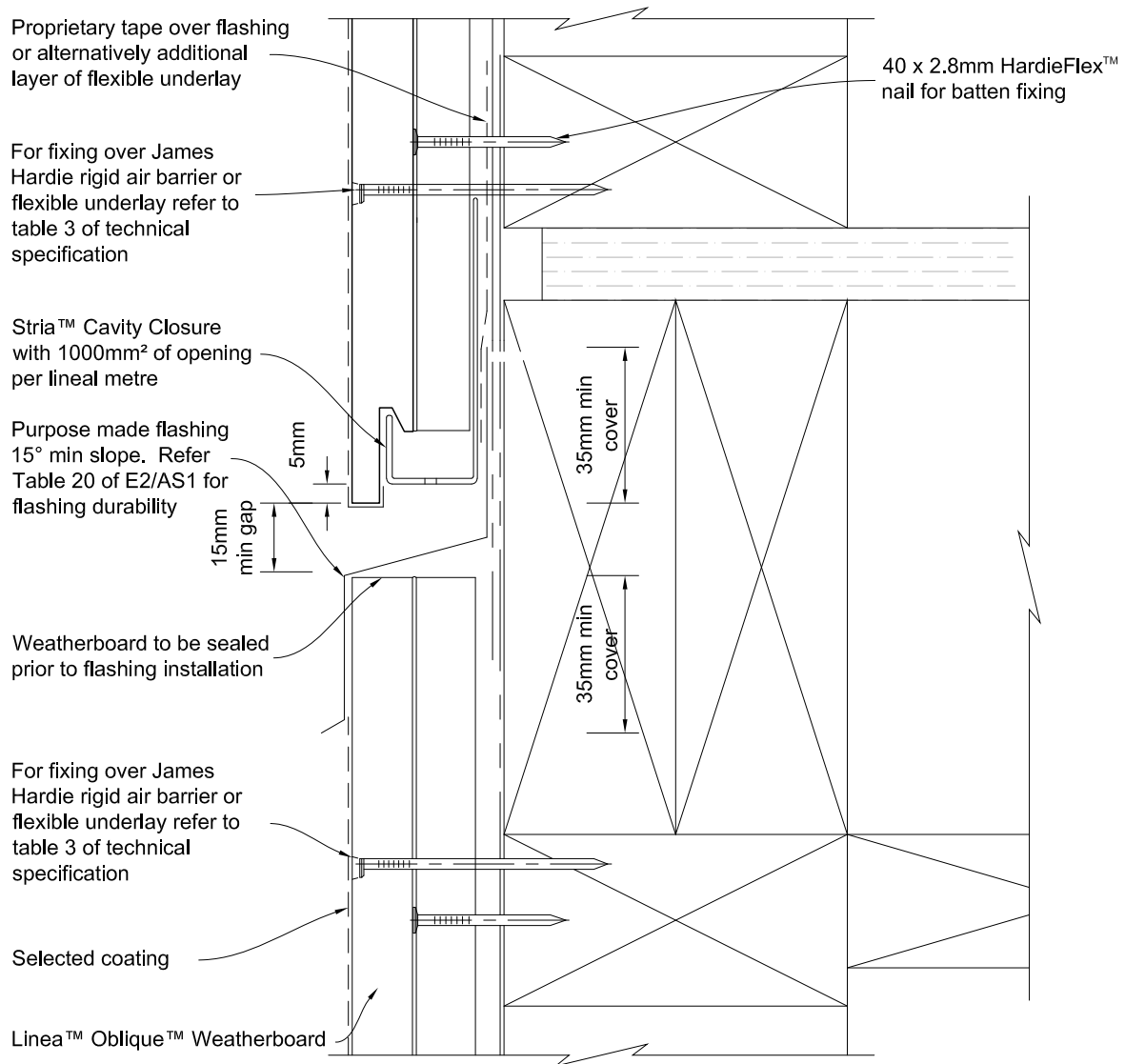


Figure 32: Drained flashing joint at floor level



Note:

This detail is required to limit cavities to a maximum of 2 stories or 7m. Refer E2/AS1 clause 9.1.9.4

STEP 1

- Check architects plans for the type of flashing to be used

STEP 2

- Check fixing centres and edge distances
- If top fixings are to be hidden by the Z flashing they will need to be fixed and sealed before the Z flashing is installed
- Cut edges need to be primed with Acraprime sealer or similar

STEP 3

- When 50 year durability is required refer to Table 20 E2/AS1

STEP 4

- The flashing to be placed in the centre of the floor joists. Do not fix timber cavity battens or cladding into floor joists

Figure 33: Apron flashing detail

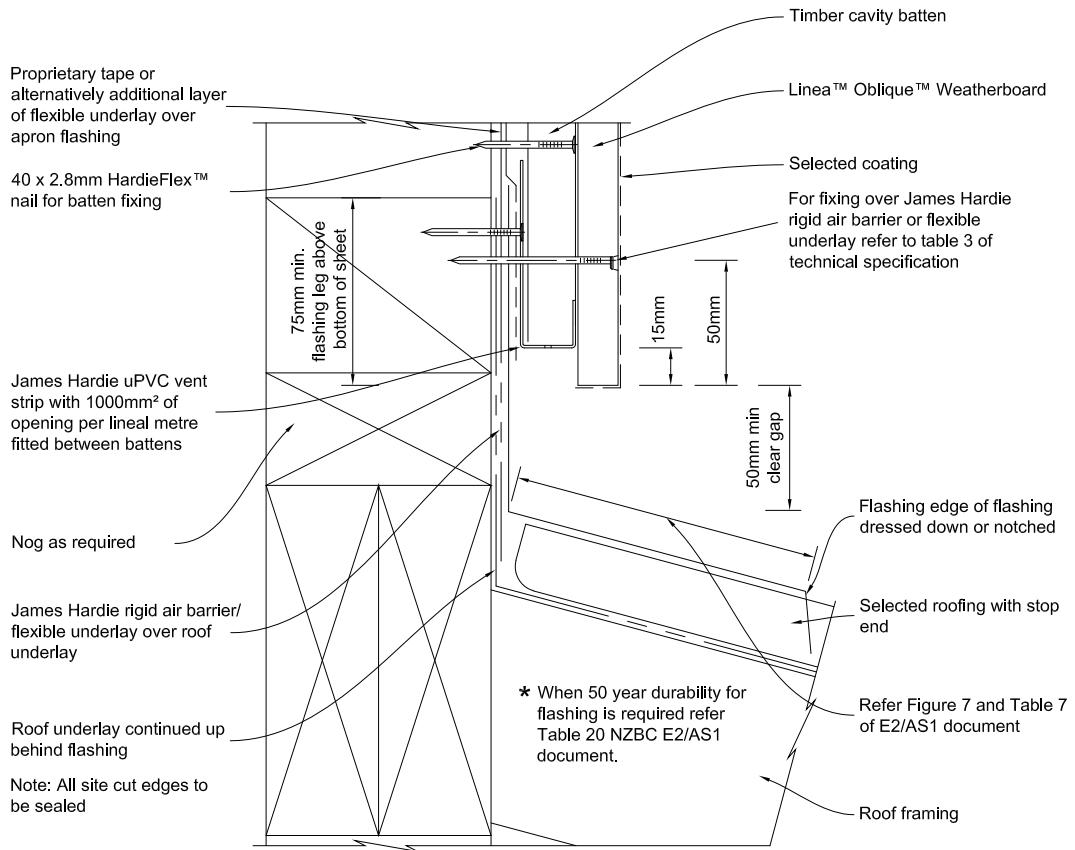


Figure 34: Parapet flashing

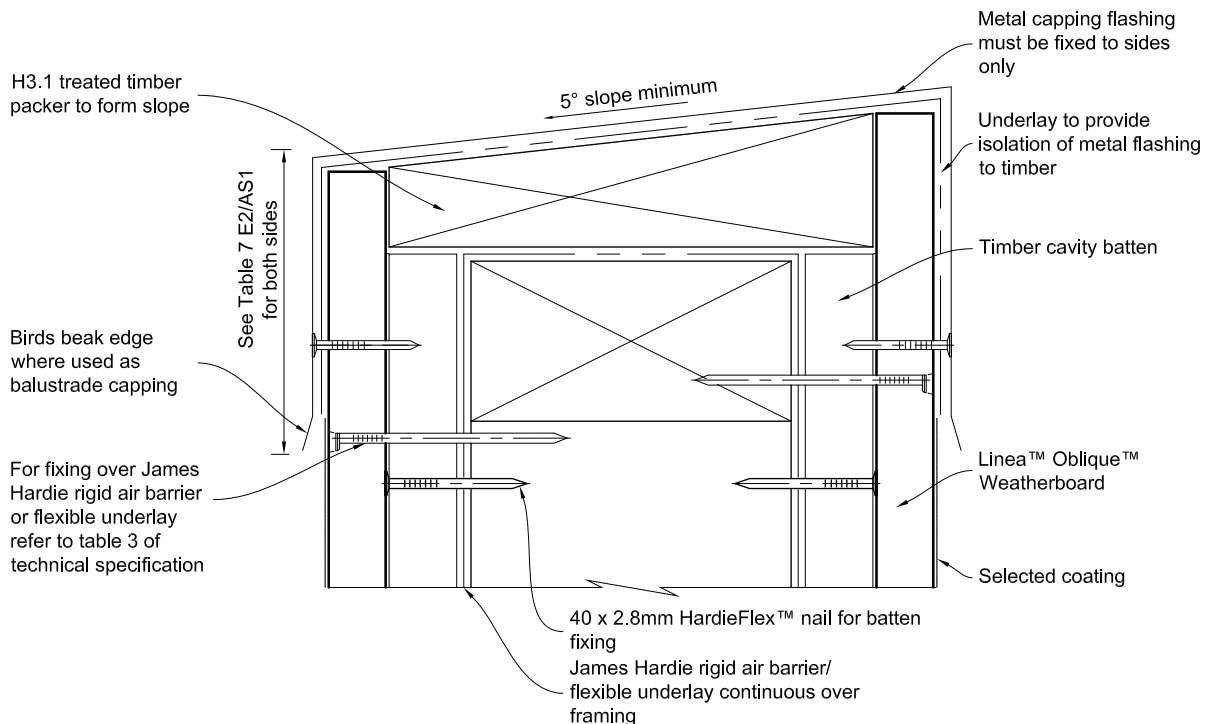


Figure 35: Roof to wall junction detail

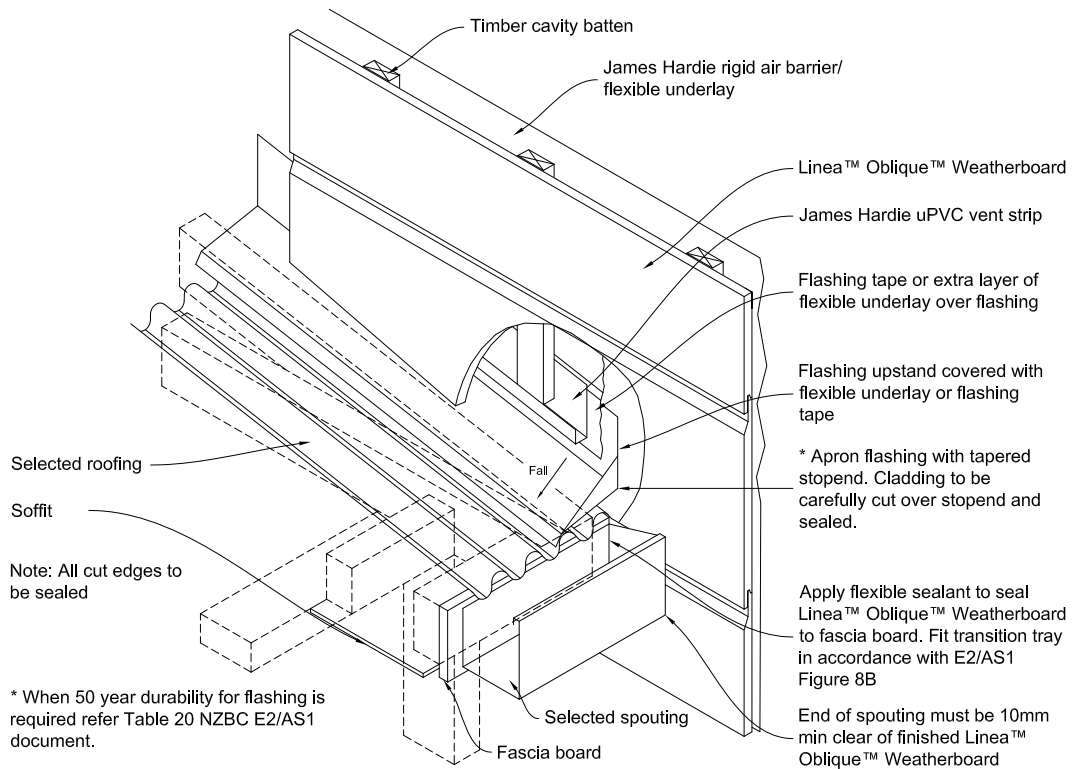


Figure 36: Meter box at sill

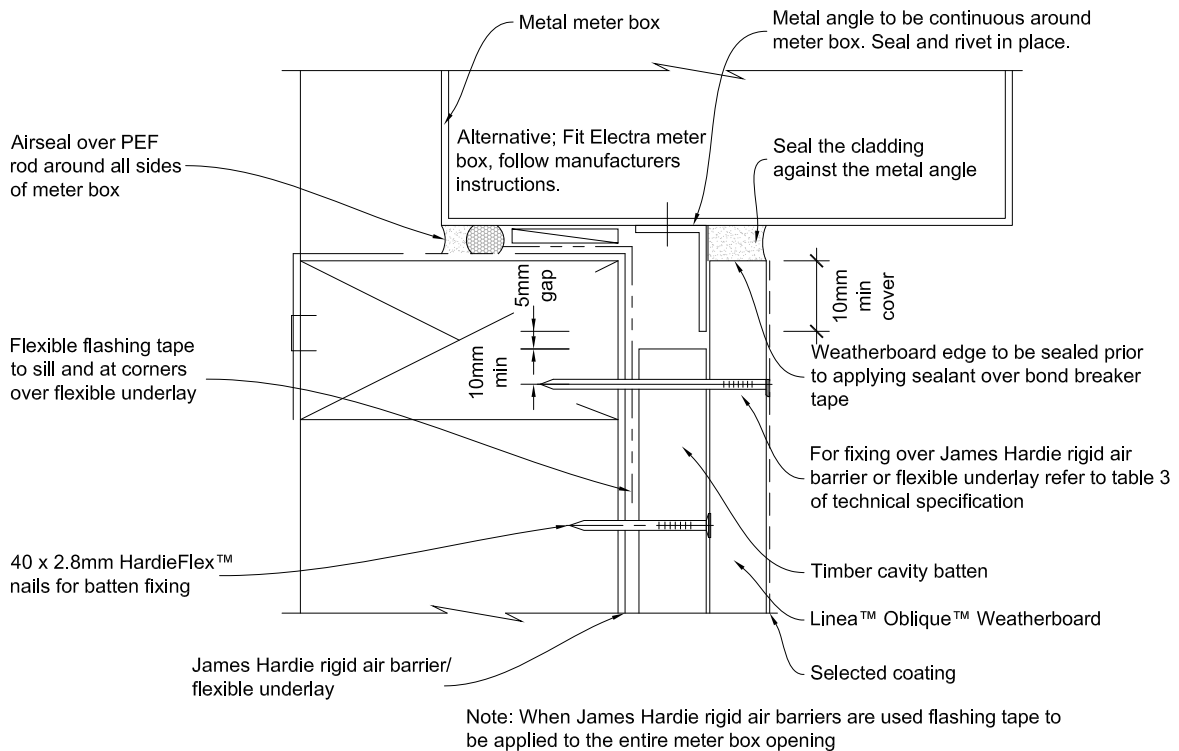
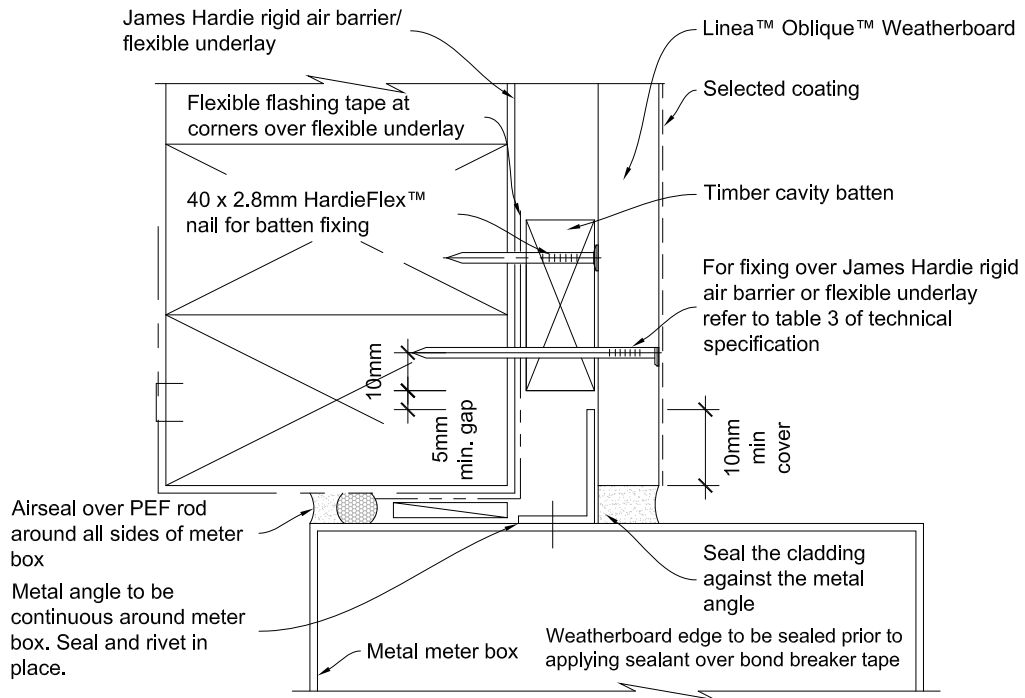


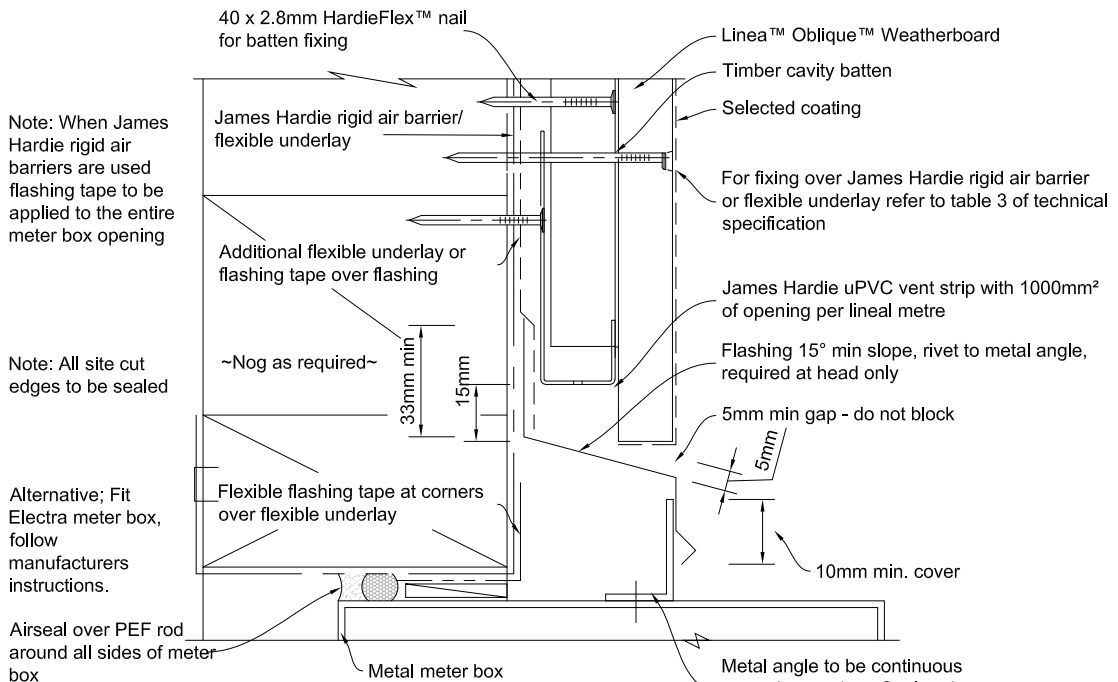
Figure 37: Meter box at jamb



Alternative; Fit Electra meter box, follow manufacturers instructions.

Note: When James Hardie rigid air barriers are used flashing tape to be applied to the entire meter box opening

Figure 38: Meter box at head



Note:

- When James Hardie rigid air barrier is used, flashing tape to be applied to the entire opening.
- Sealant must be installed between head flashings and flange in VH and EH wind zones and SED pressures.
- Alternatively, the head flashings can be formed with stop ends as per E2/AS1

Figure 39: Enclosed deck

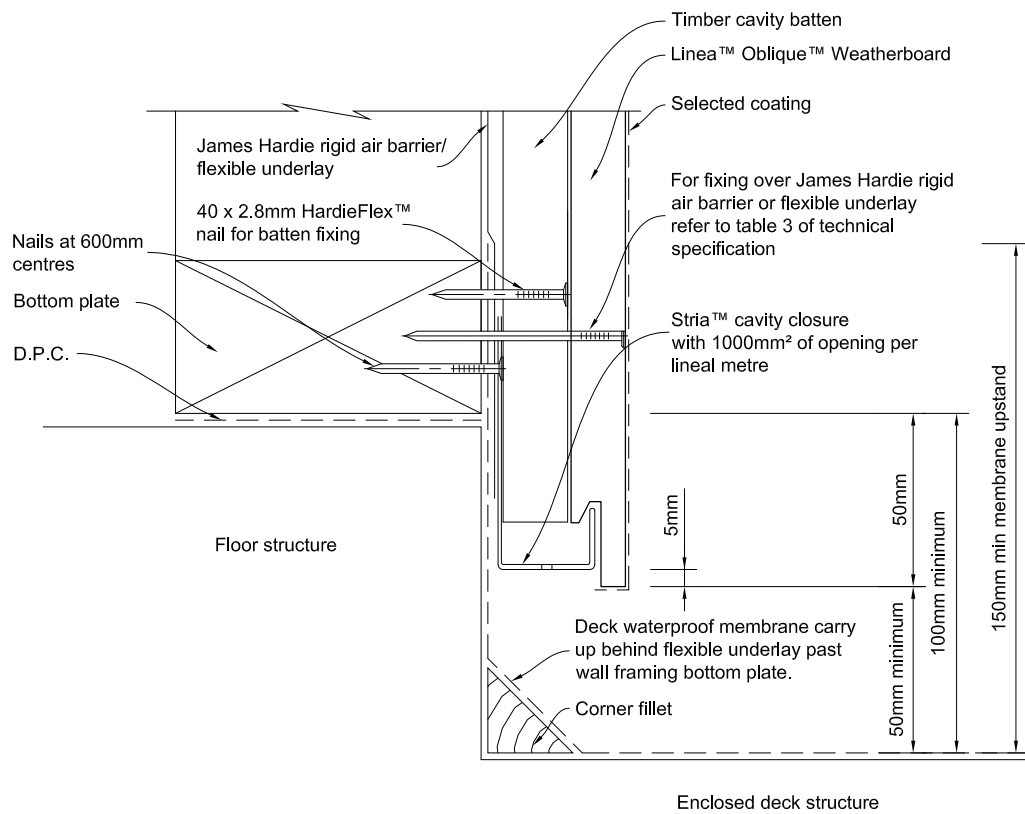


Figure 40: Pipe penetration

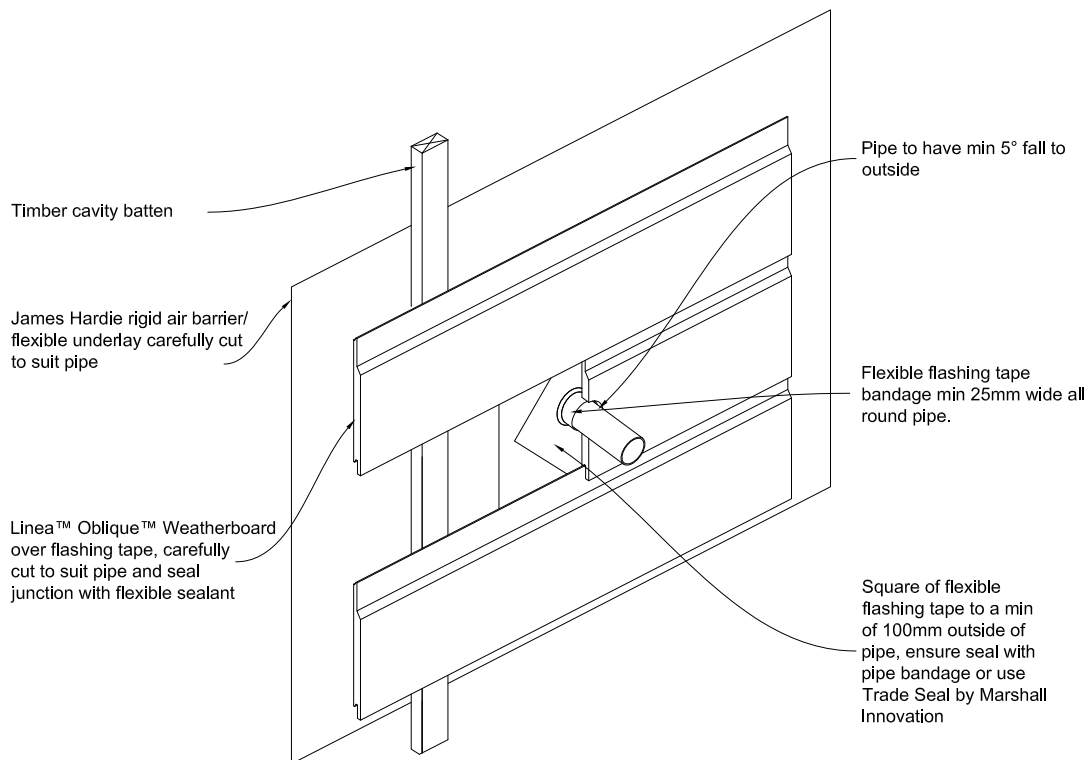


Figure 41: Garage head

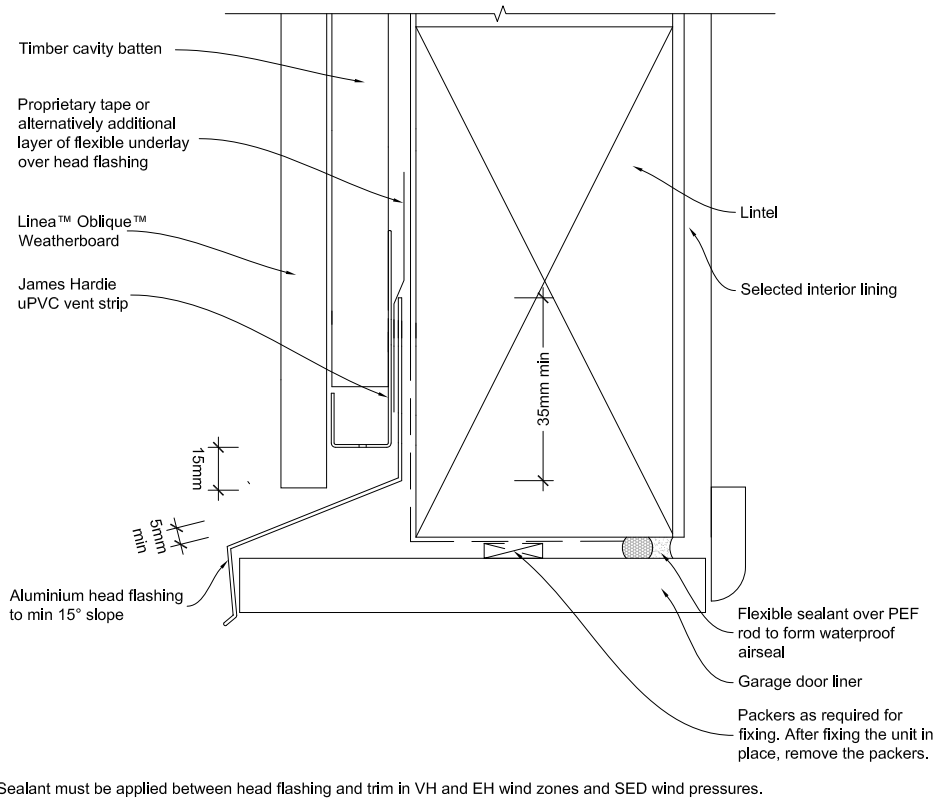
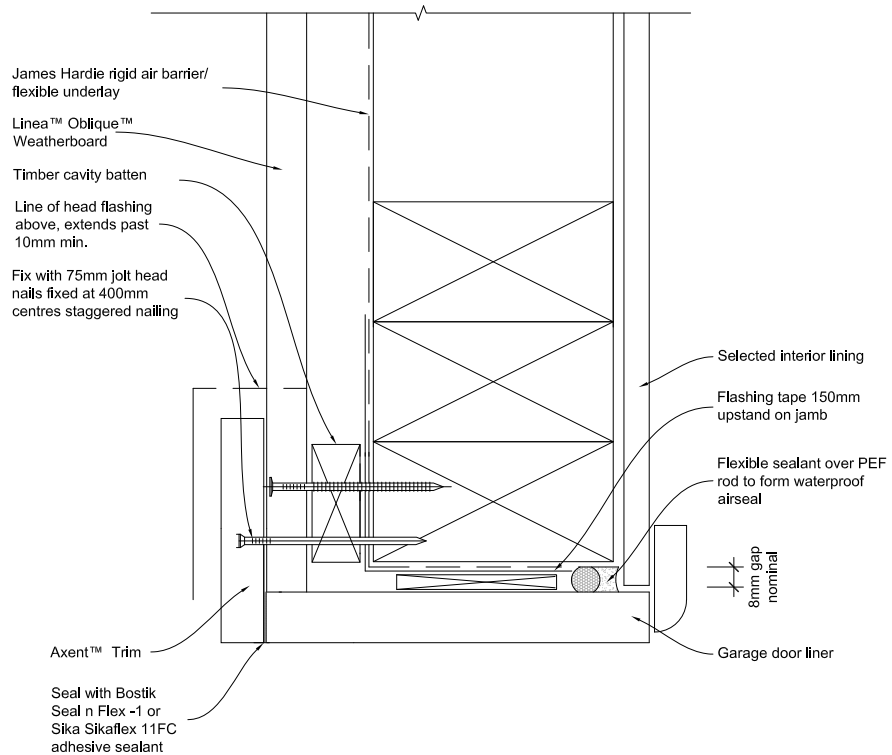


Figure 42: Garage jamb



Product Warranty



James Hardie New Zealand Limited (“James Hardie”) warrants for a period of 25 years from the date of purchase that the Linea™ Oblique™ Weatherboard on (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. Linea™ 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 Linea™ Oblique™ Weatherboard Horizontal Installation 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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Vertical Installation Technical Specification

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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

1 Application and scope

1.1 APPLICATION

Linea™ Oblique™ Weatherboard installed as per this specification gives a vertical rusticated profile weatherboard appearance. Linea Oblique Weatherboard can be fixed to timber-framed external walls. A wide range of colours can be used, varying from light to dark. Linea Oblique Weatherboard is available in 200mm or 300mm wide x 4200mm or 2700mm lengths and is 16mm thick.

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 James Hardie Technical Specification. All of the details provided in this document must be read in conjunction with the project specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure that you have the current manual. Additional installation information, warranties and warnings are available at www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

1.2 SCOPE

This specification covers the installation of Linea Oblique Weatherboard fixed vertically over James Hardie horizontal cavity battens on buildings that fall within the scope limitation of NZS 3604 and E2/AS1 of the New Zealand Building Code (NZBC).

This specification also covers the installation of Linea Oblique Weatherboard on projects, which are subject to specific engineering design (SED) up to a wind pressure of 2.5kPa (ULS).

1.3 DETAILS

Various typical Linea 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.

1.4 SPECIFIC DESIGN

For use of Linea 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.

Linea Oblique Weatherboard is suitable for use in SED project up to a wind pressure of 2.5kPa (ULS).

2 Design

2.1 COMPLIANCE

Linea Oblique Weatherboard has been issued a CodeMark certification number GM-CM30059 which confirms Linea Oblique Weatherboard is deemed to comply with the requirements of the NZBC. Please refer to our website www.jameshardie.co.nz for a copy of the CodeMark certificate. Linea 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 this Linea Oblique Weatherboard Vertical Installation technical specification. BRANZ Appraisal number 897 (2015) at www.branz.co.nz or www.jameshardie.co.nz.



2.2 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.

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.

2.3 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.

2.4 SURFACE 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.

Linea Oblique Weatherboard must overhang the bottom plate by a minimum of 50mm, as required by E2/AS1.

Linea 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 Figure 3.

2.5 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

2.6 STRUCTURE

2.6.1 Timber Framing

Timber-framed buildings must either be in accordance with NZS 3604 (Timber-framed Buildings) or designed as per specific engineering design. For a building requiring a specific engineering design, the framing stiffness must be equivalent to, or more than, the stiffness requirements of NZS 3604.

For specific design projects, the timber framing must be designed in accordance with the requirements of NZS 3603 and AS/NZS 1170.

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.

2.6.2 Wind Pressures

Linea Oblique Weatherboard is suitable for use in wind zones up to and including EH as defined in NZS 3604.

Linea Oblique Weatherboard is also suitable for use in specific design projects up to wind pressures of 2.5kPa (ULS).

2.7 FIRE RATED WALLS

Linea 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 of the NZBC, when the walls are constructed in accordance with the current James Hardie 'Fire and Acoustic' Design Manual.

Linea Oblique Weatherboard is classified as a 'non-combustible' material suitable for use on walls close to a boundary.

2.8 STRUCTURAL BRACING

Linea Oblique Weatherboard installed as per this specification cannot be used to achieve structural bracing. However, bracing can be achieved by using a James Hardie rigid air barrier 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 James Hardie Bracing Design Manual for further information.

2.9 ENERGY EFFICIENCY

External walls constructed as per this technical specification using Linea Oblique Weatherboard and bulk insulation, where the area of glazing is 30% or less of the total wall area, complies with the insulation requirements for walls in the NZBC Acceptable Solution H1/AS1 (Energy Efficiency Clause H1), Table 1.

To meet thermal insulation requirements for the construction, the bulk insulation as specified in Table 1 must be used. This insulation may be substituted with insulations having higher R-values. The thermal insulation of a wall changes when the size or spacing of timber framing is increased or decreased. The calculation used in Table 1 is based on a timber framing size 90 x 45mm and using an internal lining material such as Villaboard Lining or a 10mm plasterboard.

Table 1

Insulation capability		
Climate zone	R-value requirement	Minimum cavity insulation infill requirement
1 and 2	1.9 m ² °C/W	R2.0*
3	2.0 m ² °C/W	R2.2*
<p>Total construction R-value depends on the insulation material used and the framing ratio. The insulation material R-values specified in this table are for studs spaced at 600mm centres and nogs spaced at 600mm centres.</p> <p>* To achieve higher R-values of construction the wall insulation material must be replaced with an insulation material having higher R-values to suit the requirements.</p> <p>For further guidance on insulation requirements refer to the current edition of 'House Insulation Guide' published by BRANZ.</p>		

3 Framing

3.1 GENERAL

Linea 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.

For Linea Oblique Weatherboard Vertical Installation:

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 600mm centres maximum

Note: For fixing Linea Oblique Weatherboard, fastener spacing is provided in Section 5.

3.2 TIMBER FRAMING

3.2.1 Dimensions

A 90 x 45mm minimum framing size is required.

3.2.2 Structural Grade

Timber grade used must be in accordance with timber grades specified in NZS 3604.

3.2.3 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 Sawed 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.

3.2.4 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:

- 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 design requirements but not exceeding 600mm maximum

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.

3.3 SPECIAL FRAMING REQUIREMENTS

The following are special framing requirements for both timber and steel framing:

- Double studs are required at internal corners, refer to Figure 10
- Extra packers may be required at external corners

3.4 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.

4 Preparation

4.1 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. James Hardie HomeRAB Pre-Cladding complies with these requirements and is suitable for use in this situation. It must be installed in accordance with the James Hardie Rigid Air Barriers installation manual.

4.2 RAB BOARD

For EH wind zone or for specific engineering design (SED) projects where the wind pressure is higher than 1.5kPa, James Hardie RAB™ Board must be used.

To achieve temporary weathertightness using James Hardie RAB Board, windows/doors need to be temporarily installed. Refer to the James Hardie Rigid Air Barriers installation manual for further information regarding its installation.

4.3 CAVITY CLOSURE/VENT STRIP

The James 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. James Hardie cavity closure/vent strip has an opening area of 1000mm²/m length.

4.4 CAVITY BATTENS

Linea 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 James 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.

James 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

4.5 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

4.6 FLASHINGS

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to Linea 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 James Hardie rigid air barrier boards 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 James Hardie Rigid Air Barriers installation manual for further information.

4.7 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 Linea Oblique Weatherboard which meet the performance requirements of E2 External Moisture, an approved document of the NZBC, refer to Figures 11 to 13.

5 Installation

5.1 GENERAL

Linea 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 Linea Oblique Weatherboard can be mixed to create the desired look.

Linea 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.

Linea Oblique Weatherboard must be fully supported and fixed through James Hardie horizontal cavity battens. Ensure that cladding is hard against the battens to avoid drumminess.

This technical specification only covers the vertical installation of Linea Oblique Weatherboard. Refer to the Linea Oblique Weatherboard horizontal installation technical specification for horizontal installation.

5.2 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 2.

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 2

Exposure conditions and nail selection prescribed by NZS 3604		
NAIL MATERIAL		
Zone D	Zone C* outside sea spray zone, Zone B and geothermal hot spots	Bracing - all zones
Grade 316 Stainless	Hot-dipped galvanised or Grade 316 Stainless	Grade 316 Stainless

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

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.

5.3 FASTENER – SIZE AND LAYOUT

Linea Oblique Weatherboard must be fixed vertically to framing using fixings as specified in Table 3 below and follow the edge distance required for nails as shown in the details.

Table 3

Weatherboard fixing up to and including VH wind zone		
CAVITY CONSTRUCTION OVER FLEXIBLE UNDERLAY		
Linea Oblique Weatherboard 200	65x2.87mm D head nail or 65x2.87mm RounDrive ring shank nail or 60x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate, refer to Figure 6
Linea Oblique Weatherboard 300	65x2.87mm D head nail or 65x2.87mm RounDrive ring shank nails or 60x3.15mm HardieFlex nail	Fix one nail 150mm from bottom edge of board per nog/plate, refer to Figure 7

Weatherboard fixing up to and including VH wind zone

CAVITY CONSTRUCTION OVER HOMERAB PRE-CLADDING/RAB BOARD		
Linea Oblique Weatherboard 200	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate, refer to Figure 6
Linea Oblique Weatherboard 300	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail 150mm from bottom edge of board per nog/plate, refer to Figure 7

Weatherboard fixing EH wind zone and SED projects

CAVITY CONSTRUCTION OVER RAB BOARD		
Linea Oblique Weatherboard 200	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail 100mm from bottom edge of board per nog/plate Refer to Figure 8
Linea Oblique Weatherboard 300	75x3.06mm D head nail or 75x3.15mm RounDrive ring shank nail or 75x3.15mm HardieFlex nail	Fix one nail at 150mm from bottom edge of board per nog/plate. Refer to Figure 9

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
- HardieFlex nails - finish nails flush with weatherboard surface

6 Joints

6.1 VERTICAL JOINT

Linea Oblique Weatherboard vertical joint shall be formed using the ship lap edge of the Linea Oblique Weatherboard. Ensure that the Linea Oblique Weatherboards are securely interlocked before nailing, refer to Figures 6 to 9.

6.2 HORIZONTAL JOINT

Linea 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 17.

When using a solid timber joist, a horizontal joint or a movement joint must be formed at floor joist, refer to Figure 19.

6.3 DRAINAGE JOINT

After every two floors a horizontal drainage joint flashing is required as per E2/AS1, refer to Figure 22.

6.4 EXTERNAL CORNER

An external box corner flashing is used to fix the external corners, refer to Figure 11. Alternatively an Axent™ Trim external boxed corner can also be formed, refer to Figure 12.

6.5 INTERNAL CORNER

An internal corner flashing is to be used to form an internal corner joint, refer to Figure 10.

An extra stud is required in internal corners.

Note: All joint mouldings to be fixed at 400mm centres both sides.

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

Linea 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 Linea Oblique Weatherboard is mandatory to meet the durability requirements of the NZBC and the 25 year James Hardie product warranty. Linea 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 Linea 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.

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.

8 Storage and handling

When storing Linea Oblique Weatherboard, they must be laid flat on a smooth level surface. Edges and corners must be protected from chipping.

To ensure optimum performance, store weatherboards under cover and keep dry prior to fixing. If the weatherboards become wet, allow them to dry thoroughly before fixing.

Do not carry weatherboards on the flat, carry on edge to avoid excessive bending.

9 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*
- Re-coating exterior protective finishes**
- 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 building as well as ensuring the NZBC ground clearance requirements are maintained, especially where gardens are concerned
- The clearance between the bottom edge of the Linea Oblique Weatherboard and the finished/unfinished ground must always be maintained

**Do not use a water blaster to wash down the cladding. In extreme coastal conditions or sea spray zones, wash every 3-4 months.*

***Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.*

10 Product information

10.1 MANUFACTURING AND CLASSIFICATION

Linea 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 'Linea Oblique'.

Linea Oblique Weatherboard is manufactured to Australian/New Zealand Standard AS/NZS 2908.2 'Cellulose-Cement Products' (ISO 8336 'Fibre-Cement Flat Sheet').

Linea 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.

10.2 PRODUCT MASS

Linea Oblique Weatherboard is manufactured in 16mm thickness and has a mass of 20.57kg/m² for 200mm and 19.67kg/m² for 300mm.

Linea Oblique Weatherboard is defined as a Light Weight Wall Cladding (not exceeding 30kg/m²) as per NZS 3604.

10.3 DURABILITY

Linea Oblique Weatherboard and James Hardie rigid air barrier installed and maintained as per this technical specification will meet the durability requirement for cladding as per the NZBC clause B2 Durability.

10.3.1 Resistance to Moisture/Rotting

Linea 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)

10.3.2 Control of External Fire Spread

Linea Oblique Weatherboard meets the requirements of Appendix C C7.1.1 and is classified as 'Non-Combustible Material' which is suitable for use as external wall cladding and complies with the requirements of Paragraph 5.4 of the NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of Acceptable Solutions C/AS2 to C/AS6 of the NZBC.

10.3.3 Alpine Regions

In regions subject to freeze/thaw conditions, Linea Oblique Weatherboard and James Hardie rigid air barrier 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.

11 Safe working practices

11.1 STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALLINE SILICA

Crystalline Silica

What is it? Why and when is it a health hazard?

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!









When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

11.2 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 extractor unit as a minimum and always hose down with water/wet wipe for clean up
-  NEVER use grinders
-  ALWAYS use a circular 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
-  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 an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:





BEST

- HardieKnife™
- Hand guillotine
- Fibreshear





BETTER

- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

Working outdoors

-  Make sure you work in a well ventilated area
-  Position cutting station so wind will blow dust away from yourself and others in the working area
-  Cut products with either a HardieKnife™ or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit
-  When sawing, sanding, rebating, drilling or machining fibre cement products, always:
 - Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers' instructions) and when others are close by, ask them to do the same
 - If you are not clean shaven, then use a powered air respirator with a loose fitting head top
 - Wear safety glasses
 - Wear hearing protection
 - When others are close by, ask them to do the same

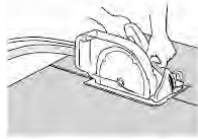
Working indoors

-  Never cut using a circular saw indoors
-  Position cutting station in a well ventilated area
-  Cut ONLY using a HardieKnife™, hand guillotine or fibreshears (manual, electric or pneumatic)
-  Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.

Working Instructions

- Refer to Recommended Safe Working Practices before starting any cutting or machining of product



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 deflector or a dust collector connected to a vacuum system. 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

11.3 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.

11.4 TIPS FOR SAFE AND EASY HANDLING


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











Sheet products

- 👍 Carry with two people
- 👍 Hold near each end and on edge
- 👍 Exercise care when handling sheet products to avoid damaging the edges/corners

12 Product and accessories





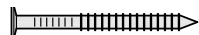
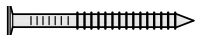


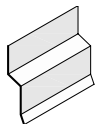
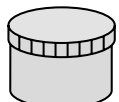
Linea Oblique Weatherboard information						
Product	Description	Size (mm)			Code	
		Thickness	Length	Width		
	Linea Oblique Weatherboard A 16mm profiled weatherboard for residential cladding. Factory sealed on all six sides. Each weatherboard has a manila white colour primer applied on its face, which accepts a wide range of paint finishes.	16	2700	200	404855	
					300	404856
			4200	200	404849	
				300	404848	

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

Accessories/tools supplied by James Hardie			
Accessories	Description	Size	Code
	James Hardie Horizontal Cavity Batten 20mm H3.1 Timber treated batten the cladding is fixed over	2700mm long	305862
	Oblique Trimline Joint Flashing Aluminium extrusion used behind cladding at horizontal joints.	3000mm long	305826
	JH Weatherboard Internal 'W' Corner Anodised aluminium extrusion used to create internal corners.	2700mm long	300386
	Linea Oblique Weatherboard External Box Corner Anodised aluminium extrusion used to create external corners.	2700mm long	305825
		4000mm long	305873
	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
	Linea Oblique Plug To fill recess in Linea Oblique Weatherboard		305930
Tools			
	HardieBlade™ Saw Blade Diamond tip fibre cement circular saw blade. Spacers not included.	184mm	300660
		254mm	303375

Accessories/tools not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with Linea Oblique Weatherboard and James Hardie rigid air barrier. 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 James Hardie rigid air barrier vertical joints. 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
	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 RoundDrive nail (ring shank hot dipped galvanised/stainless steel) For fixing Linea Oblique Weatherboard.
	75 x 3.06mm 'D' head nail or 75 x 3.15 RoundDrive nail (hot dipped galvanised or ring shank stainless steel) For fixing Linea Oblique Weatherboard.
	40 x 2.8mm or longer HardieFlex™ 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

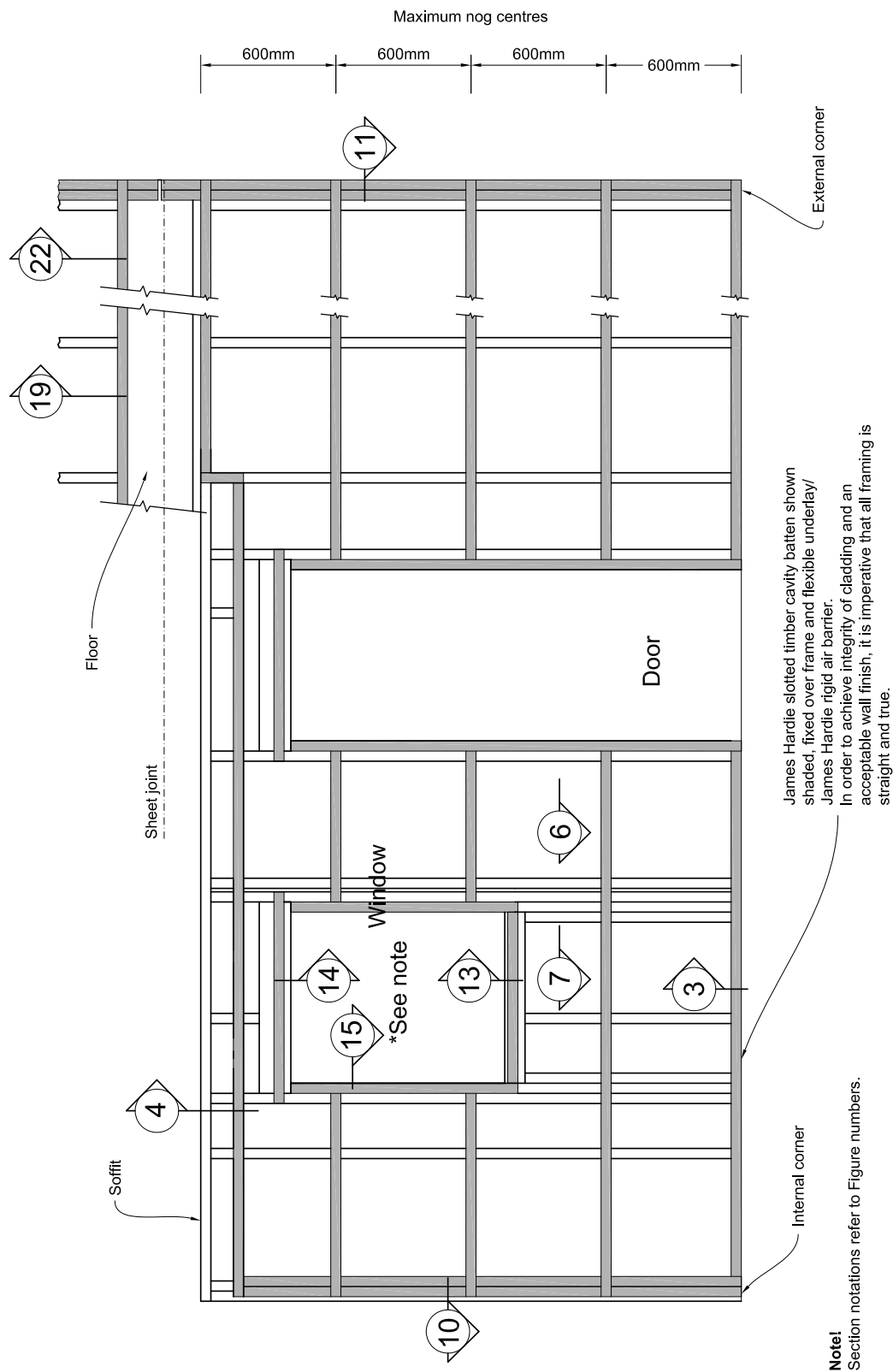
13 Details

The following generic details have been provided in this document for cavity construction methods.

Table 5

Details		
Description	Cavity Construction	
	Figure No.	Page No.
Framing set out	Figure 1	15
Cladding and James Hardie horizontal batten setout	Figure 2	16
Ground clearance	Figure 3	17
Soffit detail	Figure 4	17
No soffit detail	Figure 5	18
Vertical joint 200mm weatherboard width up to VH wind zone	Figure 6	18
Vertical joint 300mm weatherboard width up to VH wind zone	Figure 7	19
Vertical joint 200mm weatherboard width EH wind zone and SED	Figure 8	19
Vertical joint 300mm weatherboard width EH wind zone and SED	Figure 9	20
Internal corner	Figure 10	20
External aluminium box corner	Figure 11	21
External box corner	Figure 12	21
Window sill	Figure 13	22
Window head	Figure 14	22
Window jamb	Figure 15	23
Window jamb flashing	Figure 16	23
Over joist at floor level	Figure 17	24
Butt jointing of Vertical Linea Oblique Weatherboard	Figure 18	25
Trimline flashing joint at floor level	Figure 19	25
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Trimline joint	Figure 21	27
Drained flashing joint at floor level	Figure 22	28
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Parapet flashing	Figure 25	30
Roof to wall junction detail	Figure 26	31
Meter box at sill	Figure 27	31
Meter box at jamb	Figure 28	32
Meter box at head	Figure 29	32
Enclosed deck	Figure 30	33
Pipe penetration	Figure 31	34
Cladding installed	Figure 32	35
Garage head	Figure 33	36
Garage jamb	Figure 34	36

Figure 1: Framing set out



WALL ELEVATION